

Welsh Government

M4 Corridor around Newport

Environmental Statement
Supplement

Volume 3: Appendix S2.2
Supplementary Drainage
Strategy Report

M4CaN-DJV-HDG-ZG_GEN-RP-CD-0009

At Issue | September 2016

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1 Report Supplements

1.1 Purpose of this Report

1.1.1 The Welsh Government's draft Orders and Environmental Statement for the M4 Corridor around Newport (M4CaN) were published in March 2016. Supplements and Modifications to the draft Orders have been developed by the Welsh Government to be published in September 2016 for the following reasons:

- a) Amendments to the details of parties in the Schedules to the Compulsory Purchase Order following receipt of further information on title holders, lessees and interested parties.
- b) Amendments to the project further to matters raised by responses received to the draft Orders.

Supplements to the Environmental Statement and Associated Reporting are also published to consider the changes as well as further information available since preparing the draft Orders, such as further ecological surveys.

1.1.2 The following design changes have been incorporated as part of this supplement:

1. Minor revisions to the NMU provision at Church Lane and Lighthouse Road.
2. Docks Way Junction: revised horizontal and vertical alignment to lower the slip and link roads, remove the secondary roundabout and change the form of structure of the mainline viaduct (SBR-0885 Docks Way Junction Viaduct). This also reduced the length and height of the retaining wall along Docks Link Road (SRW-0895 Docks Link Retaining Wall).
3. Docks Link Road: realignment of Maes Glas Pill Culvert and bridge extension SBR-0925A and retaining wall SRW-0910 added based on outcome of further survey and as-built information provided allowing further design to be undertaken.
4. Glan Llyn Junction: providing access from Glan Llyn Link Road to the TATA owned land to the east. In addition, providing a retaining wall along the mainline to minimise impact on the existing pylon (SWR-1520 Pylon SE001 Retaining Wall).
5. J23a to J23 Trunk Road: revised vertical alignment at the west tie-in to lower the trunk road, achieved by matching the headroom of the proposed extension to St Bride's Road Bridge to the headroom of the existing St Bride's Road Bridge.
6. Magor Interchange (Junction 23) Roundabout: revised vertical alignment to lower part of the roundabout, achieved by realigning Bencroft Lane, removing Bencroft Lane underpasses and providing an overbridge to the east over the M48 (SBR-2340 Windmill Hill Overbridge).
7. Magor Interchange (Junction 23) Westbound Free-flow Link: revised vertical alignment to lower the free-flow link and height of the associated retaining wall (SRW-2320 Magor Retaining Wall) by introducing a small retaining wall (SRW-2285 Rockfield Lane North Wall) between the link and the J23a to J23 trunk road.

8. Magor Interchange (Water Treatment Area 12B): Further site investigation work has concluded that Vurlong Reen would not be sufficient for discharge of this Water Treatment Area (WTA). An alternative discharge point has been identified, which runs alongside Old Court Farm access drive and from where it would tie into existing drainage arrangements.

1.1.3 The Key Stage 3 Drainage Strategy Report described the proposed drainage strategy for the scheme. This included carriageway drainage, water treatment, attenuation lagoons and culverts.

1.1.4 This supplementary report provides detail of clarification of the drainage strategy resulting from the above design amendments and objections received during Key Stage 4.

1.2 Report Layout

1.2.1 This report presents supplementary information to the Drainage Strategy Report using the same paragraph numbering as the original report.

2 Supplementary material

In response to comments received as part of Key Stage 4, supplementary information is provided.

1. The risk of pollution and reduced water quality to the Gwent Levels especially during periods of heavy rainfall.

1.1 As described in Chapter 16 of the Environmental Statement, the proposed new section of motorway has been designed to capture all surface water run-off via naturally cleansing grass lined channels or conventional concrete channels where this isn't practically feasible.

1.2 Captured water is then conveyed by gravity into twelve dedicated water treatment areas located at regular intervals along the section of new motorway. Only once water has been passed through a sequence of treatment processes including sediment and oil traps, an open water lagoon and a large reed bed, does water return to the SSSI via a discharge to a main ree.

1.3 It was recognised at an early stage that the ability of the drainage and pollution control systems to function during severe weather was essential to manage water quality and flood risk within the Gwent Levels.

1.4 The normal design standards for trunk roads and motorways are that drainage systems are designed to accommodate a 1 year return period storm within the pipework and ensuring that a 5 year return period storm does not result in surface flooding. For the new section of motorway this was recognised as being an inappropriate standard due to the risk of potentially contaminated surface water finding its way into the ree system on the Gwent Levels.

1.5 For the new section of motorway the highway drainage systems have been designed to contain all flows up to a 100 year return period storm including a

30% increase in precipitation to account for climate change. This will ensure that the drainage systems are capable of conveying all this flow to the Water Treatment Areas (WTA) for attenuation and treatment.

- 1.6 When flows enter the WTA they first pass through a forebay area before entering the main attenuation lagoon. The forebay contains systems which are designed to retain a minimum of 50 cubic metres of oil/hydrocarbon. Any oil/hydrocarbon which is not retained within the forebay will pass into the main attenuation lagoon. The discharge out of the lagoon also contains systems to prevent oil/hydrocarbon entering the reed bed. The lagoons have the capacity to retain very large volumes of oil/hydrocarbon.
- 1.7 The attenuated flow is then trickle fed through the reed bed for final polishing and treatment.
- 1.8 Penstocks will be provided on the discharge points from the forebay, lagoon and reed bed to provide additional pollution control if this is appropriate during the management of an emergency.
- 1.9 The main attenuation lagoon has been designed to restrict flow to the equivalent 'greenfield runoff' within the Gwent Levels. The lagoons have sufficient storage capacity to attenuate flows from a 100 year return period storm including a 30% increase in precipitation, (climate change). Discharge rates from the lagoon are restricted to a flow equivalent to 3.5 l/sec for every hectare of carriageway. This rate of run-off has been agreed with Natural Resources Wales and has been used by the Internal Drainage Board for developments within the area of the Gwent Levels for many years.
- 1.10 Filter drains will be introduced at the base of the cuttings to control ground water where appropriate.

In addition to the additional information above, the following information should be substituted from the Drainage Strategy Report.

Table 3 to be replaced with the table below.

Table 3 Culvert details

Structure No.	Culverted Watercourse	Bed Level (m AOD)	WPL (m AOD)	SPL (m AOD)	Chainage	Nearest Structure
SMN 0510	Nant-y-Moor Reen (extension of existing)	3.71	4.25	4.7	5+100	W56
SMN 0550	SDR Reen Culvert	4.31	4.65	5	5+500	W50
SBR 0570	Percoed Reen	4.31	4.65	5	5+850	W50
SMN 0680	Morfa Gronw Reen	3.9	5.55	5.55	6+900	W69

Structure No.	Culverted Watercourse	Bed Level (m AOD)	WPL (m AOD)	SPL (m AOD)	Chainage	Nearest Structure
SMN 0770	Old Dairy Reen Field Access Culvert	4.1	5.77	5.82	7+700	W73
SMN 0775	Old Dairy Reen	4.1	5.77	5.82	7+750	W73
SMN 0800	Pont-y-Cwch Reen	4.8	5.70	6.00	7+990	W81
SMN 0805	Replacement Reen Pont-y-Cwch	4.8	5.7	6.000	8+050	W81
SBR 0835	Sea Wall Reen	TBC	TBC	TBC	8+380	N/A
SMN 0905A	Maes-Glas Pill Culvert Extension	TBC	TBC	TBC	9+050	N/A
SMN 1180	Picked Lane Culvert	TBC	TBC	TBC	11+800	N/A
SMN 1230	Lakes Reen	3.895	4.70	5.30	12+350	C01
SMN 1235	Lake's Reen North Access Culvert	3.895	4.70	5.30	12+350	C01
SMN 1240	Julian's Reen Side Road	3.895	4.70	5.30	12+450	C01
SMN 1250	Julian's Reen Farm Access Culvert	3.895	4.70	5.30	12+500	C01
SMN 1300	Julian's Reen	3.895	4.70	5.30	13+000	C01
SMN 1305	Tatton Farm Access	3.895	4.7	5.30	13+050	C01
SMN 1310	Julian's Reen Access Track Culvert	3.895	4.7	5.30	13+050	C01
SMN 1330	Tatton Farm Culvert	4.00	4.23	4.5	13+300	N/A
SMN 1350	Field Culvert	4.00	4.23	4.5	13+550	N/A
SMN 1430	Ellen Reen	3.61	4.23	4.5	13+900	C23
SMN 1445	Ellen Reen Diversion Track Culvert	3.61	4.23	4.5	14+400	C23
SMN 1470	Black Wall Reen Tata Access	3.50	4.23	4.50	14+850	C23

Structure No.	Culverted Watercourse	Bed Level (m AOD)	WPL (m AOD)	SPL (m AOD)	Chainage	Nearest Structure
SBR 1485	Monk's Ditch Tata Access crossing	4.35	4.00	5.30	14+750	N/A
SMN 1475	Glan Llyn Link SAR Ditch	TBC	TBC	TBC	14+800	N/A
SMN 1480	Black Wall Reen	3.50	4.23	4.50	14+890	C23
SMN 1485	Clean Ditch Tata Access Culvert	TBC	TBC	TBC	14+900	N/A
SBR 1480	Monk's Ditch	4.35	4.00	5.30	14+900	N/A
SMN 1490	Dirty Ditch Tata Access Culvert	TBC	TBC	TBC	14+930	N/A
SBR 1640	Steelworks Dedicated Reen	1.25	-	-	15+750	N/A
SMN 1655	Elver Pill Reen	3.785	4.26	4.5	16+650	C35
SMN 1720	New Cut Reen	2.965	4.1	4.45	17+200	C62
SMN 1750	North Row SAR Culvert	TBC	TBC	TBC	17+500	N/A
SBR 1755	Middle Road Reen Bridge	2.965	4.1	4.45	17+550	C62
SBR 1770	North Row Middle Road Diversion Reen (South)	2.965	4.1	4.45	17+800	C62
SBR 1780	M4 Midde Road Diversion Reen Bridge	2.965	4.1	4.45	17+900	C62
SMN 1850	Cock Street Reen	3.00	3.60	4.30	19+250	N/A
SMN 1925	Petty Reen	3.00	3.60	4.30	19+250	N/A
SMN 1940	Rush Wall Reen Culvert	3.00	3.60	4.30	19+275	N/A
SMN 1970	Bareland Street East North Culvert	TBC	TBC	TBC	19+700	N/A
SMN 1980	Bareland Street East South Culvert	TBC	TBC	TBC	19+750	N/A

The following paragraph has been amended following comments.

- 2.1.1** The culverts will be sufficiently large to allow man entry for maintenance purposes. The major cross carriageway culverts will include penstocks to

block the water flow. This will allow water within the culvert to be pumped out and allow man entry for desilting of the culvert. The culverts are to be designed to allow the invert level to be placed at a minimum of 150mm below the bed level of the reens being culverted. In addition, a minimum of 200mm free board is allowed above the summer penning level of the reens. Mammal crossings will be provided independently to the hydraulic culverts. The mammal crossings will be 900mm dia pipes which will be positioned with the invert above the SPL.

Appendix A has been amended.

Appendix A

Figure 2 - Water Treatment Area
Layout

A1 Figure 2

