M2 Merge and Diverge Assessment

Document no: 0
Revision: 3

Medway Council

Medway Local Plan
16 December 2025

M2 Merge and Diverge Assessment

Client name:	Medway Council		
Project name:	Medway Local Plan		
Client reference:		**Project no:**	B2432000
Document no:	0	**Project manager:**	Jessica Denny
Revision:	3	**Prepared by:**	Ana Ferreira
Date:	16 December 2025	**File name:**	Merge Diverge Assessment_TN_Rev2

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
1	June 2025	Draft	AF	BS	BS	JD
2	Dec 2025	Draft	AF	BS	BS	JD
3	Dec2025	Final – with M20	AF/SC	JD	BS	JD

Distribution of copies

Revision	Issue approved	Date issued	Issued to	Comments

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Contents

Appendices

Figures

1. Introduction

This document was prepared following Medway Council's request to examine the impacts of the Local Plan upon the slip road merges and diverges for the five following junctions (as shown in Figure 1):

- M2 Junction 1;
- M2 Junction 2;
- M2 Junction 3;
- M2 Junction 4;
- M2 Junction 5;
- M20 Junction 4;
- M20 Junction 5.

Figure 1 - Junctions' location

The merge and diverge assessments present in this document were carried out in accordance with the diagrams in Design Manual for Road and Bridges – CD 122 Geometric design of grade separated junctions.

The assessments compare the peak hour flows for the AM and PM merges/diverges with M2 and M20 mainline flows. Using the 2041 refined Reference Case (rRC), including the completed and committed developments between 2019 and 2041 and the 2041 final Do Something (fDS) which includes the additional growth associated with the local plan developments.

For the merge assessment, the upstream mainline flows were used and for the diverge assessment, the downstream mainline flows were used. An increase in provision may be required when forecast traffic

volumes exceed the capacity of the current or proposed layout, potentially leading to congestion or safety concerns. However, the focus of this merge and diverge assessment would only consider mitigation if there was a layout change between the rRC and the fDS provision.

Figure 2 to Figure 8 show the location of each junction's merge/diverge.

Figure 2 – M2 Junction 1

Figure 3 - M2 Junction 2

Figure 4 - M2 Junction 3

Figure 5 - M2 Junction 4

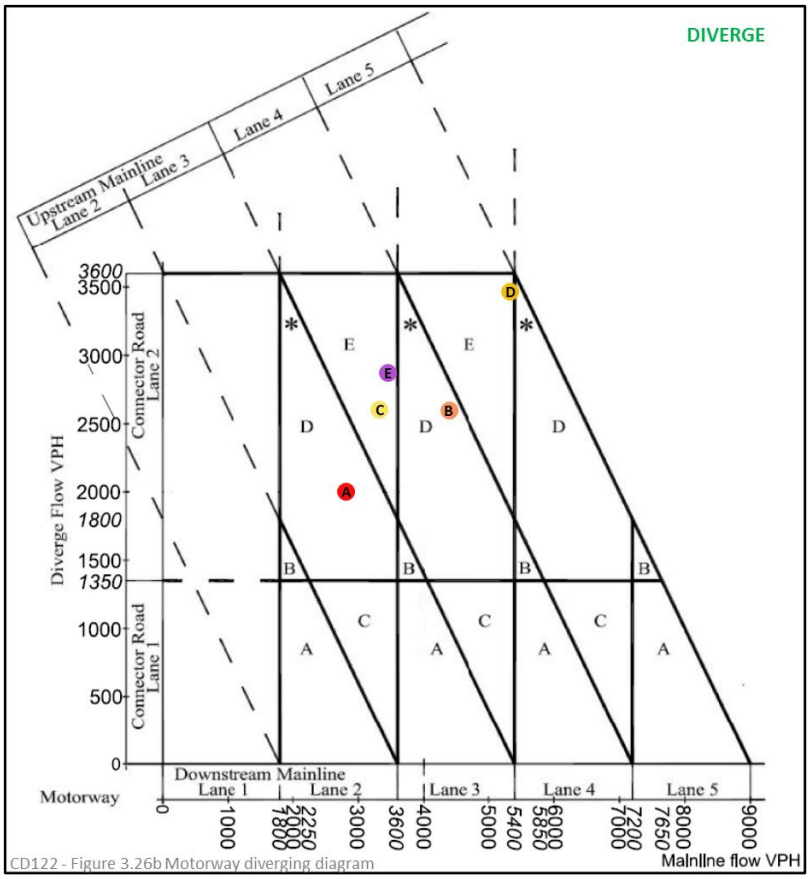
Figure 6 - M2 Junction 5

Figure 7 - M20 Junction 4

Figure 8 - M20 Junction 5

2. M2 Junction 1

(1) M2 EASTBOUND: DIVERGE



CD122 - Figure 3.26b Motorway diverging diagram

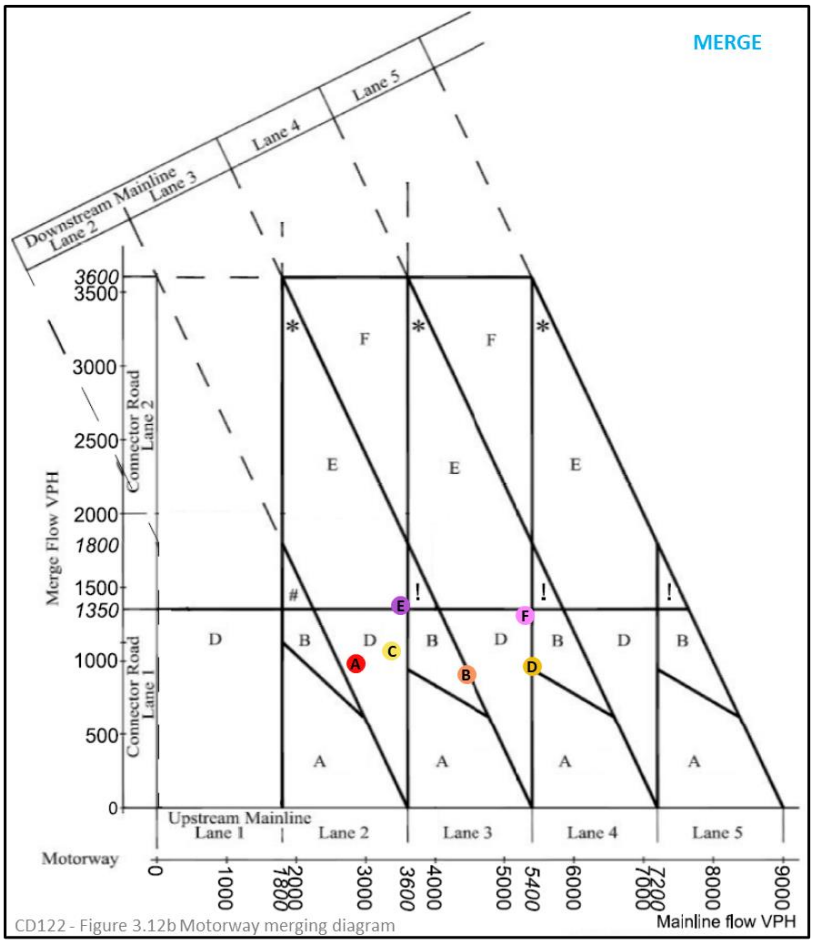
Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	2853	1970
B	Base_PM	4433	2568
C	Ref Case LTC_AM	3364	2574
D	Ref Case LTC_PM	5366	3440
E	DS LTC_AM	3492	2847
F	DS LTC_PM	5274	3946

Scenario	Diverge Layouts	
	AM	PM
Current Layout	D2	
Base	D	D
Ref Case LTC	E	E
Do Something LTC	E	n/a

Notes:

- The M2J1 EB diverge (off-slip) is currently type D2 layout.
- As an increase in provision is required in the rRC, the maximum required provision (type E) does not change between rRC and the fDS. The maximum provision (two-lane drop) is already required at the reference case.

(2) M2 EASTBOUND: MERGE



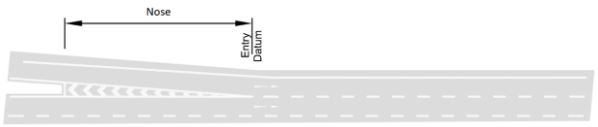
CD122 - Figure 3.12b Motorway merging diagram

Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	2853	960
B	Base_PM	4433	888
C	Ref Case LTC_AM	3364	1045
D	Ref Case LTC_PM	5366	942
E	DS LTC_AM	3492	1351
F	DS LTC_PM	5274	1287

Scenario	Merge Layouts	
	AM	PM
Current Layout	D	
Base	D	B
Ref Case LTC	D	D
Do Something LTC	E	D

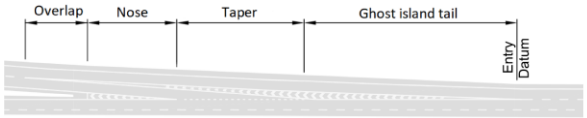
Notes:
- The M2J1 EB merge (on-slip) is currently type D layout.
- By the fDS, an increase is required from type D to a type E*.

Current scenario:



CD122 - Figure 3.14e Layout D - lane

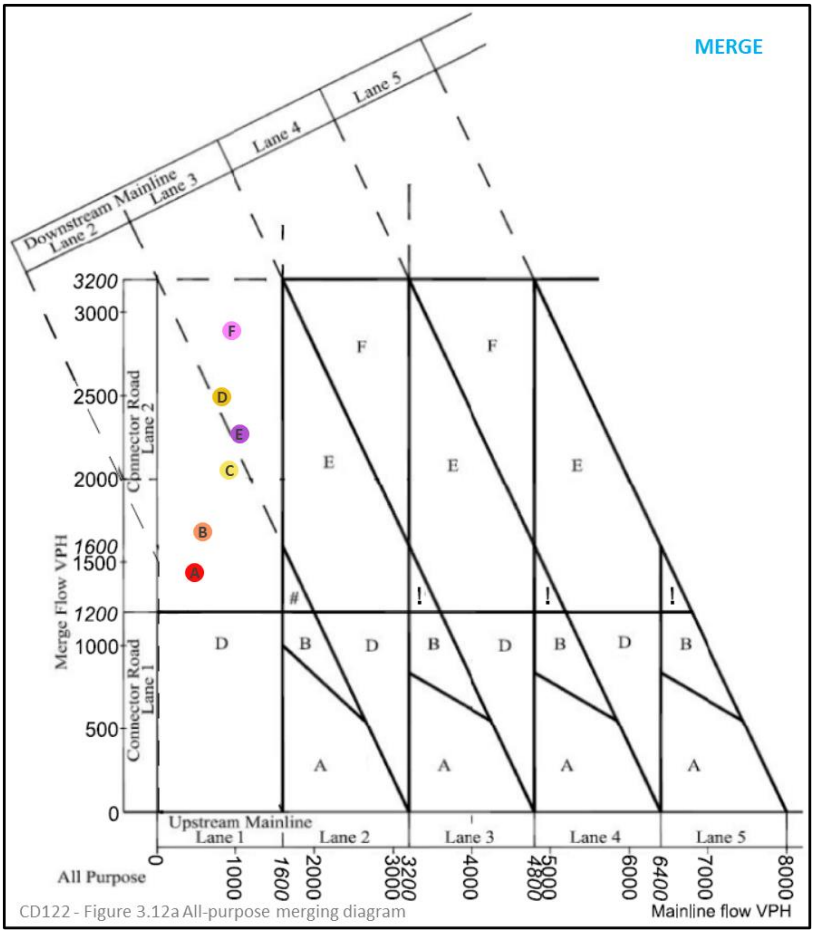
Reference Case and DS (with LTC)

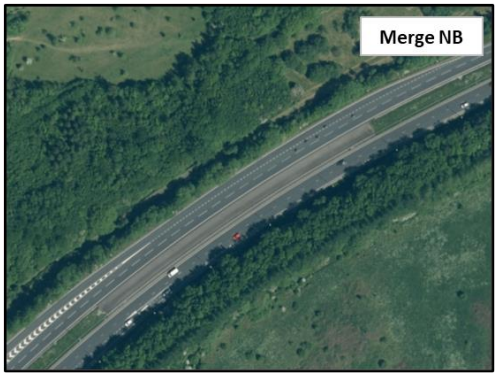


CD122 - Figure 3.14g Layout E Option 1 - lane gain with ghost island offside merge

*The proposed mitigation can be found in Section 0.

(3) A289 NORTHBOUND: MERGE





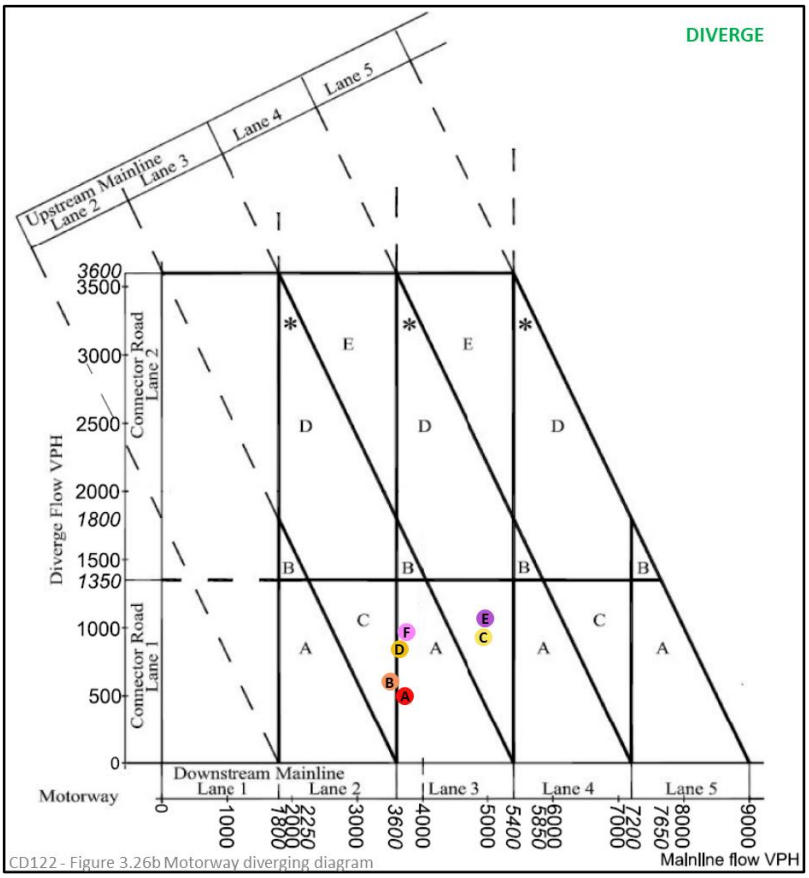
Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	462	1417
B	Base_PM	564	1661
C	Ref Case LTC_AM	897	2031
D	Ref Case LTC_PM	809	2467
E	DS LTC_AM	1031	2248
F	DS LTC_PM	930	2863

Scenario	Merge Layouts	
	AM	PM
Current Layout	B	
Base	n/a	n/a
Ref Case LTC	n/a	n/a
Do Something LTC	n/a	n/a

Notes:

- The A289 NB merge (on-slip) is currently type B layout.
- This is a complex merging situation where merging flow is higher than mainline flow. It is recommended that an E type layout would be more suitable here, but this is not due to the local plan scenarios as there is no change in provision likely to be required from the reference case.

(4) M2 WESTBOUND: DIVERGE

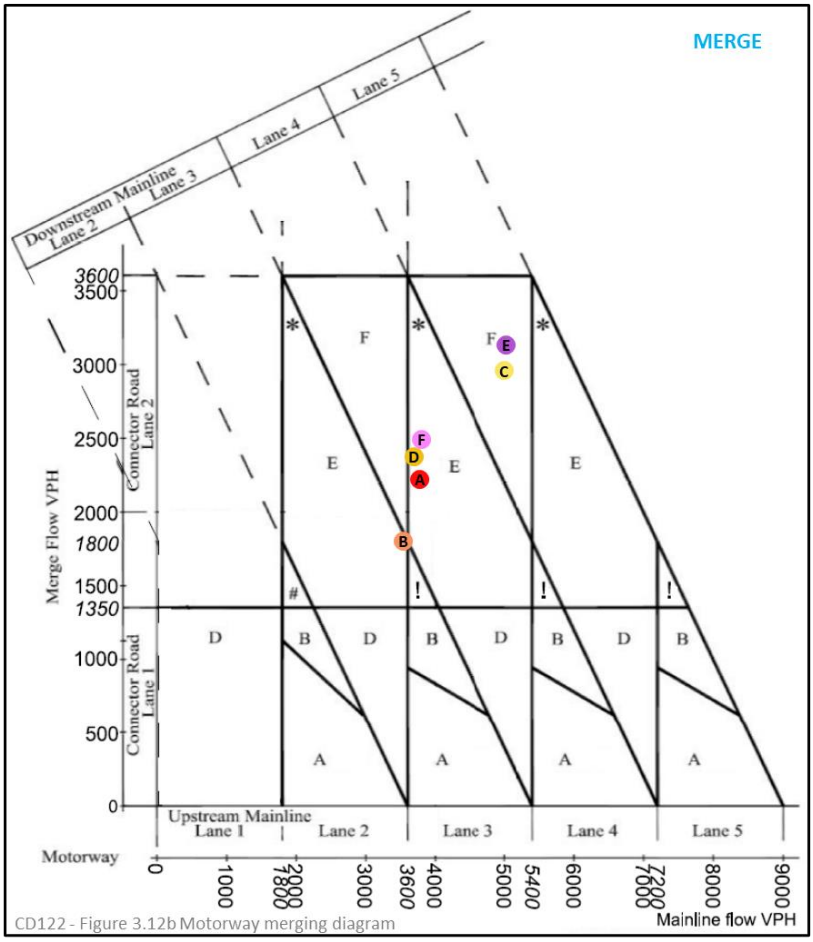


Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	3768	462
B	Base_PM	3538	564
C	Ref Case LTC_AM	4965	897
D	Ref Case LTC_PM	3685	809
E	DS LTC_AM	4998	1031
F	DS LTC_PM	3795	930

Scenario	Diverge Layouts	
	AM	PM
Current Layout	C	
Base	A	C
Ref Case LTC	C	A
Do Something LTC	C	A

Notes:
- The M2J1 WB diverge (off-slip) is currently type C layout.
- All scenarios modelled show no increase required to level of provision.

(5) M2 WESTBOUND: MERGE



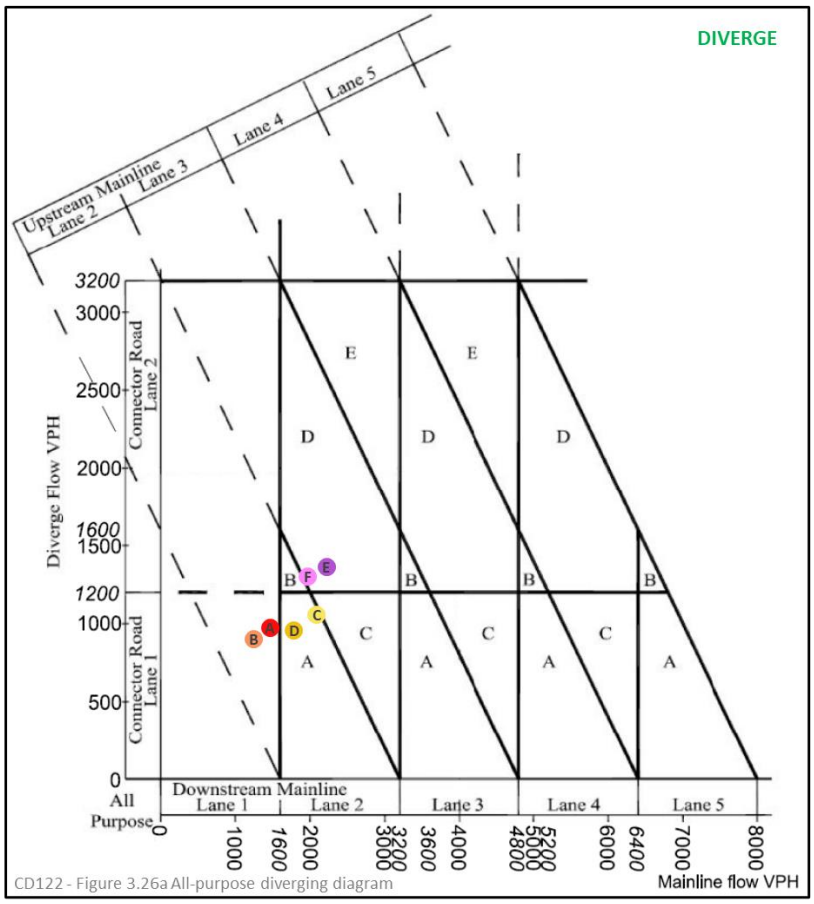
Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	3768	2190
B	Base_PM	3538	1771
C	Ref Case LTC_AM	4965	2919
D	Ref Case LTC_PM	3685	2341
E	DS LTC_AM	4998	3095
F	DS LTC_PM	3795	2460

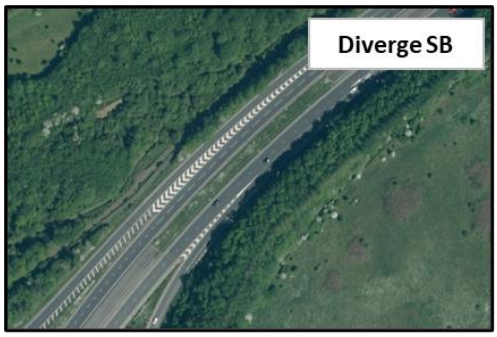
Scenario	Merge Layouts	
	AM	PM
Current Layout	F	
Base	E	E
Ref Case LTC	F	E
Do Something LTC	F	E

Notes:

- The M2J1 WB merge (on-slip) is currently type F layout.
- All scenarios modelled show no increase required to level of provision.

(6) A289 SOUTHBOUND: DIVERGE





Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	1443	960
B	Base_PM	1226	888
C	Ref Case LTC_AM	2069	1045
D	Ref Case LTC_PM	1767	942
E	DS LTC_AM	2203	1351
F	DS LTC_PM	1954	1287

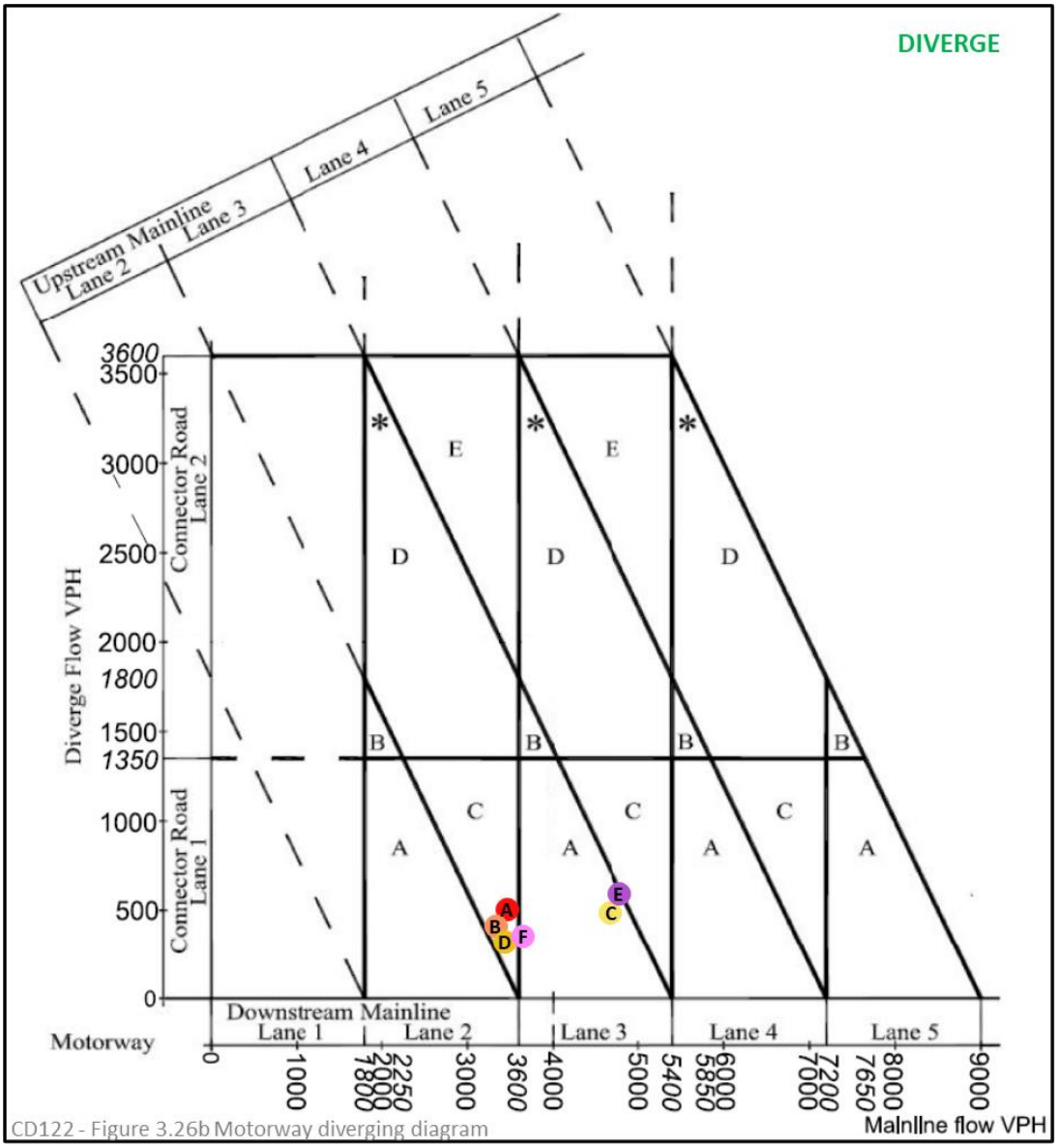
Scenario	Diverge Layouts	
	AM	PM
Current Layout	A1	
Base	n/a	n/a
Ref Case LTC	D	B
Do Something LTC	D	D

Notes:
- The A289 SB diverge (off-slip) is currently type A1 layout.
- By the fDS, an increase is required from type A to a type D*.

*The proposed mitigation can be found in Section 7.

3. M2 Junction 2

(1) M2 NORTHBOUND: DIVERGE



CD122 - Figure 3.26b Motorway diverging diagram

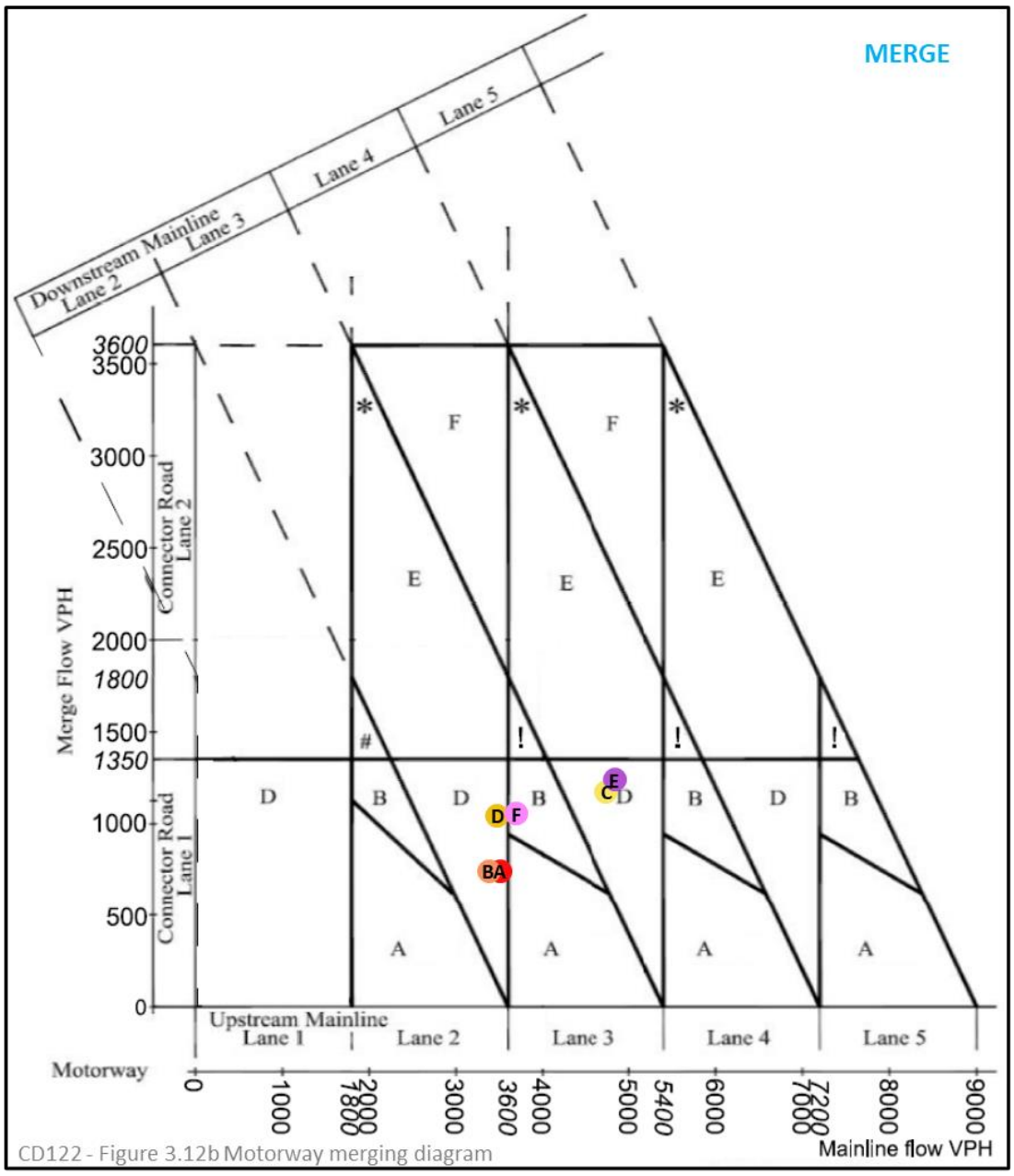
Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	3503	467
B	Base_PM	3372	374
C	Ref Case LTC_AM	4709	448
D	Ref Case LTC_PM	3471	284
E	DS LTC_AM	4811	554
F	DS LTC_PM	3690	317

Scenario	Diverge Layouts	
	AM	PM
Current Layout	C	
Base	C	C
Ref Case LTC	A	C
Do Something LTC	A	A

Notes:

- The M2 J2 NB diverge (off-slip) is currently type C layout.
- All scenarios modelled show no increase required to level of provision.
- Therefore, the local plan would not require mitigation at this diverge.

(2) M2 NORTHBOUND: MERGE



CD122 - Figure 3.12b Motorway merging diagram

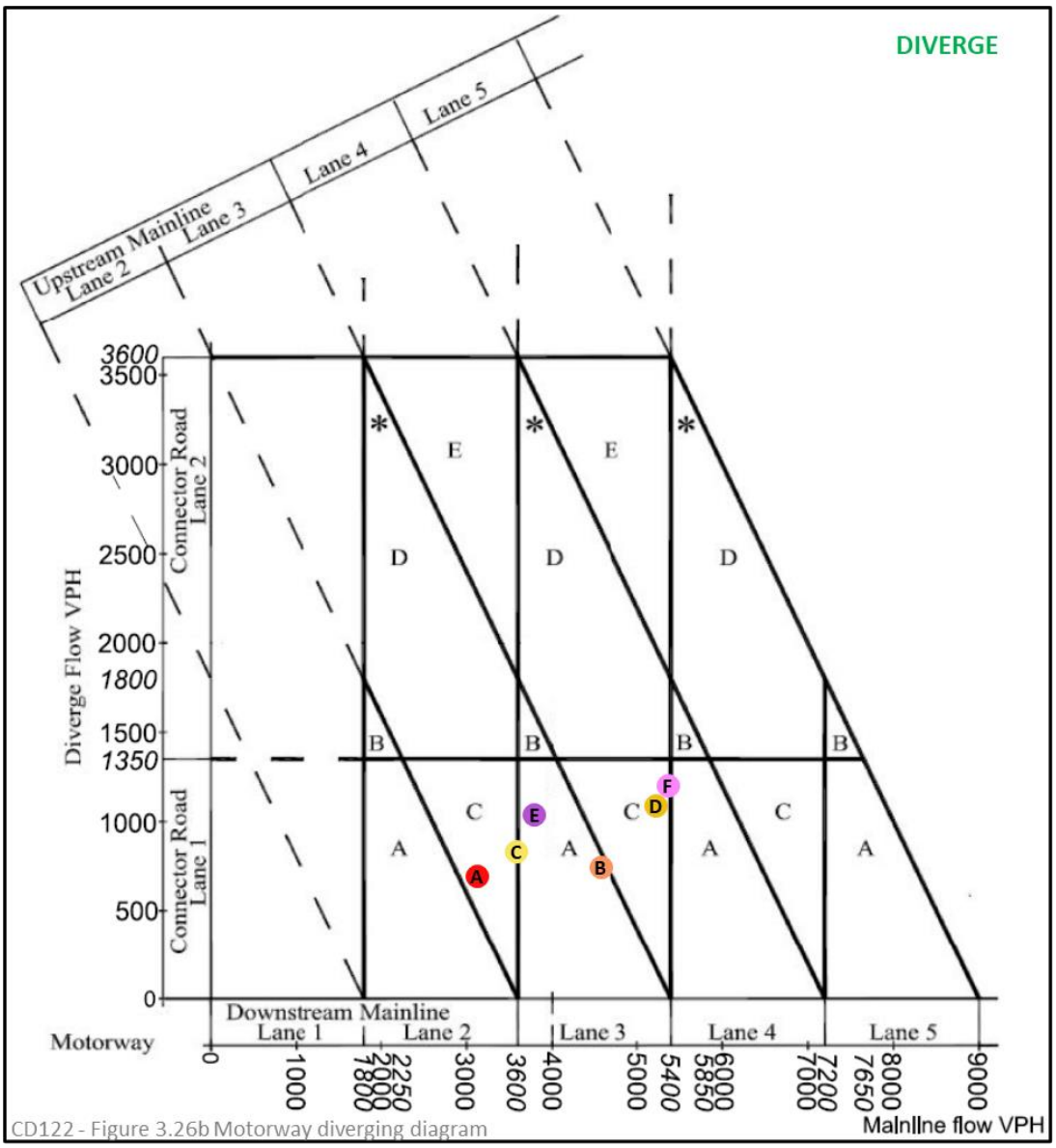
Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	3503	727
B	Base_PM	3372	729
C	Ref Case LTC_AM	4709	1153
D	Ref Case LTC_PM	3471	1023
E	DS LTC_AM	4811	1218
F	DS LTC_PM	3690	1035

Scenario	Merge Layouts	
	AM	PM
Current Layout	D	
Base	D	D
Ref Case LTC	D	D
Do Something LTC	D	B

Notes:

- The M2 J2 NB merge (on-slip) is currently type D layout.
- All scenarios modelled show no increase required to level of provision.
- Therefore, the local plan would not require mitigation at this merge.

(3) M2 SOUTHBOUND: DIVERGE



CD122 - Figure 3.26b Motorway diverging diagram

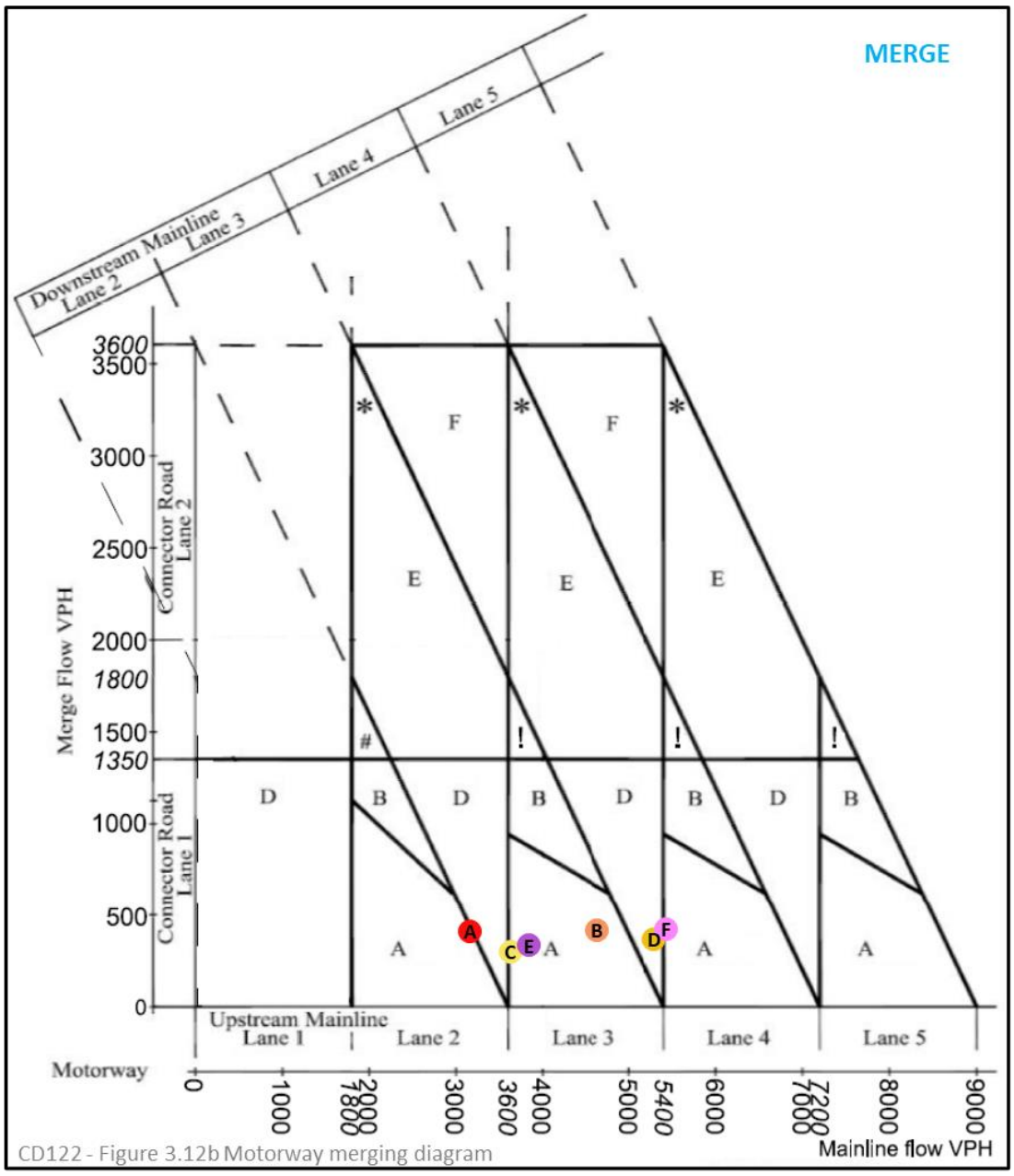
Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	3157	656
B	Base_PM	4613	708
C	Ref Case LTC_AM	3617	791
D	Ref Case LTC_PM	5255	1053
E	DS LTC_AM	3835	999
F	DS LTC_PM	5398	1162

Scenario	Diverge Layouts	
	AM	PM
Current Layout	C	
Base	C	A
Ref Case LTC	A	C
Do Something LTC	A	C

Notes:

- The M2 J2 SB diverge (off-slip) is currently type C layout.
- All scenarios modelled show no increase required to level of provision.
- Therefore, the local plan would not require mitigation at this diverge.

(4) M2 SOUTHBOUND: MERGE



CD122 - Figure 3.12b Motorway merging diagram

Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	3157	403
B	Base_PM	4613	409
C	Ref Case LTC_AM	3617	290
D	Ref Case LTC_PM	5255	359
E	DS LTC_AM	3835	325
F	DS LTC_PM	5398	411

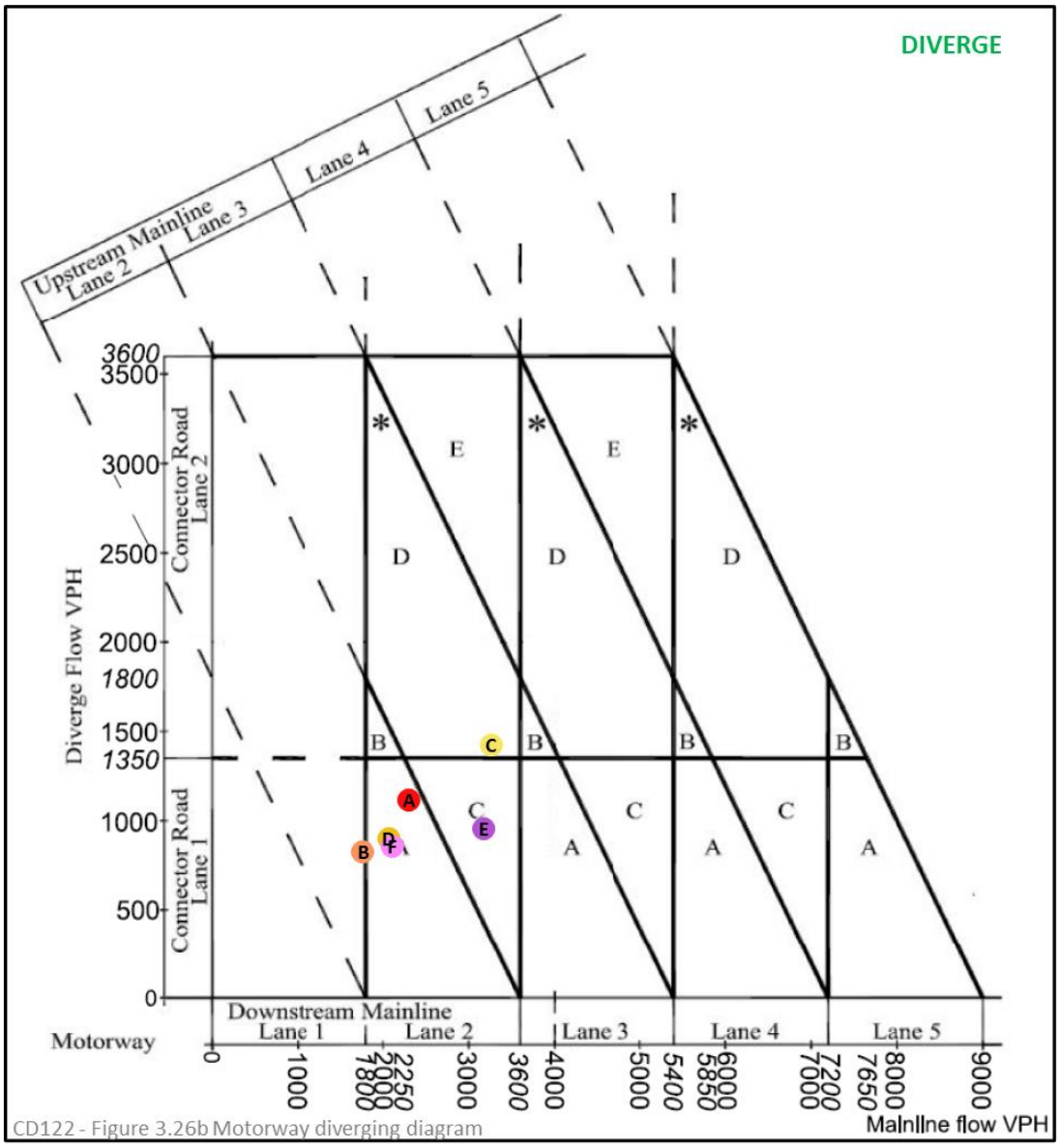
Scenario	Merge Layouts	
	AM	PM
Current Layout	D	
Base	A	A
Ref Case LTC	A	D
Do Something LTC	A	D

Notes:

- The M2 J2 SB merge (on-slip) is currently type D layout.
- All scenarios modelled show no increase required to level of provision.
- Therefore, the local plan would not require mitigation at this merge.

4. M2 Junction 3

(1) M2 NORTHBOUND: DIVERGE



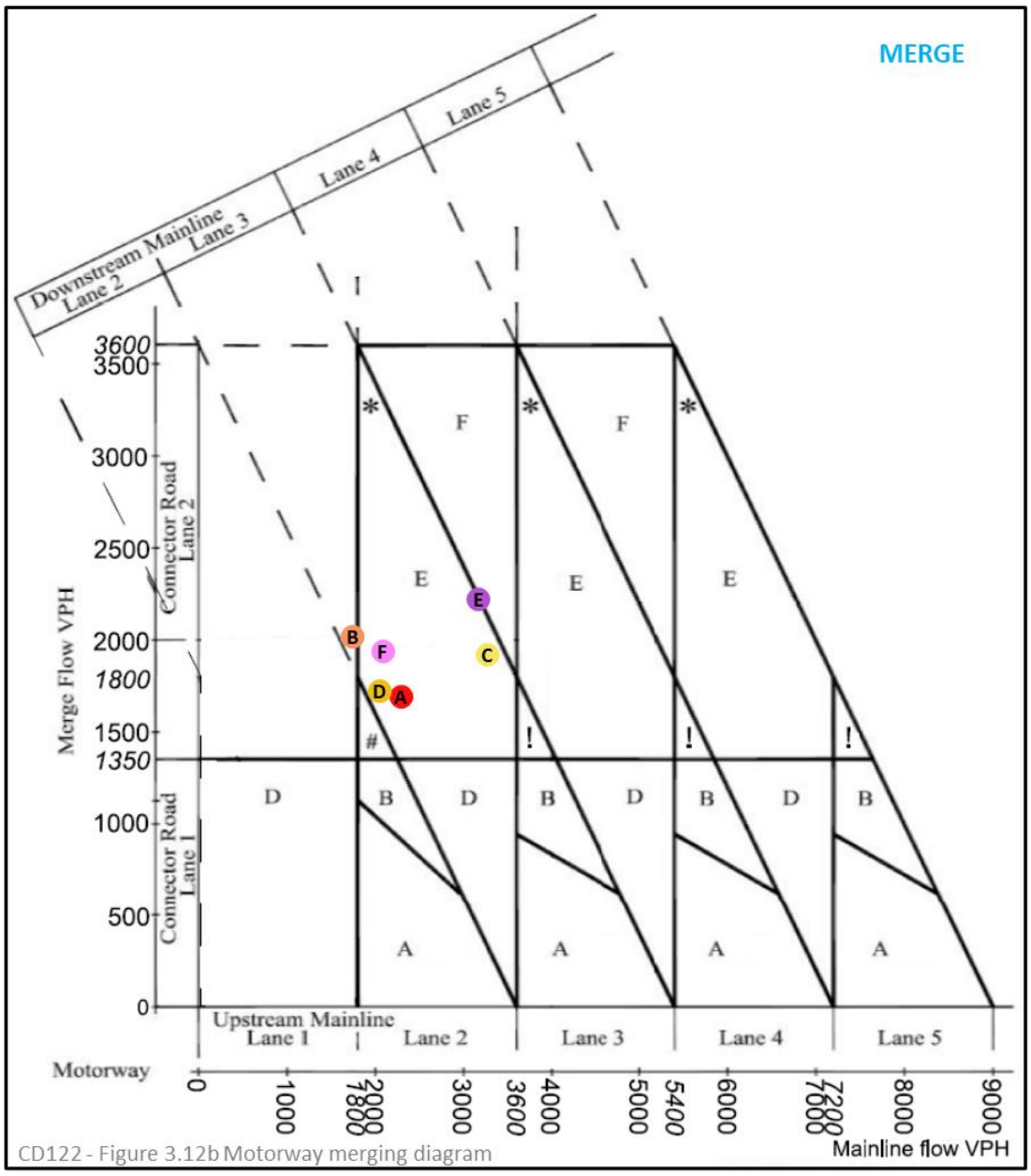
CD122 - Figure 3.26b Motorway diverging diagram

Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	2303	1105
B	Base_PM	1758	817
C	Ref Case LTC_AM	3267	1418
D	Ref Case LTC_PM	2062	890
E	DS LTC_AM	3173	946
F	DS LTC_PM	2098	848

Scenario	Diverge Layouts	
	AM	PM
Current Layout	B2	
Base	A	N/A
Ref Case LTC	D	A
Do Something LTC	C	A

Notes:
- The M2 J3 NB diverge (off-slip) is currently type B2 layout.
- An increase in provision is required in the rRC from the Current Layout. However, the maximum required provision (type D) does not change between rRC and the fDS.
- Therefore, the local plan would not require mitigation at this diverge.

(2) M2 NORTHBOUND: MERGE



CD122 - Figure 3.12b Motorway merging diagram

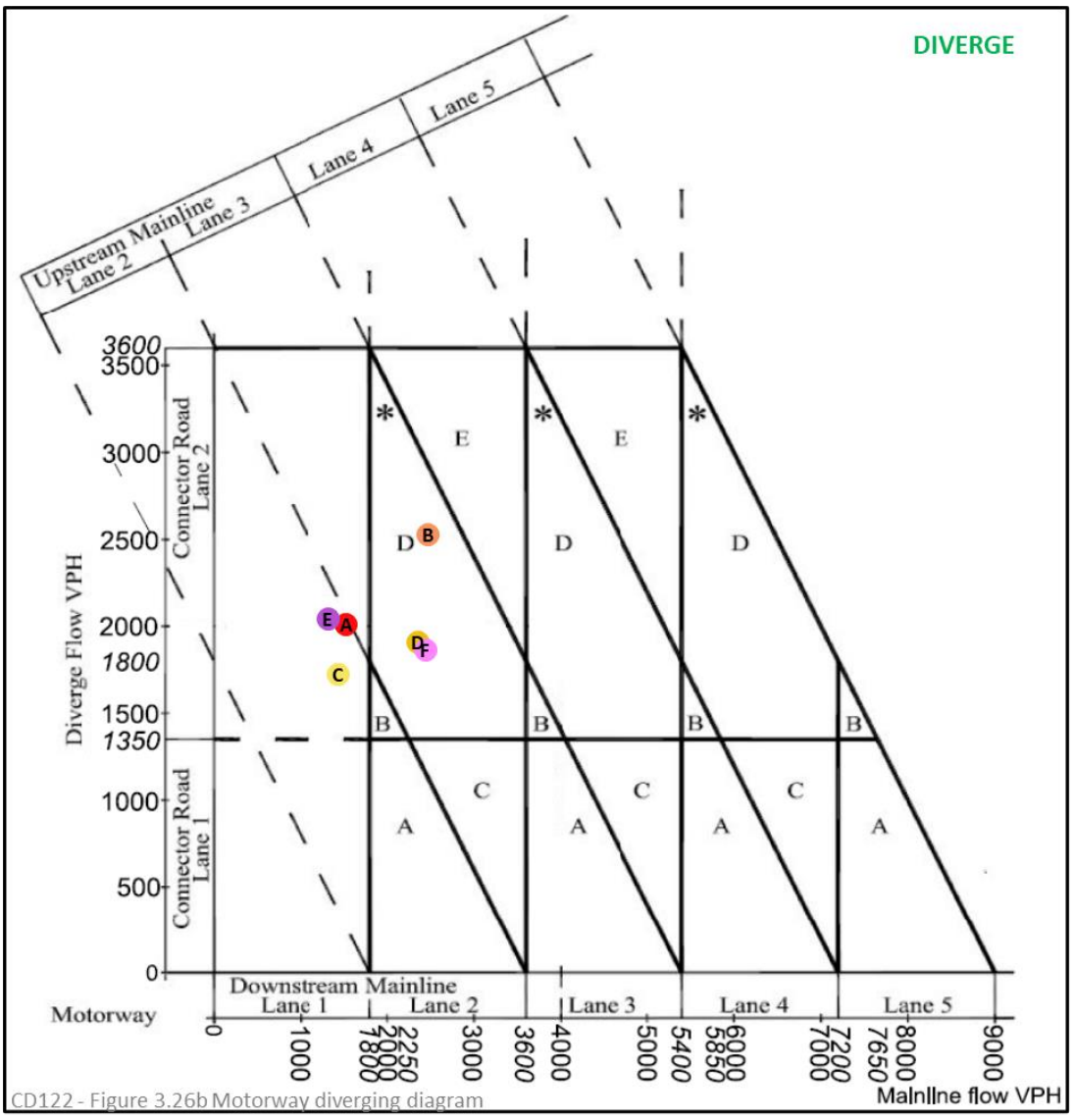
Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	2303	1667
B	Base_PM	1758	1987
C	Ref Case LTC_AM	3267	1890
D	Ref Case LTC_PM	2062	1694
E	DS LTC_AM	3173	2193
F	DS LTC_PM	2098	1909

Scenario	Merge Layouts	
	AM	PM
Current Layout	E2	
Base	E	N/A
Ref Case LTC	E	E
Do Something LTC	E	E

Notes:

- The M2 J3 NB merge (on-slip) is currently type E2 layout.
- All scenarios modelled show no increase required to level of provision.

(3) M2 SOUTHBOUND: DIVERGE



CD122 - Figure 3.26b Motorway diverging diagram

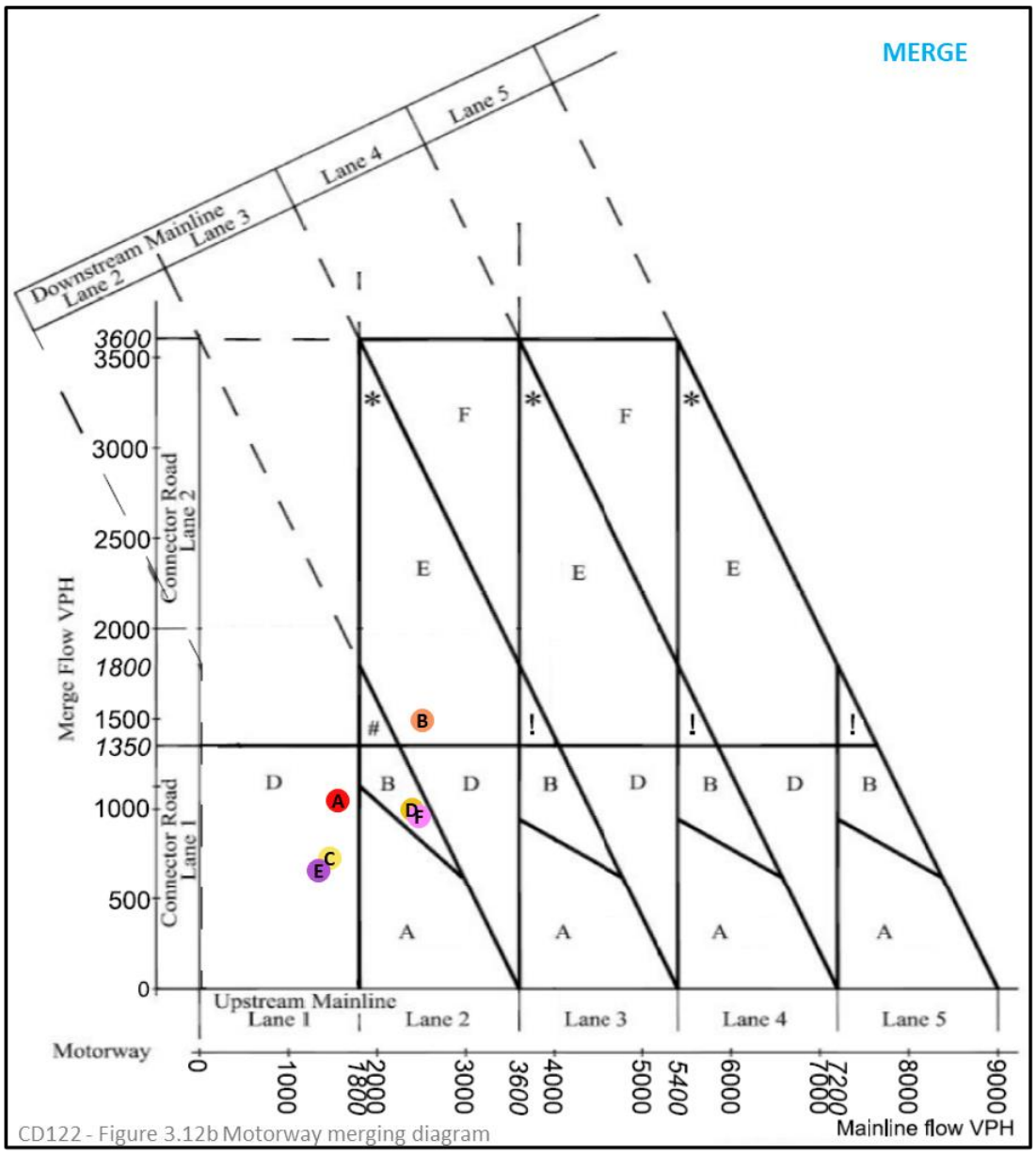
Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	1576	1983
B	Base_PM	2519	2503
C	Ref Case LTC_AM	1479	1693
D	Ref Case LTC_PM	2396	1880
E	DS LTC_AM	1361	2016
F	DS LTC_PM	2483	1837

Scenario	Diverge Layouts	
	AM	PM
Current Layout	D2	
Base	N/A	D
Ref Case LTC	N/A	D
Do Something LTC	N/A	D

Notes:

- The M2 J3 SB diverge (off-slip) is currently type D2 layout.
- All scenarios modelled show no increase required to level of provision.
- Therefore, the local plan would not require mitigation at this diverge.

(4) M2 SOUTHBOUND: MERGE



CD122 - Figure 3.12b Motorway merging diagram

Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	1576	1030
B	Base_PM	2519	1467
C	Ref Case LTC_AM	1479	711
D	Ref Case LTC_PM	2396	978
E	DS LTC_AM	1361	643
F	DS LTC_PM	2483	938

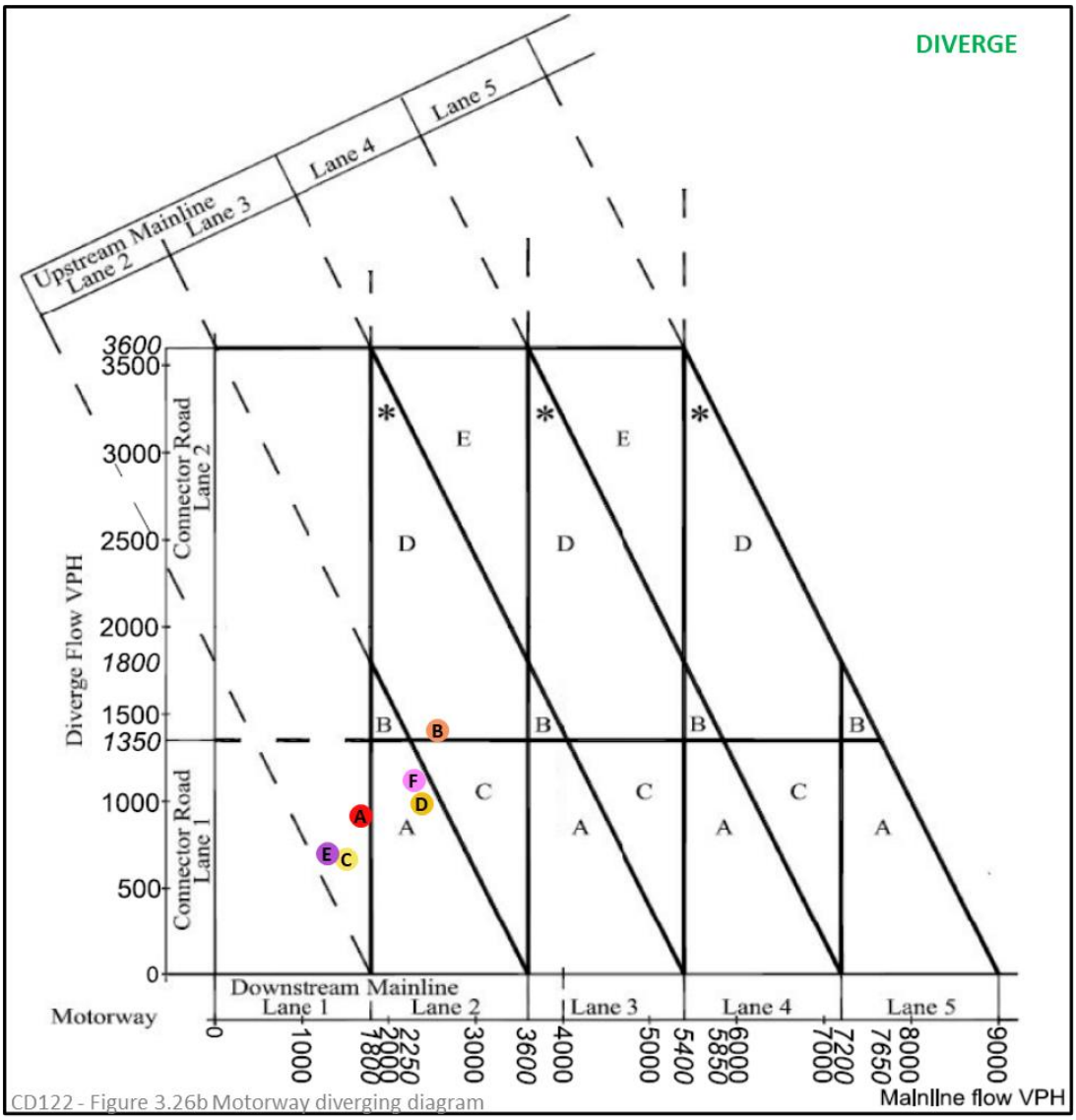
Scenario	Merge Layouts	
	AM	PM
Current Layout	E2	
Base	D	E
Ref Case LTC	D	B
Do Something LTC	D	B

Notes:

- The M2 J3 SB merge (on-slip) is currently type E2 layout.
- All scenarios modelled show no increase required to level of provision.
- Therefore, the local plan would not require mitigation at this merge.

5. M2 Junction 4

(1) M2 EASTBOUND: DIVERGE



CD122 - Figure 3.26b Motorway diverging diagram

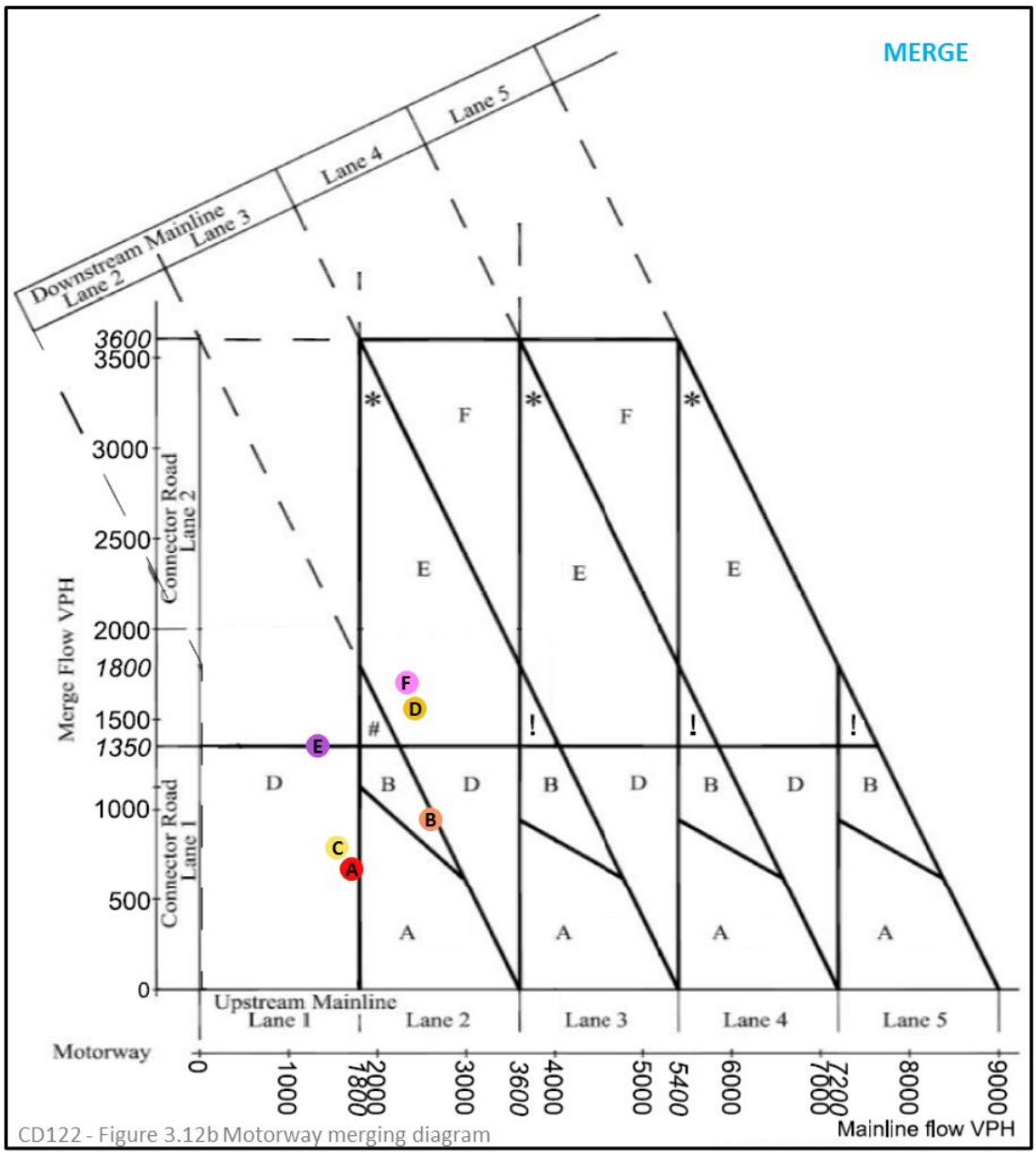
Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	1726	881
B	Base_PM	2609	1377
C	Ref Case LTC_AM	1560	630
D	Ref Case LTC_PM	2425	950
E	DS LTC_AM	1343	661
F	DS LTC_PM	2335	1085

Scenario	Diverge Layouts	
	AM	PM
Current Layout	D2	
Base	N/A	D
Ref Case LTC	N/A	A
Do Something LTC	N/A	A

Notes:

- The M2 J4 EB diverge (off-slip) is currently type D2 layout.
- All scenarios modelled show no increase required to level of provision.
- Therefore, the local plan would not require mitigation at this diverge.

(2) M2 EASTBOUND: MERGE



CD122 - Figure 3.12b Motorway merging diagram

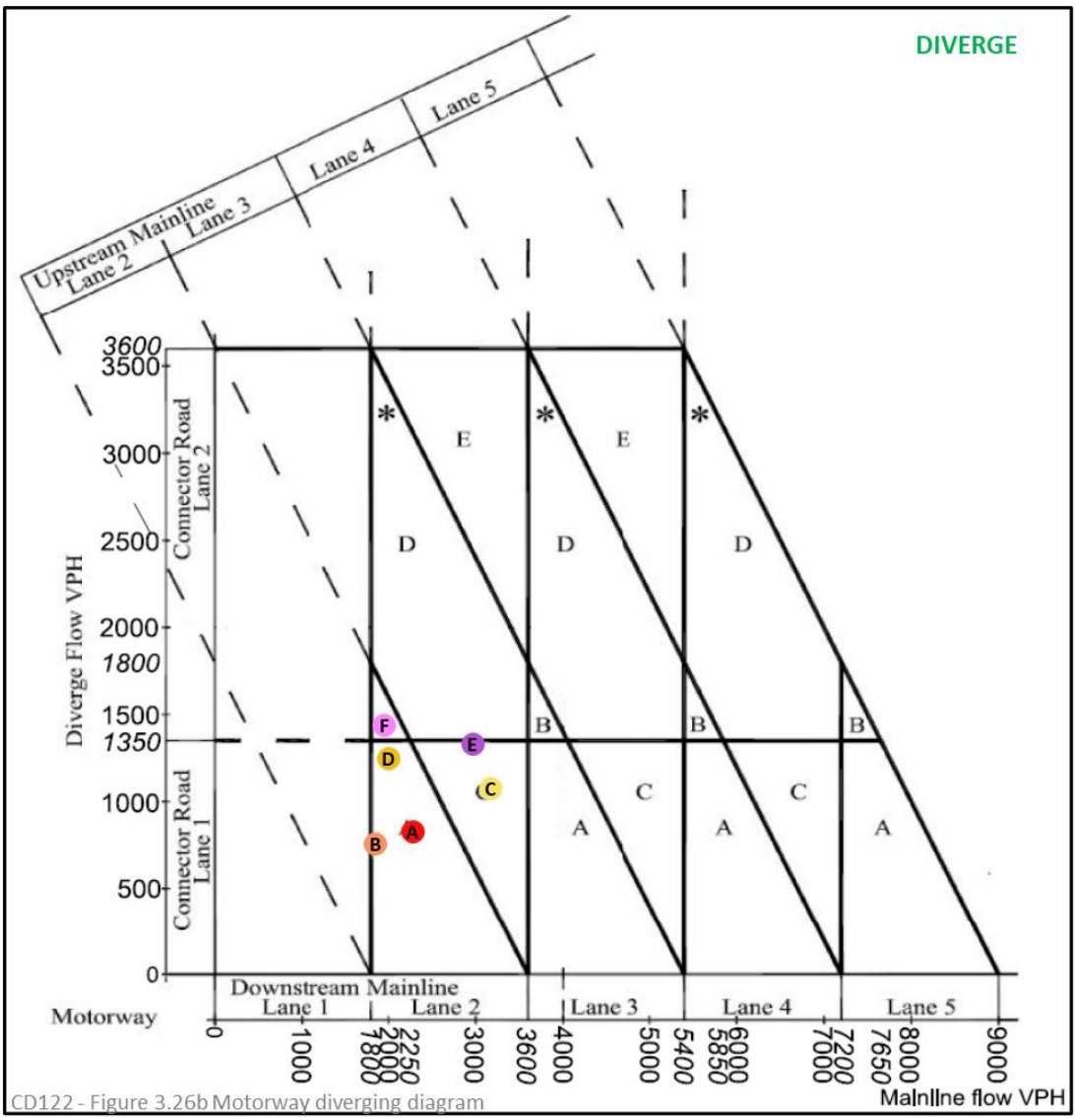
Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	1726	654
B	Base_PM	2609	928
C	Ref Case LTC_AM	1560	775
D	Ref Case LTC_PM	2425	1533
E	DS LTC_AM	1343	1331
F	DS LTC_PM	2335	1678

Scenario	Merge Layouts	
	AM	PM
Current Layout	A1	
Base	D	B
Ref Case LTC	D	E
Do Something LTC	D	E

Notes:

- The M2 J4 EB merge (on-slip) is currently type A1 layout.
- An increase in provision is required in the rRC from the Current Layout. However, the maximum required provision (type E) does not change between rRC and the fDS.
- Therefore, the local plan would not require mitigation at this merge.

(3) M2 WESTBOUND: DIVERGE



CD122 - Figure 3.26b Motorway diverging diagram

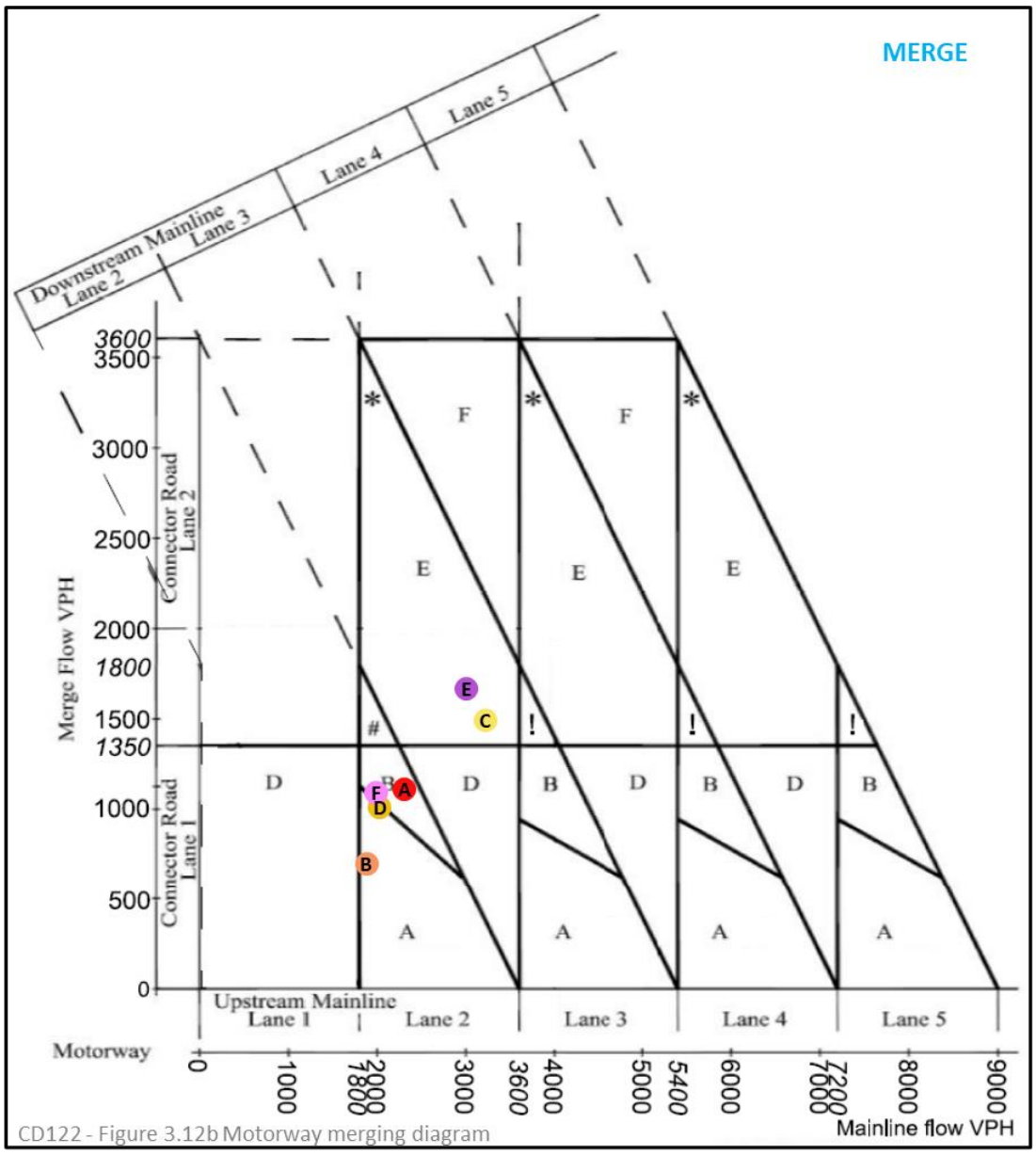
Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	2319	791
B	Base_PM	1895	719
C	Ref Case LTC_AM	3215	1040
D	Ref Case LTC_PM	2040	1214
E	DS LTC_AM	3008	1297
F	DS LTC_PM	1999	1406

Scenario	Diverge Layouts	
	AM	PM
Current Layout	A1	
Base	A	A
Ref Case LTC	C	A
Do Something LTC	C	B

Notes:

- The M2 J4 EB diverge (off-slip) is currently type A1 layout.
- An increase in provision is required in the rRC from the Current Layout. However, the maximum required provision (type C) does not change between rRC and fDS.
- Therefore, the local plan would not require mitigation at this diverge.

(4) M2 WESTBOUND: MERGE



CD122 - Figure 3.12b Motorway merging diagram

Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	2319	1089
B	Base_PM	1895	680
C	Ref Case LTC_AM	3215	1469
D	Ref Case LTC_PM	2040	991
E	DS LTC_AM	3008	1643
F	DS LTC_PM	1999	1073

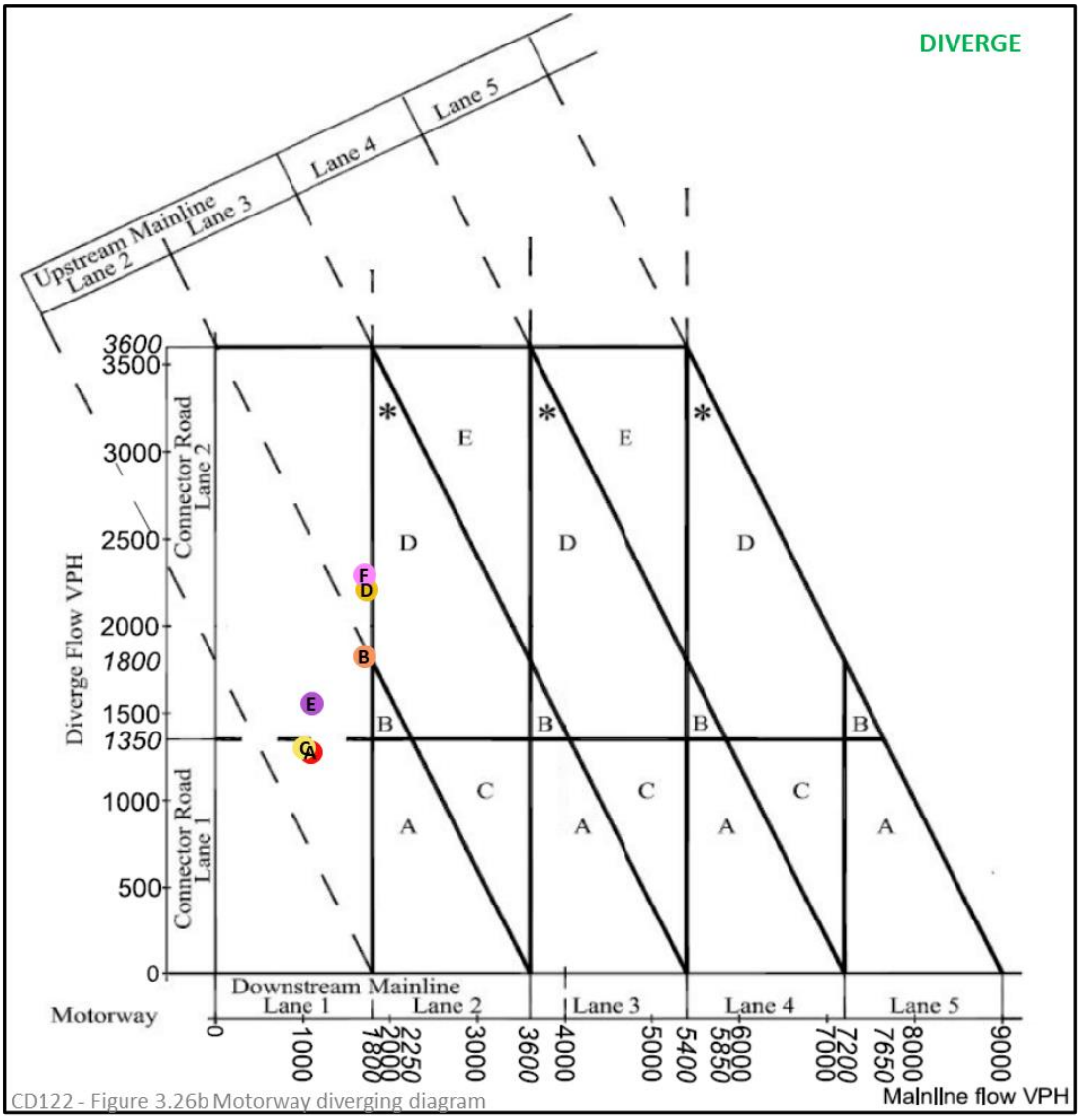
Scenario	Merge Layouts	
	AM	PM
Current Layout	E2	
Base	B	A
Ref Case LTC	E	A
Do Something LTC	E	B

Notes:

- The M2 J4 WB merge (on-slip) is currently type E2 layout.
- All scenarios modelled show no increase required to level of provision.
- Therefore, the local plan would not require mitigation at this merge.

6. M2 Junction 5

(1) M2 EASTBOUND: DIVERGE



CD122 - Figure 3.26b Motorway diverging diagram

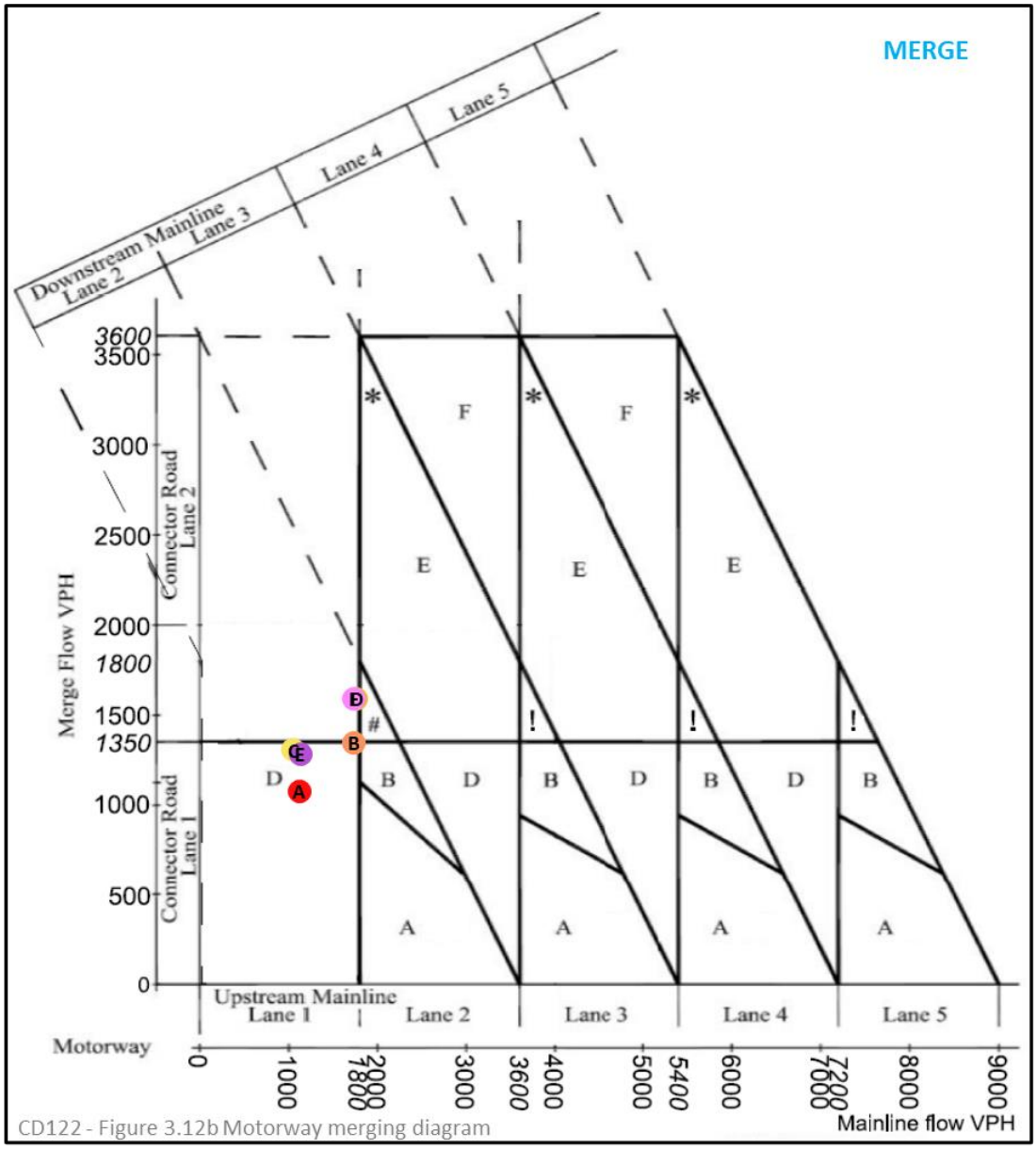
Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	1140	1240
B	Base_PM	1747	1790
C	Ref Case LTC_AM	1069	1266
D	Ref Case LTC_PM	1778	2180
E	DS LTC_AM	1152	1522
F	DS LTC_PM	1753	2261

Scenario	Diverge Layouts	
	AM	PM
Current Layout	A2	
Base	N/A	N/A
Ref Case LTC	N/A	N/A
Do Something LTC	N/A	N/A

Notes:

- The M2 J5 EB diverge (off-slip) is currently type A2 layout.
- An increase in provision is required in the rRC from the Current Layout. However, the maximum required provision (type D) does not change between rRC and the fDS
- Therefore, the local plan would not require mitigation at this diverge.

(2) M2 EASTBOUND: MERGE



CD122 - Figure 3.12b Motorway merging diagram

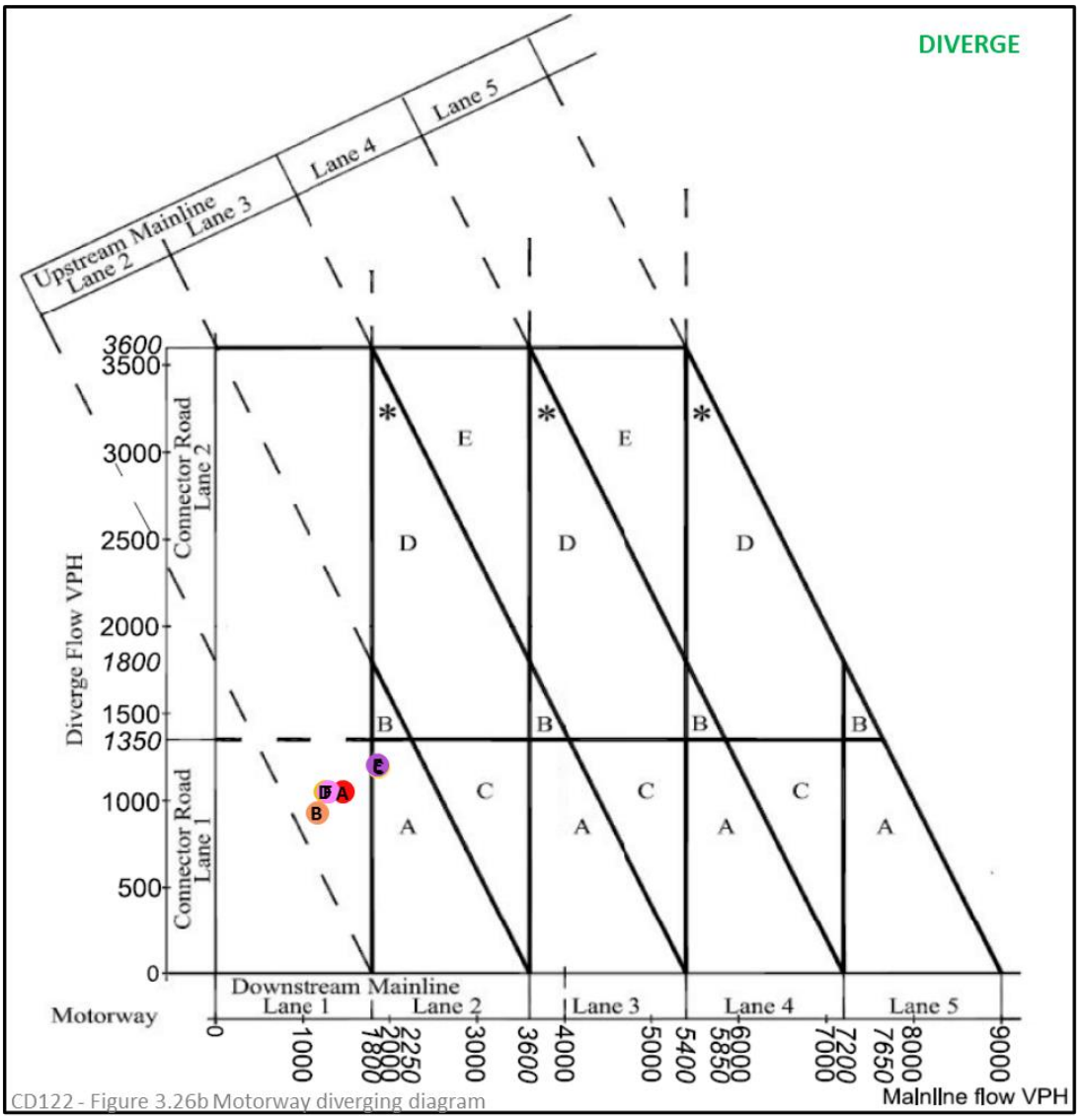
Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	1140	1054
B	Base_PM	1747	1319
C	Ref Case LTC_AM	1069	1281
D	Ref Case LTC_PM	1778	1566
E	DS LTC_AM	1152	1258
F	DS LTC_PM	1753	1564

Scenario	Merge Layouts	
	AM	PM
Current Layout	B	
Base	D	D
Ref Case LTC	D	N/A
Do Something LTC	D	N/A

Notes:

- The M2 J5 EB merge (on-slip) is currently type B layout.
- An increase in provision is required in the rRC from the Current Layout. However, the maximum required provision (type D) does not change between rRC and the fDS
- Therefore, the local plan would not require mitigation at this merge.

(3) M2 WESTBOUND: DIVERGE



CD122 - Figure 3.26b Motorway diverging diagram

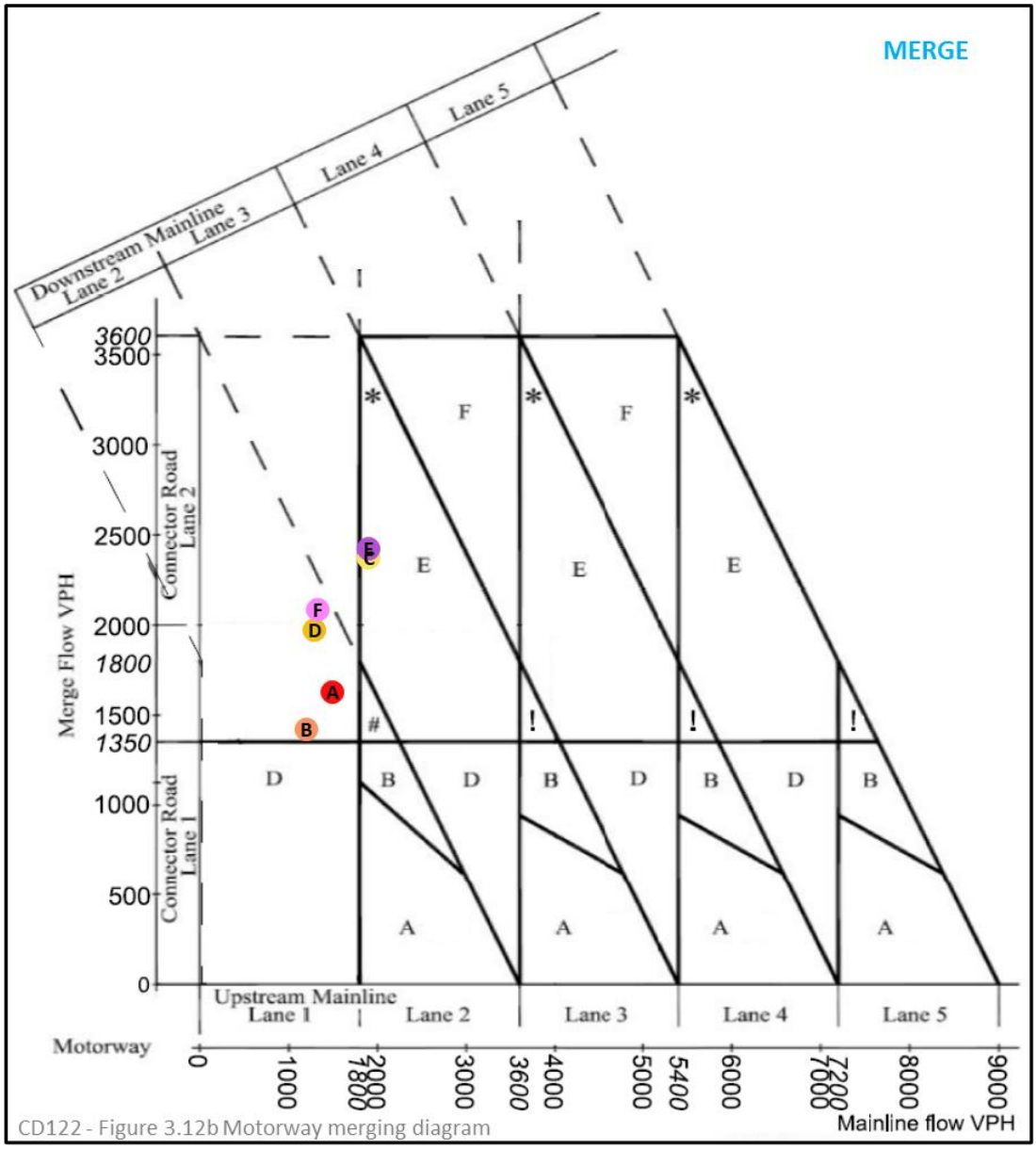
Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	1511	1010
B	Base_PM	1217	889
C	Ref Case LTC_AM	1914	1157
D	Ref Case LTC_PM	1309	1013
E	DS LTC_AM	1912	1165
F	DS LTC_PM	1347	1011

Scenario	Diverge Layouts	
	AM	PM
Current Layout	A2	
Base	N/A	N/A
Ref Case LTC	A	N/A
Do Something LTC	A	N/A

Notes:

- The M2 J5 WB diverge (off-slip) is currently type A2 layout.
- All scenarios modelled show no increase required to level of provision.
- Therefore, the local plan would not require mitigation at this diverge.

(4) M2 WESTBOUND: MERGE



CD122 - Figure 3.12b Motorway merging diagram

Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	1511	1599
B	Base_PM	1217	1397
C	Ref Case LTC_AM	1914	2341
D	Ref Case LTC_PM	1309	1945
E	DS LTC_AM	1912	2394
F	DS LTC_PM	1347	2058

Scenario	Merge Layouts	
	AM	PM
Current Layout	B	
Base	N/A	N/A
Ref Case LTC	E	N/A
Do Something LTC	E	N/A

Notes:

- The M2 J5 WB merge (on-slip) is currently type B layout.
- An increase in provision is required in the rRC from the Current Layout. However, the maximum required provision (type E) does not change between rRC and fDS.
- Therefore, the local plan would not require mitigation at this merge.

7. Proposed Mitigation at M2 J1

(2) M2 EASTBOUND: MERGE

According to the Design Manual for Road and Bridges, the M2 Eastbound Merge requires an improvement to a Type E layout. Figure 9 below shows the proposed type E layout, provided by Stantec. Jacobs can confirm the layout provided by Stantec meets the requirements set out in the DMRB, but as this is a Stantec design, Jacobs cannot comment further. The proposed mitigation drawings can be found in Appendix A.

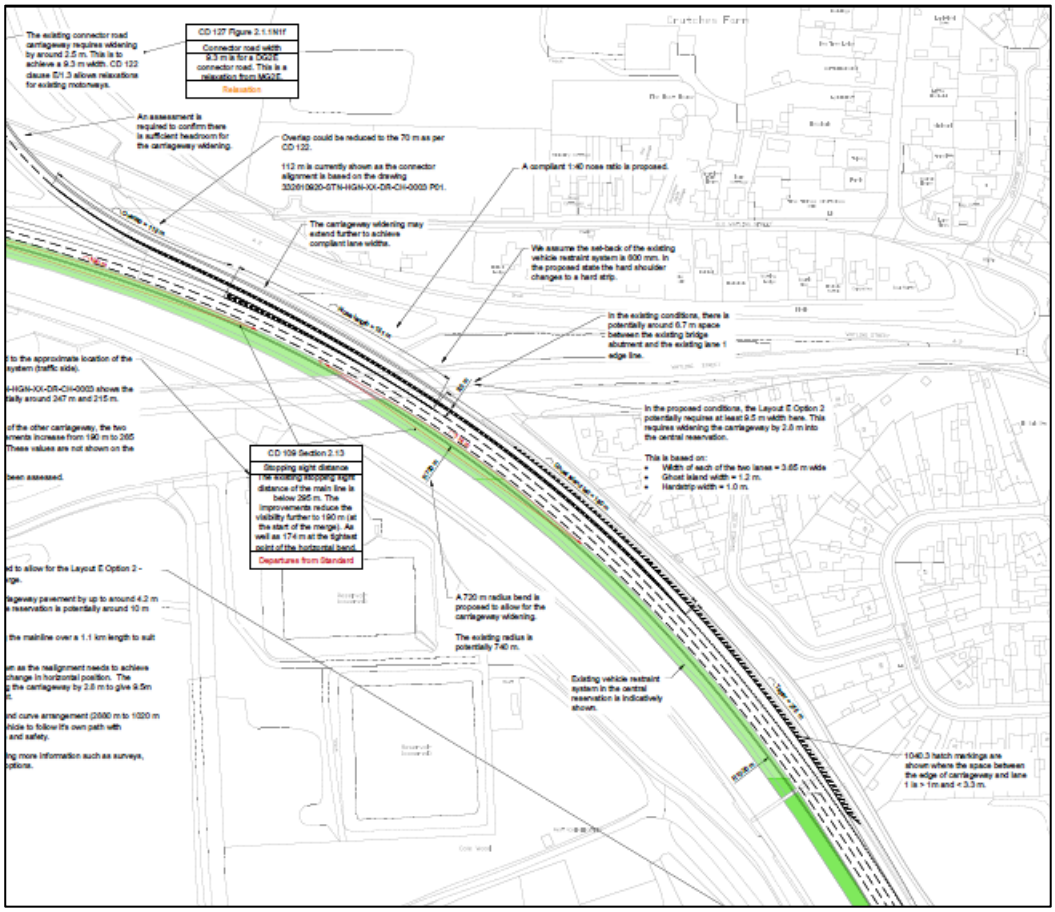


Figure 9 - M2 J1 Mitigation Snippet taken from Stantec Drawing

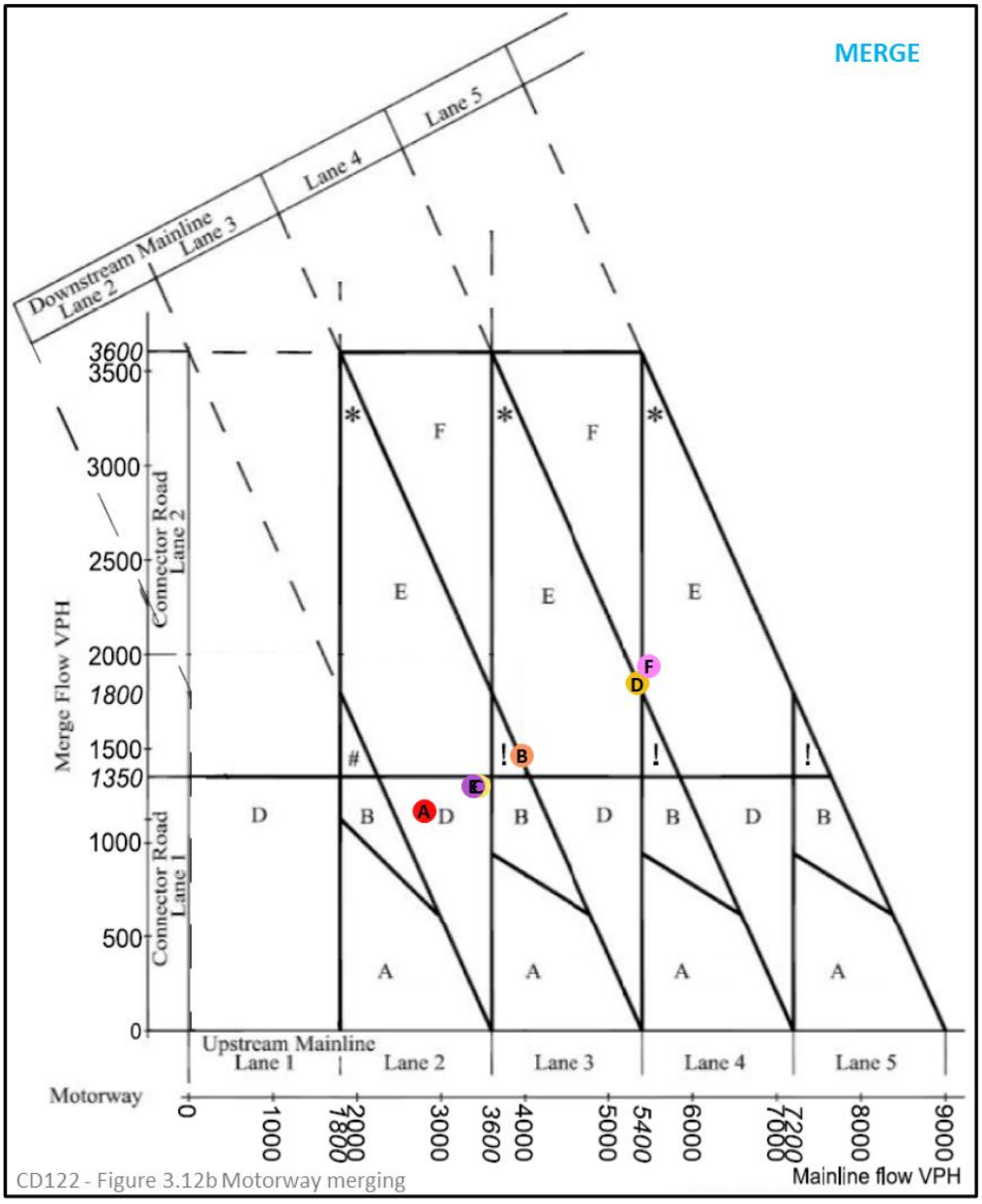
It is recommended that this report is read in conjunction with the following reports developed for the further analysis on the proposed mitigation in this location:

- B2432000 – Medway LP, M2J1, Cost Estimate Report
- B243200 – Medway LP, M2J1, Design Review
- B243200 – Medway LP, M2J1, Safety Review

Additionally, the A289 diverge requires according to the Design Manual for Road and Bridges, requires an improvement to layout type D. Further analysis on potential mitigation at this location will be undertaken.

8. M20 Junction 4

(1) M20 EASTBOUND: MERGE



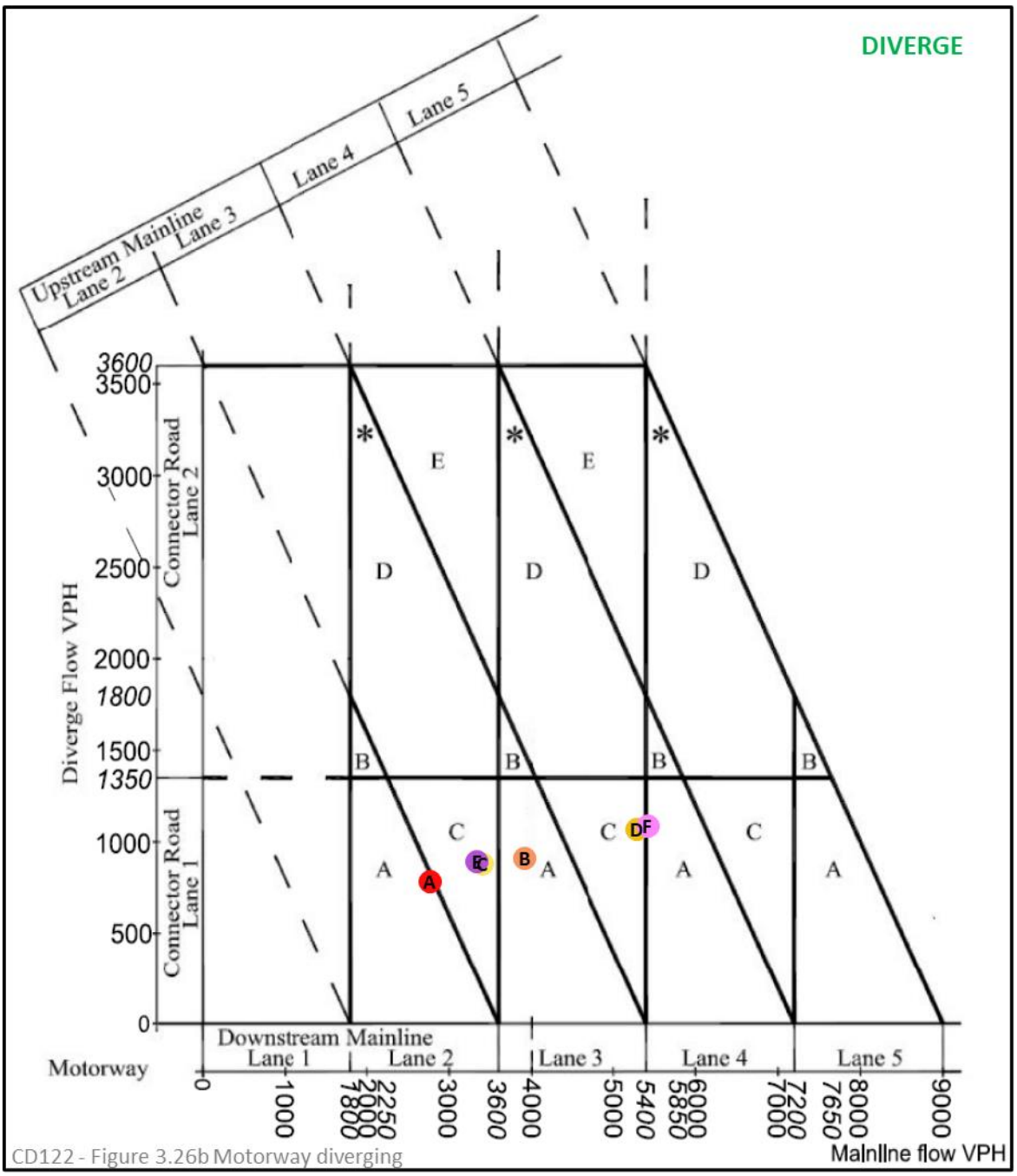
Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	2801	1150
B	Base_PM	3952	1442
C	Ref Case LTC_AM	3438	1284
D	Ref Case LTC_PM	5321	1819
E	DS LTC_AM	3375	1283
F	DS LTC_PM	5451	1912

Scenario	Merge Layouts	
	AM	PM
Current Layout	E1	
Base	D	E
Ref Case LTC	D	E
Do Something LTC	D	E

Notes:

- The M20 J4 EB Merge (off-slip) is currently type E1 layout.
- All scenarios modelled show no increase required to level of provision.

(2) M20 EASTBOUND: DIVERGE



CD122 - Figure 3.26b Motorway diverging

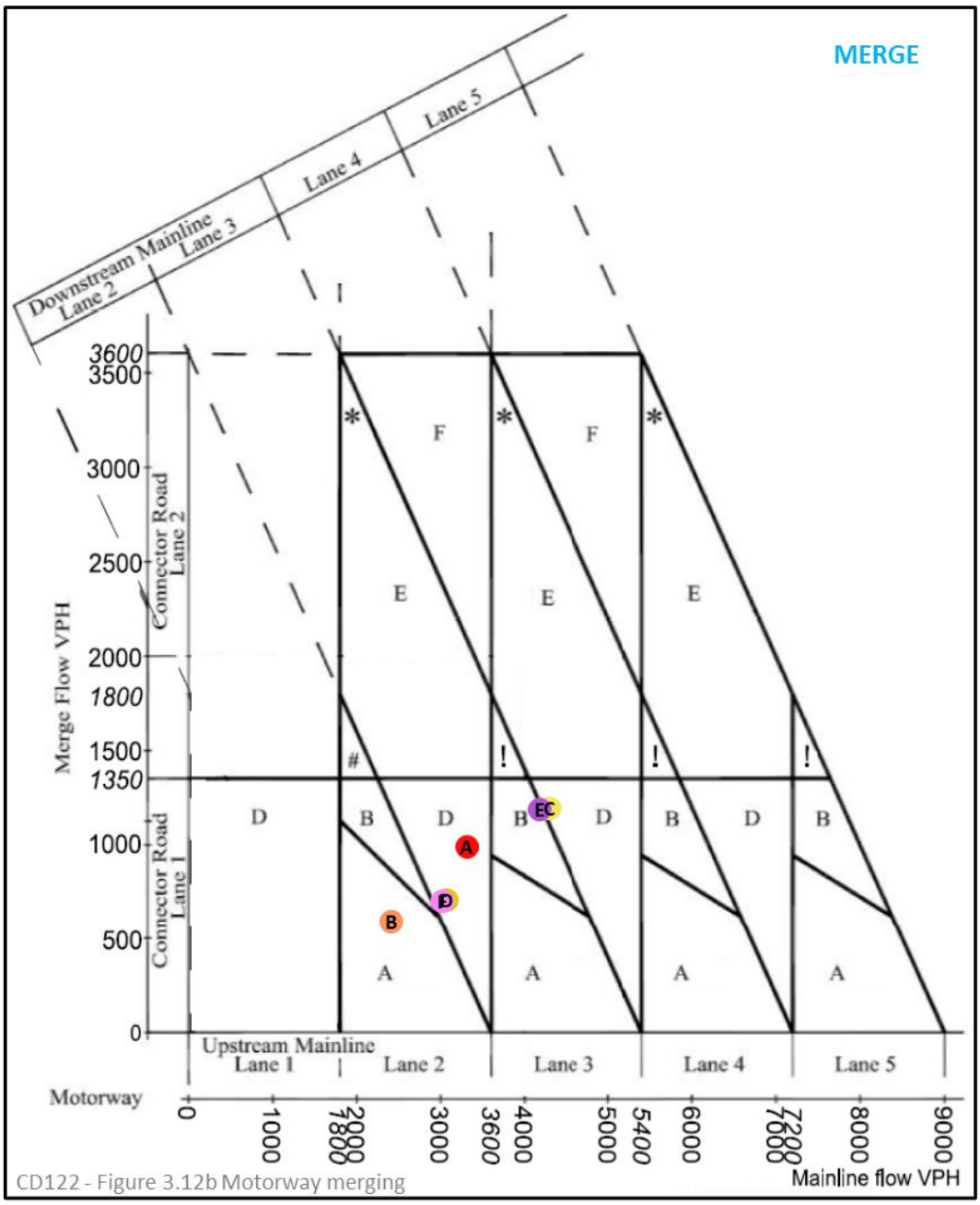
Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	2801	745
B	Base_PM	3952	877
C	Ref Case LTC_AM	3438	844
D	Ref Case LTC_PM	5321	1031
E	DS LTC_AM	3375	859
F	DS LTC_PM	5451	1052

Scenario	Diverge Layouts	
	AM	PM
Current Layout	F	
Base	A	A
Ref Case LTC	C	C
Do Something LTC	C	A

Notes:

- The M20 J4 EB diverge (off-slip) is currently type F layout.
- All scenarios modelled show no increase required to level of provision.

(3) M20 WESTBOUND: MERGE



CD122 - Figure 3.12b Motorway merging

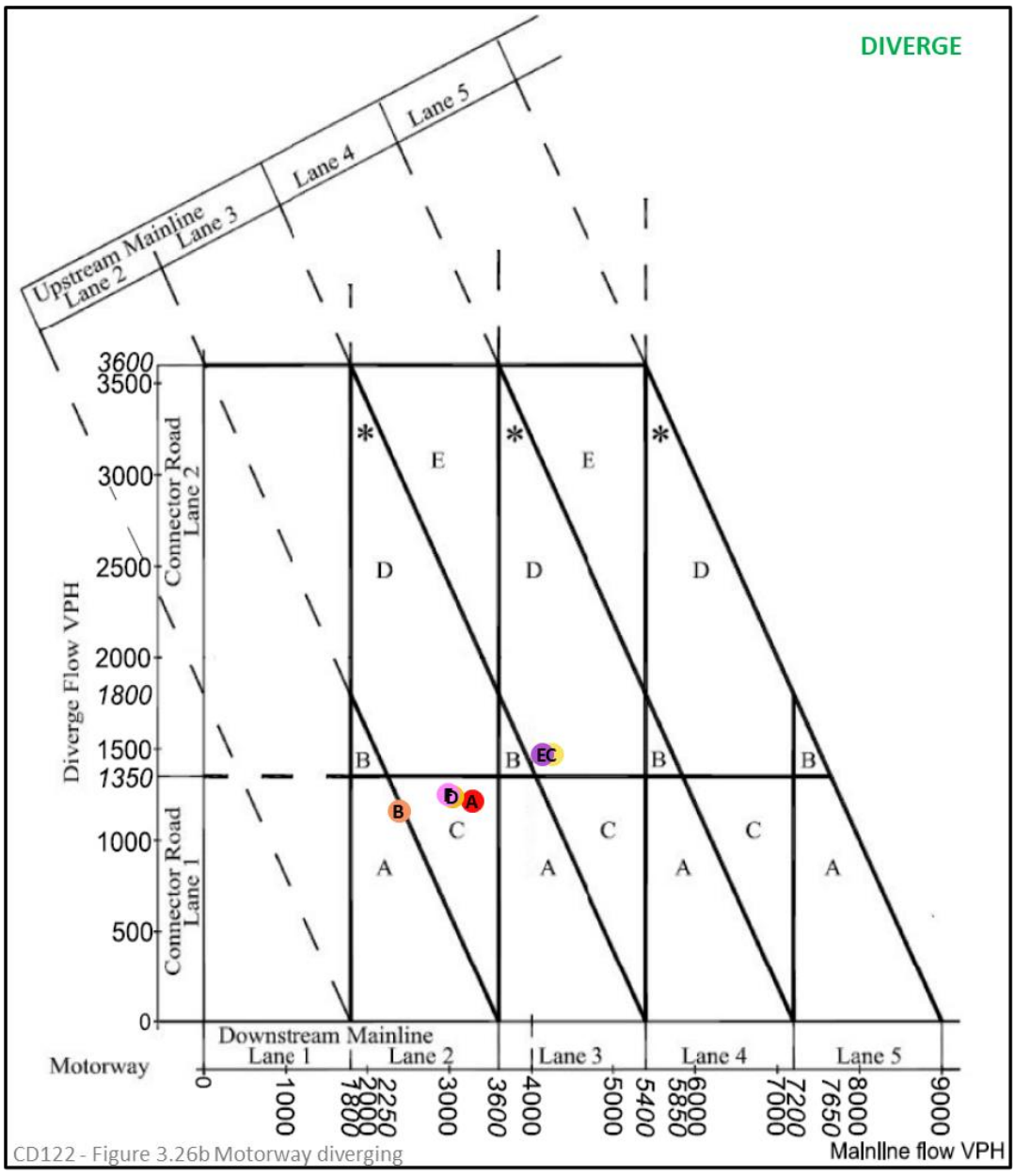
Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	3315	972
B	Base_PM	2416	579
C	Ref Case LTC_AM	4285	1177
D	Ref Case LTC_PM	3070	696
E	DS LTC_AM	4165	1167
F	DS LTC_PM	3013	687

Scenario	Merge Layouts	
	AM	PM
Current Layout	B	
Base	D	A
Ref Case LTC	D	D
Do Something LTC	B	D

Notes:

- The M20 J4 WB merge (on-slip) is currently type B layout.
- An increase in provision is required in the rRC from the Current Layout. However, the maximum required provision (type D) does not change between rRC and fDS.
- Therefore, the local plan would not require mitigation at this merge.

(4) M20 WESTBOUND: DIVERGE



CD122 - Figure 3.26b Motorway diverging

Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	3315	1180
B	Base_PM	2416	1123
C	Ref Case LTC_AM	4285	1434
D	Ref Case LTC_PM	3070	1203
E	DS LTC_AM	4165	1436
F	DS LTC_PM	3013	1214

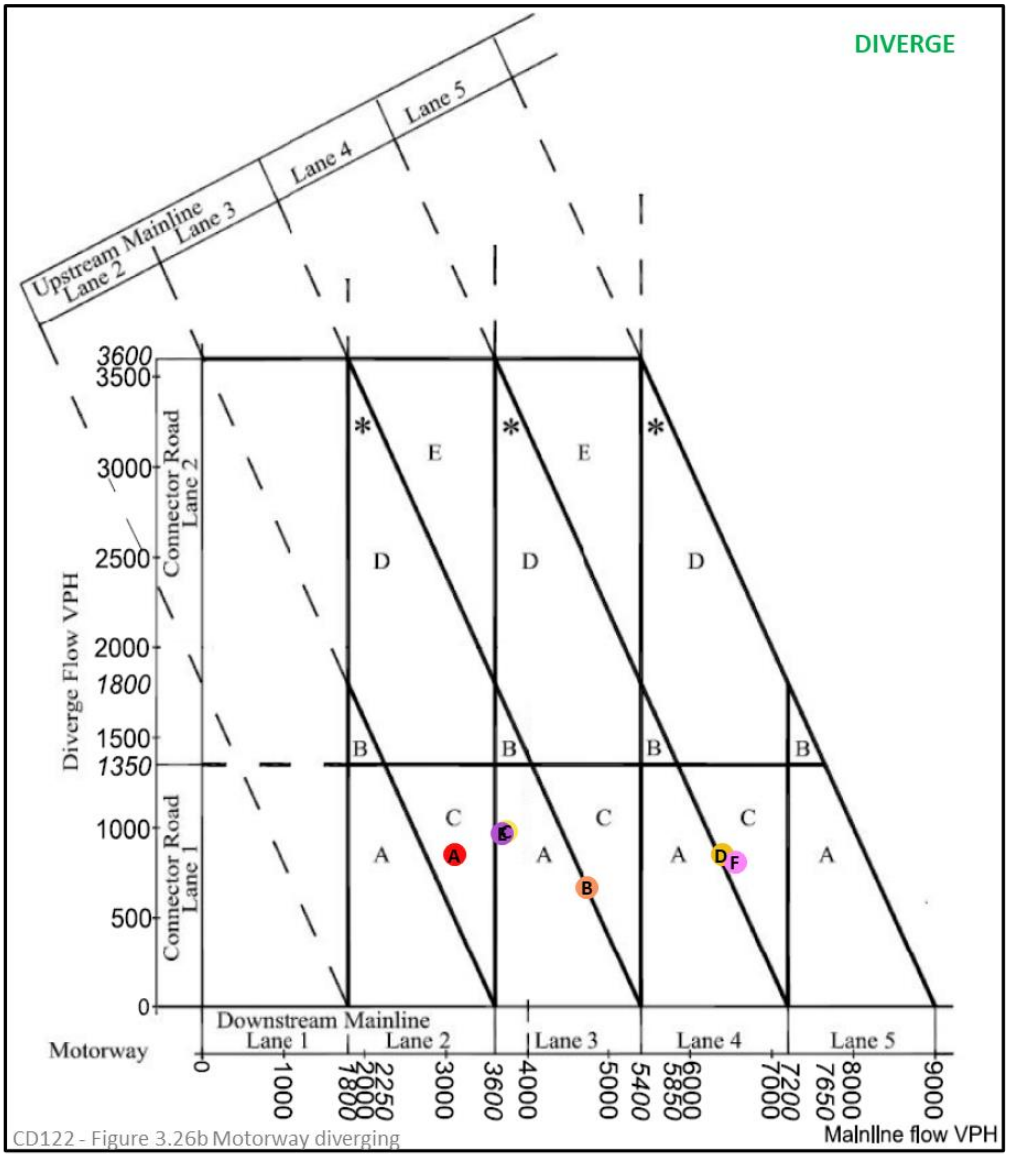
Scenario	Diverge Layouts	
	AM	PM
Current Layout	B2	
Base	C	A
Ref Case LTC	D	C
Do Something LTC	D	C

Notes:

- The M20 J4 WB diverge (off-slip) is currently type B2 layout.
- An increase in provision is required in the rRC from the Current Layout. However, the maximum required provision (type D) does not change between rRC and fDS.
- Therefore, the local plan would not require mitigation at this diverge.

9. M20 Junction 5

(1) M20 EASTBOUND: DIVERGE



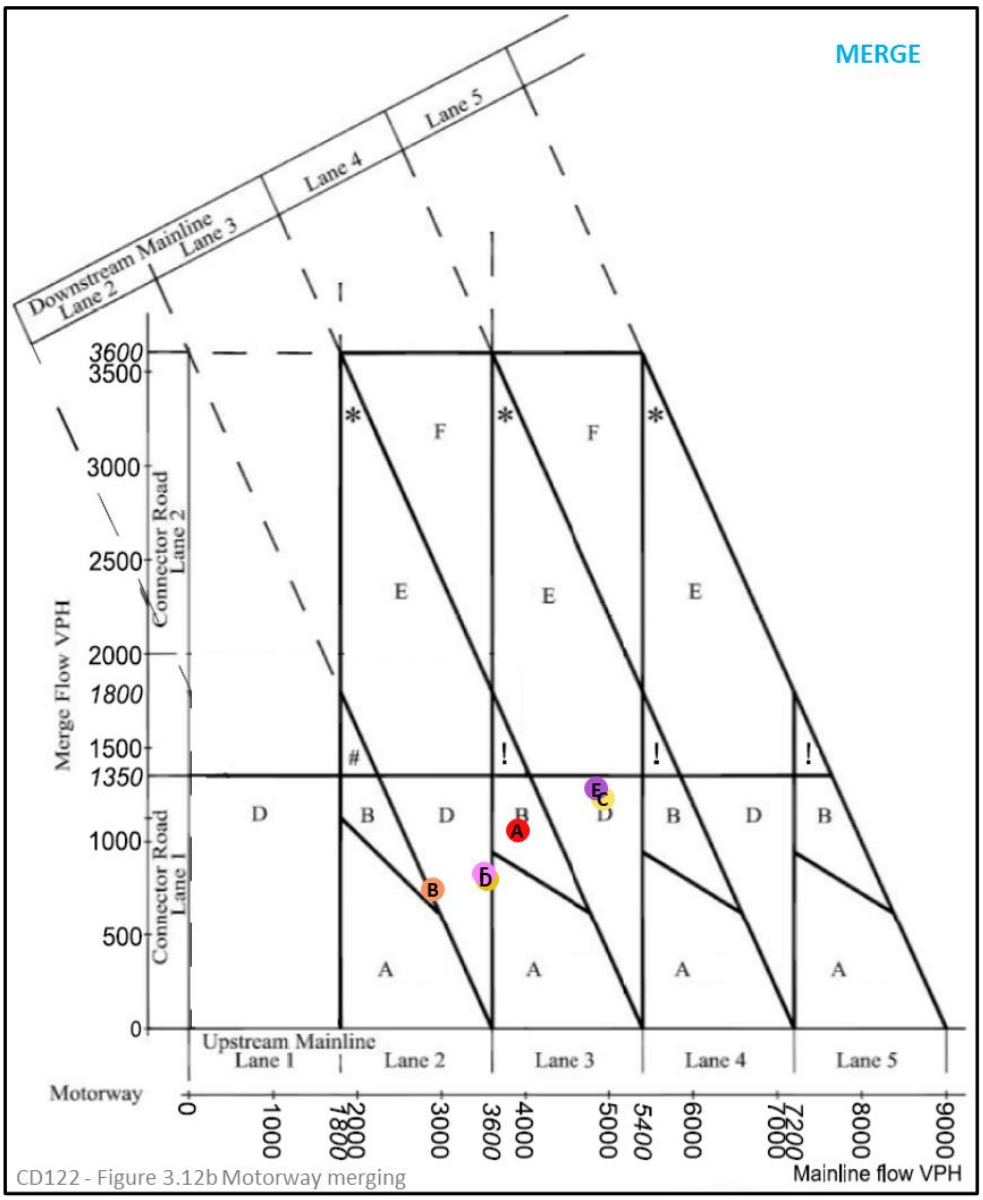
Scenario	Description	Downstream Mainline	Diverge Flow
A	Base_AM	3139	813
B	Base_PM	4762	631
C	Ref Case LTC_AM	3775	947
D	Ref Case LTC_PM	6428	813
E	DS LTC_AM	3727	931
F	DS LTC_PM	6590	774

Scenario	Diverge Layouts	
	AM	PM
Current Layout	A2	
Base	C	A
Ref Case LTC	A	C
Do Something LTC	A	C

Notes:

- The M20 J5 EB diverge (off-slip) is currently type A2 layout.
- An increase in provision is required in the rRC from the Current Layout. However, the maximum required provision (type C) does not change between rRC and fDS.
- Therefore, the local plan would not require mitigation at this diverge.

(2) M20 WESTBOUND: MERGE (E)



CD122 - Figure 3.12b Motorway merging

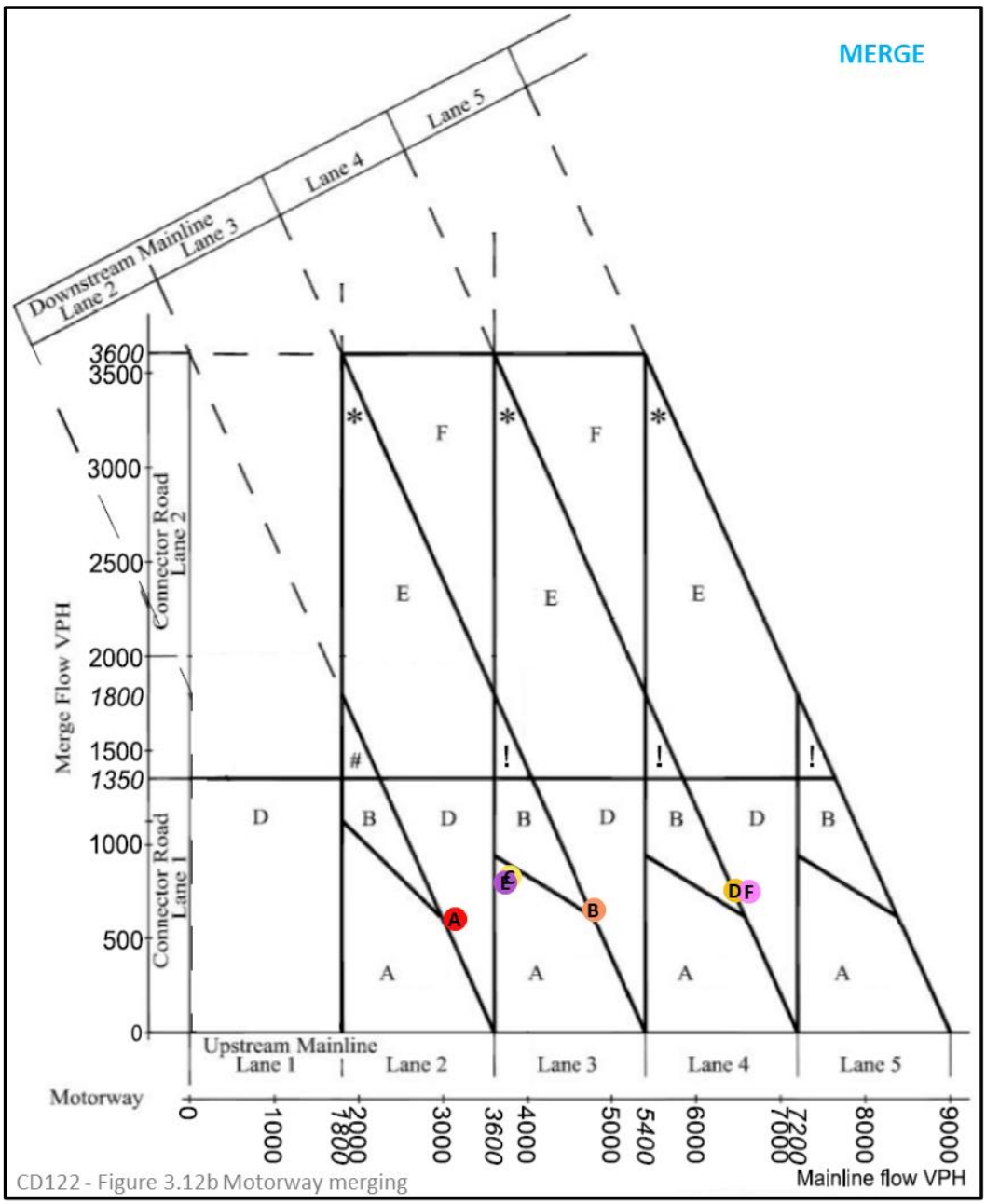
Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	3903	1037
B	Base_PM	2899	730
C	Ref Case LTC_AM	4907	1205
D	Ref Case LTC_PM	3532	781
E	DS LTC_AM	4818	1257
F	DS LTC_PM	3495	811

Scenario	Merge Layouts	
	AM	PM
Current Layout	B	
Base	B	D
Ref Case LTC	D	D
Do Something LTC	D	D

Notes:

- The M20 J5 WB (E) merge (on-slip) is currently type B layout.
- An increase in provision is required in the rRC from the Current Layout. However, the maximum required provision (type D) does not change between rRC and fDS.
- Therefore, the local plan would not require mitigation at this merge.

(3) M20 WESTBOUND: MERGE (W)



CD122 - Figure 3.12b Motorway merging

Scenario	Description	Upstream Mainline	Merge Flow
A	Base_AM	3139	592
B	Base_PM	4762	640
C	Ref Case LTC_AM	3775	812
D	Ref Case LTC_PM	6428	741
E	DS LTC_AM	3727	782
F	DS LTC_PM	6590	732

Scenario	Merge Layouts	
	AM	PM
Current Layout	B	
Base	D	D
Ref Case LTC	A	D
Do Something LTC	A	D

Notes:

- The M20 J5 WB (W) merge (on-slip) is currently type B layout.
- An increase in provision is required in the rRC from the Current Layout. However, the maximum required provision (type D) does not change between rRC and fDS.
- Therefore, the local plan would not require mitigation at this merge.

10. Summary

Most of the merges and diverges tested show no additional requirement as a result of the local plan Do Something Scenario. One merge and one diverge have been shown to require an increase in provision:

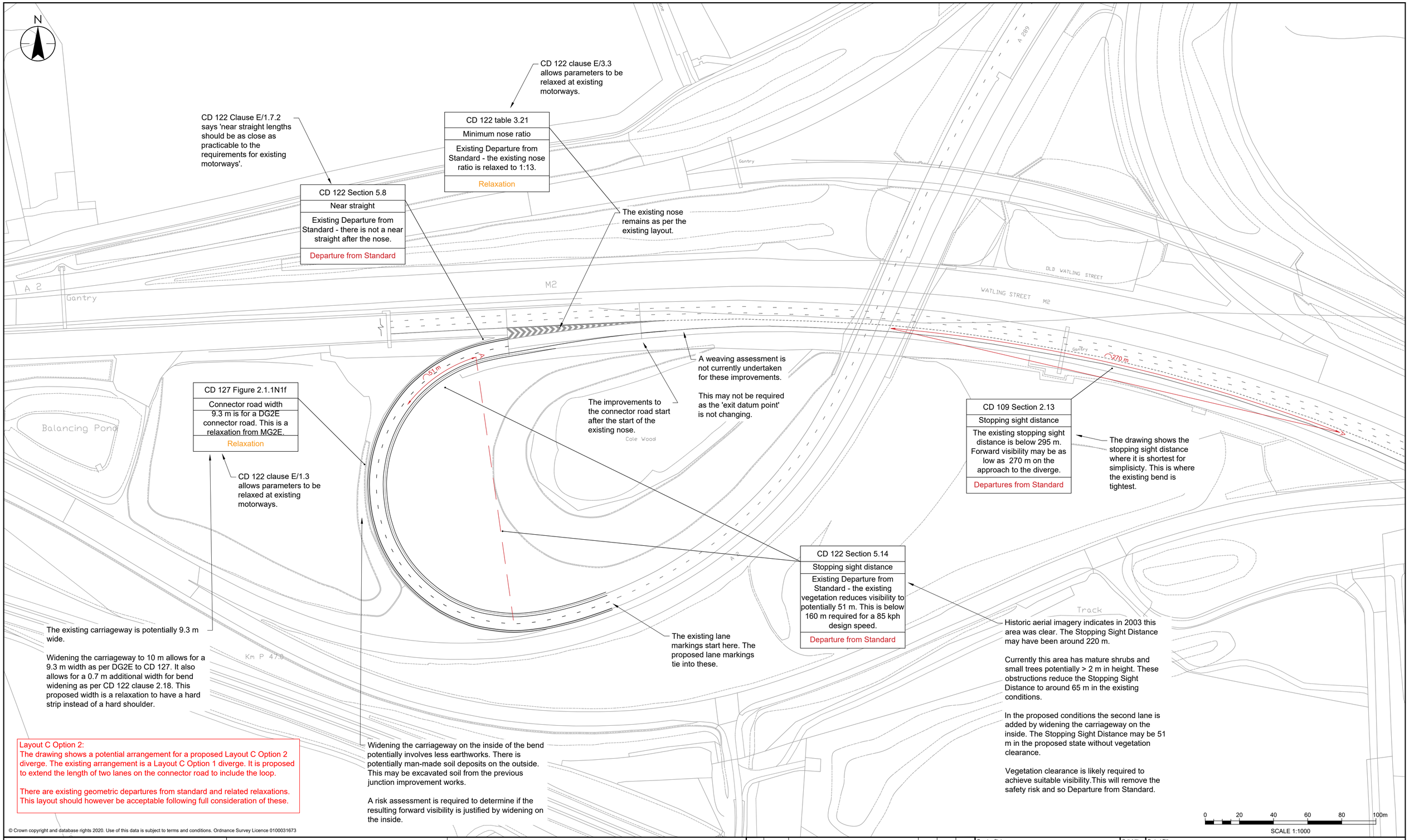
A289 Diverge SB. The diverge layout is type A for rRC and type D for fDS scenarios, an increase in provision is required (lane gain).

The M2 Eastbound Merge. The merge layout is type D for rRC and type E for fDS scenarios, an increase in provision is required (lane gain).

Stantec have provided a design drawing to Medway which shows a layout which appears to satisfy DMRB and National Highways requirements. A design, cost and safety review has been undertaken on the proposed Eastbound merge mitigation. It is recommended that this report is read in conjunction with the following reports for the further analysis on the proposed mitigation in this location:

- B2432000 – Medway LP, M2J1, Cost Estimate Report
- B243200 – Medway LP, M2J1, Design Review
- B243200 – Medway LP, M2J1, Safety Review

Appendix A. Stantec Mitigation at M2 J1



CD 122 clause E/3.3 allows parameters to be relaxed at existing motorways.

CD 122 Clause E/1.7.2 says 'near straight lengths should be as close as practicable to the requirements for existing motorways'.

CD 122 table 3.21
Minimum nose ratio
Existing Departure from Standard - the existing nose ratio is relaxed to 1:13.
Relaxation

CD 122 Section 5.8
Near straight
Existing Departure from Standard - there is not a near straight after the nose.
Departure from Standard

The existing nose remains as per the existing layout.

A weaving assessment is not currently undertaken for these improvements.

This may not be required as the 'exit datum point' is not changing.

The improvements to the connector road start after the start of the existing nose.

CD 127 Figure 2.1.1N1f
Connector road width
9.3 m is for a DG2E connector road. This is a relaxation from MG2E.
Relaxation

CD 122 clause E/1.3 allows parameters to be relaxed at existing motorways.

CD 109 Section 2.13
Stopping sight distance
The existing stopping sight distance is below 295 m. Forward visibility may be as low as 270 m on the approach to the diverge.
Departures from Standard

The drawing shows the stopping sight distance where it is shortest for simplisicty. This is where the existing bend is tightest.

CD 122 Section 5.14
Stopping sight distance
Existing Departure from Standard - the existing vegetation reduces visibility to potentially 51 m. This is below 160 m required for a 85 kph design speed.
Departure from Standard

The existing lane markings start here. The proposed lane markings tie into these.

Historic aerial imagery indicates in 2003 this area was clear. The Stopping Sight Distance may have been around 220 m.

Currently this area has mature shrubs and small trees potentially > 2 m in height. These obstructions reduce the Stopping Sight Distance to around 65 m in the existing conditions.

In the proposed conditions the second lane is added by widening the carriageway on the inside. The Stopping Sight Distance may be 51 m in the proposed state without vegetation clearance.

Vegetation clearance is likely required to achieve suitable visibility.This will remove the safety risk and so Departure from Standard.

The existing carriageway is potentially 9.3 m wide.

Widening the carriageway to 10 m allows for a 9.3 m width as per DG2E to CD 127. It also allows for a 0.7 m additional width for bend widening as per CD 122 clause 2.18. This proposed width is a relaxation to have a hard strip instead of a hard shoulder.

Widening the carriageway on the inside of the bend potentially involves less earthworks. There is potentially man-made soil deposits on the outside. This may be excavated soil from the previous junction improvement works.

A risk assessment is required to determine if the resulting forward visibility is justified by widening on the inside.

Layout C Option 2:
The drawing shows a potential arrangement for a proposed Layout C Option 2 diverge. The existing arrangement is a Layout C Option 1 diverge. It is proposed to extend the length of two lanes on the connector road to include the loop.

There are existing geometric departures from standard and related relaxations. This layout should however be acceptable following full consideration of these.

General Notes

1. This drawing shall be read in conjunction with all other relevant documentation.
2. Do not scale from this drawing.
3. All dimensions are in metres unless specified otherwise.
4. The information on this drawing is based on limited OS information.
5. The dimensions shown are assumed and require verifying through surveys.
6. This drawing shows a potential option(s) from an initial feasibility design. The potential option(s) is indicatively shown for information only. These are subject to outline and detailed design. Further changes may be required.
7. The constraints and potential departures from standard shown/listed are not exhaustive. More may become apparent through further investigations, surveys and during the detailed design.

Notes

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Rev.	Date	Description	Drawn	Chk'd	App'd
P01	14.03.24	FIRST ISSUE	RC	JA	JA

Drawing Status: FOR INFORMATION
Suitability: S2

Stantec
www.stantec.com/uk

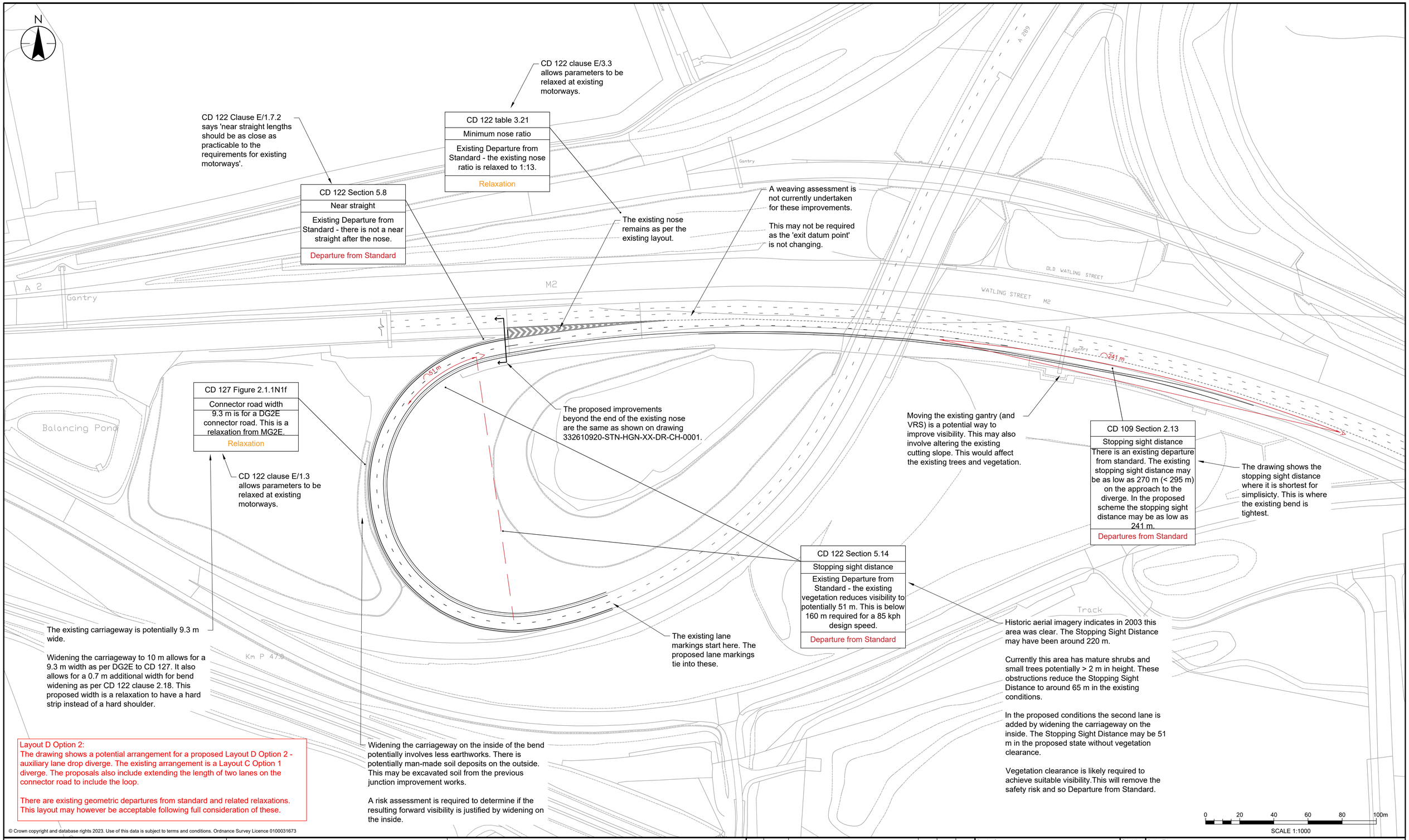
Client: Uniper SE

Project Title: MedwayOne M2J1

Drawing Title:
FEASIBILITY STUDY
M2 TO A289 DIVERGE (NB)
SCHEME A
IMPROVING THE CONNECTOR ROAD

Scale	Designed	Drawn	Checked	Approved
1:1000	-	RC	JA	JA
Original Size	**Date**	**Date**	**Date**	**Date**
A1	-	2024.03.14	2024.03.14	2024.03.14

Drawing Number: HE PIN 332610929 - Originator STN - Volume -HGN- Location XX - Type DR - Role CH - Number 0001
Project Ref. No.: 10569
Revision: P01



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Rev.	Date	Description	Drawn	Chk'd	App'd
P01	14.03.24	FIRST ISSUE	RC	JA	JA

Drawing Status: FOR INFORMATION
Suitability: S2

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www.stantec.com/uk

Client: Uniper SE

Project Title: MedwayOne M2J1

Drawing Title:
FEASIBILITY STUDY
M2 TO A289 DIVERGE (NB)
SCHEME B
IMPROVING THE CONNECTOR ROAD & DIVERGE

Scale	Designed	Drawn	Checked	Approved
1:1000	-	RC	JA	JA
Original Size	**Date**	**Date**	**Date**	**Date**
A1	-	2024.03.14	2024.03.14	2024.03.14

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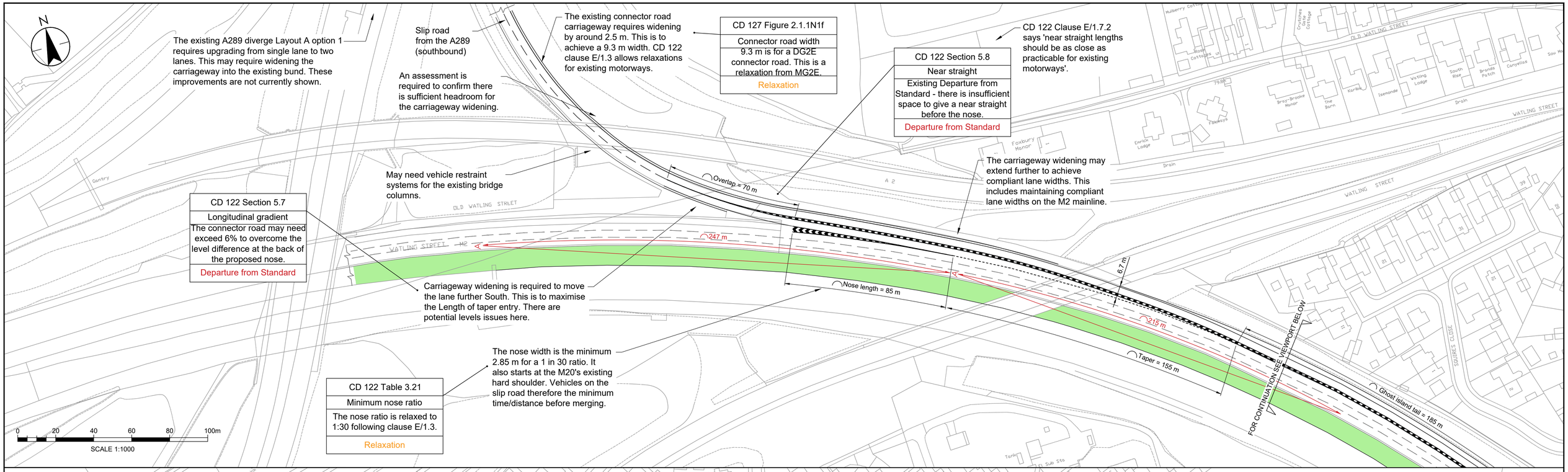
Project Ref. No.: 10569
Revision: P01



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Rev.	Date	Description	Drawn	Chk'd	App'd
P01	14.03.24	FIRST ISSUE	RC	JA	JA

Drawing Status: FOR INFORMATION
Suitability: S2

Stantec
www.stantec.com/uk

Client: Uniper SE

Project Title: MedwayOne M2J1

Drawing Title: FEASIBILITY STUDY
A289 TO M2 MERGE (SB)
SCHEME C
IMPROVING THE MERGE

Scale	Designed	Drawn	Checked	Approved
1:1000	-	RC	JA	JA
Original Size	**Date**	**Date**	**Date**	**Date**
A1	-	2024.03.14	2024.03.14	2024.03.14

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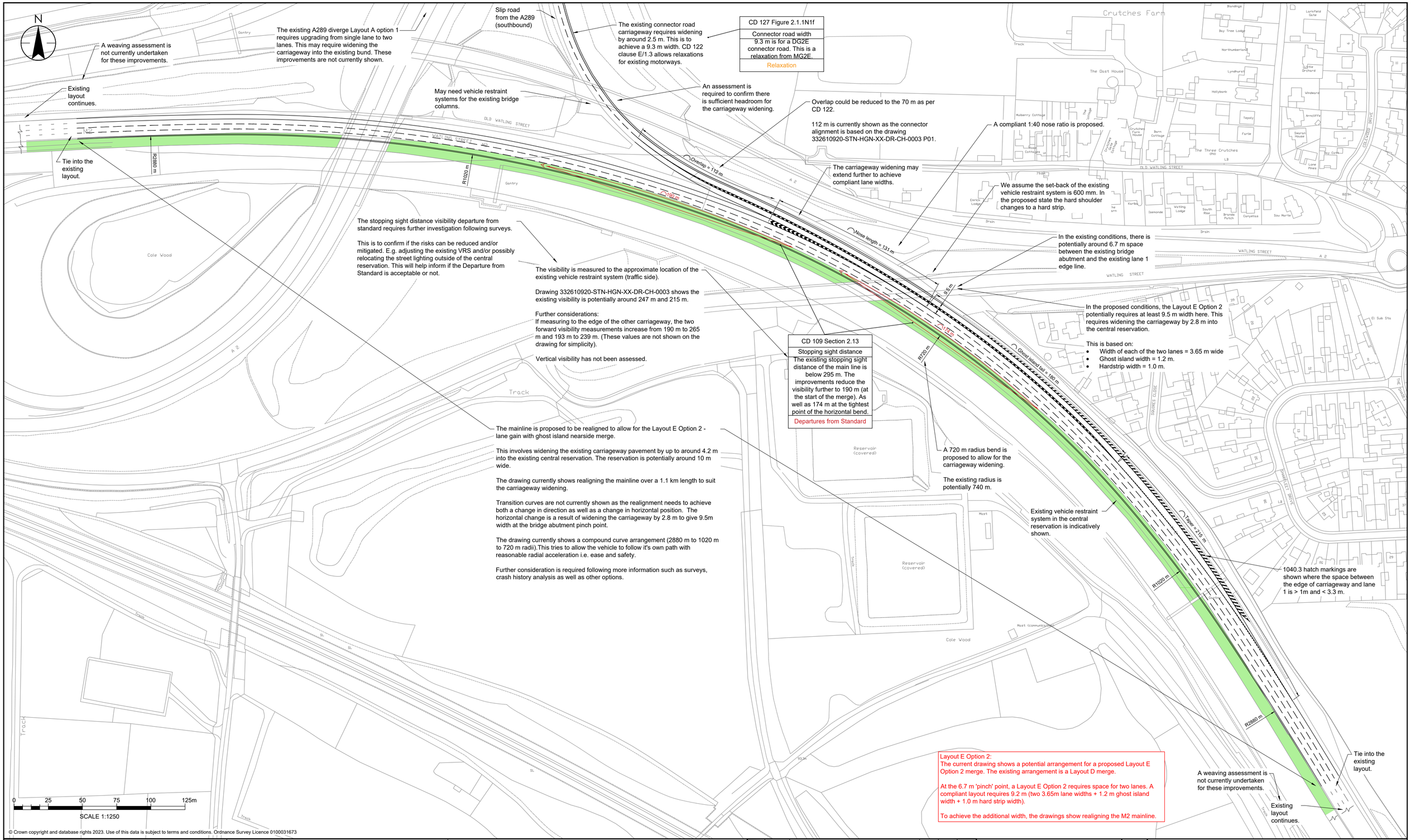
Project Ref. No.: 10569
Revision: P01



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Rev.	Date	Description	Drawn	Chk'd	App'd
P01	14.03.24	FIRST ISSUE	RC	JA	JA

Drawing Status: FOR INFORMATION
Suitability: S2

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Client: Uniper SE

Project Title: MedwayOne M2J1

Drawing Title:
FEASIBILITY STUDY
A289 TO M2 MERGE (SB)
SCHEME D
IMPROVING THE MERGE & REALIGNING THE M2

Scale	Designed	Drawn	Checked	Approved
1:1250	-	RC	JA	JA
Original Size	**Date**	**Date**	**Date**	**Date**
A1	-	2024.03.14	2024.03.14	2024.03.14

Drawing Number: HE PIN 332610920 - Originator STN - Volume -HGN- Location XX - Type DR - Role CH - Number 0004
Project Ref. No.: 10569
Revision: P01