

The Lake Lothing (Lowestoft) Third Crossing Order 201[*]



Lake Lothing
**THIRD
CROSSING**

Document SCC/LLTC/EX/39: Environmental Statement Volume 3 Appendix 18B

Drainage Strategy - Clean

Revision 1

Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rule 2010

PINS Reference Number: TR010023

Author: Suffolk County Council

Document Reference: SCC/LLTC/EX/39

Date: January 2019

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1 Introduction

1.1 Purpose of the Drainage Strategy

1.1.1 This document sets out the drainage strategy to be adopted for the Scheme. It sets the framework for the design and build contractor to undertake the detailed design of the drainage for the Scheme.

1.2 Proposed Design Parameters

1.2.1 The following design parameters for return periods for drainage from the Scheme must be adopted in the detailed design:

- 1 in 100 years and a 12 hour storm duration for sizing of the storage facilities (75mm) to account for the event of the tidal barrier creating a tidal lock preventing drainage discharge into Lake Lothing;
- 1 in 100 years and a 6 hour storm duration for sizing of the pipe networks and storage facilities (63mm);
- 1 in 1 year design period without surcharge; and
- 1 in 5 years without surcharge up to chamber cover level – i.e. no flooding.

1.2.2 The Design will take into account the effects of climate change +30% additional capacity within the system – for the run-off from the new carriageway only.

1.3 Design Standards to be adopted

1.3.1 The following Design Standards will be used in developing the drainage strategy into a detailed design:

- Design Manual for Roads and Bridges – Volume 4 Section 2 based on HD33/16 and HD45/09;
- Sewers for Adoption 7th Edition 2012; and
- Suffolk County Council Specification for Estate Roads 2007.

2 Drainage Strategy

2.1 Drainage Design

2.1.1 The document has been shall be split into the following 4 sections, with a brief description of the drainage works:

- The new bridge deck;
- The carriageway north of the new bridge;
- The carriageway south of the new bridge; and
- The New Access Road

2.1.2 The drainage strategy identified in this document is depicted on the drawings Nos. 1069948-WSP-HDG-LL-DR-CD-0001, 0002, 0003 and 0004 included in Appendix A, and identifies the areas of carriageway discharging to either the north or south of the new bridge.

2.1.3 The drainage design ultimately discharges into the Anglian Water network at the agreed discharge rate set out in Table 1 below using a flow control device. Anglian Water has undertaken a detailed assessment and have confirmed that the agreed outfalls have enough capacity to cope with the additional runoff generated by the scheme as shown in Table 1 below. Additional storage has been provided within the proposed drainage design system for the 'High Tide event' (tide lock in).

Outfall (AW Reference)	Outfall (Drawing Reference)	Eastern	Northing	Area (m ²)	Predeveloped Site Discharge rate (l/s)	Proposed Discharge rate	Betterment (%)	Attenuation Volume required 6hr - 100year	Comments	Attenuation Volume required 12hr - 100year
MH-9951S	O1	653910	292973	15199	211.3	65.0	69%	958		1094
New chamber	O2	653900	292652	2597	36.1	10.0	72%	180	Outfall beside Nexen Attenuation Tank	187
MH-9954S	O3	653914	292574	4306	59.9	25.0	58%	271		310

Table 1.- Proposed attenuation volumes/outfalls/discharge rates

2.1.4 In addition a non-return flap valve shall be fitted to the discharge point if one is not already fitted.

2.1.5 Vegetated systems will be used to provide storage and a significant degree of treatment of highway runoff and protection to receiving waters. The appropriate vegetation will be designed according to the water level and water supply in line with the requirements of the detailed design, taking into account its integration into the landscape. When the use of vegetated systems is not practical, such as lack of space, appropriate pollution control will be provided to improve the quality of surface water runoff from the carriageway.

2.2 The New Bridge Deck

2.2.1 The lifting section of the new bridge will not feature any positive drainage as reliable pipework connections between the lifting section and the static crossing sections cannot be achieved. Drainage of the carriageway will be accomplished through a

combination of the crossfall on the highway which will drain water laterally towards the kerb line, and the vertical profile of the deck which will drain water longitudinally from the lifting section on to the adjacent fixed spans. This flow will then be collected by the combined kerb drainage system commencing immediately after the joints on each side of the lifting section of the bridge. Provision will be made to collect the run-off that does not flow over the joints via a grating in the kerb line which will feed into transverse channels running across the piers below the deck at each end of the lifting section. These transverse drains will discharge into the positive drainage systems provided as part of the fixed sections of the crossing each side of the lifting section.

2.3 The Carriageway North of the New Bridge

- 2.3.1 The segregated footway/cycleway, combined footway/cycleway and strip for street furniture to each side of the bascule bridge will drain towards the carriageway.
- 2.3.2 Run off from the carriageway including the moveable bridge deck will be collected by a combined kerb drainage system for the majority of the crossing as far as the northern junction.
- 2.3.3 The run-off from the main carriageway and associated footways/cycleways will discharge into a suitably sized pond(s)/storage facility(ies), before it is discharged into the existing Anglian Water system in Peto Way/Denmark Road. A flow control device will be incorporated into the layout to restrict the discharge to a rate agreed with Anglian Water. The existing system will need take into account for the effects of climate change on the network, but only for the area of new carriageway.
- 2.3.4 A separate system with another pond facility will be provided between Denmark Road and the new bridge to store run-off from the Rotterdam Road area prior to discharge into the existing Anglian Water system in Peto Way/Denmark Road. A flow control device will be incorporated into the layout to restrict the discharge to a rate agreed with Anglian Water. The existing system will need take into account the effects of Climate change on the network, but only for the area of new carriageway.
- 2.3.5 The individual ponds will be lined to prevent any historic ground contamination from polluting the water within the ponds themselves, and will be planted to remove hydrocarbons, soluble metals and other sediment bound pollutants from the road drainage. It is anticipated that the junction area itself and the surrounding area will be served by a conventional kerb and gully/manhole and piped system before the run-off is discharged into the drainage pond(s)/storage facilities.
- 2.3.6 Penstocks and oil interceptors (or equipment of similar performance) shall be incorporated into the outfall design to enable the system to be closed down following an accidental spillage on the network.

2.4 The Carriageway South of the New Bridge

- 2.4.1 The segregated footway/cycleway, combined footway/cycleway and strip for street furniture each side of the crossing will drain to the carriageway.
- 2.4.2 Run off from the carriageway including the bridge deck will be collected by a combined kerb drainage system for the majority of the new bridge south towards the southern junction.

2.4.3 The run-off from the main carriageway and associated footways and combined footway/cycleway will be discharged at two separate locations:

- South of main bascule bridge and north of the access serving Nexen, the run-off will be collected into a storage tank situated below the footprint of the bridge. The tank will be sized to store the run-off from a 1 in 100 year storm with a twelve hour duration. Initial calculations indicate that the tank will need to be capable of storing approximately 180m³ of water. The tank will then discharge into an existing Anglian Water stormwater sewer via appropriate pollution control at an acceptable discharge rate to Anglian Water,
- South of the access serving Nexen, the drainage run-off will be captured by oversized pipes within the vicinity of Waveney Drive, before it is discharged into attenuation tanks that will store the extra flow in the event of the lock up of the tidal barrier. An existing Anglian Water storm water system is currently present in Riverside Road, which appears to collect the existing run-off from the Riverside Road area. Flow control devices will be incorporated into the layout from the storage pipes and the attenuation tanks which will restrict the discharge into the existing Anglian Water sewer at a rate acceptable to Anglian Water.

2.4.4 At the southern roundabout the carriageway run-off will be collected by a combination of a conventional gully system for the side roads and a kerb drainage system for the roundabout itself. Storage will be via oversized pipe networks networks and suitably sized attenuation tank(s), prior to discharge into an existing Anglian Water stormwater sewer, through an appropriate pollution control system and at a discharge rate agreed with Anglian Water. Initial calculations indicate that the oversized pipes and the tanks will need to be capable of storing approximately 572m³ of water.

2.4.5 Penstocks and oil interceptors (or equipment of similar performance) shall be incorporated into the outfall design to enable the system to be closed down following an accidental spillage on the network.

2.5 The New Access Road

2.5.1 The drainage for the New Access Road from Waveney Drive to the Riverside Road employment area, and from Riverside Road to Canning Road, will be a conventional manhole, piped network and gully system. These new systems will outfall into the existing Anglian Water storm sewers in either Waveney Drive, and/or the Canning Road/Riverside Road area west of the A12 Lake Lothing Third Crossing, subject to the approval of Anglian Water.

2.5.2 Manholes will be situated in the verge at a maximum spacing of 75m.

2.5.3 Penstocks and oil interceptors (or equipment of similar performance) shall be incorporated into the outfall design to enable the system to be closed down following an accidental spillage on the network.

2.6 Footway/Cycleways

2.6.1 Footways and cycleways which are provided as part of the works, will either:

- Drain towards the carriageway, or

- Drain into a separate system within the footways, which will be collected prior to discharge into the main drainage system.

2.7 Construction Details

2.7.1 Manholes, gullies and pipe networks used for the construction of the Scheme will be constructed in accordance with either:

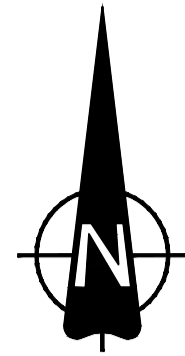
- Suffolk County Council's standard drawings; or
- The MCHW Highway Construction details; or
- Sewers for Adoption 7th Edition 2012 construction details

3 Summary

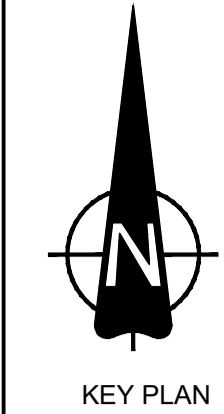
3.1 Summary

- 3.1.1 The discharge points identified are shown in Appendix A and the General Arrangement plans (document reference 2.2).

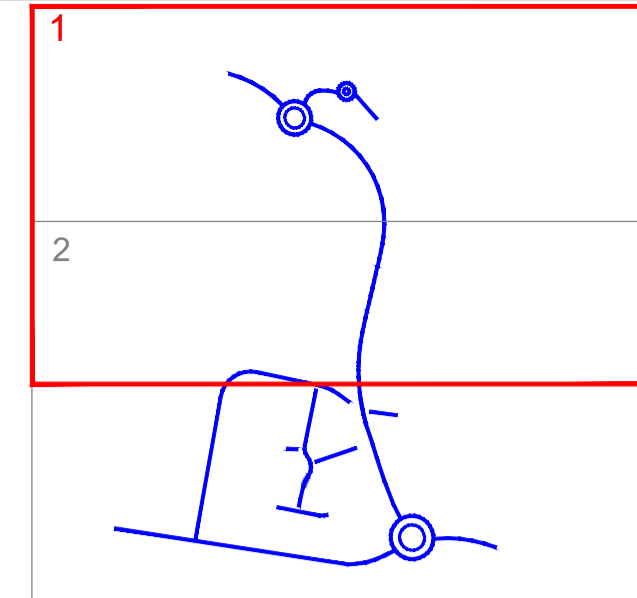
Appendix A - Drawings



SCALE BAR
 0 12.5 25 37.5 50 75 100 125m
 1:1250 (A1)



KEY PLAN



KEY

- DRAINAGE AREA A
- DRAINAGE AREA B
- DRAINAGE AREA C
- DRAINAGE AREA D

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. REFER TO DRAWINGS 1069948-WSP-HGN-LL3X-DR-CH-0103 AND 0104 FOR DETAILS OF PROPOSED CANNING ROAD ACCESS.
3. THE WORKS WILL BE SUBJECT TO DETAILED DESIGN DEVELOPMENT IN ACCORDANCE WITH THE DEVELOPMENT CONSENT ORDER.
4. THESE WORKS PLANS SHOULD BE READ IN CONJUNCTION WITH THE ENGINEERING SECTION DRAWINGS AND PLANS. THE DEVELOPMENT CONSENT ORDER PROVIDES FOR VERTICAL DEVIATION WITH REFERENCE TO THE LEVELS OF THE WORKS SHOWN ON THE ENGINEERING SECTION DRAWINGS AND PLANS.
5. ALL OUTFALLS TO EITHER LAKE LOTHING, ANGLIAN WATER ASSETS, SUFFOLK COUNTY COUNCIL DRAINAGE ASSETS OR NEW SYSTEMS SHALL HAVE POLLUTION CONTROL DEVICES INSTALLED.

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THIRD CROSSING

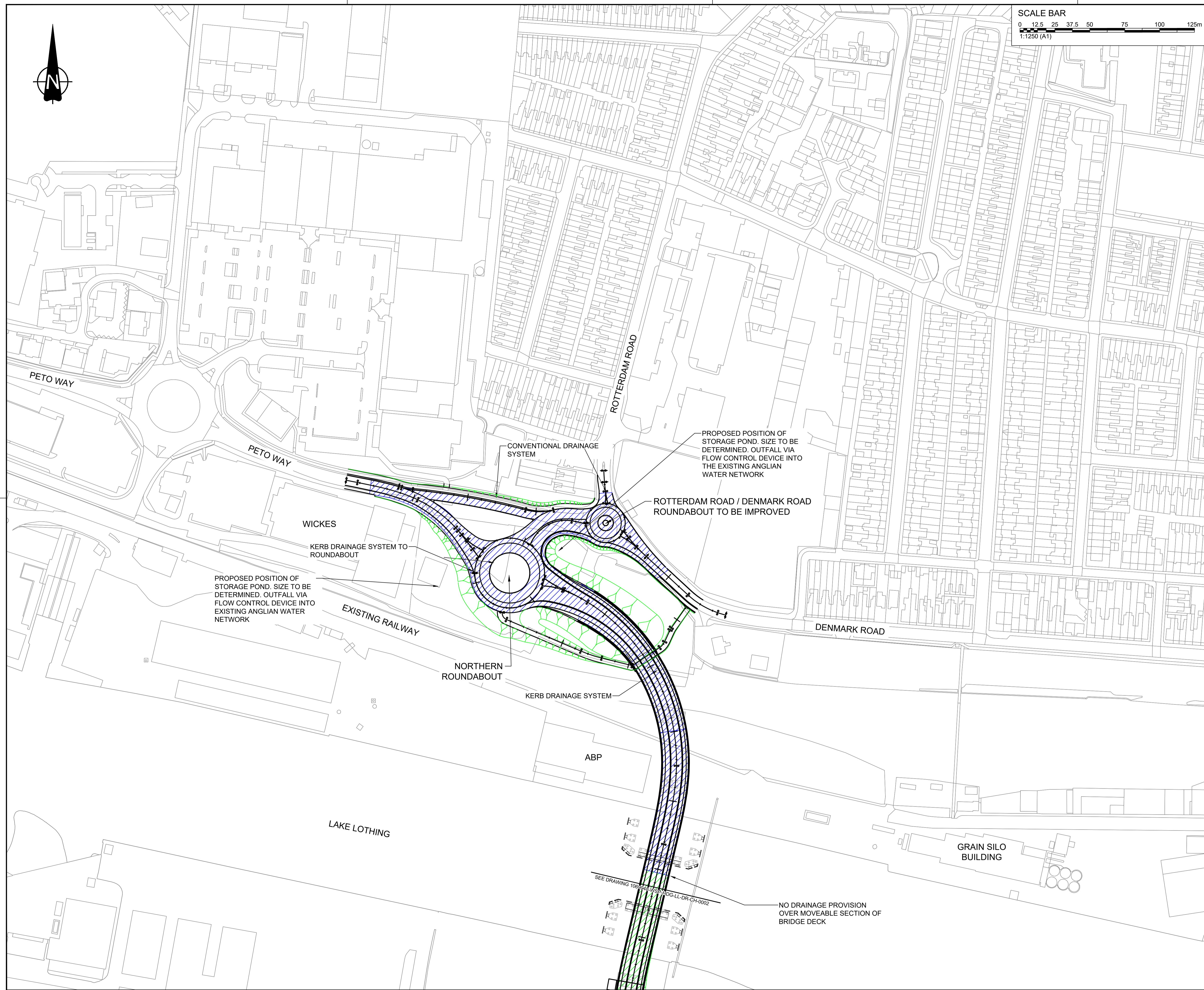
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 LAKE LOTHING THIRD CROSSING
 DRAINAGE STRATEGY
 SHEET 1 OF 2

DRAWING STATUS
 FOR DCO EXAMINATION

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GA	PC	PC	JB	S4

SCALE @ A1 SIZE	DATE	REVISION
1:1250	29/06/18	P00

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Project	Originator	Volume	
1069948-WSP-HDG-LL-DR-CH-0001			
Location	Type	Role	Number



PROPOSED POSITION OF STORAGE POND. SIZE TO BE DETERMINED. OUTFALL VIA FLOW CONTROL DEVICE INTO EXISTING ANGLIAN WATER NETWORK

PROPOSED POSITION OF STORAGE POND. SIZE TO BE DETERMINED. OUTFALL VIA FLOW CONTROL DEVICE INTO THE EXISTING ANGLIAN WATER NETWORK

ROTTERDAM ROAD / DENMARK ROAD ROUNDABOUT TO BE IMPROVED

WICKES

KERB DRAINAGE SYSTEM TO ROUNDABOUT

EXISTING RAILWAY

NORTHERN ROUNDABOUT

KERB DRAINAGE SYSTEM

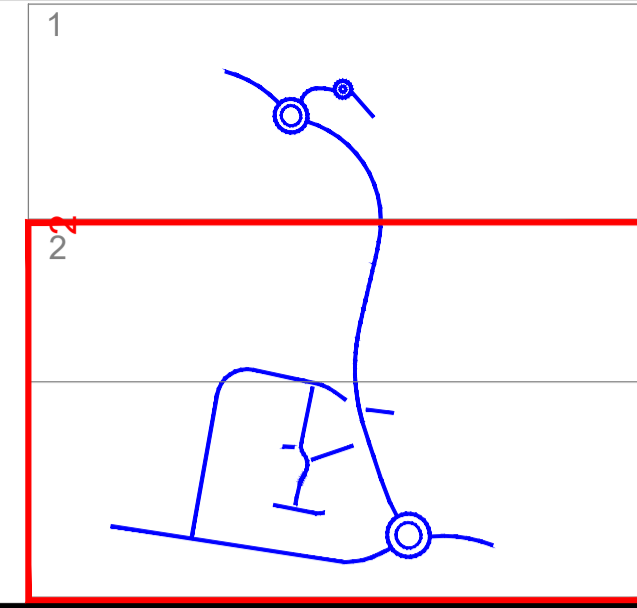
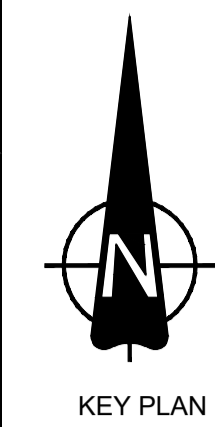
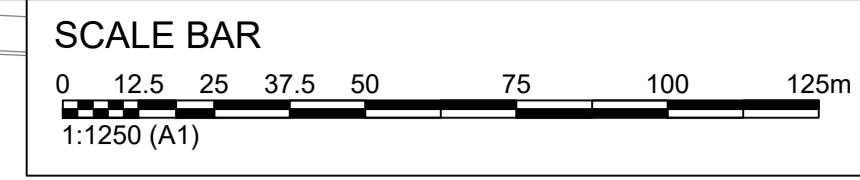
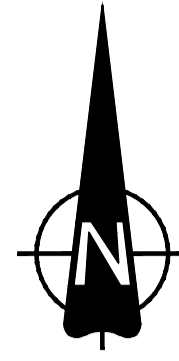
ABP

LAKE LOTHING

GRAIN SILO BUILDING

SEE DRAWING 1069948-WSP-HDG-LL-DR-CH-0002

NO DRAINAGE PROVISION OVER MOVEABLE SECTION OF BRIDGE DECK



LAKE LOTHING

ABP

GRAIN SILO BUILDING

NO DRAINAGE PROVISION OVER MOVEABLE SECTION OF THE BRIDGE DECK

KERB DRAINAGE SYSTEMS

SEE DRAWING 1069948-WSP-HGN-LL3X-DR-CH-0001

PROPOSED STORAGE TANK BELOW FOOTPRINT OF THE BRIDGE (STORAGE TO BE APPROX 135 m³) EXACT POSITION TO BE DETERMINED

NEXEN

DRAINAGE TO COMPRISE CONVENTIONAL MANHOLE AND GULLY SYSTEM

RIVERSIDE

REGISTRY OFFICE

CARRIAGEWAY DRAINAGE TO BE COLLECTED AND DISCHARGED INTO STORAGE TANK BELOW BRIDGE

KERB DRAINAGE SYSTEM

CANNING ROAD

CONVENTIONAL DRAINAGE SYSTEM COMPRISING MANHOLE AND GULLIES TO DISCHARGE INTO EITHER EXISTING ANGLIAN WATER NETWORK OR NEW SYSTEM STORAGE TO BE PROVIDED BY USE OF OVERSIZED PIPES

MOTORLINGS

RIVERSIDE BUSINESS CENTRE

HORN HILL (A12)

TOM CRISP ROUNDABOUT

PROPOSED DRAINAGE TO DISCHARGE VIA FLOW CONTROL DEVICE INTO THE EXISTING DRAINAGE SYSTEM STORAGE TO BE PROVIDED BY USE OF OVERSIZED PIPES

WAVENEY DRIVE (B1531)

CONVENTIONAL DRAINAGE SYSTEM COMPRISING MANHOLES AND GULLIES TO DISCHARGE INTO EITHER EXISTING ANGLIAN WATER NETWORK OR NEW SYSTEM STORAGE TO BE PROVIDED BY USE OF OVERSIZED PIPES

DURBAN ROAD

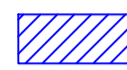
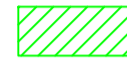


SOUTHERN ROUNDABOUT

TOM CRISP WAY (A12)

WAVENEY CRESCENT WEST

WAVENEY CRESCENT EAST

KEY

-  DRAINAGE AREA A
-  DRAINAGE AREA B
-  DRAINAGE AREA C
-  DRAINAGE AREA D

NOTES

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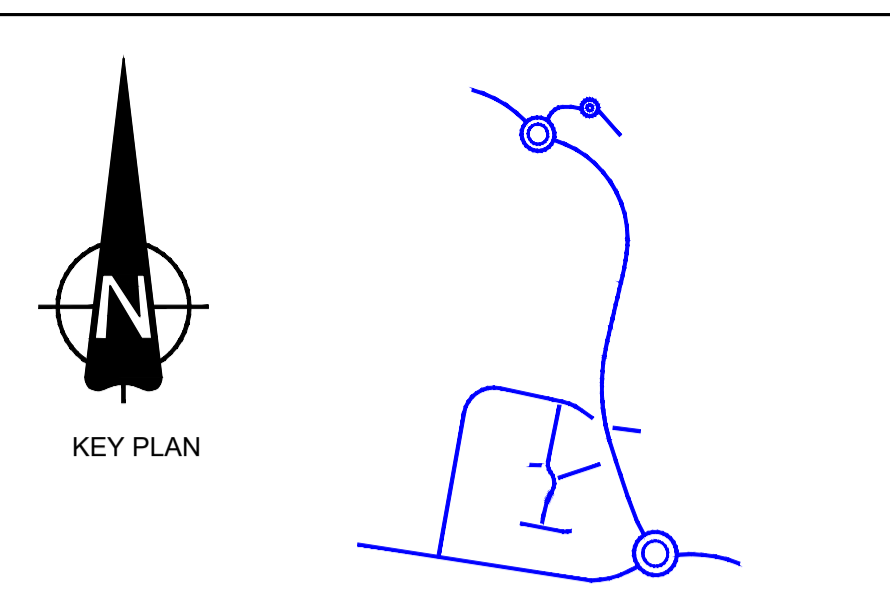
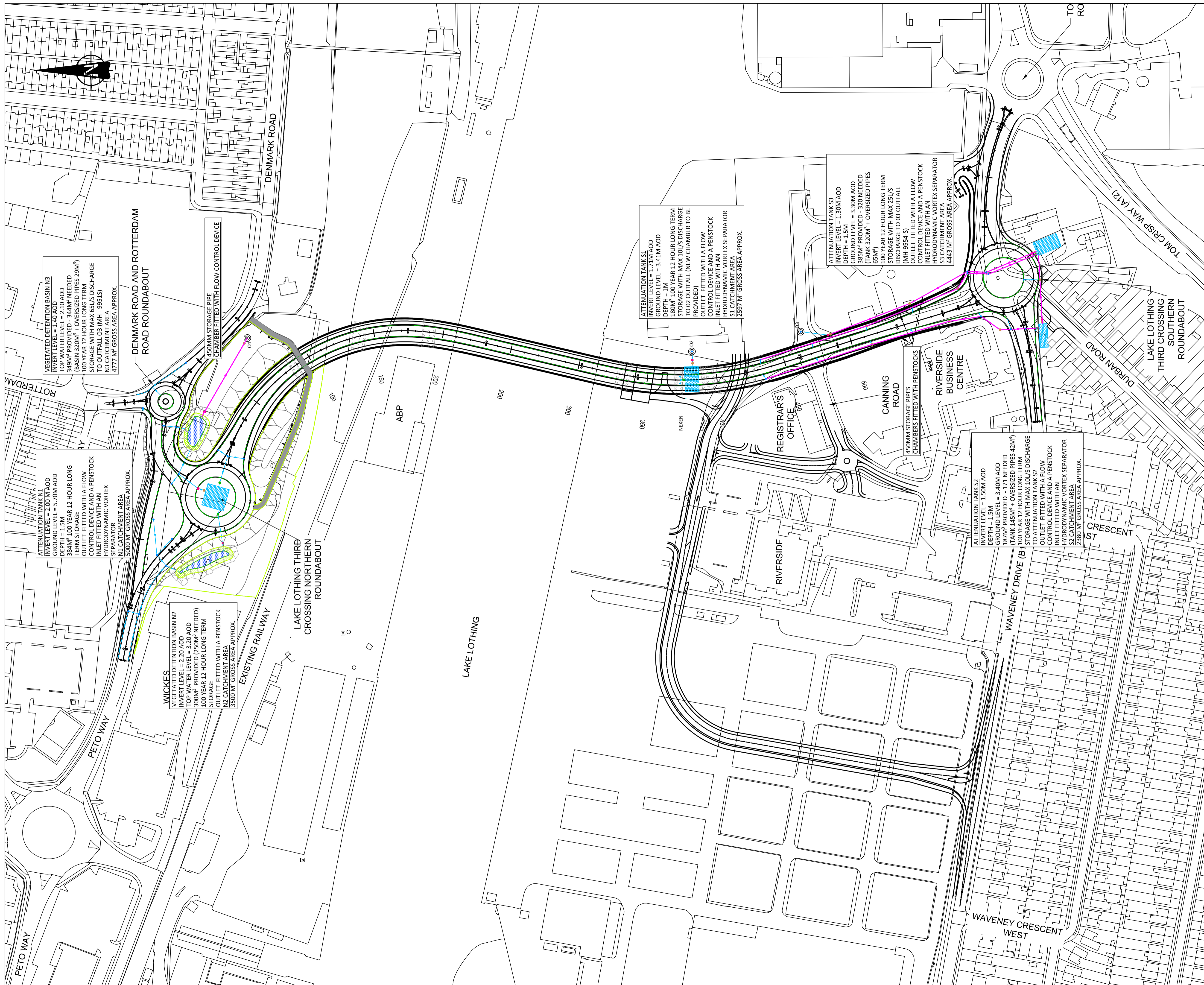
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 DRAINAGE STRATEGY
 SHEET 2 OF 2

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DRAWING NUMBER		Project		Originator		Volume	
1069948-WSP-HDG-LL-DR-CH-0002							
Location	Type	Role	Number				



- KEY**
- COMBINED KERB DRAIN UNITS
 - 450MM OVERSIZED CARRIER DRAIN PIPES
 - CARRIER DRAIN PIPES
 - PROPOSED HEADWALL
 - PROPOSED OUTFALL
 - INDICATIVE ATTENUATION TANK
 - INDICATIVE DETENTION BASIN
 - FILTER STRIP
 - HYDRODYNAMIC VORTEX SEPARATOR
 - FLOW CONTROL DEVICE
 - PENSTOCK
 - PROPOSED CHAMBER

- NOTES**
1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 2. SIZE, AREAS, LEVELS, LOCATION AND SHAPE OF ATTENUATION TANKS AND DETENTION BASIN SYSTEMS ARE INDICATIVE. FINAL SIZE, LOCATION AND SHAPE TO BE CONFIRMED THROUGH DETAIL DESIGN.
 3. DRAWINGS ARE TO BE PRINTED IN COLOUR.
 4. THIS DRAWING HAS BEEN PRODUCED BASED ON ANGLIAN WATER RECORDS AND A TOPOGRAPHICAL SURVEY.
 5. THE POSITION AND NATURE OF ALL EXISTING SURFACE WATER DRAINAGE SYSTEMS SHOWN ON THIS DRAWING IS INDICATIVE AND THE ACCURACY OF THIS INFORMATION CANNOT BE GUARANTEED. WSP WILL ACCEPT NO RESPONSIBILITY IN THE EVENT OF ANY INACCURACY OR OMISSION. THE ACTUAL POSITION OF SUCH ASSETS AND SYSTEMS SHALL BE ESTABLISHED ON SITE BY THE CONTRACTOR PRIOR TO WORKS COMMENCING.

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DESCRIPTION

PROJECT TITLE

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PROPOSED INDICATIVE DRAINAGE

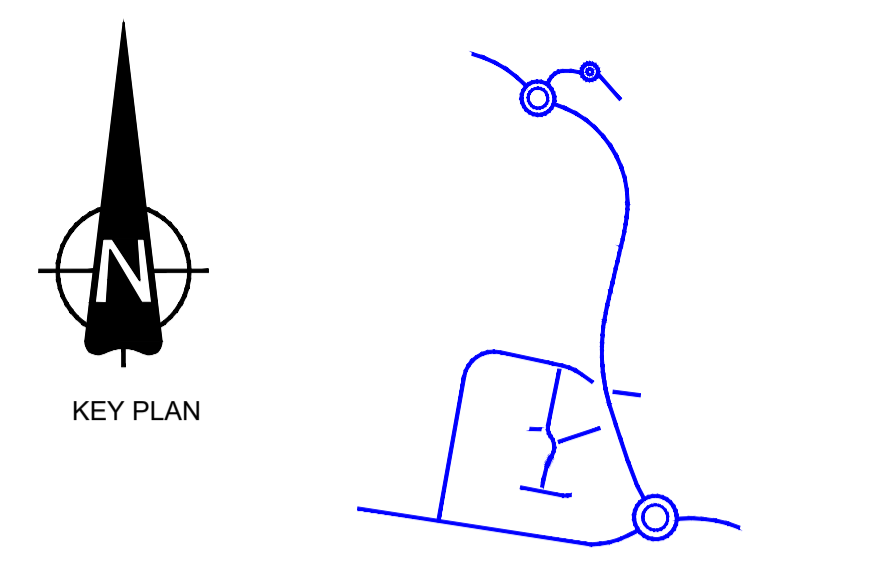
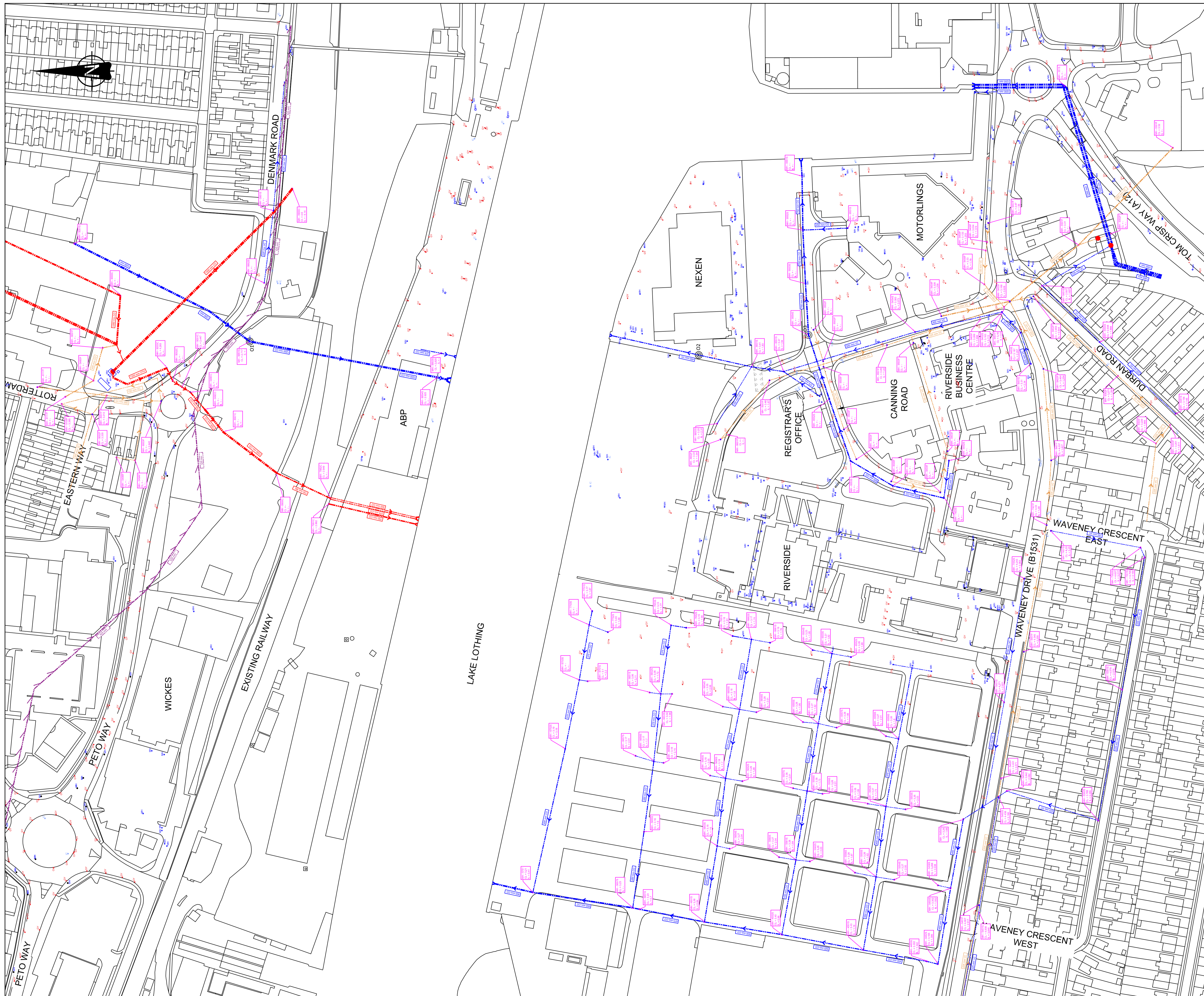
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1069948-WSP-HDG-LL-DR-CD-0003



- KEY**
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 - EXISTING FOUL SEWER (BASED ON ANGLIAN WATER RECORDS AND TOPOGRAPHICAL SURVEY)
 - EXISTING COMBINED SEWER (BASED ON ANGLIAN WATER RECORDS AND TOPOGRAPHICAL SURVEY)
 - EXISTING RISING MAIN (BASED ON ANGLIAN WATER RECORDS)
 - > EXISTING OUTFALL (COLOR DENOTES EFFLUENT TYPE) (BASED ON ANGLIAN WATER RECORDS)
 - EXISTING GULLY ASSET (BASED ON TOPOGRAPHICAL SURVEY)
 - EXISTING CHAMBER ASSET (BASED ON TOPOGRAPHICAL SURVEY)
 - EXISTING PUMPING STATION
 - EXISTING SEWER CHAMBER ASSET (BASED ON ANGLIAN WATER RECORDS AND TOPOGRAPHICAL SURVEY)
 - ⊙ PROPOSED OUTFALL

- NOTES**
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