



CARLOW
COUNTY COUNCIL

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consulting

Variation No. 4 to the Strategic Flood Risk Assessment for Carlow County Development Plan 2022-2028

Addendum Report

December 25

2019s1485

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Revision History

Revision Ref / Date Issued	Amendments	Issued to
S3-P01 – 19/12/2025		Carlow County Council

Contract

This report describes work commissioned by Carlow County Council. Carlow County Council's representative for the contract was Anita Sweeney. Fiona Byrne and Ross Bryant of JBA Consulting carried out this work.

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Purpose

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Abbreviations

1D	One Dimensional (modelling)
2D	Two Dimensional (modelling)
AEP	Annual Exceedance Probability
AFA	Area for Further Assessment
CCC	Carlow County Council
CCDP	Carlow County Development Plan
CDP	County Development Plan
CFRAM	Catchment Flood Risk Assessment and Management
CSO	Combined Sewer Overflow
DoEHLG	Department of the Environment, Heritage and Local Government
EC	European Community
FRA	Flood Risk Assessment
FRR	Flood Risk Review
GDSDS	Greater Dublin Strategic Drainage Strategy
GSI	Geological Survey of Ireland
HEC-RAS Army)	Hydrologic Engineering Center – River Analysis System (developed by the US
HEFS	High End Future Scenario
LA	Local Authority
MPW	Medium Priority Watercourse
MRFS	Medium Range Future Scenario
OPW	Office of Public Works
PFRA	Preliminary Flood Risk Assessment
SFRA	Strategic Flood Risk Assessment
SI	Site Investigation
SPR	Standard percentage runoff
TBC	To be confirmed
TC	Town Centre
Tp	Time to Peak
WWTP	Waste Water Treatment Plant

1 Introduction

JBA Consulting was commissioned by Carlow County Council (CCC) to provide assistance in the SFRA screening of Variation No. 4 of the Carlow County Development Plan 2022-2028 (CCDP) to support the NPF Implementation: Housing Growth Requirements Guidelines for Planning Authorities issued under Section 28 of the Planning and Development Act 2000 (as amended).

The SFRA is a live document that is designed to be updated as further flood risk information becomes available and changes to the development plan are proposed under any future variations.

1.1 Terms of Reference

Under the "Planning System and Flood Risk Management" guidelines, the purpose for a Strategic Flood Risk Assessment (SFRA) is detailed as being "to provide a broad (wide area) assessment of all types of flood risk to inform strategic land-use planning decisions. SFRAs enable the LA to undertake the sequential approach, including the Justification Test, allocate appropriate sites for development and identify how flood risk can be reduced as part of the development plan process".

More specifically the SFRA screening for the variation will complete the following tasks;

- Undertake a flood risk assessment for the relevant settlements within the CCDP,
- Review the various sources of potential Flood Zone mapping,
- Assist CCC in the review of additional land use zoning considerations and the application of the sequential approach and justification test.

1.2 Scope of Variation No. 4 Relevant to Flood Risk

Variation No.4 comprises a number of amendments to the Carlow County Development Plan 2022–2028. From a flood risk management perspective, only a subset of these amendments give rise to potential changes in flood risk exposure and therefore require screening:

- Proposed Amendment No.2 relates to zoning changes within Carlow Town and Environs.
- Proposed Amendment No.3 applies only to Borris, Hacketstown, Fennagh, Myshall, Kildavin and Tinryland, and relates to policy amendments on existing New Residential zoned lands.
- Proposed Amendment No.4 relates to the rezoning of lands in Myshall from Existing Residential / Infill to Agriculture
- Proposed Amendment No.5 inserts the adopted Graiguenamanagh–Tinnahinch Joint Local Area Plan zoning map into the CCDP.

No other settlements are affected by zoning or policy changes that alter flood risk exposure under Variation No.4.

A summary of proposed amendments and flood risk screening summaries as part of Variation No. 4 of the CCDP 2022-2028 are summarised in Table 1-1 below.

Table 1-1 Proposed Amendments and Flood Risk Screening Summary

Settlement	Relevant Proposed Amendment	Flood Risk Screening Summary
Carlow Town and Environs	Amendment No.2(a) to 2(h): Rezoning of Strategic Reserve lands to New Residential / Existing & Infill Residential / Open Space	Most rezoned lands are located within Flood Zone C. One site (Amendment 2(h)) intersects Flood Zones A/B and the HEFS 0.1% AEP extent. One site (Amendment 2(g)) intersects the HEFS 0.1% AEP extent. Flood risk to be addressed through the Sequential Approach at development plan stage, with site-specific Flood Risk Assessment required where development is proposed in or adjacent to flood extents.
Borris	Amendment No.3(a): Policy text changes	Amendment relates to policy text

	to existing New Residential lands	only, with no new lands zoned. New Residential lands remain within Flood Zone C and are not affected by HEFS 0.1% AEP extents. No additional exposure to Flood Zones A or B.
Hacketstown	Amendment No.3(b) & 3(c): Policy text changes to existing New Residential lands	Amendment relates to policy text only, with no new lands zoned. New Residential lands are within Flood Zone C and not at risk from fluvial flooding or HEFS 0.1% AEP extents. No additional exposure to Flood Zones A or B.
Fennagh	Amendment No.3(d): Policy text changes to existing New Residential lands	Amendment relates to policy text only, with no new lands zoned. Flood extents occur near, but not within, New Residential lands which are in Flood Zone C and not affected by HEFS 0.1% AEP extents. No additional exposure to Flood Zones A or B.
Myshall	Amendment No.3(e): Policy text changes to existing New Residential lands Amendment 4	Amendment 3(e) - Policy text change only, with no new lands zoned. New Residential lands are in Flood Zone C with no fluvial risk and are not affected by HEFS 0.1% AEP extents. No additional exposure to Flood Zones A or B. Amendment 4 - Rezoning from Existing Residential / Infill to Agriculture reduces potential flood risk exposure.
Kildavin	Amendment No.3(f): Policy text changes to existing New Residential lands	Amendment relates to policy text only, with no new lands zoned. New Residential lands are within Flood Zone C and not affected by HEFS 0.1% AEP extents. No additional exposure to Flood Zones A or B.
Tinryland	Amendment No.3(g): Policy text changes to existing New Residential lands	Amendment relates to policy text only, with no new lands zoned. New Residential lands are within Flood Zone C and are not affected by HEFS 0.1% AEP extents. No additional exposure to Flood Zones A or B.
Tinnahinch	Amendment No.5: Inclusion of zoning map from Graiguenamanagh–Tinnahinch Joint LAP	Settlement located on the River Barrow. Flood risk considerations addressed through the adopted Joint Local Area Plan and associated SFRA. No additional flood risk issues arise from Variation No.4.

1.3 Report Structure

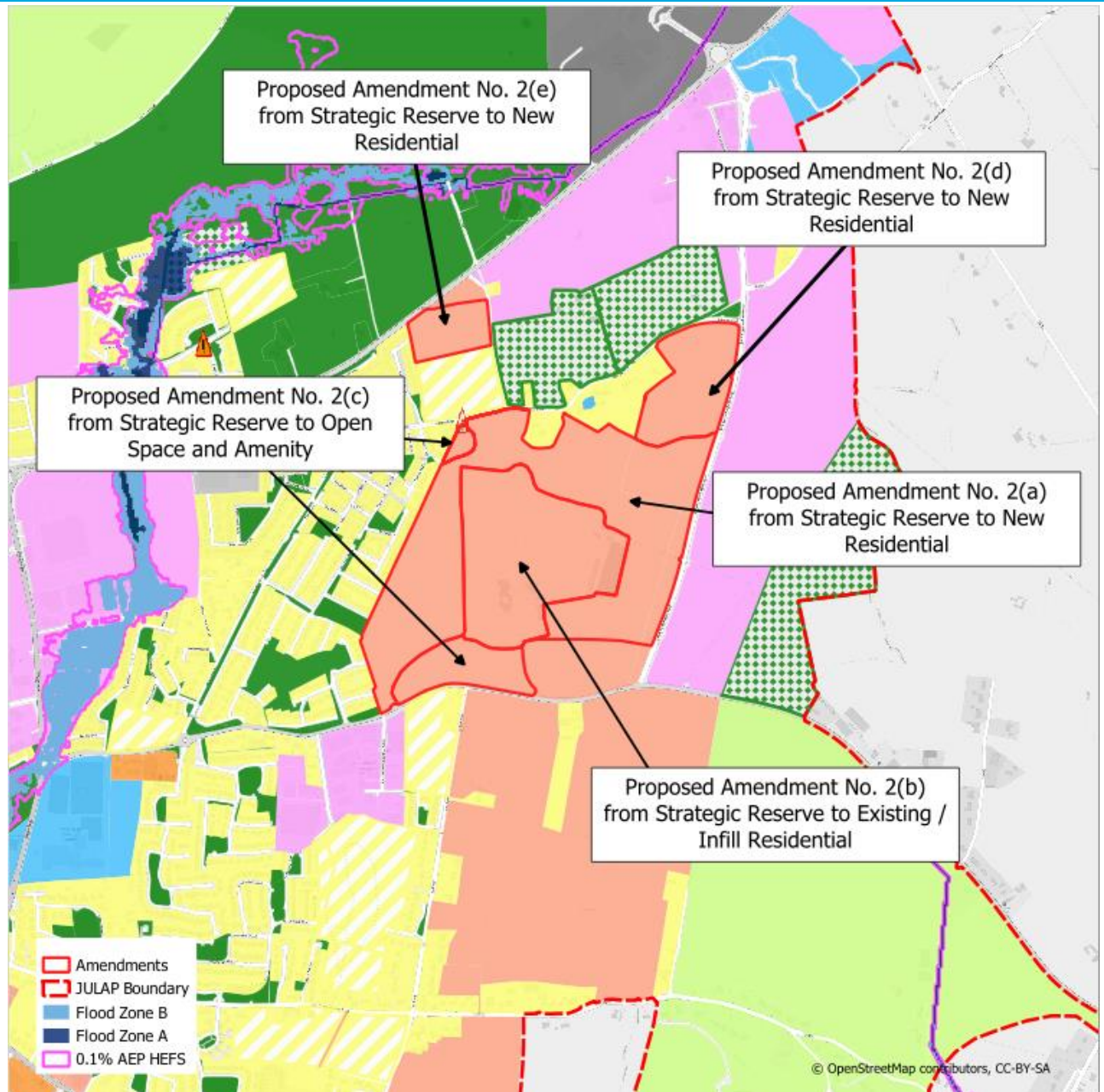
The following Section undertakes an SFRA screening of the amendments listed in Table 1-1 that introduce potential changes in flood risk exposure. Tinnahinch is addressed through the adopted Joint LAP and associated SFRA.

2 SFRA Screening

2.1 Carlow - Graigcullen

2.1.1 Amendments 2(a) to 2(e)

Hierarchy/Tier	Tier 1 - Key Town
Area for Further Assessment under CFRAM programme?	Yes



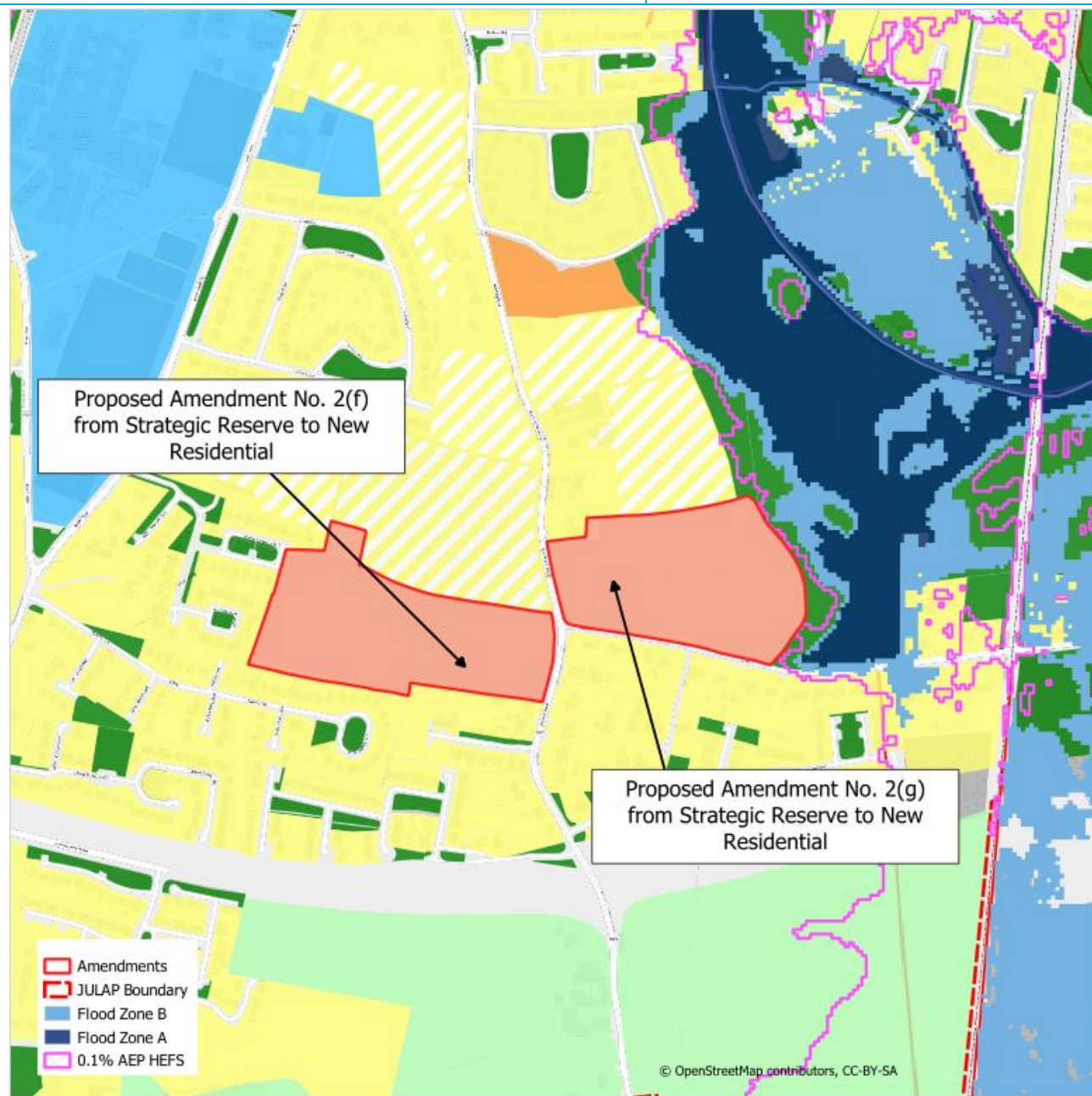
The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM
Historic Flooding	There are no historic floods reported in this area.
Climate Change	There is no predicted flooding within the boundaries of the proposed amendments. Potential increase in surface water runoff from increased rainfall.
Conclusion	Amendments No.2(a), 2(d) and 2(e) provide for the rezoning of lands from Strategic Reserve to New Residential to support housing delivery in Carlow Town in accordance with the Core Strategy, settlement hierarchy and National

	<p>Planning Framework housing targets.</p> <p>Amendment No.2(b) rezones lands from Strategic Reserve to Existing/Infill Residential, reflecting current land use, while Amendment No.2(c) rezones lands from Strategic Reserve to Open Space and Amenity to protect and enhance green infrastructure.</p> <p>All lands subject to Amendments No.2(a) to 2(e) are located outside Flood Zones A and B under both current OPW mapping and the HEFS 0.1% AEP extent.</p> <p>The zoning changes do not introduce additional exposure to Flood Zones A/B or HEFS 0.1% AEP extents. Risk at these sites can be managed in line with approved CCDP Policy and the guidance provided within the Carlow County Development Plan SFRA 2022–2028, with site-specific Flood Risk Assessment required at development stage where appropriate.</p>
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2.1.2 Amendments 2(f) and 2(g)

Hierarchy/Tier	Tier 1 - Key Town
Area for Further Assessment under CFRAM programme?	Yes



The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM
Historic Flooding	Carlow town is subject to regular flooding but there are no historic floods reported in this area.
Climate Change	Potential increase in surface water runoff from increased rainfall. There is no predicted flooding within the boundaries of the proposed amendments. There is a slight overlap between the 0.1% HEFS extent and the amendment 2(g) boundary of approximately 3m ² .
Conclusion	Amendments No.2(f) and 2(g) provide for the rezoning of lands from Strategic Reserve to New Residential to support housing delivery in Carlow Town in accordance with the Core Strategy, settlement hierarchy and National Planning Framework housing targets.

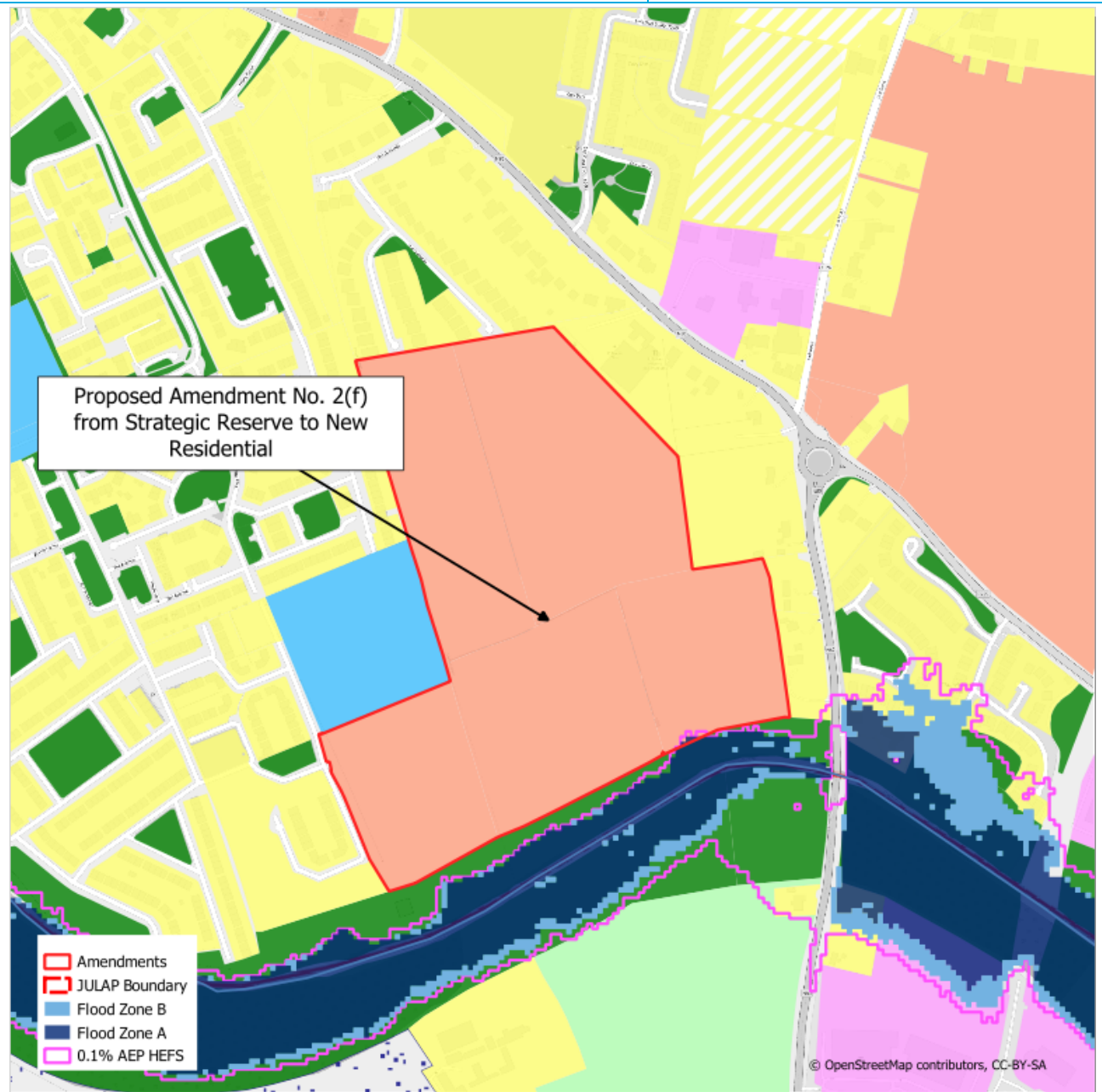
The lands subject to Amendment No.2(f) are located outside Flood Zones A and B under both current OPW mapping and the HEFS 0.1% AEP extent. The lands subject to Amendment No.2(g) are also located outside Flood Zones A and B, with minor clipping by the HEFS 0.1% AEP extent along the eastern boundary affecting approximately 3m².

The zoning changes do not introduce additional exposure to Flood Zones A or B. Development should be avoided within areas affected by the HEFS 0.1% AEP extent, with flood risk managed through the application of the Sequential Approach at development plan stage.

Risk at these sites can be managed in line with approved CCDP Policy and the guidance provided within the Carlow County Development Plan SFRA 2022–2028, with site-specific Flood Risk Assessment required at development stage where appropriate.

2.1.3 Amendment 2(h)

Hierarchy/Tier	Tier 1 - Key Town
Area for Further Assessment under CFRAM programme?	Yes



The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM
Historic Flooding	There are no historic flood events reported within the boundaries of the proposed amendment. There is an undated flood event to the southeast of the site boundary on the N80.
Climate Change	Low sensitivity to climate change close to the site. Slight overlap occurs between the 0.1% HEFS extent and the amendment boundary affecting approximately 188m ² . Potential increase in surface water runoff from increased rainfall.
Conclusion	Amendment No.2(h) provides for the rezoning of lands from Strategic Reserve to New Residential to support housing delivery in Carlow Town in accordance with the Core Strategy, settlement hierarchy and National Planning Framework housing targets.

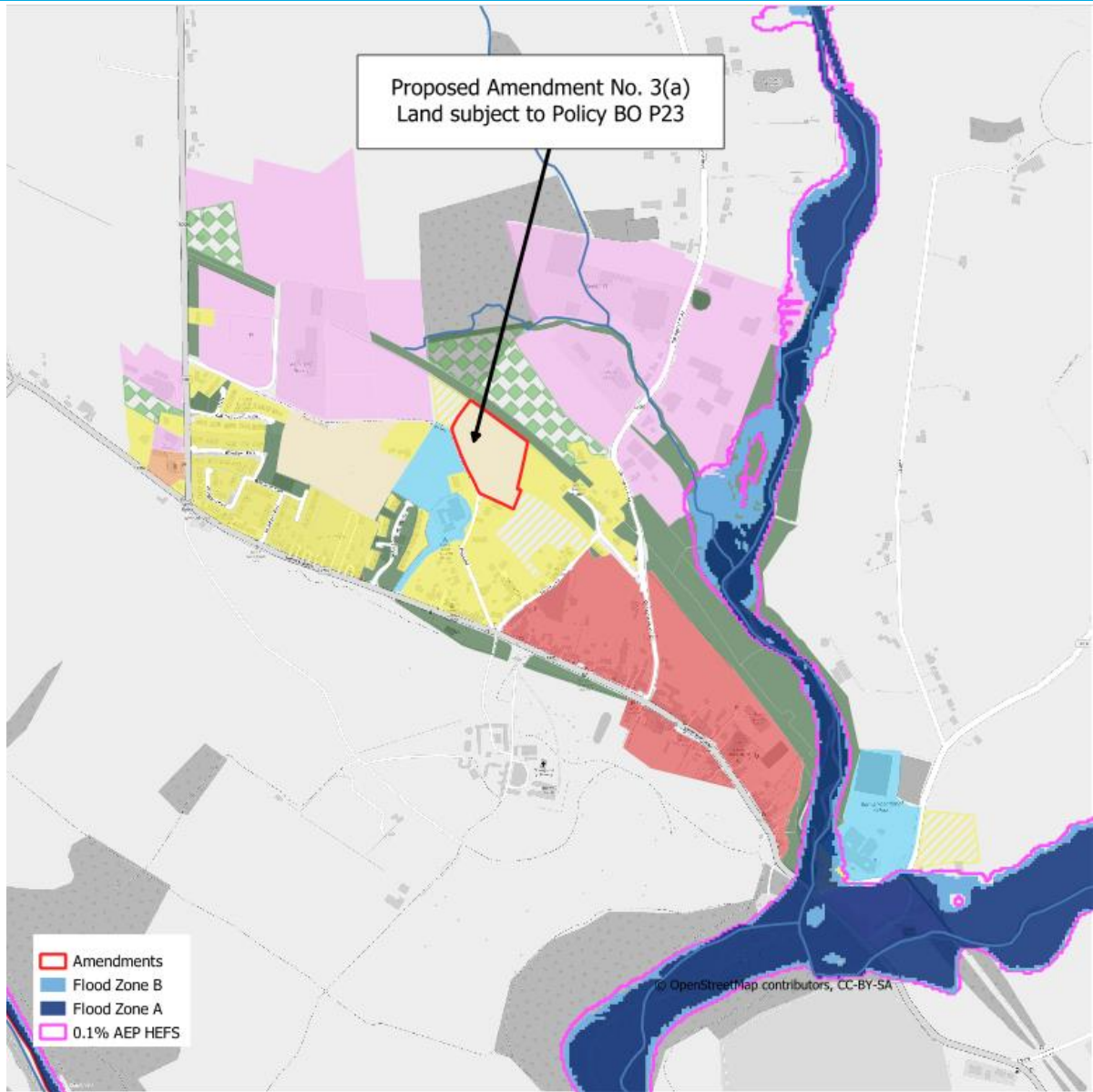
The lands subject to Amendment No.2(h) partially overlap Flood Zones A and B with a limited area of approximately 85m² along the southern boundary. The HEFS 0.1% AEP extent also overlaps the southern edge of the site.

The amendment introduces limited interaction with Flood Zones A and B. In this context, the plan-making Justification Test cannot be satisfied for these lands. Development must be avoided within areas affected by Flood Zones A and B and also within the HEFS 0.1% AEP extent, which should remain undeveloped. In line with Policy CW.H2, a development-free buffer in the form of open space will be provided within these areas. Flood risk will be managed through the application of the Sequential Approach at development plan stage.

Risk at this site can be managed in line with approved CCDP Policy and the guidance provided within the Carlow County Development Plan SFRA 2022–2028, with site-specific Flood Risk Assessment required at development stage where appropriate.

2.2 Borris

Hierarchy/Tier	Tier 3 - Small Towns
Area for Further Assessment under CFRAM programme?	No



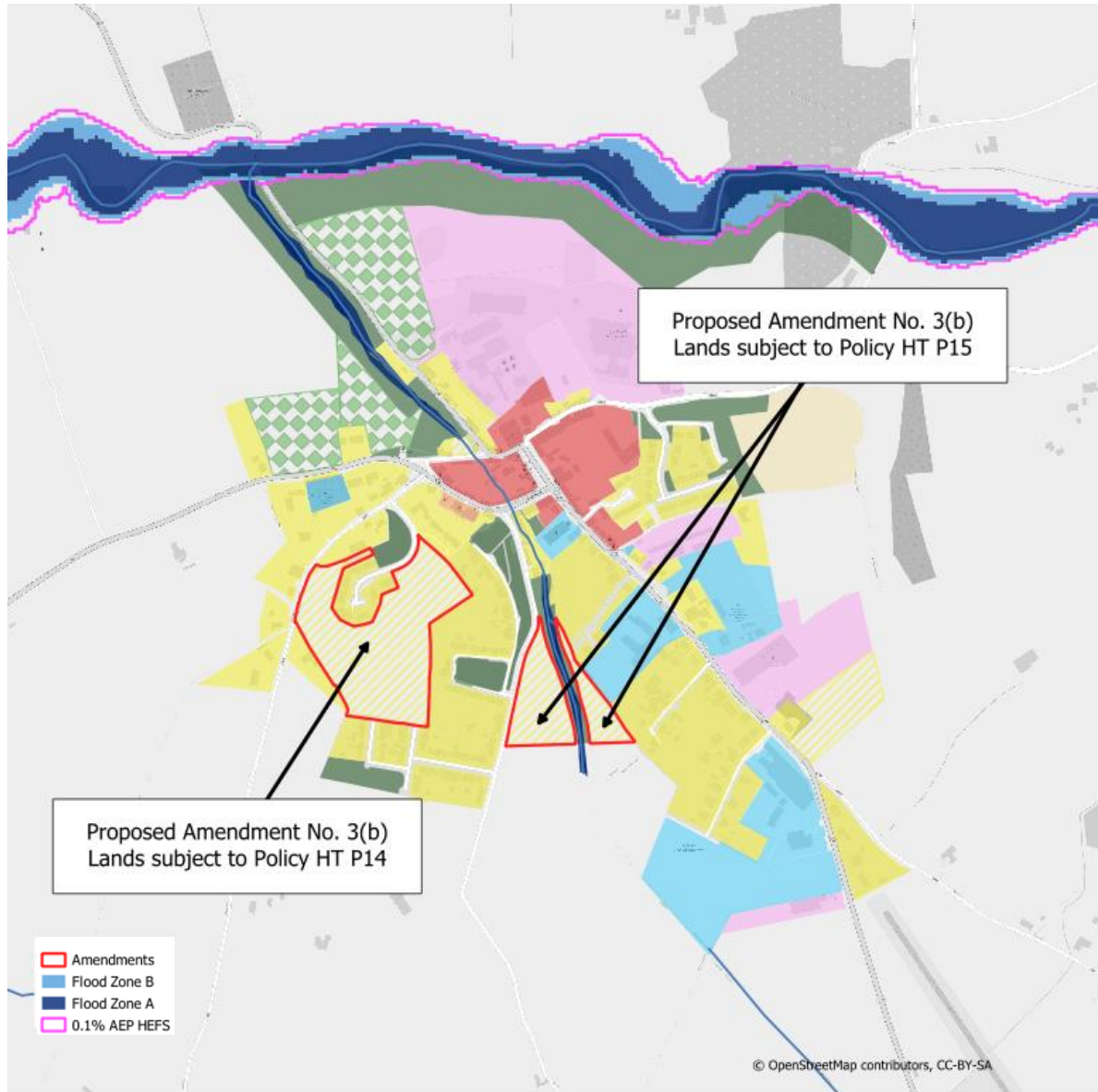
The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	NIFM
Historic Flooding	No historic records found within settlement boundary.
Climate Change	Climate change is not predicted to significantly increase fluvial flood extents on the Mountain River. The River Durin is more sensitive due to potential increases in surface water runoff from higher rainfall. The lands subject to Amendment No.3 remain in Flood Zone C and are not at risk of future fluvial flooding.
Conclusion	Amendment No.3 governs changes within Borris and relates to policy text amendments to existing residential zoning, with no new lands zoned for development. The Mountain River flows along the southern boundary of the settlement and

	<p>a tributary, the River Durin, approaches from the north, largely contained within Open Space and Amenity zoning. The New Residential lands subject to Amendment No.3 are located within Flood Zone C and are not subject to predicted fluvial flood risk or the HEFS 0.1% AEP extent. Some isolated areas of predicted PFRA pluvial flooding are present elsewhere within the settlement.</p> <p>The amendment does not introduce additional exposure to Flood Zones A or B. Flood and surface water risk associated with Amendment No.3 can be managed in line with approved CCDP Policy and the guidance provided within the Carlow County Development Plan SFRA 2022–2028.</p>
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2.3 Hacketstown

Hierarchy/Tier	Tier 3 - Small Towns
Area for Further Assessment under CFRAM programme?	No



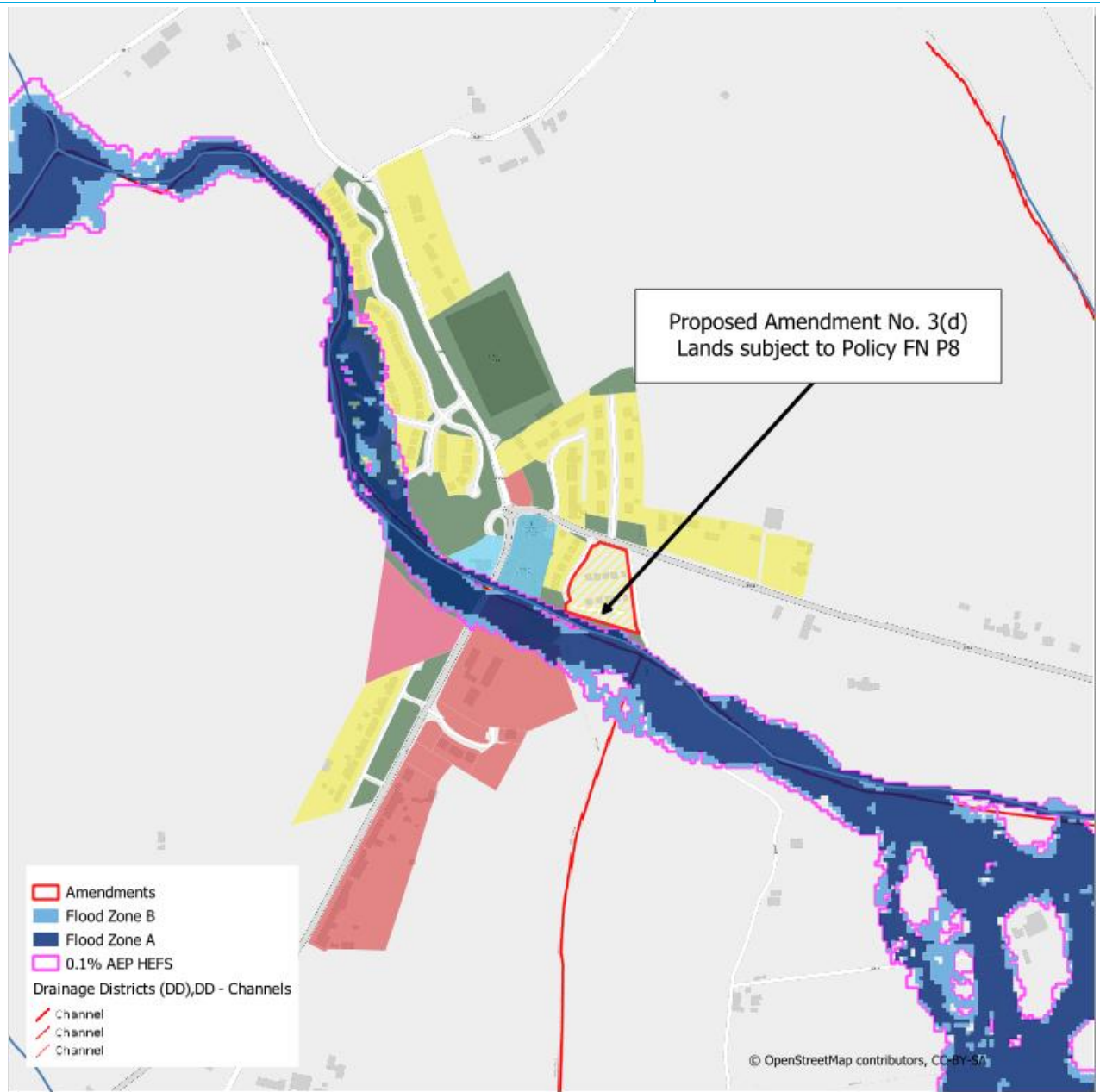
The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	NIFM & JBA
Historic Flooding	No historic records found within settlement boundary.
Climate Change	Low sensitivity to climate change. Potential increase in surface water runoff from increased rainfall.
Conclusion	<p>Amendment No.3 governs changes within Hacketstown and relates to policy text amendments to existing residential zoning, with no new lands zoned for development.</p> <p>The New Residential lands subject to Amendment No.3 are located within Flood Zone C and are not at risk from fluvial flooding or the HEFS 0.1% AEP extent. The River Derreen floodplain is located outside the development areas and is zoned as Open Space.</p>

	<p>The amendment does not introduce additional exposure to Flood Zones A or B. Flood and surface water risk associated with Amendment No.3 can be managed in line with approved CCDP Policy and the guidance provided within the Carlow County Development Plan SFRA 2022–2028.</p>
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2.4 Fennagh

Hierarchy/Tier	Tier 4 - Larger Serviced Village
Area for Further Assessment under CFRAM programme?	No



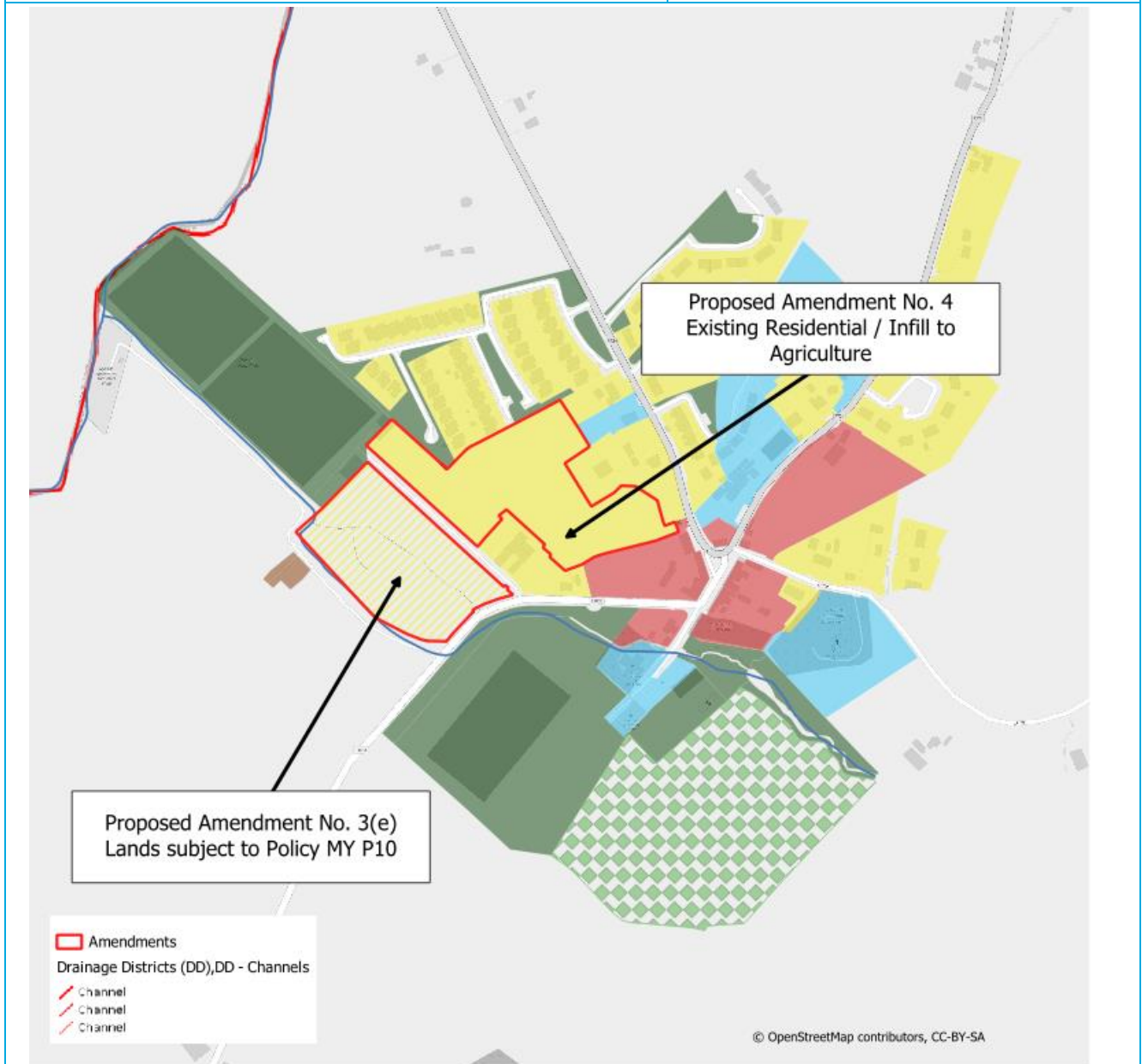
The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	NIFM
Historic Flooding	No records within the settlement boundary.
Climate Change	Low/moderate sensitivity to climate change. Potential increase in surface water runoff from increased rainfall.
Conclusion	<p>Amendment No.3 governs changes within Fennagh and relates to policy text amendments to existing residential zoning, with no new lands zoned for development.</p> <p>A Drainage District channel flows through the wider settlement in a south-easterly direction. While the Flood Zones and HEFS 0.1% AEP extent comes close to the New Residential lands, no overlap occurs and these lands remain within Flood Zone C.</p>

	<p>The amendment does not introduce additional exposure to Flood Zones A or B. Flood and surface water risk associated with Amendment No.3 can be managed in line with approved CCDP Policy and the guidance provided within the Carlow County Development Plan SFRA 2022–2028.</p>
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2.5 Myshall

Hierarchy/Tier	Tier 4 - Larger Serviced Village
Area for Further Assessment under CFRAM programme?	No



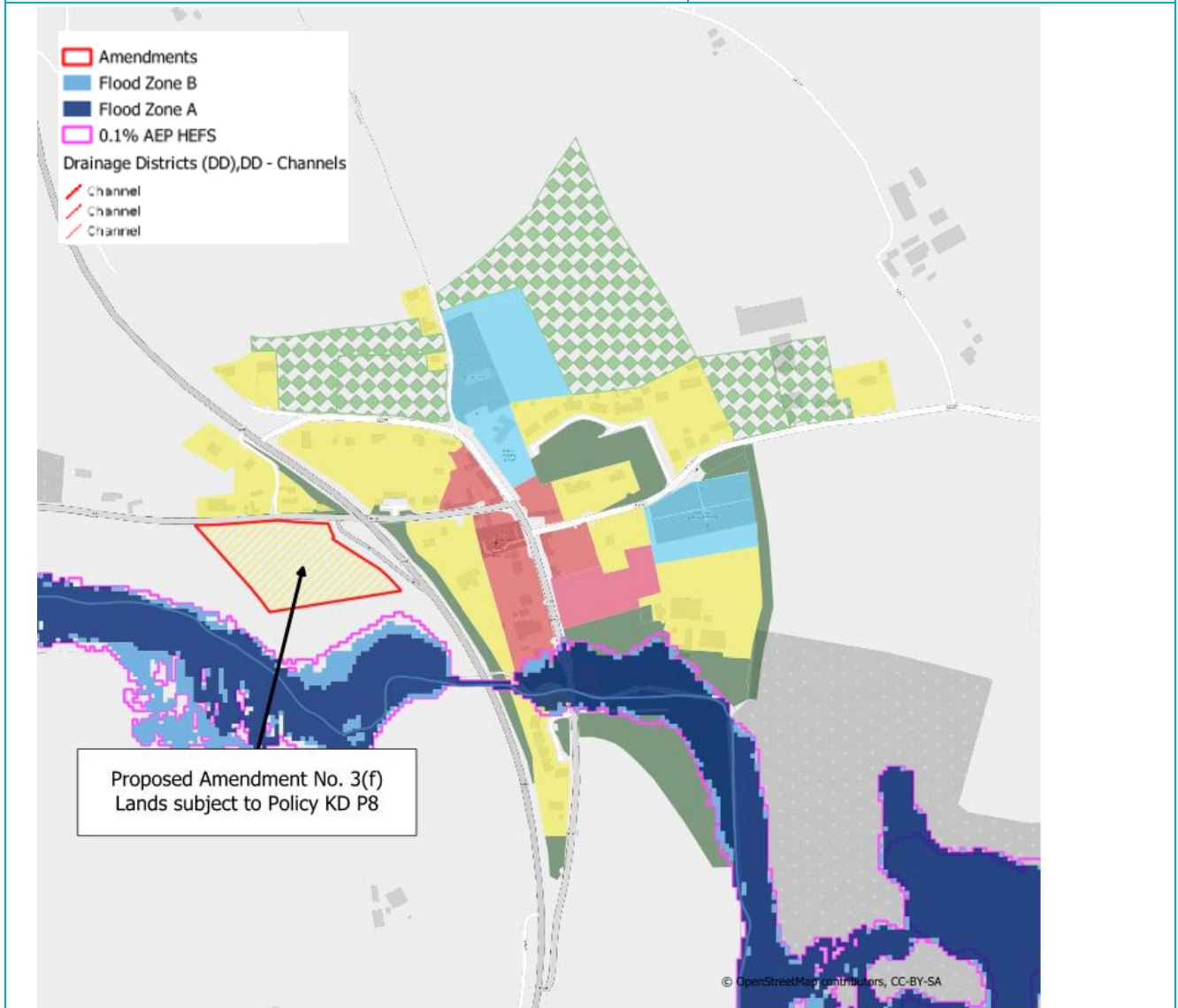
The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	NA
Historic Flooding	No records within the settlement boundary.
Climate Change	Potential increase in rainfall runoff.
Conclusion	<p>Amendment No.3 applies to Myshall and relates to policy text amendments to existing residential zoning, with no new lands zoned for development. Amendment No.4 also applies and provides for the rezoning of lands from Existing Residential / Infill to Agriculture.</p> <p>A Drainage District channel flows north along the western side of the village. There is no predicted fluvial flood mapping affecting the settlement and no recorded flood history. The areas subject to Amendments No.3 and No.4 are located within Flood Zone C and are not affected by the HEFS 0.1% AEP</p>

	<p>extent or the GSI SAR Seasonal Flood Maps. Flood risk in Myshall is therefore limited to pluvial mechanisms.</p> <p>An unmapped watercourse flows southeast to northwest through the settlement along the boundary of the New Residential zoning, has a catchment less than 1km², is not considered a significant flood risk, and will be addressed at development management stage under a formal FRA.</p> <p>Neither amendment introduces, or is likely to introduce additional exposure to Flood Zones A or B. Flood and surface water risk associated with Amendments No.3 and No.4 can be managed in line with approved CCDP Policy and the guidance provided within the Carlow County Development Plan SFRA 2022–2028.</p>
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2.6 Kildavin

Hierarchy/Tier	Tier 3 - Larger Serviced Village
Area for Further Assessment under CFRAM programme?	No



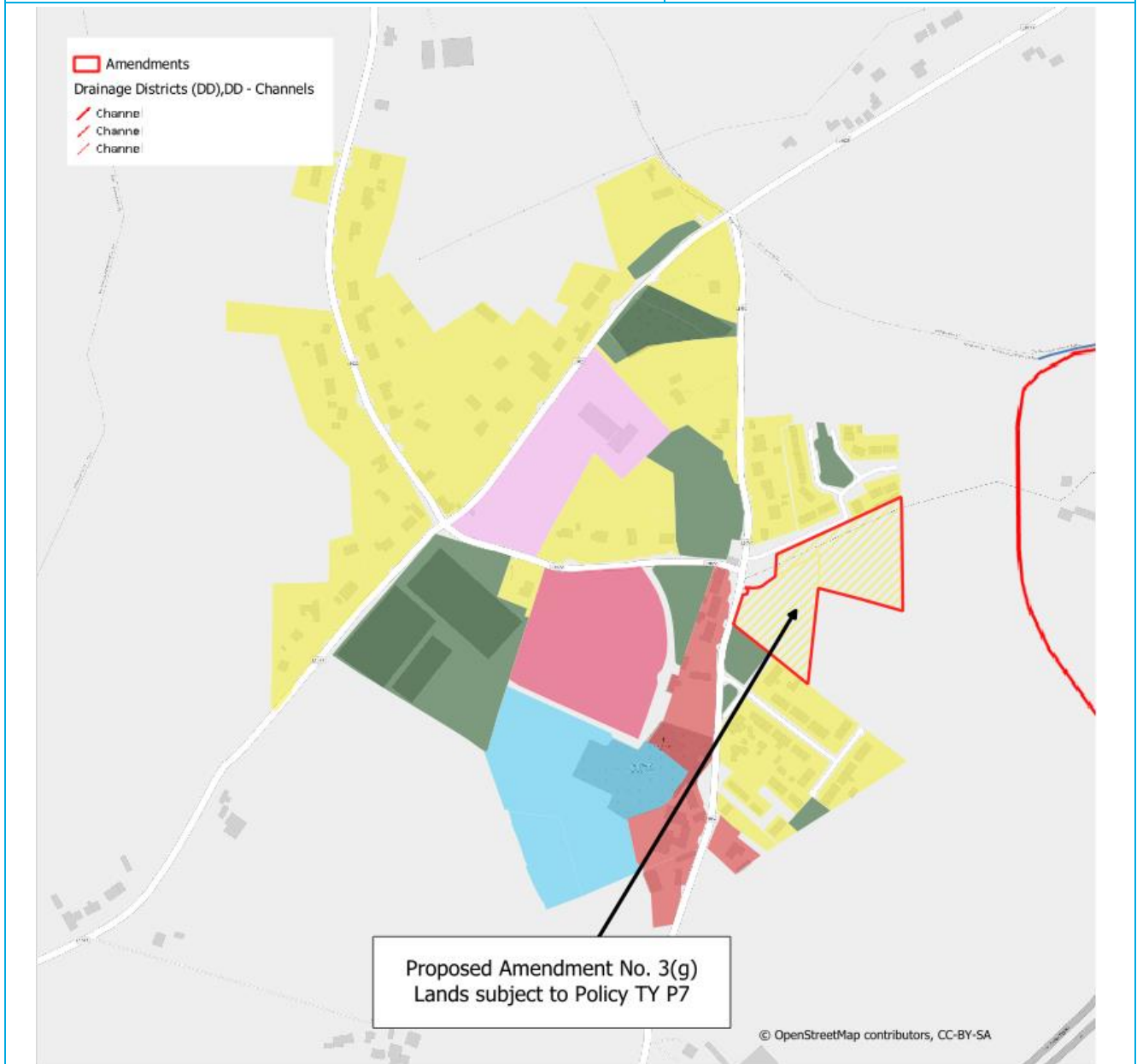
The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	NIFM
Historic Flooding	Kildavin village – recurring flood c 185m to the northeast of the site. Following very heavy rain, the surface drainage in the village cannot deal adequately with runoff from adjacent high ground.
Climate Change	Low sensitivity to climate change. Potential increase in surface water runoff from increased rainfall.
Conclusion	<p>Amendment No.3 governs changes within Kildavin and relates to policy text amendments to existing residential zoning, with no new lands zoned for development.</p> <p>A tributary of the River Slaney flows in a south-easterly direction through the village. The New Residential lands subject to Amendment No.3 are located within Flood Zone C and are not affected by predicted fluvial flooding or the HEFS 0.1% AEP extent.</p>

	<p>The amendment does not introduce additional exposure to Flood Zones A or B. Flood and surface water risk associated with Amendment No.3 can be managed in line with approved CCDP Policy and the guidance provided within the Carlow County Development Plan SFRA 2022–2028.</p>
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2.7 Tinryland

Hierarchy/Tier	Tier 4 - Larger Serviced Village
Area for Further Assessment under CFRAM programme?	No



The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	NA
Historic Flooding	Dip in road – insufficient drainage capacity. Road periodically impassable. Occurs c. 365m to the north of the site
Climate Change	Potential increase in surface water runoff from increased rainfall.
Conclusion	<p>Amendment No.3 governs changes within Tinryland and relates to policy text amendments to existing residential zoning, with no new lands zoned for development.</p> <p>There are no watercourses within the settlement. A Drainage District channel is located to the east of the village. The New Residential lands subject to Amendment No.3 are located within Flood Zone C and are not at risk from fluvial flooding or the HEFS 0.1% AEP extent.</p>

	<p>The amendment does not introduce additional exposure to Flood Zones A or B. Flood and surface water risk associated with Amendment No.3 can be managed in line with approved CCDP Policy and the guidance provided within the Carlow County Development Plan SFRA 2022–2028.</p>
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