

# **A1 in Northumberland: Morpeth to Ellingham**

**Scheme Number: TR010059**

## **6.8 Environmental Statement Appendix 10.4 - Drainage Strategy Report Part B (Tracked)**

Rule 8(1)(c)

Planning Act 2008

Infrastructure Planning (Examination Procedure) Rules 2010

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning  
(Examination Procedure) Rules  
2010**

**The A1 in Northumberland: Morpeth to  
Ellingham**

Development Consent Order 20[xx]

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**Environmental Statement Appendix 10.4 -  
Drainage Strategy Report Part B (Tracked)**

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## **APPENDICES**

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#### HYDRAULIC MODEL

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APPENDIX B

DRAINAGE STRATEGY LAYOUT DRAWINGS

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RELEVANT CORRESPONDENCE

APPENDIX A

HYDRAULIC MODEL

APPENDIX B

DRAINAGE STRATEGY LAYOUT DRAWINGS

APPENDIX C

RELEVANT CORRESPONDENCE

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## 1. INTRODUCTION

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### 1.1. PURPOSE OF THIS DOCUMENT

- 1.1.1. This Drainage Design Strategy (this Strategy) has been produced to support the Environmental Statement (ES) and Development Consent Order (DCO) application for the A1 in Northumberland: Alnwick to Ellingham (Part B). It includes a review of the Options Selection stage drainage proposals and baseline information currently available.
- 1.1.2. Part B would include approximately 8 km of online widening to the east of the A1 existing carriageway between Alnwick and Ellingham in the county of Northumberland. Further details about the location of Part B can be found on the **Location Plan (Application Document Reference: TR010041/APP/2.1)**. A detailed description of Part B can be found in **Chapter 2: The Scheme, Volume 1** of this ES (**Application Document Reference: TR010041/APP/6.1**).
- 1.1.3. A Flood Risk Assessment (FRA) has been undertaken for Part B, which can be found at **Appendix 10.1** of this ES.
- 1.1.4. The current design proposal would increase the impermeable area coverage and as such this Strategy sets out how Part B would manage the increased surface water runoff. The currently available baseline flood risk data has been considered in the siting of drainage infrastructure.
- 1.1.5. The Strategy has been produced in accordance with the Design Manual for Roads and Bridges (DMRB) Volumes 4, 6 and 11 as well as other relevant standards as agreed through consultation with the Environment Agency and Northumberland County Council (NCC) as both the local highway authority and Lead Local Flood Authority (LLFA).

### 1.2. CONSULTATION

- 1.2.1. Consultation has been undertaken with the following key stakeholders :  
**LEAD LOCAL FLOODING AUTHORITY (LLFA) - NORTHUMBERLAND COUNTY COUNCIL**
- 1.2.2. The requirements of NCC as LLFA for Part B were discussed in Morpeth on 18 July 2018. A summary of the discussions and the Applicant's response is set out in **Table 1-1** below:

**Table 1-1 - Summary of Discussion and Applicant's Response**

Summary of the Discussion	Applicant's Response
A drainage strategy is required for Part B	A drainage strategy has been compiled.
Surface water to be kept in its original (existing) catchments.	Surface water runoff from the new highway has been generally been contained in their current catchments, however in one case this has not been achieved, refer to <b>Section 4.3</b>
Adherence to the Department for Environment, Food and Rural Affairs (Defra) non-statutory guidance for sustainable drainage with regards to the surface water drainage scheme	This was done.
The allowable discharge rate to be restricted to the existing greenfield runoff rate for the 1 in 1 year and 1 in 30 year events, and that attenuation is provided for the 1 in 100 year plus climate change event	This was done.
An additional allowance for urban creep is not required.	Noted
NCC requires SuDS measures to be included within the drainage proposals.	This was done.
In addition to the Defra non-statutory guidance for sustainable drainage it is also advisable that the best practice in the Local Authority SuDS Officer Organisation (LASOO) document: Non-statutory Technical Standards for Sustainable Drainage Practice Guidance is followed	This was done.
The drainage of any new highways that would be adopted by NCC should be separated from the Applicant's drainage infrastructure	The drainage for these sections of highway have been identified and should be on a separate network.

- 1.2.3. Additional consultation was undertaken in February 2021 during the DCO process. Further to discussions with NCC as the Local Highway Authority, East Linkhall Road is to be widened to a two lane carriageway.
- 1.2.4. The LLFA advised that the “highways engineers would not be prepared to accept the roads in Part B (Rock South, East Linkhall Access Road, West Linkhall Access Road) discharging directly onto adjacent land without filter drains or ditches to take the flow to an outfall.” As a result, the below arrangements have been agreed with the LLFA.
- 1.2.5. West Linkhall Road is to use the existing A1 drainage network.
- 1.2.6. East Linkhall Road has proposed carriageway drainage consisting of filter drains to each side of the carriageway which discharge to a watercourse via a detention basin.
- 1.2.7. The proposal for the Rock South Farm Road is a combination of filter drains, surface water channels (ditches) and over the edge drainage to infiltration trenches. the location of these drainage assets is discussed in Section 4.4~~as per the original Application.~~

Field Code Changed

**LOCAL HIGHWAY AUTHORITY - NORTHUMBERLAND COUNTY COUNCIL (NCC)**

- 1.2.8. Consultation with NCC as the local highway authority took place in Morpeth on 18 July 2018. A summary of the discussions and the Applicant’s response is set out in **Table 1-2** below:

**Table 1-2 - Summary of Discussion and Applicant’s Response**

Summary of the Discussion	Applicant’s Response
NCC policy relating to the separation of trunk highway drainage and local highway drainage requires that in cases where the drainage systems cannot be separated to resort to a Memorandum of Understanding to set out the responsibilities of both parties for the operation and maintenance of the shared assets.	This was done.

Additional discussions regarding the East Linkhall Road, West Linkhall Road and Rock South Farm Road are referred to in section 1.2.2.

**NATURAL ENGLAND**

- 1.2.9. Consultation with Natural England took place in Newcastle on 17 October 2017. A summary of the discussions and the Applicant’s response is set out in **Table 1-3** below.

**Table 1-3 - Summary of Discussion and Applicant's Response**

Summary of the Discussion	Applicant's Response
Natural England stated that the central reservation should not be grassed to avoid use by barn owls.	Part B has been updated to comply with the Natural England's request.

**ENVIRONMENT AGENCY**

1.2.10. Consultation with the Environment Agency took place in Newcastle on 9 January 2018. A summary of the discussions and the Applicant's response is set out **Table 1-4** below.

**Table 1-4 - Summary of Discussion and Applicant's Response**

Summary of the Discussion	Applicant's Response
Where outfalls are proposed into existing EA Main Rivers, the runoff rates are to be limited to greenfield values. SuDS features are to be located outside of Flood Zones 2 and 3.	Part B has been updated to comply with the Environment Agency's request.

## 2. BASELINE INFORMATION

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### 2.1. EXISTING HIGHWAY DRAINAGE

- 2.1.1. The preliminary appraisal of the existing highway drainage included below is based upon Highways Agency Drainage Data Management System (HADDMS), Technical information about location and condition of drainage infrastructure on the network) data and supplemented by site visit undertaken in February 2019 and Google Maps observations.
- 2.1.2. A review of the currently available data is presented below.

#### GENERAL

- 2.1.3. The HADDMS data indicates that the highway drainage runs on both verges with pipes varying from 150 mm to 450 mm in diameter.
- 2.1.4. The HADDMS data is incomplete but it appears that the surface water drainage network discharges to ditches and watercourses.
- 2.1.5. There are a number of existing roads, tracks, Private Means of Access (PMAs), and other rights-of-way which would be affected by Part B. In general, drainage from these appear to discharge primarily to existing ditches/watercourses via informal verge drainage. The existing drainage systems in these areas would be retained and would not be impacted by the proposed works.

### 2.2. EXISTING TOPOGRAPHY AND GROUND INVESTIGATIONS

- 2.2.1. Topographic surveys have been carried out in December 2017 on the areas affected by the drainage design.
- 2.2.2. Ground Investigations have been carried out from July 2018 until January 2019. A **Ground Investigation Report** can be found at **Appendix 11.4** of this ES. In general, there is a trial pit in the areas where detention basins are proposed.

### 2.3. ENVIRONMENT AGENCY MAIN RIVERS

- 2.3.1. A review of the Environment Agency Main River map website has confirmed that no Main Rivers cross or are adjacent to the Order Limits of Part B.

### 2.4. FLOOD RISK

- 2.4.1. Flood Risk maps from the Environment Agency and data from HADDMS has been used to identify areas of flood risk along Part B.
- 2.4.2. The majority of the Order Limits of Part B is located in Flood Zone 1. However, there is a section of the highway to the south of Part B, near Denwick that passes through/across Flood Zones 2 and 3.
- 2.4.3. HADDMS identifies two localised areas of shallow surface water flood risk along the existing A1 around Charlton Mires. Where information is available on one of the incidents, Highways



England that the flooding was caused by blocked gullies on the A1 but investigation showed that the gullies were clear.

- 2.4.4. An FRA has been completed can be found at **Appendix 10.1: Flood Risk Assessment** of this ES.

## **2.5. GROUND INFILTRATION**

- 2.5.1. Infiltration tests showed soils of low permeability that were unsuitable for infiltration drainage solutions. Further details can be found at **Appendix 11.4: Ground Investigation Report** of this ES.

## **2.6. EXISTING SERVICES**

- 2.6.1. Existing utilities information along the route has been collated for all the major statutory bodies in this area. Significant under and over ground services and/or proposed diversions have been proposed along the route. The routes of the diversions have been considered in this Strategy.

## **2.7. LANDOWNERS**

- 2.7.1. The landowners affected by the proposed works have been contacted and the proposed works have been discussed with them. With regards to the drainage works, this has affected the proposed locations of detention basins and their relevant accesses. Further details can be found in the **Consultation Report (Application Document Reference: TR010041/APP/5.1)**.

### 3. DESIGN PARAMETERS

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#### 3.1. RETURN PERIODS

3.1.1. The highways drainage network has been designed in discussion with NCC as LLFA and the Environment Agency to the following criteria:

- a. No flooding or surcharging of the network in a 1 in 1 year storm event;
- b. No flooding in a 1 in 5 year storm event and no surcharge must exceed the chamber cover level;
- c. The 1 in 100 year event was used to determine the storage requirements so that the proposed works don't exceed the Greenfield Runoff rates.

#### 3.2. DISCHARGE LIMITS

3.2.1. In line with the Defra document '*Sustainable Drainage Systems: Non-statutory Technical Standards for Sustainable Drainage Systems*', March 2015, the following controls have been set to limit the discharge from the new works and to determine the storage volume required. The base greenfield runoff rates do not include any allowance for Climate Change.

##### PEAK FLOW CONTROL

- a. **S2:** For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event
- b. **S3:** For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

##### VOLUME CONTROL

- a. **S4:** Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.
- b. **S5:** Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

**c. S6:** Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

### 3.3. CLIMATE CHANGE

3.3.1. The impacts of climate change need to be taken into account when designing new drainage infrastructure.

3.3.2. In order to manage the risks associated with the long-term impacts of climate change, it was proposed that the peak rainfall intensity of the 1 in 1, 5 and 100 year rainfall events be increased by 20% in line with the DMRB HD 33/16 Design of Highway Drainage Systems. This allowance is in line with the recommendations given in the National Planning Policy Framework (NPPF) and the Environment Agency's Guidance Flood risk assessments: climate change allowances.

3.3.3. The LLFA initially requested that a climate change allowance of 40% should be used. Further to discussion with the LLFA the impact of the increase in rainfall intensities with respect to storage requirements was assessed for each of the detention options and were deemed to be satisfactory.

### 3.4. HYDRAULIC MODELLING PARAMETERS

3.4.1. Hydraulic modelling of the highways drainage network has been undertaken using the Micro Drainage software package (2016 Build). The FEH has been used to obtain rainfall parameters representative of local hydrological conditions.

3.4.2. The proposed drainage network has been modelled to determine the discharge rates for the 1 in 1 year, 1 in 5 year and 1 in 100 year storm events including climate change allowances.

3.4.3. No infiltration has been allowed for within the model reflecting the known ground conditions.

### 3.5. SURFACE WATER CHANNELS

3.5.1. Where surface water channels are proposed along Part B, they have been based on HA 37\_97 – Hydraulic Design of Road Edge Surface Water Channels. The key parameters are as outlined in **Table 3-1** below.

**Table 3-1 - Surface Water Channels**

Location of SWC	Drain Type	Design Return Period
1 in 40 crossfall to central reservation	1.5m Wide Surface Channel - Concrete	1 in 5 year
1 in 40 crossfall to verge	2.5m Wide Surface Channel - Concrete	1 in 5 year

## 4. PROPOSED DRAINAGE STRATEGY

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### 4.1. DESIGN ELEMENTS

- 4.1.1. The following section details the proposed drainage design elements according to each drainage catchment and presents the key assumptions and the risks.
- 4.1.2. It is not considered feasible to re-use the existing A1 surface water drainage assets for Part B. Existing drainage assets would be abandoned and replaced by proposed ones.
- 4.1.3. Generally, filter drains, kerb and gully, combined kerb drainage and concrete surface water channels are proposed as the primary means of removing surface water runoff from the highway. They would be sited adjacent to the hardstrip at the edges of the carriageway.
- 4.1.4. To achieve the required greenfield discharge rates for the proposed network, flow control devices have been used together with detention basins as attenuation methods for Part B.
- 4.1.5. All drainage design elements proposed in this Strategy would need to be reviewed at detailed design stage. The HAWRAT (Highways Agency Water Risk Assessment Tool) assessments show that the proposals are acceptable. Further details can be found at **Appendix 10.3: Drainage Network Water Quality Assessment** of this ES.
- 4.1.6. The Drainage Strategy Layout drawings at **Appendix B** of this Strategy have been prepared to support the DCO application and provide details of the proposed drainage layout and storage locations required for Part B.
- 4.1.7. The proposed drainage strategy is summarised as follows:
- a. Runoff from Part B would be discharged into the existing watercourses via storage detention basins where required.
  - b. Drainage discharge from highways remaining part of the local road network would be kept separate from discharge associated with Part B as agreed with NCC as LLFA.
  - c. Maintenance of trunk and local drainage assets would be subject to a 'Statement of Common Ground' between the Applicant and NCC.
  - d. Roads/tracks which are not to be incorporated as access roads to the new trunk road system, are assumed to be abandoned/truncated, and would continue to drain as existing. All existing watercourses crossing Part B, to which these roads/tracks may drain, would be maintained using culverts or other means.
  - e. Locations of detention features were agreed with NCC and the Environment Agency.
  - f. Allowable runoff rates would be restricted to the existing greenfield runoff values for the equivalent storm event.
  - g. Highway drainage is designed to accommodate a 1 in 1-year design flow without surcharging; and a 1 in 5 year flow without surface flooding of the running carriageways (with a 20% allowance for climate change).
  - h. Attenuation controls would be provided for the 1 in 1, 30 and 100-year events plus climate change.

- i. Where detention basins would be used for attenuation these would be located outside of Flood Zone 2 and 3 areas.
- j. Online controls would be provided to restrict discharges to allowable values.
- k. It is assumed that any new local access tracks, bridleways and PMAs would be drained to local land drains and watercourses.
- l. Runoff from the running lanes and hardstrips would follow the road camber to both channels, and the central reservation where there is a crossfall.
- m. Runoff to the central reservation would be to concrete V-channels.
- n. Where the highway would be within a cutting the runoff from the cutting would be to the single filter drain at either side of the highway.
- o. Where the highway would be within a cutting it is proposed that the field runoff would be taken by a cut-off ditch at the top of the cutting slope and would discharge through private ditches, etc. and would not contribute to the highway drainage network.
- p. Where the highway would be on an embankment it is proposed that the embankment runoff would be collected in a ditch at the bottom of the embankment and would be conveyed to the local ditches and watercourses.
- q. Where the highway would be on an embankment it is proposed that the field runoff would be taken by a drainage ditch to be built within the field and connected to local ditches and watercourses.
- r. Whilst runoff from the adjacent land has been considered and accounted for, there is no allowance for land drainage networks. Through discussions, no landowner has advised of the presence of any land drainage that would be affected by the works. If land drainage networks are uncovered during the detail design/construction works they would need to be addressed.
- s. As there is a requirement (further to the HAWRAT assessment) to provide treatment prior to discharge to many of the watercourses, a permanent wet shallow area would be required in the detention basins. The size and depth of this permanently wetted area is envisaged to be a small part of the overall basins, and this would be confirmed in the detailed design.
- t. The design strategy for each distinct drainage area is summarised in **Section 4.3** of this Strategy. The first set of tabled data is the calculated runoff figures for each distinct catchment. The second set of tabled data is the available data relating to each detention basin (data is displayed in metres Above Ordnance Datum (mAOD)).

## 4.2. DESIGN STRATEGY RISKS AND ASSUMPTIONS

### RISKS

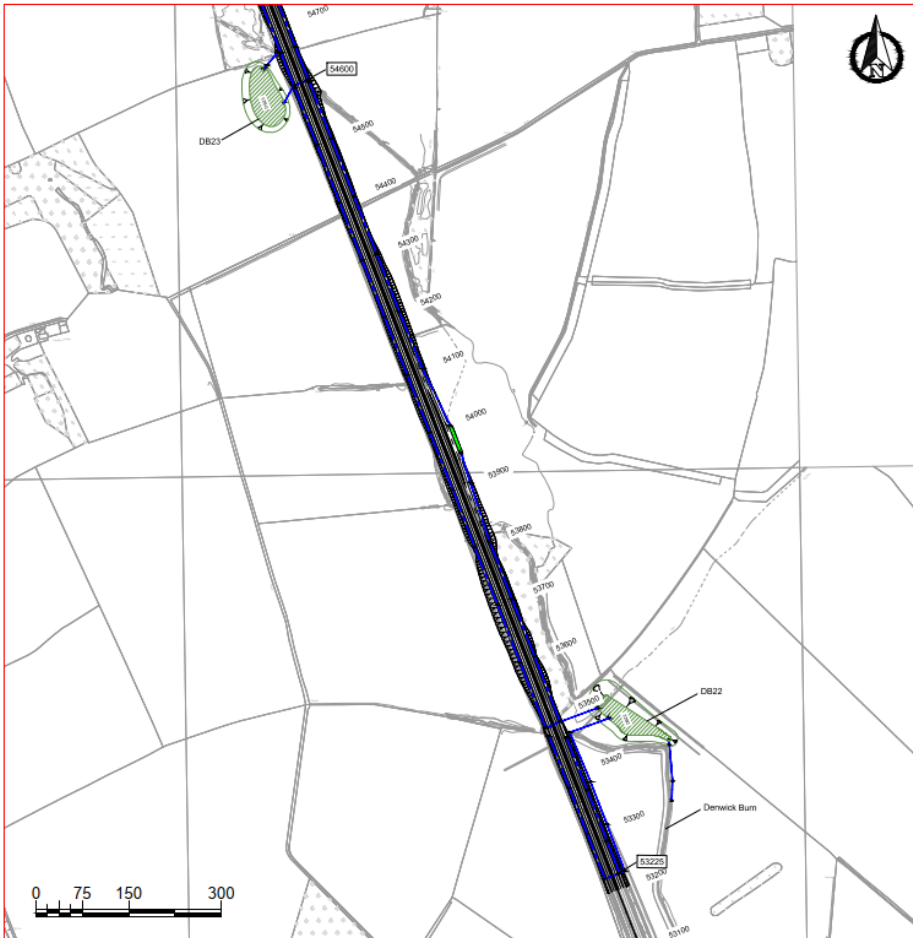
- a. The geotechnical data used was gathered during the design process primarily along the road corridor, specific Ground Investigation was undertaken at the sites of each of the detention basins. There remains 3 locations where there is limited GI information, these are discussed below.
- b. Unknown underground utilities may be present.

#### **ASSUMPTIONS**

- a.** Runoff from the running lanes and hardstrips would follow the road camber to both channels unless indicated otherwise.
- b.** Central reservations, hardstrips, and verges would be continuous across underbridges and across overbridges unless otherwise indicated.
- c.** Detention basins have generally been proposed with a storage depth of 500 mm. This would be to limit the extent of excavation due to the expected high groundwater levels and to improve the opportunities to connect to the watercourses.
- d.** Detention basins would be lined.
- e.** In cases where the detention basins are set in deep excavations the upper slopes of the basins would require some form of land drainage to ensure that the runoff from the slopes does not discharge directly to the flow control structure.
- f.** Where there are high water tables, the detention solutions would be designed to mitigate the impact of the groundwater, by providing specific drainage for the side slopes above the storage depth.
- g.** Runoff directly to existing ground would be minimal due to the nature of the existing ground. Alluvial clay is understood to overlay the catchment to a depth of up to 20 m.
- h.** It is not considered feasible to re-use the existing A1 drainage for Part B.

### 4.3. DESIGN STRATEGY BY CHAINAGE

4.3.1. Chainage 53225 to 54600 see **Figure 4-1** below.



**Figure 4-1 - Highway Drainage Layout and Detention Basin DB22**

#### **PRELIMINARY DESIGN STRATEGY:**

- a. The majority of this section drains to the verges. Run-off from the carriageway would be collected in filter drains located within northbound and southbound verges. Kerb and Gully drainage is proposed at the layby at Ch53950. As the Denwick Burn crosses the A1

at Ch53480 it was not possible to have the highway drainage cross over it, hence two drainage networks are required for this section.

- b. Detention basin DB22 would be located on the east of the carriageway north of Denwick Burn and would collect run-off from the A1 and the grass embankments where applicable. Controlled discharge from detention basin DB22 would outfall to Denwick Burn.

**Table 4-1 - Run-off Data**

<b>Chainage 53225 to Chainage 54600 Trunk Road Drainage</b>	
1 in 1 year return period greenfield run-off rate (l/s)	15.0
1 in 30 year return period greenfield run-off rate (l/s)	30.6
1 in 100 year return period greenfield run-off rate (l/s)	36.2
1 in 100 year return period +CC design storage volume (m <sup>3</sup> )	1550

**Table 4-2 - Detention Basin DB22 Data**

<b>Detention Basin DB22 – Trunk Road Drainage</b>			
Chainage	53450	Proposed Detention Basin Inlet Invert Levels (mAOD)	57.200 57.113
Proposed Detention Basin Outlet Invert Level (mAOD)	57.056	Watercourse Invert Level (mAOD)	57.09
Discharge Watercourse		Denwick Burn	

**DESIGN RISKS**

- a. There is no geotechnical information in the area of the detention basin.

4.3.2. Chainage 54600 to 56010 see **Figure 4-2** below.





**Figure 4-2 - Highway Drainage Layout and Detention Basin DB23**

**PRELIMINARY DESIGN STRATEGY:**

- a. The majority of this section drains to the verges. Run-off from the carriageway would be collected in filter drains located within northbound and southbound verges. Kerb and Gully drainage is proposed at the layby at Ch55150.
- b. Detention basin DB23 would be located west of the carriageway at approximately 500 m from the crossing of the B6341 and Hinding Lane. The detention basin would collect run-off from the new A1 and the grass embankments where applicable. The runoff from the Heckley Fence crossing at Ch55300 would discharge to the surrounding land as existing.

Controlled discharge from detention basin DB23 would outfall to Denwick Burn on the east side of the carriageway.

**Table 4-3 - Run-off Data**

<b>Chainage 54600 to Chainage 56010</b>	
1 in 1 year return period greenfield run-off rate (l/s)	15.1
1 in 30 year return period greenfield run-off rate (l/s)	30.9
1 in 100 year return period greenfield run-off rate (l/s)	36.6
1 in 100 year return period +CC design storage volume (m <sup>3</sup> )	1900

**Table 4-4 - Detention Basin DB23 Data**

<b>Detention Basin DB23 – Trunk Road Drainage</b>			
Chainage	54600	Proposed Detention Basin Inlet Invert Level (mAOD)	84.95
Proposed Detention Basin Outlet Invert Level (mAOD)	84.45	Watercourse Invert Level (mAOD)	84.31
Discharge Watercourse		Denwick Burn	

**DESIGN RISKS**

- a. There is limited geotechnical information, in the form of a single 1.5 m deep trial pit, in the area of the detention basin.

4.3.3. Chainage 56010 to 58210 see **Figure 4-3** below.



Figure 4-3 - Highway Drainage Layout and Detention Basin DB24

**PRELIMINARY DESIGN STRATEGY:**

- a. The whole of this section drains to the verges. Run-off from the carriageway would be collected in filter drains located within northbound and southbound verges. Kerb and Gully drainage is proposed at the laybys at Ch57100 and Ch57620.
- b. Detention basin DB24 would be located west of the carriageway at chainage 57000. The detention basin would collect run-off from the new A1 only. Controlled discharge from detention basin DB24 would outfall to White House Burn on the west side of the carriageway.

**Table 4-5 - Run-off Data**

<b>Chainage 56010 to Chainage 58210 Trunk Road Drainage</b>	
1 in 1 year return period greenfield run-off rate (l/s)	25.0
1 in 30 year return period greenfield run-off rate (l/s)	51.1
1 in 100 year return period greenfield run-off rate (l/s)	60.4
1 in 100 year return period +CC design storage volume (m <sup>3</sup> )	3300

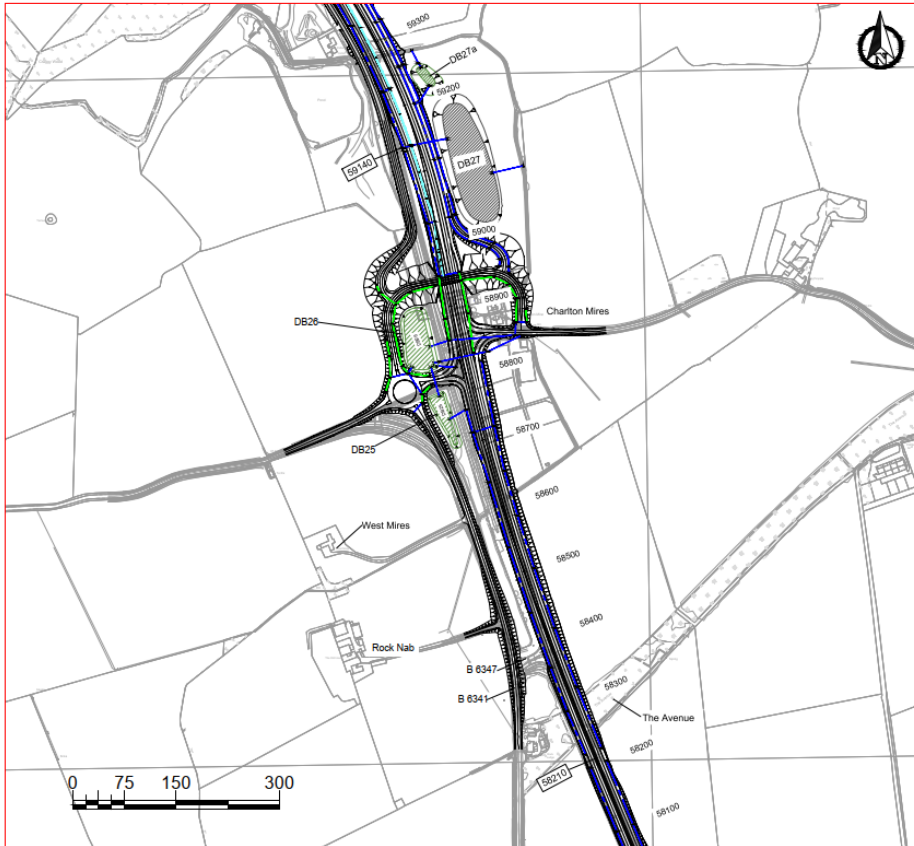
**Table 4-6 - Detention Basin DB24 Data**

<b>Detention Basin DB24 – Trunk Road Drainage</b>			
Chainage	57000	Proposed Detention Basin Inlet Invert Level (mAOD)	84.50
Proposed Detention Basin Outlet Invert Level (mAOD)	84.00	Watercourse Invert Level (mAOD)	83.61
Discharge Watercourse		White House Burn	

**DESIGN RISKS:**

- a. There is limited geotechnical information, in the form of a single 1.7 m deep trial pit, in the area of the detention basin.

4.3.4. Chainage 58210 to 59140 see **Figure 4-4** below.



**Figure 4-4 - Highway Drainage Layout and Detention Basins DB25 and DB26**

**PRELIMINARY DESIGN STRATEGY:**

- a.** Run-off from the main A1 carriageway would be collected in filter drains located in the northbound and southbound verges from the south of this section up to the new Charlton Mires junction.
- b.** North of the new Charlton Mires junction runoff would be collected in either filter drains in the verges or surface water channels in the central reservation.
- c.** At the new junction with the B6347 a network of filter drains, CKD and kerb and gully would collect the runoff. New drainage is proposed where the carriageway would be maintained by the Applicant.
- d.** The section of the B6347 that runs parallel to the A1 would be connected to the roundabout. Approximately 400 m of this section would be realigned as part of the works.

Existing drainage arrangement is over the edge and infiltration into adjacent land. No change to the existing drainage arrangement is envisaged on this section and drainage should be as existing.

- e. The volume of runoff to be stored would be split in two locations, detention basins DB25 and DB26. The two detentions basins would be located between the main A1 carriageway and the western roundabout. The basins would be connected under the carriageway from the roundabout to the A1.
- f. Runoff would be discharged to the unnamed burn to the east of the A1.

**Table 4-7 - Run-off Data**

<b>Chainage 58210 to Chainage 59140 Trunk Road Drainage</b>	
1 in 1 year return period greenfield run-off rate (l/s)	14.3
1 in 30 year return period greenfield run-off rate (l/s)	29.2
1 in 100 year return period greenfield run-off rate (l/s)	34.6
1 in 100 year return period +CC design storage volume (m <sup>3</sup> )	850

**Table 4-8 - Detention Basin DB25 Data**

<b>Detention Basin DB25 – Trunk Road Drainage</b>			
Chainage	58750	Proposed Detention Basin Inlet Invert Level (mAOD)	86.008
Proposed Detention Basin Outlet Invert Level (mAOD)	85.5	Watercourse Invert Level (mAOD)	85.186
Discharge Watercourse		Unnamed Tributary of Kittycarter Burn	

**Table 4-9 - Detention Basin Data**

<b>Detention Basin DB26 – Trunk Road Drainage</b>			
Chainage	58850	Proposed Detention Basin Inlet Invert Level (mAOD)	85.4
Proposed Detention Basin Outlet Invert Level (mAOD)	85.4	Watercourse Invert Level (mAOD)	85.186
Discharge Watercourse		Unnamed Tributary of Kittycarter Burn	

**DESIGN RISKS:**

a. There is no specific geotechnical information in the area of the detention basins.

4.3.5. Chainage 59140 to 61100 see **Figure 4-5** below.

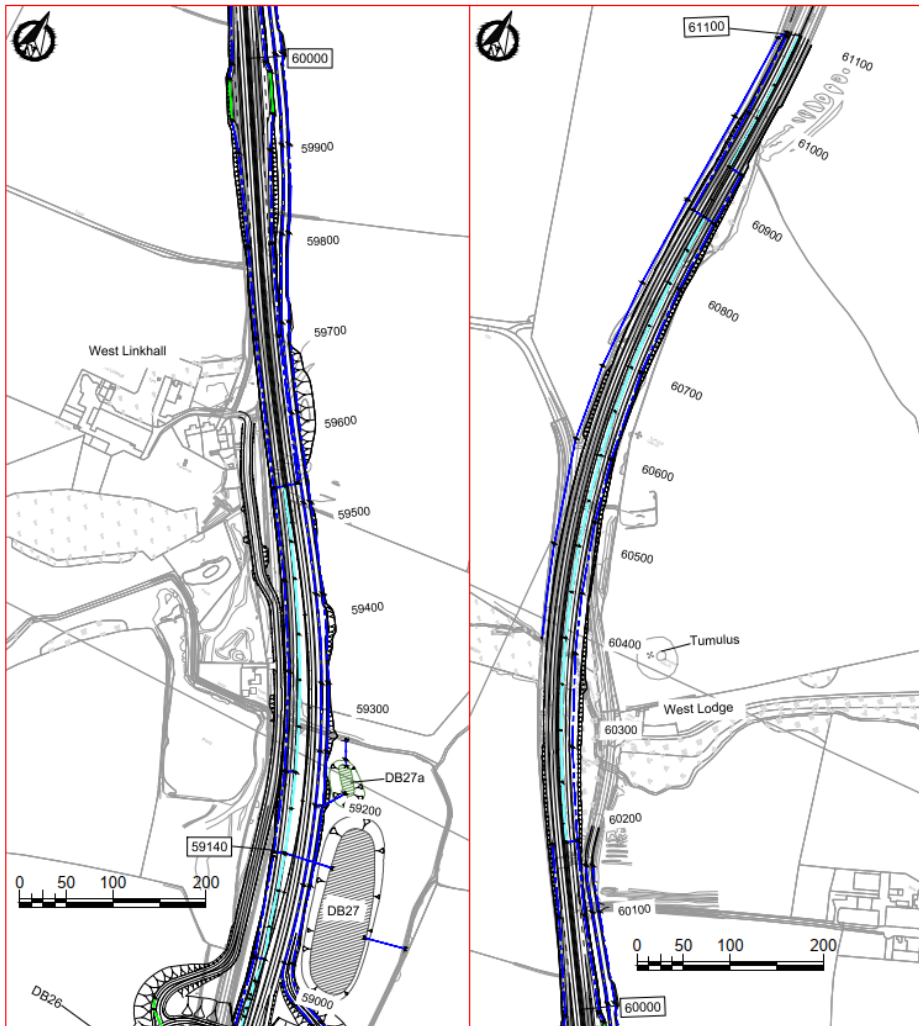


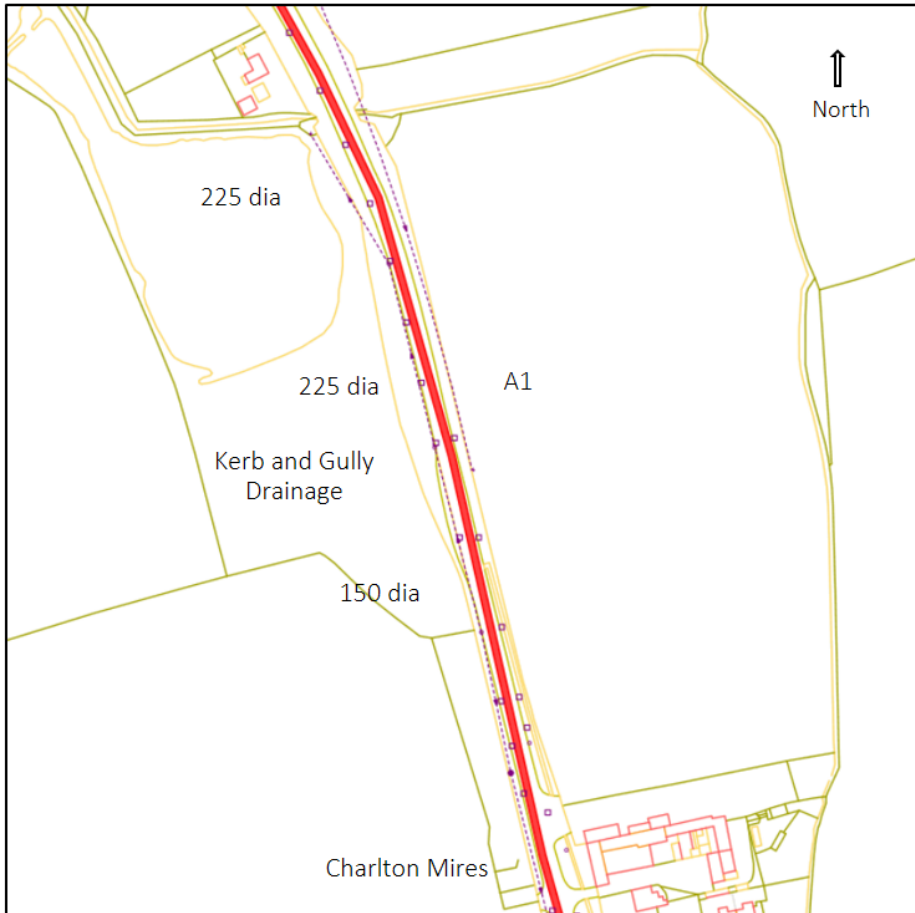
Figure 4-5 - Highway Drainage Layout and Detention Basin DB27 and DB27a

**PRELIMINARY DESIGN STRATEGY:**

- a. The runoff from the main A1 carriageway would be collected in either filter drains in the verges or surface water channels in the central reservation. Kerb and Gully drainage is proposed at the laybys at Ch59960 on both lanes.



- b.** Detention basin DB27 would be located to the east of the carriageway to the north of Charlton Mires junction. Controlled discharge would be to the unnamed ditch to the east which then connects to Kittycarter Burn.
- c.** As there was no suitable area to construct a detention basin at Shipperton Burn the runoff from this catchment would be taken to the next available catchment. This proposal was discussed and agreed with NCC as the LLFA. The LLFA advised that the greenfield runoff rate to be applied here was to be based on the current area that drains to the Kittycarter Burn.
- d.** To the north of the works, the new carriageway would be constructed over the existing network. It is proposed that the existing highway drainage is reconnected to Shipperton Burn by a new drainage run. This run would be built to the west of the A1 between Ch60400 and 60880.
- e.** Two new local roads would be constructed in this area, they are the East Linkhall Road and the West Linkhall Road. These two roads would become the responsibility of the NCC once completed. The East Linkhall Road is to be a two lane road and this necessitates a positive drainage system, the proposed filter drain network is to connect to detention basin DB27a prior to controlled discharge to the tributary of the Kittycarter Burn. It is proposed that the West Linkhall Road, which would be constructed generally on the line of the existing A1 northbound lane, would be drained using the existing A1 drainage system, refer to **Figure 4-6** below.



**Figure 4-6 - West Linkhall Road Proposal to use A1 Drainage Network**

**Table 4-10 - Run-off Data**

<b>Chainage 59140 to Chainage 61100 Trunk Road Drainage</b>	
1 in 1 year return period greenfield run-off rate (l/s)	12.7
1 in 30 year return period greenfield run-off rate (l/s)	26.0
1 in 100 year return period greenfield run-off rate (l/s)	30.8
1 in 100 year return period +CC design storage volume (m <sup>3</sup> )	3600

**Table 4-11 - Detention Basin DB27 Data**

<b>Detention Basin DB27 – Trunk Road Drainage</b>			
Chainage	59100	Proposed Detention Basin Inlet Invert Level (mAOD)	85.50
Proposed Detention Basin Outlet Invert Level (mAOD)	85.00	Watercourse Invert Level (mAOD)	84.8
Discharge Watercourse		Unnamed Tributary of Kittycarter Burn	

**Table 4-12 - Run-off Data**

<b>Chainage 59140 to Chainage 61100 East Linkhall Road Drainage</b>	
1 in 1 year return period greenfield run-off rate (l/s)	4.1
1 in 30 year return period greenfield run-off rate (l/s)	8.3
1 in 100 year return period greenfield run-off rate (l/s)	9.8
1 in 100 year return period +CC design storage volume (m <sup>3</sup> )	500

**Table 4-13 - Detention Basin DB27a Data**

<b>Detention Basin DB27a – East Linkhall Road Drainage</b>			
Chainage	59220	Proposed Detention Basin Inlet Invert Level (mAOD)	85.50
Proposed Detention Basin Outlet Invert Level (mAOD)	85.20	Watercourse Invert Level (mAOD)	84.00
Discharge Watercourse		Unnamed Tributary of Kittycarter Burn	

**DESIGN RISKS:**

a. There is limited geotechnical information in the area of the detention basin, it is noted that the trial pit terminated at 1.7 m where water was struck.

**4.4. NON-TRUNK NETWORK & SIDE ROADS**

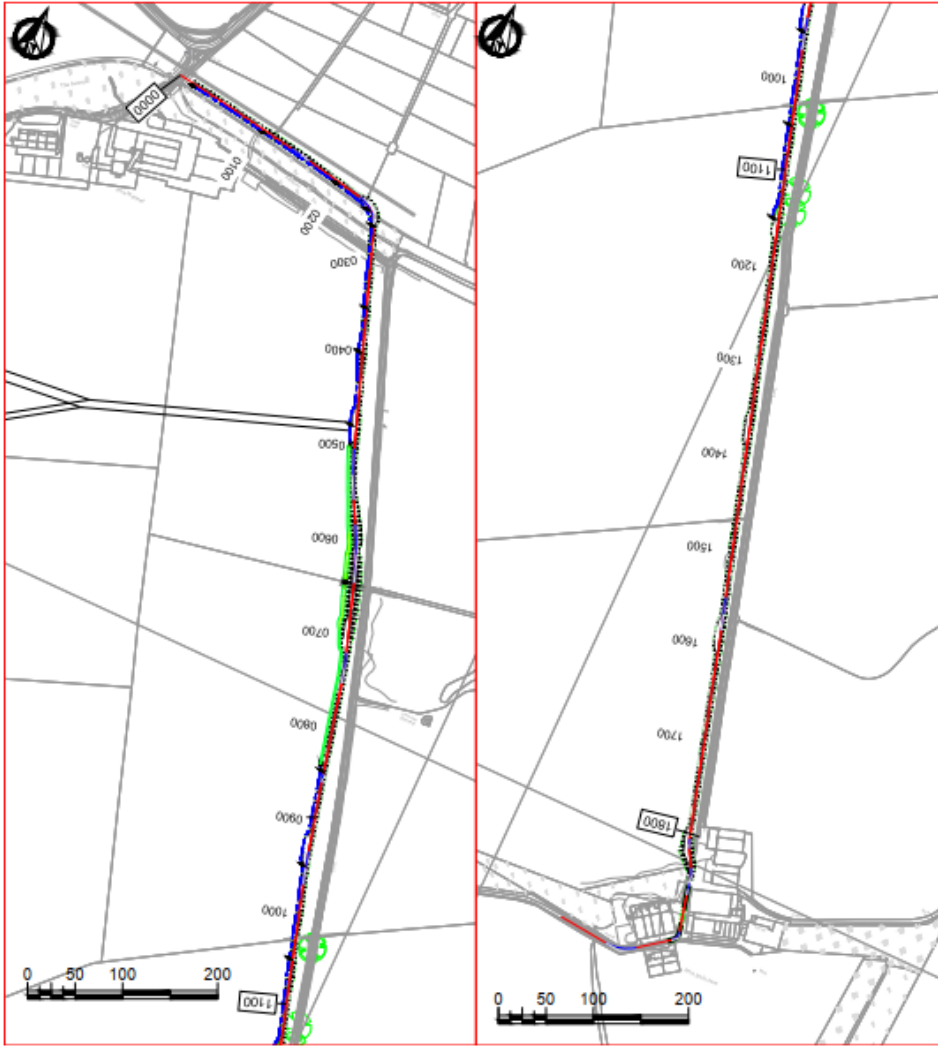
4.4.1. Maintenance boundaries at junctions have been agreed in principal between the Applicant and NCC as the local highway authority. The drainage networks associated with access roads, local tracks and local roads that would be constructed as part of Part B beyond the Applicant’s maintenance boundary extents, would not become part of the trunk road drainage network. These areas of non-trunk carriageway construction would be drained separately from the trunk road.

4.4.2. The Rock South Farm development is currently connected to the A1 at Chainage 56750. However, this road is being blocked off and no access will be permitted onto the A1 here. A new NCC-maintained road, referred to as Rock South Farm Road, is to be constructed as part of the Scheme connecting the properties to the Rock Farm to the north. This will be adopted by NCC. There is to be positive drainage to this road as shown on Figure 4-7 below.

4.4.3. The road from Chainage 0 to 640 will be served by filter drains and an open ditch which will discharge into the unnamed watercourse. A flow control device will be constructed at the outfall to limit the rate of discharge and the attenuation volume will be created in the open ditch. Similarly the section from Chainage 640 to 1150 will be served by filter drains and an open ditch which will discharge into the unnamed watercourse. A flow control device will be constructed at the outfall to limit the rate of discharge and the attenuation volume will be created in the open ditch.

4.4.1.4.4. The section from Chainage 1150 to 1840 has no watercourse to connect to and is to be drained to soakaways in the form of an infiltration trench to be constructed alongside the road. The use of infiltration in this area is dependent on the soil in the area and infiltration

tests are required to determine if infiltration is feasible. Alternative positive drainage design is being investigated should site testing rule out the southern infiltration solution.



**Figure 4-7 – Rock South Farm Road**

**Table 4-14 - Run-off Data - North**

<b>Rock South Farm Road Drainage - North</b>	
1 in 100 year return period greenfield run-off rate (l/s)	5.4
1 in 100 year return period +CC design storage volume (m <sup>3</sup> )	98
Discharge Watercourse	Unnamed Watercourse

**Table 4-15 - Run-off Data - South**

<b>Rock South Farm Road Drainage - South</b>	
1 in 100 year return period greenfield run-off rate (l/s)	5.2
1 in 100 year return period +CC design storage volume (m <sup>3</sup> )	58
Discharge Watercourse	Unnamed Watercourse

## 5. OPERATION & MAINTENANCE STRATEGY

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- 5.1.1. The maintenance strategy relevant to the drainage works are outlined below.
- 5.1.2. HA 217/08 of the DMRB gives guidance on the maintenance of combined surface drains where used as a highway drainage system. No actual maintenance programme is prescribed.
- 5.1.3. For the detention basins, the maintenance requirements would be in line with the SuDS Manual (CIRIA Guide C753). This is similar to the maintenance required for grassed surface water channels (refer to DMRB HA 119/06) but would also include clearance of grilles at headwalls and removal of sediment.
- 5.1.4. The maintenance requirements for the filter drains would be the cleaning of the filter material which would be expected to be undertaken every 20 years.

## 6. SUMMARY OF PROPOSED DRAINAGE STRATEGY

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6.1.1. A summary of the Strategy for Part B is provided below.

- a. Runoff from the A1 trunk upgrade would be discharged into the existing watercourses via detention basins. In this scenario discharge rates would be limited to existing (unfactored) values.
- b. Drainage discharge from highways remaining part of the local road network would be kept separate from discharge associated with Part B as agreed with NCC as LLFA.
- c. Roads/tracks which are not to be incorporated as access roads to the new trunk road system, are assumed to be abandoned/truncated, and would continue to drain as existing. All existing watercourses crossing the proposed route, to which these roads/tracks may drain, would be maintained using culverts or other means.
- d. Locations of detention basins have been agreed with NCC, and the Environment Agency.
- e. Allowable runoff rates have been restricted to existing greenfield runoff values for the equivalent storm events i.e. the 1 in 1, 30 and 100 year return periods.
- f. Highway drainage has been designed to accommodate a 1 in 1 year design flow without surcharging; and a 1 in 5 year flow without surface flooding of the running carriageways (with a 20% allowance for climate change).
- g. Attenuation has been provided for the 1 in 100 year event plus 20% climate change.
- h. Where detention basins would be used these would be located outside of Flood Zone 2 and 3 areas.
- i. Online controls have been modelled to restrict discharges to allowable values.
- j. It is assumed that any new local access tracks, bridleways, and PMAs would be drained to local land drains and watercourses.
- k. Runoff from the running lanes and hardstrips would follow the road camber to both channels, and to central reservation where there is a crossfall.
- l. Runoff to central reservation would be to concrete surface water channels.
- m. Where the highway would be accommodated within a cutting the runoff from the cutting would be to a combined toe drain if possible.
- n. Where the highway is accommodated within a cutting the runoff from the adjacent fields would be to a drainage ditch at the edge of the field.
- o. Where the highway is on an embankment, the runoff from the embankment would be to a toe drainage ditch if possible.
- p. Where the highway would be on an embankment, the field runoff would be taken by a drainage ditch to be built at the edge of the field.
- q. Whilst runoff from the adjacent land has been considered and accounted for, there is no allowance for land drainage networks. Through discussions, no landowner has advised of the presence of any land drainage that would be affected by the works. If land drainage networks are uncovered during the detail design/construction works, they would need to be addressed.



- r. As there is a requirement (further to the HAWRAT assessment) to provide treatment prior to discharge to many of the watercourses, a permanent wet shallow area would be required in the detention basins. The size and depth of this permanently wetted area is envisaged to be a small part of the overall basins, and this would be confirmed in the detailed design.

# Appendix A

HYDRAULIC MODEL

## **APPENDIX A – HYDRAULIC MODEL**

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**APPENDIX A – HYDRAULIC MODEL IS NOT REQUIRED TO BE APPENDED TO THE  
A1 IN NORTHUMBERLAND: ALNWICK TO ELLINGHAM ENVIRONMENTAL  
STATEMENT**

# Appendix B

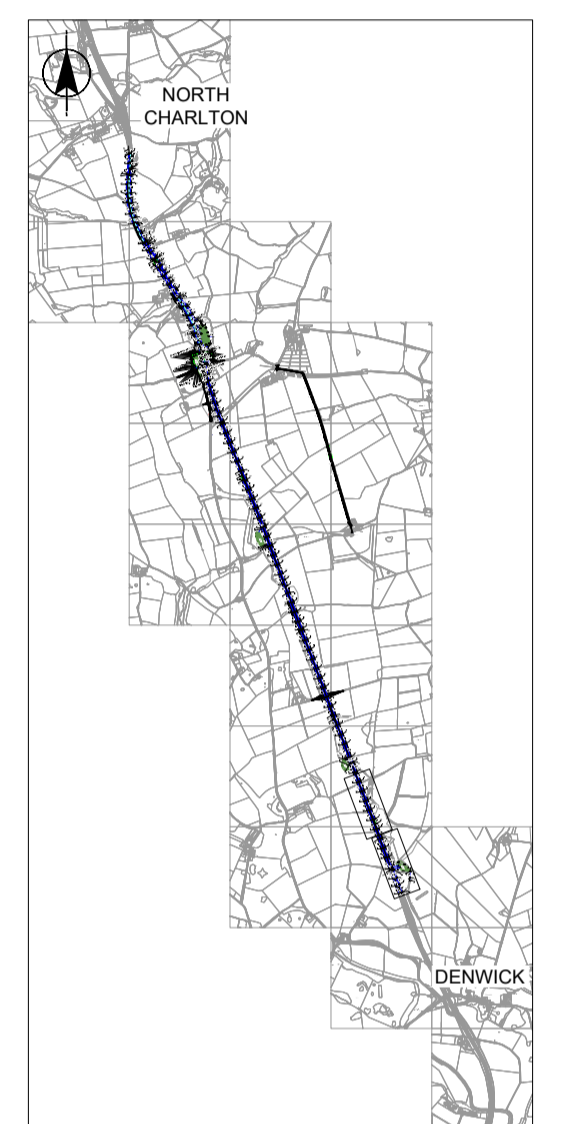
DRAINAGE STRATEGY LAYOUT  
DRAWINGS



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P02	25/06/21	REVISED SHEET NUMBERING	ZH	RS			
P01	??/??/??	FIRST ISSUE	MJC	??	??	??	

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PINS Reference Number  
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Client  
**highways england**

Project Title  
**A1 in Northumberland:  
Morpeth to Felton Scheme**

Drawing Title  
**DRAINAGE STRATEGY LAYOUT  
SHEET 1 OF 8  
REGULATION 5 (2) (o)**

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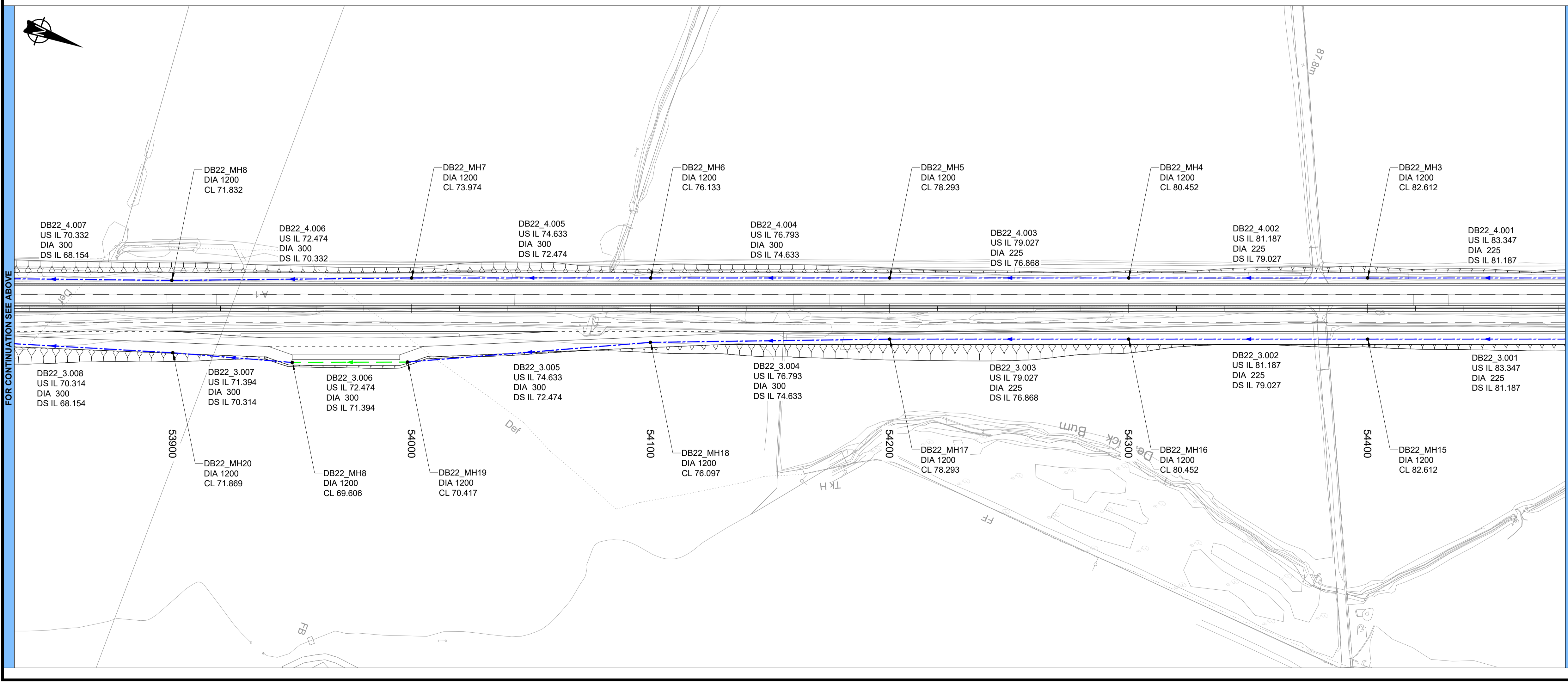
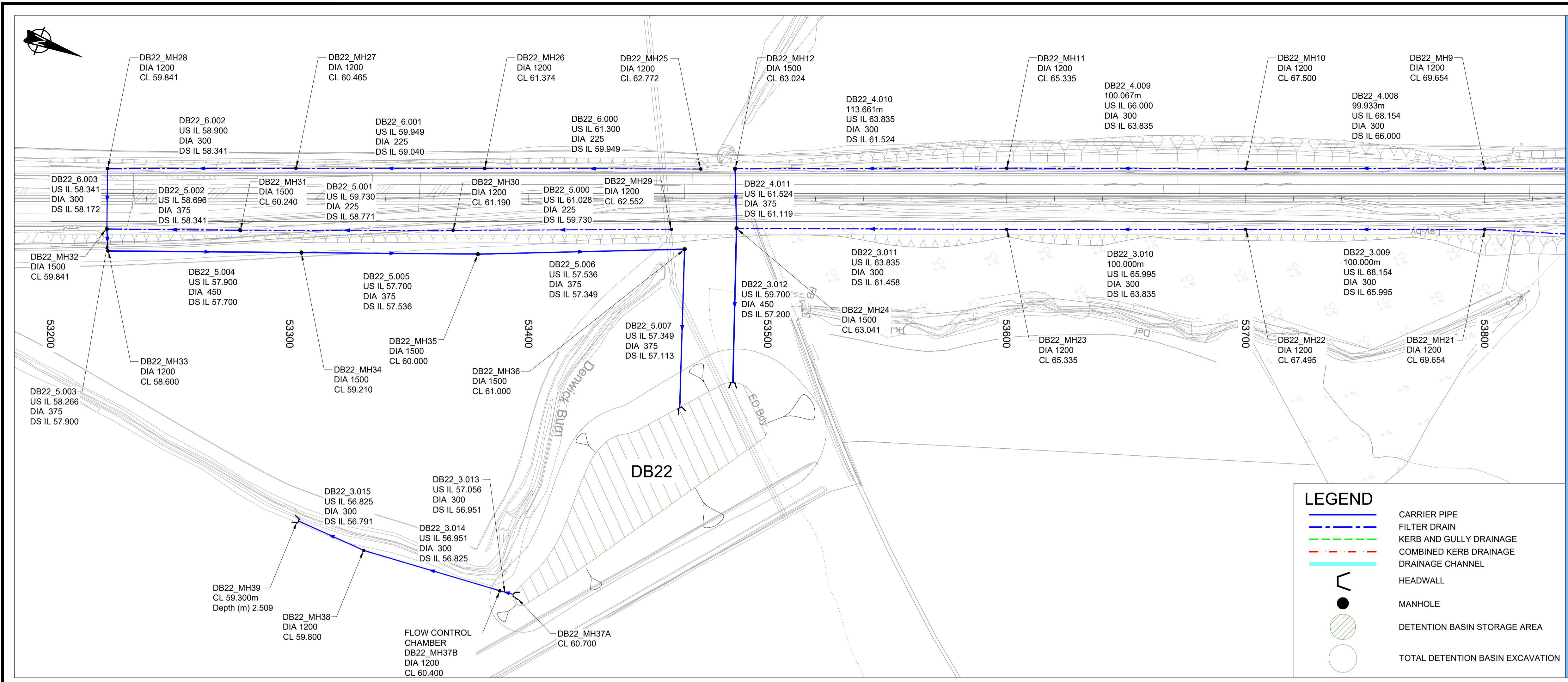
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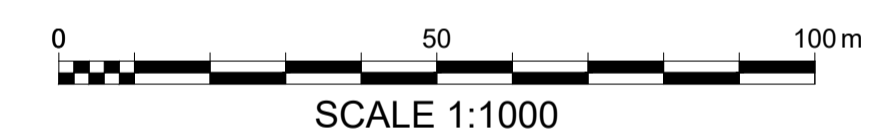
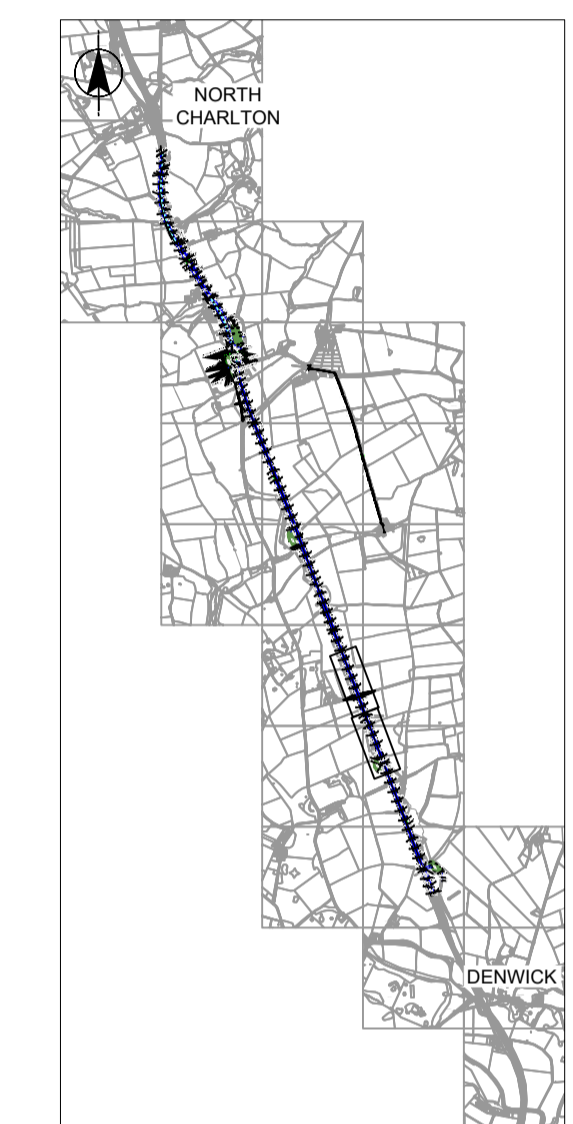




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P01	??/??/??	FIRST ISSUE	MJC	??	??	??

Substability	DCO SUBMISSION	Status	S2
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PINS Reference Number  
**TR010041**



Project Title  
**A1 in Northumberland:  
Morpeth to Felton Scheme**

Drawing Title  
**DRAINAGE STRATEGY LAYOUT  
SHEET 2 OF 8  
REGULATION 5 (2) (o)**

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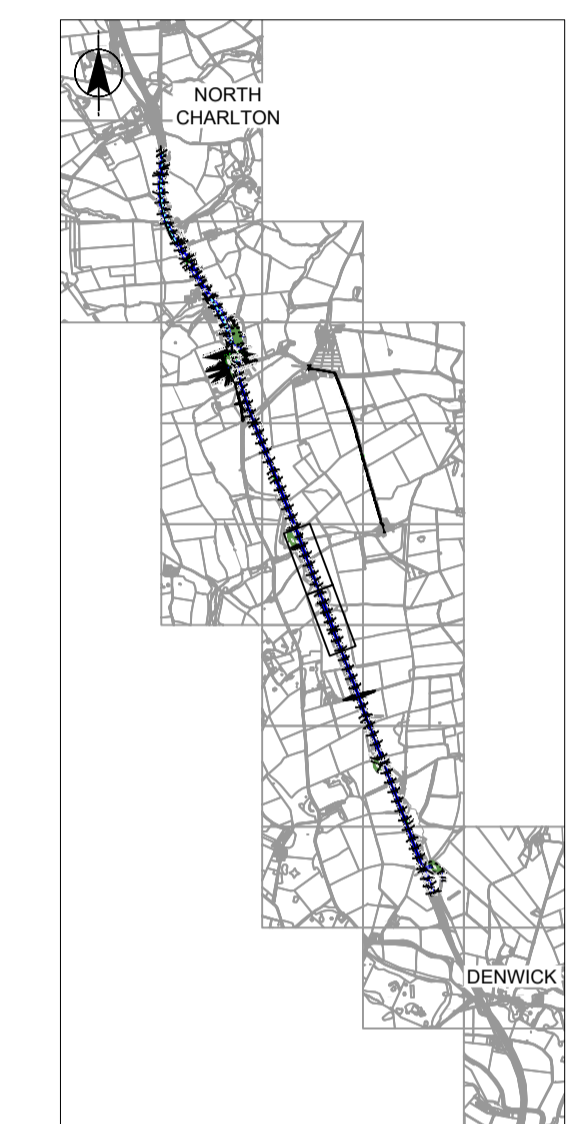
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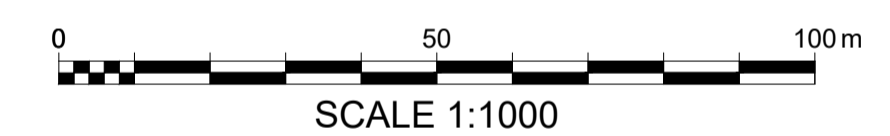
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P01	??/??/??	FIRST ISSUE	MJC	??	??	??

Submittal	DCO SUBMISSION	Status	S2
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PINS Reference Number  
**TR010041**



Project Title  
**A1 in Northumberland:  
Morpeth to Felton Scheme**

Drawing Title  
**DRAINAGE STRATEGY LAYOUT  
SHEET 3 OF 8  
REGULATION 5 (2) (o)**

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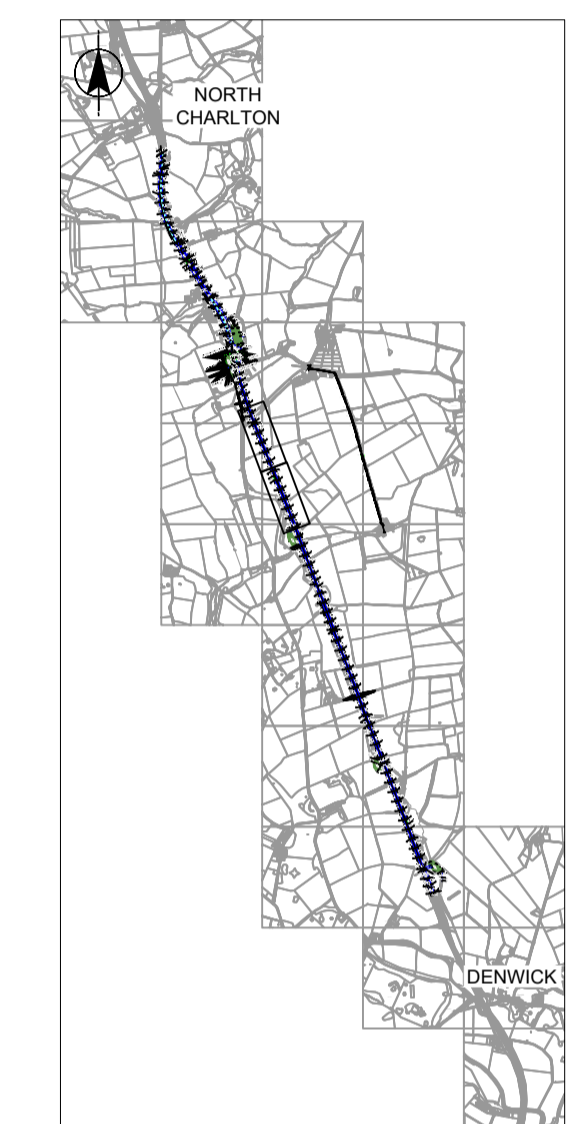
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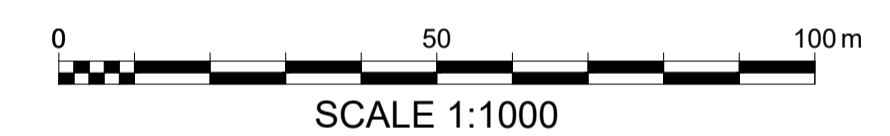
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- DITCHES ARE PROPOSED TO THE TOE OF EMBANKMENTS ON THE MAINLINE.

**DRAFT**



**KEY PLAN**  
(Scale 1:75,000)



SCALE 1:1000

Rev.	Date	Description	By	Eng' Chk	Disc' Chk	App'd
P02	25/06/21	REVISED SHEET NUMBERING	ZH	RS		
P01	??/??/??	FIRST ISSUE	MJC	??	??	??

DCO SUBMISSION S2

PINS Reference Number  
**TR010041**

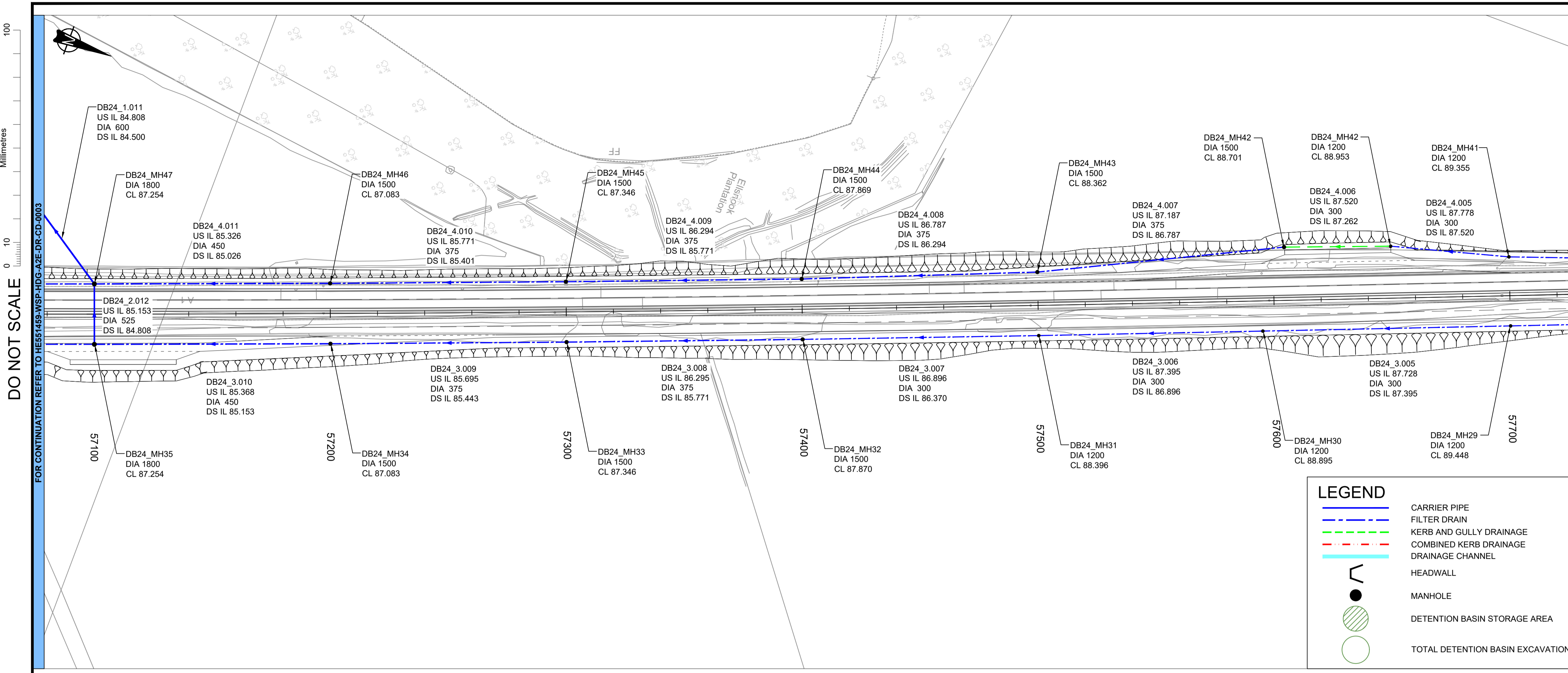
Client  
**highways england**

Project Title  
**A1 in Northumberland:  
Morpeth to Felton Scheme**

Scale	Drawn	Eng. Check	Approved	Authorised
1:1000	ZH	RS	??	??

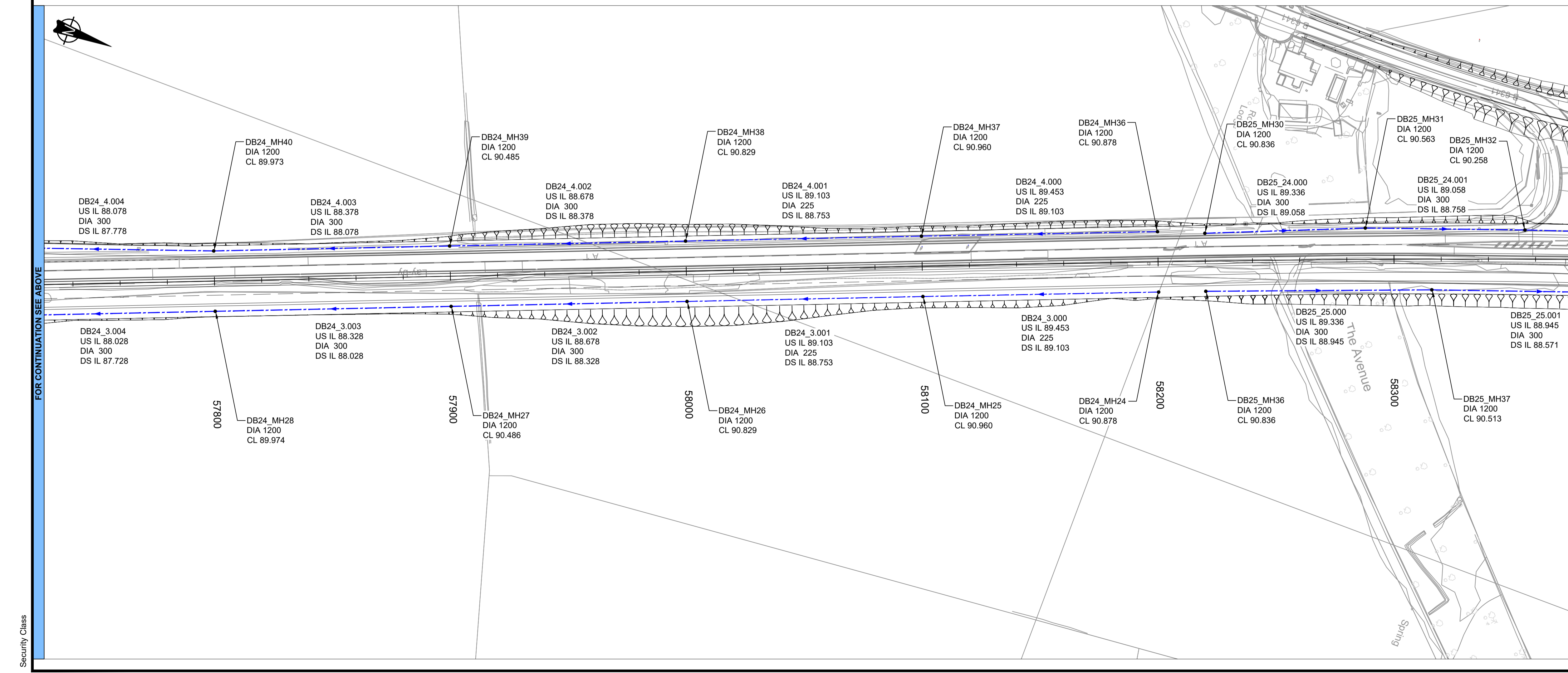
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A1	25/06/21	25/06/21	??/??/??	??/??/??

Drawing Number: **HE551459-WSP-HDG-A2E-DR-CD-0004** Revision: **P02**  
PW Stg Code: **3**



**LEGEND**

- CARRIER PIPE (Solid blue line)
- FILTER DRAIN (Dashed blue line)
- KERB AND GULLY DRAINAGE (Dashed green line)
- COMBINED KERB DRAINAGE (Dashed red line)
- DRAINAGE CHANNEL (Dashed cyan line)
- HEADWALL (Black triangle symbol)
- MANHOLE (Black circle symbol)
- DETENTION BASIN STORAGE AREA (Hatched circle symbol)
- TOTAL DETENTION BASIN EXCAVATION (Green circle symbol)



DO NOT SCALE

FOR CONTINUATION REFER TO HE551459-WSP-HDG-A2E-DR-CD-0003

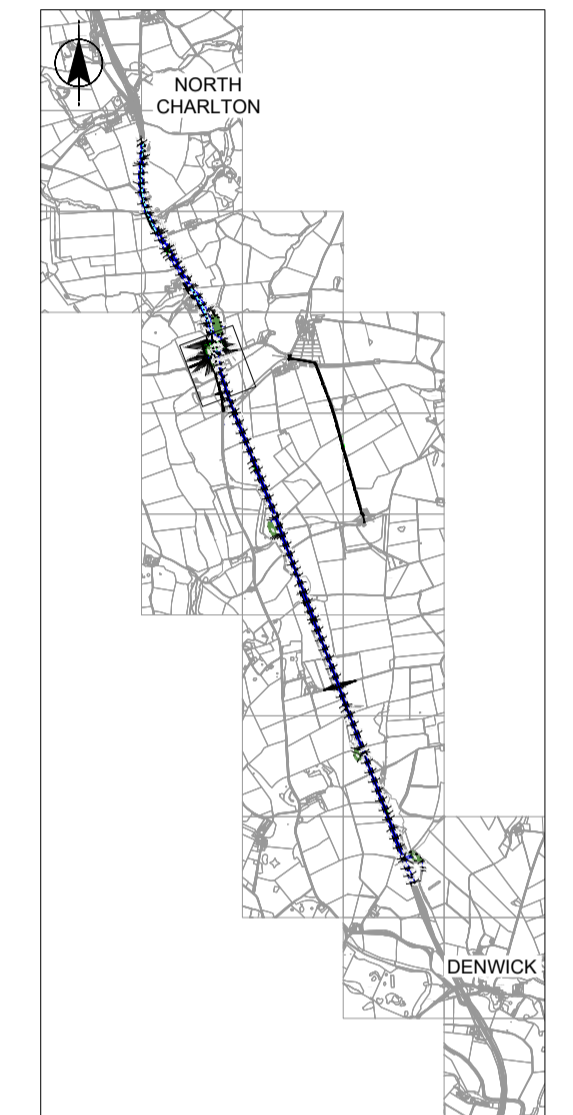
FOR CONTINUATION SEE BELOW



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KEY PLAN (Scale 1:75,000)



SCALE 1:1000

Rev.	Date	Description	By	Eng' Chk	Disc' Chk	App'd
P03	25/06/21	REVISED SHEET NUMBERING	ZH	RS		
P02	28.04.21	UPDATE TO EAST LINKHALL DRAINAGE	TR	SG	RS	??
P01	??/??/??	FIRST ISSUE	MJC	??	??	??

Subsidiarity	DCO SUBMISSION	Status	S2
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PINS Reference Number	TR010041
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Client: A1 in Northumberland: Morpeth to Felton Scheme

Drawing Title: DRAINAGE STRATEGY LAYOUT SHEET 5 OF 8 REGULATION 5 (2) (o)

Scale	1:1000	Drawn	ZH	Eng. Check	RS	Approved	??	Authorised	??
Original Size	A1	Date	25/06/21	Date	25/06/21	Date	??/??/??	Date	??/??/??

Drawing Number	HE551459-WSP-HDG-A2E-DR-CD-0005	Revision	P03
		PW Stg Code	3

DO NOT SCALE

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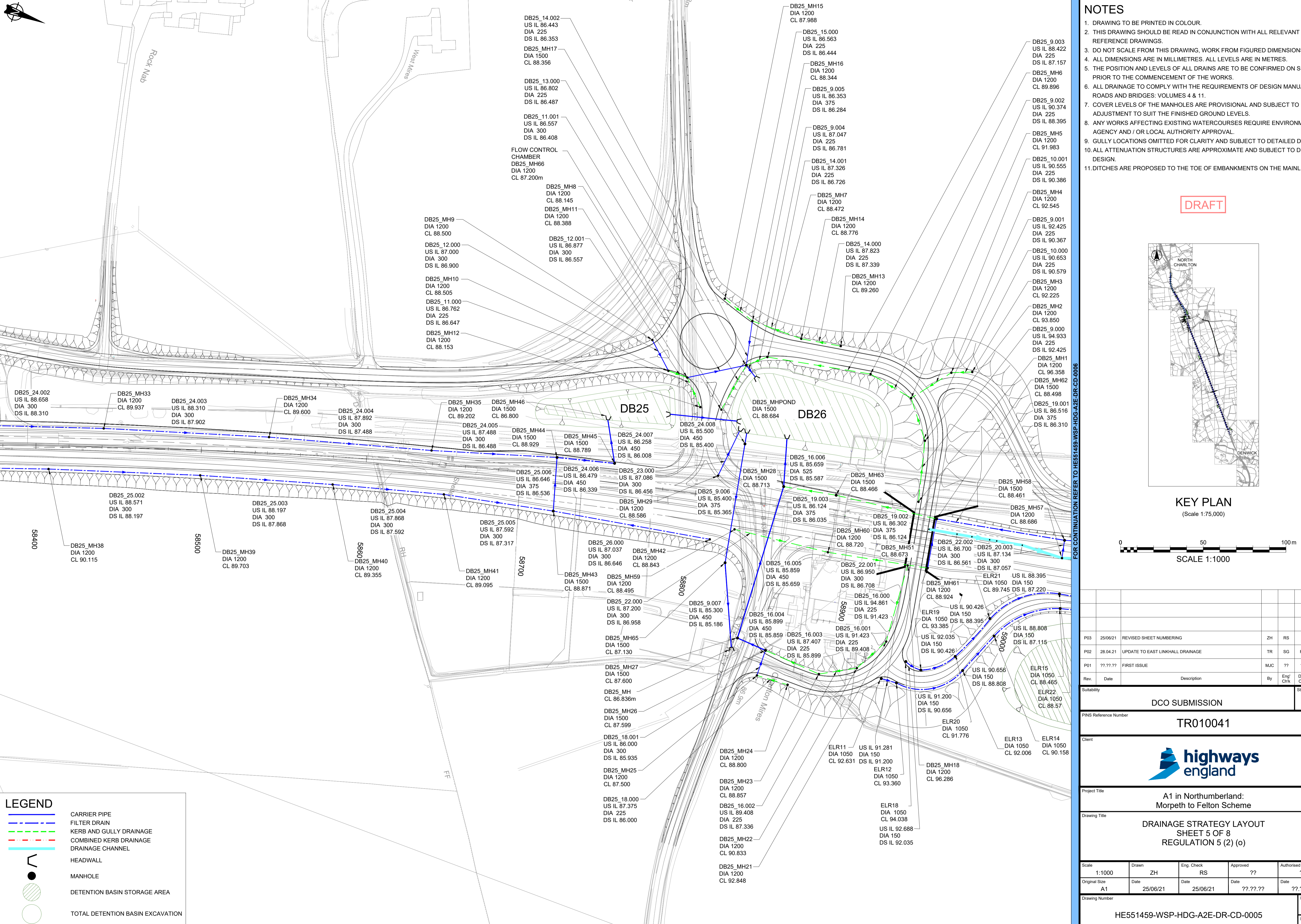
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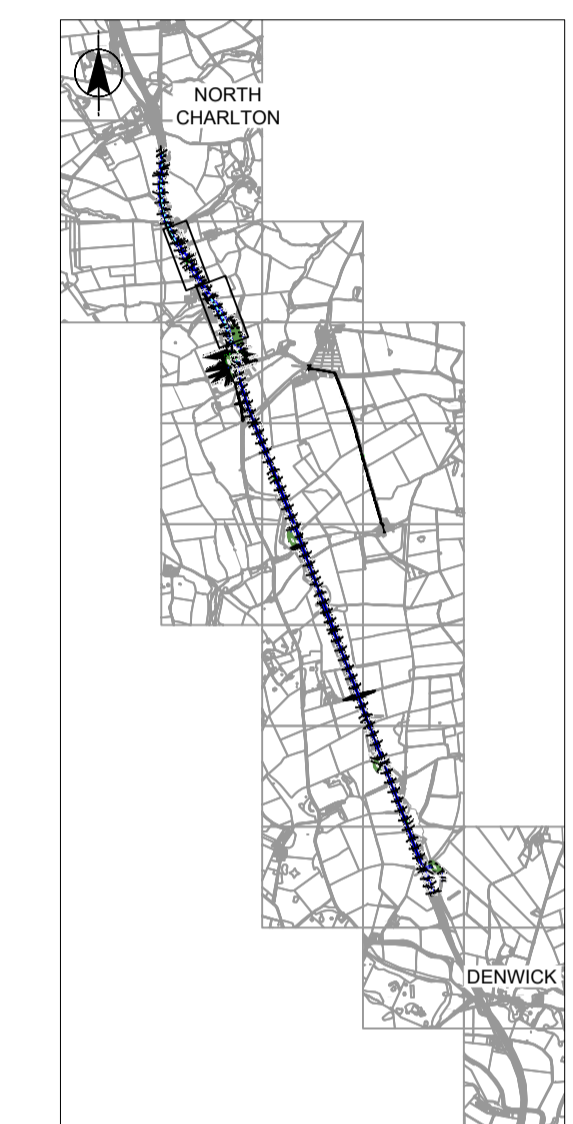
- CARRIER PIPE
- FILTER DRAIN
- KERB AND GULLY DRAINAGE
- COMBINED KERB DRAINAGE
- DRAINAGE CHANNEL
- HEADWALL
- MANHOLE
- DETENTION BASIN STORAGE AREA
- TOTAL DETENTION BASIN EXCAVATION



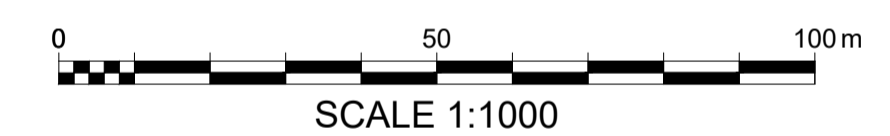
**NOTES**

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**DRAFT**



**KEY PLAN**  
(Scale 1:75,000)



Rev.	Date	Description	By	Eng' Chk	Disc' Chk	App'd
P03	25/06/21	REVISED SHEET NUMBERING	ZH	RS		
P02	28/04/21	UPDATE TO EAST LINKHALL DRAINAGE	TR	SG	RS	??
P01	??/??/??	FIRST ISSUE	MJC	??	??	??

DCO SUBMISSION S2

PINS Reference Number TR010041

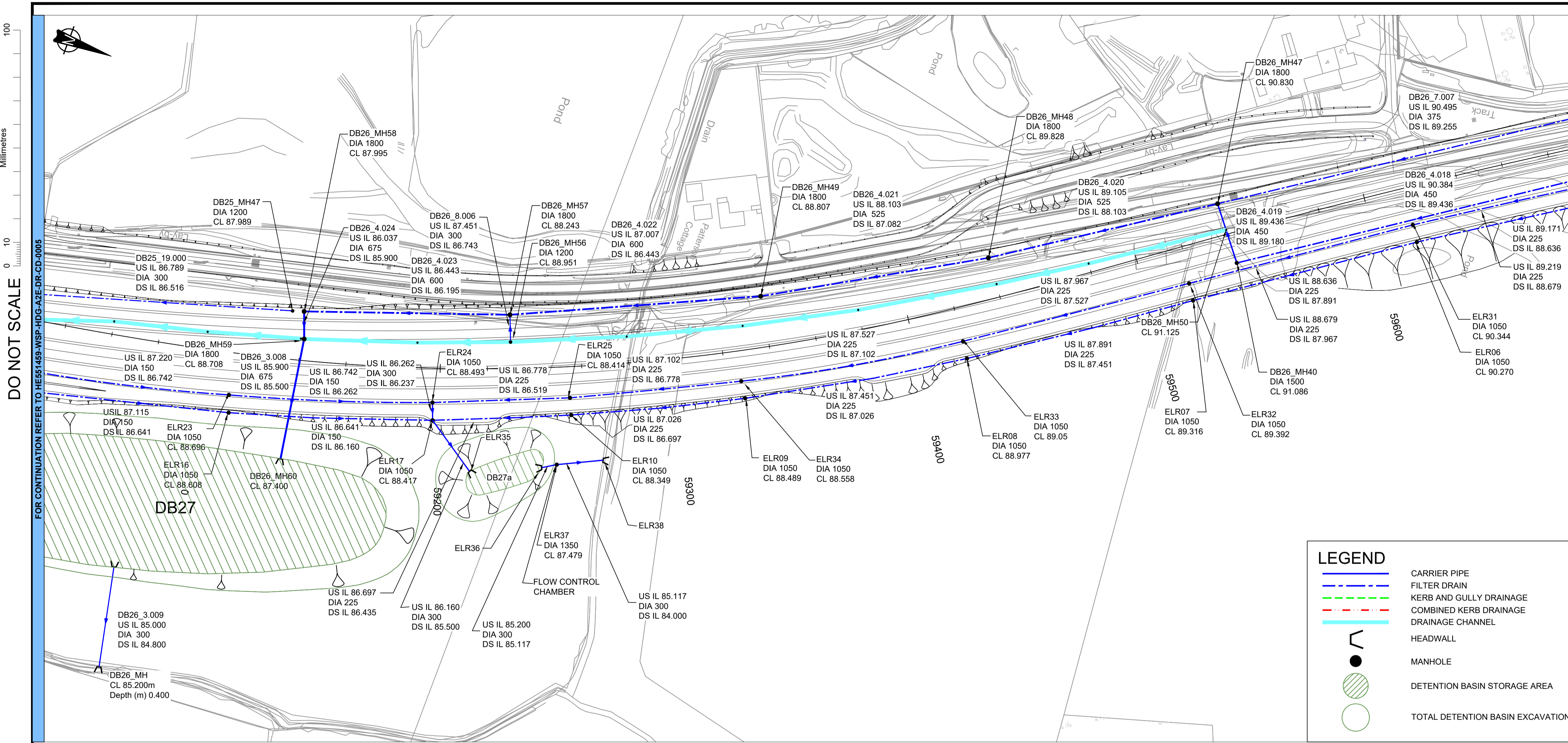


Client **A1 in Northumberland: Morpeth to Felton Scheme**

Project Title **DRAINAGE STRATEGY LAYOUT SHEET 6 OF 8 REGULATION 5 (2) (o)**

Scale	Drawn	Eng. Check	Approved	Authorised
1:1000	ZH	RS	??	??
Original Size	Date	Date	Date	Date
A1	25/06/21	25/06/21	??/??/??	??/??/??

Drawing Number **HE551459-WSP-HDG-A2E-DR-CD-0006** Revision **P03**  
PW Stg Code **3**



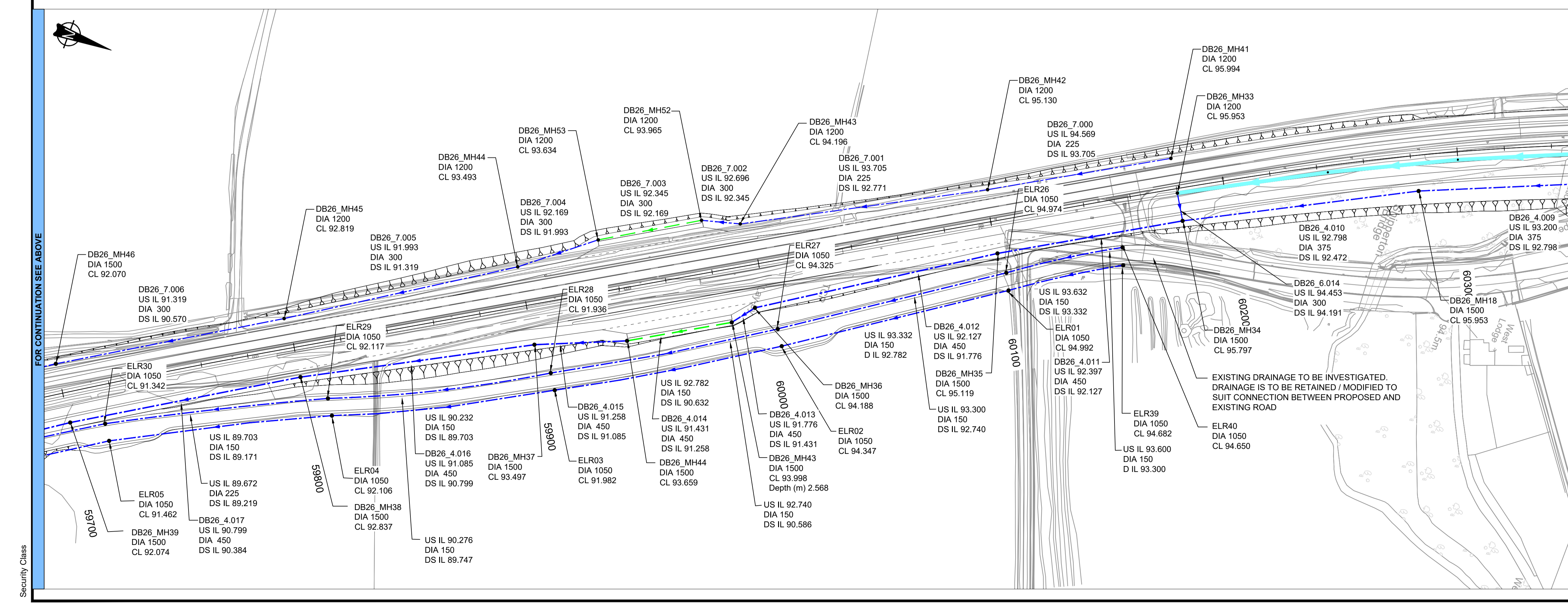
DO NOT SCALE

FOR CONTINUATION REFER TO HE551459-WSP-HDG-A2E-DR-CD-0005

FOR CONTINUATION SEE BELOW

**LEGEND**

- CARRIER PIPE
- FILTER DRAIN
- KERB AND GULLY DRAINAGE
- COMBINED KERB DRAINAGE
- DRAINAGE CHANNEL
- HEADWALL
- MANHOLE
- DETENTION BASIN STORAGE AREA
- TOTAL DETENTION BASIN EXCAVATION



FOR CONTINUATION SEE ABOVE

FOR CONTINUATION REFER TO HE551459-WSP-HDG-A2E-DR-CD-0007

Security Class



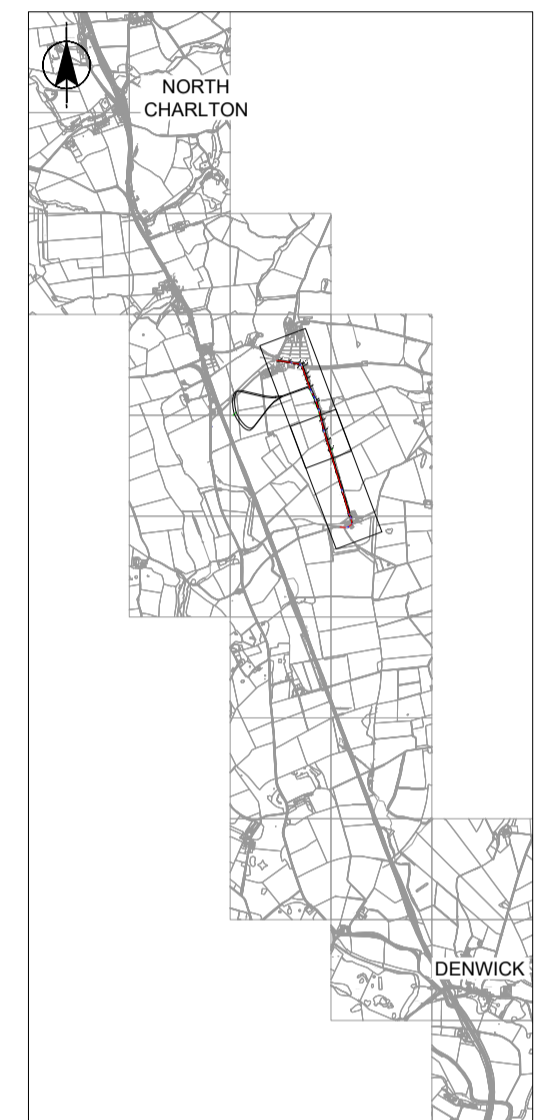




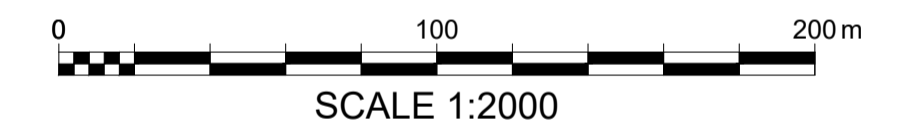
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**DRAFT**



**KEY PLAN**  
(Scale 1:75,000)



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**LEGEND**

- CARRIER PIPE
- FILTER DRAIN
- KERB AND GULLY DRAINAGE
- COMBINED KERB DRAINAGE
- DRAINAGE CHANNEL
- HEADWALL
- MANHOLE
- GRASSED DITCH

FOR CONTINUATION SEE ABOVE

Rev.	Date	Description	By	Eng' Chk	Disc' Chk	App'd	Status
P01	25/06/21	FIRST ISSUE		ZH	RS	??	??
DCO SUBMISSION							S2

PINS Reference Number  
**TR010041**



Project Title  
**A1 in Northumberland:  
Morpeth to Felton Scheme**

Drawing Title  
**DRAINAGE STRATEGY LAYOUT  
SHEET 8 OF 8  
REGULATION 5 (2) (o)**

Scale	Drawn	Eng. Check	Approved	Authorised
1:2000	ZH	RS	??	??
Original Size	Date	Date	Date	Date
A1	25/06/21	25/06/21	??/??/??	??/??/??

Drawing Number  
**HE551459-WSP-HDG-A2E-DR-CD-0008**

Revision  
**P01**  
PW Stg Code  
**3**

# Appendix C

RELEVANT CORRESPONDENCE

# Appendix C – Relevant Correspondence

## 1.1 Northumberland County Council (includes Historic England Correspondence)

### Additional Correspondence 1.1.D and 1.1.E

#### 1.1.E 9/6/21

From: David Laux <David.Laux@northumberland.gov.uk>  
Sent: 10 June 2021 15:09  
To: Sharpe, Rob <Rob.Sharpe@wsp.com>  
Cc: O'Rorke, Tom <Tom.ORorke@wsp.com>; Salisbury, Iain <Iain.Salisbury@wsp.com>; Gary Mills <Gary.Mills@northumberland.gov.uk>; Dale Rumney <Dale.Rumney@northumberland.gov.uk>; Matthew Payne <matthew.payne@northumberland.gov.uk>; Katherine Robbie <Katherine.Robbie@northumberland.gov.uk>; James Hitching <James.Hitching@northumberland.gov.uk>  
Subject: Re: A1 M2E Rock South Farm Road

Dear Rob

Thank you for sending through the proposals with the below email.

These are a considerable improvement on the previous proposals.

In general we would be content with the proposals for filter drains and ditching to drain the northern section to discharge into the watercourse as shown on the plan.

For the southern length where it is proposed to use infiltration, we would still prefer positive drainage to an outfall as the soakaways may be a long term maintenance liability, however we understand the difficulties of reaching such a watercourse. Any agreement to accept infiltration would need to be subject to the results of the further infiltration testing you intend to carry out and the final design of the soakaway trenches. It would also be necessary to have a prolonged period of operation after construction to prove effectiveness of this drainage before the Council would consider accepting the road.

It has also been suggested that throughout the length of the road the surface should be constructed say 300mm above existing ground levels to reduce the risk of water being entrapped in the pavement structure.

David

**David Laux**  
**Head of Technical Services**  
Local Services  
Northumberland County Council

County Hall  
Morpeth  
NE61 2EF  
Tel: 01670 623139

---

From: Sharpe, Rob <Rob.Sharpe@wsp.com>  
Sent: 07 June 2021 11:57 AM  
To: David Laux <David.Laux@northumberland.gov.uk>  
Cc: O'Rorke, Tom <Tom.ORorke@wsp.com>; Salisbury, Iain <Iain.Salisbury@wsp.com>  
Subject: A1 M2E Rock South Farm Road

Hi David,

I would like to speak to you to update you on the drainage that is being proposed for Rock South Farm Road.

I have discussed the proposal with James Hitching as the LLFA and he is in agreement with the general design proposal but I wanted to discuss it with you as the highway adopting authority.

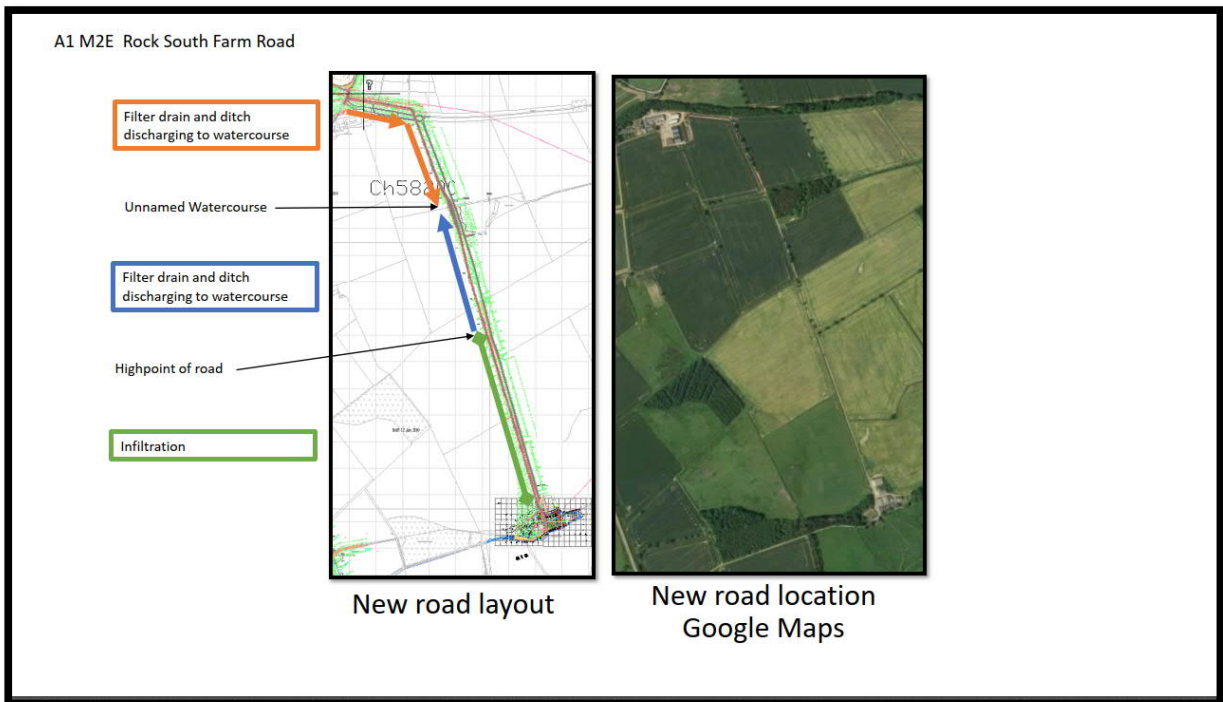
We have split the road into three sections see the attached plan.

We will be proposing that the carriageway at the two northern sections will be drained to filter drains/ditches where appropriate and discharge at controlled rates into the unnamed watercourse. There will be ditches to store the runoff before allowing it to discharge.

For the southern section, where we cannot discharge to a watercourse, we intend to use trench soakaways to be constructed adjacent to the road. The existing trial pits in this area have identified layers of sand which we hope to discharge to. We will be undertaking infiltration testing in this area to determine the suitability of infiltration and to size the required trenches. The design will be to the DMRB document CD530 Design of Soakaways.

Could you give me a call to discuss these proposals?





Regards

**Rob Sharpe** *BEng (Hons) CEng C.WEM MCIWEM*  
Technical Manager  
Water Risk Management and Engineering, WEI



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1.1.D 9/6/21

**From:** James Hitching <James.Hitching@northumberland.gov.uk>  
**Sent:** 09 June 2021 13:45  
**To:** Sharpe, Rob <Rob.Sharpe@wsp.com>  
**Cc:** Salisbury, Iain <Iain.Salisbury@wsp.com>  
**Subject:** Re: A1 M2E Rock South Farm Road

Hi Rob

Thank you for your email which accurately summaries our telephone conversation. From a flood risk perspective, I am satisfied with those proposals.

Please do forward any updated plans once these have been undertaken for comment.

Many thanks  
James

---

**From:** Sharpe, Rob <Rob.Sharpe@wsp.com>  
**Sent:** 09 June 2021 11:59  
**To:** James Hitching <James.Hitching@northumberland.gov.uk>  
**Cc:** Salisbury, Iain <Iain.Salisbury@wsp.com>  
**Subject:** RE: A1 M2E Rock South Farm Road

Hi James,

Further to our earlier conversation I write to confirm what we discussed.

The northern section of the road is to discharge to two locations, to the watercourse, each at a flow rate of 5l/s. The proposed flow controls are 60mm diameter orifices to be constructed at the end of the channels. The maximum depth of storage will be 600mm and any exceedance of this will overtop the channel and enter the watercourse.

The storage for the 1 in 100yr event is provided in the channels. The orifices are to be maintained and will be accessible from the channels which will have 1 in 3 side slopes.

Regards



**Rob Sharpe**

Technical Manager - BEng (Hons) CEng C.WEM MCIWEM

T+ 44 (0) 1513-331-8218

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From: James Hitching <James.Hitching@northumberland.gov.uk>  
Sent: 04 June 2021 10:09  
To: Sharpe, Rob <Rob.Sharpe@wsp.com>  
Subject: Re: A1 M2E Rock South Farm Road

Hi Rob

Thank you for your email.

Reading your email and attachment, I agree with its content and your summary. If you can please keep me updated with the results of the infiltration testing and any updated design.

Many thanks  
James

---

From: Sharpe, Rob <Rob.Sharpe@wsp.com>  
Sent: 03 June 2021 18:09  
To: James Hitching <James.Hitching@northumberland.gov.uk>  
Cc: O'Rourke, Tom <Tom.ORourke@wsp.com>; Salisbury, Iain <Iain.Salisbury@wsp.com>; Morrow, David <David.Morrow@wsp.com>  
Subject: A1 M2E Rock South Farm Road

Hi James,

To summarise our discussion earlier, see attached plan.

#### North

Where we can we will discharge to the unnamed watercourse, the areas identified to the north of the plan. The proposal is that we have two points of discharge, one from the north and one from the south. The outfalls of these should be, if possible, to greenfield runoff rates however it was noted that the greenfield runoff rates are small due to the small catchment areas and there are practical difficulties in providing controls for low flows. We will assess the discharges and the sizing of the storage based on the orifice control sizes. We will get back to you with some details on the rates that we develop.

The drainage from the carriageway here will be into filter drains or ditches and it will be in the ditches that we propose to provide the storage. We may also use stone filled trenches to provide additional storage.

#### South

The area to the south does not have a natural outfall to a watercourse, and here we propose to discharge the runoff into an infiltration trench along the side of the carriageway. Trial pits here

indicate that infiltration may be possible due to the presence of a sandy layer. We will be undertaking infiltration tests to determine if infiltration is possible here. We have noted that there are no ponds here and expect that the current soil is somewhat permeable.

Regards

**Rob Sharpe** *BEng (Hons) CEng C.WEM MCIWEM*  
Technical Manager  
Water Risk Management and Engineering, WEI



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M +44 (0) 7989 354525

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1.1.C 27/04/21

**From:** David Laux <David.Laux@northumberland.gov.uk>  
**Sent:** 27 April 2021 10:05  
**To:** O'Rorke, Tom <Tom.ORorke@wsp.com>  
**Cc:** Matthew Payne <matthew.payne@northumberland.gov.uk>; Katherine Robbie <Katherine.Robbie@northumberland.gov.uk>; Morrow, David <David.Morrow@wsp.com>; De Nobrega, Daniel <Daniel.DeNobrega@wsp.com>; Sharpe, Rob <Rob.Sharpe@wsp.com>; Dale Rumney <Dale.Rumney@northumberland.gov.uk>; Gary Mills <Gary.Mills@northumberland.gov.uk>  
**Subject:** Re: A1 M2E: Rock South Farm Sections

Hi Tom

As you know we are still really struggling with this and the concerns that the drainage of the road will not be adequate for adoption without positive drainage.

We are trying to consider if there are any acceptable solutions.

Does your topographical model provide information which would help us to see the direction of expected surface water flows both on the road and on the surrounding land - to try to identify where water may pool on the road, where water may flow from surrounding land onto the road, and where water from the road may flow onto surrounding land? If so could you provide us with this model?

Also do you have information about the ground conditions of the land beneath and to the east and west of the road ?

David

**David Laux**

**Head of Technical Services**

Local Services

Northumberland County Council

County Hall

Morpeth

NE61 2EF

Tel: 01670 623139

---

**From:** O'Rorke, Tom <Tom.ORorke@wsp.com>  
**Sent:** 26 April 2021 11:13 AM  
**To:** David Laux <David.Laux@northumberland.gov.uk>  
**Cc:** Matthew Payne <Matthew.Payne@northumberland.gov.uk>; Katherine Robbie <Katherine.Robbie@northumberland.gov.uk>; Morrow, David <David.Morrow@wsp.com>; De Nobrega, Daniel <Daniel.DeNobrega@wsp.com>; Sharpe, Rob <Rob.Sharpe@wsp.com>  
**Subject:** RE: A1 M2E: Rock South Farm Sections

Hi David

Apologies for the error on drawing 3004. Please see attached for the corrected version.

Kind regards

**Tom O'Rorke**

Senior Engineer – Highways North



T +44 (0) 151 331 8200  
E [tom.ororke@wsp.com](mailto:tom.ororke@wsp.com)

From: O'Rorke, Tom  
Sent: 22 April 2021 09:38  
To: David Laux <David.Laux@northumberland.gov.uk>  
Cc: Matthew Payne <Matthew.Payne@northumberland.gov.uk>; Katherine Robbie <Katherine.Robbie@northumberland.gov.uk>; Morrow, David <David.Morrow@wsp.com>; De Nobrega, Daniel <Daniel.DeNobrega@wsp.com>; Sharpe, Rob <Rob.Sharpe@wsp.com>  
Subject: A1 M2E: Rock South Farm Sections

Hi David

As requested on our call last Friday, please see the attached documents for long sections and cross sections (@ 50m intervals) for Rock South Farm Access Road.

The chainage references can be found on the GA drawings (sheets 14 & 15):

[https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/TR010059/TR010059-001500-DL5\\_Highways%20England\\_Change%20Request\\_2.4%20General%20Arrangement%20Plans\\_Rev%203.pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/TR010059/TR010059-001500-DL5_Highways%20England_Change%20Request_2.4%20General%20Arrangement%20Plans_Rev%203.pdf)

Please let me know if you have any queries or require any further information.

Kind regards

**Tom O'Rorke**

Senior Engineer – Highways North



T +44 (0) 151 331 8200  
E [tom.ororke@wsp.com](mailto:tom.ororke@wsp.com)

1<sup>st</sup> Floor Exchange Station  
Tithebarn Street, Liverpool  
L2 2QP

**wsp.com**

1.1.B 23/04/21

**From:** O'Rorke, Tom <Tom.ORorke@wsp.com>

**Sent:** 23 April 2021 10:58

**To:** Green, David <David.C.Green@wsp.com>; Green, David <David.C.Green@wsp.com>; Katherine Robbie <Katherine.Robbie@northumberland.gov.uk>; David Laux <David.Laux@northumberland.gov.uk>; Matthew Payne <matthew.payne@northumberland.gov.uk>; Morrow, David <David.Morrow@wsp.com>; Sharpe, Rob <Rob.Sharpe@wsp.com>; De Nobrega, Daniel <Daniel.DeNobrega@wsp.com>; Spink, Katie <katie.spink@highwaysengland.co.uk>; Mike Hitchinson <Michael.Hitchinson@costain.com>; Apeanyo, Roland



<Roland.Apeanyo@jacobs.com>  
**Cc:** Shiona MacDonald <Shiona.MacDonald@costain.com>; Stoneman, Mark  
 <mark.stoneman@highwaysengland.co.uk>; Dale Rumney  
 <Dale.Rumney@northumberland.gov.uk>; Salisbury, Iain <Iain.Salisbury@wsp.com>  
**Subject:** RE: A1 DCO - Maintenance Boundaries and Drainage Discussion

Hi all

Thanks again for your time last Friday, I know everyone's very busy at the moment so it was much appreciated.

Please see attached for the draft version of the minutes. Can I ask that you review the draft minutes and let me know if you have any comments / proposed amendments by 5pm on 30/04/21? If I haven't received any comments by then I will assume that you're satisfied that my minutes are an accurate representation of the discussion.

Note that I have added a couple of post-meeting updates on a couple of the items discussed, which are referenced as such and highlighted in bold.

Kind regards

**Tom O'Rorke**  
 Senior Engineer – Highways North



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 E [tom.ororke@wsp.com](mailto:tom.ororke@wsp.com)

MEETING MINUTES & ACTION SUMMARY		
<b>Meeting:</b> A1 in Northumberland Morpeth to Ellingham – Maintenance Boundaries and Drainage Discussion <b>Reference:</b> HE551459-WSP-HGN-A2E-MI-CH-00018		<b>Date:</b> 16/04/21 <b>Time:</b> 13:30-14:45 <b>Venue:</b> MS Teams Call
<b>Attendees:</b>		<b>Distribution:</b>
<b>DL</b>	David Laux – Head of Technical Services (NCC)	Attendees plus Mark Stoneman, Iain Salisbury, Shiona MacDonald, Dale Rumney
<b>KR</b>	Katherine Robbie – Senior Planning Officer (NCC)	
<b>MP</b>	Matthew Payne – Consultant Engineer (NCC)	
<b>KS</b>	Katie Spink – Assistant Project Manager (HE)	
<b>RA</b>	Roland Apeanyo – Design Manager (CJP)	
<b>MH</b>	Mike Hitchinson – Engineering Manager (CJP)	
<b>DM</b>	David Morrow – Project Manager (WSP)	

<b>DG</b>	David Green – DCO Team (WSP)	
<b>DDN</b>	Daniel De Nobrega – Highways (WSP)	
<b>TO</b>	Tom O'Rorke – Highways (WSP)	
<b>RS</b>	Rob Sharpe – Drainage (WSP)	
<b>Apologies:</b> Dale Rumney		
<b>Prepared By:</b> Tom O'Rorke		

Ref	Meeting Notes	Action By	Date
<b>1.0</b>	<b>Introductions</b>		
<b>2.0</b>	<b>West Linkhall Access Road Updates</b>		
	<p>TO explained changes to West Linkhall Access Road which included:</p> <ul style="list-style-type: none"> <li>- Length of single lane section at pinch point reduced to 125m, with intervisibility between either end;</li> <li>- Single lane section narrowed by 0.6m to 3.9m wide carriageway;</li> <li>- Turning head added to end of access road, suitable for refuse vehicles.</li> </ul> <p>MP: The single lane section of road is relatively straight and traffic flows will be low, but detailed design to consider how it is going to be marked/signed, being careful not to urbanise the road.</p> <p>DL: This is an improvement on the previous design, but the single lane section is still not ideal. However, there are obvious constraints at this locale and so this is acceptable.</p>		
<b>3.0</b>	<b>East Linkhall Access Road Updates</b>		
3.1	<p>TO explained changes to East Linkhall Access Road which included:</p> <ul style="list-style-type: none"> <li>- Widening of road to become 6.0m wide two-lane carriageway (previously 4.5m wide single land carriageway with passing bays).</li> <li>- Vertical alignment amended between Ch 59700 and 59840 (<math>\pm 250</math>mm, within vertical Limit of Deviation).</li> </ul>		
3.2	<p>TO and RS explained changes to East Linkhall Access Road drainage proposals which included:</p> <ul style="list-style-type: none"> <li>- Positive drainage introduced along the full length of new carriageway through the introduction of filter drains.</li> <li>- Addition of new detention basin (DB27a) for the drainage of East Linkhall Access Road (i.e. there are separate detention basins for HE and NCC).</li> <li>- The principle of separate basins across the scheme was also clarified.</li> </ul>		

Ref	Meeting Notes	Action By	Date
	<p>DL: This does not seem like a sensible use of taxpayer's money. Surely it would be more cost effective to make DB27 slightly larger to accommodate the drainage of East Linkhall Access Road?</p> <p>KS: Andrew Brown (Area 14) has previously stated that it is HE Operations preference for separate detention basins, as currently proposed. HE will follow up that there would be no opportunity for specific locations to be combined at detailed design.</p>	KS	May-21 liaison call
3.3	<p>Discussion around adoption of existing access road at East Linkhall.</p> <p>DM: Shipperton Bridge is not on HE Structural (SMIS) database.</p> <p>DL: NCC do not want to adopt Shipperton Bridge without the necessary as built / maintenance information and would want it to be replaced if NCC were to adopt it. Proposed that adoption of road ends south of Shipperton Bridge with the rest of the existing to the north remaining under the same present ownership. As part of this arrangement a turning head should be provided at the end of the adopted length of road.</p> <p>DM: This is something the Applicant can investigate. Alternatively, if the road was to be adopted all the way to West Lodge, inspections could be undertaken on Shipperton Bridge and remedial works undertaken if required to give NCC confidence in the structure.</p> <p><b>Post meeting update (23/04/21): Present ownership of the land is currently being investigated by HE Lands. Adoption proposals at this location will be determined once the land ownership has been confirmed.</b></p>	DM/TO	04/05/21
4.0	<p><b>Rock South Farm Access Road Drainage Proposals</b></p>		
	<p>RS provided update following an assessment of the drainage provisions for Rock South Farm Access Road:</p> <ul style="list-style-type: none"> <li>- Provision of positive drainage with attenuation not possible within the Order Limits that have been set, which were based on a design with 'over the edge' drainage.</li> <li>- Possible to provide positive drainage for northern half of access road if discharging straight into the water course – would require approval from the Lead Local Flooding Authority (NCC).</li> <li>- The southern half of the access road cannot be positively drained due to the constraints of the Order Limits and environmental impacts to create detention basin and create a new outfall.</li> </ul> <p>TO: Providing positive drainage for the northern half of the access road would require changes to the vertical alignment outside the vertical Limits of Deviation set for the road (<math>\pm 250\text{mm}</math>).</p> <p>DM: Raising the vertical alignment would take earthworks very close to the Order Limits.</p> <p>DL requested a long section and cross sections for Rock South Farm Access Road for assessment by NCC to determine whether they would be satisfied to adopt the road without positive drainage.</p> <p><b>Post meeting update (23/04/21): Further assessment has determined that positive drainage is unfeasible within the</b></p>	TO	22/04/21



Ref	Meeting Notes	Action By	Date
	<b>constraints of the Order Limits and 'over the edge' drainage is therefore proposed along the full length of Rock South Farm Access Road.</b>		
<b>5.0</b>	<b>Maintenance Limits of adoption</b>		
	<p>Focused discussions around discrete parcels of land adjacent to realigned road. Fenrother free flow could be handed to NCC but Highlaws would remain with HE (essential mitigation area).</p> <p>MH suggested that from his experience on similar schemes this detail can be agreed at the detailed design stage.</p> <p>DL asked if a written record of the methodology of determining adoption can be produced, including what has been agreed at this stage and what can be agreed at the detailed design stage.</p> <p>DM suggested this is picked up in the SoCG as well as a separate note. DM and MH to lead on the development of the note and TO to update the SoCG as appropriate.</p>	DM/MH/ TO	04/05/21
<b>6.0</b>	<b>A.O.B.</b>		
6.1	<p>DL is concerned about the text in the dDCO of the extent of the Priest Bridge and its maintenance responsibilities, which seems to suggest that NCC will be responsible for it following completion of the scheme.</p> <p>DL had also raised suggested wording in the dDCO for the de-trunked section. Action on DM to follow up issue with Mark Stoneman.</p>	DM	04/05/21
6.2	<p>Regarding the Morpeth to Felton de-trunking section, DL noted that the condition of the road and drainage assets have fallen out of discussions recently.</p> <p>KS confirmed that this is with Area 14 to bring back to the table and will ensure this is on the agenda for the next liaison meeting.</p>	KS	May-21 liaison call

1.1.A 01/03/21

**From:** David Laux [<mailto:David.Laux@northumberland.gov.uk>]

**Sent:** 01 March 2021 09:46

**To:** Stoneman, Mark <[Mark.Stoneman@highwaysengland.co.uk](mailto:Mark.Stoneman@highwaysengland.co.uk)>; Morrow, David <[david.morrow@wsp.com](mailto:david.morrow@wsp.com)>

**Cc:** Matthew Payne <[Matthew.Payne@northumberland.gov.uk](mailto:Matthew.Payne@northumberland.gov.uk)>; Katherine Robbie <[Katherine.Robbie@northumberland.gov.uk](mailto:Katherine.Robbie@northumberland.gov.uk)>

**Subject:** IMPORTANT Fw: A1 Dualling drainage plans - Side roads & NCC adoption

Dear Mark / David

I thought I should bring the below to your attention. It has come to our attention that the roads in Part B of the scheme at Rock South, East Linkhall and West Linkhall which we are to be asked to adopt do not appear to include positive drainage to an outfall.

We would not be prepared to adopt roads which do not have positive drainage of some kind (piped drains /filter drains / ditches etc) to an outfall.

Can you please consider and amend the scheme accordingly.

David

**David Laux**

**Head of Technical Services**

Local Services

Northumberland County Council

County Hall

Morpeth

NE61 2EF

Tel: 01670 623139

---

**From:** James Hitching <[James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)>

**Sent:** 23 February 2021 4:45 PM

**To:** Sharpe, Rob <[Rob.Sharpe@wsp.com](mailto:Rob.Sharpe@wsp.com)>

**Cc:** David Laux <[David.Laux@northumberland.gov.uk](mailto:David.Laux@northumberland.gov.uk)>; Gary Mills <[Gary.Mills@northumberland.gov.uk](mailto:Gary.Mills@northumberland.gov.uk)>; Matthew Payne <[Matthew.Payne@northumberland.gov.uk](mailto:Matthew.Payne@northumberland.gov.uk)>

<[Matthew.Payne@northumberland.gov.uk](mailto:Matthew.Payne@northumberland.gov.uk)>

**Subject:** Re: A1 Dualling drainage plans - Side roads & NCC adoption

Hi Rob

Following our email conversation earlier today, I have been in dialogue with our Highways Design team. In summary, our highways engineers would not be prepared to accept the roads in Part B (Rock South, East Linkhall Access Road, West Linkhall Access Road) discharging directly onto adjacent land without filter drains or ditches to take the flow to an outfall. As such, can you please contact our Highways team (David Laux, Gary Mills and Matthew Payne - all cc'ed on this email) to discuss a solution.

Following this, would there be any impact on the surface water attenuation scheme? If additional areas are now to be discharged into the basins, we will need to see updated calculations with the increased impermeable area. These details would also need to show that the basins can still accommodate the 1 in 100 year plus climate change event. If any changes are required then further updated drawings would be required.

Please do, keep me included with any further discussion which you have on this matter.

Many thanks

James

**From:** Sharpe, Rob <[Rob.Sharpe@wsp.com](mailto:Rob.Sharpe@wsp.com)>

**Sent:** 23 February 2021 15:50

**To:** James Hitching <[James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)>

**Subject:** RE: A1 Dualling drainage plans - Side roads & NCC adoption

Hi James,

That's right.

**Rob Sharpe BEng (Hons) CEng C.WEM MCIWEM**  
Technical Manager  
Water Risk Management and Engineering, WEI



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From: James Hitching <[James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)>  
Sent: 23 February 2021 11:40  
To: Sharpe, Rob <[Rob.Sharpe@wsp.com](mailto:Rob.Sharpe@wsp.com)>  
Subject: Re: A1 Dualling drainage plans - Side roads & NCC adoption

Hi Rob

Just to clarify it is the West Moor junction that takes drainage from the Bockenfield to West Moor junction and from the Bywell road.

Thanks  
James

---

From: James Hitching <[James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)>  
Sent: 23 February 2021 11:36  
To: Sharpe, Rob <[Rob.Sharpe@wsp.com](mailto:Rob.Sharpe@wsp.com)>  
Subject: Re: A1 Dualling drainage plans - Side roads & NCC adoption

Hi Rob

Many thanks for your speedy response to this.

As a follow up, I have two additional questions:

1 - Regarding the overedge drainage for those roads in Part B would these be collected by a ditch or filter drain? and also, would they be conveyed to the relevant detention basin ?

2 - It is my understanding that all SuDS attenuation basins would be adopted and maintained by Highways England. NCC would not adopt and maintain any attenuation features. Can you please confirm that this is your understanding too.

Many thanks again.

James

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From: Sharpe, Rob <[Rob.Sharpe@wsp.com](mailto:Rob.Sharpe@wsp.com)>  
Sent: 23 February 2021 09:34  
To: James Hitching <[James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)>  
Subject: RE: A1 Dualling drainage plans - Side roads & NCC adoption

Hi James,

The drawing proposals are shown on drawings 8 and 9 of 13 in Appendix B of the Drainage Strategy Report.

Here is the text on the road drainage that is to be integrated into a technical note regarding the roads to be adopted by NCC.

#### Part A M2F

It is proposed to have a positive drainage system namely filter drains at:  
the de-trunked link road and  
Bywell Road to the south of West Moor junction,

It is stated in the 6.7 Environmental Statement – Appendix 10.5 Drainage Strategy Report, that:  
The existing junction of A1 / Bywell Road will be closed and a new link road will be constructed to extend Bywell Road, connecting with the local road network and the A1 at West Moor junction. This link road will run to the west and parallel with the A1 Trunk Road from approximate chainage 20620 as far as West Moor junction at approximate chainage 21600. This new link road will be part of the local (NCC) road network, and will discharge to Detention Basin 17a.

A new link road will be constructed connecting the existing de-trunked A1 with the existing local road network. This link road will run to the east and parallel with the A1 Trunk Road from approximate chainage 20030 as far as West Moor Junction at approximate chainage 21600. This new link road will be part of the local (NCC) road network, and will discharge to Detention Basin 17b.

There is also a section of the link road that discharges south to Detention Basin 15a.

Basins 17a and 17b are to be constructed in the West Moor Junction and can be accessed from the adjacent roads, Bywell Road and link road respectively.

Basin 15a is to be constructed in a field off the detrunked section of the A1 from which there will be access.

#### Part B A2E

It is proposed to use over the edge drainage for the roads at:  
Rock South

East Linkhall Access Road  
West Linkhall Access Road

The suitability of over the edge (OTE) drainage is based on the guidance from DMRB CG501 Design of highway guidance systems. The definition of informal drain (over the edge) is "An arrangement where surface water flows off the carriageway and across the verge to a drainage system, usually a ditch."

Table 3.4 states that OTE drainage is suitable for rural applications where the carriageway is located:  
1) in verges;  
2) embankments (but only where there is an open ditch or watercourse at the base of the embankment).

Table A1 lists the advantages and disadvantages of the drainage options where it states that OTE is advantageous as it is "cost effective and easily maintained solution in rural settings."

These criteria make it suitable for the Rock South, the East and West Linkhall Access Roads though it should be noted that where the West Linkhall Access Road is to be constructed on the existing A1 carriageway, it is intended that the existing drainage network is to be re-used.

I hope this is clear. Give me a call if you need anything else.

Regards

**Rob Sharpe BEng (Hons) CEng C.WEM MCIWEM**  
Technical Manager  
Water Risk Management and Engineering, WEI



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From: James Hitching <[James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)>  
Sent: 23 February 2021 08:27  
To: Sharpe, Rob <[Rob.Sharpe@wsp.com](mailto:Rob.Sharpe@wsp.com)>  
Subject: A1 Dualling drainage plans - Side roads & NCC adoption

Hi Rob

I hope you can assist on a small query which has arisen. Whilst, we have been primarily focussing on the A1 dualling itself and its drainage - I want to turn attention to the associated works to the side roads which are part of this scheme and those roads which Northumberland County Council would adopt.

In particular, the new roads to East and West Linkhall, Rock South Farm and the extension of the Bywell Road up to the West Moor junction. Can you please direct me to the drainage drawings for these areas.

Many thanks  
James

**James Hitching**

Senior Sustainable Drainage Officer  
Flood & Coastal Erosion Risk Management  
Northumberland County Council  
County Hall  
Morpeth  
NE61 2EF

Direct Line - 01670 623623

Email – [James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)

---

1.1.1 07/05/19

**From:** James Hitching [mailto:james.hitching@northumberland.gov.uk]

**Sent:** 07 May 2019 14:04

**To:** Sharpe, Rob <Rob.Sharpe@wsp.com>

**Cc:** Muscatelli, Dino <Dino.Muscatelli@wsp.com>; Hugill, Gary <Gary.Hugill@wsp.com>; Wilson, Victoria <Victoria.Wilson@wsp.com>; McCann, Lowri <lowri.mccann@wsp.com>; Hamilton, Sarah <Sarah.Hamilton@wsp.com>; Haberfield, Stephanie <Stephanie.Haberfield@wsp.com>

**Subject:** Re: A1 A2E Highway drainage

Hi Rob

Thank you for your email. In summary, I am satisfied with all of the comments that you have made. In many instances, this information will need to be reflected within drawings and formal documents that are to be submitted. For clarity, I provide a response to each point below in blue:

1. What are the existing catchments for both areas?

The total catchment areas for the Shipperton Burn and the Kittycarter Burn are 310ha and 200ha respectively.

The existing carriageway that will be removed from the Shipperton Burn is from Ch60100 to Ch61100 and totals 1.51ha.

The new carriageway which replaces the existing carriageway from Ch60100 to Ch61100 is 3.57ha.

OK and accepted - this will need to be reflected with diagrams/drawings with any formal submission.

2. Is there any scope for a detention basin in DB6? Albeit taking a smaller catchment, with the rest going to DB5?

No, there is no suitable land for a detention basin within the current red line boundary.

This will need to be reflected with diagrams/drawings with any formal submission. Associated text to be provided to say why this is the case.

3 Full reasoning for the movement of surface water will need to be documented and explained.

We are proposing to remove Detention Basin 6 and divert flows to Detention Basin 5 in order to remove the need for a detention basin within the same field as a Scheduled Monument is located. The Scheduled Monument is a prehistoric burial mound of national importance which, by its nature, could have additional artefacts associated with the Scheduled Monument located outside the boundary shown on Historic England mapping (<https://historicengland.org.uk/listing/the-list/list-entry/1018499>). Detention Basin 6 is located outside of the Scheduled Monument boundary but the construction of the basin could cause disruption and damage to archaeological remains extending beyond the Scheduled Monument boundary. In addition, during operation there could be changes in water levels due to the presence of the detention basin which could lead to the decay of the archaeological remains associated with the Scheduled Monument. Therefore, the preference would be to remove the detention basin from the field with the Scheduled Monument in order to avoid these potential impacts.

We have received a consultation letter from Historic England in response to the statutory consultation undertaken for the scheme. Within the letter, Historic England confirm that they "welcome the default position set out in the consultation which is to avoid the scheduled area with any development activity." Historic England also note "that at this stage whether this avoidance is achievable, or whether the development will require an impact (up to the total destruction of the bowl barrow), is unclear. Clearly which of these scenarios applies makes a huge difference to the

potential impact of the development on the historic environment, and how it needs to be treated in NPPF terms." A copy of the letter is attached to this response for your information.

[Explanation acceptable - Please include this within any formal surface water drainage strategy documentation that is to be submitted.](#)

4 Flows to the Kittycarter Burn will need to be restricted to pre-development greenfield conditions for the existing catchment only.

The proposed carriageway from Ch59210 to Ch60100 discharging to Kittycarter Burn has an area of 3.38ha. This runoff will be attenuated at DB5 to the greenfield runoff rates for this area (for the 1 in 1, 30 and 100 year events). The additional runoff from the carriageway from Ch60100 to Ch61100 (3.57ha) will be accommodated within detention basin DB5, the discharge rates will be set at the greenfield runoff rates determined on the 3.38ha development.

The proposed carriageway from Ch58200 to 59210 discharging to Kittycarter Burn has an area of 3.50ha. This runoff will be attenuated at DB4 to the greenfield runoff rates for this area (for the 1 in 1, 30 and 100 year events).

[OK - Please provide associated calculations as part of any document.](#)

5 Flows will need to be connected to the watercourse to the east of the A1 and downstream of the existing culvert.

Yes, both the outfalls from the carriageway drainage which discharge from detention basins DB4 and DB5 are to the watercourse to the east of the A1.

[Excellent - Please reflect this on the respective drawings.](#)

6 Improvement works to the culvert and the general area are still requested and anticipated to be included as part of the works.

We are currently in the process of producing a Flood Risk Assessment to support the DCO application which will assess the impacts of the scheme in terms of flood risk and will be informed by hydraulic modelling to demonstrate that the scheme will not increase flood risk. The improvement works to the culvert are still under investigation to see if they are appropriate and we will inform the Council of the outcome.

[Acknowledged - awaiting further information.](#)

7 The watercourse assessment will need to look at the existing and proposed levels in the watercourse both upstream and downstream. A range of different events will need to be looked at up to and including the 1 in 100 year plus climate change event. The results of any watercourse



assessment will need to conclude that the additional flows and volumes do not increase the risk of flooding at any location in any rainfall event.

We are currently in the process of producing a Flood Risk Assessment to support the DCO application which will assess the impacts of the scheme in terms of flood risk and will be informed by hydraulic modelling to demonstrate that the scheme will not increase flood risk. The improvement works to the culvert are still under investigation to see if they are appropriate and we will inform the Council of the outcome.

Acknowledged - awaiting further information.

Please get in touch if you wish to discuss anything further.

Kind regards  
James

James Hitching  
Senior Sustainable Drainage Officer  
Flood & Coastal Erosion Risk Management  
Northumberland County Council  
County Hall  
Morpeth  
NE61 2EF

Direct Line - 01670 623623  
Email – [James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)

On Fri, 3 May 2019 at 12:40, Sharpe, Rob <[Rob.Sharpe@wsp.com](mailto:Rob.Sharpe@wsp.com)> wrote:

Hi James,

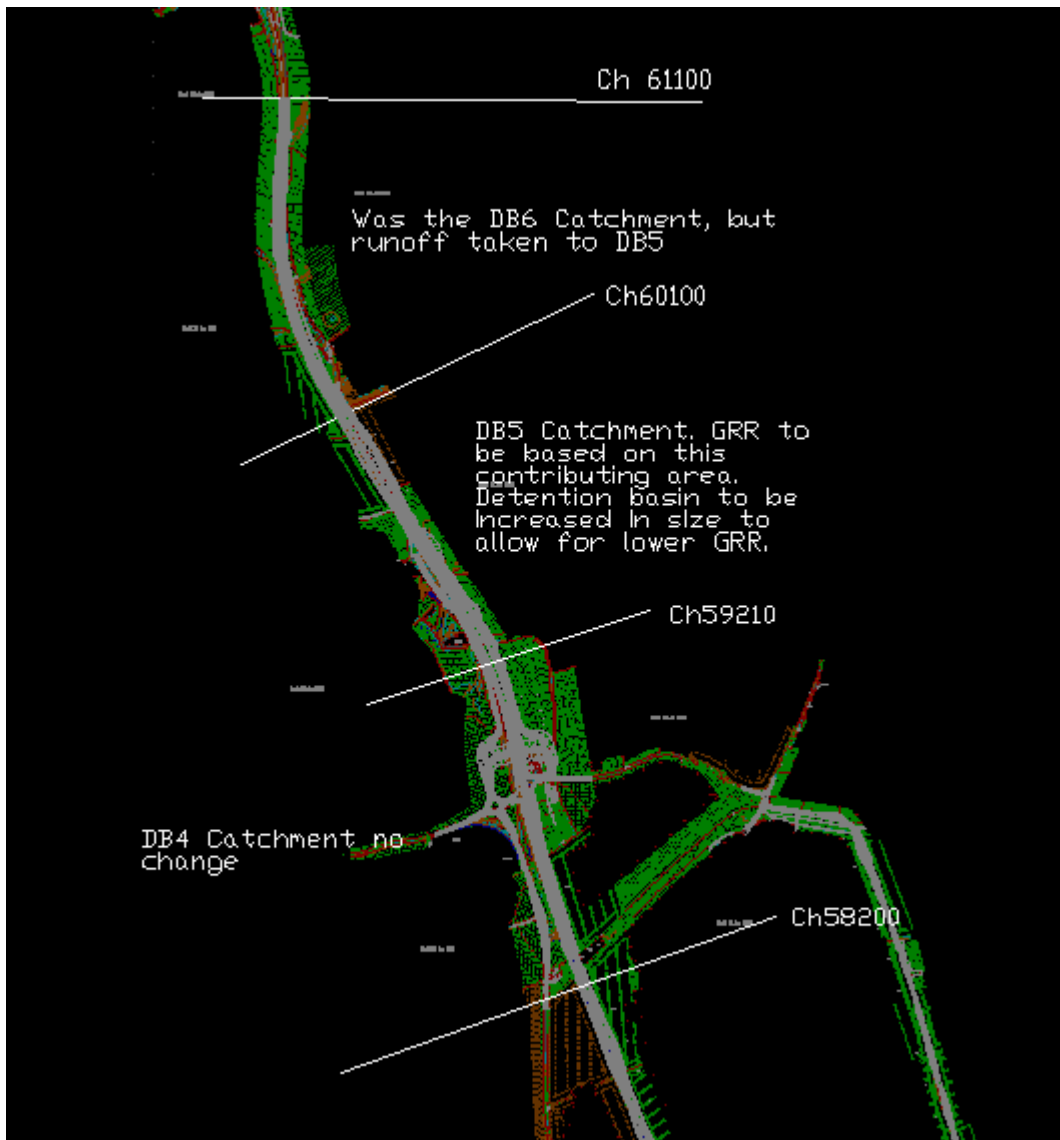
I've reviewed the points raised in your email and sought to address them in the responses below.

I've related the carriageway runoff to the road chainage as it gives us a reference point. The carriageway runoff can be split as follows:

Chainage 58200 to 59120. Attenuation to be provided at detention basin DB4, part of the Kittycarter Burn catchment.

Chainage 59120 to 60100. Attenuation to be provided at detention basin DB5, part of the Kittycarter Burn catchment.

Chainage 60100 to 61100. Attenuation to be provided at detention basin DB5, part of the Shipperton Burn catchment .



1. What are the existing catchments for both areas?

The total catchment areas for the Shipperton Burn and the Kittycarter Burn are 310ha and 200ha respectively.

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2. Is there any scope for a detention basin in DB6? Albeit taking a smaller catchment, with the rest going to DB5?

No, there is no suitable land for a detention basin within the current red line boundary.

3 Full reasoning for the movement of surface water will need to be documented and explained.

We are proposing to remove Detention Basin 6 and divert flows to Detention Basin 5 in order to remove the need for a detention basin within the same field as a Scheduled Monument is located. The Scheduled Monument is a prehistoric burial mound of national importance which, by its nature, could have additional artefacts associated with the Scheduled Monument located outside the boundary shown on Historic England mapping (<https://historicengland.org.uk/listing/the-list/list-entry/1018499>). Detention Basin 6 is located outside of the Scheduled Monument boundary but the construction of the basin could cause disruption and damage to archaeological remains extending beyond the Scheduled Monument boundary. In addition, during operation there could be changes in water levels due to the presence of the detention basin which could lead to the decay of the archaeological remains associated with the Scheduled Monument. Therefore, the preference would be to remove the detention basin from the field with the Scheduled Monument in order to avoid these potential impacts.

We have received a consultation letter from Historic England in response to the statutory consultation undertaken for the scheme. Within the letter, Historic England confirm that they “welcome the default position set out in the consultation which is to avoid the scheduled area with any development activity.” Historic England also note “that at this stage whether this avoidance is achievable, or whether the development will require an impact (up to the total destruction of the bowl barrow), is unclear. Clearly which of these scenarios applies makes a huge difference to the potential impact of the development on the historic environment, and how it needs to be treated in NPPF terms.” A copy of the letter is attached to this response for your information.

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The proposed carriageway from Ch58200 to 59210 discharging to Kittycarter Burn has an area of 3.50ha. This runoff will be attenuated at DB4 to the greenfield runoff rates for this area (for the 1 in 1, 30 and 100 year events).

5 Flows will need to be connected to the watercourse to the east of the A1 and downstream of the existing culvert.

Yes, both the outfalls from the carriageway drainage which discharge from detention basins DB4 and DB5 are to the watercourse to the east of the A1.

6 Improvement works to the culvert and the general area are still requested and anticipated to be included as part of the works.

We are currently in the process of producing a Flood Risk Assessment to support the DCO application which will assess the impacts of the scheme in terms of flood risk and will be informed by hydraulic modelling to demonstrate that the scheme will not increase flood risk. The improvement works to the culvert are still under investigation to see if they are appropriate and we will inform the Council of the outcome.

7 The watercourse assessment will need to look at the existing and proposed levels in the watercourse both upstream and downstream. A range of different events will need to be looked at up to and including the 1 in 100 year plus climate change event. The results of any watercourse assessment will need to conclude that the additional flows and volumes do not increase the risk of flooding at any location in any rainfall event.

We are currently in the process of producing a Flood Risk Assessment to support the DCO application which will assess the impacts of the scheme in terms of flood risk and will be informed by hydraulic modelling to demonstrate that the scheme will not increase flood risk. The improvement works to the culvert are still under investigation to see if they are appropriate and we will inform the Council of the outcome.

I hope that this is clear and that there is sufficient detail to satisfy you so that you can accept the proposed option.

I'll call you early next week to discuss this.

regards

**Rob Sharpe *BEng (Hons) CEng C.WEM MCIWEM***

Technical Manager



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From: James Hitching [mailto:[james.hitching@northumberland.gov.uk](mailto:james.hitching@northumberland.gov.uk)]  
Sent: 24 April 2019 10:02  
To: Sharpe, Rob <[Rob.Sharpe@wsp.com](mailto:Rob.Sharpe@wsp.com)>  
Subject: Re: A1 A2E Highway drainage

Hi Rob

Thank you for your email and subsequent phone call. I do apologise for the lateness of my reply.

In principle we are against moving water from one catchment to another. This is against best practice guidance. In addition to being against best practice, the location of where the proposed additional water is to go, is at an area which already experiences flood and drainage issues. I attach a plan, which outlines these.

Notwithstanding the above, if it is demonstrated that there is no other reasonable or practicable option but to move the surface water and attenuation to the south, then this could be acceptable. However, it will need to be demonstrated that this does not increase the risk of flooding both upstream and downstream. In particular, we ask the following questions and these will need to be addressed as part of any watercourse assessment.

1. What are the existing catchments for both areas?
2. Is there any scope for a detention basin in DB6? Albeit taking a smaller catchment, with the rest going to DB5?
3. Full reasoning for the movement of surface water will need to be documented and explained.
4. Flows to the Kittycarter Burn will need to be restricted to pre-development greenfield conditions for the existing catchment only.
5. Flows will need to be connected to the watercourse to the east of the A1 and downstream of the existing culvert.

6. Improvement works to the culvert and the general area are still requested and anticipated to be included as part of the works..

7. The watercourse assessment will need to look at the existing and proposed levels in the watercourse both upstream and downstream. A range of different events will need to be looked at up to and including the 1 in 100 year plus climate change event. The results of any watercourse assessment will need to conclude that the additional flows and volumes do not increase the risk of flooding at any location in any rainfall event.

I will send some photos of the Linkhall culvert over in two separate emails.

Please get in touch, if you wish to discuss any of the above.

Kind regards

James

James Hitching  
Senior Sustainable Drainage Officer  
Flood & Coastal Erosion Risk Management  
Northumberland County Council  
County Hall  
Morpeth  
NE61 2EF

Direct Line - 01670 623623  
Email – [James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)

On Mon, 1 Apr 2019 at 16:08, Sharpe, Rob <[Rob.Sharpe@wsp.com](mailto:Rob.Sharpe@wsp.com)> wrote:

Hi James,

As discussed last week I am looking at the highway drainage of the northern phase of the A1 in Northumberland, known as the A1 Alnwick to Ellingham (A2E) stretch.

We are using the same philosophy as on the Morpeth to Felton (M2F) stretch, mainly detention basins to attenuate and treat the runoff prior to discharge at greenfield runoff rates to the adjacent watercourses.

At the northernmost end of the scheme we were proposing to construct a detention basin (DB6) to the east to the newly dualled road with the attenuated flow discharging to the Shipperton Burn. However this location has been identified as having a tumulus, which is a Scheduled Monument, in it, and though the basin will not impact on the monument directly, there is the possibility that further remains are within this area and that they could be uncovered during the new works. It is believed that limiting the works in this field will have both environmental and financial benefits. We are therefore considering not constructing the detention basin in this area and taking the runoff to the detention basin (DB5) further to the south.

This alternative location is currently being proposed as a detention basin but we have the option to increase its capacity to take the runoff from the north of the site. The discharge from this basin will be to the un-named watercourse which is currently used as an outfall for the existing carriageway in this area. This watercourse then connects to the Kittycarter Burn.

I have attached two plans which I hope makes this proposal clear.

I would be grateful if you could review this proposal and advise if there are any issues with decreasing the overall contributing area to Shipperton Burn and the subsequent increase in the contributing area to the un-named watercourse and Kittycarter Burn.

If you need any further information, please contact me.

regards

**Rob Sharpe *BEng (Hons) CEng C.WEM MCIWEM***

Technical Manager



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From: "[mike.collins@HistoricEngland.org.uk](mailto:mike.collins@HistoricEngland.org.uk)" <[mike.collins@historicengland.org.uk](mailto:mike.collins@historicengland.org.uk)>

To: A1inNorthumberland <[A1inNorthumberland@highwaysengland.co.uk](mailto:A1inNorthumberland@highwaysengland.co.uk)>

Cc:

Bcc:

Date: Mon, 8 Apr 2019 11:26:22 +0000

Subject: Historic England advice on case PL00551504

Dear Sirs

I am writing in relation to the following:

NSIP: National Significant Infrastructure Project (DCO)



A1 Northumberland: Alnwick to Ellingham Scheme  
[Case Ref. PL00551504; HE File Ref. NSIP 0110/00; Your Reference. TR0100053/S42 (1) (a)]

Due to an error within our systems a previous version of our advice, containing spelling mistakes, was sent to you. Apologies for this and please find attached a corrected version.

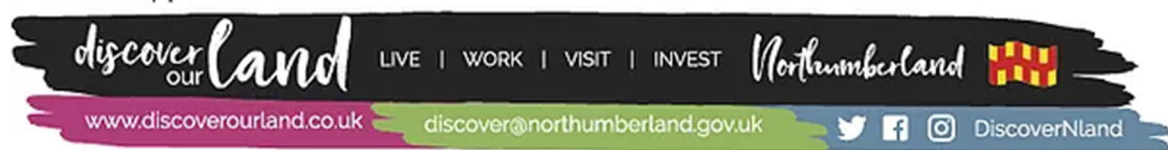
Yours Sincerely

Mike Collins  
Inspector of Ancient Monuments (Hadrian's Wall)  
E-mail: [mike.collins@HistoricEngland.org.uk](mailto:mike.collins@HistoricEngland.org.uk)  
Direct Dial: 0191 2691212

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## 2.1 Northumberland County Council

### 2.1.1 19/2/18

**From:** James Hitching [mailto:james.hitching@northumberland.gov.uk]  
**Sent:** 19 February 2018 17:20  
**To:** Gilliland, Simon <Simon.Gilliland@wsp.com>  
**Cc:** lucy.mo@environment-agency.gov.uk; Caroline.Maarouf@environment-agency.gov.uk; Johnson, Claire <Claire.Johnson@wsp.com>; Sharpe, Rob <Rob.Sharpe@wsp.com>; Thresh, Majlinda <Majlinda.Thresh@wsp.com>; Bedford, Lee <lee.bedford@wsp.com>; Macmillan, Nic <Nic.Macmillan@wsp.com>; Achampong, Henri <Henrietta.Achampong@wsp.com>  
**Subject:** Re: A1 in Northumberland Drainage Strategy

Dear Simon

Thank you for your email and the draft surface water drainage strategy. I have read through the strategy and associated drawings and make the following comments:

It is acknowledged that this is a first draft and as such the strategy makes comments such as "appears to" and "needs to be investigated". When formally submitted, there can be no further unknowns and as such all investigations will need to have been carried out and the strategy amended accordingly. Many other factors still need to be examined and undertaken further, as such we await these details before making comment. The comment made now are partially informative acknowledging additional information is forthcoming.

Following the connectivity/outfall surveys further and complete information on the existing surface water catchments will need to be submitted. As present, areas and catchments have been used to ascertain impermeable areas; however, no background information to these areas has been produced.

Where groundwater levels are high, is it the intention to line the ponds?

Are ponds rather than basins going to be used in every instance within this scheme?

Access to each feature for ongoing maintenance will need to be presented.

Full design and associated drawings for each pond/basin/swale will need to be undertaken and presented.

The draft drainage strategy makes reference to the Q100 greenfield runoff rate and the associated attenuation required in a 1 in 100 year plus climate change event. The defra guidance document Sustainable Drainage Systems Non-statutory Technical Standards for Sustainable Drainage Systems has been correctly reference and the surface water design will need to adhere with this document.

Guidance S2 of this documents reads "S2 For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year

rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event".

At present the 1 in 1 year greenfield runoff rate has not been calculated and therefore it is unknown as to whether the system will be designed as so the system will discharge at these lower rates. This needs to be established within the drainage strategy.

Furthermore guidance S4 states "Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event".

The greenfield runoff volumes have not be calculated and/or presented within the drainage strategy. This is required when especially looking to discharge at the 1 in 100 year greenfield runoff rate. Long-term storage and interception storage may be required as part of the attenuation requirements by adopting this methodology and strategy to disposing surface water. All associated calculations will need to be presented within the drainage strategy.

The government guidance on climate change requires the +20% and +40% scenarios to be looked at and assessed. The impact of the +40% event needs to be looked at within every catchment. The impact on site and off site will need to be examined. Where possible every feature should accommodate the 40% climate change event. Where this is not possible, valid reasons will need to be given and these reasoning will need to be cross-referenced with the risk of flooding on and off-site, as described above.

What impact will the swales/basins/ponds and associated access have on existing features? For example pond P2a appears to overlap with an existing pond.

The impact of existing drainage will need to be looked at particularly where it is inadequate and where existing problems existing. We have alerted you to the issue with the existing holding tanks at Felton and the requirements and desire to improve these as part of this scheme.

With drawing HE 551459 Rev P01 "Offline in-cutting" it appears that the swales are located at a higher level than the road. In this instance how will the road be drained and how will the swales be effectively utilised?

Please get in touch if you want discuss any of the above in more detail.

Kind regards  
James

**James Hitching**

Senior Sustainable Drainage Officer  
Flood & Coastal Erosion Risk Management  
Northumberland County Council  
County Hall  
Morpeth  
NE61 2EF

Direct Line - 01670 623623  
Email – [James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)

On 13 February 2018 at 17:05, Gilliland, Simon <[Simon.Gilliland@wsp.com](mailto:Simon.Gilliland@wsp.com)> wrote:

All,

Further to the meetings and correspondence with the wider WSP Water team on the A1 in Northumberland scheme please find attached our draft surface water drainage strategy for the Morpeth to Felton section of the scheme.

It may be helpful to have a phone conversation/ meeting to discuss this further once you've looked through.

As you'll see the drainage strategy has currently been developed based on Highways England's own climate change guidance.

The guidance received from HE (SES) is that all new schemes shall adopt the following approach to drainage design:

1. For all new schemes that do not involve adaptation of an existing drainage network: Full compliance with the requirements described in NPPF;
2. For all new schemes that involve adaptation of an existing drainage network: Compliance in accordance with HD33, (with the exception of Smart Motorways where IAN 161 shall apply);
3. In both 1 and 2, above, the design solution shall incorporate a 20% uplift in peak rainfall intensity. The proposal shall also sensitivity test the design with a 40% uplift in peak rainfall intensity. The difference between the 2 scenarios (Central and Upper) shall enable the end user to understand the range of impact between the climate change risk scenarios. In the light of this knowledge the Project Sponsor shall determine the appropriate course of action to be implemented;
4. For all schemes that use existing outfalls, the current discharge rates shall not be exceeded. The current discharge rates (no rates were historically pre-defined, or pre-agreed) shall be calculated using the current design methods available within DMRB 4.2.
5. All schemes shall be checked for a 1 in 100 year flooding compliance.

The storage volumes required in 1 in 100 year return period with 20% and the 40% climate change allowances are tabulated below.

Pond Ref.	100yr RP 20% CC storage Volume (m3)	100yr RP 40% CC storage Volume (m3)	Increase in Storage Volume required (%)
Swale 1	1700	2100	24
Swale 2	750	900	20
2a	550	625	14

4	1350	1650	22
6	2100	2550	21
7	1700	2100	24
7a	250	300	20
7b	200	225	13
9	900	1100	22
11	1500	1850	23
12	700	850	21
13	1350	1650	22
14	400	500	25
15	1950	2350	21
15a	500	600	20
17	1350	1650	22
17a	750	875	17
17b	850	1050	24
Local Network	200	225	13
18	1150	1400	22
19	1700	2100	24
Local Network	200	250	25
Local Network	200	250	25

Regards

Simon

**Simon Gilliland MEng CEng MICE**

Principal Engineer (Team Leader) – Flooding & Drainage North West



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2.1.2 22/11/17

**From:** Ryan, Seamus

**Sent:** 22 November 2017 11:46

**To:** gary.mills@northumberland.gov.uk; david.brookes@northumberland.gov.uk; graham.fairs@northumberland.gov.uk

**Cc:** Thresh, Majlinda <Majlinda.Thresh@wsp.com>; Sharpe, Rob <Rob.Sharpe@wsp.com>; Harrison, Colin <Colin.Harrison@wsp.com>; Grymula, Jaroslaw <Jaroslaw.Grymula@wsp.com>; Stylianou, Constantina <Constantina.Stylianou@wsp.com>;

Winnington, Max <Max.Winnington@wsp.com>; Johnson, Claire  
<Claire.Johnson@wsp.com>

**Subject:** FW: A1 M2F Drainage Strategy

Hi gents,

We are just following up on our email from 16<sup>th</sup> November as below.

The separation of the trunk road and local road network drainage systems forms an important part of our drainage strategy for the proposed A1 upgrade. We are currently working on the assumption that the two drainage systems will have separate attenuation (e.g. ponds), but that discharge to the local watercourse will be via a common outfall pipe and outfall structure. Flows from each pond element will need to be restricted to the allowable discharge rates, and this can be achieved by separate flow controls on each pond, or via a common control point if space is restricted.

Access for pond maintenance is being dealt with by our colleagues in the wsp Highways Section.

We would appreciate your comments on this, and for the chance to discuss if required.

Best regards,

Seamus Ryan

**Seamus Ryan BSc CEng MIEI**

Senior Engineer (Contract) – Flooding & Drainage



M +44 (0) 7815502743

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Tithebarn Street, Liverpool  
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**From:** Ryan, Seamus

**Sent:** 16 November 2017 10:25

**To:** 'gary.mills@northumberland.gov.uk' <[gary.mills@northumberland.gov.uk](mailto:gary.mills@northumberland.gov.uk)>;  
'david.brookes@northumberland.gov.uk' <[david.brookes@northumberland.gov.uk](mailto:david.brookes@northumberland.gov.uk)>;  
'graham.fairs@northumberland.gov.uk' <[graham.fairs@northumberland.gov.uk](mailto:graham.fairs@northumberland.gov.uk)>

**Subject:** A1 M2F Drainage Strategy

Hi gents,

I'm currently putting together the drainage strategy document for the proposed A1, Morpeth to Felton, upgrade. I have been provided with the broad strategy for dealing with surface water run-off from your Mr James Hitching.

The strategy, as set out by James, requires separation of the proposed trunk road drainage from the associated local road network drainage.

Currently, the strategy contains a number of elements, as follows:-

1. The actual highway drainage to remove the surface water from the carriageway
2. The potential treatment of the run-off
3. The potential attenuation requirements (e.g. ponds)
4. The potential flow control arrangements
5. The outfall requirements.

The strategy is to discharge to local watercourses via controlled pond attenuation.

The drainage may need to be separated where the proposed Highways England trunk highway impacts on the existing road network. This may then potentially involve separate attenuation ponds, controls, and/or discharge pipes and outfalls for both trunk and local networks. It would be beneficial if the potential duplication of required assets could be reduced by, for example, allowing NCC ponds to discharge into HE ponds prior to outfall; or allowing a joint outfall pipe or outfall structure to be used.

Can you advise me if NCC have a current policy that covers this situation, or can you advise on how previous similar situations have been dealt with? Basically, I need to know as part of the strategy, what is acceptable to NCC as separation of systems.

I would appreciate the opportunity to discuss this at a convenient time.

Many thanks for your help,  
Seamus  
**Seamus Ryan BSc CEng MIEI**  
Senior Engineer (Contract) – Flooding & Drainage



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---

2.1.3 9/11/17

From: James Hitching [<mailto:james.hitching@northumberland.gov.uk>]  
Sent: 09 November 2017 15:38  
To: Ryan, Seamus <[Seamus.Ryan@wsp.com](mailto:Seamus.Ryan@wsp.com)>  
Cc: Thresh, Majlinda <[Majlinda.Thresh@wsp.com](mailto:Majlinda.Thresh@wsp.com)>; Bedford, Lee <[lee.bedford@wsp.com](mailto:lee.bedford@wsp.com)>  
Subject: Re: FW: A1 dualling scheme - flood risk and surface water comments

Dear Seamus



Unfortunately we do not have a document separating out drainage. Hopefully our Highways team can assist with anything specific with regards to this matter in the future.

Thanks

James

**James Hitching**

Senior Sustainable Drainage Officer  
Flood & Coastal Erosion Risk Management  
Northumberland County Council  
County Hall  
Morpeth  
NE61 2EF  
Direct Line - 01670 623623  
Email – [James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)

On 6 November 2017 at 09:30, Ryan, Seamus <[Seamus.Ryan@wsp.com](mailto:Seamus.Ryan@wsp.com)> wrote:

Hi James,

Many thanks for your ongoing help with this development. I was just wondering if NCC have a policy with regard to the separation of the drainage, as outlined below. We understand that NCC adopted highways are to be drained separately, but we are trying to minimise the footprint required to achieve this.

Best regards,

**Seamus Ryan BSc CEng MIEI**

Senior Engineer (Contract) – Flooding & Drainage



---

2.1.4 1/11/17

From: James Hitching [<mailto:james.hitching@northumberland.gov.uk>]

Sent: 01 November 2017 10:13

To: Ryan, Seamus <[Seamus.Ryan@wsp.com](mailto:Seamus.Ryan@wsp.com)>

Cc: Bedford, Lee <[lee.bedford@wsp.com](mailto:lee.bedford@wsp.com)>; Thresh, Majlinda <[Majlinda.Thresh@wsp.com](mailto:Majlinda.Thresh@wsp.com)>; Ruth Bendell <[ruth.bendell@northumberland.gov.uk](mailto:ruth.bendell@northumberland.gov.uk)>; Aaron McNeill

<[aaron.mcneill@northumberland.gov.uk](mailto:aaron.mcneill@northumberland.gov.uk)>; Briggs, Ellie <[Ellie.Briggs@wsp.com](mailto:Ellie.Briggs@wsp.com)>

Subject: Re: A1 dualling scheme - flood risk and surface water comments

Hi Seamus

Thank you for your email. In answer to the points in your proposals:

1. Yes - Where the proposed highway is in greenfield areas, please do calculate run-off so it is restricted to greenfield run-off rates.
2. No - we ask that brownfield areas are calculated in accordance with the Defra document - non-technical standards for sustainable drainage systems. This outlines that for brownfield developments the allowable discharge rate should be akin to that of the greenfield runoff rate for the equivalent area. We would seek that this be achieved. If justification can be made for a higher rate it may be considered however, these developments must provide a minimum 50% improved situation on existing infrastructure for all events and provide evidence as to why the proposed discharge is the lowest feasible.

I hope that this clarifies our position on these aspects on the surface water disposal scheme.

Thanks

James

**James Hitching**

Senior Sustainable Drainage Officer  
Flood & Coastal Erosion Risk Management  
Northumberland County Council  
County Hall  
Morpeth  
NE61 2EF

Direct Line - 01670 623623

Email – [James.Hitching@northumberland.gov.uk](mailto:James.Hitching@northumberland.gov.uk)

On 27 October 2017 at 14:53, Ryan, Seamus <[Seamus.Ryan@wsp.com](mailto:Seamus.Ryan@wsp.com)> wrote:

Hi James,

With regard to your email below, can you please clarify the following in relation to run-off rates:-

Our proposal is:-1. Where the proposed highway is in greenfield areas, run-off will be restricted to greenfield run-off levels. 2. Where the proposed highway includes sections of existing carriageway, run-off will be restricted to existing, non-factored, levels for those sections. I.e. where there is existing hard-standing, climate change only will be added to the run-off calculation for attenuation.

Can you please advise if that is the correct interpretation.

Regards,

Seamus Ryan

---

2.1.5 24/10/17

From: James Hitching [<mailto:james.hitching@northumberland.gov.uk>]

Sent: 24 October 2017 17:06

To: Ryan, Seamus <[Seamus.Ryan@wsp.com](mailto:Seamus.Ryan@wsp.com)>; Bedford, Lee <[lee.bedford@wsp.com](mailto:lee.bedford@wsp.com)>

Cc: Ruth Bendell <[ruth.bendell@northumberland.gov.uk](mailto:ruth.bendell@northumberland.gov.uk)>; Aaron McNeill

<[aaron.mcneill@northumberland.gov.uk](mailto:aaron.mcneill@northumberland.gov.uk)>; Briggs, Ellie <[Ellie.Briggs@wsp.com](mailto:Ellie.Briggs@wsp.com)>

Subject: A1 dualling scheme - flood risk and surface water comments

Dear Seamus and Lee,

Further to your respective emails and the technical meeting last Friday. I feel it is easier to send one email for which I hope encompasses the flood risk and surface water drainage issues around the A1 dualling scheme.

**Flood Risk**

We ask that particular care and attention be made to any works which are within the Cotting Burn catchment. Watercourse AF02 falls within this catchment. The Cotting Burn has caused flooding within Morpeth in the past and therefore we ask that where possible water is

attenuated longer and that the allowable discharge rate is reduced to as small as possible. A similar approach should also be applied on the Benridge Burn which flows into the river Wansbeck. Again, flooding from this source through Morpeth has occurred recently (2008 and 2012).

We ask that a similar principle is applied to all watercourses that flow through Felton. Watercourses AF29 (Bradley Brook) through to AF34 (Back Burn) inclusive. Felton has experienced flooding on numerous occasions in recent memory. Furthermore, there are existing attenuation features at this section of the current A1. The local residents are very vocal and adamant that these features are not working as they should and are contributing to the flooding within Felton when it occurs.

With regards to any river crossing, our preferred solution is for a free standing bridge across the watercourse. If this cannot be achieved we ask for a box culvert, followed by a circular culvert with its diameter as large as possible. At locations where an existing bridge/culvert is in place we ask that the extension of this feature matches that there at present. At any location where this was to change, a watercourse assessment will need to be undertaken and appended to any formal documentation. This assessment will need to demonstrate that there is no increase in flood risk both upstream and downstream as a result of the works. We ask that all matters relating to culverts are undertaken using CIRIA - *Culvert Design Operation Guide*.

Flood risk assessments / watercourse assessments will be required for the crossings at Longdike Burn AF20, Earsdon Burn AF11 and the River Lyne AF06. There are flood outlines associated with these watercourses and dwellings/buildings within close proximity. Therefore it needs to be ensured that the proposed works will not detrimentally affect these features. Please contact the Environment Agency as to whether they have further information on these respective watercourses.

Where access tracks are required to access any new SuDS features, these shall not be raised within areas of floodplain, unless demonstrated and illustrated within the flood risk assessment.

Regarding the River Coquet, the crossing at this location and any works that are within 10 metres of this watercourse, please speak directly to the Environment Agency. The River Coquet is a designated Main River and therefore the Environment Agency are the statutory body who will respond specifically to this.

### **Surface Water**

A drainage strategy will be required for this scheme.

We ask that the surface water is kept in its original existing catchments. As such a plan looking at the existing catchments (and sub-catchments) needs to be devised and submitted. Information from FEH and LiDAR is available and can be used within this assessment. Surface water for the new highway needs to be kept to this catchment, additional plans demonstrating this will need to be submitted.

Please adhere to the DEFRA non-statutory guidance for sustainable drainage with regards to the surface water drainage scheme. This outlines restricted discharge rates and attenuation volumes that we will require. In summary we ask that the allowable discharge rate is

restricted to the existing greenfield runoff rate and that attenuation is provided for the 1 in 100 year plus climate change event. In this instance we will not be requiring an additional allowance for urban creep. Associated calculations will be required for all drainage networks and catchments for this scheme.

SuDS measures need to be included within the drainage scheme. All these features need to be demonstrated on a plan drawing. We ask that all SuDS features are designed in accordance with CIRIA C753 *SuDS Manual*. Health and safety for these features need to adhere to CIRIA RP992 *Health and safety principles for SuDS*.

We have no preference to ponds or basins; however, please be aware of nearby airfields for which preclude the use of ponds and longstanding open water. Additional mitigation may be required at these locations.

All SuDS features need to be located outside of flood zones 2 and 3.

In addition to the DEFRA non-statutory guidance for sustainable drainage, please refer to the LASOO document - *non-statutory guidance for sustainable drainage practice guide*.

### **Further additional comments**

It is NCC's desire to separate the drainage from any new highways that would be adopted by NCC and not the Highways Agency. Therefore within any design, please can the drainage for these sections of highway be distinguished and designed on a separate network accordingly. Where this is not possible, please liaise with NCC Highways, where we can provide further comments.

A drainage survey of the detrunked section of the A1 will need to be undertaken and submitted to NCC.

I hope this addresses all of your preliminary questions, if you do have anything additional then please get in touch.

Kind regards

James

#### **James Hitching**

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## 2.2 Highways England SES

Mon 22/01/2018 13:52

Bailey, Andy <Andrew.Bailey@highwaysengland.co.uk>

RE: A1 MtF Drainage Strategy

To: Sharpe, Rob <Rob.Sharpe@wsp.com>

Good afternoon Rob,

First and foremost, there is no requirement for SES to be involved - except in the case of 'Departures from Standard' and where a 'clarification of the requirements' outlined in our standards is required. DMRB 4.2: HD 49 & HD 50 (currently) set out the basic requirements for a Designer to comply with the requisite (published) standards and the need for the Designer to self-certify the design as complying with the standards. In this context, it would be meaningless for SES Drainage Specialist to even attempt to comment on a design as it would go against our published policy.

However, there are emerging issues in relation to Climate Change (CC) that may not have been fully incorporated in the current version of our published standards. As such, I consider that it would be useful if I reproduced some of the instructions we gave to our consultants commissioned with the task of updating the Drainage Documents contained within DMRD Vol 4.2, with particular reference to HD33 and HD45. The instruction is as follows:

When it comes to Design of Road Drainage HE advise that designers would normally be expected to adopt the following approach:

- All edge drain details for collection of run off and carrier pipes/conduits for conveyance of that run off shall be designed based on the 'rainfall' experienced by the road catchment. River levels and sea levels are not part of this design consideration. However, all drainage design shall incorporate appropriate discharge controls to comply with the national requirements.

Highways England fully recognise the design standards described in the National Planning Policy Framework (NPPF) for climate change adaptation. NPPF provides the controls we need to ensure the SRN drainage network can be designed, constructed and operated in a safe way, and in order to meet our legal obligation not to increase the risk of flooding. All new schemes shall adopt the following approach to drainage design:

1. For all new schemes that do not involve adaptation of an existing drainage network: Full compliance with the requirements described in NPPF;
2. For all new schemes that involve adaptation of an existing drainage network: Compliance in accordance with HD33, (with the exception of Smart Motorways where IAN 161 shall apply);
3. In both 1 and 2, above, the design solution shall incorporate a 20% uplift in peak rainfall intensity. The proposal shall also sensitivity test the design with a 40% uplift in peak rainfall intensity. The difference between the 2 scenarios (Central and Upper) shall enable the end user to understand the range of impact between the

climate change risk scenarios. In the light of this knowledge the Project Sponsor shall determine the appropriate course of action to be implemented;

4. For all schemes that use existing outfalls, the current discharge rates shall not be exceeded. The current discharge rates (no rates were historically pre-defined, or pre-agreed) shall be calculated using the current design methods available within DMRB 4.2.
5. All schemes shall be checked for a 1 in 100 year flooding compliance.

Where rivers and the sea have the potential to influence a highway design the regional effects of climate change must again be taken into account. In this case the impact of climate change on river flows and sea level rise must be taken into account as part of a flood risk assessment. Our HD45 publication, which covers flood risk assessment, signposts the end-user back to Volume 4.2 (HA107) for Culvert design. However, the end user should be aware of, and implement, the most up-to-date climate change guidance to assess risk and design culverts in accordance with the new regional variations defined in NPPF, and to use the higher risk levels when doing so.

*Note on Peak Rainfall Intensity allowances: The working assumption is that all new road infrastructure shall have a design lifetime of 60 years. Under the climate change scenarios for peak rainfall intensity described in NPPF Table 2 the design lifetime of new road infrastructure now places them in the “2080s” banding (Note that NPPF Table 2 brackets the “2080s” peak rainfall intensity scenarios over the 2070 to 2115 period). NPPF text on peak rainfall intensity simply states the need to “understand the range of impact” and refers to the Central and Upper values across all of England that will facilitate this understanding. NPPF Table 2 then defines the “2080s” Central and Upper Peak Rainfall Intensity values as 20% and 40%, respectively. It is in this context that HE requirements are defined. You will note that for completely new road drainage designs our requirements are in full accordance with NPPF, whilst ensuring due diligence is exercised when “understanding” and evaluating the potential effects of a changing climate.*

*It should first be noted that the HD33 guidance on climate change deals with ‘drainage design’ only. When it comes to the effects of climate change on ‘flood risk assessment’ HD33 should simply sign-post the end-user to HD 45. In this way there is a clear distinction between the effects of changing climate on drainage design, as a consequence of changing ‘rainfall intensity’, and on flood risk assessment, as a consequence of changing ‘river level & sea level rise’. Values are defined for both parameters in the National Planning Policy Framework.*

Finally I can confirm that all Drainage Designs shall be undertaken in accordance with HE standards and in consultation with the Local Authorities that are responsible for the side roads.

As it is already covered under HD 49&50, I do not see the need for the Design or Strategy to be reviewed by SES. The exception here is that all ‘Departures from Standards’ will need to be ‘reviewed and approved’ by the relevant SES Specialist.

I hope you find the above helpful in undertaking your design task and help you further define and evidence any further / remaining query you may have.

Regards

**Andy Bailey (FIHE) – Senior Drainage Engineer**

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From: Sharpe, Rob [<mailto:Rob.Sharpe@wsp.com>]

Sent: 22 January 2018 13:02

To: Bailey, Andy

Subject: A1 MtF Drainage Strategy

Importance: High

Hi Andy,

I was given your name by Nanette Hoyle who advised that we run the Drainage Strategy past you.

I have two queries on our methodology that I hope you can help with.

**Climate Change**

In line with HA 33/16 we have allowed a 20% increase in rainfall for both the 1 in 5 year (drainage asset capacity – no flooding) and the 1 in 100 year (off road storage). The local highways authority (Northumberland County Council) have requested that we increase the climate change allowance to 40%. Is this in your view acceptable?

**Storage provision**

We have based the storage volumes (prior to discharging into the local watercourses) on the greenfield runoff rates. For the 1 in 100 year plus climate change event we have restricted the flows to the Q100 figure (based on Qbar, Greenfield Runoff Rates - Institute of Hydrology Report 124 FSR 3-parameter equation). Is this the approach that you would advise?

Will you call me so that we can talk these over, prior to completing the strategy?

Regards

**Rob Sharpe BEng (Hons) CEng C.WEM MCIWEM**

Principal Engineer



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## 2.3 Highways England Project Manager

**From:** Bevan, Tsuwun [<mailto:Tsuwun.Bevan@highwaysengland.co.uk>]  
**Sent:** 22 May 2018 18:22  
**To:** Morrow, David <[David.Morrow@wsp.com](mailto:David.Morrow@wsp.com)>; Achampong, Henri <[Henrietta.Achampong@wsp.com](mailto:Henrietta.Achampong@wsp.com)>; Muscatelli, Dino <[Dino.Muscatelli@wsp.com](mailto:Dino.Muscatelli@wsp.com)>; Johnson, Claire <[Claire.Johnson@wsp.com](mailto:Claire.Johnson@wsp.com)>  
**Cc:** Finnigan, James <[James.Finnigan@highwaysengland.co.uk](mailto:James.Finnigan@highwaysengland.co.uk)>; Mahoney, Joanna <[Joanna.Mahoney@highwaysengland.co.uk](mailto:Joanna.Mahoney@highwaysengland.co.uk)>; Albone, Sarah <[Sarah.Albone@highwaysengland.co.uk](mailto:Sarah.Albone@highwaysengland.co.uk)>  
**Subject:** A1iN - Decisions

All,

Following Project Committee today, I can confirm the following:

**Traffic speed at roadworks** – agreed with request not to implement 60mph through roadworks; agreed there was a strong safety case for 40mph on the online widening sections. But to be prepared for push-back from Customer Focus. As an aside, I have queried with Safe Roads whether they want to see the TN.

**20% v 40% uplift to 4 nr ponds/swales** – agreed not to apply uplift of 40%, e.g. to retain 20% uplift. Can we pick this up with NCC at the next working group meeting - unless you think a separate, specific meeting would be better? I'm meeting with NCC on 5/6 in the morning mainly to provide NoE update ahead of SRG in the afternoon but will give them the heads up

**Appetite to re-build/update the traffic model for BH/weekend traffic** – no decision, but little appetite to do this so seems unlikely. There is a meeting with DfT tomorrow so hoping for some clarity.

**Early works strategy** – we need to work up the strategy for regional committee; **Dave** – can discuss to see what this looks like; I'm thinking we need to cover things like if scheme is pulled, what are the mitigation etc. I think we've already done a lot of this

**VM Workshop** – the one scheduled for 7 June is to be cancelled. Likely to be re-scheduled for Aug, possibly Sept and likely to be more of a Benefits Realisation workshop than VM workshop.

Any questions, let me know

**Tsuwun Bevan** CEng MICE  
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