Flood & Water Management Act 2010

Section 19 Flood Investigation Report
FI0086

Location: Broughton, Flintshire
Incident Date: October 2023

CYNGOR
Sir y Fflint
Flintshire
COUNTY COUNCIL

Document Control Sheet

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Revision History

Date	Version Number	Summary of Changes
02/05/2024	Draft Report 1	NA
11/07/2024	Version 2	First issue following FCC review
10/07/2025	Version 3	Updated to document feedback from Risk Management Authorities
01/09/2025	Final Version	Final edits made by the LLFA

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Executive Summary

This report has been prepared for the purpose of meeting the requirements of Section 19 of the Flood and Water Management Act 2010. Under Section 19 of the Flood and Water Management Act 2010, the Lead Local Flood Authority (Flintshire County Council) on becoming aware of a flood in its area must, to the extent it considers necessary or appropriate, investigate, prepare and publish a Flood Investigation Report.

As a Lead Local Flood Authority (LLFA), it is the responsibility of Flintshire County Council (FCC) to manage the local flood risk from surface water, groundwater and ordinary watercourses such as streams and ditches (including lakes and ponds).

Section 19 of the Flood and Water Management Act 2010 states:

"On becoming aware of a flood in its area, a lead local flood authority must to the extent it considers necessary or appropriate, investigate –

(a) Which risk management authorities have relevant flood risk management functions, and
(b) Whether each of those risk management authorities has exercised, or is intending to exercise, those functions in response to the flood"

The flood risk management authorities in Flintshire are:

- Flintshire County Council
- Flintshire's Environment Department
- Natural Resources Wales
- Dwr Cymru / Welsh Water

The relevant Flood Risk Management Authority for this event is Flintshire County Council as flooding was mainly attributed to an 'ordinary watercourse'. Internal flooding to a single residential property warrants that the incident should be investigated, and a report prepared in accordance with the Council's Local Flood Risk Management Strategy (LFRMS):[1]

In October 2023, Storm Babet brought periods of heavy rainfall across large areas of the United Kingdom. The Met Office reported that the 18th to the 21st of October saw "the third-wettest independent 3-day period for England and Wales in a series from 1891".

Representatives of Waterco Ltd, on behalf of FCC, have carried out community engagement and communicated with relevant stakeholders to gain an understanding of the nature of the October 2023 flood event. This Report provides details of the flooding incident.

Across Broughton, there were 26 reports of internal flooding. The majority of the internal flooding incidents can be attributed to the exceedance of a culvert beneath Mold Road. Other reports of internal flooding have been attributed to exceedance of drainage systems, including highway gullies.

[1] https://www.flintshire.gov.uk/en/PDFFiles/Flooding-and-Drainage/Flintshire-Local-Flood-Risk-Management-Strategy.pdf.

Table 1 sets out the recommended actions required to reduce the flooding, and the stakeholder required to undertake each action.

Table 1 - Recommendations to Address Flooding

Ref	Stakeholder	Action
01	FCC Highways Authority	Review the frequency of gully cleansing in affected areas, for example on the Rowans.
02	FCC Highways Authority & LLFA	Inspect the existing culvert inlet FCC Asset Ref No: AM0060. NGR: 333346, 363367 (Mold Road) on a frequent basis, remove debris as required.
03	FCC Highways Authority & LLFA	Undertake a CCTV condition survey of the Mold Road culvert to review the existing condition/siltation. Plan to take any remedial actions as required.
04	FCC LLFA	Communicate with local communities to raise awareness of property level flood resilience measures that can be implemented to help mitigate flood risk
05	FCC LLFA	Investigate implementing natural flood management upstream of the Mold Road culvert inlet FCC Asset Ref No: AM0060. NGR: 333346, 363367.
06	DCWW	Review customer complaints and investigate the associated sections of public sewer system to remove any blockage / significant debris following the October 2023 event.
07	North and Mid-Wales Trunk Road Agent	Inspect the inlet of the A55 0060 C50 Broughton culvert on a frequent basis to ensure it is free of blockage / debris.
08	North and Mid-Wales Trunk Road Agent	CCTV the A55 0120 C10 Pentrobin Culvert to ensure the culvert is free of blockage and any significant siltation. Take remedial action as required.
09	Broughton & Bretton Flood Action Group	Continue to engage with residents to help raise awareness of local issues surrounding flooding.
10	Property owners / residents	Consider the implementation of property level flood resilience measures. These could include; the installation of non-return valves to prevent ingress of floodwater on private drainage systems and installing flood barriers or flood doors.

1.0 Introduction

1.1 Since the introduction of the Flood and Water Management Act 2010 (FWMA) Flintshire County Council (FCC) is the designated Lead Local Flood Authority (LLFA).

1.2 Under Section 19 of the FWMA, Flintshire County Council as the LLFA on becoming aware of a flood in its area must, to the extent that it considers necessary or appropriate, investigate and prepare a report.

1.3 Where a LLFA carries out an investigation then the report must be published, and any relevant risk management authorities notified.

1.4 Waterco have been commissioned by FCC to carry out a Flood Investigation Report in relation to flooding in Broughton during Storm Babet which occurred in October 2023. Storm Babet caused internal and external flooding to residential properties in Broughton.

1.5 The purpose of this Section 19 (S19) Flood Investigation Report is to identify the cause of internal flooding to properties in Broughton during the October 2023 flood event. This report will provide an overview of flooding mechanisms, identify relevant Risk Management Authorities and stakeholders, and provide a list of recommendations.

1.6 The opinions expressed in this report and the comments and recommendations given are based on an assessment of available information.

1.7 The information, views and conclusions drawn are based, in part, on information supplied to Waterco by other parties. Waterco has proceeded in good faith on the assumption that this information is accurate. Waterco accepts no liability for any inaccurate conclusions, assumptions or actions taken resulting from any inaccurate information supplied to Waterco from others.

2.0 Summary of Storm Babet and Impact

National Context

2.1 Storm Babet brought heavy and persistent rainfall across much of the UK and 'was the third-wettest independent 3-day period for England and Wales in a series from 1891' according to the Met Office[2]. As shown in Figure 1, many parts of the UK received over 50mm of rain, with 75-100mm of rain recorded across areas of North Wales. Several areas across the UK received over 100% of the average rainfall amount for October.

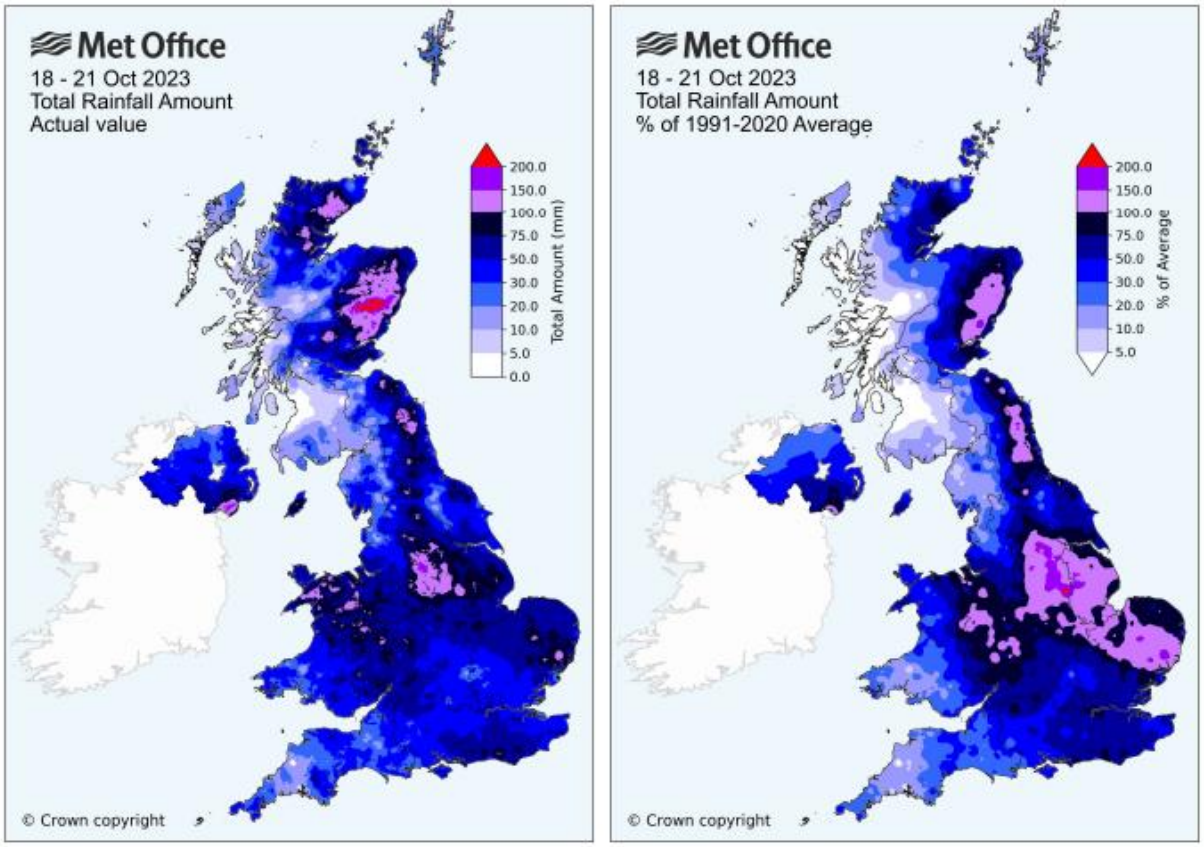

Figure 1 - Met Office Accumulated Daily Rainfall 18th-21st of October 2023

2.2 Storm Babet was part of a wider period of heavy rainfall across the country. According to NRW, the 9 month period ending in March 2024 was the second wettest of any 9 month period recorded in North Wales, and the wettest 9-month period ending in the month of March. Storms over this period (such as Storm Babet) were characterised more by their prolonged rainfall rather than their intensity. Between September 2023 and March 2024 NRW issued 194 Flood Warnings and 3 Severe Flood Warnings.

Regional Context

2.3 Unlike most storms, Storm Babet did not pass over rapidly. This allowed multiple fronts to add more rainfall over a prolonged period of time. The evapotranspiration rate in October was low and rainfalls were frequent throughout the month, with high levels of antecedent rainfall on October 13th / 14th (27mm in Mold) leading to soils being close to saturation.

2.4 Rainfall records have been obtained from NRW's Mold rain gauge[3].

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[2] Storm Babet Reporthttps://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2023/2023_08_storm_babet.pdf

[3] https://rivers-and-seas.naturalresources.wales/Station/1011?parameterType=2

2.5 Figure 2 shows the rainfall in the days leading up to the flooding on the 20th October. Flintshire experienced rainfall two days prior to the 20th October, with 15.2mm of rainfall on the 18th and 11.8mm on the 19th. On 20th October, Mold rain gauge recorded 61.8mm of rainfall.

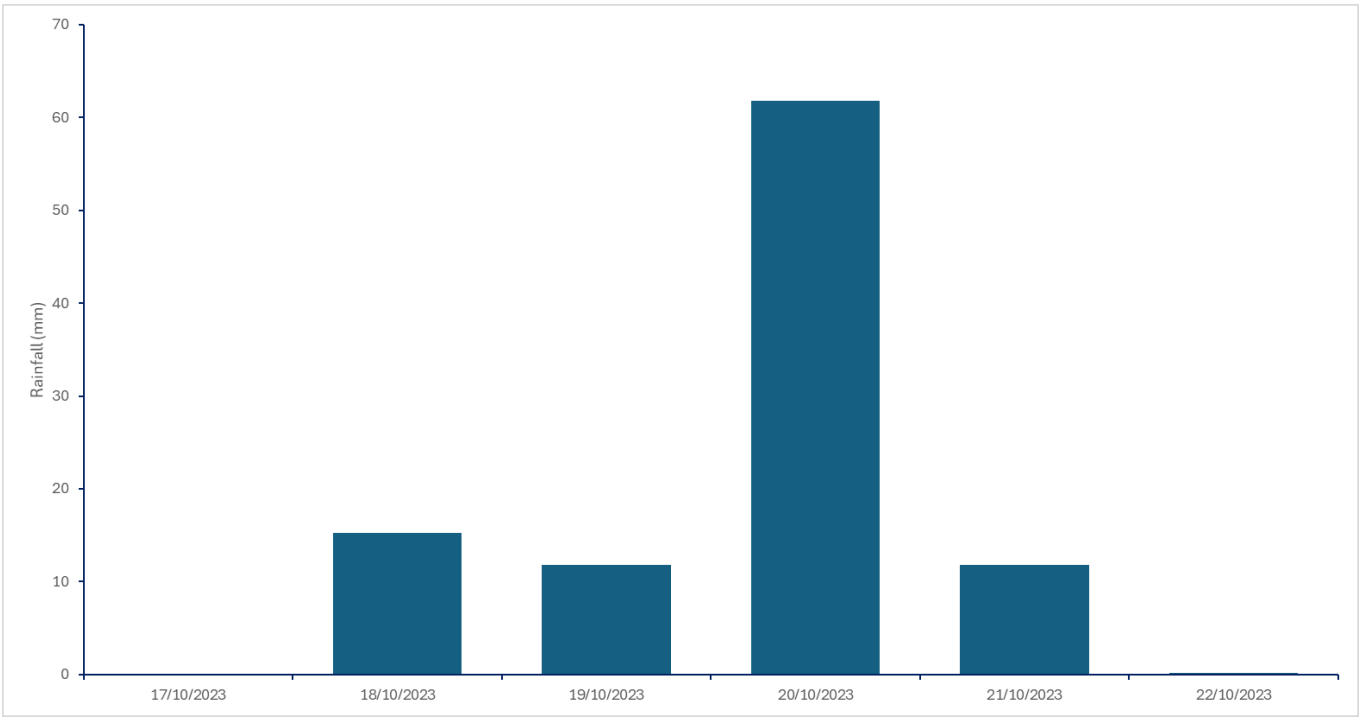


Figure 2 - NRW Mold Rain Gauge - Daily Rainfall From 18th-21st October

2.6 Figure 3 shows that there was a period of intense rainfall on Wednesday the 18th October which began at 19:00pm and peaked between 21:00-22:00 with 5mm of rainfall per hour. There was some additional rainfall on Thursday the 19th October peaking at approximately 1mm per hour. During 20th October, rainfall was prolonged with peak rainfall intensities at approximately 4.2mm per hour.

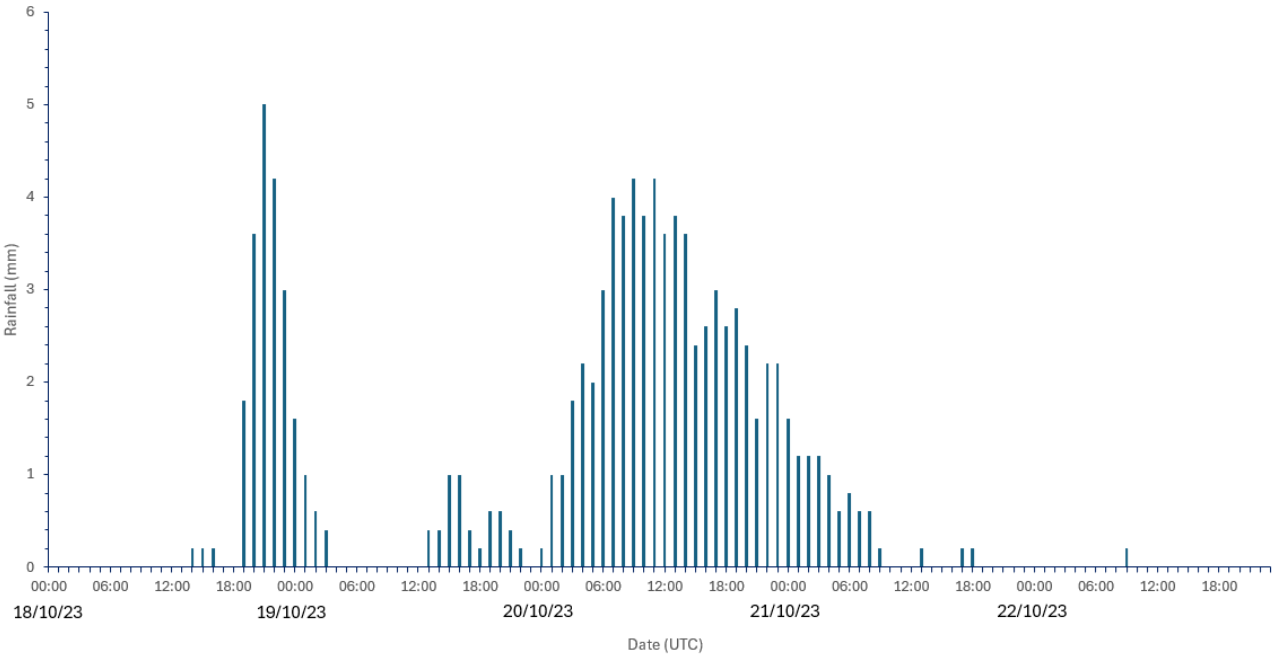


Figure 3 - Hourly rainfall between the 18th and 22nd of October

2.7 Flood Estimation Handbook (FEH) analysis estimates that a total of 61.8mm of rainfall over 24 hours (on the 20th of October), as recorded at the NRW Mold rain gauge, equates to an approximate return period of 1 in 20 years.

2.8 The 73.6mm of rainfall over a 48-hour period between the 19th and 20th of October (recorded at the NRW Mold rain gauge) equates to a return period of approximately 1 in 23 years. The 88.8mm of rainfall over a 72-hour period between the 18th and 20th of October equates to an approximate return period of 1 in 39 years.

2.9 Due to high amounts of rainfall throughout October, there would have been a lack of soil water storage and in consequence, higher and quicker runoff resulting in flooding.

Local Context

2.10 Community Engagement was undertaken by Waterco in Broughton on the 31st October 2023. The purpose of the community engagement exercise was to gather information on the number of properties affected and the flooding mechanisms / source(s). In addition to speaking with householders, a questionnaire was posted to seek additional feedback. Table 2 shows a summary of the number of responses received.

Table 2 - Summary of Community Engagement Undertaken in Broughton

Location	Verbal responses received (properties)	Number of postal / email responses
Lancaster Park	19	8
Marlwood Place	4	6
Mold Road	8	7
Windsor Drive	6	4
Llys Caer	2	1
Cherry Dale Road	2	0
The Rowans	4	2
Wellington Road	0	0
Old Warren	0	1

2.11 In addition to the community engagement exercise, a number of stakeholders were consulted regarding any information on flooding in Broughton:

- **Natural Resources Wales** – provided information on calls received during Storm Babet; a record of properties known to have flooded and correspondence with North Wales Fire & Rescue Service.
- **FCC Highways Authority** – provided a call log showing where members of public had reporting flooding.
- **Dŵr Cymru Welsh Water** – held a post-Storm Babet meeting with FCC and Waterco to share details of asset performance and flooding records during Storm Babet.

2.12 Table 3 provides a summary of the locations and reported effects of flooding following the community engagement exercise and stakeholder engagement.

Table 3 - Summary of Flooding in Broughton During Storm Babet

Location	Internal Flooding	Impact
Mold Road	8	Internal flooding to 8 properties, external driveway / garden flooding confirmed to at least 4 others.
Lancaster Park	7	Internal flooding to 7 properties, external driveway / garden flooding confirmed to at least 12 others.
Marlwood Place	4	Internal flooding to 4 properties, external driveway / garden flooding confirmed to at least 4 others.
Windsor Drive	2	Internal flooding at 2 properties, external driveway / garden flooding confirmed to at least 6 others.
Llys Caer	0	External flooding to driveways / gardens. Mention of detached garages flooding.
Cherry Dale Road	0	Initial reports of internal flooding at 1 property, however community engagement suggests this was not the case
The Rowans	3	Internal flooding to 3 properties, external driveway / garden flooding confirmed to at least 2 others.
Wellington Road	1	1 report of internal flooding.
Hope Road	0	Reports of flooding to gardens and garages.
Old Warren	1	1 report of internal flooding.
Broughton Hall Road	0	Report of flooding at the school
Total Internal Flooding Reports	**26**	**Number of internal flooding incidents based on community engagement exercises and stakeholder engagement. Flooding to additional properties may have occurred but not reported to FCC.**

2.13 An additional visit was undertaken by Waterco on 28/05/2024 to inspect areas of interest including the Mold Road culvert and the A55 culvert. A photographic record of the site visit is included in Appendix A.

3.0 Study Area Overview

Location

3.1 Flooding in Broughton was generally reported on Mold Road, Lancaster Park, Marlwood Place, Windsor Drive and Llys Caer. Figure 4 shows the approximate locations of internal property flooding in Broughton. Figure 4 is also reproduced as Appendix B.

Figure 4 - Plan of Reported Flooding Areas
Contains OS Data © Crown Copyright (2024)

Geology

3.2 The British Geological Survey (BGS)[4] online mapping (1:50,000 scale) indicates that Broughton is predominantly underlain by superficial deposits of Till, generally comprising Diamicton. The underlying bedrock geology is identified as being a mixture of Sandstone, Mudstone and Siltstone.

3.3 Vertical permeability in this area is very limited. The soils and upper till will allow significant lateral flows during intense rainfall events.

Hydrological Setting

[4] British Geological Survey - https://mapapps2.bgs.ac.uk/geoindex/home.html

3.4 There is an unnamed watercourse to the north of Mold Road which flows south. The unnamed watercourse is culverted beneath Mold Road at National Grid Reference (NGR): 333344, 363369. The watercourse flows through the centre of Broughton in a culverted channel and emerges to the east of the rear gardens of properties off Llys Caer and Cherry Dale Road. The watercourse continues south and is culverted beneath the A55 (dual carriageway) at NGR 333466, 363009. Images of both culverts are included in Appendix A.

3.5 The catchment area of the unnamed watercourse covers approximately 0.9km^2. Figure 5 shows the approximate catchment area generated using Scalgo software[5]. The catchment area may be larger than that shown in Figure 5 should highway runoff from the A55 be drained towards the Mold Road culvert. A review of detailed Ordnance Survey mapping suggests that there are drains (watercourses) orientating from the A55 west of Broughton, towards the Broughton area and the Mold Road culvert. Detailed survey, including a review of the drainage system serving the A55, would be required to establish the exact catchment area.

Figure 5 – Contributing Watercourse Catchment
(source: SCALGO)

Drainage Assets

3.6 Public sewer records have been obtained from Dŵr Cymru Welsh Water (DCWW)[6]. The sewer records show that large areas of Broughton, including Mold Road and Windsor Drive are served by a combined drainage system. Lancaster Park, Cherry Dale Road and Marlwood Place are served by separate surface water and foul sewers. The surface water sewers are shown to connect to the culverted section of the unnamed watercourse flowing south through Broughton. DCWW sewer plans are included in Appendix C.

3.7 When the unnamed watercourse is at capacity, the surface water sewers in Lancaster Park, Cherry Dale Road and Marlwood Place will not be able to discharge freely. This could result in flows backing up within the sewers and surcharging of manhole chambers.

[5] Scalgo - https://scalgo.com/
[6] DCWW sewer plans - https://flood-map-for-planning.naturalresources.wales/

NRW Flood Maps

3.8 The NRW 'Flood Map for Planning – Rivers, Surface Water and Small Watercourses' map (shown in Figure 6 and Appendix D) identifies the flood risk associated with small watercourses such as the unnamed watercourse which flows south through Broughton. The NRW map shows that a number of the properties / streets in Broughton are located in Flood Zones 2 and 3. Flood Zone 2 is defined as an area with between a 0.1% and 1% chance of flooding from surface water and / or small watercourses in any given year, including the effects of climate change. Flood Zone 3 is defined as an area with a greater than 1% chance of flooding from surface water and / or small watercourses in any given year, including the effects of climate change.

3.9 The flood risk shown on the NRW 'Flood Map for Planning, Rivers, Surface Water and Small Watercourses' map is based on a combination of rainfall and LiDAR data. The mapping identifies areas where surface water may flow or pool during heavy rainfall.

3.10 NRW mapping shows that once the Mold Road culvert exceeds its capacity, flood flows are stored upstream of the culvert inlet before reaching a sufficient height to spill onto Mold Road. Flooding disperses south of Mold Road. The NRW mapping also shows that flooding could occur upstream of the A55 culvert should the culvert exceed its capacity.

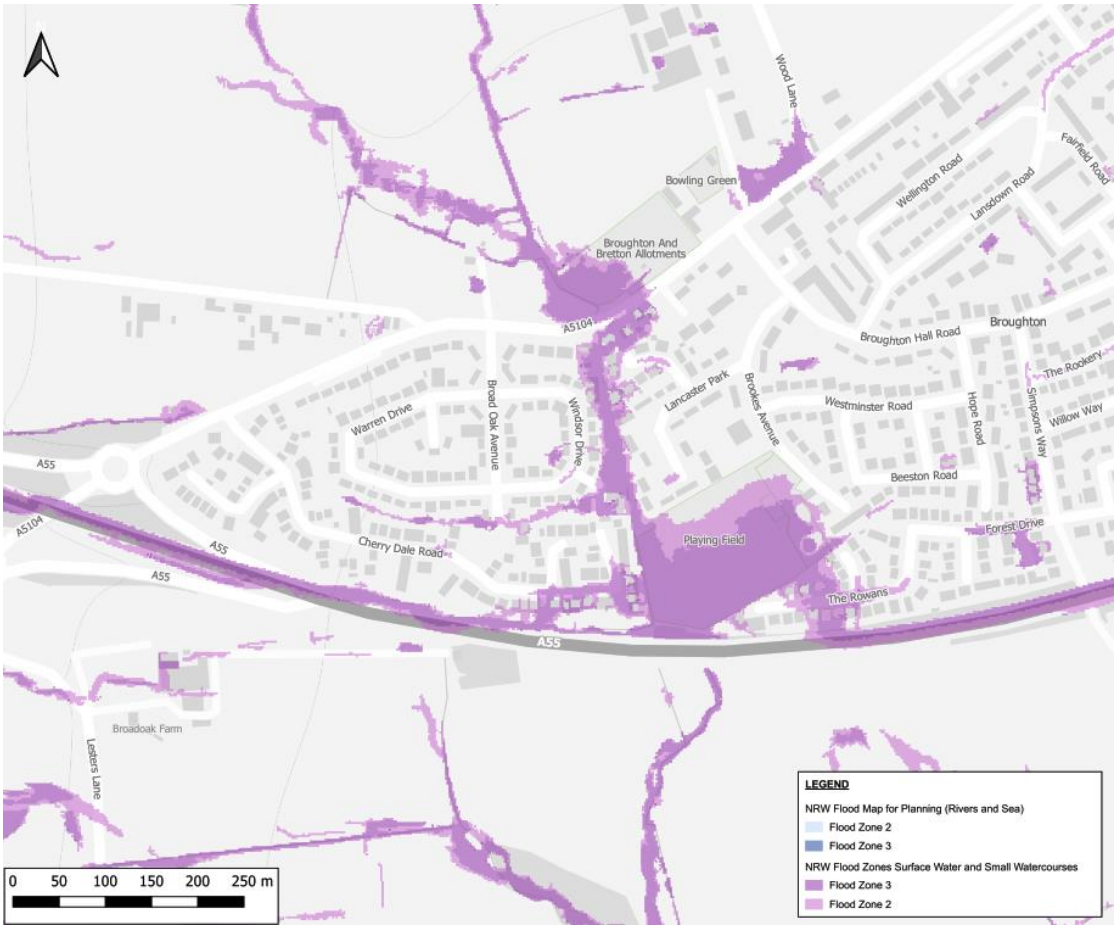


Figure 6 - NRW Flood Map for Planning, Rivers and Sea, Surface Water and Small Watercourses Map

4.0 Flood Locations, Descriptions and Mechanisms

Mold Road

4.1 Based on the findings of the community engagement exercise and stakeholder engagement, the flooding to Mold Road is attributed to an exceedance of the culvert inlet of the unnamed watercourse which crosses beneath Mold Road. Flood flows accumulated behind the culvert inlet before spilling onto Mold Road. Several of the houses along Mold Road are situated below the road level, leading to flood flows from the road entering properties.

4.2 High soil saturation levels prior to Storm Babet meant that runoff from the catchment upstream of the Mold Road culvert was rapid, meaning the watercourse would have conveyed large flows of water. An image taken by a resident (Appendix E) shows debris accumulation at the culvert inlet which may have exacerbated flooding. However, the debris may have been transported during the flood event.

4.3 Residents also reported water exceeding drainage systems and causing internal flooding through backflow (through toilets). This is likely a result of floodwater entering the public sewer system. Figure 7 provides a summary of the reported flooding.

Figure 7 - Mold Road Area

Marlwood Place / Lancaster Park

4.4 Based on the findings of the community engagement exercise and stakeholder engagement, the flooding to Marlwood Place and Lancaster Park is a result of an exceedance of the culvert inlet of the unnamed watercourse which crosses beneath Mold Road. Flood flows from Mold Road proceeded south onto Marlwood Place and Lancaster Park.

4.5 Residents also reported that there was a blockage or exceedance where the watercourse is culverted beneath the A55 which caused floodwaters to back up behind the culvert. Figure 8 provides a summary of the reported flooding.

4.6 Residents reported water exceeding drainage systems and causing internal flooding through backflow (through toilets). This is likely a result of floodwater entering the public sewer system.

Figure 8 - Marlwood Place / Lancaster Park Area

Windsor Drive / Llys Caer

4.7 Based on the findings of the community engagement exercise and stakeholder engagement, the flooding at Windsor Drive and Llys Caer, is a result of an exceedance of the culvert inlet of the unnamed watercourse which crosses beneath Mold Road. Flood flows from Mold Road proceeded south to Windsor Drive and Llys Caer.

4.8 Similar to Marlwood Place and Lancaster Park, residents also reported that there was a blockage or exceedance where the watercourse is culverted beneath the A55 which caused floodwaters to back up.

4.9 There were also reports of a manhole on the public sewer system in this area surcharging leading to sewage entering gardens. Figure 9 provides a summary of the reported flooding.

Figure 9 - Windsor Drive / Llys Caer Area

The Rowans

4.10 Based on the findings of the community engagement exercise and stakeholder engagement, the reported source of flooding was exceedance of the highway drains / gullies. Properties on the south side of the Rowans are situated at a lower elevation than the highway and floodwater entered the curtilage of properties causing 3 reported internal flooding incidents.

4.11 Flooding to the Rowans and exceedance of the highway drainage system may also be linked to receiving systems (combined sewer or watercourse) being at full capacity or already being exceeded downstream.

4.12 A resident reported that drains were cleared following the flood event. This suggests that the drains were blocked or became blocked during the flood event. Figure 10 provides a summary of the reported flooding.

Figure 10 - The Rowans Area

Other Areas

Old Warren

4.13 FCC had reports of flooding to a property at Old Warren which was confirmed during community engagement. The resident affected mentioned that floodwaters were flowing from the fields to the south of the property which caused internal flooding.

Hope Road

4.14 Resident reported that their front garden and garage flooded. Area is separated from the Mold Road culvert and there have been no other reports of flooding in this area. This is therefore likely an isolated incident.

Hamilton Avenue

4.15 FCC had a report of internal flooding in this area. There was no response to community engagement or letter drop. Area is separated from the Mold Road culvert and there have been no other reports of flooding in this area. This is therefore likely an isolated incident which may require further investigation.

Broughton Hall Road

4.16 FCC had a report of flooding at the school however were unaware if flooding was internal. Area is separated from the Mold Road culvert and there have been no other reports of flooding in this area. This is therefore likely an isolated incident which may require further investigation.

Cherry Dale Road

4.17 FCC had a report of internal flooding at 1 address in this location, however during the community engagement the resident advised that the property did not flood.

Lower Kinnerton

4.18 It is acknowledged that flood events were recorded across the Wales – England national border in Lower Kinnerton, located approximately 1km south-east of Broughton.

4.19 The watercourse discussed in this Flood Investigation Report flows south beyond the A55 culvert and contributes to flood risk in Lower Kinnerton. As such, any potential flood alleviation work undertaken on the catchment upstream of the Mold Road culvert may assist in reducing flood risk downstream in Lower Kinnerton.

5 Relevant Parties Communication Register

5.1 The table below provides the details of communications that have taken place with relevant parties up to the time of writing this report. Relevant parties are considered to be all authorities and stakeholders directly involved and responsible for flood risk management, property owners affected by the flood event, and all parties who may be able to provide information salient to the flood investigation.

Table 4 - Relevant Parties Communications Register

Contact	Communications
Local Residents	Community engagement undertaken on 31/10/2023. Questionnaires and photographs returned to Waterco.
Broughton & Bretton Flood Action Group	Approached by group to share information. Meeting on 22/03/2024
Flintshire County Council (FCC)	Shared details of call logs and confirmed flooding locations
Dŵr Cymru Welsh Water DCWW	Meeting on the 19/02/2024 to share information of flood locations and sources
Natural Resources Wales (NRW)	Email consultation from NRW with information on flood locations and sources. NRW also shared data from North Wales Fire and Rescue (on callouts / flood locations).
North Wales Fire & Rescue	

6.0 Conclusions

6.1 Waterco Ltd were appointed by FCC to prepare a Flood Investigation Report for Broughton following flooding from Storm Babet on the 20th of October 2023.

6.2 Internal flooding was confirmed along Mold Road, Lancaster Park, Marlwood Place and Windsor Drive, with the source of flooding being the watercourse which is culverted beneath Mold Road. Internal flooding was also recorded on the Rowans, Old Warren and potentially Wellington Road. The sources of flooding were cited as exceedance of highway gullies and runoff from fields.

6.3 Rainfall experienced during Storm Babet was prolonged and steady, and high levels of rainfall throughout October meant soils were already saturated which led to faster runoff rates.

6.4 Surcharge of the Mold Road culvert may be associated with debris accumulation at the culvert inlet; however, the debris may have been transported during the flood event. The watercourse which flows south in a culverted channel from Mold Road is also culverted beneath the A55. There are reports of the A55 culverts being overwhelmed causing flood flows to back up.

6.5 Residents also reported water exceeding drainage systems and causing internal flooding through backflow (through toilets). This is likely a result of floodwater entering the public foul or combined sewer system.

6.6 A total of 26 internal flooding incidents were reported in Broughton during Storm Babet.

7.0 Recommendations

7.1 Table 5 sets out the recommended actions required following the flooding of October 2023 and the stakeholder required to undertake each action.

Table 5 – Recommendations to Address Flooding

Ref	Stakeholder	Action
01	FCC Highways Authority	Review the frequency of gully cleansing in affected areas, for example on the Rowans.
02	FCC Highways Authority & LLFA	Inspect the existing culvert inlet FCC Asset Ref No: AM0060. NGR: 333346, 363367 (Mold Road) on a frequent basis, remove debris as required.
03	FCC Highways Authority & LLFA	Undertake a CCTV condition survey of the Mold Road culvert to review the existing condition/siltation. Plan to take any remedial actions as required.
04	FCC LLFA	Communicate with local communities to raise awareness of property level flood resilience measures that can be implemented to help mitigate flood risk
05	FCC LLFA	Investigate implementing natural flood management upstream of the Mold Road culvert inlet FCC Asset Ref No: AM0060. NGR: 333346, 363367.
06	DCWW	Review customer complaints and investigate the associated sections of public sewer system to remove any blockage / significant debris following the October 2023 event.
07	North and Mid-Wales Trunk Road Agent	Inspect the inlet of the A55 0060 C50 Broughton culvert on a frequent basis to ensure it is free of blockage / debris.
08	North and Mid-Wales Trunk Road Agent	CCTV the A55 0120 C10 Pentrobin Culvert to ensure the culvert is free of blockage and any significant siltation. Take remedial action as required.
09	Broughton & Bretton Flood Action Group	Continue to engage with residents to help raise awareness of local issues surrounding flooding.
10	Property owners / residents	Consider the implementation of property level flood resilience measures. These could include; the installation of non-return valves to prevent ingress of floodwater on private drainage systems and installing flood barriers or flood doors.

APPENDIX A
Waterco Photographic Record

Waterco

PHOTOGRAPHIC LOG

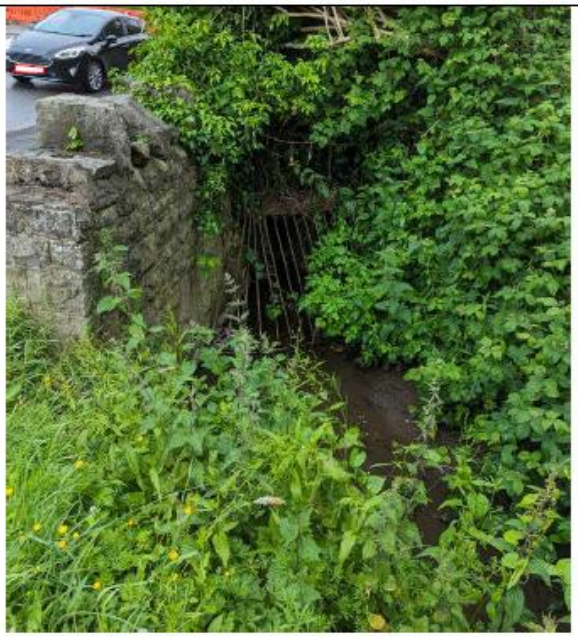
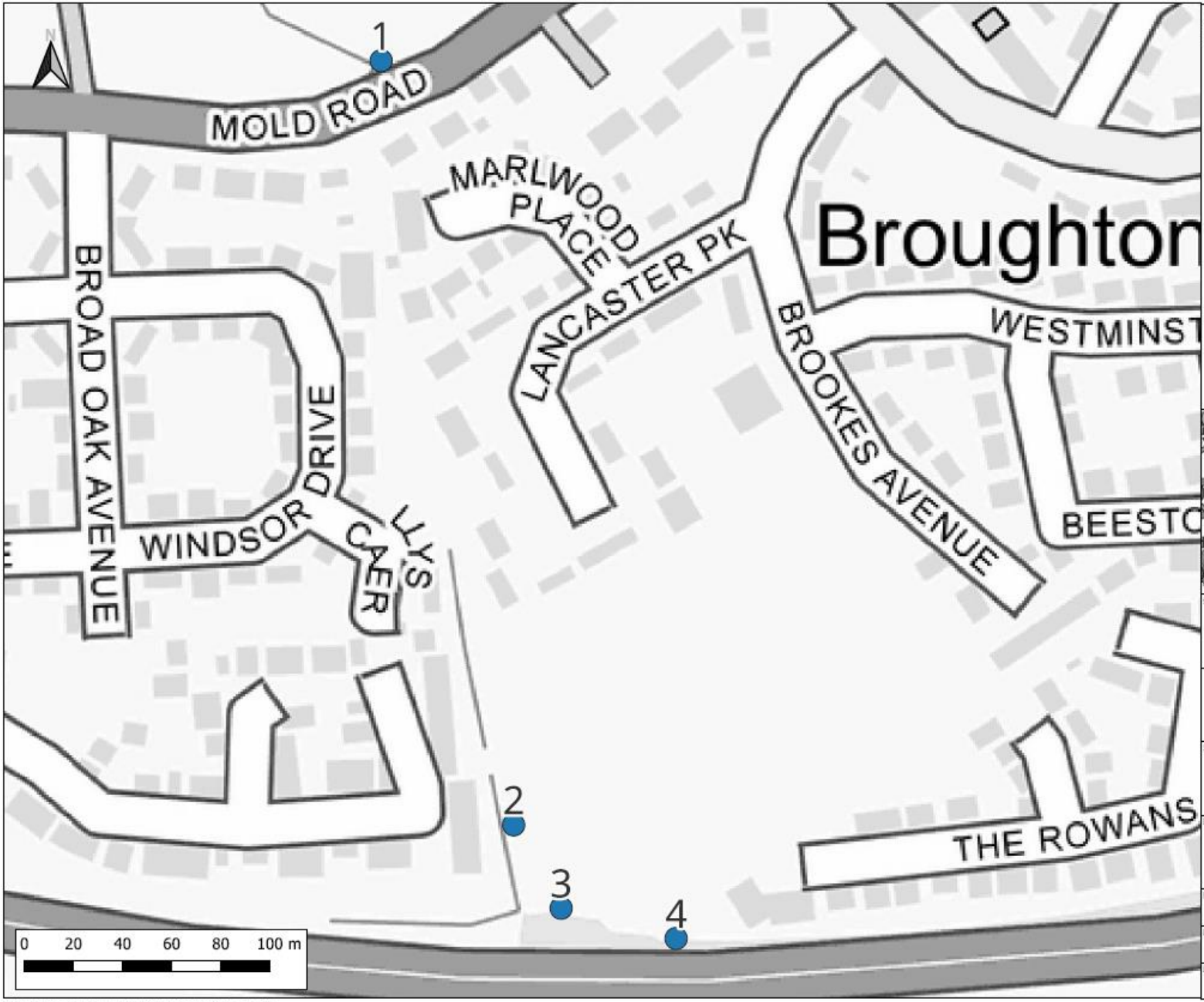
Photo No.1	
Date: 28/05/2024 **Description:** Mold Road Culvert	

Photo No. 2	
Date: 28/05/2024 **Description:** Watercourse east of Cherry Dale Road as it re-emerges	

Photo No.3	
Date: 28/05/2024 **Description:** Culvert adjacent to Broughton United FC football field.	

Photo No. 4	
Date: 28/05/2024 **Description:** A55 Culvert	



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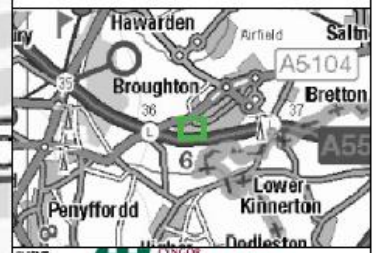
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

Photo Locations



CLIENT: Cyngor Sir y Fflint Flintshire County Council

waterco
www.waterco.co.uk

SCHEME: Broughton

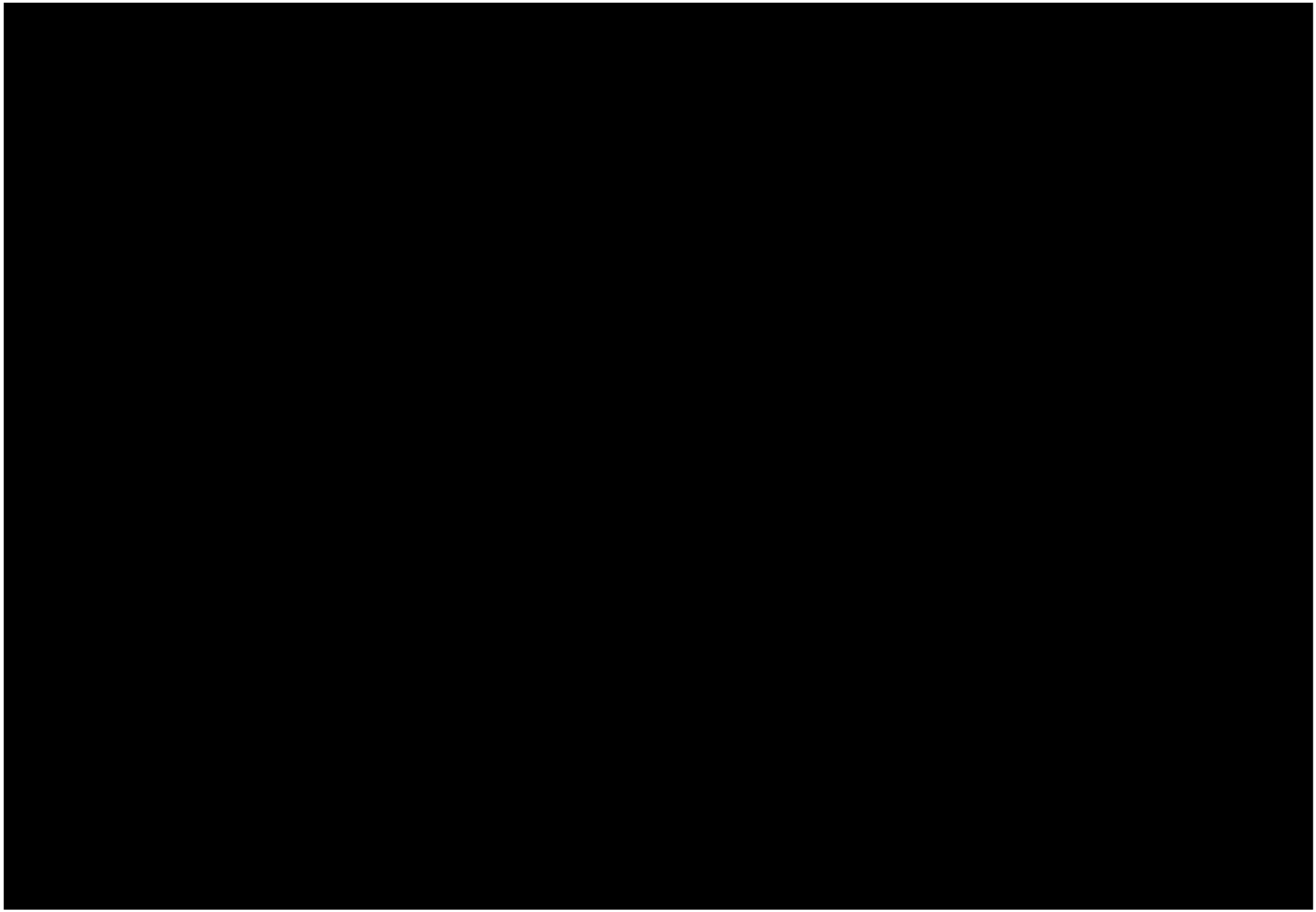
PLOT TITLE: Photograpic Record Location Plan

PLOT STATUS:	DATE:
FINAL	04-07-2024

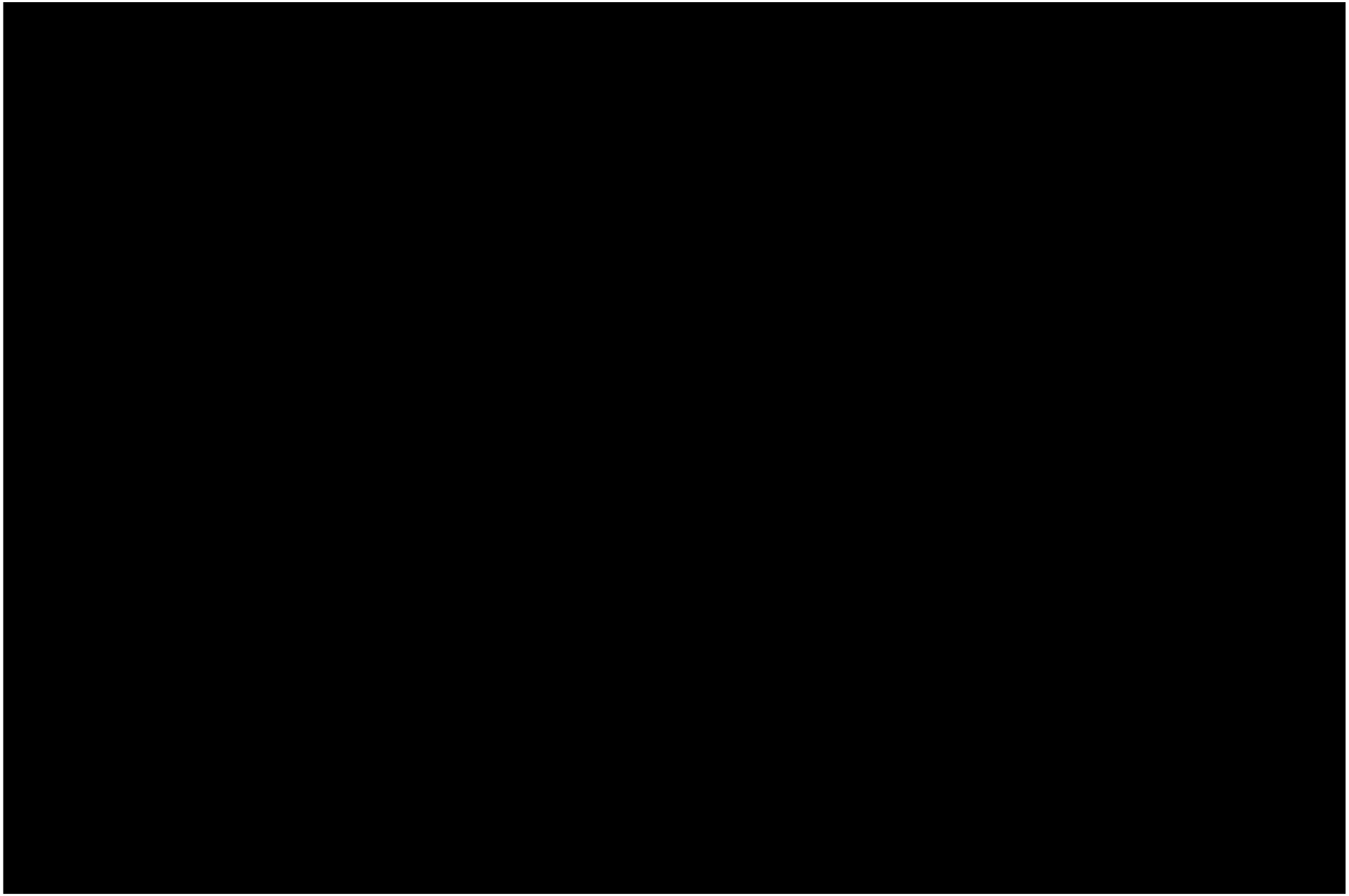
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
IT	AW	MW	1:1500

PLOT NAME:	REVISION:
14113_Photo_Location_Plan	-

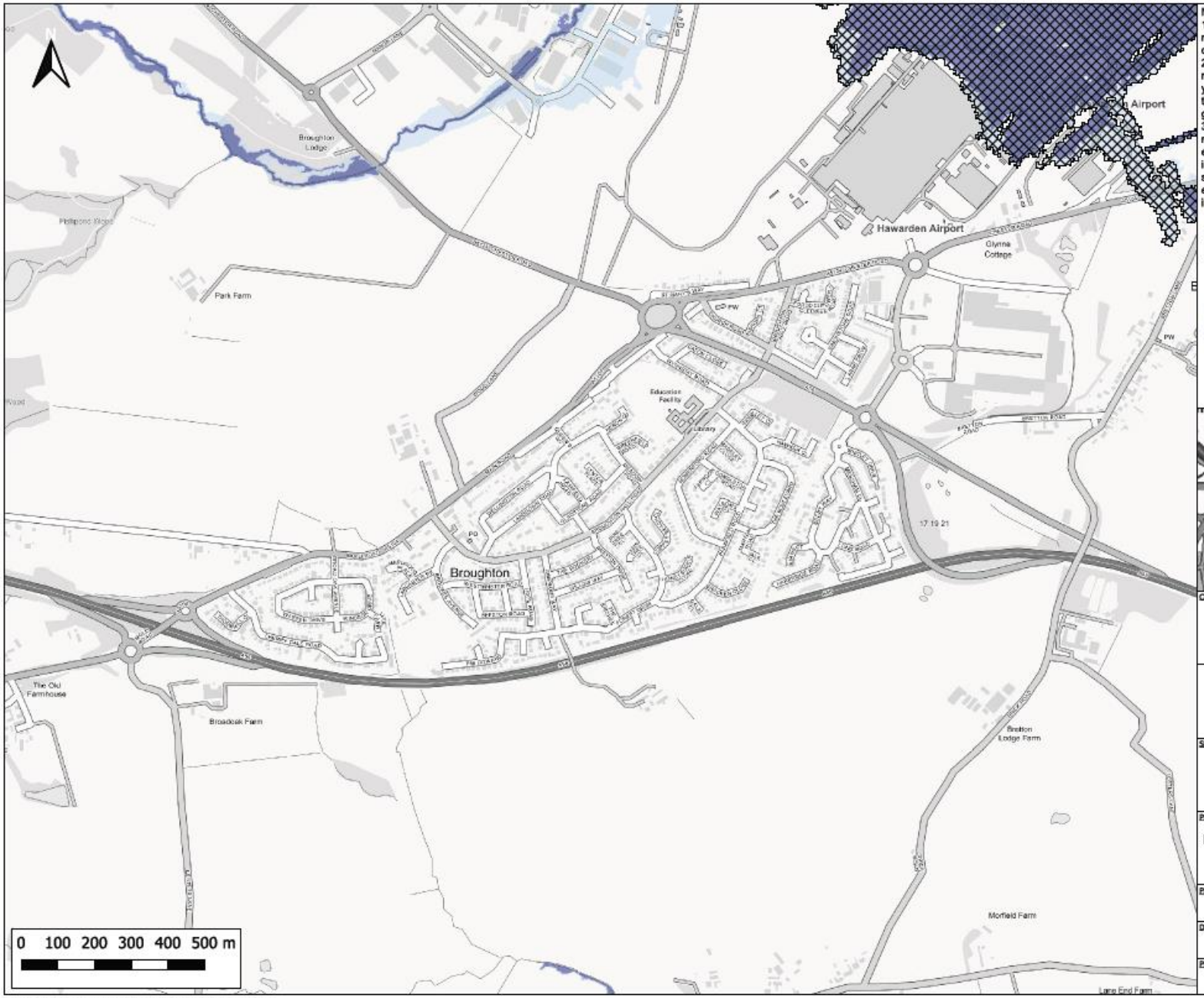
APPENDIX B
Reported Flooding Areas



APPENDIX C
DCWW Sewer Plans



APPENDIX D
NRW Flood Maps



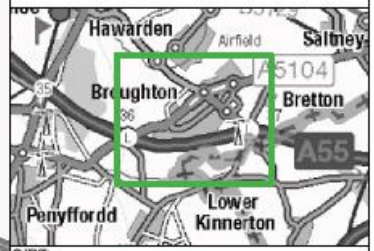
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise
2) Flood Zone 3 displays the extent of flooding from rivers with a 1% AEP or greater of flooding in a given year including and allowance for climate change and the sea with a 0.5% AEP or greater of flooding in a given year including and allowance for climate change
3) Flood Zone 2 displays the extent of flooding from rivers with a less than 1% AEP but greater than or equal to 0.1% AEP of flooding in a given year including and allowance for climate change and the sea with a less than 0.5% AEP but greater than or equal to 0.1% AEP of flooding in a given year including an allowance for climate change

LEGEND

- TAN15 Defended Zones

Flood Map for Planning

- Flood Zone 1
- Flood Zone 2
- Flood Zone 3



CLIENT:

Sir y Fflint Flintshire

waterco
www.waterco.co.uk

SCHEME:

Broughton S19 Flood Investigation Report

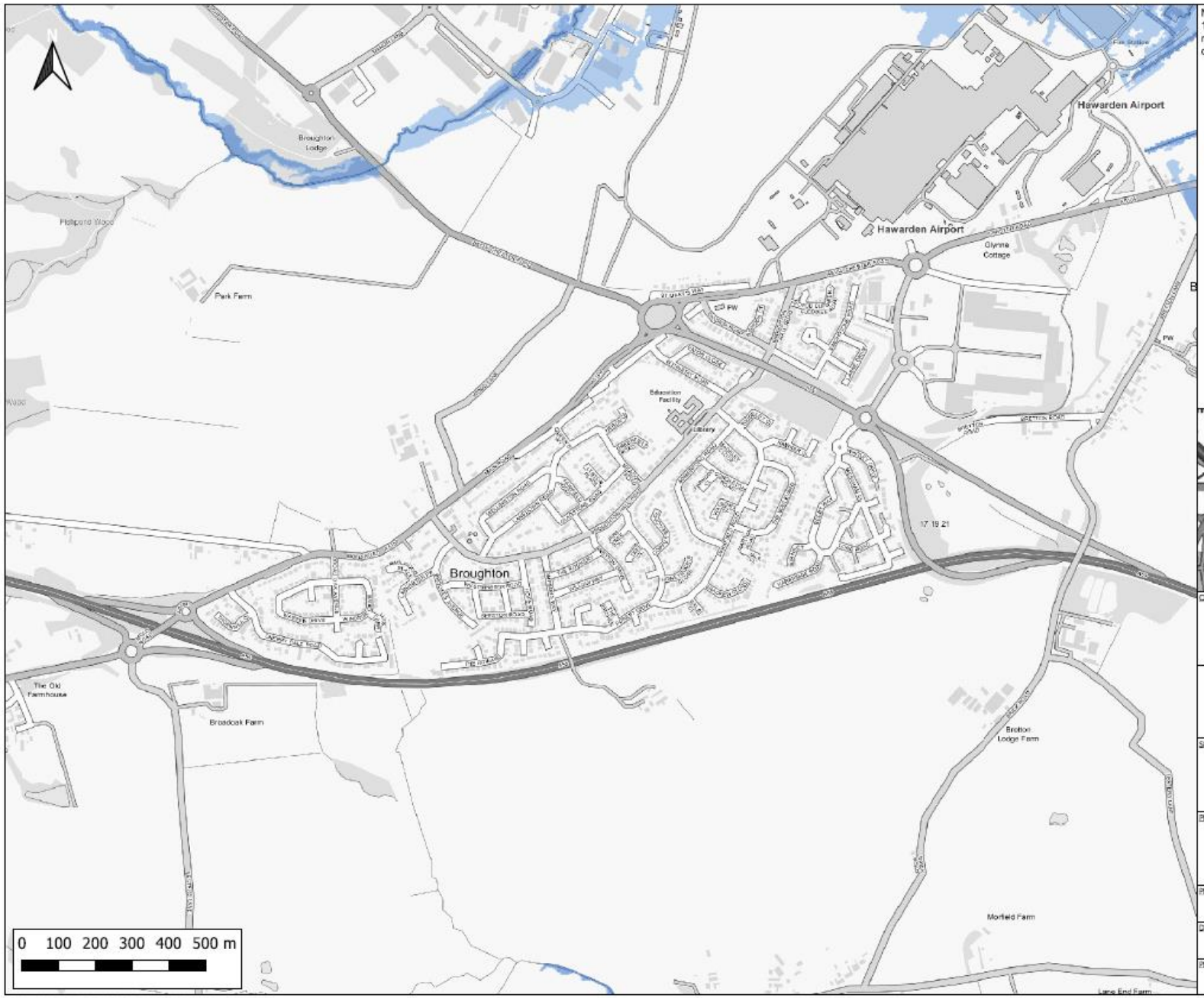
PLOT TITLE:

NRW Flood Map for Planning (Rivers and Sea) Data published May 2025

PLOT STATUS:	DATE:
FINAL	02-07-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
IH	LS	MW	1:10000

PLOT NAME:	REVISION:
14113_NRW_FMfP	-

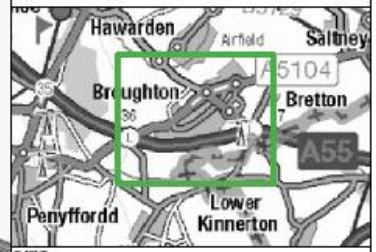


Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

Flood Zones - Rivers

- Flood Zone 1
- Flood Zone 2
- Flood Zone 3



CLIENT:

Cyngor Sir y Fflint Flintshire County Council

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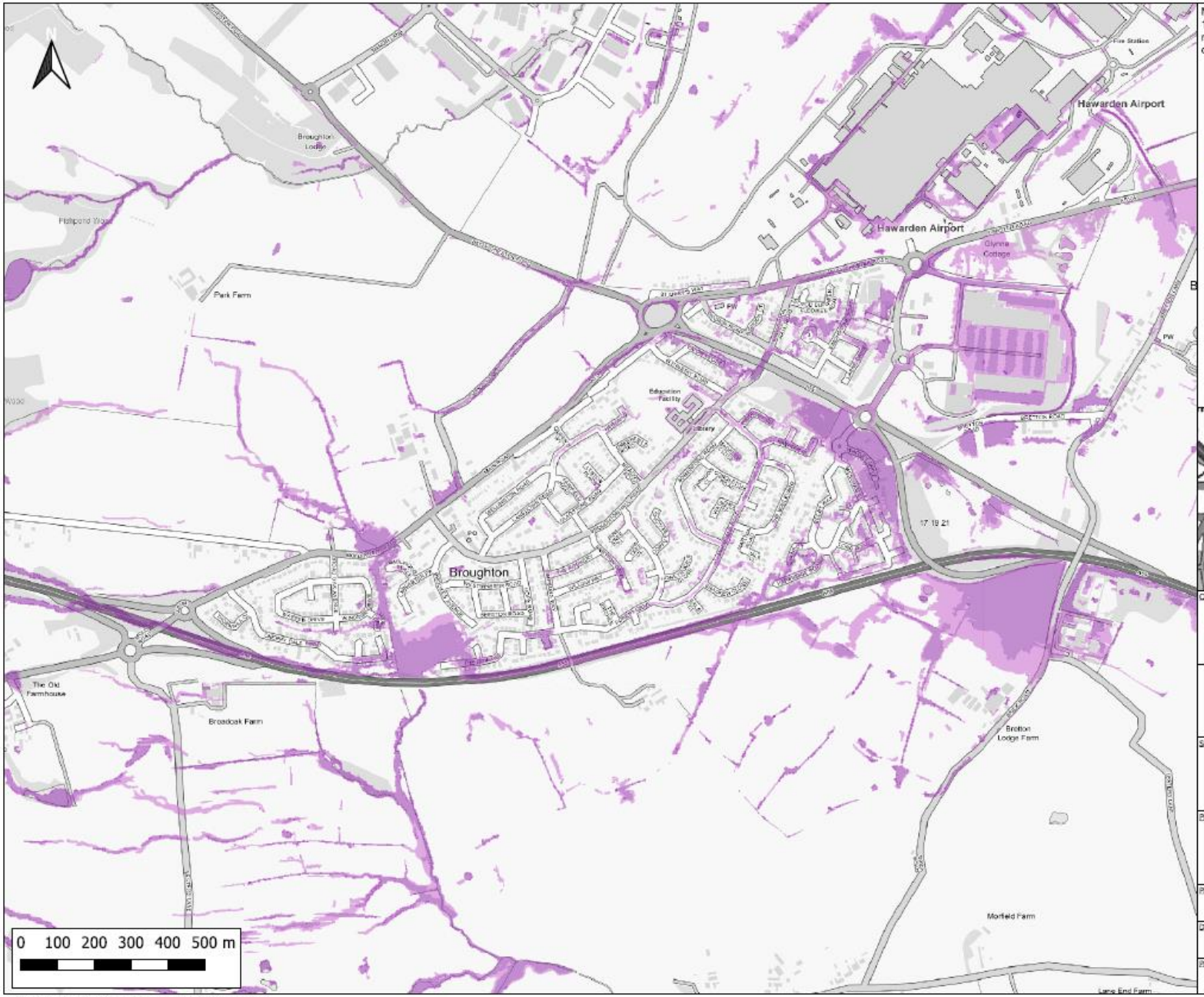
www.waterco.co.uk

SCHEME:
Broughton S19 Flood Investigation Report

PLOT TITLE:
NRW Flood Zones - Rivers
Data published May 2025

PLOT STATUS:			DATE:
FINAL			02-07-2025
DRAWN: IH	CHECKED: LS	APPROVED: MW	PLOT SCALE AT A3: 1:10000
PLOT NAME: 14113_NRW_Flood_Zones_Rivers			REVISION: -

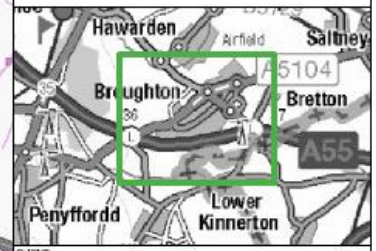


Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

Flood Zones - Surface Water & Small Watercourses

- Flood Zone 1
- Flood Zone 2
- Flood Zone 3



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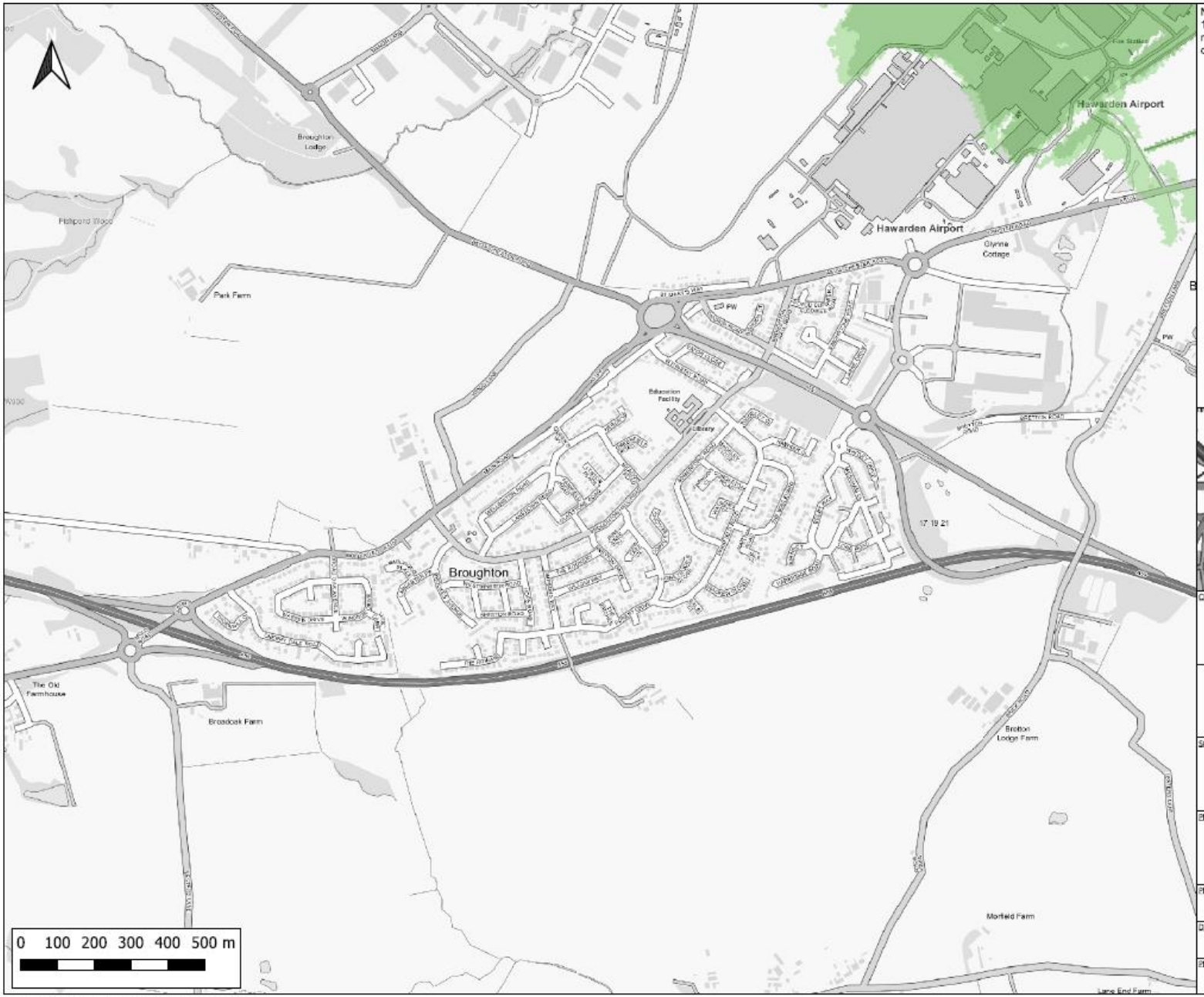
SCHEME:
Broughton S19 Flood Investigation Report

PLOT TITLE:
NRW Flood Zones - Surface Water & Small Watercourses
Data published May 2025

PLOT STATUS:	DATE:
FINAL	02-07-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
IH	LS	MW	1:10000

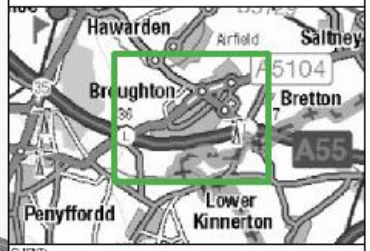
PLOT NAME:	REVISION:
14113_NRW_Flood_Zones_Surface_Water	-



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

Flood Zones - Sea
- Flood Zone 1
- Flood Zone 2
- Flood Zone 3



CLIENT:
Sir y Fflint Flintshire

waterco
www.waterco.co.uk

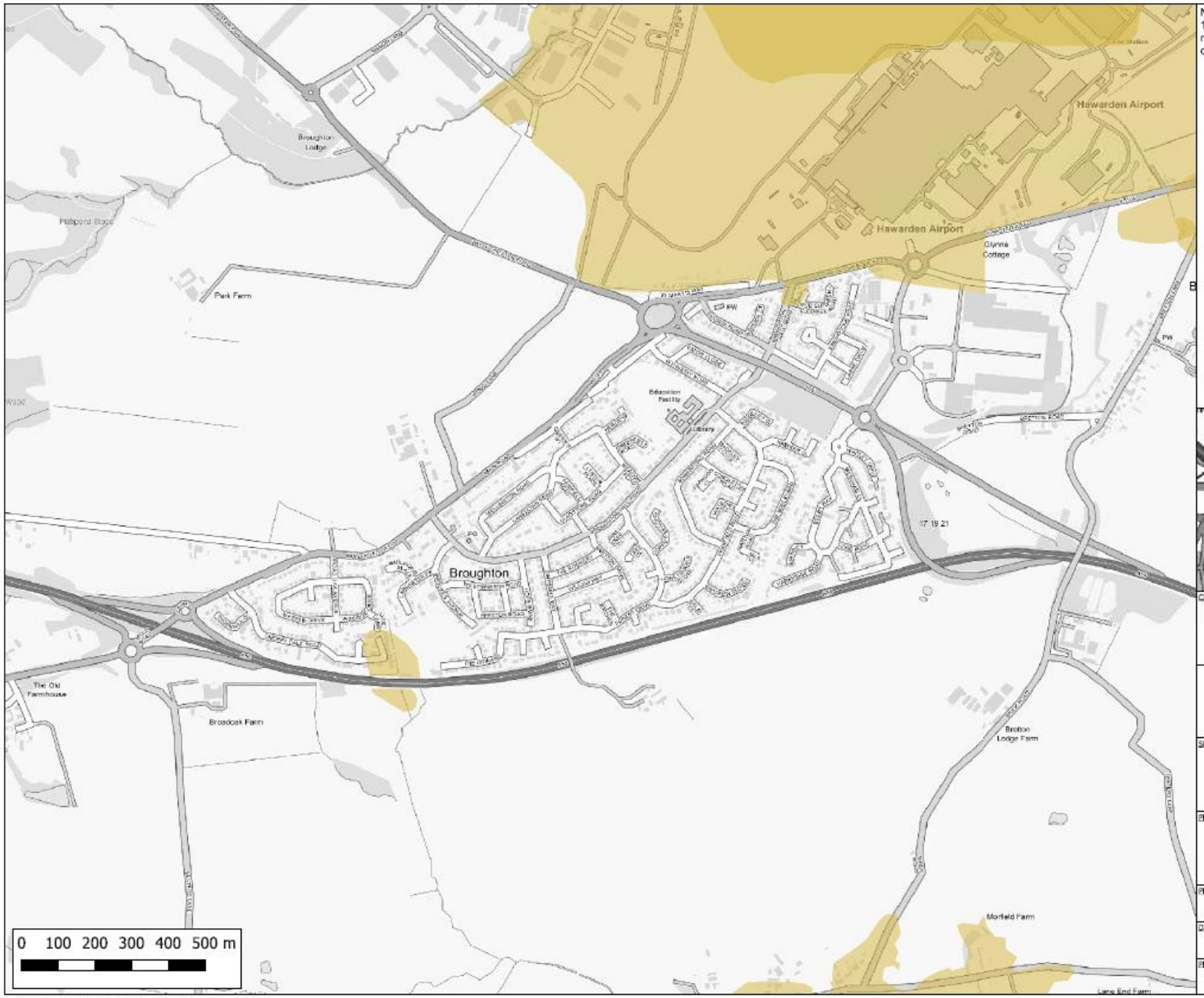
SCHEME:
Broughton S19 Flood Investigation Report

PLOT TITLE:
NRW Flood Risk from the Sea
Data published May 2025

PLOT STATUS:	DATE:
FINAL	02-07-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
IH	LS	MW	1:10000

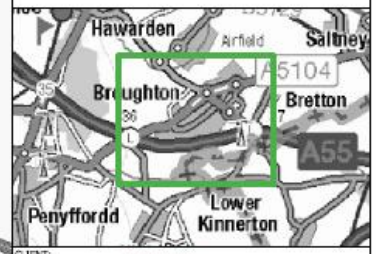
PLOT NAME:	REVISION:
14113_NRW_Flood_Zones_Sea	-



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

NRW Recorded Flood Extents



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SCHEME:

Broughton S19 Flood Investigation Report

PLOT TITLE:

NRW Recorded Flood Extents
Data published May 2025

PLOT STATUS:	DATE:
FINAL	02-07-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
IH	LS	MW	1:10000

PLOT NAME:	REVISION:
14113_NRW_Recorded_Flood_Extents	-

APPENDIX E
Photographs from Residents