

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



Lake Lothing
**THIRD
CROSSING**

**Document SCC/LLTC/EX/3985:
Environmental Statement Volume 3
Appendix 18B**

Drainage Strategy—~~clean~~ and Plans

Revision ~~12~~ - tracked

Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rule 2010

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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 unless otherwise agreed with the County Planning Authority:

- 1 in 100 years and a 12 hour storm duration for sizing of the storage facilities (~~75mm~~)84.2mm¹ 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%~~+40%² ~~additional capacity within the system~~ to account for the increase in peak rainfall intensity – for the run-off from the new ~~carriageway~~ highway 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~~
 - Flood Estimation Handbook³; and
 - Suffolk County Council Specification for Estate Roads 2007.

1. Rainfall from the Flood Estimation Handbook, Depth Duration Frequency model updated;
2. Climate change increased as requested by SCC as Local Lead Flood Authority (LLFA);
3. Flood Estimation Handbook added as requested by SCC as LLFA

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~~event' (tide lock in).

Outfall (AW Reference)	Outfall (Drawing Reference)	Eastern	Northing	Catchment Areas (m ²)	Predeveloped Site Discharge rate (l/s)	Proposed Discharge rate (l/s)	Betterment (%)	Attenuation Volume required 12hr - 100year + 40%CC	Attenuation Volume provided 12hr - 100year + 40%CC	Comments
MH-9951S	O1	653910	292973	11439	159.0	65.0	59%	1312	1332	An initial interception of 5mm and a runoff coefficient of 0.6 has been considered for the permeable areas
New chamber	O2	653900	292652	2469	34.3	10.0	71%	286	288	Outfall beside Nexen Attenuation Tank
MH-9954S	O3	653914	292574	5359	74.5	25.0	66%	620	619*	* 11m ³ extra provided by chambers

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Table 1 - Proposed attenuation volumes/outfalls/discharge ~~rates~~rates⁴

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

4. A runoff coefficient of 0.6 has been introduced to consider the landscaping area surrounding the detention basins

4. Paragraph 2.2.1 amended as requested by SCC as Highway Authority.

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. 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. 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.⁵

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/highway.
- 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

5. Paragraph 2.2.1 amended as requested by SCC as Highway Authority.

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~~ 288m³⁶ of water. The tank will then discharge into an existing Anglian Water stormwater sewer via appropriate pollution control at an acceptable discharge rate to ~~Anglain~~ Anglian Water,
- South of the access serving Nexen, the drainage run-off will be captured by oversized pipes and attenuation tanks, within the vicinity of ~~the Waveney Drive, before it is discharged into attenuation tanks that~~ southern roundabout. The storage facilities will storebe capable, of storing the extra flow in the event of the lock up of the tidal barrier. ~~An~~ The run off will be discharged via an existing Anglian Water storm water system, which 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~~ provided before the ~~layout from the storage pipes and the attenuation tanks~~ agreed outfall which will restrict the discharge ~~into the existing~~ to an acceptable rate agreed with Anglian Water ~~sewer at a rate acceptable to Anglain Water.~~⁷

- 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

6. Volume changed to reflect the requirements of SCC as LLFA.

7. Second Paragraph to point 2.4.3 rewritten to reflect comments by SCC as LLFA

with Anglian Water. Initial calculations indicate that the oversized pipes and the tanks will need to be capable of storing approximately ~~572m³~~6130m³⁸ 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 or into the existing drainage present within the land west of the access road⁹, subject to the approval of Anglian Water.

2.5.2 Manholes will be situated in the verge at a maximum spacing of ~~75m~~. 80m.

~~80m~~10.

~~2.5.12~~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

8. Volume changed to reflect the requirements of SCC as LLFA.

9. Manhole spacings changed to reflect the requirements of SCC as Highway Authority.

3 Summary

3.1 Summary

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

Appendix A - Drawings

