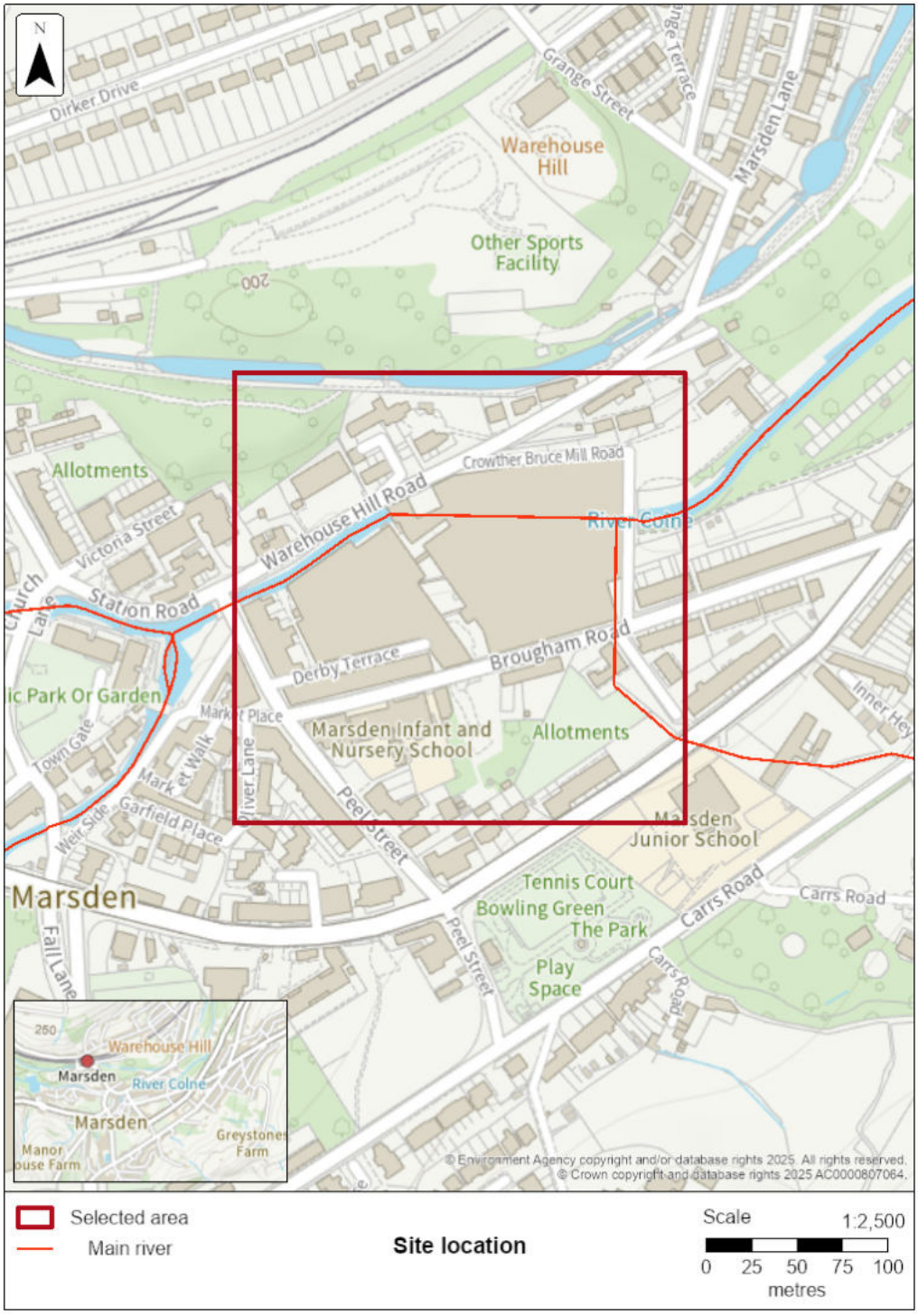
APPENDIX D – EA FLOOD INFORMATION DATA & CORRESPONDENCE

Flood risk assessment data

Location of site: 405023 / 411675 (shown as easting and northing coordinates)
Document created on: 1 April 2025
This information was previously known as a product 4.
Customer reference number: EA6ARG3DXB2B

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

We recommend that you work with a flood risk consultant to get your flood risk assessment.

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- past floods
- flood defences and attributes

We do not have past flooding data for this location.

Please note that:

- flooding may have occurred that we do not have records for
- flooding can come from a range of different sources
- we can only supply flood risk data relating to floodng from rivers or the sea

You can contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

We aren't able to display flood defence locations and attributes as there are no formal flood defences in the area of interest.

Surface water and other sources of flooding

When using the surface water map on the check your long term flood risk service the following considerations apply:

- surface water extents are suitable for use in planning
- surface water climate change scenarios may help to inform risk assessments, but the available data fall short of what is required to assess planned development
- surface water depth information should not be used for planning purposes

To find out about other factors that might affect the flood risk of this location, you should also check:

- reservoir flood risk
- groundwater flood risk - you could use the British Geological Survey groundwater flooding data, groundwater: current status and flood risk and the guide on mining and groundwater constraints for development - further information may be available from the lead local flood authority (LLFA)
- your local planning authority's SFRA, which includes future flood risk

Your Lead Local Flood Authority is Kirklees District.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: 2019 Colne Model
Scenario(s): Defended fluvial, defences removed fluvial, defences removed climate change fluvial
Date: 1 August 2019

Model name: 2019 Crowhill Model
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 8 January 2019

Model name: 2019 Wessenden Model
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 1 August 2019

These models contain the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occuring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

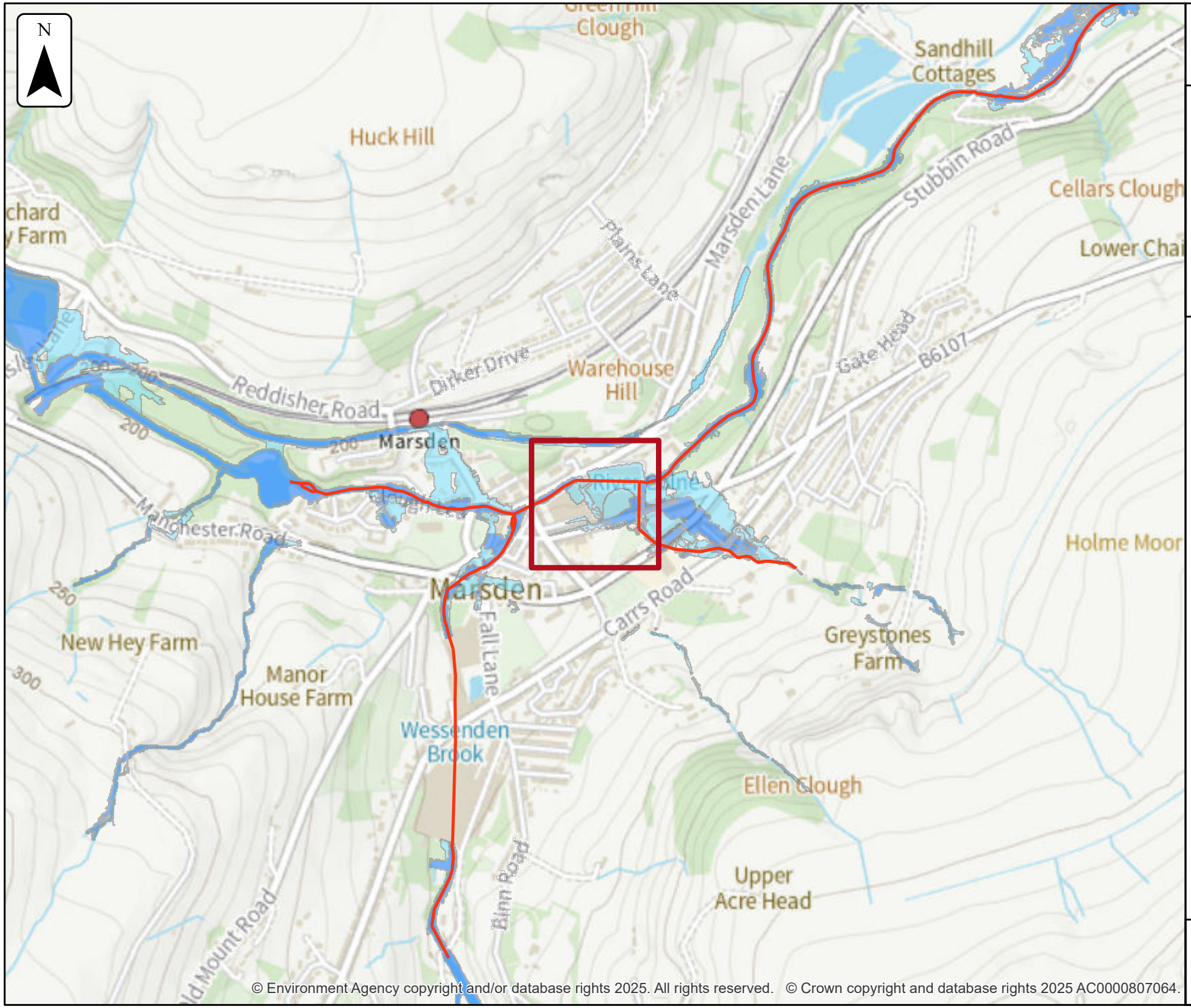
- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change



Environment Agency

Flood map for planning

Location (easting/northing)
405023/411675

Scale
1:10,000

Created
1 Apr 2025

- Selected area
- Main river
- Flood defence
- Water storage area

Flood Zones 2 and 3
Rivers and Sea

- Flood Zone 2
- Flood Zone 3

0 100 200 300 400 500
metres

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

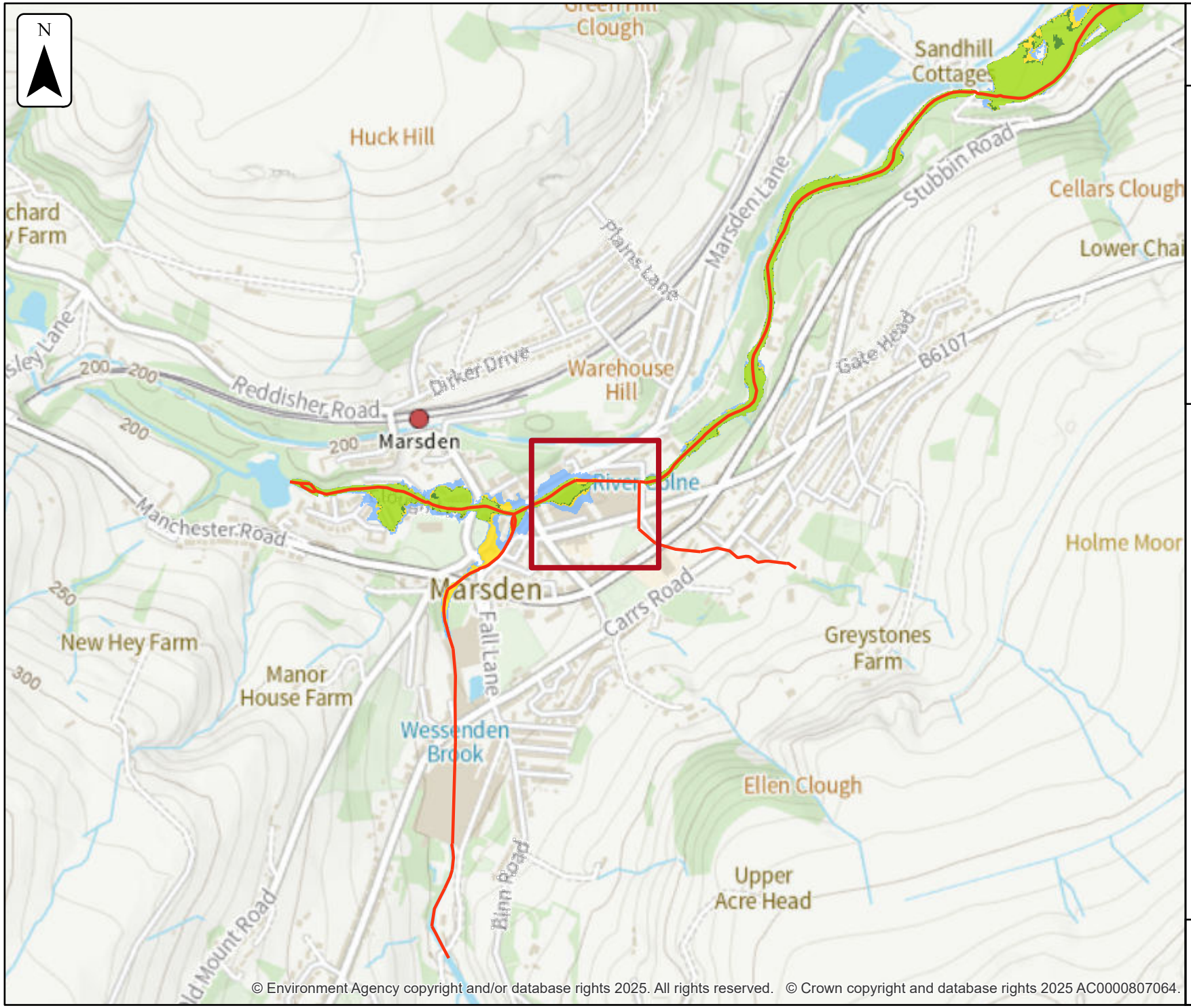
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- Defended modelled fluvial: risk of flooding from rivers where there are flood defences
- Defences removed modelled fluvial: risk of flooding from rivers where flood defences have been removed
- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences
- Defences removed climate change modelled fluvial: risk of flooding from rivers where flood defences have been removed, including estimated impact of climate change
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change



Environment Agency

Defences removed climate change modelled fluvial extent

Location (easting/northing)
405023/411675

Scale
1:10,000

Created
1 Apr 2025

Model name
2019 Colne Model

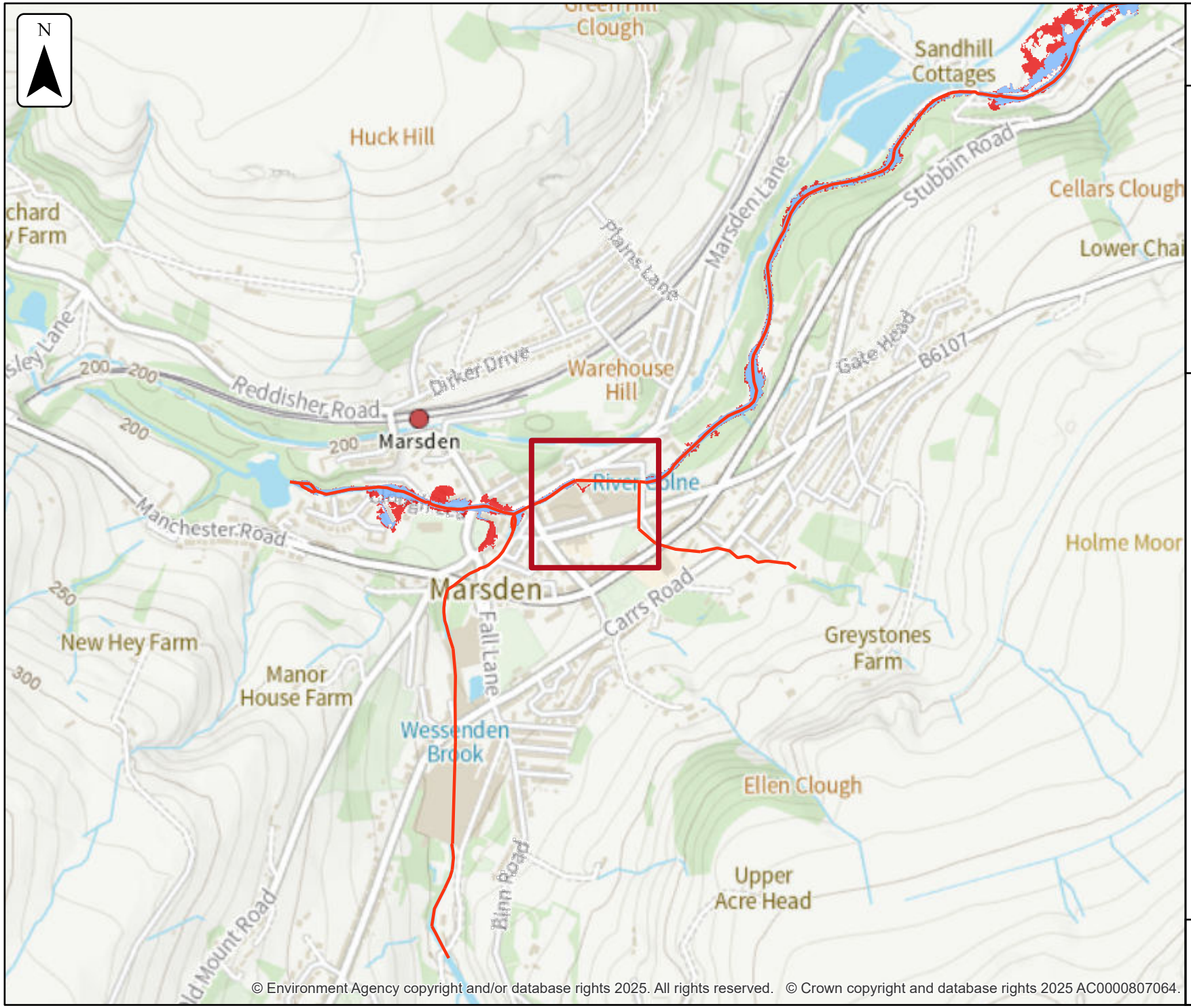
- Selected area
- Main river

Modelled flood extent

- 1% AEP (+20%)
- 1% AEP (+30%)
- 1% AEP (+50%)
- 0.1% AEP (+20%)

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

Defences removed modelled fluvial extent

Location (easting/northing)
405023/411675

Scale
1:10,000

Created
1 Apr 2025

Model name
2019 Colne Model

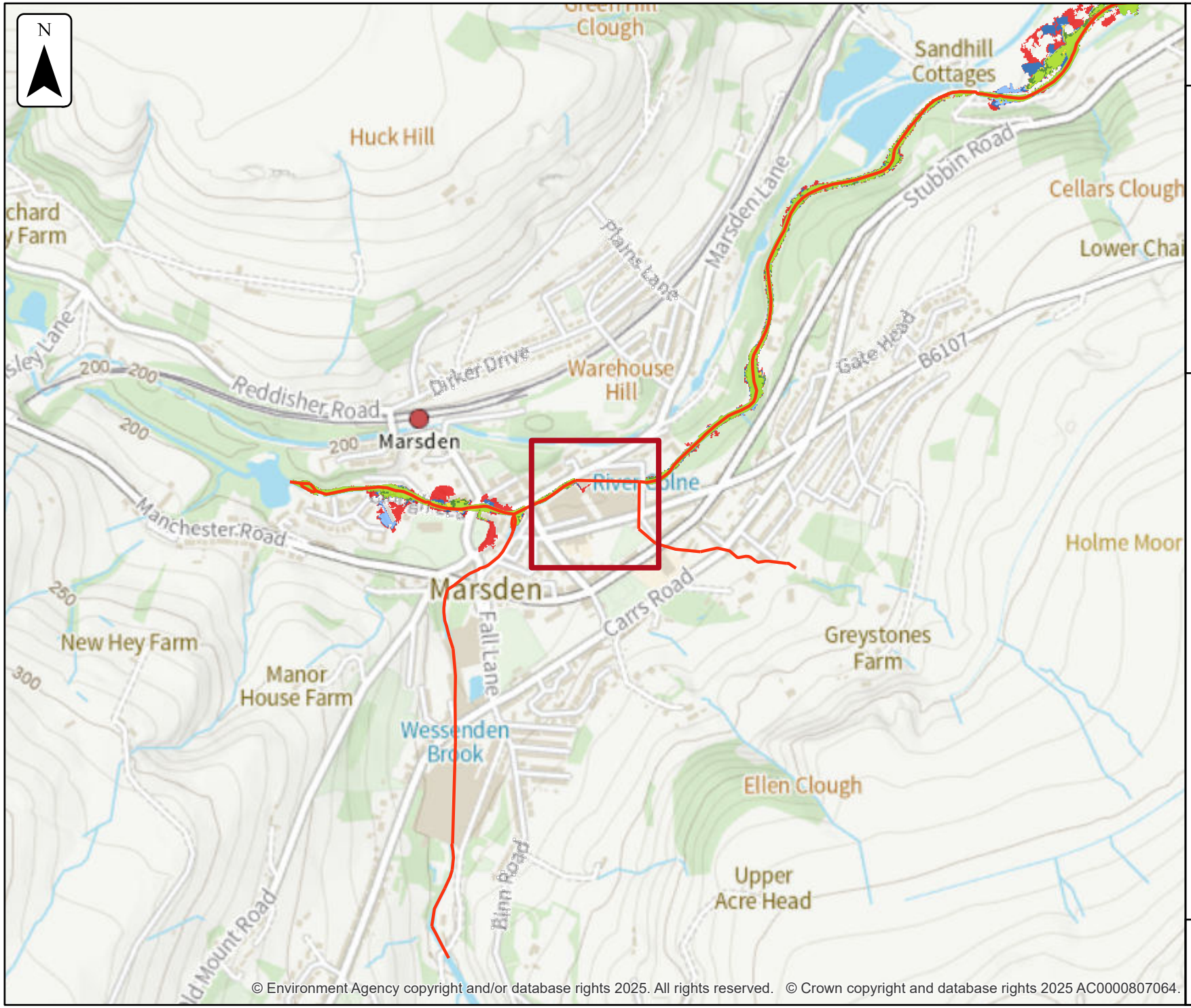
- Selected area
- Main river

Modelled flood extent

- 1% AEP
- 0.1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

Defended modelled fluvial extent

Location (easting/northing)
405023/411675

Scale
1:10,000

Created
1 Apr 2025

Model name
2019 Colne Model

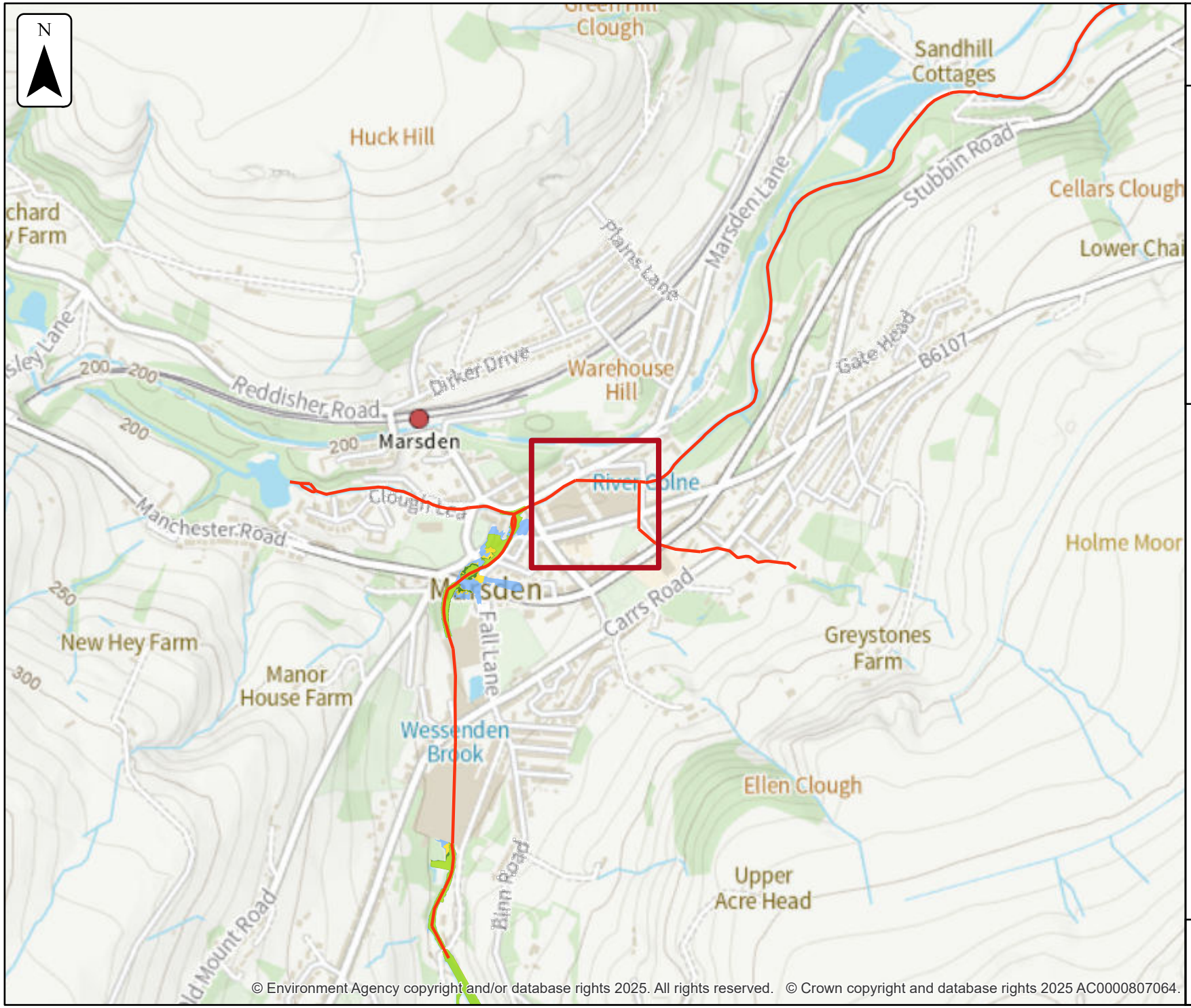
- Selected area
- Main river

Modelled flood extent

- 5% AEP
- 2% AEP
- 1.33% AEP
- 1% AEP
- 0.5% AEP
- 0.1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

No defences exist climate change modelled fluvial extent

Location (easting/northing)
405023/411675

Scale
1:10,000

Created
1 Apr 2025

Model name
2019 Wessenden Model

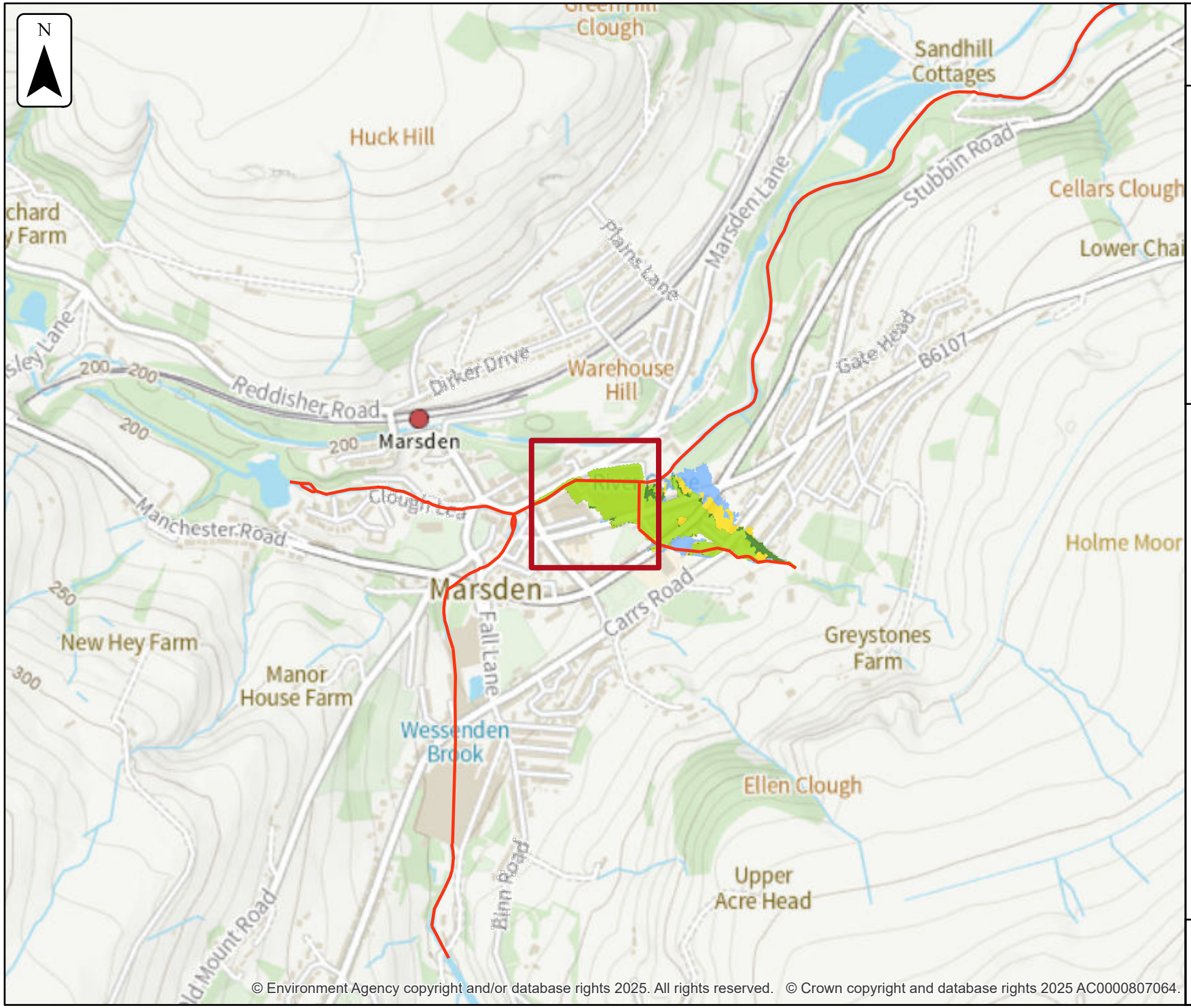
- Selected area
- Main river

Modelled flood extent

- 1% AEP (+20%)
- 1% AEP (+30%)
- 1% AEP (+50%)
- 0.1% AEP (+20%)

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

No defences exist climate change modelled fluvial extent

Location (easting/northing)
405023/411675

Scale
1:10,000

Created
1 Apr 2025

Model name
2019 Crowhill Model

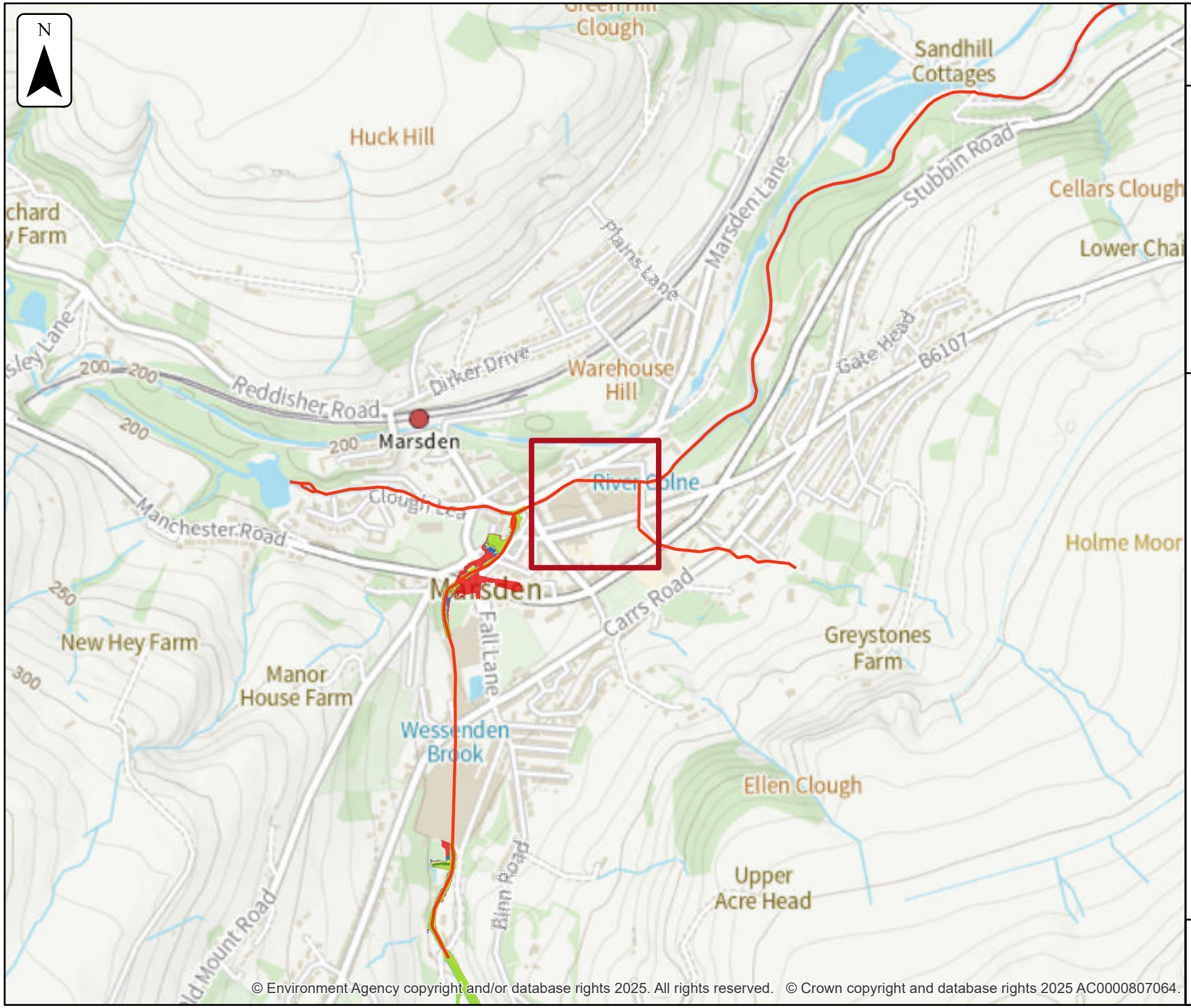
- Selected area
- Main river

Modelled flood extent

- 1% AEP (+20%)
- 1% AEP (+30%)
- 1% AEP (+50%)
- 0.1% AEP (+20%)

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
405023/411675

Scale
1:10,000

Created
1 Apr 2025

Model name
2019 Wessenden Model

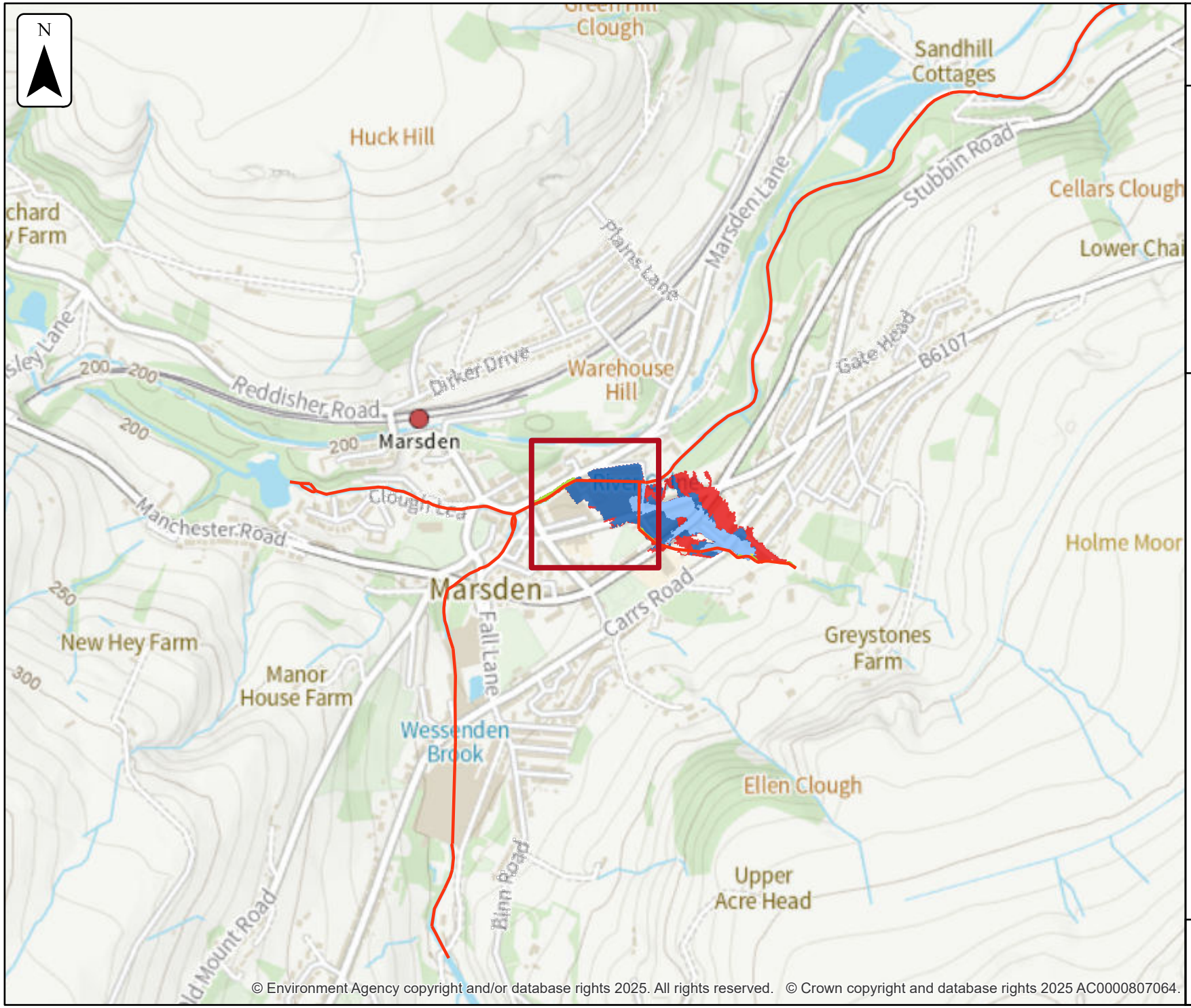
- Selected area
- Main river

Modelled flood extent

- 5% AEP
- 2% AEP
- 1.33% AEP
- 1% AEP
- 0.5% AEP
- 0.1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
405023/411675

Scale
1:10,000

Created
1 Apr 2025

Model name
2019 Crowhill Model

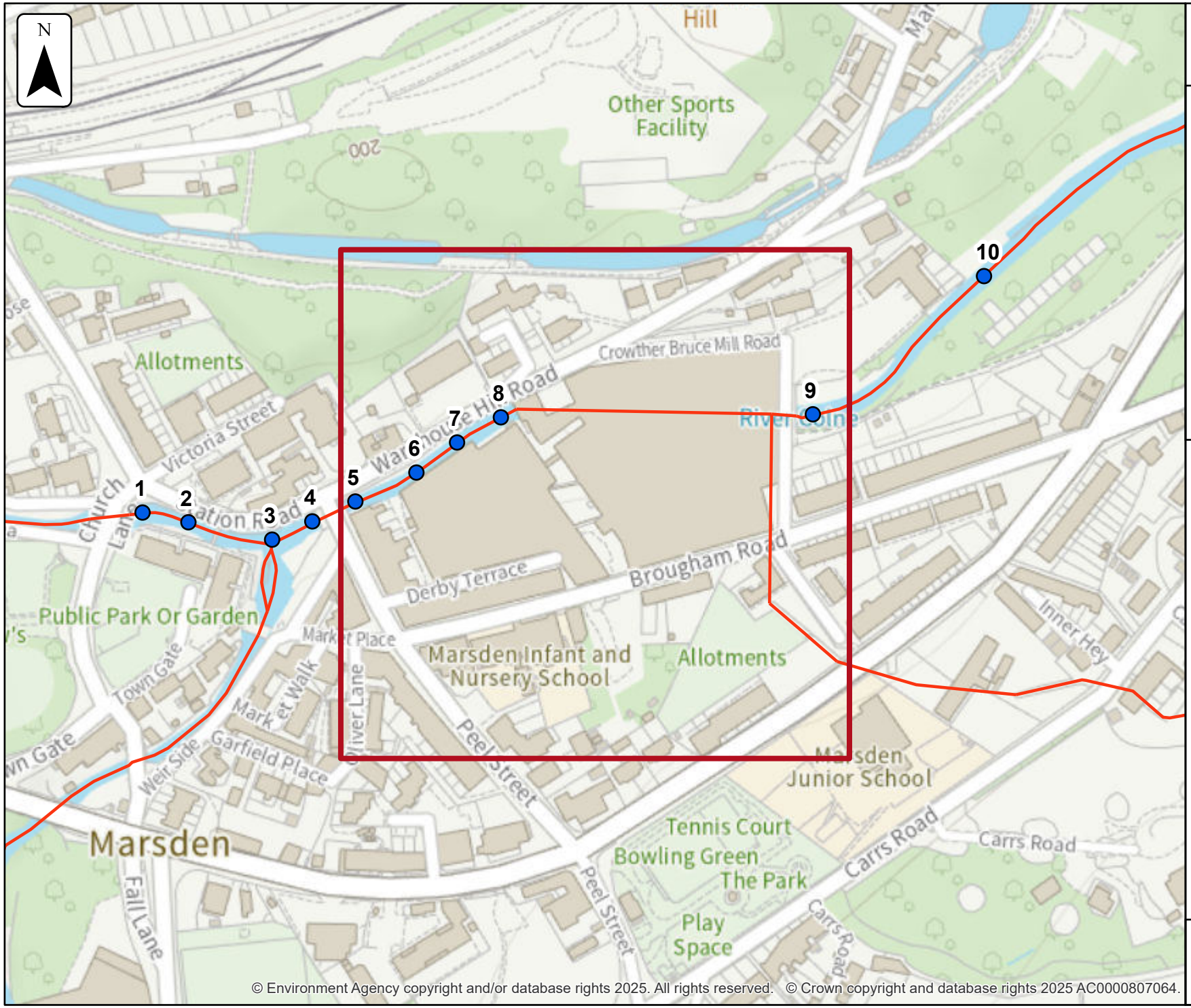
- Selected area
- Main river

Modelled flood extent

- 5% AEP
- 2% AEP
- 1.33% AEP
- 1% AEP
- 0.5% AEP
- 0.1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

Defences removed climate change modelled fluvial node locations

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Colne Model

- Selected area
- Modelled location
- Main river

0 25 50 75 100
metres

Modelled node locations data

Defences removed climate change

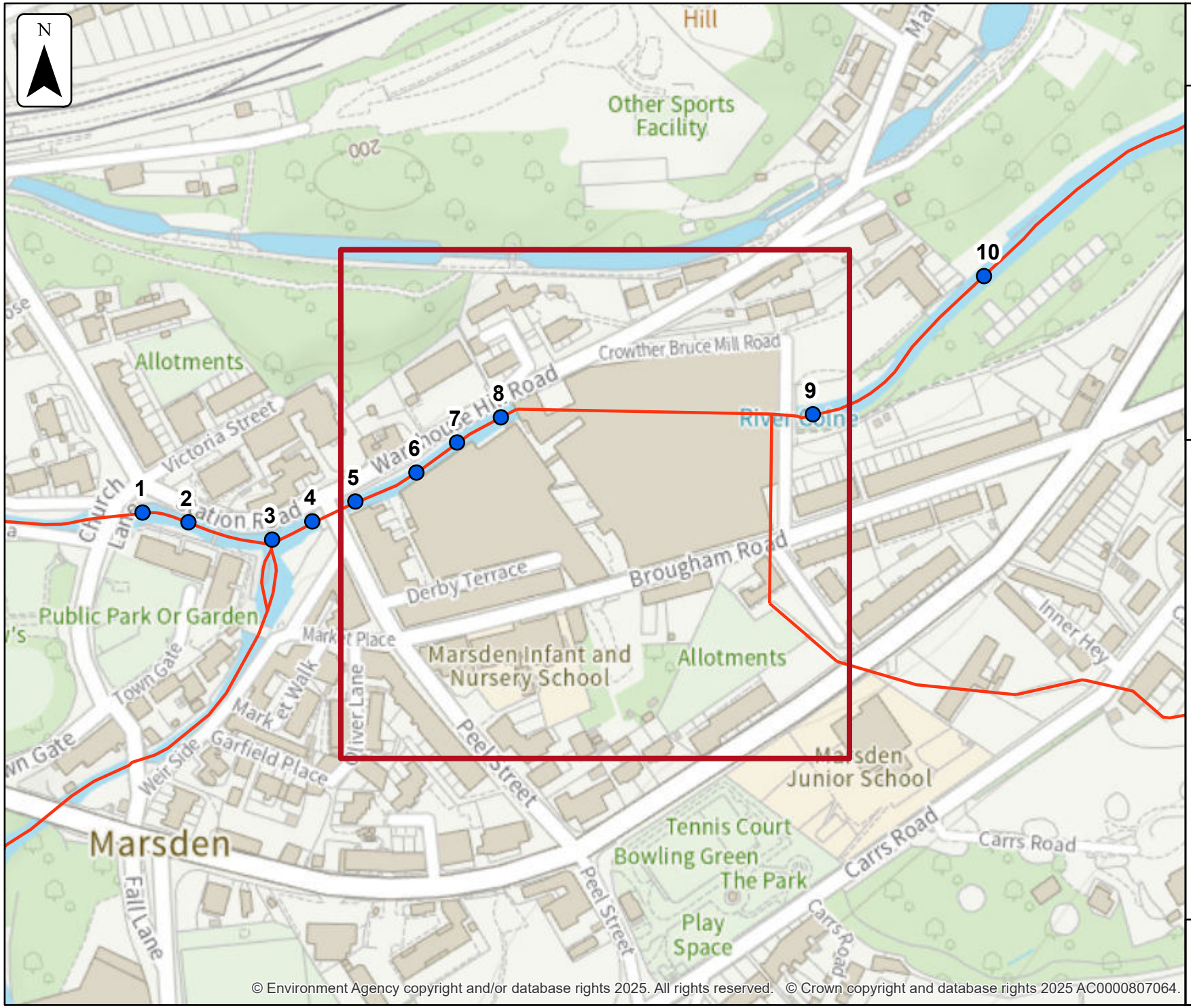
Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
				Level	Level	Level	Level
1	1197866	404803	411671	181.62	181.68	181.77	182.03
2	1198120	404825	411666	179.71	179.85	180.53	181.08
3	1198078	404866	411658	179.34	179.50	179.78	180.85
4	1197882	404885	411667	178.55	178.67	178.90	180.65
5	1197846	404906	411676	178.55	178.67	178.90	179.58
6	1197984	404936	411690	178.38	178.53	178.82	180.09
7	1197786	404956	411705	178.32	178.48	178.83	180.11
8	1197933	404977	411717	178.25	178.45	178.82	180.09
9	1197852	405129	411719	176.03	176.16	176.43	176.84
10	1197854	405213	411786	174.69	174.80	174.97	175.30

Data in this table comes from the 2019 Colne Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
				Flow	Flow	Flow	Flow
1	1197866	404803	411671	50.0	54.17	62.51	90.74
2	1198120	404825	411666	50.0	54.17	66.81	90.73
3	1198078	404866	411658	50.0	54.17	64.70	94.93
4	1197882	404885	411667	71.0	76.92	89.57	111.05
5	1197846	404906	411676	71.0	76.92	89.57	111.05
6	1197984	404936	411690	71.0	76.92	90.46	111.33
7	1197786	404956	411705	71.0	76.92	89.80	111.02
8	1197933	404977	411717	71.0	76.92	88.75	111.02
9	1197852	405129	411719	71.0	76.92	88.75	111.02
10	1197854	405213	411786	71.26	77.20	89.08	111.27

Data in this table comes from the 2019 Colne Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

Defences removed modelled fluvial node locations

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Colne Model

- Selected area
- Modelled location
- Main river

0 25 50 75 100
metres

Modelled node locations data

Defences removed

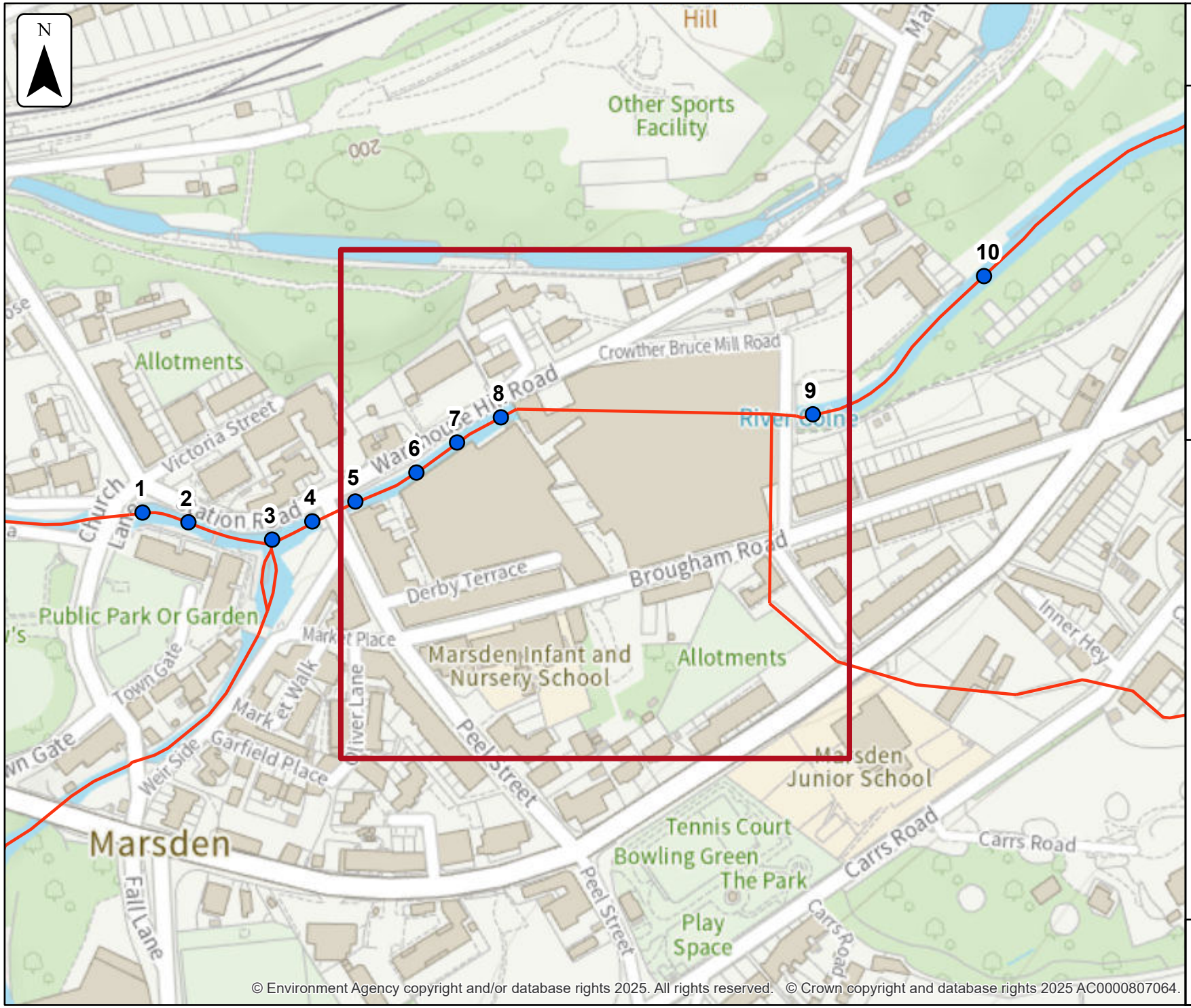
Label	Modelled location ID	Easting	Northing	10% AEP	3.33% AEP	1% AEP	0.1% AEP
				Level	Level	Level	Level
1	1197866	404803	411671	181.12	181.30	181.50	181.90
2	1198120	404825	411666	178.69	179.01	179.42	180.69
3	1198078	404866	411658	178.18	178.51	179.02	179.71
4	1197882	404885	411667	177.59	177.88	178.30	178.99
5	1197846	404906	411676	177.59	177.88	178.30	178.99
6	1197984	404936	411690	177.13	177.49	178.06	178.92
7	1197786	404956	411705	176.93	177.37	177.98	178.97
8	1197933	404977	411717	176.84	177.27	177.85	178.98
9	1197852	405129	411719	174.94	175.27	175.72	176.51
10	1197854	405213	411786	173.89	174.13	174.46	175.02

Data in this table comes from the 2019 Colne Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.

Defences removed

Label	Modelled location ID	Easting	Northing	10% AEP	3.33% AEP	1% AEP	0.1% AEP
				Flow	Flow	Flow	Flow
1	1197866	404803	411671	22.88	30.56	41.67	75.62
2	1198120	404825	411666	22.88	30.56	41.67	86.70
3	1198078	404866	411658	22.88	30.56	41.67	79.53
4	1197882	404885	411667	32.81	43.47	59.17	95.33
5	1197846	404906	411676	32.81	43.47	59.17	95.33
6	1197984	404936	411690	32.81	43.47	59.17	96.76
7	1197786	404956	411705	32.81	43.47	59.17	96.11
8	1197933	404977	411717	32.81	43.47	59.17	92.92
9	1197852	405129	411719	32.81	43.47	59.17	92.59
10	1197854	405213	411786	32.94	43.64	59.38	92.80

Data in this table comes from the 2019 Colne Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

Defended modelled fluvial node locations

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Colne Model

- Selected area
- Modelled location
- Main river

0 25 50 75 100
metres

Modelled node locations data

Defended

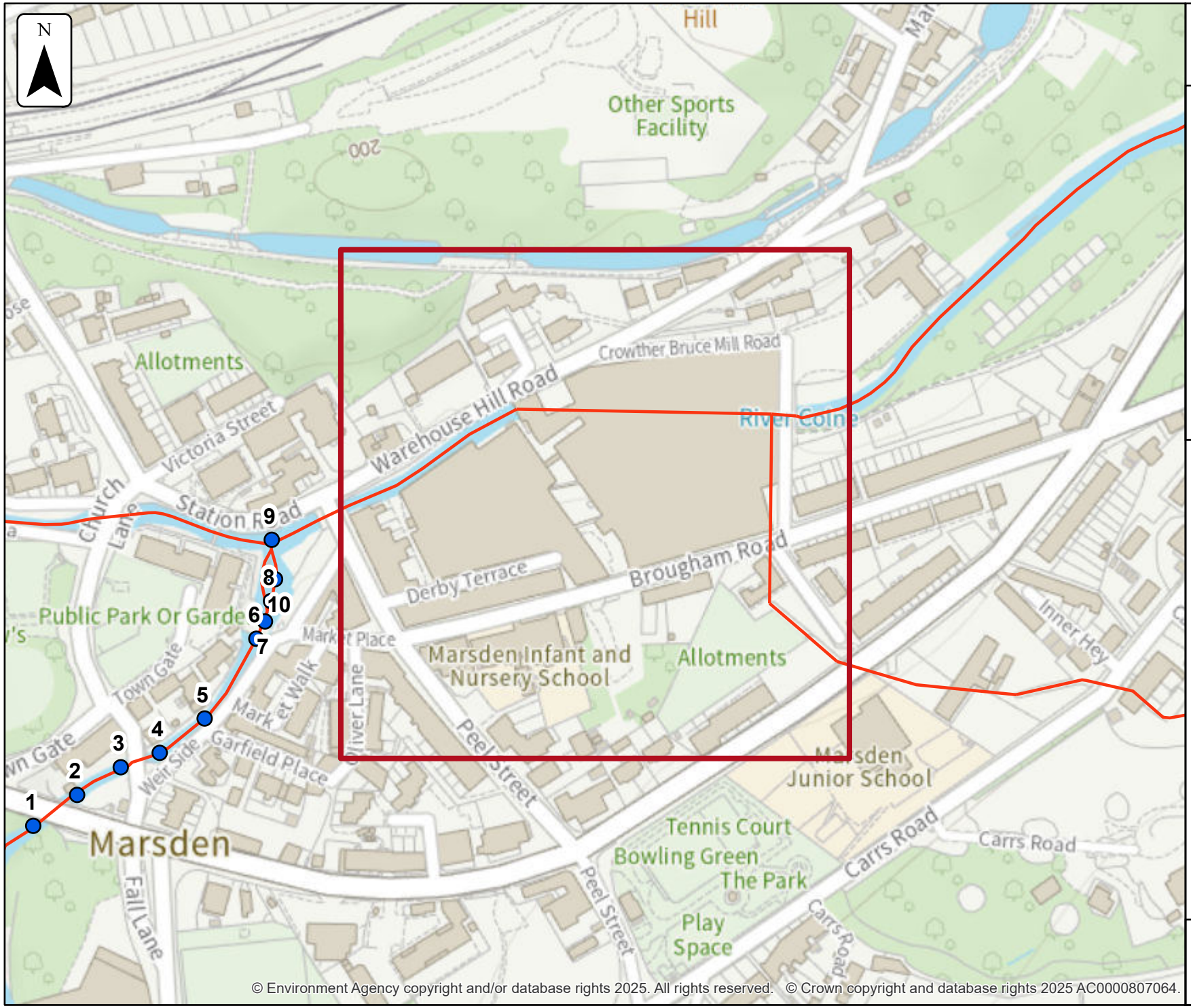
Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
1	1197866	404803	411671	180.79	181.0	181.12	181.23	181.27	181.30	181.38	181.45	181.50	181.62	181.90
2	1198120	404825	411666	178.32	178.52	178.69	178.88	178.96	179.01	179.18	179.31	179.42	179.66	180.69
3	1198078	404866	411658	177.82	178.0	178.18	178.38	178.47	178.51	178.71	178.89	179.02	179.24	179.71
4	1197882	404885	411667	177.29	177.46	177.59	177.76	177.84	177.88	178.05	178.19	178.30	178.50	178.99
5	1197846	404906	411676	177.29	177.45	177.59	177.76	177.84	177.88	178.05	178.19	178.30	178.50	178.99
6	1197984	404936	411690	176.75	176.95	177.13	177.35	177.44	177.49	177.70	177.91	178.06	178.32	178.92
7	1197786	404956	411705	176.46	176.69	176.93	177.20	177.31	177.37	177.62	177.82	177.98	178.25	178.97
8	1197933	404977	411717	176.31	176.58	176.84	177.10	177.21	177.27	177.50	177.70	177.85	178.16	178.98
9	1197852	405129	411719	174.52	174.75	174.94	175.14	175.22	175.27	175.45	175.60	175.72	175.96	176.51
10	1197854	405213	411786	173.55	173.76	173.89	174.03	174.09	174.13	174.26	174.37	174.46	174.64	175.02

Data in this table comes from the 2019 Colne Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.

Defended

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	1197866	404803	411671	13.59	18.80	22.88	27.50	29.15	30.56	34.87	38.71	41.67	49.82	75.62
2	1198120	404825	411666	13.59	18.80	22.88	27.50	29.15	30.56	34.87	38.71	41.67	49.81	86.70
3	1198078	404866	411658	13.59	18.80	22.88	27.50	29.14	30.56	34.87	38.71	41.67	49.81	79.53
4	1197882	404885	411667	21.27	27.05	32.81	39.26	41.93	43.47	49.59	54.97	59.17	68.31	95.33
5	1197846	404906	411676	21.27	27.05	32.81	39.26	41.93	43.47	49.59	54.97	59.17	68.31	95.33
6	1197984	404936	411690	21.27	27.05	32.81	39.26	41.93	43.47	49.59	54.97	59.17	68.31	96.76
7	1197786	404956	411705	21.27	27.05	32.81	39.26	41.93	43.47	49.59	54.97	59.17	68.31	96.11
8	1197933	404977	411717	21.27	27.05	32.81	39.26	41.93	43.47	49.59	54.97	59.17	68.31	92.92
9	1197852	405129	411719	21.27	27.05	32.81	39.26	41.93	43.47	49.59	54.97	59.17	68.31	92.59
10	1197854	405213	411786	21.37	27.15	32.94	39.41	42.09	43.64	49.77	55.17	59.38	68.54	92.80

Data in this table comes from the 2019 Colne Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

No defences exist climate change modelled fluvial node locations

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Wessenden Model

- Selected area
- Modelled location
- Main river

0 25 50 75 100
metres

Modelled node locations data

No defences exist climate change

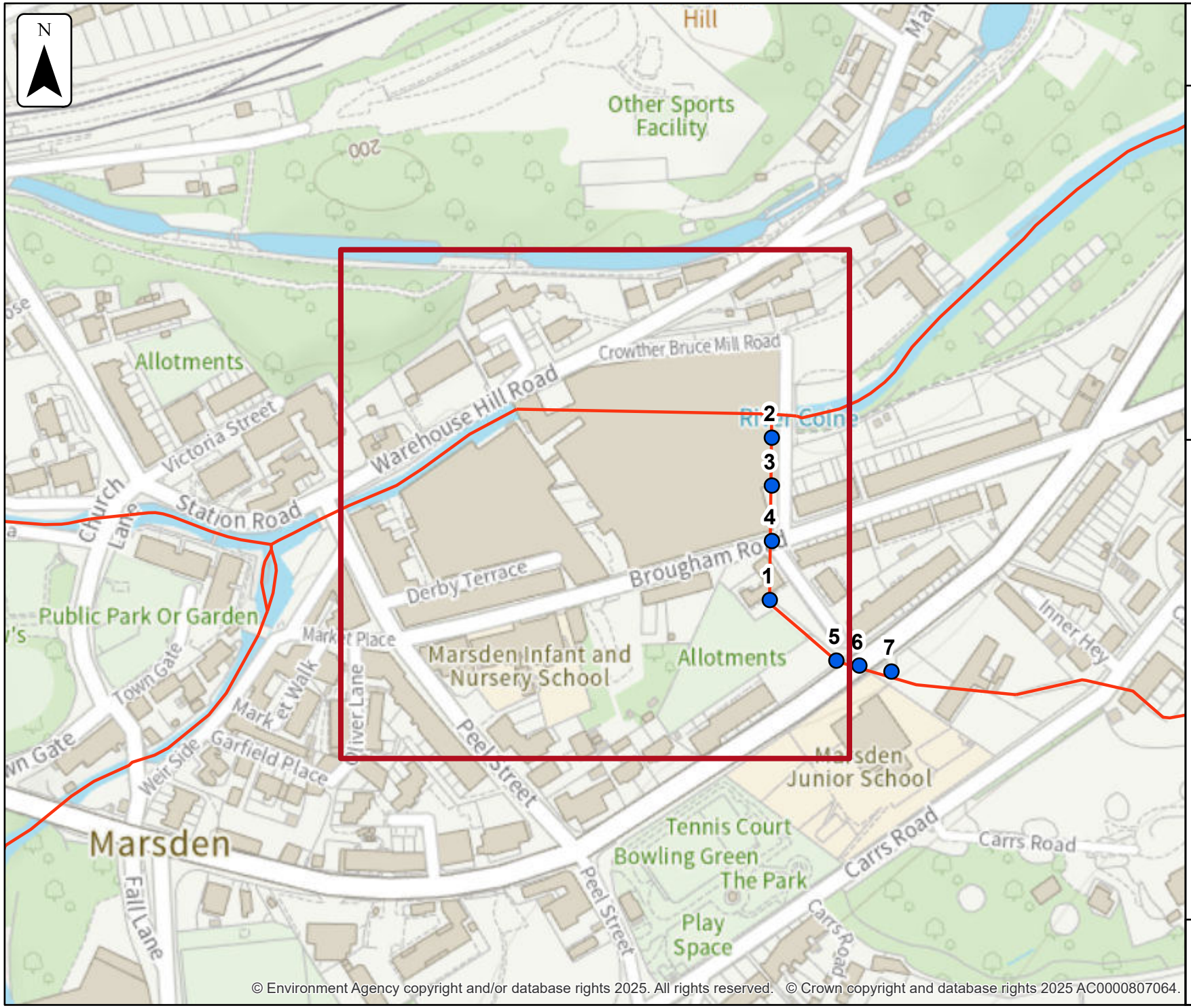
Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
				Level	Level	Level	Level
1	1199854	404750	411519	182.42	182.84	182.95	183.27
2	1199834	404771	411534	182.42	182.83	182.93	183.20
3	1199852	404792	411547	181.88	182.54	182.78	183.09
4	1199853	404811	411554	181.88	181.96	182.09	182.68
5	1199842	404833	411571	181.13	181.20	181.38	181.81
6	1199856	404858	411610	180.56	180.59	180.61	181.31
7	1199839	404862	411618	180.55	180.59	180.61	180.98
8	1199840	404865	411628	180.58	180.62	180.68	180.86
9	1199851	404866	411658	178.0	178.0	178.0	178.0
10	1199831	404867	411639	178.05	178.09	178.09	178.19

Data in this table comes from the 2019 Wessenden Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.

No defences exist climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
				Flow	Flow	Flow	Flow
1	1199854	404750	411519	29.47	34.45	38.32	50.86
2	1199834	404771	411534	29.47	34.45	38.32	50.86
3	1199852	404792	411547	29.47	31.92	36.84	50.93
4	1199853	404811	411554	29.47	31.92	36.84	50.93
5	1199842	404833	411571	29.47	32.01	36.84	52.18
6	1199856	404858	411610	29.47	32.60	36.84	50.40
7	1199839	404862	411618	29.47	32.60	36.84	50.40
8	1199840	404865	411628	29.47	31.92	36.84	50.40
9	1199851	404866	411658	29.47	32.34	36.84	50.40
10	1199831	404867	411639	29.47	31.92	36.84	50.40

Data in this table comes from the 2019 Wessenden Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

No defences exist climate change modelled fluvial node locations

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Crowhill Model

- Selected area
- Modelled location
- Main river

0 25 50 75 100
metres

Modelled node locations data

No defences exist climate change

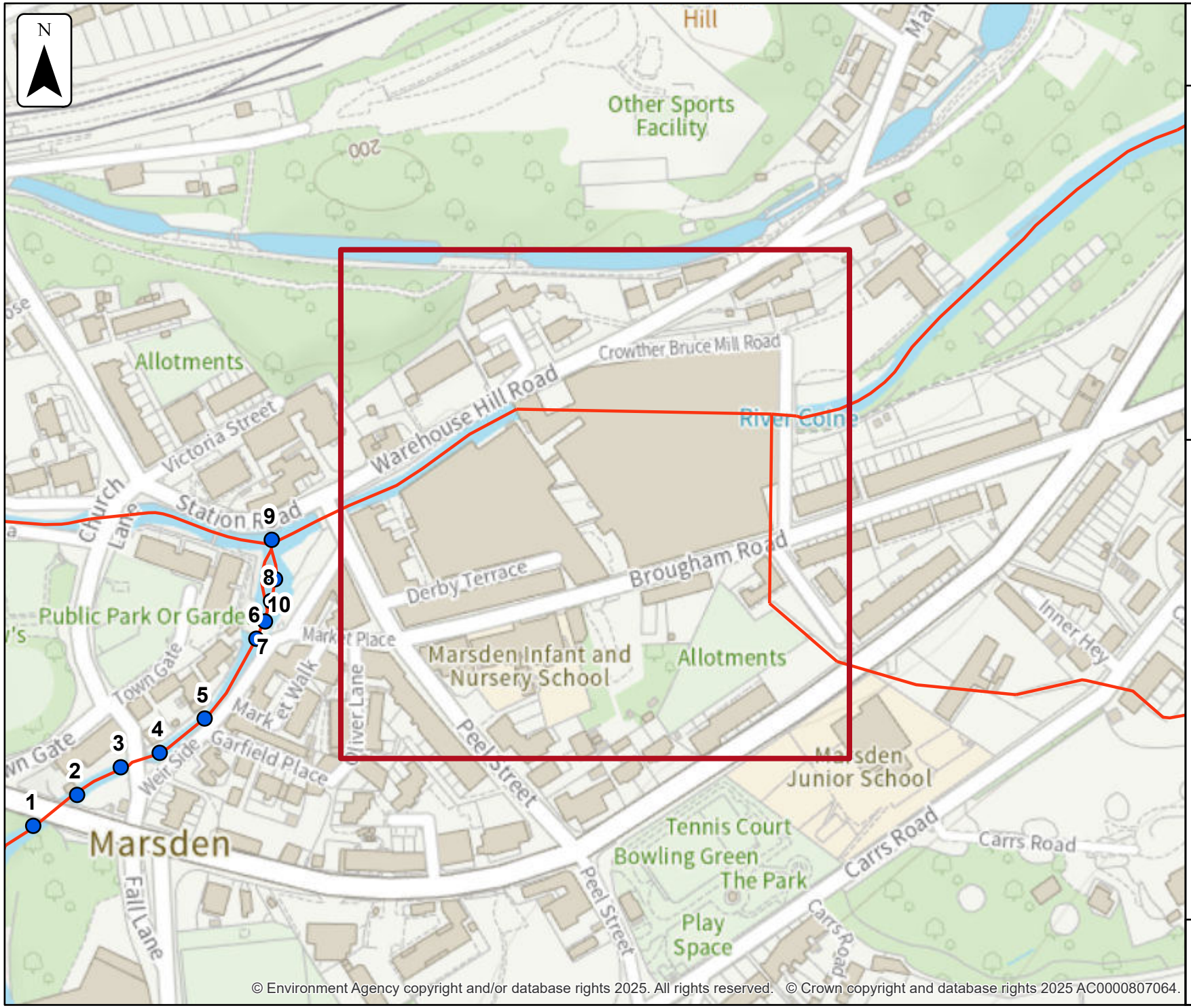
Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
				Level	Level	Level	Level
1	1199912	405108	411628	180.79	180.80	180.82	180.94
2	1199910	405109	411707	174.52	174.52	174.52	174.52
3	1199909	405109	411684	176.40	176.42	176.43	176.55
4	1199924	405109	411657	178.60	178.61	178.63	178.74
5	1199916	405141	411599	184.57	184.59	184.61	184.74
6	1199931	405152	411597	185.06	185.06	185.07	185.10
7	1199933	405167	411594	186.95	186.97	186.99	187.07

Data in this table comes from the 2019 Crowhill Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.

No defences exist climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
				Flow	Flow	Flow	Flow
1	1199912	405108	411628	1.56	1.59	1.63	1.89
2	1199910	405109	411707	1.56	1.59	1.63	1.89
3	1199909	405109	411684	1.56	1.59	1.64	1.89
4	1199924	405109	411657	1.56	1.59	1.63	1.89
5	1199916	405141	411599	1.56	1.59	1.64	1.88
6	1199931	405152	411597	1.56	1.59	1.64	1.86
7	1199933	405167	411594	1.56	1.59	1.67	1.86

Data in this table comes from the 2019 Crowhill Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

No defences exist modelled fluvial node locations

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Wessenden Model

- Selected area
- Modelled location
- Main river

0 25 50 75 100
metres

Modelled node locations data

No defences exist

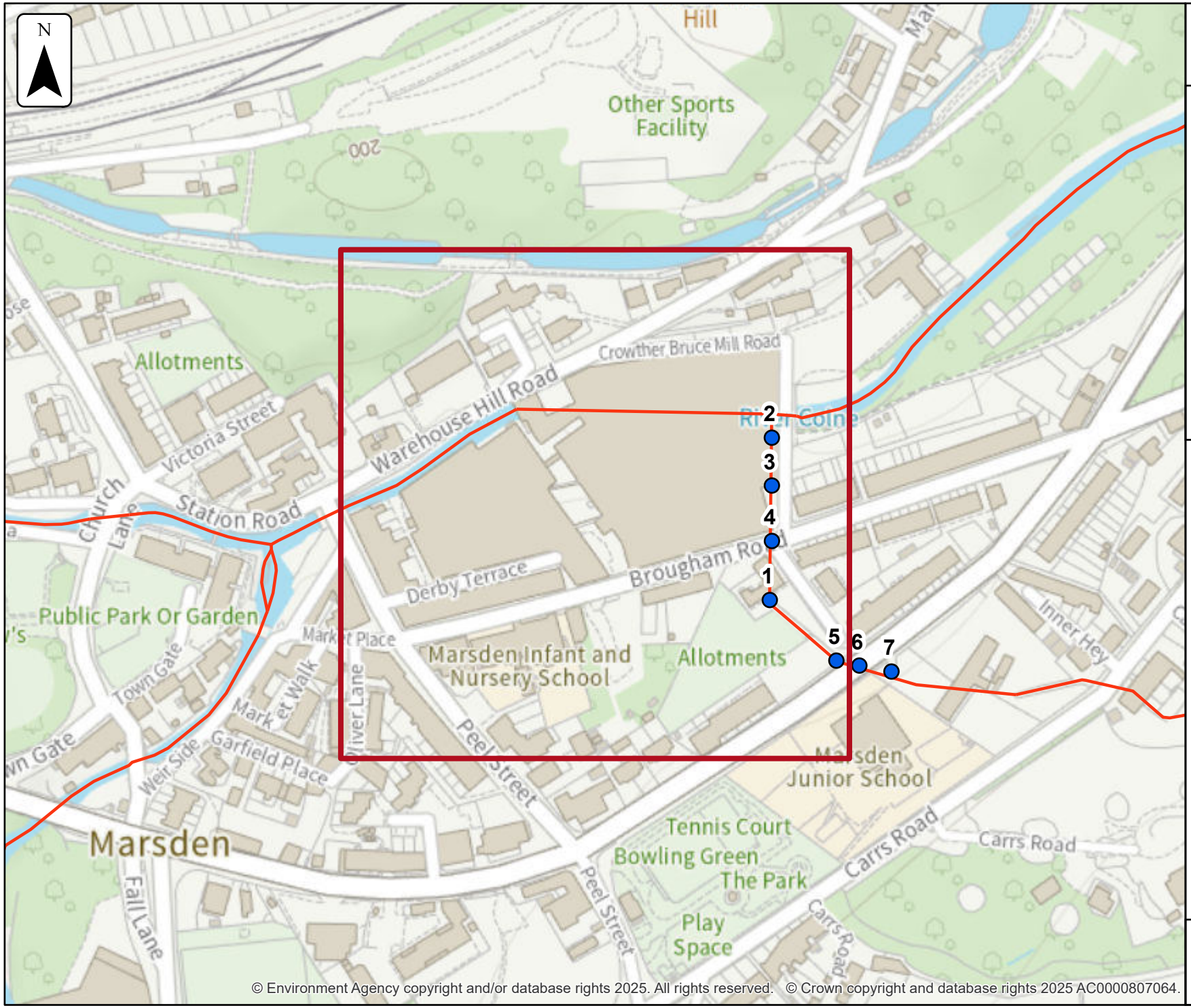
Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
1	1199854	404750	411519	181.44	181.58	181.70	181.83	181.87	181.91	182.02	182.12	182.19	182.39	183.11
2	1199834	404771	411534	181.44	181.58	181.70	181.83	181.87	181.91	182.02	182.12	182.19	182.39	183.05
3	1199852	404792	411547	180.94	181.14	181.27	181.41	181.46	181.49	181.58	181.66	181.71	181.86	182.91
4	1199853	404811	411554	180.94	181.14	181.27	181.41	181.46	181.49	181.58	181.66	181.71	181.86	182.24
5	1199842	404833	411571	180.45	180.58	180.67	180.77	180.79	180.82	180.89	180.95	181.0	181.12	181.49
6	1199856	404858	411610	180.23	180.31	180.35	180.40	180.41	180.42	180.46	180.48	180.50	180.55	180.66
7	1199839	404862	411618	180.23	180.31	180.35	180.40	180.41	180.42	180.46	180.48	180.50	180.55	180.65
8	1199840	404865	411628	180.20	180.28	180.33	180.38	180.39	180.41	180.45	180.48	180.51	180.57	180.75
9	1199851	404866	411658	178.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0
10	1199831	404867	411639	178.0	178.01	178.01	178.01	178.02	178.02	178.02	178.03	178.03	178.05	178.10

Data in this table comes from the 2019 Wessenden Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.

No defences exist

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	1199854	404750	411519	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.54	28.84	41.99
2	1199834	404771	411534	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.54	28.84	41.99
3	1199852	404792	411547	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.54	28.84	41.99
4	1199853	404811	411554	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.54	28.84	41.99
5	1199842	404833	411571	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.54	28.84	41.99
6	1199856	404858	411610	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.55	28.84	41.99
7	1199839	404862	411618	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.55	28.84	41.99
8	1199840	404865	411628	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.55	28.84	41.99
9	1199851	404866	411658	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.55	28.84	41.99
10	1199831	404867	411639	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.55	28.84	41.99

Data in this table comes from the 2019 Wessenden Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

No defences exist modelled fluvial node locations

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Crowhill Model

- Selected area
- Modelled location
- Main river

0 25 50 75 100
metres

Modelled node locations data

No defences exist

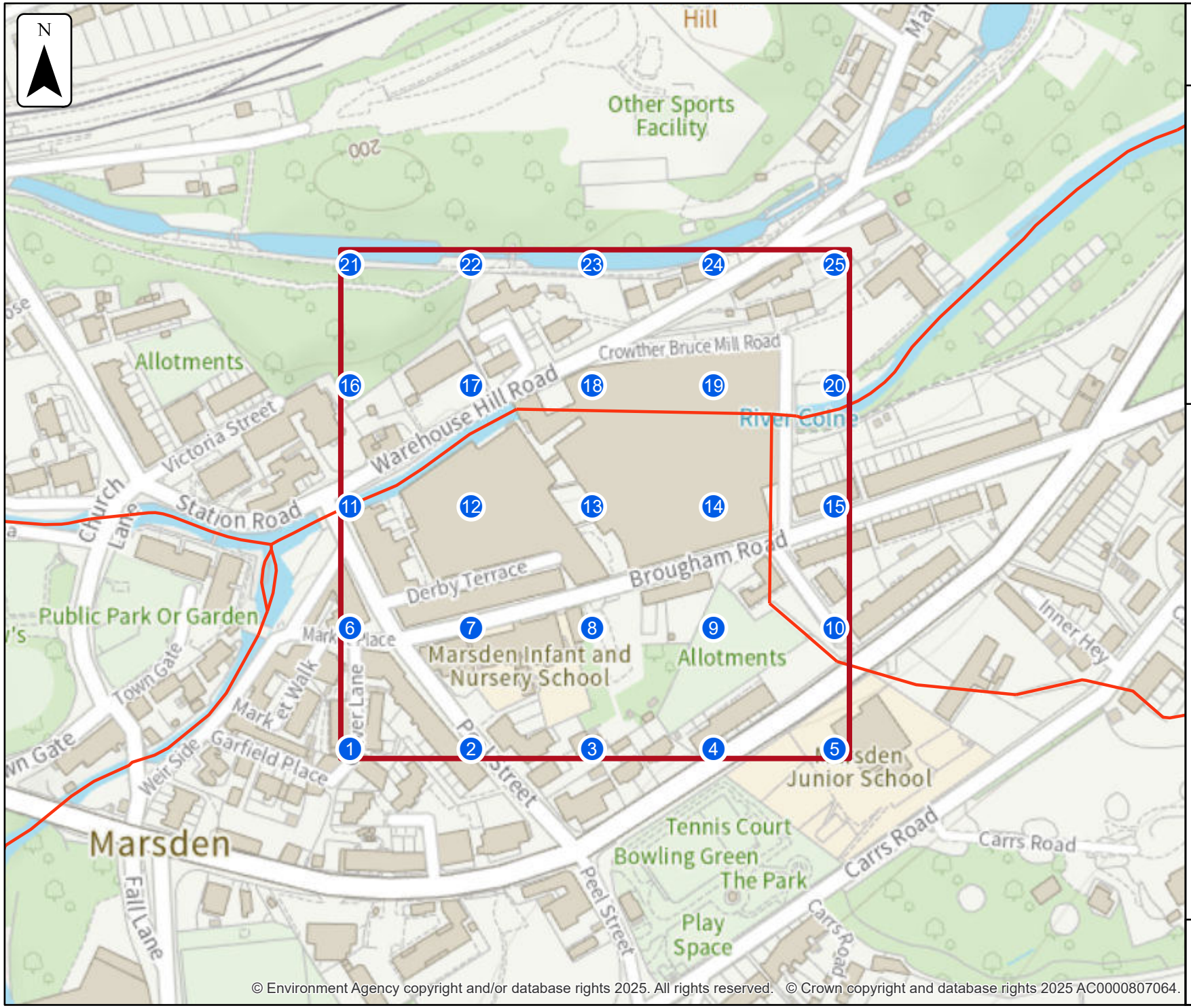
Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
1	1199912	405108	411628	180.20	180.32	180.40	180.49	180.53	180.55	180.63	180.69	180.73	180.79	180.88
2	1199910	405109	411707	174.52	174.52	174.52	174.52	174.52	174.52	174.52	174.52	174.52	174.52	174.52
3	1199909	405109	411684	175.81	175.93	176.01	176.11	176.14	176.17	176.24	176.31	176.35	176.40	176.49
4	1199924	405109	411657	178.0	178.12	178.21	178.30	178.33	178.36	178.43	178.50	178.54	178.60	178.68
5	1199916	405141	411599	184.07	184.13	184.17	184.21	184.22	184.24	184.33	184.43	184.49	184.57	184.68
6	1199931	405152	411597	184.85	184.89	184.92	184.96	184.97	184.98	185.0	185.03	185.04	185.06	185.09
7	1199933	405167	411594	186.41	186.52	186.60	186.68	186.71	186.74	186.81	186.87	186.90	186.95	187.03

Data in this table comes from the 2019 Crowhill Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.

No defences exist

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	1199912	405108	411628	0.46	0.65	0.79	0.96	1.02	1.07	1.22	1.36	1.44	1.56	1.76
2	1199910	405109	411707	0.46	0.65	0.79	0.96	1.02	1.07	1.22	1.36	1.44	1.56	1.76
3	1199909	405109	411684	0.46	0.65	0.79	0.96	1.02	1.07	1.22	1.36	1.44	1.56	1.76
4	1199924	405109	411657	0.46	0.65	0.79	0.96	1.02	1.07	1.22	1.36	1.44	1.56	1.76
5	1199916	405141	411599	0.46	0.65	0.79	0.96	1.02	1.07	1.22	1.36	1.44	1.56	1.76
6	1199931	405152	411597	0.46	0.65	0.79	0.96	1.02	1.07	1.23	1.36	1.44	1.56	1.75
7	1199933	405167	411594	0.46	0.65	0.79	0.96	1.02	1.07	1.22	1.36	1.44	1.56	1.80

Data in this table comes from the 2019 Crowhill Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

Defended modelled fluvial extent and height

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Colne Model

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 48.0
- 48.0 - 52.0
- 52.0 - 56.0
- 56.0 - 60.0
- 60.0 - 64.0
- 64.0 - 68.0
- 68.0 - 72.0
- 72.0 - 76.0
- 76.0 - 80.0

This map shows the 0.1% AEP height data

0 25 50 75 100
metres

Sample point data

Defended

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
1	404904	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	404963	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	405022	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	405081	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	405140	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	404904	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	404963	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	405022	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	405081	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	405140	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	404904	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	404963	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
13	405022	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	405081	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	405140	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	404904	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
17	404963	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	405022	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	405081	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	405140	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	404904	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	404963	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	405022	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	405081	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
25	405140	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Data in this table comes from the 2019 Colne Model model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

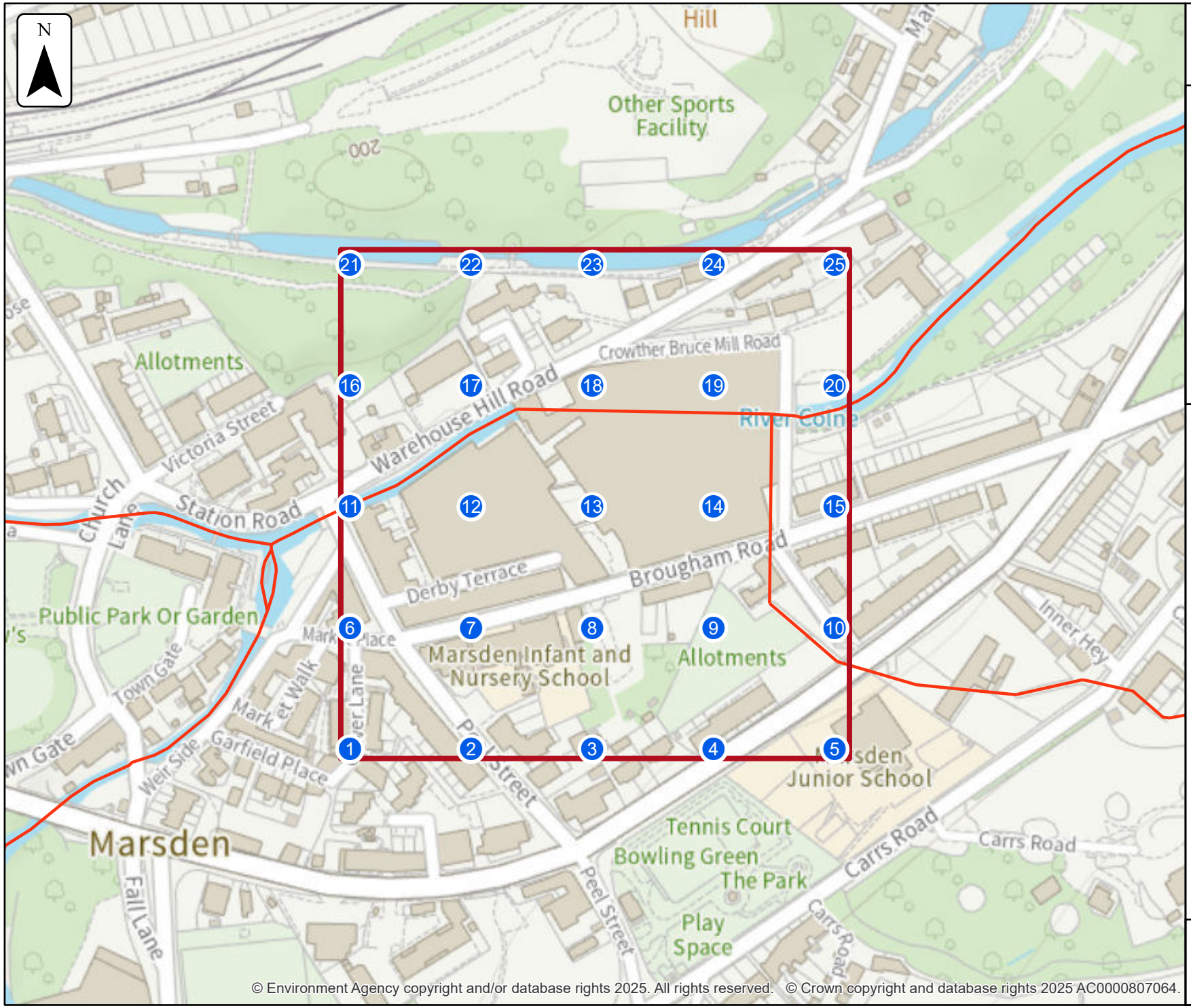
Defended

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
1	404904	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	404963	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	405022	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	405081	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	405140	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	404904	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	404963	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	405022	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	405081	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	405140	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	404904	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	404963	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
13	405022	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	405081	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	405140	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	404904	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
17	404963	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	405022	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	405081	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	405140	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	404904	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	404963	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	405022	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	405081	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
25	405140	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Data in this table comes from the 2019 Colne Model model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

Defences removed modelled fluvial extent and height

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Colne Model

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 48.0
- 48.0 - 52.0
- 52.0 - 56.0
- 56.0 - 60.0
- 60.0 - 64.0
- 64.0 - 68.0
- 68.0 - 72.0
- 72.0 - 76.0
- 76.0 - 80.0

This map shows the 0.1% AEP height data

0 25 50 75 100
metres

Sample point data

Defences removed

Label	Easting	Northing	10% AEP	3.33% AEP	1% AEP	0.1% AEP
			Depth	Depth	Depth	Depth
1	404904	411556	NoData	NoData	NoData	NoData
2	404963	411556	NoData	NoData	NoData	NoData
3	405022	411556	NoData	NoData	NoData	NoData
4	405081	411556	NoData	NoData	NoData	NoData
5	405140	411556	NoData	NoData	NoData	NoData
6	404904	411615	NoData	NoData	NoData	NoData
7	404963	411615	NoData	NoData	NoData	NoData
8	405022	411615	NoData	NoData	NoData	NoData
9	405081	411615	NoData	NoData	NoData	NoData
10	405140	411615	NoData	NoData	NoData	NoData
11	404904	411674	NoData	NoData	NoData	NoData
12	404963	411674	NoData	NoData	NoData	NoData

Label	Easting	Northing	10% AEP	3.33% AEP	1% AEP	0.1% AEP
			Depth	Depth	Depth	Depth
13	405022	411674	NoData	NoData	NoData	NoData
14	405081	411674	NoData	NoData	NoData	NoData
15	405140	411674	NoData	NoData	NoData	NoData
16	404904	411733	NoData	NoData	NoData	NoData
17	404963	411733	NoData	NoData	NoData	NoData
18	405022	411733	NoData	NoData	NoData	NoData
19	405081	411733	NoData	NoData	NoData	NoData
20	405140	411733	NoData	NoData	NoData	NoData
21	404904	411792	NoData	NoData	NoData	NoData
22	404963	411792	NoData	NoData	NoData	NoData
23	405022	411792	NoData	NoData	NoData	NoData
24	405081	411792	NoData	NoData	NoData	NoData

Label	Easting	Northing	10% AEP	3.33% AEP	1% AEP	0.1% AEP
			Depth	Depth	Depth	Depth
25	405140	411792	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData

Data in this table comes from the 2019 Colne Model model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

Defences removed

Label	Easting	Northing	10% AEP	3.33% AEP	1% AEP	0.1% AEP
			Height	Height	Height	Height
1	404904	411556	NoData	NoData	NoData	NoData
2	404963	411556	NoData	NoData	NoData	NoData
3	405022	411556	NoData	NoData	NoData	NoData
4	405081	411556	NoData	NoData	NoData	NoData
5	405140	411556	NoData	NoData	NoData	NoData
6	404904	411615	NoData	NoData	NoData	NoData
7	404963	411615	NoData	NoData	NoData	NoData
8	405022	411615	NoData	NoData	NoData	NoData
9	405081	411615	NoData	NoData	NoData	NoData
10	405140	411615	NoData	NoData	NoData	NoData
11	404904	411674	NoData	NoData	NoData	NoData
12	404963	411674	NoData	NoData	NoData	NoData

Label	Easting	Northing	10% AEP	3.33% AEP	1% AEP	0.1% AEP
			Height	Height	Height	Height
13	405022	411674	NoData	NoData	NoData	NoData
14	405081	411674	NoData	NoData	NoData	NoData
15	405140	411674	NoData	NoData	NoData	NoData
16	404904	411733	NoData	NoData	NoData	NoData
17	404963	411733	NoData	NoData	NoData	NoData
18	405022	411733	NoData	NoData	NoData	NoData
19	405081	411733	NoData	NoData	NoData	NoData
20	405140	411733	NoData	NoData	NoData	NoData
21	404904	411792	NoData	NoData	NoData	NoData
22	404963	411792	NoData	NoData	NoData	NoData
23	405022	411792	NoData	NoData	NoData	NoData
24	405081	411792	NoData	NoData	NoData	NoData

Label	Easting	Northing	10% AEP	3.33% AEP	1% AEP	0.1% AEP
			Height	Height	Height	Height
25	405140	411792	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData

Data in this table comes from the 2019 Colne Model model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
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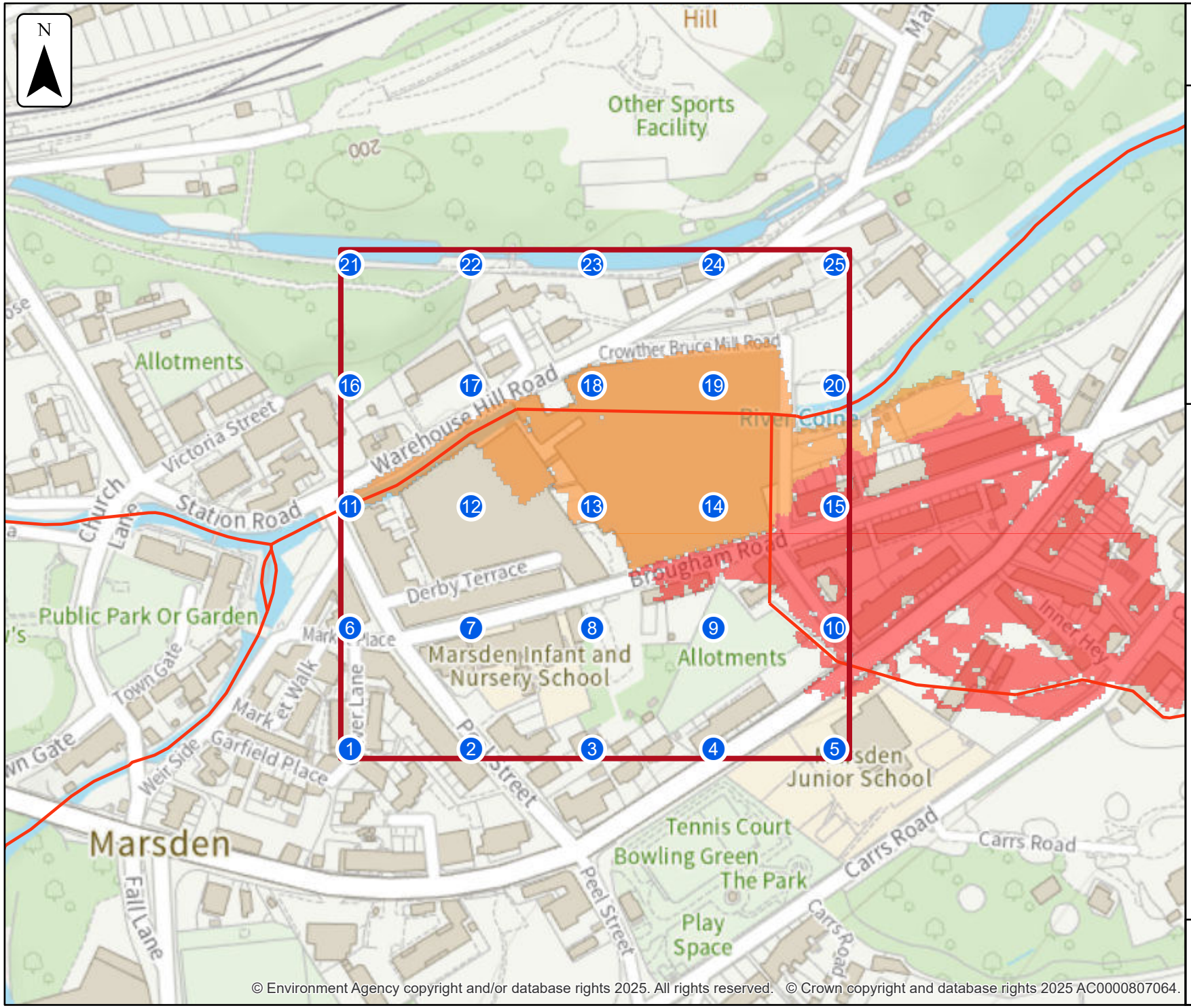
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

No defences exist modelled fluvial extent and height

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Crowhill Model

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 0.0
- 0.0 - 26.0
- 26.0 - 52.0
- 52.0 - 78.0
- 78.0 - 104.0
- 104.0 - 130.0
- 130.0 - 156.0
- 156.0 - 182.0
- 182.0 - 208.0

This map shows the 0.1% AEP height data

0 25 50 75 100
metres

Sample point data

No defences exist

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
1	404904	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	404963	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	405022	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	405081	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	405140	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	404904	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	404963	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	405022	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	405081	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	405140	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.02	0.03
11	404904	411674	3	3	3	3	3	3	3	3	3	3.00	3.24
12	404963	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
13	405022	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.00	0.04
14	405081	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.02	0.07
15	405140	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	404904	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
17	404963	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	405022	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.00	0.04
19	405081	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.01	0.08
20	405140	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	404904	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	404963	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	405022	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	405081	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
25	405140	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	6.69	6.69	6.69

Data in this table comes from the 2019 Crowhill Model model. Height values are shown in mAOD, and depth values are shown in metres.
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'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

No defences exist

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
1	404904	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	404963	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	405022	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	405081	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	405140	411556	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	404904	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	404963	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	405022	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	405081	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	405140	411615	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	186.08	186.09
11	404904	411674	176.00	176.00	176.00	176.00	176.00	176.00	176.00	176.00	176.00	176.00	176.24
12	404963	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
13	405022	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	180.44	180.48
14	405081	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	181.70	181.75
15	405140	411674	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	404904	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
17	404963	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	405022	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	178.40	178.44
19	405081	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	178.38	178.45
20	405140	411733	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	404904	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	404963	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	405022	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	405081	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
25	405140	411792	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			176.00	176.00	176.00	176.00	176.00	176.00	184.68	184.79	184.86	188.91	188.95

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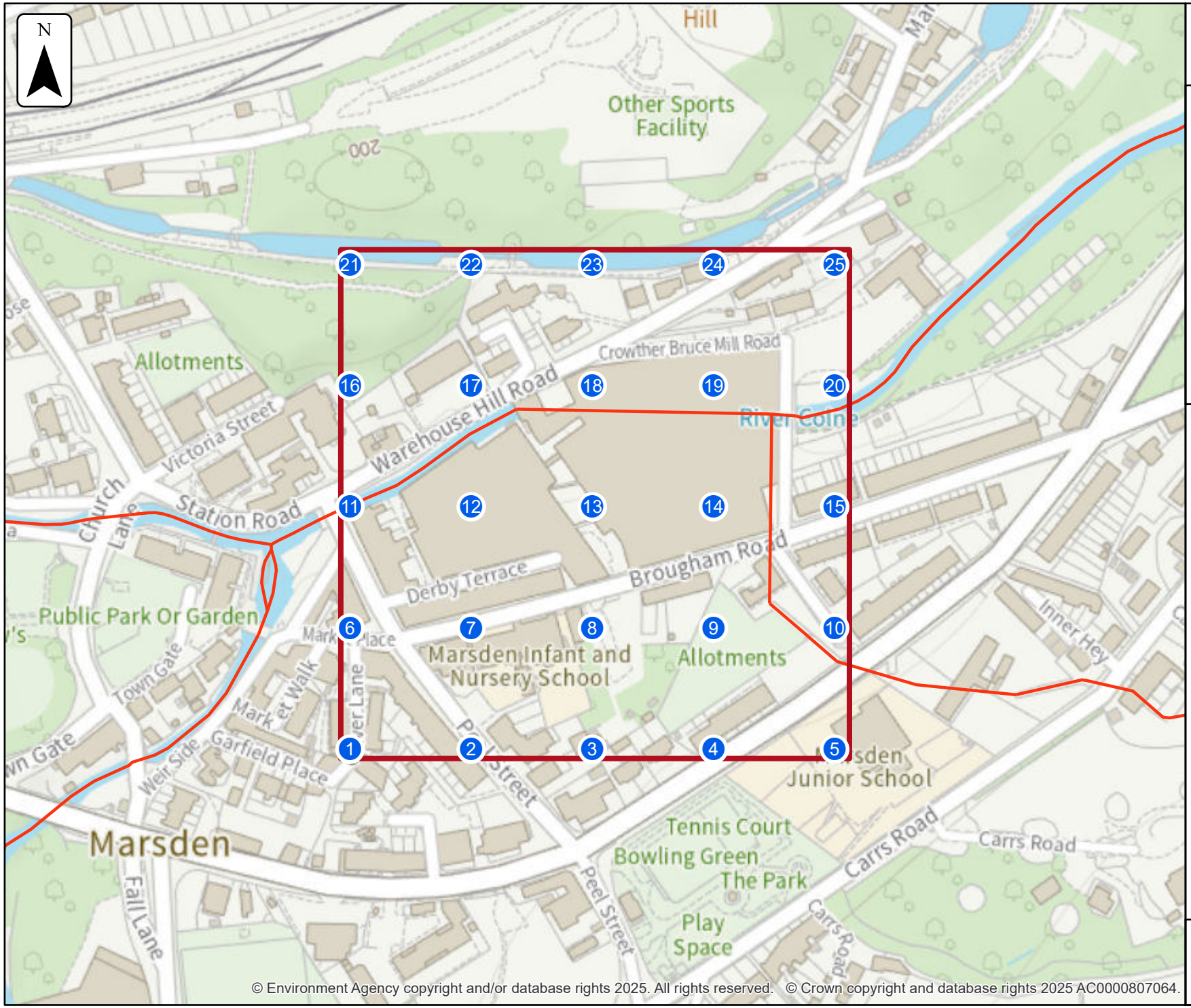

Environment Agency

Defences removed climate change modelled fluvial extent and height

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Colne Model

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 48.0
- 48.0 - 52.125
- 52.125 - 56.25
- 56.25 - 60.375
- 60.375 - 64.5
- 64.5 - 68.625
- 68.625 - 72.75
- 72.75 - 76.875
- 76.875 - 81.0

This map shows the 0.1% AEP +20% height data

0 25 50 75 100
metres

Sample point data

Defences removed climate change

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Depth	Depth	Depth	Depth
1	404904	411556	NoData	NoData	NoData	NoData
2	404963	411556	NoData	NoData	NoData	NoData
3	405022	411556	NoData	NoData	NoData	NoData
4	405081	411556	NoData	NoData	NoData	NoData
5	405140	411556	NoData	NoData	NoData	NoData
6	404904	411615	NoData	NoData	NoData	NoData
7	404963	411615	NoData	NoData	NoData	NoData
8	405022	411615	NoData	NoData	NoData	NoData
9	405081	411615	NoData	NoData	NoData	NoData
10	405140	411615	NoData	NoData	NoData	NoData
11	404904	411674	NoData	NoData	NoData	NoData
12	404963	411674	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Depth	Depth	Depth	Depth
13	405022	411674	NoData	NoData	NoData	NoData
14	405081	411674	NoData	NoData	NoData	NoData
15	405140	411674	NoData	NoData	NoData	NoData
16	404904	411733	NoData	NoData	NoData	NoData
17	404963	411733	NoData	NoData	NoData	NoData
18	405022	411733	NoData	NoData	NoData	NoData
19	405081	411733	NoData	NoData	NoData	NoData
20	405140	411733	NoData	NoData	NoData	NoData
21	404904	411792	NoData	NoData	NoData	NoData
22	404963	411792	NoData	NoData	NoData	NoData
23	405022	411792	NoData	NoData	NoData	NoData
24	405081	411792	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Depth	Depth	Depth	Depth
25	405140	411792	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData

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'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

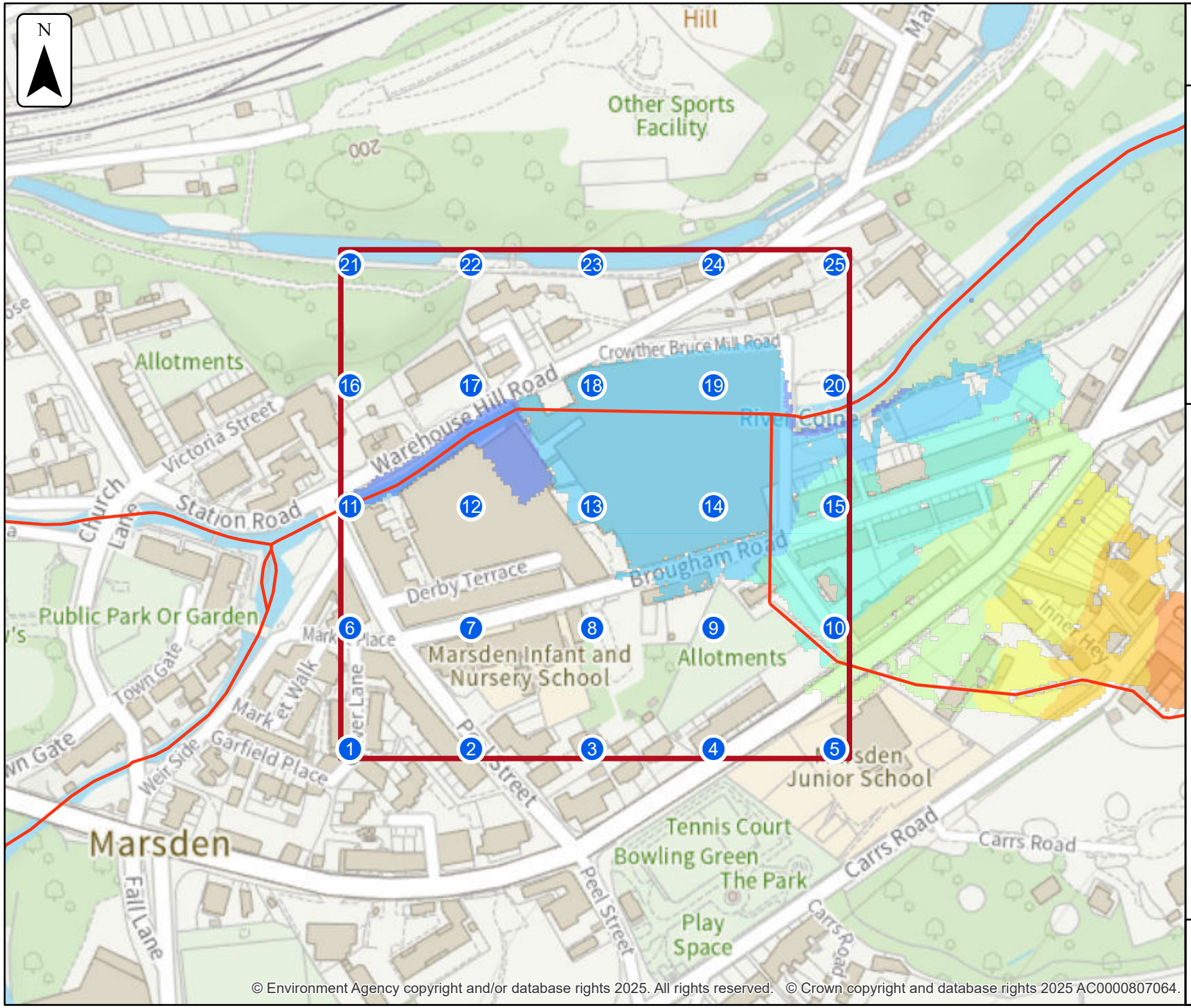
Defences removed climate change

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Height	Height	Height	Height
1	404904	411556	NoData	NoData	NoData	NoData
2	404963	411556	NoData	NoData	NoData	NoData
3	405022	411556	NoData	NoData	NoData	NoData
4	405081	411556	NoData	NoData	NoData	NoData
5	405140	411556	NoData	NoData	NoData	NoData
6	404904	411615	NoData	NoData	NoData	NoData
7	404963	411615	NoData	NoData	NoData	NoData
8	405022	411615	NoData	NoData	NoData	NoData
9	405081	411615	NoData	NoData	NoData	NoData
10	405140	411615	NoData	NoData	NoData	NoData
11	404904	411674	NoData	NoData	NoData	NoData
12	404963	411674	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Height	Height	Height	Height
13	405022	411674	NoData	NoData	NoData	NoData
14	405081	411674	NoData	NoData	NoData	NoData
15	405140	411674	NoData	NoData	NoData	NoData
16	404904	411733	NoData	NoData	NoData	NoData
17	404963	411733	NoData	NoData	NoData	NoData
18	405022	411733	NoData	NoData	NoData	NoData
19	405081	411733	NoData	NoData	NoData	NoData
20	405140	411733	NoData	NoData	NoData	NoData
21	404904	411792	NoData	NoData	NoData	NoData
22	404963	411792	NoData	NoData	NoData	NoData
23	405022	411792	NoData	NoData	NoData	NoData
24	405081	411792	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Height	Height	Height	Height
25	405140	411792	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData

Data in this table comes from the 2019 Colne Model model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

No defences exist climate change modelled fluvial extent and height

Location (easting/northing)
405023/411675

Scale
1:2,500

Created
1 Apr 2025

Model name
2019 Crowhill Model

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 174.0
- 174.0 - 178.25
- 178.25 - 182.5
- 182.5 - 186.75
- 186.75 - 191.0
- 191.0 - 195.25
- 195.25 - 199.5
- 199.5 - 203.75
- 203.75 - 208.0

This map shows the 0.1% AEP +20% height data

0 25 50 75 100
metres

Sample point data

No defences exist climate change

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Depth	Depth	Depth	Depth
1	404904	411556	NoData	NoData	NoData	NoData
2	404963	411556	NoData	NoData	NoData	NoData
3	405022	411556	NoData	NoData	NoData	NoData
4	405081	411556	NoData	NoData	NoData	NoData
5	405140	411556	NoData	NoData	NoData	NoData
6	404904	411615	NoData	NoData	NoData	NoData
7	404963	411615	NoData	NoData	NoData	NoData
8	405022	411615	NoData	NoData	NoData	NoData
9	405081	411615	NoData	NoData	NoData	NoData
10	405140	411615	0.02	0.03	0.03	0.03
11	404904	411674	3.00	3.02	3.11	3.38
12	404963	411674	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Depth	Depth	Depth	Depth
13	405022	411674	0.01	0.01	0.03	0.04
14	405081	411674	0.02	0.04	0.06	0.08
15	405140	411674	NoData	NoData	NoData	NoData
16	404904	411733	NoData	NoData	NoData	NoData
17	404963	411733	NoData	NoData	NoData	NoData
18	405022	411733	0.00	0.01	0.02	0.05
19	405081	411733	0.01	0.02	0.05	0.11
20	405140	411733	NoData	NoData	NoData	NoData
21	404904	411792	NoData	NoData	NoData	NoData
22	404963	411792	NoData	NoData	NoData	NoData
23	405022	411792	NoData	NoData	NoData	NoData
24	405081	411792	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Depth	Depth	Depth	Depth
25	405140	411792	NoData	NoData	NoData	NoData
Max value in selected area:			6.69	6.69	6.69	6.69

Data in this table comes from the 2019 Crowhill Model model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

No defences exist climate change

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Height	Height	Height	Height
1	404904	411556	NoData	NoData	NoData	NoData
2	404963	411556	NoData	NoData	NoData	NoData
3	405022	411556	NoData	NoData	NoData	NoData
4	405081	411556	NoData	NoData	NoData	NoData
5	405140	411556	NoData	NoData	NoData	NoData
6	404904	411615	NoData	NoData	NoData	NoData
7	404963	411615	NoData	NoData	NoData	NoData
8	405022	411615	NoData	NoData	NoData	NoData
9	405081	411615	NoData	NoData	NoData	NoData
10	405140	411615	186.08	186.09	186.09	186.09
11	404904	411674	176.01	176.02	176.11	176.38
12	404963	411674	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Height	Height	Height	Height
13	405022	411674	180.44	180.45	180.47	180.48
14	405081	411674	181.70	181.72	181.74	181.76
15	405140	411674	NoData	NoData	NoData	NoData
16	404904	411733	NoData	NoData	NoData	NoData
17	404963	411733	NoData	NoData	NoData	NoData
18	405022	411733	178.40	178.41	178.42	178.45
19	405081	411733	178.38	178.39	178.42	178.48
20	405140	411733	NoData	NoData	NoData	NoData
21	404904	411792	NoData	NoData	NoData	NoData
22	404963	411792	NoData	NoData	NoData	NoData
23	405022	411792	NoData	NoData	NoData	NoData
24	405081	411792	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Height	Height	Height	Height
25	405140	411792	NoData	NoData	NoData	NoData
Max value in selected area:			188.91	188.92	188.94	188.96

Data in this table comes from the 2019 Crowhill Model model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Kirklees District.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

Find out more about flood risk activity permits

Help and advice

Contact the Yorkshire Environment Agency team at neyorkshire@environment-agency.gov.uk for:

- more information about getting a product 5, 6, 7 or 8
- general help and advice about the site you're requesting data for

Jonathan Allchin

From: Lambert, Bev <bev.lambert@environment-agency.gov.uk>
Sent: 31 May 2024 09:44
To: Jonathan Allchin; Peter Dixon
Subject: FW: For RA/2024/146800/03 response - (FW: 23421 - New Mill, Marsden) [Filed 06 Jun 2024 16:56]

Categories: Filed by Mail Manager

Hi Jonathan

Further to your email dated 14 May requesting further information to aid your understanding of how the Colne and Crowhill models affect your site, I have received the following response from the modelling team:

Firstly, we assume the existing ground levels across the site for the modelling have been taken from LIDAR data, but please can you confirm which data was used?

Please see the below section from the modelling report:
Existing topographic survey:

- Channel survey was undertaken by Maltby Land Surveys between January and August 2005 to the Environment Agency National Survey Specification v2.3. Cross sections were captured along with bank heights for the 2005 study reach of the Rivers Colne and Holme. Due to the absence of LIDAR data, spot level survey was carried out for the upper section of New Mill Dike. The survey was independently checked by Atlantic Geomatics in September 2005. This cross-check found no gross errors in the control stations used for the main survey.
- JBA carried out a River Colne and Holme pre-feasibility study in 2009-2010, an update to the 2005 study. As part of this study bank level survey was undertaken in 2009 by JBA for various locations across the catchments.
- Some information regarding the spill geometry of reservoirs was provided by Yorkshire Water. In an email dated 07 February 2017, it was confirmed that the Holme Styes Reservoir (feeding the River Ribble) has a 15.24m long spillway with an ogee profile, set at 266.94mAOD. Yateholme Reservoir (upstream of Brownhill Reservoir) has a broad crested weir 13.5m in length at a height of 301.70mAOD.

In 2017 a check survey and tributary survey was undertaken to establish the suitability of the 2005 survey; this was carried out by Precision Point Surveys Limited. Check sections were located on various hydraulic structures through the study reach to establish whether there had been any notable datum shifts, or topographic changes, in the catchment since 2005 (check survey on the control stations used in 2005 was also collected). All the check survey locations indicated a decrease in levels in the River Colne and Holme catchment. There was a consistent decrease in levels across the area, but the average difference between these levels was 0.05m and so the 2005 survey was considered fit for purpose. This was agreed with the Environment Agency.

LIDAR data

- Filtered and unfiltered LIDAR data at 0.5m resolution covering much of the study area. Areas excluded are upstream of Marsden, Meltham, Holmbridge and the River Ribble. The Environment Agency confirmed that the most recent 0.5m LIDAR was flown in 2016 which confirms the date of the LIDAR flight on the Open Data website.

- Filtered and unfiltered LIDAR data at 2m resolution. This is more extensive than the 0.5m resolution, with only areas upstream of Meltham and Holmbridge excluded.

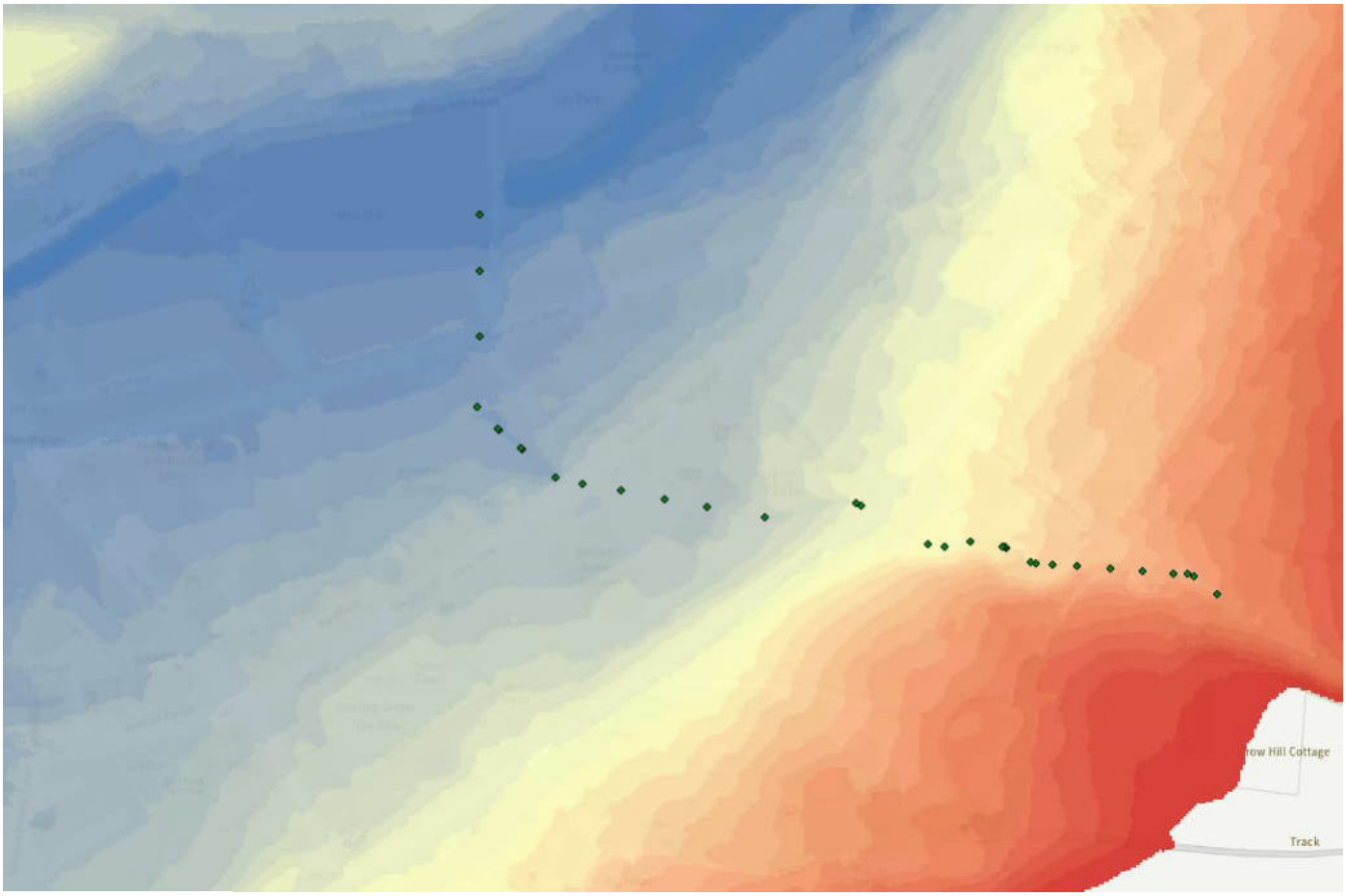
If it would aid the customer, we can provide the full model report under license.

Secondly, for the 2019 Crowhill Model, how is the flooding shown on the plans expected to occur? For instance, if you look at node 4 in the 1%AEP+30%cc scenario, the flood level is 178.61, but from the topo survey, the finished road level at this point is 182.30(ish) so wouldn't the flooding be contained within the culvert? Or does the modelling expect the flooding to "pop out" of the culvert at some point and then follow the overland flow route down to the River Colne, and hence our site?

The customer is correct in their assessment of the node EA12312468_CROW1cb000, as this does show the level stated and it would seem this is within the culvert beneath the road. However, this node point data is a snapshot of the river level at this location only, so the customer is correct that flooding would appear to come from a different source. We do not have animations of the model to fully show the flow path, however please see a desktop assessment below.

Assessment of 2d grid outputs

The general layout of the site (2022 composite DTM Lidar from Defra Data Services) shows the site at the base of a valley

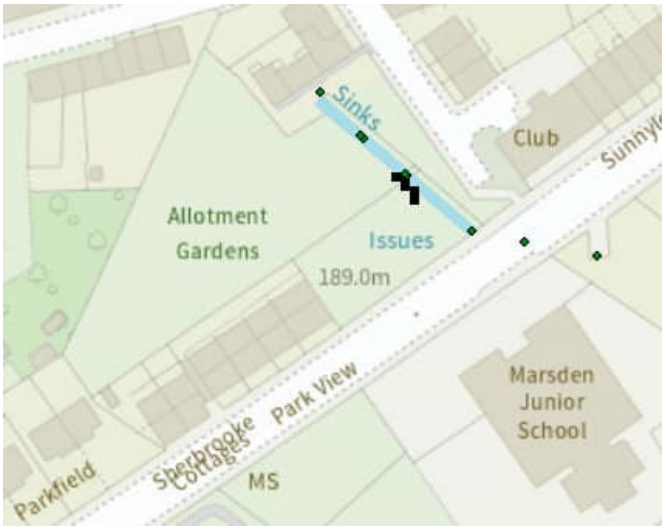


<VALUE>
175.9179993 - 177.5156986
177.5156987 - 179.1133979
179.113398 - 180.7110973
180.7110974 - 182.3087966
182.3087967 - 183.9064959
183.906496 - 185.5041953
185.5041954 - 187.1018946
187.1018947 - 188.6995939
188.699594 - 190.2972933
190.2972934 - 191.8949926
191.8949927 - 193.4926919
193.492692 - 195.0903913
195.0903914 - 196.6880906
196.6880907 - 198.2857899
198.28579 - 199.8834893
199.8834894 - 201.4811886
201.4811887 - 203.0788879
203.078888 - 204.6765873
204.6765874 - 206.2742866
206.2742867 - 207.8719859
207.871986 - 209.4696853
209.4696854 - 211.0673846
211.0673847 - 212.6650839
212.665084 - 214.2627833
214.2627834 - 215.8604826
215.8604827 - 217.4581819
217.458182 - 219.0558813
219.0558814 - 220.6535806
220.6535807 - 222.2512799
222.25128 - 223.8489793

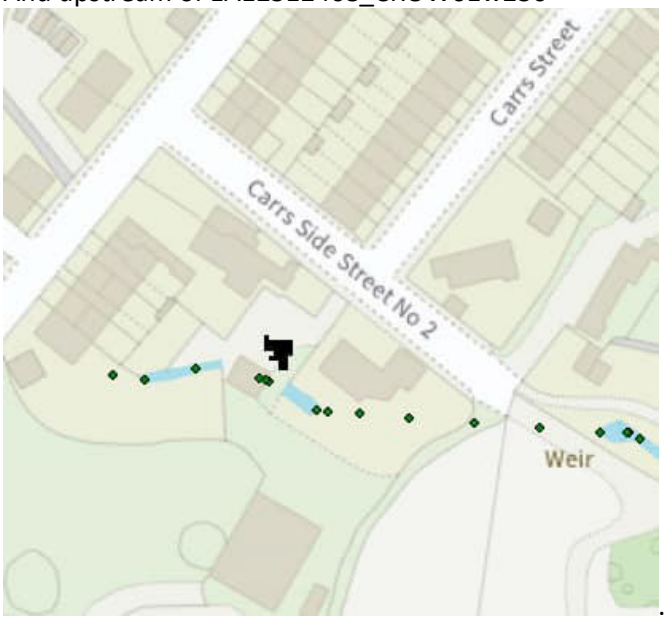
2d model outputs first originate upstream of the site at

in the 2% AEP. This is slightly upstream of node EA12312468_CROW01b024.

Further results are then seen at the 1.3% AEP at this location



And upstream of EA12312468_CROW01w236



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The next modelled event (1% AEP)

Shows that upstream of EA12312468_CROW01b024 is largely the same, however the area between EA12312468_CROW01w236 and the site is within the depth grids. This seemingly indicates that flow is expected to

come from the land between nodes EA12312468_CROW01w236 and EA12312468_CROW01_217 and flow downhill towards the Colne.

This pattern continues in the larger modelled events (1% + 30% AEP) shown below.

The area first identified appears to remain unconnected from the rest of the grids so it is most likely the expected flow route is overland flow from the upper regions.

I cannot at this time locate the files necessary to inspect the 1D elements of the model, but this would likely stray into the paid assessment territory. However, the above should be sufficient to understand the risk source to this area.
Let me know if you need anything further.

The next step we expect is that the applicant selects an appropriate design flood level, based on the information provided above for the basis of their assessment.

If you would like further advice, this will need to go through our charged advice service.

Kind regards

Bev Lambert
Sustainable Places - Planning Advisor and Assistant Flood Warning Duty Officer

Please accept my thanks for your email in advance - each UK adult sending one less 'thank you' email a day would save more than 16,400 tonnes of carbon a year.

Pronouns: she/her [why is this here?]

Phone: 07833 234623
Email: bev.lambert@environment-agency.gov.uk
Team email: sp-yorkshire@environment-agency.gov.uk

Environment Agency, First Floor, Foss House, Kings Pool, Peasholme Green, YORK, YO1 7PX

From: Jonathan Allchin <jonathan.allchin@dudleys.co.uk>
Sent: Tuesday, May 14, 2024 9:11 AM
To: Lambert, Bev <bev.lambert@environment-agency.gov.uk>
Cc: Peter Dixon <Peter.Dixon@dudleys.co.uk>
Subject: RE: 23421 - New Mill, Marsden

Hi Bev,

Further to our recent Teams meeting on this site, please could we request a few more details about the 2019 Colne Model and the 2019 Crowhill Model and how they affect this site?

Firstly, we assume the existing ground levels across the site for the modelling have been taken from LIDAR data, but please can you confirm which data was used?

Secondly, for the 2019 Crowhill Model, how is the flooding shown on the plans expected to occur? For instance, if you look at node 4 in the 1%AEP+30%cc scenario, the flood level is 178.61, but from the topo survey, the finished road level at this point is 182.30(ish) so wouldn't the flooding be contained within the culvert? Or does the modelling expect the flooding to "pop out" of the culvert at some point and then follow the overland flow route down to the River Colne, and hence our site?

Kind regards

Jonathan Allchin
Senior Engineer

DUDLEYS
CONSULTING ENGINEERS

E: jonathan.allchin@dudleys.co.uk
T: 0113 258 3611
P: Tithe House, 35 Town Street, Leeds, LS18 5LJ
W: www.dudleys.co.uk

From: Lambert, Bev <bev.lambert@environment-agency.gov.uk>
Sent: Wednesday, April 24, 2024 2:21 PM
To: Jonathan Allchin <jonathan.allchin@dudleys.co.uk>

APPENDIX E – DRAINAGE STRATEGY & HYDRAULIC CALCULATIONS

NORTH

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS SCHEME HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE REPRODUCED IN COLOUR.
3. IF ANY DISCREPANCIES ARE FOUND IN THIS DRAWING, PLEASE REPORT TO DUDLEYS CONSULTING ENGINEERS.
4. THIS DRAWING HAS BEEN ORIENTATED TO OS BRITISH NATIONAL GRID (EPSG:27700 OSGB36). EXISTING SURVEY STATIONS ARE SHOWN ON THE TOPOGRAPHICAL SURVEY.
5. THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:
   5.1. EXISTING BUILDING SURVEYS BY LAND SURVEY CONSULTANTS DATED DECEMBER 2004
   5.2. EXISTING BUILDING SURVEYS BY CT SURVEYS DATED DECEMBER 2020
   5.3. RIVER SURVEYS BY ZS SURVEYS DATED AUGUST 2024
   5.4. DRAINAGE SURVEYS BY ZS SURVEYS DATED APRIL 2025
   5.5. 2029 PROPOSED MASTERPLAN DRAFT BY KPP ARCHITECTS
6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH RELEVANT ARCHITECTS' AND ENGINEERS' DRAWINGS AND THE FOLLOWING SPECIFICATIONS:
   6.1. ENGSPEC 06 - ROAD, PAVING AND CAR PARKING AREAS
   6.2. ENGSPEC 17 - DRAINAGE WORK
   6.3. ENGSPEC 24 - SPECIFICATION FOR HIGHWAY DRAINAGE
7. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT EDITION OF THE BUILDING REGULATIONS, SEWERAGE SECTOR CODES OF PRACTICE, AND THE RELEVANT LOCAL HIGHWAY AUTHORITY STANDARDS.
8. THE POSITIONS OF EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN BASED ON INFORMATION EXTRACTED FROM RECORDS OBTAINED FROM UTILITY PROVIDERS. THESE MUST BE REGARDED AS APPROXIMATE ONLY. THE ACCURACY OR COMPLETENESS OF THE INFORMATION OR THE LOCATION OF SUCH APPARATUS IS NOT GUARANTEED AND NO WARRANTY IS GIVEN OR IMPLIED REGARDING THE POSITION, DEPTH, SIZE OR GRADIENT THEREOF. THE CONTRACTOR MUST MAKE THEIR OWN ENQUIRIES OF THE UTILITY PROVIDERS AND PUBLIC AUTHORITIES AND SATISFY THEMSELVES AS TO THE EXACT POSITION, DEPTH, SIZE AND GRADIENT OF SERVICES. IN THE INTEREST OF SAFETY, THE APPROXIMATE POSITION OF UNDERGROUND CABLES SHOULD BE OBTAINED BY USE OF ELECTRONIC CABLE LOCATORS AND THIS POSITION CONFIRMED BY CAREFUL TRIAL-HOLING USING HAND-DUG METHODS.
9. BEFORE UNDERTAKING ANY DRAINAGE WORKS, THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE LOCATION AND DEPTH OF THE FINAL CONNECTION POINT(S). ANY DISCREPANCIES MUST BE NOTIFIED TO DUDLEYS CONSULTING ENGINEERS IMMEDIATELY TO ALLOW SUFFICIENT TIME FOR ANY NECESSARY DESIGN CHANGES. COMMENCING NEW DRAINAGE WORKS WITHOUT FIRST ESTABLISHING THE CONNECTION IS ENTIRELY AT THE CONTRACTORS OWN RISK AND MAY RESULT IN ABORTIVE WORK IF THE POSITION OR DEPTH OF THE CONNECTION POINT(S) DIFFERS TO WHAT IS DETAILED ON THIS DRAWING.

KEY

- SITE BOUNDARY
- PROPOSED PRIVATE SURFACE WATER DRAIN
- PROPOSED PRIVATE FOUL WATER DRAIN
- PROPOSED PRIVATE SURFACE WATER MANHOLE
- PROPOSED PRIVATE SURFACE WATER PPIC
- PROPOSED PRIVATE FOUL WATER MANHOLE
- PROPOSED PRIVATE FOUL WATER PPIC
- PROPOSED PRIVATE SURFACE WATER RODDING EYE
- PROPOSED PRIVATE SURFACE WATER YARD GULLY
- PROPOSED PRIVATE SURFACE WATER ATTENUATION TANK
- PROPOSED PRIVATE SURFACE WATER CHANNEL DRAIN
- PROPOSED PRIVATE BYPASS SEPARATOR
- PROPOSED ADOPTED S106 FOUL WATER LATERAL
- PROPOSED ADOPTED S106 FOUL WATER MANHOLE
- EXISTING ADOPTED COMBINED SEWER
- EXISTING ADOPTED COMBINED MANHOLE
- EXISTING WATERCOURSE

DATE	REVISION DESCRIPTION	BY	CHK	REV.
03.12.25	UPDATED LAYOUT AND DESIGN	JA	PD	P03
10.07.25	UPDATED LAYOUT AND DESIGN	JA	PD	P02
16.09.24	PRELIMINARY ISSUE	JA	PD	P01

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Leeds, LS18 5LJ
0113 258 3611
info@dudleys.co.uk

PROJECT
NEW MILLS
MARSDEN

TITLE
DRAINAGE STRATEGY

SCALE	PAPER	STATUS
1:250	A0	PRELMINARY

DRAWING NO. 23421-DCE-XX-XX-D-C-100 REV. P03

NORTH

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS SCHEME HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

NOTES

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4. THIS DRAWING HAS BEEN ORIENTATED TO OS BRITISH NATIONAL GRID (EPSG:27700 OSGB36). EXISTING SURVEY STATIONS ARE SHOWN ON THE TOPOGRAPHICAL SURVEY.
5. THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:
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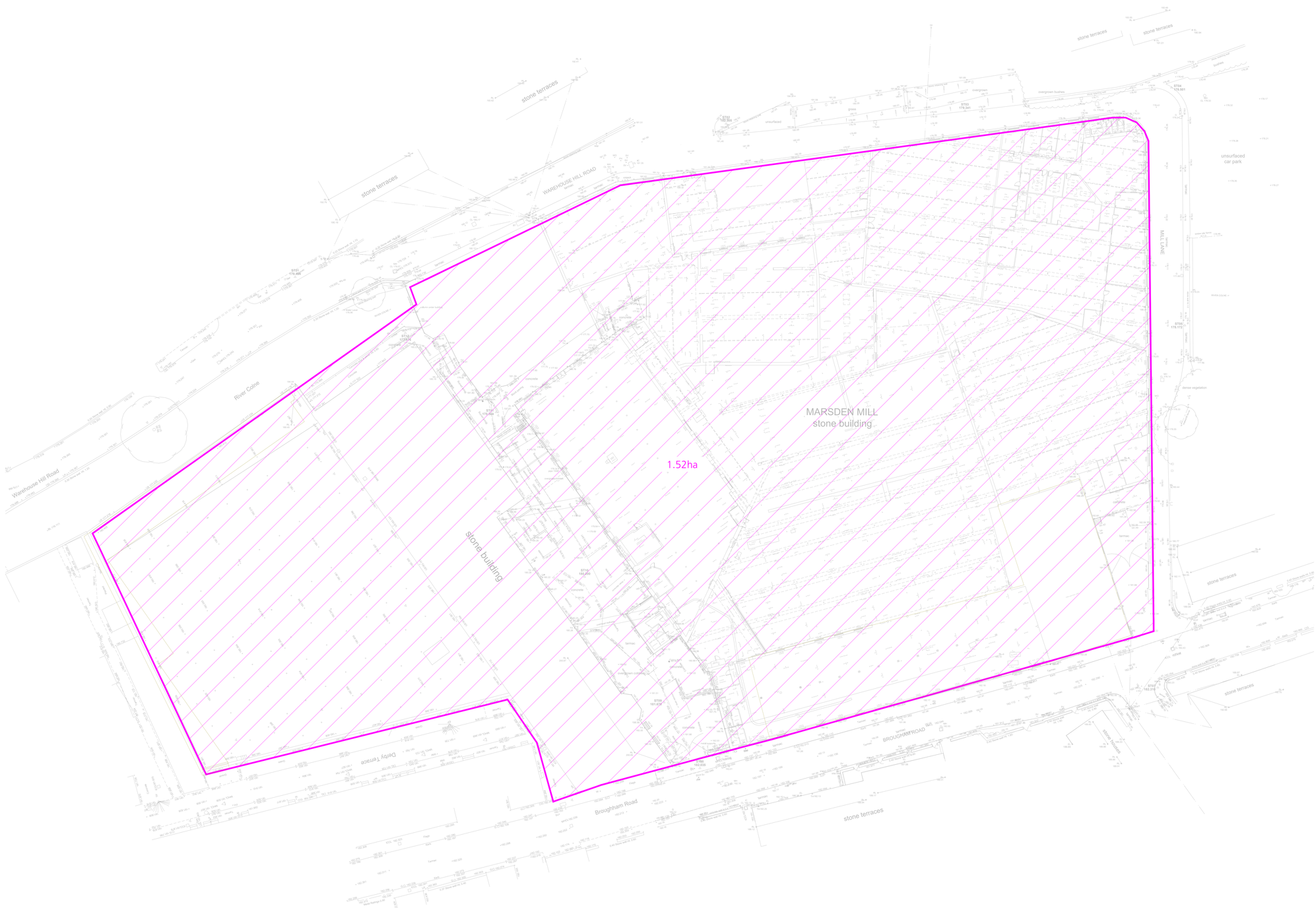
   - 5.2. EXISTING BUILDING SURVEYS BY CT SURVEYS DATED DECEMBER 2020
   - 5.3. RIVER SURVEYS BY ZS SURVEYS DATED AUGUST 2024
   - 5.4. DRAINAGE SURVEYS BY ZS SURVEYS DATED APRIL 2025
   - 5.5. 2019 PROPOSED MASTERPLAN DRAFT BY KPP ARCHITECTS

KEY

EXISTING IMPERMEABLE AREA, TOTAL: 1.52ha



02.07.25	PRELIMINARY ISSUE	JA	PD	P01
DATE	REVISION DESCRIPTION	BY	CHK.	REV.

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PROJECT

NEW MILLS
MARSDEN

TITLE

EXISTING IMPERMEABLE AREAS

SCALE	PAPER	STATUS
1:250	A0	PRELMINARY

DRAWING NO.	REV.
23421-DCE-XX-XX-D-C-102	P01

NORTH

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

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   - 5.4. DRAINAGE SURVEYS BY ZS SURVEYS DATED APRIL 2025
   - 5.5. 2029 PROPOSED MASTERPLAN DRAFT BY KPP ARCHITECTS

KEY

PROPOSED IMPERMEABLE AREA, TOTAL: 1.01ha

DATE	REVISION DESCRIPTION	BY	CHK.	REV.
03.12.25	UPDATED LAYOUT AND IMPERMEABLE AREA	JA	PD	P02
02.07.25	PRELIMINARY ISSUE	JA	PD	P01

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PROJECT
NEW MILLS
MARSDEN

TITLE
PROPOSED IMPERMEABLE AREAS

SCALE	PAPER	STATUS
1:250	A0	PRELMINARY

DRAWING NO. 23421-DCE-XX-XX-D-C-103 REV. P02

NORTH

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

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KEY

- 00.000 / 00.000 — PROPOSED SPOT LEVELS
- FFL 000.000 — PROPOSED FINISHED FLOOR LEVELS
- 00.000 / *00.000* — EXISTING SPOT LEVELS
- RW 1.2m — PROPOSED RETAINING WALL
- OB 0.15m — PROPOSED OVERBUILD
- OB 0.15m — EXISTING WALLS TO BE EXPOSED AND ACT AS OVERBUILD
- UB 0.15m — PROPOSED UNDERBUILD
- PROPOSED FLOOD RESISTANCE & RESILIENCE MEASURES
- 1:63 — PROPOSED GRADIENTS
- PROPOSED BATTER
- S — STEPPED APPROACH
- FLOOD EXCEEDANCE ROUTE

03.12.25	UDPATED LAYOUT AND LEVELS DESIGN	JA	PD	P03
03.07.25	UDPATED LAYOUT AND LEVELS DESIGN	JA	PD	P02
16.09.24	PRELIMINARY ISSUE	JA	PD	P01
DATE	REVISION DESCRIPTION	BY	CHK.	REV.

DUDLEYS CONSULTING ENGINEERS
Tithe House
35 Town Street
Leeds, LS18 5LJ
0113 258 3611
info@dudleys.co.uk

PROJECT
NEW MILLS
MARSDEN

TITLE
FLOOD EXCEEDANCE ROUTE

SCALE	PAPER	STATUS
1:250	A0	PRELIMINARY

DRAWING NO. 23421-DCE-XX-XX-D-C-129 REV. P03

NORTH

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS SCHEME HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE REPRODUCED IN COLOUR.
3. IF ANY DISCREPANCIES ARE FOUND IN THIS DRAWING, PLEASE REPORT TO DUDLEYS CONSULTING ENGINEERS.
4. THIS DRAWING HAS BEEN ORIENTATED TO OS BRITISH NATIONAL GRID (EPSG:27700 OSGB36). EXISTING SURVEY STATIONS ARE SHOWN ON THE TOPOGRAPHICAL SURVEY.
5. THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:
   - 5.1. EXISTING BUILDING SURVEYS BY LAND SURVEY CONSULTANTS DATED DECEMBER 2004
   - 5.2. EXISTING BUILDING SURVEYS BY CT SURVEYS DATED DECEMBER 2020
   - 5.3. RIVER SURVEYS BY ZS SURVEYS DATED AUGUST 2024
   - 5.4. DRAINAGE SURVEYS BY ZS SURVEYS DATED APRIL 2025
   - 5.5. 2029 PROPOSED MASTERPLAN DRAFT BY KPP ARCHITECTS
   - 5.6. FLOOD INFORMATION DATA PROVIDED BY THE ENVIRONMENT AGENCY DATED APRIL 2025

KEY

- FLOOD ZONE 2
- FLOOD ZONE 3
- 178.53 MODELLED FLOOD LEVEL IN 1%AEP+30%CC EVENT

CROWTHER BRUCE MILL ROAD

WAREHOUSE HILL ROAD

POINT: 18
1%AEP+30%CC DEPTH: 0.01
1%AEP+30%CC LEVEL: 178.41
ASSUMED GROUND LEVEL FROM EA DATA: 178.40
EXISTING GROUND LEVEL: 182.43

POINT: 19
1%AEP+30%CC DEPTH: 0.02
1%AEP+30%CC LEVEL: 178.39
ASSUMED GROUND LEVEL FROM EA DATA: 178.37
EXISTING GROUND LEVEL: 182.50

RIVER COLNE

178.45

178.48

178.53

EXISTING BUILDING TO HAVE FLOOD RESISTANT & RESILIENCE MEASURES TO A LEVEL OF 179.13, 600mm ABOVE THE ESTIMATED FLOOD LEVEL

EXISTING BUILDING TO HAVE FLOOD RESISTANT & RESILIENCE MEASURES TO A LEVEL OF 179.13, 600mm ABOVE THE ESTIMATED FLOOD LEVEL

MARSDEN MILL
stone building

stone terraces

unsurfaced car park

MILL LANE

POINT: 13
1%AEP+30%CC DEPTH: 0.01
1%AEP+30%CC LEVEL: 180.45
ASSUMED GROUND LEVEL FROM EA DATA: 180.44
EXISTING GROUND LEVEL: 180.44

POINT: 14
1%AEP+30%CC DEPTH: 0.04
1%AEP+30%CC LEVEL: 181.72
ASSUMED GROUND LEVEL FROM EA DATA: 181.68
EXISTING GROUND LEVEL: 180.96

EXISTING BUILDING TO HAVE 600mm OF FLOOD RESISTANT & RESILIENCE MEASURES

EXISTING BUILDING TO HAVE 600mm OF FLOOD RESISTANT & RESILIENCE MEASURES

DERBY TERRACE

BROUGHAM ROAD

DATE	REVISION DESCRIPTION	BY	CHK	REV.
03.12.25	UPDATED SITE LAYOUT	JA	PD	P02
03.07.25	PRELIMINARY ISSUE	JA	PD	P01

DUDLEYS CONSULTING ENGINEERS
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PROJECT
NEW MILLS
MARSDEN

TITLE
FLOOD ZONES

SCALE	PAPER	STATUS
1:250	A0	PRELMINARY

DRAWING NO. 23421-DCE-XX-XX-D-C-130 REV. P02

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
SW1.00	0.040	5.00	180.380	600	404970.680	411697.174	0.730
SW1.01	0.014	5.00	180.380	600	404979.059	411685.064	0.920
SW2.00	0.061	5.00	180.730	600	404964.922	411668.345	1.130
SW1.02	0.057	5.00	180.340	1350	404982.818	411673.389	1.265
SW1.03	0.053	5.00	180.430	1350	404996.167	411657.930	1.560
SW3.00	0.035	5.00	181.380	1200	405026.333	411655.565	1.520
SW1.04	0.114	5.00	180.370	1350	405014.810	411670.561	1.730
SW1.05	0.024	5.00	179.090	1350	405008.174	411693.836	1.600
SW4.00	0.019	5.00	177.840		404968.594	411704.562	0.650
SW4.01			177.820	450	404986.679	411716.658	0.910
SW4.02	0.024	5.00	177.810	1200	404994.633	411713.398	1.425
SW1.06	0.085	5.00	178.300	1350	405000.284	411705.908	2.250
SW1.07	0.012	5.00	177.740	1350	405022.543	411722.021	1.800
SW1.08	0.076	5.00	177.820	1350	405036.111	411719.595	2.240
SW5.00	0.024	5.00	180.850	450	405076.146	411671.980	1.350
SW5.01	0.035	5.00	180.770	1200	405049.905	411672.717	1.600
SW6.00	0.060	5.00	180.700	600	405079.508	411687.566	1.350
SW5.02	0.105	5.00	180.660	450	405047.511	411687.693	1.755
SW5.03	0.026	5.00	180.500	450	405043.693	411691.184	1.660
SW7.00	0.027	5.00	178.510		405070.047	411708.403	1.010
SW5.04			178.250	1350	405042.232	411710.732	2.650
SW1.09-TANK			177.770		405051.195	411716.620	1.920
SW8.00	0.022	5.00	181.000	450	405106.288	411683.176	1.380
SW8.01	0.075	5.00	179.290	600	405103.250	411693.079	0.775
SW8.02	0.005	5.00	178.400	450	405083.255	411711.262	2.500
SW1.10			178.200	1350	405083.392	411713.554	2.850
SW1.11-SEPARATOR			178.100	1200	405089.136	411713.965	2.460
SW1.12-FC			178.000	1350	405098.391	411714.626	3.140
SW1.13-OUTFALL			178.000		405099.793	411719.020	2.410

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	SW1.00	SW1.01	14.726	0.600	179.650	179.460	0.190	77.5	225	5.17	41.8
1.001	SW1.01	SW1.02	12.265	0.600	179.460	179.300	0.160	76.7	225	5.30	41.5
2.000	SW2.00	SW1.02	18.593	0.600	179.600	179.300	0.300	62.0	225	5.19	41.7
1.002	SW1.02	SW1.03	20.425	0.600	179.075	178.870	0.205	99.6	450	5.47	41.1
1.003	SW1.03	SW1.04	22.519	0.600	178.870	178.640	0.230	97.9	450	5.65	40.6
3.000	SW3.00	SW1.04	18.912	0.600	179.860	178.940	0.920	20.6	150	5.14	41.8
1.004	SW1.04	SW1.05	24.203	0.600	178.640	177.490	1.150	21.0	450	5.74	40.4
1.005	SW1.05	SW1.06	14.422	0.600	177.490	176.050	1.440	10.0	450	5.78	40.3
4.000	SW4.00	SW4.01	21.757	0.600	177.190	176.910	0.280	77.7	150	5.32	41.4
4.001	SW4.01	SW4.02	8.596	0.600	176.910	176.460	0.450	19.1	150	5.38	41.3
4.002	SW4.02	SW1.06	9.383	0.600	176.385	176.275	0.110	85.3	225	5.49	41.0
1.006	SW1.06	SW1.07	27.479	0.600	176.050	175.940	0.110	249.8	450	6.14	39.5
1.007	SW1.07	SW1.08	13.783	0.600	175.940	175.880	0.060	229.7	450	6.31	39.0
1.008	SW1.08	SW1.09-TANK	3.321	0.600	175.880	175.850	0.030	110.7	450	6.34	39.0
5.000	SW5.00	SW5.01	26.251	0.600	179.500	179.170	0.330	79.5	150	5.39	41.3
5.001	SW5.01	SW5.02	15.166	0.600	179.170	178.980	0.190	80.0	150	5.61	40.7
6.000	SW6.00	SW5.02	31.997	0.600	179.350	178.905	0.445	71.9	225	5.35	41.4
5.002	SW5.02	SW5.03	5.173	0.600	178.905	178.840	0.065	80.0	225	5.67	40.6
5.003	SW5.03	SW5.04	19.603	0.600	178.840	177.000	1.840	10.7	225	5.75	40.4
7.000	SW7.00	SW5.04	27.912	0.600	177.500	177.075	0.425	65.7	150	5.37	41.3
5.004	SW5.04	SW1.09-TANK	3.943	0.600	175.900	175.854	0.046	85.7	450	5.78	40.3
1.009	SW1.09-TANK	SW1.10	20.318	0.600	175.850	175.680	0.170	119.5	450	6.52	38.5
8.000	SW8.00	SW8.01	10.359	0.600	179.620	178.590	1.030	10.1	150	5.05	42.0
8.001	SW8.01	SW8.02	27.026	0.600	178.515	175.900	2.615	10.3	225	5.16	41.8

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.486	59.1	6.0	0.505	0.695	0.040	0.0	49	0.968
1.001	1.495	59.4	8.1	0.695	0.815	0.054	0.0	56	1.052
2.000	1.664	66.2	9.2	0.905	0.815	0.061	0.0	57	1.182
1.002	2.036	323.9	25.5	0.815	1.110	0.172	0.0	85	1.236
1.003	2.054	326.7	33.0	1.110	1.280	0.225	0.0	95	1.334
3.000	2.231	39.4	5.3	1.370	1.280	0.035	0.0	37	1.564
1.004	4.446	707.2	54.6	1.280	1.150	0.374	0.0	84	2.689
1.005	6.451	1026.1	58.0	1.150	1.800	0.398	0.0	72	3.558
4.000	1.141	20.2	2.8	0.500	0.760	0.019	0.0	38	0.806
4.001	2.315	40.9	2.8	0.760	1.200	0.019	0.0	27	1.333
4.002	1.416	56.3	6.4	1.200	1.800	0.043	0.0	51	0.942
1.006	1.281	203.8	75.0	1.800	1.350	0.526	0.0	189	1.187
1.007	1.337	212.6	75.9	1.350	1.490	0.538	0.0	185	1.228
1.008	1.931	307.2	86.5	1.490	1.470	0.614	0.0	163	1.671
5.000	1.128	19.9	3.6	1.200	1.450	0.024	0.0	43	0.857
5.001	1.125	19.9	8.7	1.450	1.530	0.059	0.0	69	1.088
6.000	1.544	61.4	9.0	1.125	1.530	0.060	0.0	58	1.106
5.002	1.463	58.2	32.8	1.530	1.435	0.224	0.0	121	1.505
5.003	4.031	160.3	36.5	1.435	1.025	0.250	0.0	73	3.277
7.000	1.243	22.0	4.0	0.860	1.025	0.027	0.0	44	0.952
5.004	2.197	349.4	40.4	1.900	1.466	0.277	0.0	102	1.486
1.009	1.858	295.5	124.1	1.470	2.070	0.891	0.0	203	1.782
8.000	3.195	56.5	3.3	1.230	0.550	0.022	0.0	25	1.766
8.001	4.093	162.7	14.6	0.550	2.275	0.097	0.0	45	2.560

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
8.002	SW8.02	SW1.10	2.296	0.600	175.900	175.875	0.025	91.8	225	5.19	41.7
1.010	SW1.10	SW1.11-SEPARATOR	2.474	0.600	175.650	175.640	0.010	250.0	450	6.55	38.5
1.011	SW1.11-SEPARATOR	SW1.12-FC	6.465	0.600	175.640	175.610	0.030	215.5	450	6.63	38.3
1.012	SW1.12-FC	SW1.13-OUTFALL	4.612	0.600	175.610	175.590	0.020	230.6	450	6.69	38.1

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
8.002	1.365	54.3	15.4	2.275	2.100	0.102	0.0	82	1.181
1.010	1.281	203.7	138.0	2.100	2.010	0.993	0.0	272	1.372
1.011	1.381	219.6	137.3	2.010	1.940	0.993	0.0	258	1.453
1.012	1.334	212.2	136.9	1.940	1.960	0.993	0.0	263	1.414

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	14.726	77.5	225	Circular	180.380	179.650	0.505	180.380	179.460	0.695
1.001	12.265	76.7	225	Circular	180.380	179.460	0.695	180.340	179.300	0.815
2.000	18.593	62.0	225	Circular	180.730	179.600	0.905	180.340	179.300	0.815
1.002	20.425	99.6	450	Circular	180.340	179.075	0.815	180.430	178.870	1.110
1.003	22.519	97.9	450	Circular	180.430	178.870	1.110	180.370	178.640	1.280
3.000	18.912	20.6	150	Circular	181.380	179.860	1.370	180.370	178.940	1.280
1.004	24.203	21.0	450	Circular	180.370	178.640	1.280	179.090	177.490	1.150
1.005	14.422	10.0	450	Circular	179.090	177.490	1.150	178.300	176.050	1.800
4.000	21.757	77.7	150	Circular	177.840	177.190	0.500	177.820	176.910	0.760
4.001	8.596	19.1	150	Circular	177.820	176.910	0.760	177.810	176.460	1.200
4.002	9.383	85.3	225	Circular	177.810	176.385	1.200	178.300	176.275	1.800
1.006	27.479	249.8	450	Circular	178.300	176.050	1.800	177.740	175.940	1.350
1.007	13.783	229.7	450	Circular	177.740	175.940	1.350	177.820	175.880	1.490
1.008	3.321	110.7	450	Circular	177.820	175.880	1.490	177.770	175.850	1.470
5.000	26.251	79.5	150	Circular	180.850	179.500	1.200	180.770	179.170	1.450
5.001	15.166	80.0	150	Circular	180.770	179.170	1.450	180.660	178.980	1.530

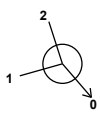
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW1.00	600	Manhole	Adoptable	SW1.01	600	Manhole	Adoptable
1.001	SW1.01	600	Manhole	Adoptable	SW1.02	1350	Manhole	Adoptable
2.000	SW2.00	600	Manhole	Adoptable	SW1.02	1350	Manhole	Adoptable
1.002	SW1.02	1350	Manhole	Adoptable	SW1.03	1350	Manhole	Adoptable
1.003	SW1.03	1350	Manhole	Adoptable	SW1.04	1350	Manhole	Adoptable
3.000	SW3.00	1200	Manhole	Adoptable	SW1.04	1350	Manhole	Adoptable
1.004	SW1.04	1350	Manhole	Adoptable	SW1.05	1350	Manhole	Adoptable
1.005	SW1.05	1350	Manhole	Adoptable	SW1.06	1350	Manhole	Adoptable
4.000	SW4.00		Junction		SW4.01	450	Manhole	Adoptable
4.001	SW4.01	450	Manhole	Adoptable	SW4.02	1200	Manhole	Adoptable
4.002	SW4.02	1200	Manhole	Adoptable	SW1.06	1350	Manhole	Adoptable
1.006	SW1.06	1350	Manhole	Adoptable	SW1.07	1350	Manhole	Adoptable
1.007	SW1.07	1350	Manhole	Adoptable	SW1.08	1350	Manhole	Adoptable
1.008	SW1.08	1350	Manhole	Adoptable	SW1.09-TANK		Junction	
5.000	SW5.00	450	Manhole	Adoptable	SW5.01	1200	Manhole	Adoptable
5.001	SW5.01	1200	Manhole	Adoptable	SW5.02	450	Manhole	Adoptable

Pipeline Schedule

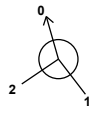
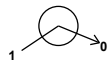
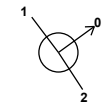
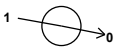
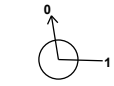
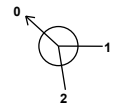
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
6.000	31.997	71.9	225	Circular	180.700	179.350	1.125	180.660	178.905	1.530
5.002	5.173	80.0	225	Circular	180.660	178.905	1.530	180.500	178.840	1.435
5.003	19.603	10.7	225	Circular	180.500	178.840	1.435	178.250	177.000	1.025
7.000	27.912	65.7	150	Circular	178.510	177.500	0.860	178.250	177.075	1.025
5.004	3.943	85.7	450	Circular	178.250	175.900	1.900	177.770	175.854	1.466
1.009	20.318	119.5	450	Circular	177.770	175.850	1.470	178.200	175.680	2.070
8.000	10.359	10.1	150	Circular	181.000	179.620	1.230	179.290	178.590	0.550
8.001	27.026	10.3	225	Circular	179.290	178.515	0.550	178.400	175.900	2.275
8.002	2.296	91.8	225	Circular	178.400	175.900	2.275	178.200	175.875	2.100
1.010	2.474	250.0	450	Circular	178.200	175.650	2.100	178.100	175.640	2.010
1.011	6.465	215.5	450	Circular	178.100	175.640	2.010	178.000	175.610	1.940
1.012	4.612	230.6	450	Circular	178.000	175.610	1.940	178.000	175.590	1.960

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
6.000	SW6.00	600	Manhole	Adoptable	SW5.02	450	Manhole	Adoptable
5.002	SW5.02	450	Manhole	Adoptable	SW5.03	450	Manhole	Adoptable
5.003	SW5.03	450	Manhole	Adoptable	SW5.04	1350	Manhole	Adoptable
7.000	SW7.00		Junction		SW5.04	1350	Manhole	Adoptable
5.004	SW5.04	1350	Manhole	Adoptable	SW1.09-TANK		Junction	
1.009	SW1.09-TANK		Junction		SW1.10	1350	Manhole	Adoptable
8.000	SW8.00	450	Manhole	Adoptable	SW8.01	600	Manhole	Adoptable
8.001	SW8.01	600	Manhole	Adoptable	SW8.02	450	Manhole	Adoptable
8.002	SW8.02	450	Manhole	Adoptable	SW1.10	1350	Manhole	Adoptable
1.010	SW1.10	1350	Manhole	Adoptable	SW1.11-SEPARATOR	1200	Manhole	Adoptable
1.011	SW1.11-SEPARATOR	1200	Manhole	Adoptable	SW1.12-FC	1350	Manhole	Adoptable
1.012	SW1.12-FC	1350	Manhole	Adoptable	SW1.13-OUTFALL		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW1.00	404970.680	411697.174	180.380	0.730	600	 0	1.000	179.650	225
SW1.01	404979.059	411685.064	180.380	0.920	600	 1	1.000	179.460	225
						0	1.001	179.460	225
SW2.00	404964.922	411668.345	180.730	1.130	600	 0	2.000	179.600	225
SW1.02	404982.818	411673.389	180.340	1.265	1350	 1	2.000	179.300	225
						2	1.001	179.300	225
						0	1.002	179.075	450
SW1.03	404996.167	411657.930	180.430	1.560	1350	 1	1.002	178.870	450
						0	1.003	178.870	450

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW3.00	405026.333	411655.565	181.380	1.520	1200				
						0	3.000	179.860	150
SW1.04	405014.810	411670.561	180.370	1.730	1350		1	3.000	178.940	150
							2	1.003	178.640	450
						0	1.004	178.640	450
SW1.05	405008.174	411693.836	179.090	1.600	1350		1	1.004	177.490	450
						0	1.005	177.490	450
SW4.00	404968.594	411704.562	177.840	0.650					
						0	4.000	177.190	150
SW4.01	404986.679	411716.658	177.820	0.910	450		1	4.000	176.910	150
						0	4.001	176.910	150
SW4.02	404994.633	411713.398	177.810	1.425	1200		1	4.001	176.460	150
						0	4.002	176.385	225
SW1.06	405000.284	411705.908	178.300	2.250	1350		1	4.002	176.275	225
							2	1.005	176.050	450
						0	1.006	176.050	450
SW1.07	405022.543	411722.021	177.740	1.800	1350		1	1.006	175.940	450
						0	1.007	175.940	450
SW1.08	405036.111	411719.595	177.820	2.240	1350		1	1.007	175.880	450
						0	1.008	175.880	450
SW5.00	405076.146	411671.980	180.850	1.350	450				
						0	5.000	179.500	150
SW5.01	405049.905	411672.717	180.770	1.600	1200		1	5.000	179.170	150
						0	5.001	179.170	150
SW6.00	405079.508	411687.566	180.700	1.350	600				
						0	6.000	179.350	225
SW5.02	405047.511	411687.693	180.660	1.755	450		1	6.000	178.905	225
							2	5.001	178.980	150
						0	5.002	178.905	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW5.03	405043.693	411691.184	180.500	1.660	450	1	5.002	178.840	225
						0	5.003	178.840	225
SW7.00	405070.047	411708.403	178.510	1.010		0	7.000	177.500	150
SW5.04	405042.232	411710.732	178.250	2.650	1350	1	7.000	177.075	150
						2	5.003	177.000	225
						0	5.004	175.900	450
SW1.09-TANK	405051.195	411716.620	177.770	1.920		1	5.004	175.854	450
						2	1.008	175.850	450
						0	1.009	175.850	450
SW8.00	405106.288	411683.176	181.000	1.380	450	0	8.000	179.620	150
SW8.01	405103.250	411693.079	179.290	0.775	600	1	8.000	178.590	150
						0	8.001	178.515	225
SW8.02	405083.255	411711.262	178.400	2.500	450	1	8.001	175.900	225
						0	8.002	175.900	225
SW1.10	405083.392	411713.554	178.200	2.850	1350	1	8.002	175.875	225
						2	1.009	175.680	450
						0	1.010	175.650	450
SW1.11-SEPARATOR	405089.136	411713.965	178.100	2.460	1200	1	1.010	175.640	450
						0	1.011	175.640	450
SW1.12-FC	405098.391	411714.626	178.000	3.140	1350	1	1.011	175.610	450
						0	1.012	175.610	450
SW1.13-OUTFALL	405099.793	411719.020	178.000	2.410		1	1.012	175.590	450

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	✓	1 year (l/s)	73.5
Rainfall Events	Singular	Drain Down Time (mins)	1440	30 year (l/s)	180.4
Summer CV	1.000	Additional Storage (m³/ha)	0.0	100 year (l/s)	235.7
Winter CV	1.000	Starting Level (m)		Check Discharge Volume	✓
Analysis Speed	Detailed	Check Discharge Rate(s)	✓	100 year 360 minute (m³)	909

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Brownfield	Time of Concentration (mins)	30.00
Brownfield Method	MRM	Betterment (%)	0
Contributing Area (ha)	1.520	Q 1 year (l/s)	104.9
PIMP (%)	100	Q 30 year (l/s)	257.7
CV	1.000	Q 100 year (l/s)	336.8

Pre-development Discharge Volume

Site Makeup	Brownfield	CV	1.000	Betterment (%)	0
Brownfield Method	MRM	Return Period (years)	100	PR	1.000
Contributing Area (ha)	1.520	Climate Change (%)	0	Runoff Volume (m^3)	909
PIMP (%)	100	Storm Duration (mins)	360		

Node SW1.12-FC Online Orifice Control

Flap Valve	✓	Invert Level (m)	175.610	Diameter (m)	0.251
Downstream Link	1.012	Design Depth (m)	1.400	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	149.0		

Node SW1.09-TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	175.850
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	29

Depth (m)	Area (m^2)	Inf Area (m^2)	Depth (m)	Area (m^2)	Inf Area (m^2)	Depth (m)	Area (m^2)	Inf Area (m^2)
0.000	204.0	204.0	1.500	204.0	279.9	1.501	0.0	279.9

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.29%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	179.689	0.039	3.9	0.0110	0.0000	OK
15 minute summer	SW1.01	10	179.507	0.046	5.3	0.0131	0.0000	OK
15 minute summer	SW2.00	10	179.647	0.047	6.0	0.0132	0.0000	OK
15 minute summer	SW1.02	10	179.145	0.070	16.7	0.1000	0.0000	OK
15 minute summer	SW1.03	10	178.951	0.081	21.7	0.1159	0.0000	OK
15 minute summer	SW3.00	10	179.890	0.030	3.4	0.0341	0.0000	OK
15 minute summer	SW1.04	11	178.712	0.072	35.8	0.1036	0.0000	OK
15 minute summer	SW1.05	11	177.549	0.059	37.9	0.0838	0.0000	OK
15 minute summer	SW4.00	10	177.223	0.033	1.9	0.0000	0.0000	OK
15 minute summer	SW4.01	10	176.932	0.022	1.9	0.0036	0.0000	OK
15 minute summer	SW4.02	10	176.428	0.043	4.2	0.0483	0.0000	OK
15 minute summer	SW1.06	11	176.210	0.160	50.0	0.2286	0.0000	OK
15 minute summer	SW1.07	11	176.097	0.157	51.6	0.2251	0.0000	OK
30 minute summer	SW1.08	19	176.012	0.132	55.4	0.1883	0.0000	OK
15 minute summer	SW5.00	10	179.534	0.034	2.3	0.0054	0.0000	OK
15 minute summer	SW5.01	11	179.226	0.056	5.7	0.0636	0.0000	OK
15 minute summer	SW6.00	10	179.397	0.047	5.9	0.0132	0.0000	OK
15 minute summer	SW5.02	10	179.011	0.106	21.5	0.0169	0.0000	OK
15 minute summer	SW5.03	10	178.900	0.060	23.8	0.0096	0.0000	OK
15 minute summer	SW7.00	10	177.535	0.035	2.6	0.0000	0.0000	OK
30 minute summer	SW5.04	19	175.992	0.092	25.3	0.1321	0.0000	OK
30 minute summer	SW1.09-TANK	22	175.973	0.123	80.0	23.7623	0.0000	OK
15 minute summer	SW8.00	10	179.640	0.020	2.1	0.0032	0.0000	OK
15 minute summer	SW8.01	10	178.552	0.037	9.4	0.0103	0.0000	OK
15 minute summer	SW8.02	10	175.975	0.075	9.9	0.0119	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	3.9	0.741	0.065	0.0771	
15 minute summer	SW1.01	1.001	SW1.02	5.2	0.903	0.087	0.0704	
15 minute summer	SW2.00	2.000	SW1.02	5.9	1.021	0.090	0.1079	
15 minute summer	SW1.02	1.002	SW1.03	16.6	0.948	0.051	0.3569	
15 minute summer	SW1.03	1.003	SW1.04	21.6	1.208	0.066	0.4028	
15 minute summer	SW3.00	3.000	SW1.04	3.4	1.352	0.086	0.0472	
15 minute summer	SW1.04	1.004	SW1.05	35.7	2.514	0.051	0.3449	
15 minute summer	SW1.05	1.005	SW1.06	38.0	1.284	0.037	0.4502	
15 minute summer	SW4.00	4.000	SW4.01	1.9	0.846	0.093	0.0488	
15 minute summer	SW4.01	4.001	SW4.02	1.9	1.156	0.045	0.0138	
15 minute summer	SW4.02	4.002	SW1.06	4.1	0.810	0.073	0.0476	
15 minute summer	SW1.06	1.006	SW1.07	50.5	1.013	0.248	1.3696	
15 minute summer	SW1.07	1.007	SW1.08	51.7	1.180	0.243	0.6043	
30 minute summer	SW1.08	1.008	SW1.09-TANK	54.8	1.936	0.179	0.1179	
15 minute summer	SW5.00	5.000	SW5.01	2.3	0.511	0.114	0.1183	
15 minute summer	SW5.01	5.001	SW5.02	5.6	0.950	0.281	0.0893	
15 minute summer	SW6.00	6.000	SW5.02	5.8	0.491	0.095	0.3899	
15 minute summer	SW5.02	5.002	SW5.03	21.3	1.596	0.366	0.0699	
15 minute summer	SW5.03	5.003	SW5.04	23.7	2.842	0.148	0.1636	
15 minute summer	SW7.00	7.000	SW5.04	2.6	0.831	0.116	0.0857	
30 minute summer	SW5.04	5.004	SW1.09-TANK	25.1	1.216	0.072	0.1057	
30 minute summer	SW1.09-TANK	1.009	SW1.10	49.5	0.842	0.168	1.3081	
15 minute summer	SW8.00	8.000	SW8.01	2.1	1.507	0.037	0.0144	
15 minute summer	SW8.01	8.001	SW8.02	9.4	1.225	0.057	0.2124	
15 minute summer	SW8.02	8.002	SW1.10	9.8	0.936	0.180	0.0240	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.29%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	SW1.10	70	175.944	0.294	53.9	0.4206	0.0000	OK
120 minute summer	SW1.11-SEPARATOR	70	175.938	0.298	53.0	0.3365	0.0000	OK
120 minute summer	SW1.12-FC	70	175.932	0.322	52.5	0.4605	0.0000	OK
120 minute summer	SW1.13-OUTFALL	70	175.740	0.150	52.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	SW1.10	1.010	SW1.11-SEPARATOR	53.0	0.541	0.260	0.2732	
120 minute summer	SW1.11-SEPARATOR	1.011	SW1.12-FC	52.5	0.503	0.239	0.7516	
120 minute summer	SW1.12-FC	1.012	SW1.13-OUTFALL	52.6	1.089	0.248	0.2229	122.3

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.31%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	179.730	0.080	15.0	0.0227	0.0000	OK
15 minute summer	SW1.01	10	179.557	0.097	20.1	0.0273	0.0000	OK
15 minute summer	SW2.00	10	179.696	0.096	22.9	0.0271	0.0000	OK
15 minute summer	SW1.02	10	179.220	0.145	64.0	0.2076	0.0000	OK
15 minute summer	SW1.03	10	179.036	0.166	83.5	0.2374	0.0000	OK
15 minute summer	SW3.00	10	179.922	0.062	13.1	0.0696	0.0000	OK
15 minute summer	SW1.04	10	178.789	0.148	138.6	0.2124	0.0000	OK
15 minute summer	SW1.05	10	177.603	0.113	146.9	0.1621	0.0000	OK
15 minute summer	SW4.00	10	177.255	0.065	7.1	0.0000	0.0000	OK
15 minute summer	SW4.01	10	176.954	0.044	7.1	0.0070	0.0000	OK
60 minute summer	SW4.02	38	176.494	0.109	12.4	0.1234	0.0000	OK
60 minute summer	SW1.06	39	176.494	0.444	151.5	0.6355	0.0000	OK
60 minute summer	SW1.07	40	176.481	0.541	152.4	0.7738	0.0000	SURCHARGED
60 minute summer	SW1.08	41	176.473	0.593	169.1	0.8490	0.0000	SURCHARGED
15 minute summer	SW5.00	11	179.570	0.070	9.0	0.0112	0.0000	OK
15 minute summer	SW5.01	11	179.514	0.344	22.0	0.3890	0.0000	SURCHARGED
15 minute summer	SW6.00	10	179.443	0.093	22.5	0.0264	0.0000	OK
15 minute summer	SW5.02	11	179.253	0.348	80.5	0.0553	0.0000	SURCHARGED
15 minute summer	SW5.03	11	178.970	0.130	89.6	0.0207	0.0000	OK
15 minute summer	SW7.00	10	177.572	0.072	10.1	0.0000	0.0000	OK
60 minute summer	SW5.04	41	176.471	0.571	79.6	0.8168	0.0000	SURCHARGED
60 minute summer	SW1.09-TANK	41	176.470	0.620	243.3	120.2319	0.0000	SURCHARGED
15 minute summer	SW8.00	10	179.660	0.040	8.2	0.0064	0.0000	OK
15 minute summer	SW8.01	10	178.587	0.072	36.3	0.0203	0.0000	OK
60 minute summer	SW8.02	40	176.452	0.552	29.3	0.0878	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	14.9	1.033	0.253	0.2130	
15 minute summer	SW1.01	1.001	SW1.02	19.9	1.290	0.335	0.1894	
15 minute summer	SW2.00	2.000	SW1.02	22.7	1.465	0.343	0.2881	
15 minute summer	SW1.02	1.002	SW1.03	63.6	1.311	0.196	0.9920	
15 minute summer	SW1.03	1.003	SW1.04	82.9	1.694	0.254	1.1098	
15 minute summer	SW3.00	3.000	SW1.04	13.0	1.957	0.329	0.1255	
15 minute summer	SW1.04	1.004	SW1.05	137.9	3.608	0.195	0.9290	
15 minute summer	SW1.05	1.005	SW1.06	146.5	1.642	0.143	1.2963	
15 minute summer	SW4.00	4.000	SW4.01	7.1	1.214	0.350	0.1271	
15 minute summer	SW4.01	4.001	SW4.02	7.0	1.674	0.171	0.0360	
60 minute summer	SW4.02	4.002	SW1.06	12.5	1.027	0.223	0.2732	
60 minute summer	SW1.06	1.006	SW1.07	148.9	1.164	0.730	4.3485	
60 minute summer	SW1.07	1.007	SW1.08	147.2	1.187	0.692	2.1838	
60 minute summer	SW1.08	1.008	SW1.09-TANK	165.7	2.214	0.540	0.5262	
15 minute summer	SW5.00	5.000	SW5.01	8.9	0.667	0.448	0.3376	
15 minute summer	SW5.01	5.001	SW5.02	21.1	1.201	1.061	0.2670	
15 minute summer	SW6.00	6.000	SW5.02	22.3	0.691	0.364	0.8847	
15 minute summer	SW5.02	5.002	SW5.03	80.3	2.252	1.380	0.1646	
15 minute summer	SW5.03	5.003	SW5.04	89.7	3.963	0.560	0.4439	
15 minute summer	SW7.00	7.000	SW5.04	10.0	1.207	0.454	0.2307	
60 minute summer	SW5.04	5.004	SW1.09-TANK	77.6	0.932	0.222	0.6247	
60 minute summer	SW1.09-TANK	1.009	SW1.10	91.5	0.839	0.310	3.2193	
15 minute summer	SW8.00	8.000	SW8.01	8.2	2.218	0.145	0.0382	
15 minute summer	SW8.01	8.001	SW8.02	36.2	1.638	0.222	0.6805	
60 minute summer	SW8.02	8.002	SW1.10	26.5	0.910	0.488	0.0913	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.31%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW1.10	41	176.449	0.799	104.7	1.1438	0.0000	SURCHARGED
60 minute summer	SW1.11-SEPARATOR	41	176.437	0.797	99.9	0.9012	0.0000	SURCHARGED
60 minute summer	SW1.12-FC	41	176.421	0.811	99.8	1.1600	0.0000	SURCHARGED
60 minute summer	SW1.13-OUTFALL	41	175.803	0.213	99.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW1.10	1.010	SW1.11-SEPARATOR	99.9	0.631	0.490	0.3920	
60 minute summer	SW1.11-SEPARATOR	1.011	SW1.12-FC	99.8	0.630	0.455	1.0243	
60 minute summer	SW1.12-FC	1.012	SW1.13-OUTFALL	99.8	1.292	0.470	0.3562	302.4

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.21%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	179.748	0.098	21.0	0.0277	0.0000	OK
15 minute summer	SW1.01	10	179.579	0.119	28.2	0.0335	0.0000	OK
15 minute summer	SW2.00	10	179.717	0.117	32.0	0.0332	0.0000	OK
15 minute summer	SW1.02	10	179.253	0.177	89.5	0.2540	0.0000	OK
15 minute summer	SW1.03	10	179.072	0.202	116.8	0.2885	0.0000	OK
15 minute summer	SW3.00	10	179.935	0.075	18.4	0.0850	0.0000	OK
15 minute summer	SW1.04	10	178.820	0.180	194.0	0.2579	0.0000	OK
30 minute summer	SW1.05	18	177.629	0.139	201.5	0.1988	0.0000	OK
15 minute summer	SW4.00	10	177.270	0.080	10.0	0.0000	0.0000	OK
30 minute summer	SW4.01	19	176.963	0.053	9.6	0.0085	0.0000	OK
30 minute summer	SW4.02	19	176.944	0.559	21.7	0.6324	0.0000	SURCHARGED
30 minute summer	SW1.06	19	176.926	0.876	262.4	1.2533	0.0000	SURCHARGED
60 minute summer	SW1.07	41	176.831	0.891	210.4	1.2756	0.0000	SURCHARGED
60 minute summer	SW1.08	41	176.820	0.940	239.0	1.3448	0.0000	SURCHARGED
15 minute summer	SW5.00	11	180.030	0.530	12.6	0.0843	0.0000	SURCHARGED
15 minute summer	SW5.01	11	179.916	0.746	28.2	0.8441	0.0000	SURCHARGED
15 minute summer	SW6.00	11	179.604	0.253	31.5	0.0717	0.0000	SURCHARGED
15 minute summer	SW5.02	11	179.476	0.571	109.7	0.0908	0.0000	SURCHARGED
15 minute summer	SW5.03	11	179.005	0.165	122.6	0.0262	0.0000	OK
15 minute summer	SW7.00	10	177.589	0.089	14.2	0.0000	0.0000	OK
60 minute summer	SW5.04	42	176.816	0.916	109.2	1.3106	0.0000	SURCHARGED
60 minute summer	SW1.09-TANK	42	176.815	0.965	344.1	187.0586	0.0000	SURCHARGED
15 minute summer	SW8.00	10	179.668	0.048	11.5	0.0077	0.0000	OK
15 minute summer	SW8.01	10	178.601	0.086	50.7	0.0243	0.0000	OK
60 minute summer	SW8.02	41	176.789	0.889	41.1	0.1413	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	20.9	1.107	0.354	0.2781	
15 minute summer	SW1.01	1.001	SW1.02	27.9	1.398	0.470	0.2449	
15 minute summer	SW2.00	2.000	SW1.02	31.7	1.588	0.480	0.3716	
15 minute summer	SW1.02	1.002	SW1.03	89.0	1.406	0.275	1.2949	
15 minute summer	SW1.03	1.003	SW1.04	116.0	1.832	0.355	1.4414	
15 minute summer	SW3.00	3.000	SW1.04	18.2	2.129	0.463	0.1621	
15 minute summer	SW1.04	1.004	SW1.05	193.3	3.917	0.273	1.1997	
30 minute summer	SW1.05	1.005	SW1.06	200.9	1.683	0.196	1.4421	
15 minute summer	SW4.00	4.000	SW4.01	9.9	1.354	0.492	0.1602	
30 minute summer	SW4.01	4.001	SW4.02	9.6	1.739	0.235	0.0997	
30 minute summer	SW4.02	4.002	SW1.06	18.8	1.035	0.334	0.3732	
30 minute summer	SW1.06	1.006	SW1.07	256.3	1.618	1.258	4.3539	
60 minute summer	SW1.07	1.007	SW1.08	208.4	1.315	0.980	2.1838	
60 minute summer	SW1.08	1.008	SW1.09-TANK	236.9	2.366	0.771	0.5262	
15 minute summer	SW5.00	5.000	SW5.01	11.8	0.669	0.591	0.4621	
15 minute summer	SW5.01	5.001	SW5.02	28.0	1.588	1.407	0.2670	
15 minute summer	SW6.00	6.000	SW5.02	30.1	0.814	0.491	1.2726	
15 minute summer	SW5.02	5.002	SW5.03	109.6	2.872	1.884	0.1833	
15 minute summer	SW5.03	5.003	SW5.04	122.5	4.190	0.764	0.5725	
15 minute summer	SW7.00	7.000	SW5.04	14.0	1.308	0.637	0.2988	
60 minute summer	SW5.04	5.004	SW1.09-TANK	107.1	1.017	0.307	0.6247	
60 minute summer	SW1.09-TANK	1.009	SW1.10	111.8	0.837	0.378	3.2193	
15 minute summer	SW8.00	8.000	SW8.01	11.5	2.428	0.203	0.0489	
15 minute summer	SW8.01	8.001	SW8.02	50.6	1.758	0.311	0.7250	
60 minute summer	SW8.02	8.002	SW1.10	38.9	0.979	0.717	0.0913	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.21%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW1.10	41	176.784	1.134	122.4	1.6231	0.0000	SURCHARGED
60 minute summer	SW1.11-SEPARATOR	41	176.766	1.125	122.3	1.2729	0.0000	SURCHARGED
60 minute summer	SW1.12-FC	41	176.741	1.131	122.2	1.6183	0.0000	SURCHARGED
60 minute summer	SW1.13-OUTFALL	41	175.830	0.239	122.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW1.10	1.010	SW1.11-SEPARATOR	122.3	0.772	0.600	0.3920	
60 minute summer	SW1.11-SEPARATOR	1.011	SW1.12-FC	122.2	0.772	0.557	1.0243	
60 minute summer	SW1.12-FC	1.012	SW1.13-OUTFALL	122.1	1.357	0.576	0.4150	423.3

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.23%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	179.742	0.092	18.9	0.0260	0.0000	OK
15 minute summer	SW1.01	10	179.571	0.111	25.4	0.0315	0.0000	OK
15 minute summer	SW2.00	10	179.710	0.110	28.9	0.0312	0.0000	OK
15 minute summer	SW1.02	10	179.242	0.167	80.8	0.2385	0.0000	OK
15 minute summer	SW1.03	10	179.060	0.190	105.4	0.2716	0.0000	OK
15 minute summer	SW3.00	10	179.931	0.071	16.6	0.0799	0.0000	OK
15 minute summer	SW1.04	10	178.810	0.170	175.2	0.2429	0.0000	OK
15 minute summer	SW1.05	10	177.618	0.128	185.9	0.1826	0.0000	OK
15 minute summer	SW4.00	10	177.265	0.075	9.0	0.0000	0.0000	OK
15 minute summer	SW4.01	9	176.958	0.048	8.9	0.0077	0.0000	OK
30 minute summer	SW4.02	19	176.798	0.413	19.7	0.4666	0.0000	SURCHARGED
30 minute summer	SW1.06	19	176.782	0.732	239.6	1.0473	0.0000	SURCHARGED
60 minute summer	SW1.07	41	176.730	0.790	195.2	1.1298	0.0000	SURCHARGED
60 minute summer	SW1.08	41	176.719	0.839	221.4	1.2009	0.0000	SURCHARGED
15 minute summer	SW5.00	11	179.866	0.366	11.4	0.0582	0.0000	SURCHARGED
15 minute summer	SW5.01	11	179.769	0.599	25.7	0.6771	0.0000	SURCHARGED
15 minute summer	SW6.00	11	179.474	0.124	28.4	0.0350	0.0000	OK
15 minute summer	SW5.02	11	179.395	0.490	99.5	0.0779	0.0000	SURCHARGED
15 minute summer	SW5.03	11	178.992	0.152	111.3	0.0242	0.0000	OK
15 minute summer	SW7.00	10	177.583	0.083	12.8	0.0000	0.0000	OK
60 minute summer	SW5.04	42	176.716	0.815	101.1	1.1670	0.0000	SURCHARGED
60 minute summer	SW1.09-TANK	42	176.715	0.865	318.7	167.6157	0.0000	SURCHARGED
15 minute summer	SW8.00	10	179.666	0.046	10.4	0.0073	0.0000	OK
15 minute summer	SW8.01	10	178.596	0.081	45.8	0.0230	0.0000	OK
60 minute summer	SW8.02	41	176.691	0.791	37.8	0.1258	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	18.8	1.084	0.318	0.2558	
15 minute summer	SW1.01	1.001	SW1.02	25.2	1.365	0.424	0.2262	
15 minute summer	SW2.00	2.000	SW1.02	28.7	1.550	0.433	0.3437	
15 minute summer	SW1.02	1.002	SW1.03	80.4	1.377	0.248	1.1932	
15 minute summer	SW1.03	1.003	SW1.04	104.8	1.785	0.321	1.3306	
15 minute summer	SW3.00	3.000	SW1.04	16.5	2.077	0.417	0.1499	
15 minute summer	SW1.04	1.004	SW1.05	174.5	3.824	0.247	1.1085	
15 minute summer	SW1.05	1.005	SW1.06	185.4	1.645	0.181	1.4087	
15 minute summer	SW4.00	4.000	SW4.01	8.9	1.319	0.443	0.1483	
15 minute summer	SW4.01	4.001	SW4.02	8.9	1.736	0.217	0.0959	
30 minute summer	SW4.02	4.002	SW1.06	17.5	1.010	0.310	0.3732	
30 minute summer	SW1.06	1.006	SW1.07	234.8	1.482	1.152	4.3539	
60 minute summer	SW1.07	1.007	SW1.08	193.3	1.220	0.909	2.1838	
60 minute summer	SW1.08	1.008	SW1.09-TANK	219.5	2.319	0.714	0.5262	
15 minute summer	SW5.00	5.000	SW5.01	10.9	0.683	0.547	0.4621	
15 minute summer	SW5.01	5.001	SW5.02	25.7	1.461	1.294	0.2670	
15 minute summer	SW6.00	6.000	SW5.02	27.2	0.797	0.443	0.9941	
15 minute summer	SW5.02	5.002	SW5.03	99.6	2.668	1.712	0.1768	
15 minute summer	SW5.03	5.003	SW5.04	111.3	4.130	0.695	0.5282	
15 minute summer	SW7.00	7.000	SW5.04	12.6	1.277	0.575	0.2758	
60 minute summer	SW5.04	5.004	SW1.09-TANK	99.2	0.991	0.284	0.6247	
60 minute summer	SW1.09-TANK	1.009	SW1.10	106.3	0.835	0.360	3.2193	
15 minute summer	SW8.00	8.000	SW8.01	10.4	2.364	0.184	0.0454	
15 minute summer	SW8.01	8.001	SW8.02	45.7	1.723	0.281	0.7117	
60 minute summer	SW8.02	8.002	SW1.10	35.8	0.899	0.659	0.0913	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.23%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW1.10	41	176.687	1.037	116.3	1.4842	0.0000	SURCHARGED
60 minute summer	SW1.11-SEPARATOR	41	176.670	1.030	116.2	1.1652	0.0000	SURCHARGED
60 minute summer	SW1.12-FC	42	176.648	1.038	116.1	1.4855	0.0000	SURCHARGED
60 minute summer	SW1.13-OUTFALL	42	175.822	0.232	116.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW1.10	1.010	SW1.11-SEPARATOR	116.2	0.733	0.570	0.3920	
60 minute summer	SW1.11-SEPARATOR	1.011	SW1.12-FC	116.1	0.733	0.529	1.0243	
60 minute summer	SW1.12-FC	1.012	SW1.13-OUTFALL	116.1	1.341	0.547	0.3992	389.5

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	179.767	0.117	27.5	0.0330	0.0000	OK
15 minute summer	SW1.01	10	179.602	0.142	37.0	0.0401	0.0000	OK
15 minute summer	SW2.00	10	179.740	0.140	41.9	0.0396	0.0000	OK
15 minute summer	SW1.02	10	179.286	0.211	117.2	0.3016	0.0000	OK
15 minute summer	SW1.03	10	179.108	0.237	153.0	0.3398	0.0000	OK
15 minute summer	SW3.00	10	179.949	0.089	24.0	0.1007	0.0000	OK
15 minute summer	SW1.04	10	178.844	0.204	254.1	0.2914	0.0000	OK
30 minute summer	SW1.05	19	177.728	0.238	266.3	0.3404	0.0000	OK
30 minute summer	SW4.00	20	177.614	0.424	12.7	0.0000	0.0000	FLOOD RISK
30 minute summer	SW4.01	19	177.529	0.619	12.3	0.0984	0.0000	FLOOD RISK
30 minute summer	SW4.02	19	177.497	1.112	25.5	1.2574	0.0000	SURCHARGED
30 minute summer	SW1.06	19	177.469	1.419	337.1	2.0305	0.0000	SURCHARGED
60 minute summer	SW1.07	41	177.262	1.322	276.9	1.8915	0.0000	SURCHARGED
60 minute summer	SW1.08	42	177.244	1.364	314.9	1.9525	0.0000	SURCHARGED
15 minute summer	SW5.00	12	180.786	1.286	16.5	0.2045	0.0000	FLOOD RISK
15 minute summer	SW5.01	12	180.604	1.433	34.7	1.6213	0.0000	FLOOD RISK
15 minute summer	SW6.00	11	180.170	0.820	41.2	0.2319	0.0000	SURCHARGED
15 minute summer	SW5.02	11	179.975	1.070	139.8	0.1702	0.0000	SURCHARGED
15 minute summer	SW5.03	11	179.321	0.481	152.2	0.0765	0.0000	SURCHARGED
15 minute summer	SW7.00	10	177.607	0.107	18.5	0.0000	0.0000	OK
60 minute summer	SW5.04	43	177.238	1.338	144.3	1.9151	0.0000	SURCHARGED
60 minute summer	SW1.09-TANK	43	177.237	1.387	453.5	268.8361	0.0000	SURCHARGED
15 minute summer	SW8.00	10	179.676	0.056	15.1	0.0089	0.0000	OK
15 minute summer	SW8.01	10	178.615	0.100	66.5	0.0282	0.0000	OK
60 minute summer	SW8.02	42	177.201	1.300	54.7	0.2068	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	27.4	1.161	0.463	0.3467	
15 minute summer	SW1.01	1.001	SW1.02	36.6	1.484	0.616	0.3025	
15 minute summer	SW2.00	2.000	SW1.02	41.6	1.684	0.628	0.4586	
15 minute summer	SW1.02	1.002	SW1.03	116.6	1.483	0.360	1.6102	
15 minute summer	SW1.03	1.003	SW1.04	152.0	2.010	0.465	1.7395	
15 minute summer	SW3.00	3.000	SW1.04	23.8	2.261	0.604	0.1991	
15 minute summer	SW1.04	1.004	SW1.05	254.3	3.895	0.360	1.7500	
30 minute summer	SW1.05	1.005	SW1.06	263.2	1.937	0.256	1.7556	
30 minute summer	SW4.00	4.000	SW4.01	12.3	1.391	0.609	0.3830	
30 minute summer	SW4.01	4.001	SW4.02	12.5	1.751	0.306	0.1513	
30 minute summer	SW4.02	4.002	SW1.06	25.1	1.029	0.445	0.3732	
30 minute summer	SW1.06	1.006	SW1.07	329.4	2.079	1.616	4.3539	
60 minute summer	SW1.07	1.007	SW1.08	274.1	1.730	1.289	2.1838	
60 minute summer	SW1.08	1.008	SW1.09-TANK	312.0	2.509	1.016	0.5262	
15 minute summer	SW5.00	5.000	SW5.01	15.8	0.896	0.792	0.4621	
15 minute summer	SW5.01	5.001	SW5.02	37.1	2.109	1.868	0.2670	
15 minute summer	SW6.00	6.000	SW5.02	38.7	0.973	0.630	1.2726	
15 minute summer	SW5.02	5.002	SW5.03	134.4	3.380	2.310	0.2057	
15 minute summer	SW5.03	5.003	SW5.04	149.1	4.334	0.930	0.7052	
15 minute summer	SW7.00	7.000	SW5.04	18.3	1.378	0.831	0.3701	
60 minute summer	SW5.04	5.004	SW1.09-TANK	141.5	1.094	0.405	0.6247	
60 minute summer	SW1.09-TANK	1.009	SW1.10	132.9	0.839	0.450	3.2193	
15 minute summer	SW8.00	8.000	SW8.01	15.1	2.605	0.267	0.0598	
15 minute summer	SW8.01	8.001	SW8.02	66.4	2.018	0.408	0.7661	
60 minute summer	SW8.02	8.002	SW1.10	51.8	1.303	0.955	0.0913	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW1.10	42	177.194	1.544	145.6	2.2100	0.0000	SURCHARGED
60 minute summer	SW1.11-SEPARATOR	42	177.168	1.528	145.4	1.7280	0.0000	SURCHARGED
60 minute summer	SW1.12-FC	42	177.133	1.523	145.4	2.1796	0.0000	SURCHARGED
60 minute summer	SW1.13-OUTFALL	42	175.857	0.267	145.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW1.10	1.010	SW1.11-SEPARATOR	145.4	0.918	0.714	0.3920	
60 minute summer	SW1.11-SEPARATOR	1.011	SW1.12-FC	145.4	0.917	0.662	1.0243	
60 minute summer	SW1.12-FC	1.012	SW1.13-OUTFALL	145.3	1.412	0.685	0.4742	564.7

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
SW1.00	0.040	5.00	180.380	600	404970.680	411697.174	0.730
SW1.01	0.014	5.00	180.380	600	404979.059	411685.064	0.920
SW2.00	0.061	5.00	180.730	600	404964.922	411668.345	1.130
SW1.02	0.057	5.00	180.340	1350	404982.818	411673.389	1.265
SW1.03	0.053	5.00	180.430	1350	404996.167	411657.930	1.560
SW3.00	0.035	5.00	181.380	1200	405026.333	411655.565	1.520
SW1.04	0.114	5.00	180.370	1350	405014.810	411670.561	1.730
SW1.05	0.024	5.00	179.090	1350	405008.174	411693.836	1.600
SW4.00	0.019	5.00	177.840		404968.594	411704.562	0.650
SW4.01			177.820	450	404986.679	411716.658	0.910
SW4.02	0.024	5.00	177.810	1200	404994.633	411713.398	1.425
SW1.06	0.085	5.00	178.300	1350	405000.284	411705.908	2.250
SW1.07	0.012	5.00	177.740	1350	405022.543	411722.021	1.800
SW1.08	0.076	5.00	177.820	1350	405036.111	411719.595	2.240
SW5.00	0.024	5.00	180.850	450	405076.146	411671.980	1.350
SW5.01	0.035	5.00	180.770	1200	405049.905	411672.717	1.600
SW6.00	0.060	5.00	180.700	600	405079.508	411687.566	1.350
SW5.02	0.105	5.00	180.660	450	405047.511	411687.693	1.755
SW5.03	0.026	5.00	180.500	450	405043.693	411691.184	1.660
SW7.00	0.027	5.00	178.510		405070.047	411708.403	1.010
SW5.04			178.250	1350	405042.232	411710.732	2.650
SW1.09-TANK			177.770		405051.195	411716.620	1.920
SW8.00	0.022	5.00	181.000	450	405106.288	411683.176	1.380
SW8.01	0.075	5.00	179.290	600	405103.250	411693.079	0.775
SW8.02	0.005	5.00	178.400	450	405083.255	411711.262	2.500
SW1.10			178.200	1350	405083.392	411713.554	2.850
SW1.11-SEPARATOR			178.100	1200	405089.136	411713.965	2.460
SW1.12-FC			178.000	1350	405098.391	411714.626	3.140
SW1.13-OUTFALL			178.000		405099.793	411719.020	2.410

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	SW1.00	SW1.01	14.726	0.600	179.650	179.460	0.190	77.5	225	5.17	41.8
1.001	SW1.01	SW1.02	12.265	0.600	179.460	179.300	0.160	76.7	225	5.30	41.5
2.000	SW2.00	SW1.02	18.593	0.600	179.600	179.300	0.300	62.0	225	5.19	41.7
1.002	SW1.02	SW1.03	20.425	0.600	179.075	178.870	0.205	99.6	450	5.47	41.1
1.003	SW1.03	SW1.04	22.519	0.600	178.870	178.640	0.230	97.9	450	5.65	40.6
3.000	SW3.00	SW1.04	18.912	0.600	179.860	178.940	0.920	20.6	150	5.14	41.8
1.004	SW1.04	SW1.05	24.203	0.600	178.640	177.490	1.150	21.0	450	5.74	40.4
1.005	SW1.05	SW1.06	14.422	0.600	177.490	176.050	1.440	10.0	450	5.78	40.3
4.000	SW4.00	SW4.01	21.757	0.600	177.190	176.910	0.280	77.7	150	5.32	41.4
4.001	SW4.01	SW4.02	8.596	0.600	176.910	176.460	0.450	19.1	150	5.38	41.3
4.002	SW4.02	SW1.06	9.383	0.600	176.385	176.275	0.110	85.3	225	5.49	41.0
1.006	SW1.06	SW1.07	27.479	0.600	176.050	175.940	0.110	249.8	450	6.14	39.5
1.007	SW1.07	SW1.08	13.783	0.600	175.940	175.880	0.060	229.7	450	6.31	39.0
1.008	SW1.08	SW1.09-TANK	3.321	0.600	175.880	175.850	0.030	110.7	450	6.34	39.0
5.000	SW5.00	SW5.01	26.251	0.600	179.500	179.170	0.330	79.5	150	5.39	41.3
5.001	SW5.01	SW5.02	15.166	0.600	179.170	178.980	0.190	80.0	150	5.61	40.7
6.000	SW6.00	SW5.02	31.997	0.600	179.350	178.905	0.445	71.9	225	5.35	41.4
5.002	SW5.02	SW5.03	5.173	0.600	178.905	178.840	0.065	80.0	225	5.67	40.6
5.003	SW5.03	SW5.04	19.603	0.600	178.840	177.000	1.840	10.7	225	5.75	40.4
7.000	SW7.00	SW5.04	27.912	0.600	177.500	177.075	0.425	65.7	150	5.37	41.3
5.004	SW5.04	SW1.09-TANK	3.943	0.600	175.900	175.854	0.046	85.7	450	5.78	40.3
1.009	SW1.09-TANK	SW1.10	20.318	0.600	175.850	175.680	0.170	119.5	450	6.52	38.5
8.000	SW8.00	SW8.01	10.359	0.600	179.620	178.590	1.030	10.1	150	5.05	42.0
8.001	SW8.01	SW8.02	27.026	0.600	178.515	175.900	2.615	10.3	225	5.16	41.8

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.486	59.1	6.0	0.505	0.695	0.040	0.0	49	0.968
1.001	1.495	59.4	8.1	0.695	0.815	0.054	0.0	56	1.052
2.000	1.664	66.2	9.2	0.905	0.815	0.061	0.0	57	1.182
1.002	2.036	323.9	25.5	0.815	1.110	0.172	0.0	85	1.236
1.003	2.054	326.7	33.0	1.110	1.280	0.225	0.0	95	1.334
3.000	2.231	39.4	5.3	1.370	1.280	0.035	0.0	37	1.564
1.004	4.446	707.2	54.6	1.280	1.150	0.374	0.0	84	2.689
1.005	6.451	1026.1	58.0	1.150	1.800	0.398	0.0	72	3.558
4.000	1.141	20.2	2.8	0.500	0.760	0.019	0.0	38	0.806
4.001	2.315	40.9	2.8	0.760	1.200	0.019	0.0	27	1.333
4.002	1.416	56.3	6.4	1.200	1.800	0.043	0.0	51	0.942
1.006	1.281	203.8	75.0	1.800	1.350	0.526	0.0	189	1.187
1.007	1.337	212.6	75.9	1.350	1.490	0.538	0.0	185	1.228
1.008	1.931	307.2	86.5	1.490	1.470	0.614	0.0	163	1.671
5.000	1.128	19.9	3.6	1.200	1.450	0.024	0.0	43	0.857
5.001	1.125	19.9	8.7	1.450	1.530	0.059	0.0	69	1.088
6.000	1.544	61.4	9.0	1.125	1.530	0.060	0.0	58	1.106
5.002	1.463	58.2	32.8	1.530	1.435	0.224	0.0	121	1.505
5.003	4.031	160.3	36.5	1.435	1.025	0.250	0.0	73	3.277
7.000	1.243	22.0	4.0	0.860	1.025	0.027	0.0	44	0.952
5.004	2.197	349.4	40.4	1.900	1.466	0.277	0.0	102	1.486
1.009	1.858	295.5	124.1	1.470	2.070	0.891	0.0	203	1.782
8.000	3.195	56.5	3.3	1.230	0.550	0.022	0.0	25	1.766
8.001	4.093	162.7	14.6	0.550	2.275	0.097	0.0	45	2.560

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
8.002	SW8.02	SW1.10	2.296	0.600	175.900	175.875	0.025	91.8	225	5.19	41.7
1.010	SW1.10	SW1.11-SEPARATOR	2.474	0.600	175.650	175.640	0.010	250.0	450	6.55	38.5
1.011	SW1.11-SEPARATOR	SW1.12-FC	6.465	0.600	175.640	175.610	0.030	215.5	450	6.63	38.3
1.012	SW1.12-FC	SW1.13-OUTFALL	4.612	0.600	175.610	175.590	0.020	230.6	450	6.69	38.1

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
8.002	1.365	54.3	15.4	2.275	2.100	0.102	0.0	82	1.181
1.010	1.281	203.7	138.0	2.100	2.010	0.993	0.0	272	1.372
1.011	1.381	219.6	137.3	2.010	1.940	0.993	0.0	258	1.453
1.012	1.334	212.2	136.9	1.940	1.960	0.993	0.0	263	1.414

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	14.726	77.5	225	Circular	180.380	179.650	0.505	180.380	179.460	0.695
1.001	12.265	76.7	225	Circular	180.380	179.460	0.695	180.340	179.300	0.815
2.000	18.593	62.0	225	Circular	180.730	179.600	0.905	180.340	179.300	0.815
1.002	20.425	99.6	450	Circular	180.340	179.075	0.815	180.430	178.870	1.110
1.003	22.519	97.9	450	Circular	180.430	178.870	1.110	180.370	178.640	1.280
3.000	18.912	20.6	150	Circular	181.380	179.860	1.370	180.370	178.940	1.280
1.004	24.203	21.0	450	Circular	180.370	178.640	1.280	179.090	177.490	1.150
1.005	14.422	10.0	450	Circular	179.090	177.490	1.150	178.300	176.050	1.800
4.000	21.757	77.7	150	Circular	177.840	177.190	0.500	177.820	176.910	0.760
4.001	8.596	19.1	150	Circular	177.820	176.910	0.760	177.810	176.460	1.200
4.002	9.383	85.3	225	Circular	177.810	176.385	1.200	178.300	176.275	1.800
1.006	27.479	249.8	450	Circular	178.300	176.050	1.800	177.740	175.940	1.350
1.007	13.783	229.7	450	Circular	177.740	175.940	1.350	177.820	175.880	1.490
1.008	3.321	110.7	450	Circular	177.820	175.880	1.490	177.770	175.850	1.470
5.000	26.251	79.5	150	Circular	180.850	179.500	1.200	180.770	179.170	1.450
5.001	15.166	80.0	150	Circular	180.770	179.170	1.450	180.660	178.980	1.530

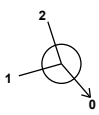
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW1.00	600	Manhole	Adoptable	SW1.01	600	Manhole	Adoptable
1.001	SW1.01	600	Manhole	Adoptable	SW1.02	1350	Manhole	Adoptable
2.000	SW2.00	600	Manhole	Adoptable	SW1.02	1350	Manhole	Adoptable
1.002	SW1.02	1350	Manhole	Adoptable	SW1.03	1350	Manhole	Adoptable
1.003	SW1.03	1350	Manhole	Adoptable	SW1.04	1350	Manhole	Adoptable
3.000	SW3.00	1200	Manhole	Adoptable	SW1.04	1350	Manhole	Adoptable
1.004	SW1.04	1350	Manhole	Adoptable	SW1.05	1350	Manhole	Adoptable
1.005	SW1.05	1350	Manhole	Adoptable	SW1.06	1350	Manhole	Adoptable
4.000	SW4.00		Junction		SW4.01	450	Manhole	Adoptable
4.001	SW4.01	450	Manhole	Adoptable	SW4.02	1200	Manhole	Adoptable
4.002	SW4.02	1200	Manhole	Adoptable	SW1.06	1350	Manhole	Adoptable
1.006	SW1.06	1350	Manhole	Adoptable	SW1.07	1350	Manhole	Adoptable
1.007	SW1.07	1350	Manhole	Adoptable	SW1.08	1350	Manhole	Adoptable
1.008	SW1.08	1350	Manhole	Adoptable	SW1.09-TANK		Junction	
5.000	SW5.00	450	Manhole	Adoptable	SW5.01	1200	Manhole	Adoptable
5.001	SW5.01	1200	Manhole	Adoptable	SW5.02	450	Manhole	Adoptable

Pipeline Schedule

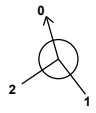
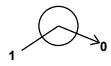
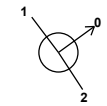
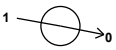
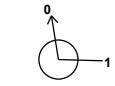
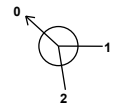
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
6.000	31.997	71.9	225	Circular	180.700	179.350	1.125	180.660	178.905	1.530
5.002	5.173	80.0	225	Circular	180.660	178.905	1.530	180.500	178.840	1.435
5.003	19.603	10.7	225	Circular	180.500	178.840	1.435	178.250	177.000	1.025
7.000	27.912	65.7	150	Circular	178.510	177.500	0.860	178.250	177.075	1.025
5.004	3.943	85.7	450	Circular	178.250	175.900	1.900	177.770	175.854	1.466
1.009	20.318	119.5	450	Circular	177.770	175.850	1.470	178.200	175.680	2.070
8.000	10.359	10.1	150	Circular	181.000	179.620	1.230	179.290	178.590	0.550
8.001	27.026	10.3	225	Circular	179.290	178.515	0.550	178.400	175.900	2.275
8.002	2.296	91.8	225	Circular	178.400	175.900	2.275	178.200	175.875	2.100
1.010	2.474	250.0	450	Circular	178.200	175.650	2.100	178.100	175.640	2.010
1.011	6.465	215.5	450	Circular	178.100	175.640	2.010	178.000	175.610	1.940
1.012	4.612	230.6	450	Circular	178.000	175.610	1.940	178.000	175.590	1.960

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
6.000	SW6.00	600	Manhole	Adoptable	SW5.02	450	Manhole	Adoptable
5.002	SW5.02	450	Manhole	Adoptable	SW5.03	450	Manhole	Adoptable
5.003	SW5.03	450	Manhole	Adoptable	SW5.04	1350	Manhole	Adoptable
7.000	SW7.00		Junction		SW5.04	1350	Manhole	Adoptable
5.004	SW5.04	1350	Manhole	Adoptable	SW1.09-TANK		Junction	
1.009	SW1.09-TANK		Junction		SW1.10	1350	Manhole	Adoptable
8.000	SW8.00	450	Manhole	Adoptable	SW8.01	600	Manhole	Adoptable
8.001	SW8.01	600	Manhole	Adoptable	SW8.02	450	Manhole	Adoptable
8.002	SW8.02	450	Manhole	Adoptable	SW1.10	1350	Manhole	Adoptable
1.010	SW1.10	1350	Manhole	Adoptable	SW1.11-SEPARATOR	1200	Manhole	Adoptable
1.011	SW1.11-SEPARATOR	1200	Manhole	Adoptable	SW1.12-FC	1350	Manhole	Adoptable
1.012	SW1.12-FC	1350	Manhole	Adoptable	SW1.13-OUTFALL		Junction	

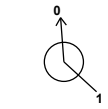
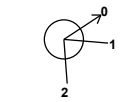
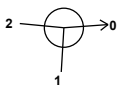
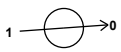
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW1.00	404970.680	411697.174	180.380	0.730	600	 0	1.000	179.650	225
SW1.01	404979.059	411685.064	180.380	0.920	600	 1	1.000	179.460	225
						0	1.001	179.460	225
SW2.00	404964.922	411668.345	180.730	1.130	600	 0	2.000	179.600	225
SW1.02	404982.818	411673.389	180.340	1.265	1350	 1	2.000	179.300	225
						2	1.001	179.300	225
						0	1.002	179.075	450
SW1.03	404996.167	411657.930	180.430	1.560	1350	 1	1.002	178.870	450
						0	1.003	178.870	450

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW3.00	405026.333	411655.565	181.380	1.520	1200				
						0	3.000	179.860	150
SW1.04	405014.810	411670.561	180.370	1.730	1350		1	3.000	178.940	150
							2	1.003	178.640	450
						0	1.004	178.640	450
SW1.05	405008.174	411693.836	179.090	1.600	1350		1	1.004	177.490	450
						0	1.005	177.490	450
SW4.00	404968.594	411704.562	177.840	0.650					
						0	4.000	177.190	150
SW4.01	404986.679	411716.658	177.820	0.910	450		1	4.000	176.910	150
						0	4.001	176.910	150
SW4.02	404994.633	411713.398	177.810	1.425	1200		1	4.001	176.460	150
						0	4.002	176.385	225
SW1.06	405000.284	411705.908	178.300	2.250	1350		1	4.002	176.275	225
							2	1.005	176.050	450
						0	1.006	176.050	450
SW1.07	405022.543	411722.021	177.740	1.800	1350		1	1.006	175.940	450
						0	1.007	175.940	450
SW1.08	405036.111	411719.595	177.820	2.240	1350		1	1.007	175.880	450
						0	1.008	175.880	450
SW5.00	405076.146	411671.980	180.850	1.350	450				
						0	5.000	179.500	150
SW5.01	405049.905	411672.717	180.770	1.600	1200		1	5.000	179.170	150
						0	5.001	179.170	150
SW6.00	405079.508	411687.566	180.700	1.350	600				
						0	6.000	179.350	225
SW5.02	405047.511	411687.693	180.660	1.755	450		1	6.000	178.905	225
							2	5.001	178.980	150
						0	5.002	178.905	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW5.03	405043.693	411691.184	180.500	1.660	450		1	5.002	178.840	225
							0	5.003	178.840	225
SW7.00	405070.047	411708.403	178.510	1.010						
							0	7.000	177.500	150
SW5.04	405042.232	411710.732	178.250	2.650	1350		1	7.000	177.075	150
							2	5.003	177.000	225
							0	5.004	175.900	450
SW1.09-TANK	405051.195	411716.620	177.770	1.920			1	5.004	175.854	450
							2	1.008	175.850	450
							0	1.009	175.850	450
SW8.00	405106.288	411683.176	181.000	1.380	450					
							0	8.000	179.620	150
SW8.01	405103.250	411693.079	179.290	0.775	600		1	8.000	178.590	150
							0	8.001	178.515	225
SW8.02	405083.255	411711.262	178.400	2.500	450		1	8.001	175.900	225
							0	8.002	175.900	225
SW1.10	405083.392	411713.554	178.200	2.850	1350		1	8.002	175.875	225
							2	1.009	175.680	450
							0	1.010	175.650	450
SW1.11-SEPARATOR	405089.136	411713.965	178.100	2.460	1200		1	1.010	175.640	450
							0	1.011	175.640	450
SW1.12-FC	405098.391	411714.626	178.000	3.140	1350		1	1.011	175.610	450
							0	1.012	175.610	450
SW1.13-OUTFALL	405099.793	411719.020	178.000	2.410			1	1.012	175.590	450

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	✓	1 year (l/s)	73.5
Rainfall Events	Singular	Drain Down Time (mins)	1440	30 year (l/s)	180.4
Summer CV	1.000	Additional Storage (m³/ha)	0.0	100 year (l/s)	235.7
Winter CV	1.000	Starting Level (m)		Check Discharge Volume	✓
Analysis Speed	Detailed	Check Discharge Rate(s)	✓	100 year 360 minute (m³)	909

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Brownfield	Time of Concentration (mins)	30.00
Brownfield Method	MRM	Betterment (%)	0
Contributing Area (ha)	1.520	Q 1 year (l/s)	104.9
PIMP (%)	100	Q 30 year (l/s)	257.7
CV	1.000	Q 100 year (l/s)	336.8

Pre-development Discharge Volume

Site Makeup	Brownfield	CV	1.000	Betterment (%)	0
Brownfield Method	MRM	Return Period (years)	100	PR	1.000
Contributing Area (ha)	1.520	Climate Change (%)	0	Runoff Volume (m^3)	909
PIMP (%)	100	Storm Duration (mins)	360		

Node SW1.13-OUTFALL Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m^2)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to All storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	0.000	1440	0.730

Node SW1.12-FC Online Orifice Control

Flap Valve	✓	Invert Level (m)	175.610	Diameter (m)	0.251
Downstream Link	1.012	Design Depth (m)	1.400	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	149.0		

Node SW1.09-TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	175.850
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	29

Depth (m)	Area (m^2)	Inf Area (m^2)	Depth (m)	Area (m^2)	Inf Area (m^2)	Depth (m)	Area (m^2)	Inf Area (m^2)
0.000	204.0	204.0	1.500	204.0	279.9	1.501	0.0	279.9

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	179.689	0.039	3.9	0.0110	0.0000	OK
15 minute summer	SW1.01	10	179.507	0.046	5.3	0.0131	0.0000	OK
15 minute summer	SW2.00	10	179.647	0.047	6.0	0.0132	0.0000	OK
15 minute summer	SW1.02	10	179.145	0.070	16.7	0.1000	0.0000	OK
15 minute summer	SW1.03	10	178.951	0.081	21.7	0.1159	0.0000	OK
15 minute summer	SW3.00	10	179.890	0.030	3.4	0.0341	0.0000	OK
15 minute summer	SW1.04	11	178.712	0.072	35.8	0.1036	0.0000	OK
15 minute summer	SW1.05	11	177.549	0.059	37.9	0.0838	0.0000	OK
15 minute summer	SW4.00	10	177.223	0.033	1.9	0.0000	0.0000	OK
15 minute summer	SW4.01	10	176.932	0.022	1.9	0.0036	0.0000	OK
15 minute summer	SW4.02	10	176.428	0.043	4.2	0.0483	0.0000	OK
1440 minute summer	SW1.06	1470	176.304	0.254	10.1	0.3629	0.0000	OK
1440 minute summer	SW1.07	1470	176.304	0.364	10.3	0.5204	0.0000	OK
1440 minute summer	SW1.08	1470	176.304	0.424	18.5	0.6062	0.0000	OK
15 minute summer	SW5.00	10	179.534	0.034	2.3	0.0054	0.0000	OK
15 minute summer	SW5.01	11	179.226	0.056	5.7	0.0636	0.0000	OK
15 minute summer	SW6.00	10	179.397	0.047	5.9	0.0132	0.0000	OK
15 minute summer	SW5.02	10	179.011	0.106	21.5	0.0169	0.0000	OK
15 minute summer	SW5.03	10	178.900	0.060	23.8	0.0096	0.0000	OK
15 minute summer	SW7.00	10	177.535	0.035	2.6	0.0000	0.0000	OK
1440 minute summer	SW5.04	1470	176.304	0.404	6.2	0.5776	0.0000	OK
1440 minute summer	SW1.09-TANK	1470	176.304	0.454	22.7	87.9106	0.0000	SURCHARGED
15 minute summer	SW8.00	10	179.640	0.020	2.1	0.0032	0.0000	OK
15 minute summer	SW8.01	10	178.552	0.037	9.4	0.0103	0.0000	OK
1440 minute summer	SW8.02	1470	176.304	0.404	1.9	0.0642	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	3.9	0.741	0.065	0.0771	
15 minute summer	SW1.01	1.001	SW1.02	5.2	0.903	0.087	0.0704	
15 minute summer	SW2.00	2.000	SW1.02	5.9	1.021	0.090	0.1079	
15 minute summer	SW1.02	1.002	SW1.03	16.6	0.948	0.051	0.3569	
15 minute summer	SW1.03	1.003	SW1.04	21.6	1.208	0.066	0.4028	
15 minute summer	SW3.00	3.000	SW1.04	3.4	1.352	0.086	0.0472	
15 minute summer	SW1.04	1.004	SW1.05	35.7	2.514	0.051	0.3449	
15 minute summer	SW1.05	1.005	SW1.06	38.0	1.284	0.037	0.4502	
15 minute summer	SW4.00	4.000	SW4.01	1.9	0.846	0.093	0.0488	
15 minute summer	SW4.01	4.001	SW4.02	1.9	1.156	0.045	0.0138	
15 minute summer	SW4.02	4.002	SW1.06	4.1	0.810	0.073	0.0476	
1440 minute summer	SW1.06	1.006	SW1.07	10.1	0.676	0.050	3.1500	
1440 minute summer	SW1.07	1.007	SW1.08	10.3	0.593	0.048	2.0124	
1440 minute summer	SW1.08	1.008	SW1.09-TANK	19.1	0.635	0.062	0.5200	
15 minute summer	SW5.00	5.000	SW5.01	2.3	0.511	0.114	0.1183	
15 minute summer	SW5.01	5.001	SW5.02	5.6	0.950	0.281	0.0893	
15 minute summer	SW6.00	6.000	SW5.02	5.8	0.491	0.095	0.3899	
15 minute summer	SW5.02	5.002	SW5.03	21.3	1.596	0.366	0.0699	
15 minute summer	SW5.03	5.003	SW5.04	23.7	2.842	0.148	0.1636	
15 minute summer	SW7.00	7.000	SW5.04	2.6	0.831	0.116	0.0857	
1440 minute summer	SW5.04	5.004	SW1.09-TANK	9.5	0.432	0.027	0.6076	
1440 minute summer	SW1.09-TANK	1.009	SW1.10	15.2	0.495	0.051	3.2189	
15 minute summer	SW8.00	8.000	SW8.01	2.1	1.507	0.037	0.0144	
15 minute summer	SW8.01	8.001	SW8.02	9.4	1.225	0.057	0.2124	
1440 minute summer	SW8.02	8.002	SW1.10	1.9	0.458	0.036	0.0913	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute summer	SW1.10	1470	176.304	0.654	17.1	0.9353	0.0000	SURCHARGED
1440 minute summer	SW1.11-SEPARATOR	1470	176.304	0.664	17.1	0.7505	0.0000	SURCHARGED
1440 minute summer	SW1.12-FC	1470	176.304	0.694	17.0	0.9925	0.0000	SURCHARGED
1440 minute summer	SW1.13-OUTFALL	1470	176.320	0.730	17.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
1440 minute summer	SW1.10	1.010	SW1.11-SEPARATOR	17.1	0.356	0.084	0.3920	
1440 minute summer	SW1.11-SEPARATOR	1.011	SW1.12-FC	17.0	0.254	0.077	1.0243	
1440 minute summer	SW1.12-FC	1.012	SW1.13-OUTFALL	17.0	0.141	0.080	0.7307	320.4

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	179.730	0.080	15.0	0.0227	0.0000	OK
15 minute summer	SW1.01	10	179.557	0.097	20.1	0.0273	0.0000	OK
15 minute summer	SW2.00	10	179.696	0.096	22.9	0.0271	0.0000	OK
15 minute summer	SW1.02	10	179.220	0.145	64.0	0.2076	0.0000	OK
15 minute summer	SW1.03	10	179.036	0.166	83.5	0.2374	0.0000	OK
15 minute summer	SW3.00	10	179.922	0.062	13.1	0.0696	0.0000	OK
15 minute summer	SW1.04	10	178.789	0.148	138.6	0.2124	0.0000	OK
15 minute summer	SW1.05	10	177.603	0.113	146.9	0.1621	0.0000	OK
15 minute summer	SW4.00	10	177.255	0.065	7.1	0.0000	0.0000	OK
15 minute summer	SW4.01	10	176.954	0.044	7.1	0.0070	0.0000	OK
60 minute summer	SW4.02	38	176.494	0.109	12.4	0.1234	0.0000	OK
60 minute summer	SW1.06	39	176.494	0.444	151.5	0.6355	0.0000	OK
60 minute summer	SW1.07	40	176.481	0.541	152.4	0.7738	0.0000	SURCHARGED
60 minute summer	SW1.08	41	176.473	0.593	169.1	0.8490	0.0000	SURCHARGED
15 minute summer	SW5.00	11	179.570	0.070	9.0	0.0112	0.0000	OK
15 minute summer	SW5.01	11	179.514	0.344	22.0	0.3890	0.0000	SURCHARGED
15 minute summer	SW6.00	10	179.443	0.093	22.5	0.0264	0.0000	OK
15 minute summer	SW5.02	11	179.253	0.348	80.5	0.0553	0.0000	SURCHARGED
15 minute summer	SW5.03	11	178.970	0.130	89.6	0.0207	0.0000	OK
15 minute summer	SW7.00	10	177.572	0.072	10.1	0.0000	0.0000	OK
60 minute summer	SW5.04	41	176.471	0.571	79.6	0.8168	0.0000	SURCHARGED
60 minute summer	SW1.09-TANK	41	176.470	0.620	243.3	120.2319	0.0000	SURCHARGED
15 minute summer	SW8.00	10	179.660	0.040	8.2	0.0064	0.0000	OK
15 minute summer	SW8.01	10	178.587	0.072	36.3	0.0203	0.0000	OK
60 minute summer	SW8.02	40	176.452	0.552	29.3	0.0878	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	14.9	1.033	0.253	0.2130	
15 minute summer	SW1.01	1.001	SW1.02	19.9	1.290	0.335	0.1894	
15 minute summer	SW2.00	2.000	SW1.02	22.7	1.465	0.343	0.2881	
15 minute summer	SW1.02	1.002	SW1.03	63.6	1.311	0.196	0.9920	
15 minute summer	SW1.03	1.003	SW1.04	82.9	1.694	0.254	1.1098	
15 minute summer	SW3.00	3.000	SW1.04	13.0	1.957	0.329	0.1255	
15 minute summer	SW1.04	1.004	SW1.05	137.9	3.608	0.195	0.9290	
15 minute summer	SW1.05	1.005	SW1.06	146.5	1.642	0.143	1.2963	
15 minute summer	SW4.00	4.000	SW4.01	7.1	1.214	0.350	0.1271	
15 minute summer	SW4.01	4.001	SW4.02	7.0	1.674	0.171	0.0360	
60 minute summer	SW4.02	4.002	SW1.06	12.5	1.027	0.223	0.2732	
60 minute summer	SW1.06	1.006	SW1.07	148.9	1.164	0.730	4.3485	
60 minute summer	SW1.07	1.007	SW1.08	147.2	1.187	0.692	2.1838	
60 minute summer	SW1.08	1.008	SW1.09-TANK	165.7	2.214	0.540	0.5262	
15 minute summer	SW5.00	5.000	SW5.01	8.9	0.667	0.448	0.3376	
15 minute summer	SW5.01	5.001	SW5.02	21.1	1.201	1.061	0.2670	
15 minute summer	SW6.00	6.000	SW5.02	22.3	0.691	0.364	0.8847	
15 minute summer	SW5.02	5.002	SW5.03	80.3	2.252	1.380	0.1646	
15 minute summer	SW5.03	5.003	SW5.04	89.7	3.963	0.560	0.4439	
15 minute summer	SW7.00	7.000	SW5.04	10.0	1.207	0.454	0.2307	
60 minute summer	SW5.04	5.004	SW1.09-TANK	77.6	0.932	0.222	0.6247	
60 minute summer	SW1.09-TANK	1.009	SW1.10	91.5	0.839	0.310	3.2193	
15 minute summer	SW8.00	8.000	SW8.01	8.2	2.218	0.145	0.0382	
15 minute summer	SW8.01	8.001	SW8.02	36.2	1.638	0.222	0.6805	
60 minute summer	SW8.02	8.002	SW1.10	26.5	0.910	0.488	0.0913	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW1.10	41	176.449	0.799	104.7	1.1438	0.0000	SURCHARGED
60 minute summer	SW1.11-SEPARATOR	41	176.437	0.797	99.9	0.9012	0.0000	SURCHARGED
60 minute summer	SW1.12-FC	41	176.421	0.811	99.8	1.1600	0.0000	SURCHARGED
1440 minute summer	SW1.13-OUTFALL	1470	176.320	0.730	38.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW1.10	1.010	SW1.11-SEPARATOR	99.9	0.631	0.490	0.3920	
60 minute summer	SW1.11-SEPARATOR	1.011	SW1.12-FC	99.8	0.630	0.455	1.0243	
60 minute summer	SW1.12-FC	1.012	SW1.13-OUTFALL	99.8	1.292	0.470	0.3562	300.5

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	179.748	0.098	21.0	0.0277	0.0000	OK
15 minute summer	SW1.01	10	179.579	0.119	28.2	0.0335	0.0000	OK
15 minute summer	SW2.00	10	179.717	0.117	32.0	0.0332	0.0000	OK
15 minute summer	SW1.02	10	179.253	0.177	89.5	0.2540	0.0000	OK
15 minute summer	SW1.03	10	179.072	0.202	116.8	0.2885	0.0000	OK
15 minute summer	SW3.00	10	179.935	0.075	18.4	0.0850	0.0000	OK
15 minute summer	SW1.04	10	178.820	0.180	194.0	0.2579	0.0000	OK
30 minute summer	SW1.05	18	177.629	0.139	201.5	0.1988	0.0000	OK
15 minute summer	SW4.00	10	177.270	0.080	10.0	0.0000	0.0000	OK
30 minute summer	SW4.01	19	176.963	0.053	9.6	0.0085	0.0000	OK
30 minute summer	SW4.02	19	176.944	0.559	21.7	0.6324	0.0000	SURCHARGED
30 minute summer	SW1.06	19	176.926	0.876	262.4	1.2533	0.0000	SURCHARGED
60 minute summer	SW1.07	41	176.831	0.891	210.4	1.2756	0.0000	SURCHARGED
60 minute summer	SW1.08	41	176.820	0.940	239.0	1.3448	0.0000	SURCHARGED
15 minute summer	SW5.00	11	180.030	0.530	12.6	0.0843	0.0000	SURCHARGED
15 minute summer	SW5.01	11	179.916	0.746	28.2	0.8441	0.0000	SURCHARGED
15 minute summer	SW6.00	11	179.604	0.253	31.5	0.0717	0.0000	SURCHARGED
15 minute summer	SW5.02	11	179.476	0.571	109.7	0.0908	0.0000	SURCHARGED
15 minute summer	SW5.03	11	179.005	0.165	122.6	0.0262	0.0000	OK
15 minute summer	SW7.00	10	177.589	0.089	14.2	0.0000	0.0000	OK
60 minute summer	SW5.04	42	176.816	0.916	109.2	1.3106	0.0000	SURCHARGED
60 minute summer	SW1.09-TANK	42	176.815	0.965	344.1	187.0586	0.0000	SURCHARGED
15 minute summer	SW8.00	10	179.668	0.048	11.5	0.0077	0.0000	OK
15 minute summer	SW8.01	10	178.601	0.086	50.7	0.0243	0.0000	OK
60 minute summer	SW8.02	41	176.789	0.889	41.1	0.1413	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	20.9	1.107	0.354	0.2781	
15 minute summer	SW1.01	1.001	SW1.02	27.9	1.398	0.470	0.2449	
15 minute summer	SW2.00	2.000	SW1.02	31.7	1.588	0.480	0.3716	
15 minute summer	SW1.02	1.002	SW1.03	89.0	1.406	0.275	1.2949	
15 minute summer	SW1.03	1.003	SW1.04	116.0	1.832	0.355	1.4414	
15 minute summer	SW3.00	3.000	SW1.04	18.2	2.129	0.463	0.1621	
15 minute summer	SW1.04	1.004	SW1.05	193.3	3.917	0.273	1.1997	
30 minute summer	SW1.05	1.005	SW1.06	200.9	1.683	0.196	1.4421	
15 minute summer	SW4.00	4.000	SW4.01	9.9	1.354	0.492	0.1602	
30 minute summer	SW4.01	4.001	SW4.02	9.6	1.739	0.235	0.0997	
30 minute summer	SW4.02	4.002	SW1.06	18.8	1.035	0.334	0.3732	
30 minute summer	SW1.06	1.006	SW1.07	256.3	1.618	1.258	4.3539	
60 minute summer	SW1.07	1.007	SW1.08	208.4	1.315	0.980	2.1838	
60 minute summer	SW1.08	1.008	SW1.09-TANK	236.9	2.366	0.771	0.5262	
15 minute summer	SW5.00	5.000	SW5.01	11.8	0.669	0.591	0.4621	
15 minute summer	SW5.01	5.001	SW5.02	28.0	1.588	1.407	0.2670	
15 minute summer	SW6.00	6.000	SW5.02	30.1	0.814	0.491	1.2726	
15 minute summer	SW5.02	5.002	SW5.03	109.6	2.872	1.884	0.1833	
15 minute summer	SW5.03	5.003	SW5.04	122.5	4.190	0.764	0.5725	
15 minute summer	SW7.00	7.000	SW5.04	14.0	1.308	0.637	0.2988	
60 minute summer	SW5.04	5.004	SW1.09-TANK	107.1	1.017	0.307	0.6247	
60 minute summer	SW1.09-TANK	1.009	SW1.10	111.8	0.837	0.378	3.2193	
15 minute summer	SW8.00	8.000	SW8.01	11.5	2.428	0.203	0.0489	
15 minute summer	SW8.01	8.001	SW8.02	50.6	1.758	0.311	0.7250	
60 minute summer	SW8.02	8.002	SW1.10	38.9	0.979	0.717	0.0913	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW1.10	41	176.784	1.134	122.4	1.6231	0.0000	SURCHARGED
60 minute summer	SW1.11-SEPARATOR	41	176.766	1.125	122.3	1.2729	0.0000	SURCHARGED
60 minute summer	SW1.12-FC	41	176.741	1.131	122.2	1.6183	0.0000	SURCHARGED
1440 minute summer	SW1.13-OUTFALL	1470	176.320	0.730	53.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW1.10	1.010	SW1.11-SEPARATOR	122.3	0.772	0.600	0.3920	
60 minute summer	SW1.11-SEPARATOR	1.011	SW1.12-FC	122.2	0.772	0.557	1.0243	
60 minute summer	SW1.12-FC	1.012	SW1.13-OUTFALL	122.1	1.357	0.576	0.4150	421.3

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.33%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	179.742	0.092	18.9	0.0260	0.0000	OK
15 minute summer	SW1.01	10	179.571	0.111	25.4	0.0315	0.0000	OK
15 minute summer	SW2.00	10	179.710	0.110	28.9	0.0312	0.0000	OK
15 minute summer	SW1.02	10	179.242	0.167	80.8	0.2385	0.0000	OK
15 minute summer	SW1.03	10	179.060	0.190	105.4	0.2716	0.0000	OK
15 minute summer	SW3.00	10	179.931	0.071	16.6	0.0799	0.0000	OK
15 minute summer	SW1.04	10	178.810	0.170	175.2	0.2429	0.0000	OK
15 minute summer	SW1.05	10	177.618	0.128	185.9	0.1826	0.0000	OK
15 minute summer	SW4.00	10	177.265	0.075	9.0	0.0000	0.0000	OK
15 minute summer	SW4.01	9	176.958	0.048	8.9	0.0077	0.0000	OK
30 minute summer	SW4.02	19	176.798	0.413	19.7	0.4666	0.0000	SURCHARGED
30 minute summer	SW1.06	19	176.782	0.732	239.6	1.0473	0.0000	SURCHARGED
60 minute summer	SW1.07	41	176.730	0.790	195.2	1.1298	0.0000	SURCHARGED
60 minute summer	SW1.08	41	176.719	0.839	221.4	1.2009	0.0000	SURCHARGED
15 minute summer	SW5.00	11	179.866	0.366	11.4	0.0582	0.0000	SURCHARGED
15 minute summer	SW5.01	11	179.769	0.599	25.7	0.6771	0.0000	SURCHARGED
15 minute summer	SW6.00	11	179.474	0.124	28.4	0.0350	0.0000	OK
15 minute summer	SW5.02	11	179.395	0.490	99.5	0.0779	0.0000	SURCHARGED
15 minute summer	SW5.03	11	178.992	0.152	111.3	0.0242	0.0000	OK
15 minute summer	SW7.00	10	177.583	0.083	12.8	0.0000	0.0000	OK
60 minute summer	SW5.04	42	176.716	0.815	101.1	1.1670	0.0000	SURCHARGED
60 minute summer	SW1.09-TANK	42	176.715	0.865	318.7	167.6157	0.0000	SURCHARGED
15 minute summer	SW8.00	10	179.666	0.046	10.4	0.0073	0.0000	OK
15 minute summer	SW8.01	10	178.596	0.081	45.8	0.0230	0.0000	OK
60 minute summer	SW8.02	41	176.691	0.791	37.8	0.1258	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	18.8	1.084	0.318	0.2558	
15 minute summer	SW1.01	1.001	SW1.02	25.2	1.365	0.424	0.2262	
15 minute summer	SW2.00	2.000	SW1.02	28.7	1.550	0.433	0.3437	
15 minute summer	SW1.02	1.002	SW1.03	80.4	1.377	0.248	1.1932	
15 minute summer	SW1.03	1.003	SW1.04	104.8	1.785	0.321	1.3306	
15 minute summer	SW3.00	3.000	SW1.04	16.5	2.077	0.417	0.1499	
15 minute summer	SW1.04	1.004	SW1.05	174.5	3.824	0.247	1.1085	
15 minute summer	SW1.05	1.005	SW1.06	185.4	1.645	0.181	1.4087	
15 minute summer	SW4.00	4.000	SW4.01	8.9	1.319	0.443	0.1483	
15 minute summer	SW4.01	4.001	SW4.02	8.9	1.736	0.217	0.0959	
30 minute summer	SW4.02	4.002	SW1.06	17.5	1.010	0.310	0.3732	
30 minute summer	SW1.06	1.006	SW1.07	234.8	1.482	1.152	4.3539	
60 minute summer	SW1.07	1.007	SW1.08	193.3	1.220	0.909	2.1838	
60 minute summer	SW1.08	1.008	SW1.09-TANK	219.5	2.319	0.714	0.5262	
15 minute summer	SW5.00	5.000	SW5.01	10.9	0.683	0.547	0.4621	
15 minute summer	SW5.01	5.001	SW5.02	25.7	1.461	1.294	0.2670	
15 minute summer	SW6.00	6.000	SW5.02	27.2	0.797	0.443	0.9941	
15 minute summer	SW5.02	5.002	SW5.03	99.6	2.668	1.712	0.1768	
15 minute summer	SW5.03	5.003	SW5.04	111.3	4.130	0.695	0.5282	
15 minute summer	SW7.00	7.000	SW5.04	12.6	1.277	0.575	0.2758	
60 minute summer	SW5.04	5.004	SW1.09-TANK	99.2	0.991	0.284	0.6247	
60 minute summer	SW1.09-TANK	1.009	SW1.10	106.3	0.835	0.360	3.2193	
15 minute summer	SW8.00	8.000	SW8.01	10.4	2.364	0.184	0.0454	
15 minute summer	SW8.01	8.001	SW8.02	45.7	1.723	0.281	0.7117	
60 minute summer	SW8.02	8.002	SW1.10	35.8	0.899	0.659	0.0913	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.33%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW1.10	41	176.687	1.037	116.3	1.4842	0.0000	SURCHARGED
60 minute summer	SW1.11-SEPARATOR	41	176.670	1.030	116.2	1.1652	0.0000	SURCHARGED
60 minute summer	SW1.12-FC	42	176.648	1.038	116.1	1.4855	0.0000	SURCHARGED
1440 minute summer	SW1.13-OUTFALL	1470	176.320	0.730	48.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW1.10	1.010	SW1.11-SEPARATOR	116.2	0.733	0.570	0.3920	
60 minute summer	SW1.11-SEPARATOR	1.011	SW1.12-FC	116.1	0.733	0.529	1.0243	
60 minute summer	SW1.12-FC	1.012	SW1.13-OUTFALL	116.1	1.341	0.547	0.3992	387.6

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.55%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	179.767	0.117	27.5	0.0330	0.0000	OK
15 minute summer	SW1.01	10	179.602	0.142	37.0	0.0401	0.0000	OK
15 minute summer	SW2.00	10	179.740	0.140	41.9	0.0396	0.0000	OK
15 minute summer	SW1.02	10	179.286	0.211	117.2	0.3016	0.0000	OK
15 minute summer	SW1.03	10	179.108	0.237	153.0	0.3398	0.0000	OK
15 minute summer	SW3.00	10	179.949	0.089	24.0	0.1007	0.0000	OK
15 minute summer	SW1.04	10	178.844	0.204	254.1	0.2914	0.0000	OK
30 minute summer	SW1.05	19	177.728	0.238	266.3	0.3404	0.0000	OK
30 minute summer	SW4.00	20	177.614	0.424	12.7	0.0000	0.0000	FLOOD RISK
30 minute summer	SW4.01	19	177.529	0.619	12.3	0.0984	0.0000	FLOOD RISK
30 minute summer	SW4.02	19	177.497	1.112	25.5	1.2574	0.0000	SURCHARGED
30 minute summer	SW1.06	19	177.469	1.419	337.1	2.0305	0.0000	SURCHARGED
60 minute summer	SW1.07	41	177.262	1.322	276.9	1.8915	0.0000	SURCHARGED
60 minute summer	SW1.08	42	177.244	1.364	314.9	1.9525	0.0000	SURCHARGED
15 minute summer	SW5.00	12	180.786	1.286	16.5	0.2045	0.0000	FLOOD RISK
15 minute summer	SW5.01	12	180.604	1.433	34.7	1.6213	0.0000	FLOOD RISK
15 minute summer	SW6.00	11	180.170	0.820	41.2	0.2319	0.0000	SURCHARGED
15 minute summer	SW5.02	11	179.975	1.070	139.8	0.1702	0.0000	SURCHARGED
15 minute summer	SW5.03	11	179.321	0.481	152.2	0.0765	0.0000	SURCHARGED
15 minute summer	SW7.00	10	177.607	0.107	18.5	0.0000	0.0000	OK
60 minute summer	SW5.04	43	177.238	1.338	144.3	1.9151	0.0000	SURCHARGED
60 minute summer	SW1.09-TANK	43	177.237	1.387	453.5	268.8361	0.0000	SURCHARGED
15 minute summer	SW8.00	10	179.676	0.056	15.1	0.0089	0.0000	OK
15 minute summer	SW8.01	10	178.615	0.100	66.5	0.0282	0.0000	OK
60 minute summer	SW8.02	42	177.201	1.300	54.7	0.2068	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	27.4	1.161	0.463	0.3467	
15 minute summer	SW1.01	1.001	SW1.02	36.6	1.484	0.616	0.3025	
15 minute summer	SW2.00	2.000	SW1.02	41.6	1.684	0.628	0.4586	
15 minute summer	SW1.02	1.002	SW1.03	116.6	1.483	0.360	1.6102	
15 minute summer	SW1.03	1.003	SW1.04	152.0	2.010	0.465	1.7395	
15 minute summer	SW3.00	3.000	SW1.04	23.8	2.261	0.604	0.1991	
15 minute summer	SW1.04	1.004	SW1.05	254.3	3.895	0.360	1.7500	
30 minute summer	SW1.05	1.005	SW1.06	263.2	1.937	0.256	1.7556	
30 minute summer	SW4.00	4.000	SW4.01	12.3	1.391	0.609	0.3830	
30 minute summer	SW4.01	4.001	SW4.02	12.5	1.751	0.306	0.1513	
30 minute summer	SW4.02	4.002	SW1.06	25.1	1.029	0.445	0.3732	
30 minute summer	SW1.06	1.006	SW1.07	329.4	2.079	1.616	4.3539	
60 minute summer	SW1.07	1.007	SW1.08	274.1	1.730	1.289	2.1838	
60 minute summer	SW1.08	1.008	SW1.09-TANK	312.0	2.509	1.016	0.5262	
15 minute summer	SW5.00	5.000	SW5.01	15.8	0.896	0.792	0.4621	
15 minute summer	SW5.01	5.001	SW5.02	37.1	2.109	1.868	0.2670	
15 minute summer	SW6.00	6.000	SW5.02	38.7	0.973	0.630	1.2726	
15 minute summer	SW5.02	5.002	SW5.03	134.4	3.380	2.310	0.2057	
15 minute summer	SW5.03	5.003	SW5.04	149.1	4.334	0.930	0.7052	
15 minute summer	SW7.00	7.000	SW5.04	18.3	1.378	0.831	0.3701	
60 minute summer	SW5.04	5.004	SW1.09-TANK	141.5	1.094	0.405	0.6247	
60 minute summer	SW1.09-TANK	1.009	SW1.10	132.9	0.839	0.450	3.2193	
15 minute summer	SW8.00	8.000	SW8.01	15.1	2.605	0.267	0.0598	
15 minute summer	SW8.01	8.001	SW8.02	66.4	2.018	0.408	0.7661	
60 minute summer	SW8.02	8.002	SW1.10	51.8	1.303	0.955	0.0913	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.55%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW1.10	42	177.194	1.544	145.6	2.2100	0.0000	SURCHARGED
60 minute summer	SW1.11-SEPARATOR	42	177.168	1.528	145.4	1.7280	0.0000	SURCHARGED
60 minute summer	SW1.12-FC	42	177.133	1.523	145.4	2.1796	0.0000	SURCHARGED
1440 minute summer	SW1.13-OUTFALL	1470	176.320	0.730	69.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW1.10	1.010	SW1.11-SEPARATOR	145.4	0.918	0.714	0.3920	
60 minute summer	SW1.11-SEPARATOR	1.011	SW1.12-FC	145.4	0.917	0.662	1.0243	
60 minute summer	SW1.12-FC	1.012	SW1.13-OUTFALL	145.3	1.412	0.685	0.4742	562.6

SPEL ESR Bypass

Treatment System

Overview

The SPEL ESR Bypass Treatment System treats flows up to and including the 1 in 1 year return events (27mm/h) in line with guidence from the CIRIA SuDS Manual (C753).

The SPEL ESR Bypass System is fully certified to meet the CIRIA SuDS Mitigation Index. It has been tested by WRc to the British Water Code of Practice for Manufactured Treatment Devices. This unit is also certified to the British and European Standard BS EN 858 by HR Wallingford.

SPEL's ESR range is a total treatment system removing Hydrocarbons, Total Suspended Solids (TSS) and Metals. It's a highly efficient, single unit, water quality SuDS component.

Product Range

200 Series
(1.2m internal diameter):
Treated Flow Rate: 10-15 l/s
Catchment Area: 1,333m^2 - 2,000m^2

300 Series
(1.8m internal diameter):
Treated Flow Rate: 20-50 l/s
Catchment Area: 2,665m^2 - 6,665m^2

400 Series
(2.6m internal diameter):
Treated Flow Rate: 60-160 l/s
Catchment Area: 8,000m^2 - 21,333m^2

500 Series
(3.5m internal diameter):
Treated Flow Rate: 180-250 l/s
Catchment Area: 24,000m^2 - 33,333m^2

600 Series
(4m internal diameter):
Treated Flow Rate: 300-700 l/s
Catchment Area: 40,000m^2 - 93,333m^2

Applications

The ESR Bypass Treatment System will treat up to the 1 in 1 year storm event for surface water run-off to a Pollution Hazard Index of 'Medium'.

This covers surfaces such as:

Roofs

Private and public car parks

Residential roads and drives

Low and medium use roads

Commercial yards and delivery areas

The ESR Bypass Treatment System can be used as part of a treatment train to achieve a 'High' Mitigation Index. (See other SPEL SuDS treatment systems).

Shell Design

Designed with reference to BS EN 13121. All tank shells carry the SPEL 25 Year Warranty and life expectancy in excess of 50 years.

Shell Specifications

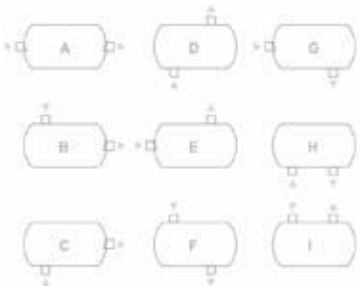
Different tank shell specifications are available dependent upon tank invert levels, ground conditions and ground water levels. (See Section 7)

Inlet/Outlet Connections

160/225/300mm diameter PVCU socket/spigot.

450, 600, 750, 900 and 1200mm diameter GRP spigot available, for connecting to site pipework via Flex-Seal/Band-Seal or similar flexible couplings.

The nine inlet/outlet options below are available to assist with design and installation.



This graphic shows indicative locations only. For accurate location, please contact our technical team.

SPEL ESR Bypass Treatment System

Stormwater Treatment System

The SPEL ESR Bypass Treatment System is fully certified to meet the CIRIA SuDS Mitigation Index. It has been tested by WRc to the British Water Code of Practice for Manufactured Treatment Devices. This unit is also certified to the British and European Standard BS EN 858.

SPEL's ESR range is a total treatment system removing Hydrocarbons, Total Suspended Solids (TSS) and Metals. It's a highly efficient, single unit, water quality SuDS component.

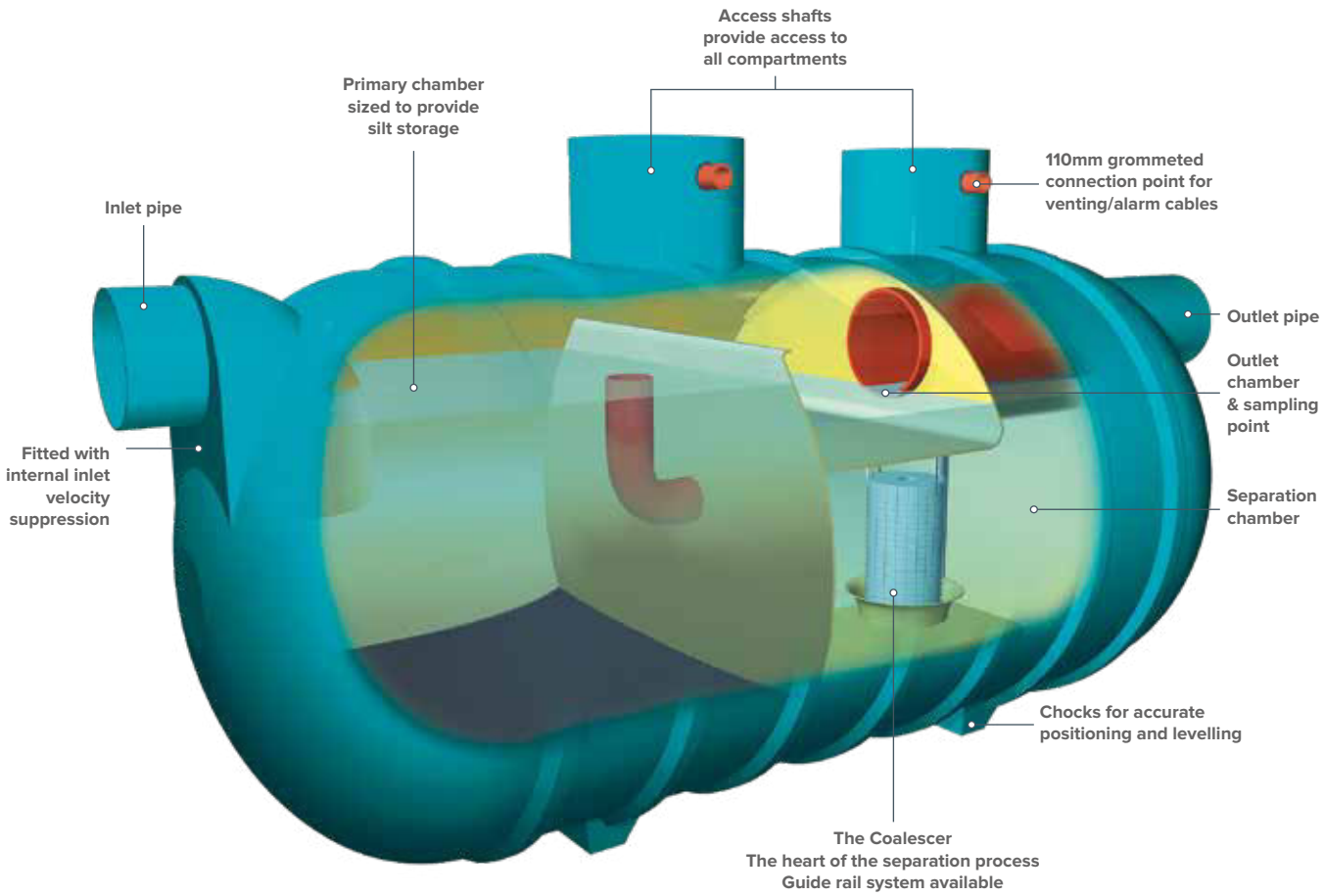
The coalescer inserts are easy to clean and simple to replace but rarely require replacing. The unique 'insert' format ensures that this unit can be extracted complete every time, compared to other systems where 'wrap around' style units allow the foam to slip off, requiring confined space entry to retrieve.

SPEL ESR Bypass Treatment System
Certified Mitigation Index

TSS	0.8
Metals	0.6
Hydrocarbons	0.9*

**H R Wallingford test results to BS EN 858*

The total treatment solution for SuDS



SPEL ESR Bypass Treatment System

Testing and Certification

Research and development is at the heart of what we do at SPEL, our passion as Zero Pollution Ambassadors is to be at the cutting edge of clean surface water technology.

Months of rigorous testing has resulted in the SPEL ESR Range.

Surface Water Treatment Device Performance Declaration

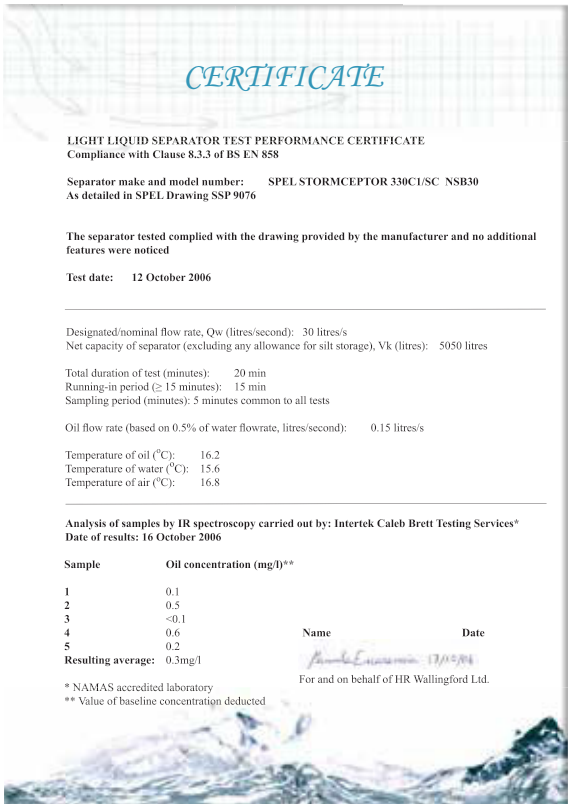
Testing carried out according to British Water Code of Practice

Product Details	Description
Manufacturer	SPEL Products
Treatment Device Name/Model	Stormceptor Type 210 C1/SC
General description	Class 1 By-pass Separator with Silt Capacity
Envisaged application	Treatment of Surface Water Run-off
Pollutant(s) captured	Suspended Solids

Test	Value	Unit
Treatment device capacity	3200	litres
Sediment Storage capacity	1000	litres
Treatment Flow rate	10	l/s
Connected Area	1,333	m²
Pollution retention flow rate	10	l/s

Parameter	Value	Unit
Maximum capacity flow rate	100	l/s
Device head loss (at treatment flowrate)	0.15	m
Device head loss (at maximum capacity treatment flowrate)	-	m
TSS capture and retention efficiency (Milisil W4 test sediment)	**82**	**%**
Zinc capture efficiency (if tested)	Not tested for dissolved metals	%
Zinc retention efficiency (if tested)	Not tested for dissolved metals	%
Copper capture efficiency (if tested)	Not tested for dissolved metals	%
Copper retention efficiency (if tested)	Not tested for dissolved metals	%
Dissolved Metals reduction	0.0	%
Particulate metals reduction*	61.5*	%
Total Metals reduction*	61.5*	%
Total Metals Mitigation Index	0.615*	-

* Extrapolated value in accordance with British Water How to Guide: Applying the CIRIA The SuDS Manual (C753) Simple Index Approach to Proprietary / Manufactured Stormwater Treatment Devices. Version 7, Section 4.3, (2021- under pre-publication review).



CERTIFICATE

LIGHT LIQUID SEPARATOR TEST PERFORMANCE CERTIFICATE
Compliance with Clause 8.3.3 of BS EN 858

Separator make and model number: SPEL STORMCEPTOR 330C1/SC NSB30
As detailed in SPEL Drawing SSP 9076

The separator tested complied with the drawing provided by the manufacturer and no additional features were noticed

Test date: 12 October 2006

Designated/nominal flow rate, Qw (litres/second): 30 litres/s
Net capacity of separator (excluding any allowance for silt storage), Vk (litres): 5050 litres

Total duration of test (minutes): 20 min
Running-in period (≥ 15 minutes): 15 min
Sampling period (minutes): 5 minutes common to all tests

Oil flow rate (based on 0.5% of water flowrate, litres/second): 0.15 litres/s

Temperature of oil (°C): 16.2
Temperature of water (°C): 15.6
Temperature of air (°C): 16.8

Analysis of samples by IR spectroscopy carried out by: Intertek Caleb Brett Testing Services*
Date of results: 16 October 2006

Sample	Oil concentration (mg/l)**
1	0.1
2	0.5
3	<0.1
4	0.6
5	0.2
Resulting average:	0.3mg/l

Name Date

For and on behalf of HR Wallingford Ltd.

* NAMAS accredited laboratory
** Value of baseline concentration deducted

SPEL's Head of Technical Development alongside the WRc testing officer.

SPEL ESR Bypass Treatment System

Specification Chart

As directed by the SuDS Manual, treatment trains should be sized according to the **connectible area**, see column 5 below.

Model	Series	Treated Flow Rate	Maximum Flow	Connectible/ Catchment area (m^2)*	Oil Storage (litres)	Silt Capacity (litres)	Tank Length (mm)	Internal Diameter (mm)	Inlet Invert (mm)	Base to Inlet (mm)	Base to Outlet (mm)	Optimum in/out pipe diameter** (mm)	Number of Access Shafts A-C*** (dia. mm)			
							L		A	B	C		600	750	900	1200
210C1/ESR	200	10	100	**1,333**	150	1,000	2,920	1,220	550	1,350	1,300	300	-	1	-	-
212C1/ESR	200	12	120	**1,600**	180	1200	3,570	1,220	550	1,350	1,300	300	-	1	-	-
215C1/ESR	200	15	150	**2,000**	225	1,500	4,237	1,220	550	1,350	1,300	300	-	1	-	-
320C1/ESR	300	20	200	**2,665**	300	2,000	3,200	1,800	700	1,450	1,350	450	2	-	-	-
325C1/ESR	300	25	250	**3,333**	375	2,500	3,535	1,800	700	1,450	1,350	450	2	-	-	-
330C1/ESR	300	30	300	**4,000**	450	3,000	4,420	1,800	700	1,450	1,350	450	-	1	1	-
340C1/ESR	300	40	400	**5,333**	600	4,000	5,760	1,800	740	1,410	1,310	450	1	1	-	-
345C1/ESR	300	45	450	**6,000**	675	4,500	6,563	1,800	740	1,410	1,310	450	1	1	-	-
350/C1/ESR	300	50	500	**6,665**	750	5,000	7,060	1,800	740	1,410	1,310	450	1	1	-	-
460C1/ESR	400	60	600	**8,000**	900	6,000	4,400	2,600	950	2,100	2,000	600	-	1	1	-
470C1/ESR	400	70	700	**9,333**	1,050	7,000	5,250	2,600	950	2,100	2,000	600	-	1	1	-
480C1/ESR	400	80	800	**10,665**	1,200	8,000	6,170	2,600	950	2,100	2,000	600	-	1	1	-
4100C1/ESR	400	100	1,000	**13,333**	1,500	10,000	7,400	2,600	1,100	1,950	1,850	750	-	1	1	-
4125C1/ESR	400	125	1,250	**16,665**	1,875	12,500	9,000	2,600	1,100	1,950	1,850	750	-	1	1	-
4150C1/ESR	400	150	1,500	**20,000**	2,250	15,000	9,930	2,600	1,100	1,950	1,850	750	-	-	2	-
4160C1/ESR	400	160	1,600	**21,333**	2,400	16,000	11,830	2,600	1,250	1,950	1,850	750	-	1	2	-
5180C1/ESR	500	180	1,800	**24,000**	2,700	18,000	7,472	3,500	1,185	2,690	2,550	900	-	1	2	-
5200C1/ESR	500	200	2,000	**26,665**	3,000	20,000	8,530	3,500	1,185	2,425	2,325	1,200	1	1	2	-
5250C1/ESR	500	250	2,500	**33,333**	3,750	25,000	10,040	3,500	1,185	2,425	2,325	1,200	2	1	2	-
6300C1/ESR	600	300	3,000	**40,000**	4,500	30,000	10,310	4,000	1,325	2,850	2,675	1,200	1	1	2	-
6350C1/ESR	600	350	3,500	**46,665**	5,250	35,000	11,499	4,000	1,325	2,850	2,675	1,200	-	2	3	-
6400C1/ESR	600	400	4,000	**53,333**	6,000	40,000	12,690	4,000	1,325	2,850	2,675	1,200	-	2	3	-
6500C1/ESR	600	500	5,000	**66,665**	7,500	50,000	15,880	4,000	1,325	2,850	2,675	1,200	-	2	4	-
6600C1/ESR	600	600	6,000	**80,000**	9,000	60,000	18,256	4,000	1,325	2,850	2,675	1,200	2	1	4	-
6700C1/ESR	600	700	7,000	**93,333**	10,500	70,000	22,250	4,000	1,325	2,850	2,675	1,200	-	2	5	-

These connectible/catchment areas are based on the SuDS Manual requirement for bypass devices to treat the 1 in 1 year storm event (27mm).

***SPEL ESR Bypass Treatment Systems are designed for a maximum flow (NS/NSB) but can be fitted with larger than the recommended maximum connection size IN/OUT or with the addition of adapters providing the maximum flow (NS/NSB) cannot be exceeded or any increase in the operating level in the SPEL Separator to cause the captured pollutants to escape into the vent connections or through access shaft connections. Any overriding of the above criteria could jeopardise performance to the European Standard BS EN 858-1.*

****D-I configurations available upon request.*

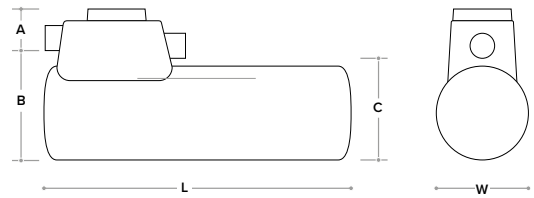
Shell Specification

The 'standard' specification is normally adequate for most installations but Heavy, Extra Heavy, Special, Extra Special, Ultra and Ultra Plus specifications are available depending upon the burial depth and water table level, in winter. The concern is when the system is emptied completely and remains empty for a period of time.

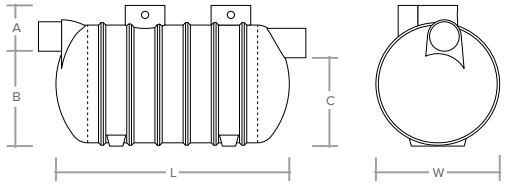
For more information and to see burial depth charts see Section 7.

200 Series ESR – Inside diameter 1200mm, outside diameter 1225mm.
300 Series ESR – Inside diameter 1800mm, outside diameter 1875mm.
400 Series ESR – Inside diameter 2600mm, outside diameter 2700mm.
500 Series ESR – Inside diameter 3500mm, outside diameter 3650mm.
600 Series ESR – Inside diameter 4000mm, outside diameter 4150mm.

200 series



300/400/500 & 600 series



SPEL ESR Bypass Treatment System

Components and Accessories

SPEL Coalescer Guide Rail Systems

To facilitate easy insertion of coalescer units, the optional SPEL guide rail system manufactured in stainless steel can be incorporated into SPEL ESR Bypass Treatment Systems.

Brackets fixed to the top and bottom of the coalescer unit simply engage with the stainless steel guide rail which is fixed to the top of the stub access shaft. The coalescer unit is then lowered in the normal way, being guided at the correct angle into the conical base.

Lifting chains are available for the larger coalescer units and where extension shafts are fitted.

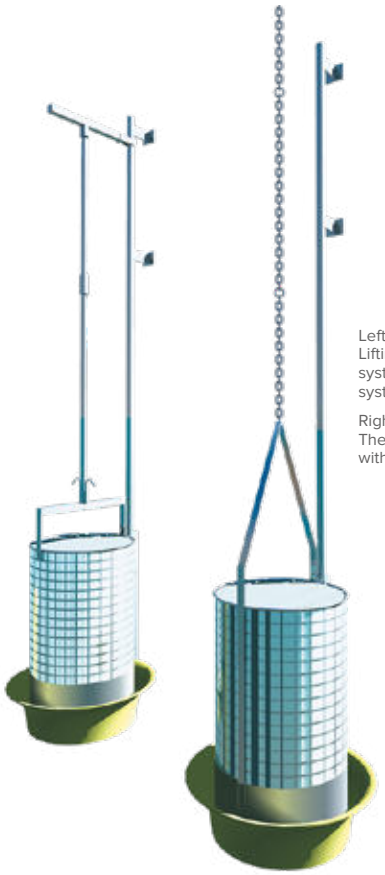
Extension guide rails can be incorporated into SPEL extension shafts to suit.

SPEL Coalescer Lifting, Locating and Locking system (3L)

Where SPEL ESR Systems can be subjected to surcharging and/or tidal outfall, then the SPEL 3L system should be included.

The SPEL Lifting, Locating and Locking system is manufactured in stainless steel and replaces the standard coalescer unit handle.

The locating/locking handle ensures the coalescer unit is seated and locked in its correct position.

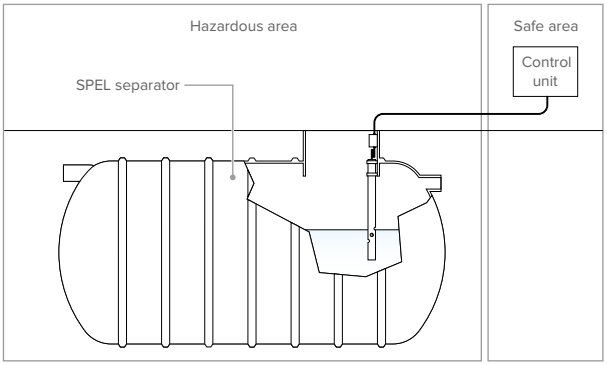


Left:
Lifting, locating and locking system with guide rail system.

Right:
The SPEL coalescer unit with lifting chain.

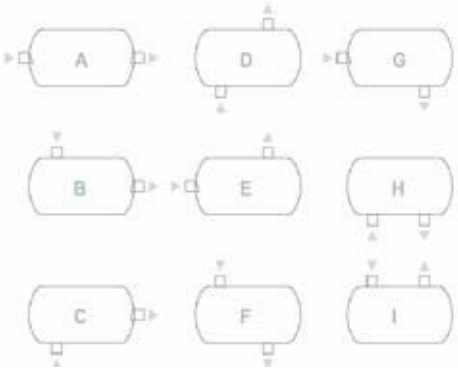
SPEL Automatic Monitoring Alarms

SPEL offer a range of alarms, for full details refer to the SPEL Data Manual Section 8.



SPEL ESR Range Inlet/Outlet Orientation

Dependent upon model and diameter of connections, these nine different orientations are available. However on the larger models it is important to check with our technical department.



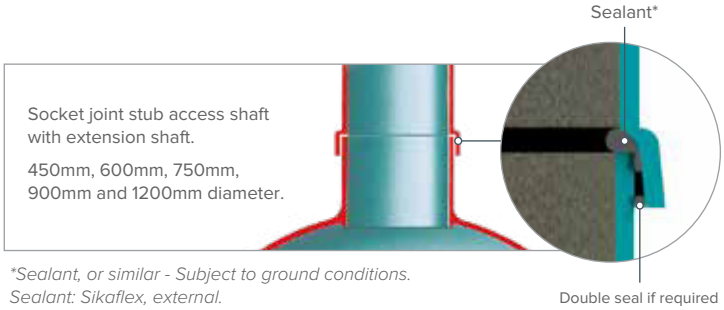
This graphic shows indicative locations only. For accurate location, please contact our technical team.

SPEL ESR Bypass Treatment System

Components and Accessories

SPEL extension access shafts

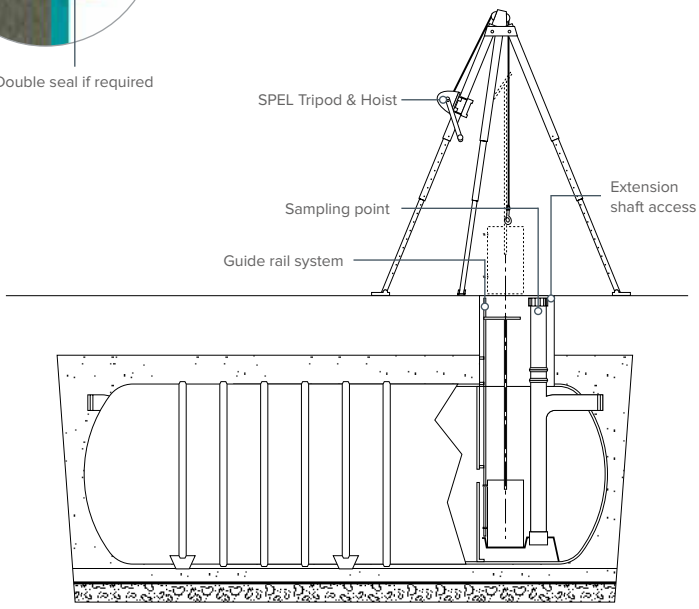
Extension access shafts are available for deep invert applications.



**Sealant, or similar - Subject to ground conditions.*
Sealant: Sikaflex, external.

SPEL tripod and hoist

Where surface water run-off has a high silt content the coalescer units can become filled, making them heavy to lift out. In order to facilitate easy withdrawal of coalescer units the SPEL tripod and hoist is recommended.



A SPEL P400 1CSC undergoing a routine service.