STRATEGIC FLOOD RISK ASSESSMENT

FOR THE

DRAFT
GALWAY COUNTY DEVELOPMENT PLAN 2022-2028

for: **Galway County Council**

Áras an Chontae

Prospect Hill

Galway

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Section 1 Introduction and Policy Background

1.1 Introduction and Terms of Reference

Galway County Council is reviewing the Galway County Development Plan 2014 (as varied) and has prepared the Draft Galway County Development Plan 2022-2028 hereafter referred to as the "Draft Plan".

The preparation of the Draft Plan is undergoing an appropriate level of Strategic Flood Risk Assessment (SFRA) in accordance with *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and Department of the Environment, Community and Local Government Circular PL 2/2014. The SFRA provides an assessment of flood risk and includes mapped boundaries for Flood Risk Zones.

The SFRA in an ongoing process, alongside the Plan-preparation process, and will be updated to take into account, for example, any new information or any future changes to the Draft Plan on foot of submissions.

1.2 Summary of Conclusion and Recommendations

The purpose of this document is to detail the findings of the SFRA that is being undertaken alongside the preparation of the Draft Plan.

The SFRA has informed the Draft Plan and enables compliance with the Flood Risk Management Guidelines. Most SFRA recommendations – including those related to land use zoning and flood risk management provisions – have been integrated into the Draft Plan; however, a Member's amendment was approved that is contrary to the Guidelines – see Section 4.5.

1.3 Flood Risk and its Relevance as an Issue to the Plan

1.3.1 Flood Risk

Flooding is an environmental phenomenon and can pose a risk to human health as well as causing economic and social effects. Some of the effects of flooding are identified on Table 1 below.

Certain lands within the County have the potential to be vulnerable to flooding and this vulnerability could be exacerbated by changes in both the occurrence of severe rainfall events and associated flooding. Local conditions such as low-lying lands and slow surface water drainage can increase the risk of flooding.

Table 1 Potential effects that may occur as a result of flooding

Tangible Effects	Intangible Human and Other Effects
Damage to buildings (houses)	Loss of life
Damage to contents of buildings	Physical injury
Damage to new infrastructure e.g. roads	Increased stress
Loss of income	Physical and psychological trauma
Disruption of flow of employees to work causing knock on effects	Increase in flood related suicide
Enhanced rate of property deterioration and decay	Increase in ill health
Long term rot and damp	Homelessness
	Loss of uninsured possessions

1.4 Flood Risk Management Policy

1.4.1 EU Floods Directive

The European Directive 2007/60/EC on the assessment and management of flood risk aims to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU. The Directive requires Member States to:

- Carry out a preliminary assessment by 2011 in order to identify the river basins and associated coastal areas where potential significant flood risk exists (preliminary mapping was prepared and a list of Areas for Further Assessment finalised in 2012).
- Prepare flood extent maps for the identified areas (finalised in 2016 for inclusion in Flood Risk Management Plans – see below).
- Prepare flood risk management plans focused on prevention, protection and preparedness. These plans are to include measures to reduce the probability of flooding and its potential consequences. These Plans were adopted in 2018.

Implementation of the EU Floods Directive is required to be coordinated with the requirements of the EU Water Framework Directive and the current National River Basin Management Plan.

1.4.2 National Flood Policy

Historically, flood risk management focused on land drainage for the benefit of agricultural improvement. With increasing urbanisation, the Arterial Drainage Act, 1945, was amended in 1995 to permit the Office of Public Works (OPW) to implement localised flood relief schemes to provide flood protection for cities, towns and villages.

In line with changing national and international paradigms on how to manage flood risk most effectively and efficiently, a review of national flood policy was undertaken in 2003-2004. The review was undertaken by an Inter-Departmental Review Group, led by the Minister of State at the Department of Finance with special responsibility for the OPW. The Review Group prepared a report that was put to Government, and subsequently approved and published in September 2004 (Report of the Flood Policy Review Group, OPW, 2004).

The scope of the review included a review of the roles and responsibilities of the different bodies with responsibilities for managing flood risk, and to set a new policy for flood risk management in Ireland into the future. The adopted policy was accompanied by many specific recommendations, including:

- Focus on managing flood risk, rather than relying only flood protection measures aimed at reducing flooding;
- Taking a catchment-based approach to assess and manage risks within the whole-catchment context; and
- Being proactive in assessing and managing flood risks, including the preparation of flood maps and flood risk management plans.

1.4.3 National CFRAM Programme

The national Catchment Flood Risk Assessment and Management (CFRAM) programme commenced in Ireland in 2011. The CFRAM Programme is intended to deliver on core components of the National Flood Policy, adopted in 2004, and on the requirements of the EU Floods Directive. The Programme is being implemented through CFRAM studies that have been undertaken for each of the river basin districts in Ireland.

The CFRAM Programme comprises three phases as follows:

- The Preliminary Flood Risk Assessment[1] (PFRA) mapping exercise, which was completed in 2012;
- The CFRAM Studies and parallel activities, with Flood Risk Management Plans finalised in 2018; and
- Implementation and Review.

The Programme provides for three main consultative stages as follows:

- Consultation for the PFRA mapping that was adopted in 2012;
- Consultation for Flood Extent mapping, that was finalised in 2016 for inclusion in Flood Risk Management Plans; and
- Consultation for Flood Risk Management Plans, that were adopted in 2018.

The OPW is the lead agency for flood risk management in Ireland. The coordination and implementation of Government policy on the management of flood risk in Ireland is part of its responsibility. The European Communities (Assessment and Management of Flood Risks) Regulations 2010 (S.I. No. 122) identifies the Commissioners of Public Works as the 'competent authority' with overall responsibility for implementation of the Floods Directive 2007/60/EC. The OPW is the principal agency involved in the preparation of CFRAM Studies.

1.4.4 Flood Risk Management Guidelines

1.4.4.1 Introduction

In 2009, the OPW and the then Department of the Environment and Local Government (DEHLG) published Guidelines on flood risk management for planning authorities entitled *The Planning System and Flood Risk Management - Guidelines for Planning Authorities*. The Guidelines introduce mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. Implementation of the Guidelines is intended to be achieved through actions at the national, regional, local authority and site-specific levels. Planning authorities and An Bord Pleanála are required to have regard to the Guidelines in carrying out their functions under the Planning Acts.

The core objectives of the Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water run-off;
- Ensure effective management of residual risks for development permitted in floodplains;
- Avoid unnecessary restriction of national, regional or local economic and social growth;
- Improve the understanding of flood risk among relevant stakeholders; and
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

1.4.4.2 Principles of Flood Risk Management

The key principles of flood risk management set out in the flood Guidelines are to:

- Avoid development that will be at risk of flooding or that will increase the flooding risk elsewhere, where possible;
- Substitute less vulnerable uses, where avoidance is not possible; and
- Mitigate and manage the risk, where avoidance and substitution are not possible.

[1] The PFRAs identified areas at risk of significant flooding and includes maps showing areas deemed to be at risk. The areas deemed to be most significant risk, where the flood risk that is of particular concern nationally, are identified as Areas for Further Assessment (AFAs). AFAs were identified in County Galway at Ahascragh, Athenry, Ballinasloe, Claregalway, Clifden, Corrofin, Galway City, Gort, Kinvarra, Loughrea, Oranmore, Oughterard, Portumna, Roundstone and Tuam.

The Guidelines follow the principle that development should not be permitted in flood risk areas, particularly floodplains, except where there are no alternative and appropriate sites available in lower risk areas that are consistent with the objectives of proper planning and sustainable development.

Development in areas that have the highest flood risk should be avoided and/or only considered in exceptional circumstances (through a prescribed *Justification Test*) if adequate land or sites are not available in areas that have lower flood risk. Most types of development would be considered inappropriate in areas that have the highest flood risk. Only water-compatible development such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation and essential transport infrastructure that cannot be located elsewhere would be considered appropriate in these areas.

1.4.4.3 Stages of SFRA

The Flood Risk Management Guidelines recommend a staged approach to flood risk assessment that covers both the likelihood of flooding and the potential consequences. The stages of appraisal and assessment are:

> **Stage 1 Flood risk identification** – to identify whether there may be any flooding or surface water management issues related to either the area of Regional Spatial and Economic Strategies, Development Plans and LAP's or a proposed development site that may warrant further investigation at the appropriate lower-level plan or planning application levels.
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> **Stage 2 Initial flood risk assessment** – to confirm sources of flooding that may affect a Plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment are scoped.
>
> **Stage 3 Detailed flood risk assessment** – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

1.4.4.4 Flood Zones

Flood risk is an expression of the combination of the flood probability or likelihood and the magnitude of the potential consequences of the flood event. It is normally expressed in terms of the following relationship:

Flood risk = Likelihood of flooding x Consequences of flooding

Likelihood of flooding is normally defined as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. For example, a 1% Annual Exceedance Probability (AEP) indicates the severity of a flood that is expected to be exceeded on average once in 100 years, i.e. it has a 1 in 100 (1%) chance of occurring in any one year.

Consequences of flooding depend on the hazards associated with the flooding (e.g. depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability of people, property and the environment potentially affected by a flood (e.g. the age profile of the population, the type of development and the presence and reliability of mitigation measures).

Flood zones are geographical areas within which the likelihood of flooding is in a particular range and they are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning.

There are three types of flood zones defined for the purposes of the Flood Guidelines:

- **Flood Zone A** – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding);
- **Flood Zone B** – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and
- **Flood Zone C** – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all other areas that are not in zones A or B.

A summary of the requirements of the Flood Guidelines for land uses across each of the above flood zones is provided at **Appendix I**.

1.5 Emerging Information and Disclaimer

It is important to note that compliance with the requirements of the Flood Risk Management Guidelines is currently based on emerging and best available data at the time of preparing the assessment, including Flood Risk Management Plans, which will be updated on a cyclical basis as part of CFRAM activities. The SFRA process for the Draft Plan is ongoing and will be updated as relevant, including to take account of any Material Alterations that arise during the Plan-preparation process.

Following adoption of the Plan, information in relation to flood risk may be altered in light of future data and analysis, by, for example, the OPW, or future flood events. As a result, all landowners and developers are advised that Galway County Council and their agents can accept no responsibility for losses or damages arising due to assessments of the vulnerability to flooding of lands, uses and developments. Owners, users and developers are advised to take all reasonable measures to assess the vulnerability to flooding of lands and buildings (including basements) in which they have an interest prior to making planning or development decisions. Any future SFRAs for the area will integrate other new and emerging data.

1.6 Content of the County Development Plan

The Galway County Development Plan is a land use plan and overall strategy for the proper planning and sustainable development of the functional area of County Galway over the six-year period 2022-2028. The Plan sets out the Councils proposed policies and objectives for the development of the County over the Plan period. The draft Plan comprises of the following documents:

There are two Volumes to the County Development Plan, and a number of documents that are appended to the Draft Plan which include:

- Volume 1 Written Statement
- Volume 2 Settlement Strategy
- Appendix 1 Local Authority Renewable Energy Strategy
- Appendix 2 Housing Strategy and Housing Need Demand Assessment
- Appendix 3 Galway County Transportation Planning Strategy
- Appendix 4 Landscape Character Assessment
- Appendix 5 Rural Housing Design Guidelines
- Appendix 6 Record of Protected Structures
- Appendix 7 Architectural Conservation Areas
- Appendix 8 Environmental Reports

The Written Statement comprises 15 chapters listed below. Chapters 1 – 14 include a vision, strategic aims and policy objectives. Chapter 15 sets out the Development Management Standards.

1. Introduction
2. Core Strategy, Settlement Strategy and Housing Strategy
3. Placemaking, Regeneration and Urban Living
4. Rural Living and Development

5. Economic, Enterprise and Retail
6. Transport and Movement
7. Infrastructure, Utilities and Environmental Protection
8. Tourism and Landscape
9. Marine and Coastal Management
10. Natural Heritage, Biodiversity and Green Infrastructure
11. Community Development and Social Infrastructure
12. Architecture, Archaeology and Culture
13. Gaeltacht and Islands
14. Climate Change, Energy and Renewable Resource
15. Development Management Standards

The most relevant parts of the Plan for this SFRA relate to land use zoning and provisions relating to flood risk management[2].

[2] Flood risk management recommendations made by the SFRA process and integrated into the Draft Plan are provided under Section 4.

Section 2 Stage 1 SFRA - Flood Risk Identification

2.1 Introduction

Stage 1 SFRA (flood risk identification) was undertaken in order to identify whether there may be any flooding or surface water management issues within or adjacent to zoned lands and consequently whether Stage 2 SFRA (flood risk assessment) should be proceeded to.

Different areas of County Galway are subject to different Flood Risk Management Plans:

- Corrib River Basin (UOM30)
- Galway Bay North River Basin (UOM31)
- Erriff - Clew Bay - Blacksod - Broadhaven River Basin (UOM32-33)
- Shannon Upper & Lower River Basin (UOM25-26)
- Galway Bay South East River Basin (UOM29)
- Shannon Estuary North & Mal Bay River Basin (UOM27-28)

Stage 1 SFRA is based on existing information on flood risk indicators based on historical evidence and computational models. **Appendix II** (pages 2-5) show the spatial distribution of County-wide historical and predictive flood risk indicators.

Appendix II also provides maps of these historical and predictive indicators for An Cheathrú Rua, An Spidéal, Baile Chláir, Ballygar, Bearna, Briar Hill, Clifden, Dunmore, Guarran, Glenamaddy, Headford, Kinvara, Maigh Cuilinn, Moylough, Oranmore, Oughterard and Portumna.

2.2 Drainage, Defences and Early Warning Systems

With regard to areas benefitting from drainage and defences (flood relief scheme works), there are various measures that have been implemented in County Galway that will contribute towards flood risk management. These include the culverting of various streams and rivers in many urban areas.

Embankments and associated predicted benefitting lands under a number of historical government schemes are mapped in **Appendix II**.

Arterial Drainage Schemes were carried out by the Office of Public Works under the Arterial Drainage Act 1945 to improve land for agricultural purposes and to mitigate flooding. Arterial drainage maintenance and monitoring of these schemes is still carried out by OPW on rivers, lakes, weirs, bridges and embankments to maintain adequate conveyance and ensure that flood waters (of varying magnitude) are retained in bank by lowering water levels during the growing season thus reducing waterlogging on the adjacent land during wetter periods. Arterial drainage maintenance schemes are common in Galway and as can be seen in **Appendix II**, various settlements and/or their surrounding areas benefit from these schemes.

Benefitting Areas have been notified to Insurance Ireland under the Ballinasloe (Derrymullen) Flood Relief Scheme which protects properties to a 1% AEP fluvial flood event.

The 2018 Flood Risk Management Plans identify various general measures under "Measures Applicable for all Areas"[3].

[3] Including under the headings of:
- Prevention: Sustainable Planning and Development Management
- Prevention: Sustainable Urban Drainage Systems
- Prevention: Voluntary Home Relocation
- Prevention: Local Adaptation Planning
- Prevention: Land Use Management and Natural Flood Risk Management Measures

With regard to Oranmore, the Galway Bay South East River Basin FRMP identifies:

- Development of a Flood Forecasting System

  High resolution forecasts are available at Galway Bay and, as part of a coastal flood forecasting system for Galway Bay, could be used to provide warning to the residents of Oranmore. This system would provide the ability to inform managing authorities and the public of the potential for failure or overtopping of flood defence structures and to trigger emergency response plans.

With regard to Gort, the Galway Bay South East River Basin FRMP identifies:

- Maintain the existing Gort Flood Relief Scheme

  There is an existing Flood Relief Scheme providing protection to properties in Gort. Ongoing maintenance will be undertaken of this scheme

- Development of a Flood Forecasting System

  To progress as part of the development of the National Flood Forecasting Service. This system would include a "level trigger flood warning" which would require the installation of a new telemetered level gauge at Gort Bridge. This system would provide the ability to inform managing authorities and the public of the potential for failure or overtopping of flood defence structures and to trigger emergency response plans.

With regard to Loughrea, the Galway Bay South East River Basin FRMP identifies:

- No structural Flood Relief Scheme is proposed at this time for Loughrea

  There is a relatively low level of flood risk to this community from rivers and/or the sea, and no structural flood relief measures are therefore proposed at this time. The current level of risk will be reviewed, along with all areas, on a regular basis into the future

With regard to Athenry, the Galway Bay South East River Basin FRMP identifies:

- No structural Flood Relief Scheme is proposed at this time for Athenry

  There is a relatively low level of flood risk to this community from rivers and/or the sea, and no structural flood relief measures are therefore proposed at this time. The current level of risk will be reviewed, along with all areas, on a regular basis into the future.

With regard to Portumna, the Shannon Upper & Lower River Basin FRMP identifies:

- Progress the development of a Flood Relief Scheme for Portumna

  Progress the project-level development and assessment of a Flood Relief Scheme for Portumna, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation. The proposed measure for Portumna that may be implemented after project-level assessment and planning or Exhibition and confirmation might include;
    - Construction of a 434m new flood defence wall and an 870m embankment.
    - Installation of a simple flood-forecasting unit, including an addition of telemetry to an existing hydrometric gauge to send warning messages when water level reaches a specified trigger point.
    - Public awareness
    - Raised road level over a length of 20m along the north of Portumna Harbour.
    - Vertical Sector Gate to act as a barrier to flooding across the entrance to Portumna Harbour to prevent the inlet receiving flood water directly from the Shannon. The structure would consist of a set of gates which could be closed after a flood warning, and open during normal conditions to allow the passage of boats.
    - Maintain existing flood defences.

With regard to Balinasloe, the Shannon Upper & Lower River Basin FRMP identifies:

- Maintain the existing Ballinasloe (Derrymullen) Flood Relief Scheme

  There is an existing Flood Relief Scheme providing protection to properties in Ballinasloe (Derrymullen). Ongoing maintenance will be undertaken of this scheme. The Derrymullan Flood works were initiated in 2010 following major

- Protection: Minor Works Scheme Maintenance of Arterial Drainage Schemes and Existing Flood Relief Schemes
- Protection: Maintenance of Drainage Districts Maintenance of Channels Not Part of a Scheme
- Preparedness: Flood Forecasting and Warning
- Preparedness: Review of Emergency Response Plans for Severe Weather
- Preparedness: Individual and Community Resilience
- Preparedness: Individual Property Protection
- Preparedness: Flood-Related Data Collection

flooding in the 2009 flood event, and constructed from 2010 to 2011. The works comprise the construction of a flood relief wall around Derrymullan, installation of penstock and flood gates and provides protection against a 1% AEP (100 year) fluvial event from the Deerpark River for 135 properties.

- Measure Underway: Progress a Flood Relief Scheme for Ballinasloe (Stage I Scheme Development and Preliminary Design)

  The proposed Ballinasloe Flood Relief Scheme may include, construction of new flood defence walls, flood defence embankments and a demountable flood gate; Construction of two new flood alleviation arch culverts at Ballinasloe East Bridge. Regrading of the riverbank upstream and downstream of the bridge to maximize efficiency of the flood alleviation culverts; Construction of two Lock Gates across the Canal and a sluice gate across the channel flowing into the marina; Upgrade existing culvert; Upgrade the existing Kilclooney Road Bridge on the River Deerpark; Regrading of the riverbed upstream and downstream of Kilclooney Road Bridge to maximize efficiency; Maintain all existing defences. The proposed scheme is expected to provide protection against the 100-year flood (1% Annual Exceedance Probability)

With regard to Ahascragh, the Shannon Upper & Lower River Basin FRMP identifies:

- Undertake a Detailed Assessment of the Viability of a Potential Measure for Ahascragh

  Undertake a detailed assessment of the flood risk, including re-assessment of the 2015/2016 floods, to determine if an economically viable measure may exist that could justify implementation under the Minor Works Programme. The flood risk management measures considered are based on the predicted flood risk maps which were determined using all available survey and historical data up to Summer 2012. Anecdotal evidence from flood events in November/December 2015 and hydrometric gauge 26120 suggest that the Shannon CFRAM predicted flood maps may, however, under-predict the flood extent for less frequent (i.e. greater magnitude) flood events, and that there are areas of Ahascragh at risk of flooding that are not represented in the CFRAM predicted flood maps.

With regard to Tuam, the Corrib Catchment FRMP identifies:

- No structural Flood Relief Scheme is proposed at this time for Tuam

  There is a relatively low level of flood risk to this community from rivers and/or the sea, and no structural flood relief measures are therefore proposed at this time. The current level of risk will be reviewed, along with all areas, on a regular basis into the future

With regard to Corrofin, the Corrib Catchment FRMP identifies:

- Undertake a Detailed Assessment of the Proposed Flood Relief Scheme

  Potentially viable structural flood relief measures have been investigated for Corrofin. A technically viable flood relief scheme has been identified, however, a more detailed assessment of the costs and benefits will be completed to determine if the proposed Scheme is feasible.

With regard to Baile Chláir, the Corrib Catchment FRMP identifies:

- Measure Underway: Progress a Flood Relief Scheme for the Clare River (Claregalway) (Status: Stage V: Handover of Works)

  The Clare River(Claregalway) Flood Relief Scheme includes a Flood eye at Claregalway Bridge with associated channel deepening upstream under and downstream of the bridge and flood eye; a new bridge at Crusheeny; Channel widening from downstream of Crusheeny Bridge for 1.3 km upstream; new embankment upstream of the confluence with the Islandmore drain for 0.7 km with a non-return valve on the Islandmore drain; embankment at the Nine Arches Bridge; Increasing capacity of two culverts on the Kiniska drain; drainage for floodwater via pipeline from Lakeview to the Clare River; drainage for floodwater from Carnmore / Cashla area via pipeline to Islandmore drain; maintenance of the stretch of the Clare River and tributaries within the Scheme; road raising at Miontagh South. The scheme will protect against the 100-year flood (1% Annual Exceedance Probability)

With regard to Oughterard, the Corrib Catchment FRMP identifies:

- No structural Flood Relief Scheme is proposed at this time for Oughterard

  Potentially viable structural flood relief measures have been investigated for this community. However, the benefits accruing from these measures would not justify the costs of structural works at this time. The current level of risk will be reviewed, along with all areas, on a regular basis into the future.

With regard to Oughterard, the Galway Bay North FRMP identifies:

- Development of a Flood Forecasting System

  To progress as part of the development of the National Flood Forecasting Service. High resolution forecasts are available at Galway Bay and, as part of a coastal flood forecasting system for Galway Bay, could be used to provide

warning to the residents of Roundstone. This system would provide the ability to inform managing authorities and the public of the potential for failure or overtopping of flood defence structures and to trigger emergency response plans.

With regard to Clifden, the Erriff - Clew Bay - Blacksod - Broadhaven FRMP identifies:

- Progress the development of a Flood Relief Scheme for Clifden

  Progress the project-level development and assessment of a Flood Relief Scheme for Clifden, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation.

The provision of flood protection measures can significantly reduce flood risk. However, the Ministerial Guidelines require that the presence of flood protection structures should be ignored in determining flood zones. This is because of risks relating to failure and severe flood events that exceed design capacity (the risk of severe events is exacerbated with climate change). Notwithstanding this, new development can proceed in areas that are at elevated levels of flood risk subject to the Justification Test provided for by the Guidelines being passed, which takes into account proposals to manage flood risk, such as the development of defences. Although insurance can be challenging to attain in these instances.

Various rivers and their banks and culverts in the County are maintained by the Office of Public Works and Galway County Council.

As provided for under Draft Plan Objective FRM 07 it is Council policy to "Protect water bodies and watercourses within the County from inappropriate development, including rivers, streams, associated undeveloped riparian strips, wetlands and natural floodplains. This will include buffers in riverine and wetland areas as appropriate. Consult with the OPW in relation to proposed developments in the vicinity of drainage channels and rivers for which the OPW are responsible, and retain a strip on either side of such channels where required, to facilitate maintenance access thereto. In addition, promote the sustainable management and uses of water bodies and avoid culverting or realignment of these features". Such protection will, in combination with the direction of development within the existing footprints of settlements, safeguard flood plains from development throughout the County.

Met Éireann currently issues flood warnings for County Galway. Met Éireann, in collaboration with the OPW, is currently engaged in the establishment of a National Flood Forecasting and Warnings Service to forecast for fluvial and coastal flood events.

2.3 Other Flood Studies

Other Flood Studies considered in the preparation of this assessment include:

- Flood Risk Management Plan (Corrib River Basin), 2018;
- Flood Risk Management Plan (Galway Bay North River Basin), 2018;
- Flood Risk Management Plan (Erriff - Clew Bay - Blacksod - Broadhaven), 2018;
- Flood Risk Management Plan (Shannon Upper & Lower), 2018;
- Flood Risk Management Plan (Galway Bay South East), 2018;
- Flood Risk Management Plan (Shannon Estuary North & Mal Bay), 2018;
- Previous SFRAs in County Galway; and
- Regional Flood Risk Assessment for the Northern and Western Regional Spatial and Economic Strategy, 2020.

2.4 Flood Risk Indicators

Indicators of flood risk that are based on historical flooding events are identified and described on Table 2 and mapped at county and settlement level in **Appendix II**.

Indicators of flood risk that are based on computational models – predictive flood risk indicators – are identified and described on Table 3 and mapped at county and settlement level in **Appendix II**.

Table 2 Historical Flood Risk Indicators

Information Source	Description	Strategic Limitations
Recorded Flood Events from the OPW	A flood event is the occurrence of recorded flooding at a given location on a given date. The flood event is derived from different types of information (reports, photographs etc.).	This dataset only provides a spot location
Recurring Flood Events	A flood event that has occurred more than once at a certain area is named a recurring flood event.	This dataset only provides a spot location
OPW Flood Extent	A flood extent is an inundated area as recorded at a certain moment in time. This layer of information includes floods recorded in 1999/2000 and 1954.	Coverage limited
Alluvium Soils	Mineral alluvial soil mapping is indicative of recurrent or significant fluvial flooding at some point in the past and was generated by Teagasc with co-operation of the Forest Service, EPA and GSI. This project was completed May 2006.	Drainage may have changed significantly since these soils were deposited.
Benefitting lands (OPW)	Benefitting lands mapping is a dataset identifying land that might benefit from the implementation of Arterial (Major) Drainage Schemes (under the Arterial Drainage Act 1945) and indicating areas of land estimated or reported to be subject to flooding or poor drainage.	Identifies broad areas - low resolution for flood risk management
Drainage Districts (OPW)	This drainage scheme mapping dataset was prepared on behalf of the Drainage Districts (Local Authorities with statutory responsibility for maintenance under the Arterial Drainage Act, 1925). These maps identify land that might benefit from the implementation of Arterial (Major) Drainage Schemes and indicate areas of land subject to flooding or poor drainage.	Identifies large broad areas - very low resolution for flood risk management
Land Commission (OPW)	This dataset indicates areas of land defended to some degree against flooding that were formerly the responsibility of the Land Commission.	Identifies broad areas - low resolution for flood risk management

Table 3 Predictive Flood Risk Indicators

Information Source	Description	Strategic Limitations
CFRAM Study, Flood Extent Mapping, 2016	Following the undertaking of the PFRA, the OPW, through its engineering consultants and working with local authorities and other stakeholders, conducted extensive engineering assessments to better understand and detail the actual risk from flooding for areas that were at highest levels of risk. This was the subject of public consultation. The outcome of that work includes Predicted Flood Extent maps that were finalised in 2016. For fluvial flood levels, calibration and verification of the models make use of the best available data including hydrometric records, photographs, videos, press articles and anecdotal information.	Spatial spread is limited, including to the areas that are considered to be at most risk of flooding.
OPW Preliminary Flood Risk Assessment (PFRA) Fluvial, Groundwater and Pluvial flood maps, 2012[4]	The OPW PFRA mapping dataset has been arrived at by: • Reviewing records of floods that have happened in the past; • Undertaking analysis to determine which areas might flood in the future, and what the impacts might be; and • Extensive consultation with each local authorities and other Government departments and agencies. This assessment has considered all types of flooding, including that which can occur from rivers, the sea and estuaries, heavy rain, groundwater, the failure of infrastructure, and so on. It has also considered the impacts flooding can have on people, property, businesses, the environment and cultural assets. Further information on the purpose and development of the OPW PFRA Maps are available on www.cfram.ie. National Coastal Protection Strategy Study flood and coastal erosion risk maps: the predicted flood extents that were produced under the Irish Coastal Protection Strategy Study (ICPSS) are based on analysis and modelling. The project included: • Analysis of historic recorded sea levels	The PFRA is only a preliminary assessment, based on available or readily derivable information. Analysis has been undertaken to identify areas prone to flooding, and the risks associated with such flooding, but this analysis is purely indicative and undertaken for the purpose of completing the PFRA. The mapping has been developed using simple and cost-effective methods and is based on broad-scale simple analysis and may not be accurate for a specific location/use.

[4] **Appendix II** of this assessment includes PFRA Fluvial and Coastal mapping. Pluvial and groundwater flood risk is present in the County, however; it is not taken into account in the delineation of flood zones. Nonetheless, it has informed the development of recommendations detailed in Section 4.

Information Source	Description	Strategic Limitations
	• Numerical modelling and statistical analysis of combined tide levels and storm surges to estimate extreme water levels along the national coastline • for defined probabilities • Calculation of the extent of the predictive flooding, by comparing calculated extreme tide and surge waters levels along the coast with ground level based on a Digital Terrain Model (DTM). These indicative national coastal flood maps are included in the Draft PFRA Maps, provided in a separate volume, for the purposes of consultation on the PFRA.	

2.5 Conclusion of Stage 1 SFRA

The information detailed above indicates elevated levels of flood risk in various locations across the County; therefore, a Stage 2 SFRA has been proceeded to.

Section 3 Stage 2 SFRA - Flood Risk Assessment

3.1 Introduction

Stage 2 SFRA (flood risk assessment) has been undertaken to:

- Confirm the sources of flooding that may affect zoned and adjacent areas;
- Appraise the adequacy of existing information as identified by the Stage 1 SFRA; and
- Scope the extent of the risk of flooding through the preparation of flood zone maps.

3.2 Findings and Adequacy of Existing Information and Delineation of Flood Zones

Desk and in-field studies were undertaken taking into account the following factors:

- OPW's CFRAMS fluvial flood extent mapping (2016) and other predictive indicators;
- Historical indicators of flood risk;
- Aerial photography;
- Documented Council knowledge of lands;
- Council Engineer review and input into indicators and flood zones (local knowledge);
- The potential source and direction of flood paths from the sea and rivers and streams;
- Vegetation indicative of flood risk; and
- The locations of topographic/built features that coincide with the flood indicator related boundaries/topographical survey.

Within the annual exceedance probabilities specified by the Flood Guidelines for Flood Zones A and B, there are elevated levels of flood risk within the majority of the County's settlements for which land use zoning is included in the Plan, as shown in **Appendix II**.

3.3 Flood Risk Zone Mapping

Flood Risk Zone maps have been produced taking into account the findings of the Stage 1 and Stage 2 SFRA desk and in field studies as identified above[5].

The maps are provided in **Appendix II** and identify Flood Zone A (darker blue) and Flood Zone B[6] (lighter blue). All other areas fall within Flood Zone C. As per the Guidelines, the flood zones in County Galway are as follows:

- Flood Zone A – where the probability of flooding from rivers is highest (greater than 1% or 1 in 100 for river flooding);
- Flood Zone B – where the probability of flooding from rivers is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding); and
- Flood Zone C – where the probability of flooding from rivers is low (less than 0.1% or 1 in 1000 for river flooding).

[5] Including taking into account predictive and historical indicators of flood risk, documented Council knowledge of lands, Council Engineer review and input into indicators and flood zones (local knowledge), the potential source and direction of flood paths from rivers and streams, vegetation indicative of flood risk and the locations of topographic/built features that coincide with the flood indicator related boundaries/topographical survey.

[6] As identified by the Guidelines, in rivers with a well-defined floodplain or where the coastal plain is well defined at its rear, the limits of Zones A and B will virtually coincide. Zone B will only be significantly different in spatial extent from Zone A where there is extensive land with a gentle gradient away from the river or the sea.

3.4 Sensitivity to Climate Change

'The Planning System and Flood Risk Management Guidelines for Planning Authorities and Technical Appendices, 2009' recommends that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects. In this regard, the Guidelines recommends:

- Recognising that significant changes in the flood extent may result from an increase in rainfall or tide events and accordingly adopting a cautious approach to zoning land in these potential transitional areas;
- Ensuring that the levels of structures designed to protect against flooding such as flood defences[7], land raising or raised floor levels are sufficient to cope with the effects of climate change over the lifetime of the development they are designed to protect (normally 85-100 years); and
- Ensuring that structures to protect against flooding and the development protected are capable of adaptation to the effects of climate change when there is more certainty about the effects and still time for such adaptation to be effective.

Advice on the expected impacts of climate change and the allowances to be provided for future flood risk management in Ireland is given in the OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (2009). Two climate change scenarios are considered. These are the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). The MRFS is intended to represent a "likely" future scenario based on the wide range of future predictions available. The HEFS represents a more "extreme" future scenario at the upper boundaries of future projections. Based on these two scenarios the OPW recommended allowances for climate change in relation to river flows and sea levels are given in Table 4. These climate change allowances are particularly important at the development management stage of planning, and will ensure that proposed development is designed and constructed to take into account best current knowledge. Climate change allowances have been integrated into the recommendations provided at Section 4 of this report and MRFS and HEFS mapping is available from the OPW for certain areas, including AFAs, and provided in **Appendix II** to this SFRA report.

Table 4 Allowances for Future Scenarios (100-Year Time Horizon)[8]

Criteria	MRFS – to be considered for most development scenarios	HEFS – to be considered in relation to high value, high vulnerability development which cannot be relocated
Extreme Rainfall Depths	+20%	+30%
Flood Flows	+20%	+30%
Mean Sea Level Rise	+500mm	+1000mm

[7] Defended areas are highly sensitive to climate change as the likelihood of defence failure and resulting flooding increases.
[8] OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (2009)

Section 4 Recommendations

4.1 Introduction

In order to comply with *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and Department of the Environment, Community and Local Government Circular (*PL 2/2014*) and contribute towards flood risk management within the Plan area, the recommendations below have been made by the SFRA process and generally integrated into the Draft Plan; however, a Member's amendment was approved that is contrary to the Guidelines – see Section 4.5.

4.2 Land Use Zoning

Text integrated into Volume 2

Constrained Land Use (CL)
To facilitate the appropriate management and sustainable use of flood risk within previously developed areas.

This zoning applies to previously developed areas only and limits new development, while recognising that existing development uses within these zones may require small scale development, as outlined below, over the life of the County Development Plan, which would contribute towards the compact and sustainable urban development of the village.

The underlying zoning or the existing permitted uses are deemed to be acceptable in principle for minor developments to existing buildings (such as small extensions to houses, most changes of use of existing buildings), which are unlikely to raise significant flooding issues, provided they do not obstruct important flow paths, introduce a significant additional number of people into flood risk areas or entail the storage of hazardous substances.

Since such applications concern existing buildings or developed areas, the sequential approach cannot be used to locate them in lower-risk areas and the Justification Test will not apply.

Development proposals within this zone shall be accompanied by a detailed Flood Risk Assessment, carried out in accordance with The Planning System and Flood Risk Assessment Guidelines and Circular PL 2/2014 (or as updated), which shall assess the risks of flooding associated with the proposed development.

Proposals shall only be considered where it is demonstrated to the satisfaction of the Planning Authority that they would not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities, or increase the risk of flooding to other locations. The nature and design of structural and non-structural flood risk management measures required for development in such areas will also be required to be demonstrated, to ensure that flood hazard and risk will not be increased. Measures proposed shall follow best practice in the management of health and safety for users and residents of the development.

Specifications for developments in flood vulnerable areas set out in this plan shall be complied with as appropriate. (Please also refer to policy objective SGV 17).

SGV 17 Flood Risk Areas and Land Use Zones
Ensure that any proposed development that may be compatible with the land use zoning policy objectives/matrix but which includes a use that is not appropriate to the Flood Zone (as indicated on Map 8 – Flood Risk Management) and/or that may be vulnerable to flooding is subject to flood risk assessment, in accordance with The Planning System and Flood Risk

Management Guidelines for Planning Authorities 2009 and the Departmental Circular Pl 2/2014 (or as updated within the lifetime of this plan) and the policy objectives of this plan.

Text integrated into Chapter 15 Development Management:

DM Standard 71: Flooding

Flood Zones and Appropriate Uses

The table below indicates the types of land uses that are appropriate in each of the Flood Zones identified within the Plan area, in accordance with the 2009 Flood Risk Management Guidelines for Planning Authorities and Departmental Circular PL2/2014 (or any updated/superseding legislation or policy guidance).

Where developments/land uses are proposed that are considered inappropriate to the Flood Zone, then a Development Management Justification Test and site-specific Flood Risk Assessment will be required in accordance with The Planning System and Flood Risk Management Guidelines 2009 (and as updated).

Flood Zones	Overall probability	Planning implications for land uses		
		Highly Vulnerable Development	Less Vulnerable Development	Water Compatible Development
Flood Zone A	Highest	Inappropriate – if proposed then Justification Test and detailed Flood Risk Assessment is required	Inappropriate – if proposed then Justification Test and detailed Flood Risk Assessment is required	Appropriate – screen for flood risk
Flood zone B	Moderate	Inappropriate – if proposed then Justification Test and detailed Flood Risk Assessment is required	Inappropriate due to climate change – if proposed then Justification Test and detailed Flood Risk Assessment is required	Appropriate – screen for flood risk
Flood Zone C	Lowest	Appropriate - detailed Flood Risk Assessment may be required	Appropriate - detailed Flood Risk Assessment may be required	Appropriate – screen for flood risk

Note (refer to Flood Risk Management Guidelines 2009 and 'SFRA for the Galway County Development Plan 2022-2028' for additional detail):

- Highly Vulnerable Development - Houses, schools, hospitals, residential institutions, emergency services, essential infrastructure, etc.
- Less Vulnerable Development - Economic uses (retail, leisure, warehousing, commercial, industrial, non-residential institutions, etc.), land and buildings used for agriculture or forestry, local transport infrastructure, etc.
- Water Compatible Development - Docks, marinas, wharves, water-based recreation and tourism (excluding sleeping accommodation), amenity open space, sports and recreation, flood control infrastructure, etc.

Structural and Non-Structural Risk Management Measures in Flood Vulnerable Zones

Applications for development in flood vulnerable zones shall provide details of structural and non-structural risk management measures to include, but not be limited to specifications of the following:

Floor Levels

In areas of limited flood depth, the specification of the threshold and floor levels of new structures shall be raised above expected flood levels to reduce the risk of flood losses to a building, by raising floor heights within the building structure using a suspended floor arrangement or raised internal concrete platforms.

When designing an extension or modification to an existing building, an appropriate flood risk reduction measure shall be specified to ensure the threshold levels into the building are above the design flood level. However, care must also be taken to ensure access for all is provided in compliance with Part M of the Building Regulations.

Where threshold levels cannot be raised to the street for streetscape, conservation or other reasons, the design shall specify a mixing of uses vertically in buildings - with less vulnerable uses located at ground floor level, along with other measures for dealing with residual flood risk.

Internal Layout

Internal layout of internal space shall be designed and specified to reduce the impact of flooding [for example, living accommodation, essential services, storage space for provisions and equipment shall be designed to be located above the predicted flood level]. In addition, designs and specifications shall ensure that, wherever reasonably practicable, the siting of living accommodation (particularly sleeping areas) shall be above flood level.

With the exception of single storey extensions to existing properties, new single storey accommodation shall not be deemed appropriate where predicted flood levels are above design floor levels. In all cases, specifications for safe access, refuge and evacuation shall be incorporated into the design of the development.

Flood-Resistant Construction
Developments in flood vulnerable zones shall specify the use of flood-resistant construction aimed at preventing water from entering buildings - to mitigate the damage floodwater caused to buildings.

Developments shall specify the use of flood resistant construction prepared using specialist technical input to the design and specification of the external building envelope – with measures to resist hydrostatic pressure (commonly referred to as "tanking") specified for the outside of the building fabric.

The design of the flood resistant construction shall specify the need to protect the main entry points for floodwater into buildings - including doors and windows (including gaps in sealant around frames), vents, air-bricks and gaps around conduits or pipes passing through external building fabric.

The design of the flood resistant construction shall also specify the need to protect against flood water entry through sanitary appliances as a result of backflow through the drainage system.

Flood-Resilient Construction
Developments in flood vulnerable zones that are at risk of occasional inundation shall incorporate design and specification for flood resilient construction which accepts that floodwater will enter buildings and provides for this in the design and specification of internal building services and finishes. These measures limit damage caused by floodwater and allow relatively quick recovery.

This can be achieved by specifying wall and floor materials such as ceramic tiling that can be cleaned and dried relatively easily, provided that the substrate materials (e.g. blockwork) are also resilient. Electrics, appliances and kitchen fittings shall also be specified to be raised above floor level, and one-way valves shall be incorporated into drainage pipes.

Emergency Response Planning
In addition to considering physical design issues for developments in flood vulnerable zones, the developer shall specify that the planning of new development also takes account of the need for effective emergency response planning for flood events in areas of new development.

Applications for developments in flood vulnerable zones shall provide details that the following measures will be put in place and maintained:

- Provision of flood warnings, evacuation plans and ensuring public awareness of flood risks to people where they live and work;
- Coordination of responses and discussion with relevant emergency services i.e. Local Authorities, Fire and Rescue, Civil Defence and An Garda Siochána through the SFRA; and
- Awareness of risks and evacuation procedures and the need for family flood plans.

Access and Egress During Flood Events
Applications for developments in flood vulnerable zones shall include details of arrangements for access and egress during flood events. Such details shall specify that: • flood escape routes have been kept to publicly accessible land; • such routes will have signage and other flood awareness measures in place, to inform local communities what to do in case of flooding; and this information will be provided in a welcome pack to new occupants.

Further Information
Further and more detailed guidance and advice can be found at http://www.flooding.ie and in the Building Regulations.

4.3 Integration of other provisions relating to flood risk management into the Plan

Other provisions relating to flood risk management, including the following, have also been integrated into the Draft Plan.

No.	Reference	Provision
1	FL 1	Flood Risk Management Guidelines It is the policy objective of Galway County Council to support, in co-operation with the OPW, the implementation of the EU Flood Risk Directive (2007/60/EC), the Flood Risk Regulations (SI No. 122 of 2010) and the DEHLG/OPW publication The Planning System and Flood Risk Management Guidelines (2009) (and any updated/superseding legislation or policy guidance) and Department Circular PL2/2014 or any updated / superseding version.

No.	Reference	Provision
2	FL 2	Flood Risk Management and Assessment Comply with the requirements of the DoEHLG/OPW The Planning System and Flood Risk Management Guidelines for Planning Authorities and its accompanying Technical Appendices Document 2009 (including any updated/superseding documents). This will include the following: (a) Avoid, reduce and/or mitigate, as appropriate in accordance with the Guidelines; (b) Development proposals in areas where there is an identified or potential risk of flooding or that could give rise to a risk of flooding elsewhere will be required to carry out a Site-Specific Flood Risk Assessment, and justification test where appropriate, in accordance with the provisions of The Planning System and Flood Risk Management Guidelines 2009 (or any superseding document); Any flood risk assessment should include an assessment of the potential impacts of climate change, such as an increase in the extent or probability of flooding, and any associated measures necessary to address these impacts; (c) Development that would be subject to an inappropriate risk of flooding or that would cause or exacerbate such a risk at other locations shall not normally be permitted; (d) Galway County Council shall work with other bodies and organisations, as appropriate, to help protect critical infrastructure, including water and wastewater, within the County, from risk of flooding.
3	FL 3	Principles of the Flood Risk Management Guidelines The Council shall implement the key principles of flood risk management set out in the Flood Risk Management Guidelines as follows: (a) Avoid development that will be at risk of flooding or that will increase the flooding risk elsewhere, where possible; (b) Substitute less vulnerable uses, where avoidance is not possible; and (c) Mitigate and manage the risk, where avoidance and substitution are not possible. Development should only be permitted in areas at risk of flooding when there are no alternative, reasonable sites available in areas at lower risk that also meet the objectives of proper planning and sustainable development. Vulnerable development in areas which have the highest flood risk should be avoided and/or only considered in exceptional circumstances (through a prescribed Justification Test) if adequate land or sites are not available in areas which have lower flood risk.
4	FL 4	Flood Relief Schemes The Council shall support and co-operate with the Office of Public Works (OPW) in the delivery of Flood Relief Schemes.
5	FL 5	Catchment Planning The Council will support the OPW'S CFRAM Programme and catchment-based Flood Planning Groups, especially where catchments go beyond the Council's administrative boundary, in the development and implementation of catchment-based strategies for the management of flood risk - including those relating to storage and conveyance.
6	FL 6	Surface Water Drainage and Sustainable Drainage Systems (SuDs) Maintain and enhance, as appropriate, the existing surface water drainage system in the County. Ensure that new developments are adequately serviced with surface water drainage infrastructure and promote the use of Sustainable Drainage Systems in all new developments. Surface water run-off from development sites will be limited to pre-development levels and planning applications for new developments will be required to provide details of surface water drainage and sustainable drainage systems proposals.
7	FL 7	Protection of Waterbodies and Watercourses Protect waterbodies and watercourses within the County from inappropriate development, including rivers, streams, associated undeveloped riparian strips, wetlands and natural floodplains. This will include protection buffers in riverine, wetland and coastal areas as appropriate.
8	FL 8	Flood Risk Assessment for Planning Applications and CFRAMS Protect Flood Zone A and Flood Zone B from inappropriate development and direct developments/land uses into the appropriate Flood Zone in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 (or any superseding document) and the guidance contained in Development Management Standard DMSX. Site-specific Flood Risk Assessment (FRA) is required for all planning applications in areas at elevated risk of flooding, even for developments appropriate to the particular flood zone. The detail of these site-specific FRAs will depend on the level of risk and scale of development. A detailed site-specific FRA should quantify the risks, the effects of selected mitigation and the management of any residual risks. The Council shall have regard to the results of any CFRAM Studies in the assessment of planning applications. Where a development/land use is proposed that is inappropriate within the Flood Zone, then the development proposal will need to be accompanied by a Development Management Justification Test in addition to the site-specific Flood Risk Assessment. In Flood Zone C, where the probability of flooding is low (less than 0.1%, Flood Zone C), site-specific Flood Risk Assessment may be required and the developer should satisfy themselves that the probability of flooding is appropriate to the development being proposed.
9	FL 9	SFRA of Lower Tier Plans

No.	Reference	Provision
		Lower tier plans shall undertake SFRA (Strategic Flood Risk Assessment) in compliance with the Flood Risk Management Guidelines.
10	FL 10	SFRA/FRA and Climate Change SFRAs and site-specific FRAs shall provide information on the implications of climate change with regard to flood risk in relevant locations. The 2009 OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (or any superseding document) shall be consulted with to this effect.
11	FL 11	FRA and Environmental Impact Assessment (EIA) Flood risk may constitute a significant environmental effect of a development proposal that in certain circumstances may trigger a sub-threshold EIA. FRA should therefore be an integral part of any EIA undertaken for projects within the County.
12	FL 12	Inland Fisheries It is the Council policy objective to consult, where necessary, with Inland Fisheries Ireland, the National Parks and Wildlife Service and other relevant agencies in the construction of flood alleviation measures in County Galway.
13	FL 13	CFRAM It is Council policy objective to take account of and incorporate into local planning policy and decision making, including possible future variations to this plan, CFRAM measures that may be published in the future, including planned investment measures for managing and reducing flood risk.
14	FL 14	Flood Vulnerable Zones It is Council policy objective to ensure that applications pertaining to existing developments in flood vulnerable zones provide details of structural and non-structural risk management measures to include, but not be limited to specifications of the following - floor levels, internal layout, flood resilient construction, flood resistant construction, emergency response planning, access and egress during flood events.
15	FL 15	Flood Risk Management Ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the OPW Climate Change Sectoral Adaptation Plan for Flood Risk Management applicable at the time.
16	FL 16	Benefitting Land Applications for development on land identified as benefitting land may be prone to flooding, and as such site-specific flood risk assessments may be required in these areas.

4.4 Justification Test

The Justification Test (including its various criteria – see **Appendix I**) is required to be passed whereby *highly vulnerable*[9] land uses are being proposed on undeveloped lands in Flood Zone A or whereby *highly* and/or *less vulnerable* land uses are being proposed on undeveloped lands in Flood Zone B.

This requirement did not arise as the levels of flood risk identified by the SFRA were a key informant of land uses in undeveloped areas in Flood Zones A and B. Only appropriate land uses are being proposed for previously undeveloped lands within Flood Zones A and B.

With respect to lands which have already been developed, the potential conflict between zonings and *highly* and *less vulnerable* development will be avoided by applying the measures which have been integrated into the Plan, including those at Chapter 14.2.1 "Land Uses and Flooding". This approach is established and tested and consistent with the requirements of the Flood Risk Management Guidelines and associated Circular PL 2/2014.

Table 5 provides a justification of the zoning approach for previously developed lands.

Although Stage 3 detailed flood risk assessment has not been required for the Plan-preparation process thus far, it may be required for individual projects following adoption of the Plan.

[9] For details on what types of development are considered highly vulnerable, less vulnerable or water compatible please refer to Table 6 in **Appendix I**.

Table 5 Justification of the Zoning Approach for Previously Developed Lands

Settlements	Are lands that have been already developed within Flood Zone A and/or B?	Is the settlement targeted for growth under the RSES, existing CDP and Draft CDP?	Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement?	SFRA recommendation integrated into the Plan for management of risk?
An Cheathrú Rua	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
An Spidéal	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Baile Chláir	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Ballygar	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Bearna	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Briar Hill	No	Not applicable	Not applicable	Not applicable
Clifden	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Dunmore	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Guarran	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Glenamaddy	No	Not applicable	Not applicable	Not applicable
Headford	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Kinvara	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Maigh Cuilinn	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Moylough	No	Not applicable	Not applicable	Not applicable
Oranmore	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Oughterard	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated
Portumna	Yes, within existing settlement envelope	Yes	Yes, already developed, would contribute towards overall sustainable, compact and balanced regional development	Yes, including insert references when Plan is updated

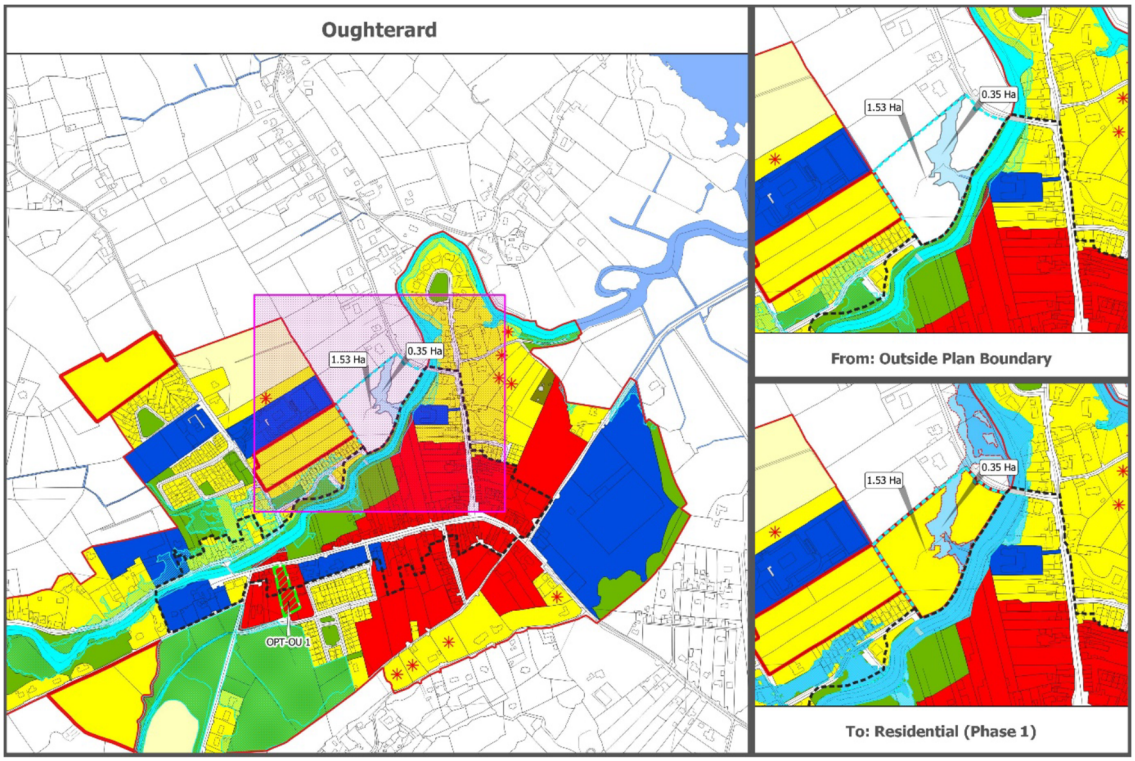
4.5 Member's Amendment Contrary to the Guidelines

The preparation of the Chief Executive's Draft Plan, for the consideration of Members in advance of public display was informed by the SFRA process.

Advice relating to Members' Motions to amend the Chief Executive's Draft Plan was provided to the Members for their consideration in advance of agreeing amendments.

Taking into account, inter alia, the advice on Motions and the SEA, AA and SFRA documentation for the Chief Executive's Draft Plan, the Members agreed to amend the Chief Executive's Draft Plan by resolution. An earlier version of this SFRA report was updated to take account of these amendments.

One Amendment is contrary to the 2009 Ministerial Guidelines on Flood Risk Management – see below. That amendment, to add Residential zoning to the north of the existing development envelope includes certain lands within Flood Zones A and B. This Justification Test would not be passed for these undeveloped lands. In order to mitigate residual flood risk, additional mitigation was integrated into the Plan[10] , with hazard signs shown on the land use zoning map; however, the zoning remains contrary to the Flood Risk Management Guidelines.



[10] OSGT 10 -Inappropriate Development on Flood Zones
Where a development/land use is proposed within any area subject to this objective the development proposal will need to be accompanied by a detailed hydrological assessment and robust SUDS design which demonstrates the capacity to withstand potential flood events to maintain water quality and avoid potential effects to ecological features.
• Any development proposals should be considered with caution and will be required to comply with The Planning System and Flood Risk Management Guidelines for Planning Authorities/Circular PL2/2014 & the associated Development Management Justification Test.
• Climate Change should be duly considered in any development proposal.
• Protect the riparian zones of watercourse systems throughout the plan area through a general 10 metre protection buffer from rivers within the plan area as measured from the near river bank, (this distance may be increased and decreased on a site by site basis, as appropriate).
• Any development proposals submitted for this site will require a detailed ecological report (s), carried out by suitably qualified personnel for the purposes of informing Appropriate Assessment Screening by Galway County Council, the competent authority.
• The relevant lands will be outlined and flagged with a symbol on the land use zoning map and on the GIS system of Galway County Council so that staff and the public are aware of the special conditions/constraints attached.
• A briefing will be provided to relevant staff within Galway County Council on the special conditions and constraints on relevant lands.

Section 5 Conclusion

Stage 2 SFRA has been undertaken as part of the Plan-preparation process and the SFRA has informed the preparation of the Draft Plan.

The SFRA has mapped boundaries for Flood Risk Zones, taking into account factors including: predictive and historical indicators of flood risk; documented Council knowledge of lands; Council Engineer review and input into indicators and flood zones (local knowledge); the potential source and direction of flood paths from rivers and streams; vegetation indicative of flood risk; and the locations of topographic/built features that coincide with the flood indicator related boundaries/topographical survey.

Most SFRA recommendations have been integrated into the Draft Plan and the Draft Plan generally complies with the Guidelines and associated Circular; however, a Member's amendment was approved that is contrary to the Guidelines – see Section 4.5.

Appendix I: Summary of the requirements of the Flood Guidelines for land uses in Flood Zones

Requirements relating to land uses in Flood Zones as set out in the Department of Environment, Heritage and Local Government (DEHLG) and Office of Public Works (OPW) 2009 Flood Guidelines (including at Chapter 3 Principles and Key Mechanisms and Chapter 5 Flooding and Development Management) and Departmental Circular PL2/2014 should be adhered to.

- The Sequential Approach, including the Justification test -

The key principles of the Guidelines' risk-based sequential approach (see Figure 1) are:

- Avoid development in areas at risk of flooding. If this is not possible, consider substituting a land use that is less vulnerable to flooding. Only when both avoidance and substitution cannot take place should consideration be given to mitigation and management of risks.

- Inappropriate types of development that would create unacceptable risks from flooding should not be planned for or permitted.

- Exceptions to the restriction of development due to potential flood risks are provided for through the use of a Justification Test, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated.

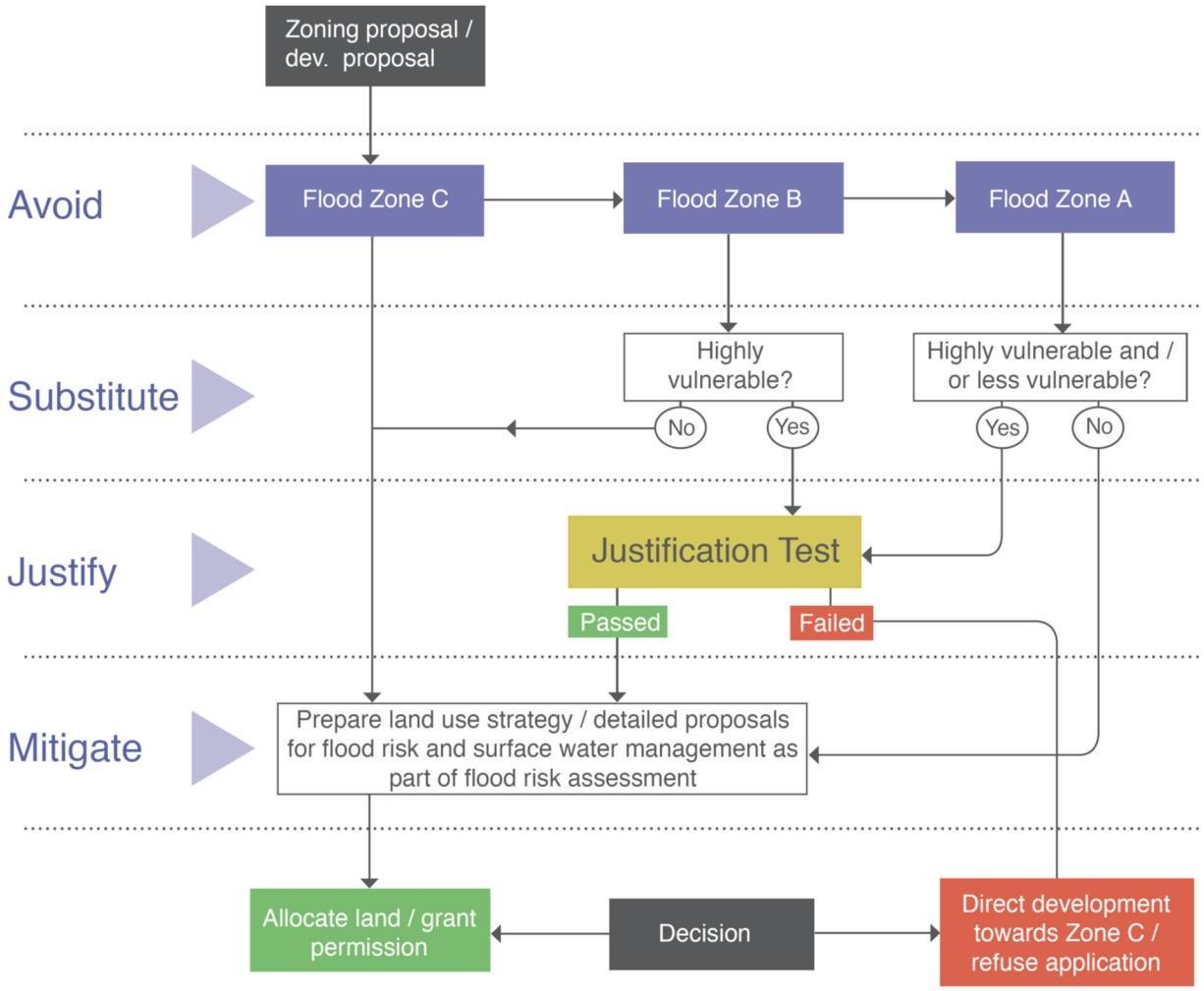


Figure 1 Sequential Approach Process[11]

In summary, the **planning implications** for each of the flood zones are:

Zone A - High probability of flooding. Most types of development would be considered inappropriate in this zone. Development in this zone should be avoided and/or only considered in exceptional circumstances, such as in city and town centres, or in the case of essential infrastructure that cannot be located elsewhere, and where the Justification Test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation, would be considered appropriate in this zone.

Zone B - Moderate probability of flooding. Highly vulnerable development, such as hospitals, residential care homes, Garda, fire and ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure, would generally be considered inappropriate in this zone, unless the requirements of the Justification Test can be met. Less vulnerable development, such as retail, commercial and industrial uses, sites used for short-let for caravans and camping and secondary strategic transport and utilities infrastructure, and water-compatible development might be considered appropriate in this zone. In general however, less vulnerable development should only be considered in this zone if adequate lands or sites are not available in Zone C and subject to a flood risk assessment to the appropriate level of detail to demonstrate that flood risk to and from the development can or will adequately be managed.

Zone C - Low probability of flooding. Development in this zone is appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainable development considerations.

[11] Flood Zone C covers all areas outside of Zones A and B

Table 6 overleaf classifies the vulnerability of different types of development while Table 7 identifies the appropriateness of development belonging to each vulnerability class within each of the flood zones as well as identifying what instances in which the Justification Test should be undertaken. Inappropriate development that does not meet the criteria of the Justification Test should not be considered at the plan-making stage or approved within the development management process.

Table 6 Classification of vulnerability of different types of development

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
*Uses not listed here should be considered on their own merits	

Table 7 Vulnerability Classes and Flood Zones

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

The **Justification Test** which is referred to as part of the Sequential Approach is an assessment of whether a development proposal within an area at risk of flooding meets specific criteria for proper planning and sustainable development and demonstrates that it will not be subject to unacceptable risk nor increase flood risk elsewhere. The Justification Test should be applied only where development is within flood risk areas that would be defined as inappropriate under the screening test of the sequential risk based approach outlined above. This Justification Test is shown below.

Where, as part of the preparation and adoption or variation and amendment of a development/local area plan[1], a planning authority is considering the future development of areas in an urban settlement that are at moderate or high risk of flooding, for uses or development vulnerable to flooding that would generally be inappropriate as set out in Table 3.2, all of the following criteria must be satisfied:

1 The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.

2 The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:

(i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement[2];

(ii) Comprises significant previously developed and/or under-utilised lands;

(iii) Is within or adjoining the core[3] of an established or designated urban settlement;

(iv) Will be essential in achieving compact and sustainable urban growth; and

(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement[4]

3 A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.

N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment.

Figure 2 Justification Test [12]

[12] Footnotes: [1] Including Strategic Development Zones and Section 25 Schemes in the area of the Dublin Docklands Development Authority [2]In the case of Gateway planning authorities, where a number of strategic growth centres have been identified within the overall area of the authority, the Justification Test may be applied for vulnerable development within each centre. [3] See definition of the core of an urban settlement in Glossary of Terms. [4] This criterion may be set aside where section 4.27b applies.

Appendix II: Flood Mapping

Galway County Development Plan 2022- 2028

Strategic Flood Risk Assessment
Galway Settlements

Appendix II

RevC - May 2021

Comhairle Chontae na Gaillimhe
Galway County Council

CAAS

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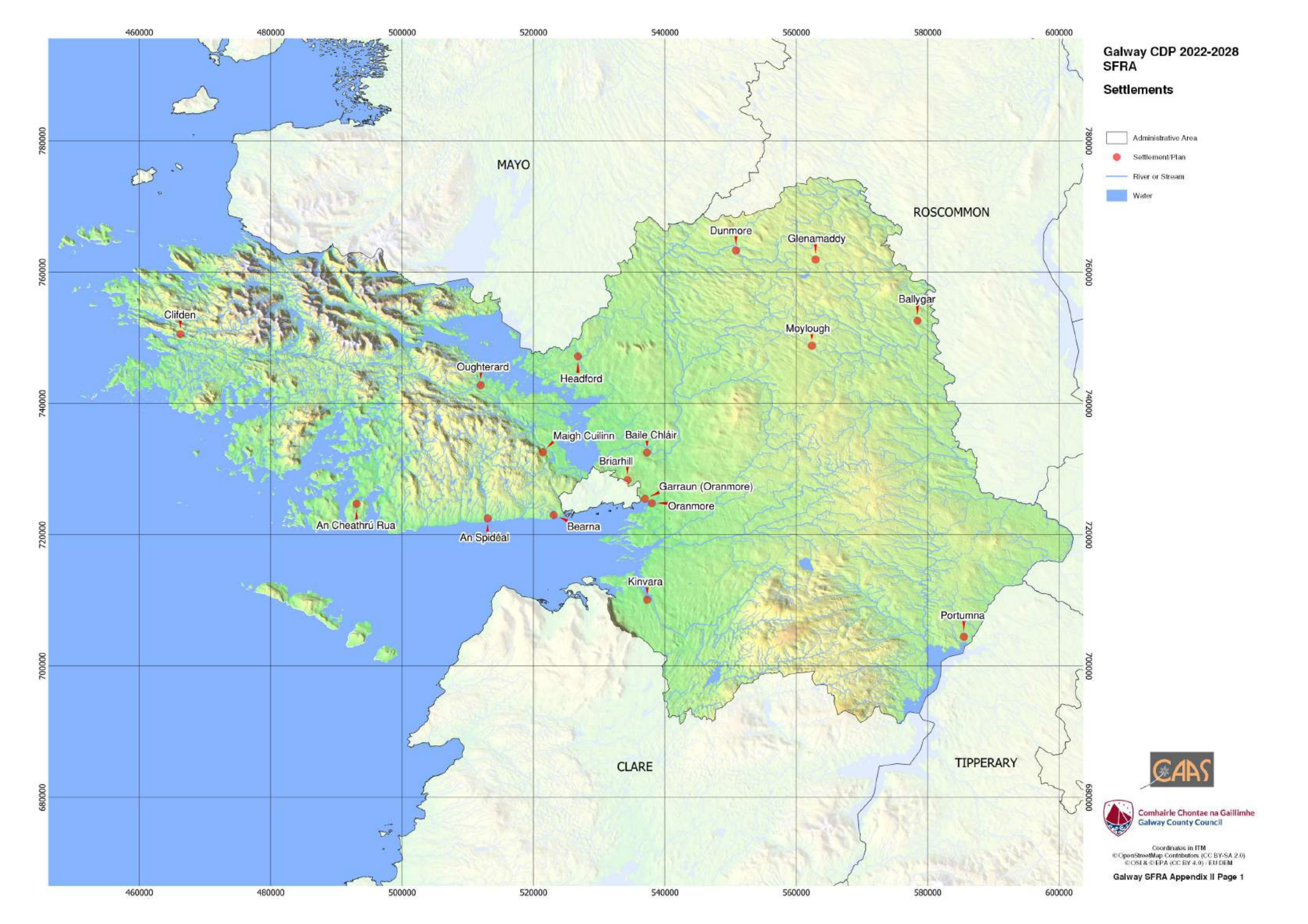
County Maps

Settlement Maps


Galway CDP 2022-2028
SFRA
Settlements
Administrative Area
Settlement/Plan
River or Stream
Water
MAYO
ROSCOMMON
CLARE
TIPPERARY
Clifden
Oughterard
Headford
Maigh Cuilinn
Baile Chláir
Briarhill
Garraun (Oranmore)
Oranmore
Bearna
An Cheathrú Rua
An Spidéal
Kinvara
Dunmore
Glenamaddy
Ballygar
Moylough
Portumna
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680000
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Galway County Council
Coordinates in ITM
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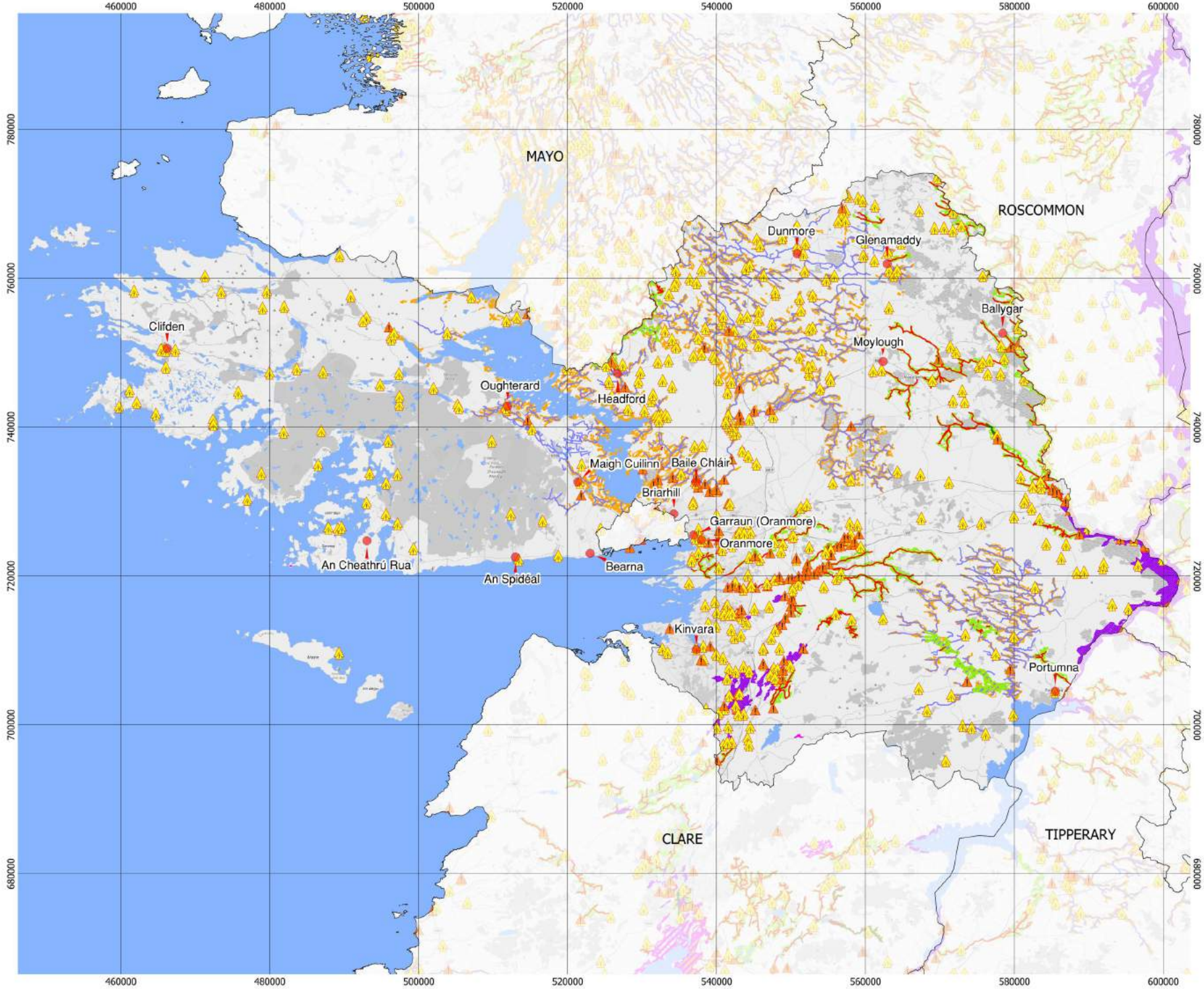

Galway CDP 2022-2028 SFRA

OPW Historical Flood Data

- Administrative Area
- Settlement/Plan
- Water

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

Past Flood Event

- Recurring Flood Event
- REMOVE FROM LEGEND
- Past Flood Extent

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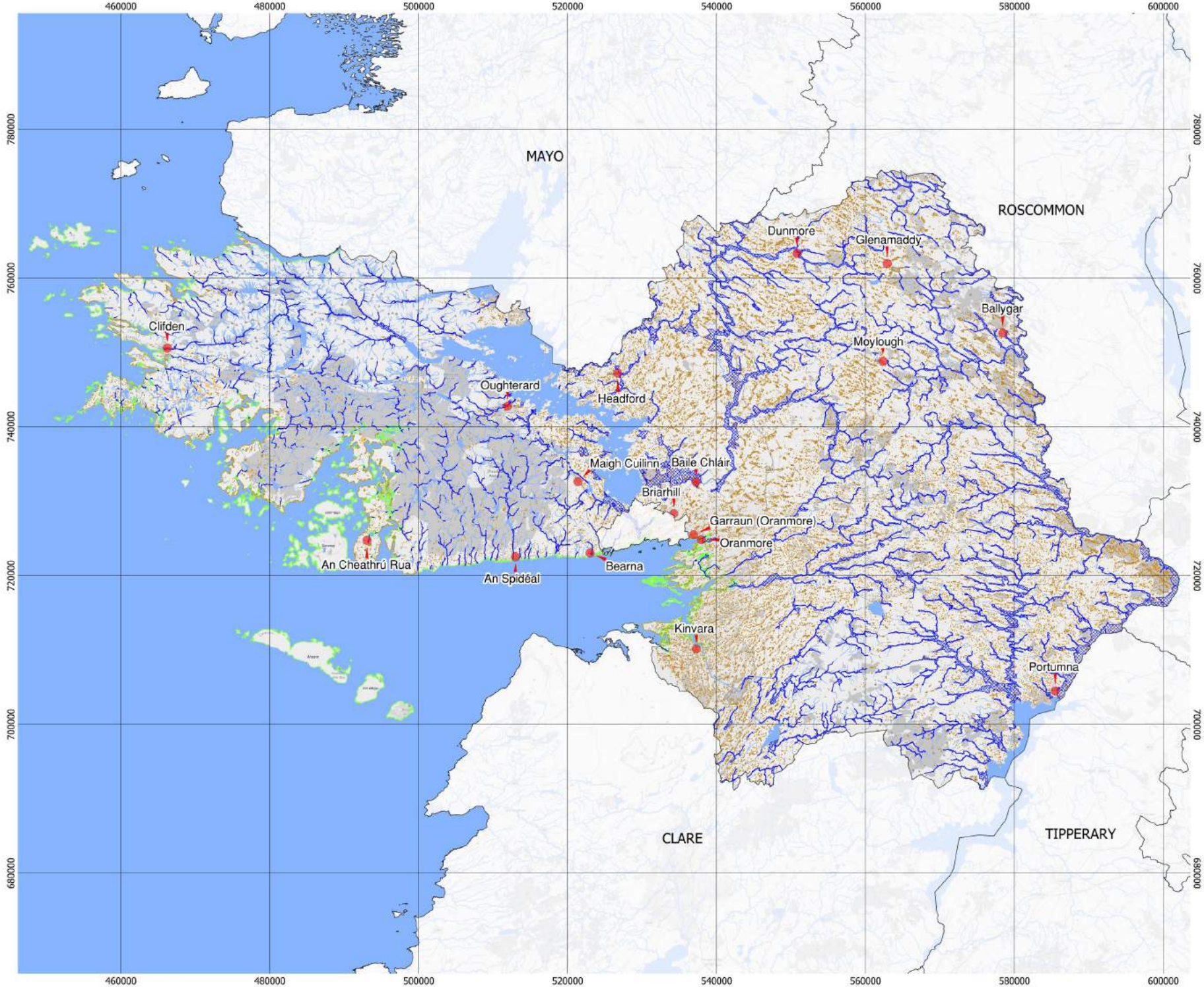
Coordinates in ITM



Galway CDP 2022-2028 SFRA

OPW Preliminary Flood Risk Assessment (PFRA)

- Administrative Area
- Settlement/Plan
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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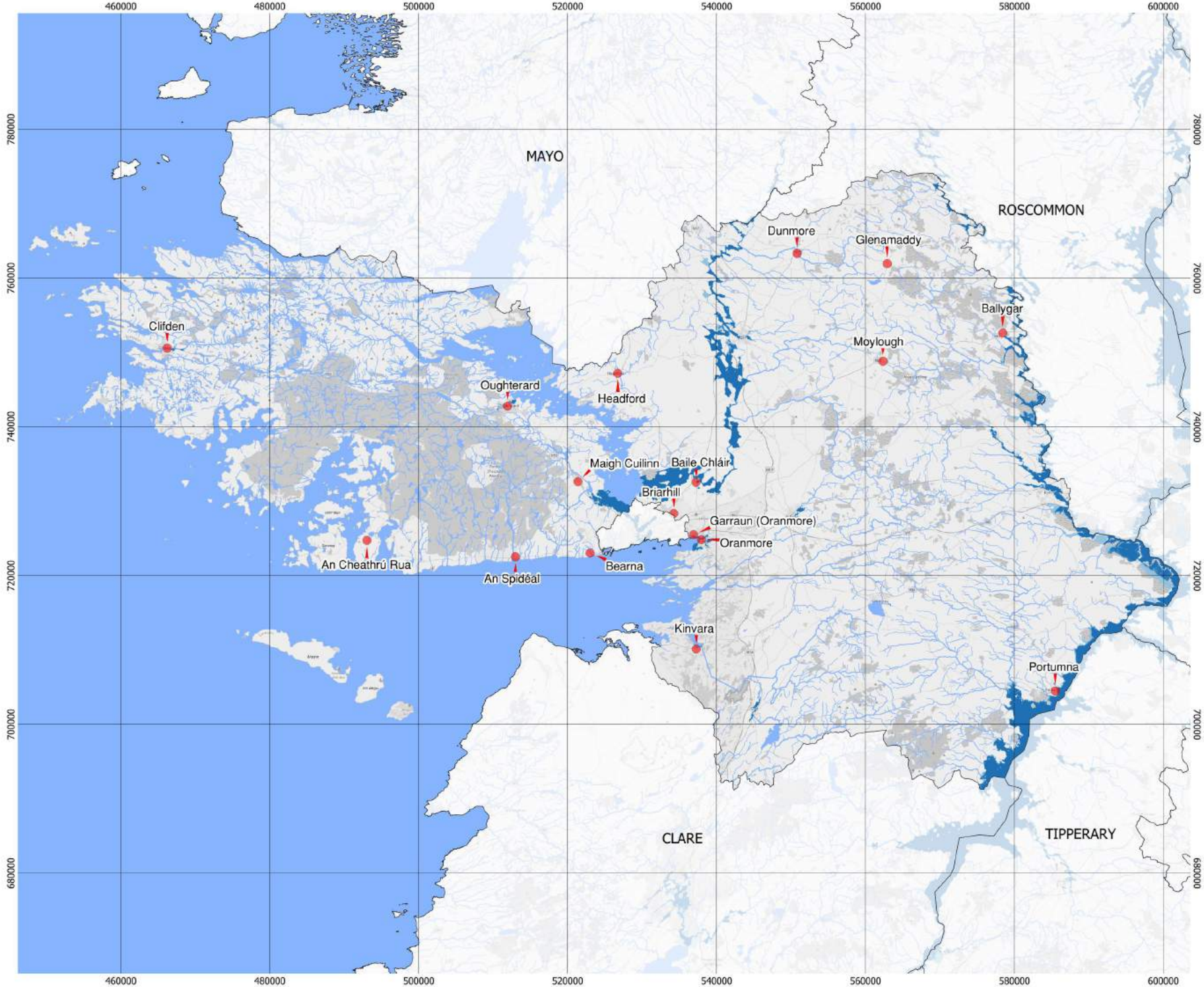
Coordinates in ITM



Galway CDP 2022-2028 SFRA

OPW Catchment Flood Risk Assessment & Management (CFRAM)

- Administrative Area
- Settlement/Plan
- River or Stream
- Water

CFRAM All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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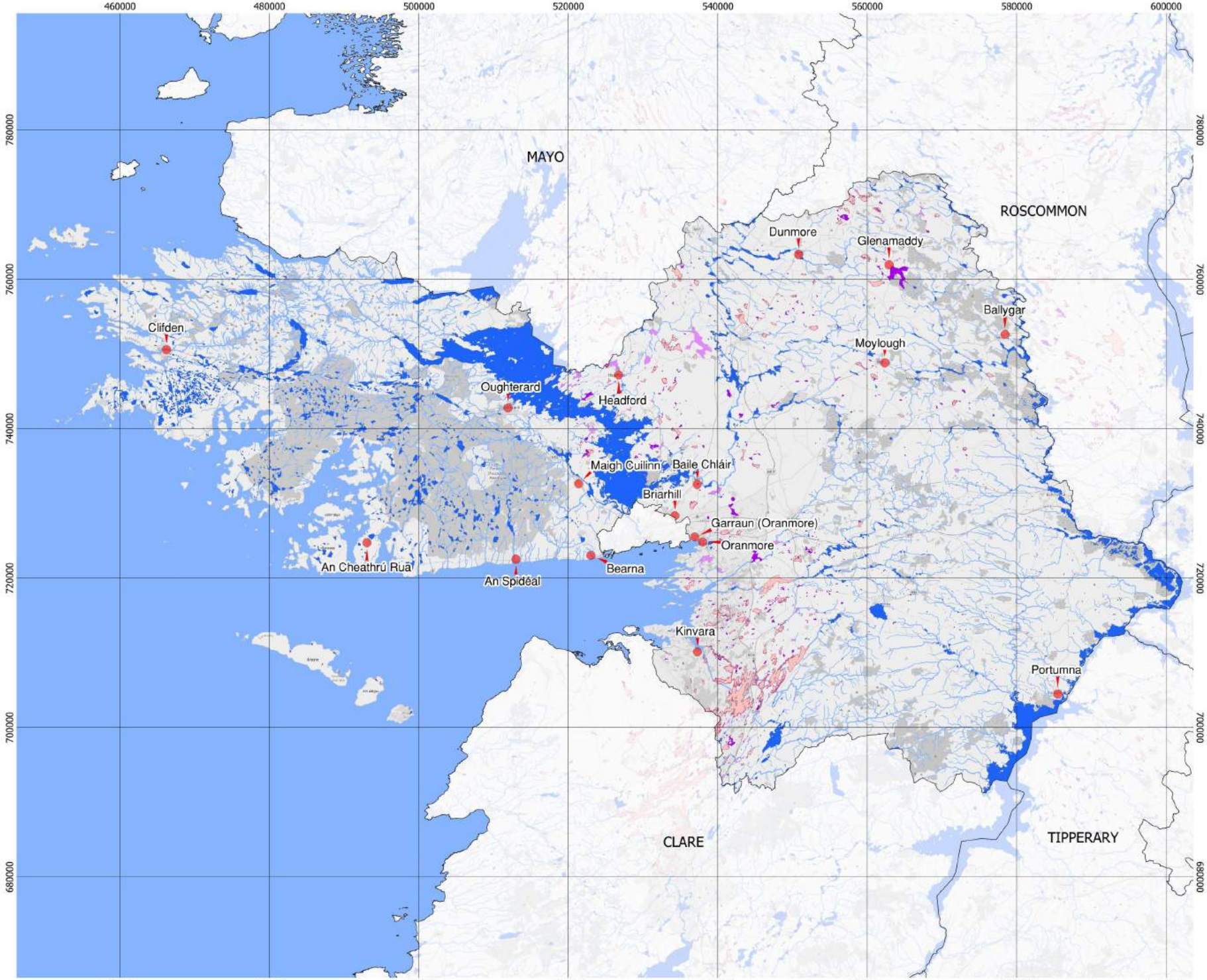
Galway County Council

Coordinates in ITM



Galway CDP 2022-2028 SFRA

GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement/Plan
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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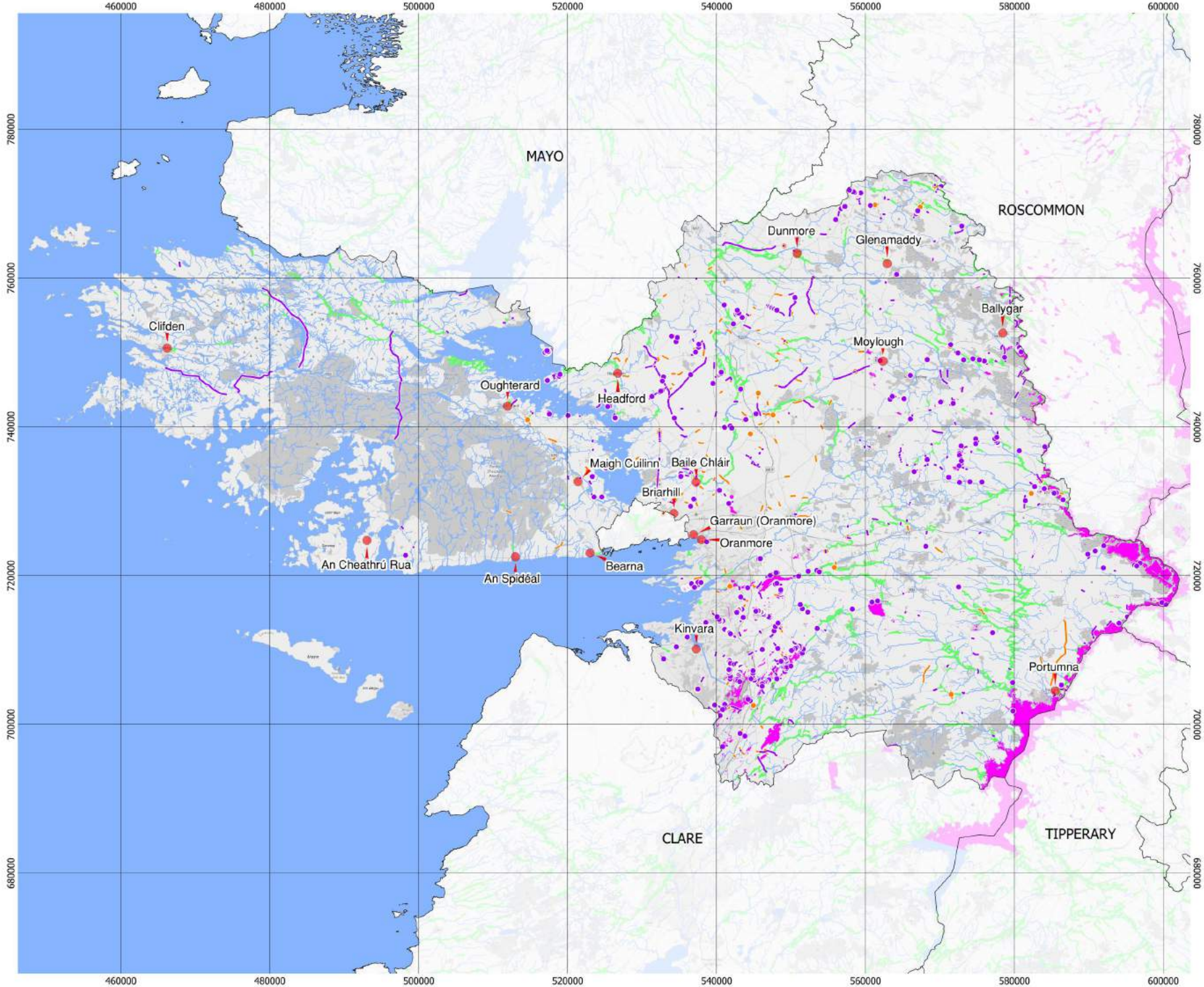
Galway County Council

Coordinates in ITM



Galway CDP 2022-2028
SFRA

Galway County Council
Flood Data

- Administrative Area
- Settlement/Plan
- River or Stream
- Water

Historical Flood Data

- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- Flood Points 2009
- Road Closures 2009
- GCC Floods 09 Combined Sources

SIS National Soils

- Alluvial Soils

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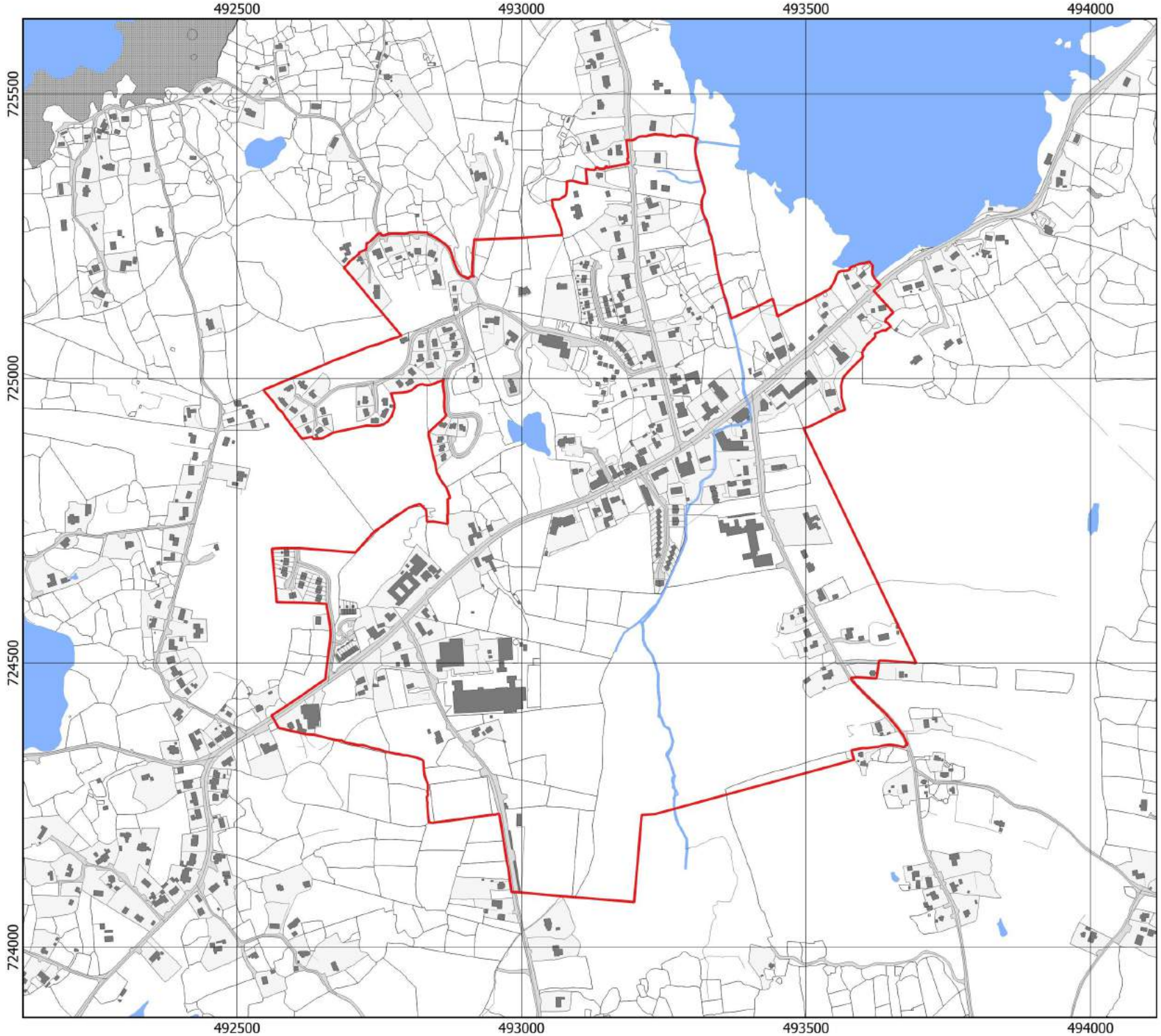
Coordinates in ITM



Galway CDP 2022-2028 SFRA

An Cheathrú Rua OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

Past Flood Event

- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data

- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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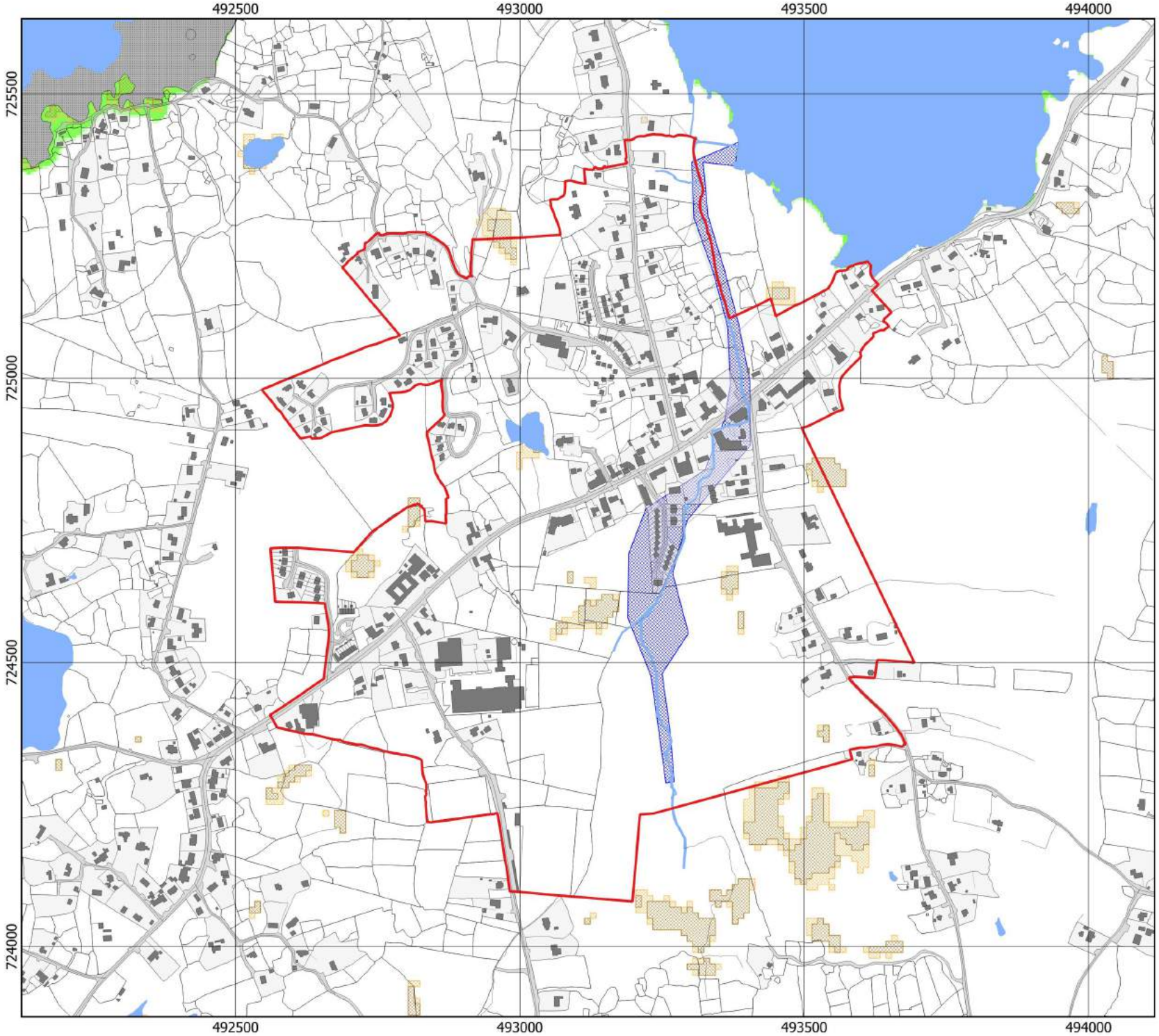

Galway CDP 2022-2028
SFRA

An Cheathrú Rua
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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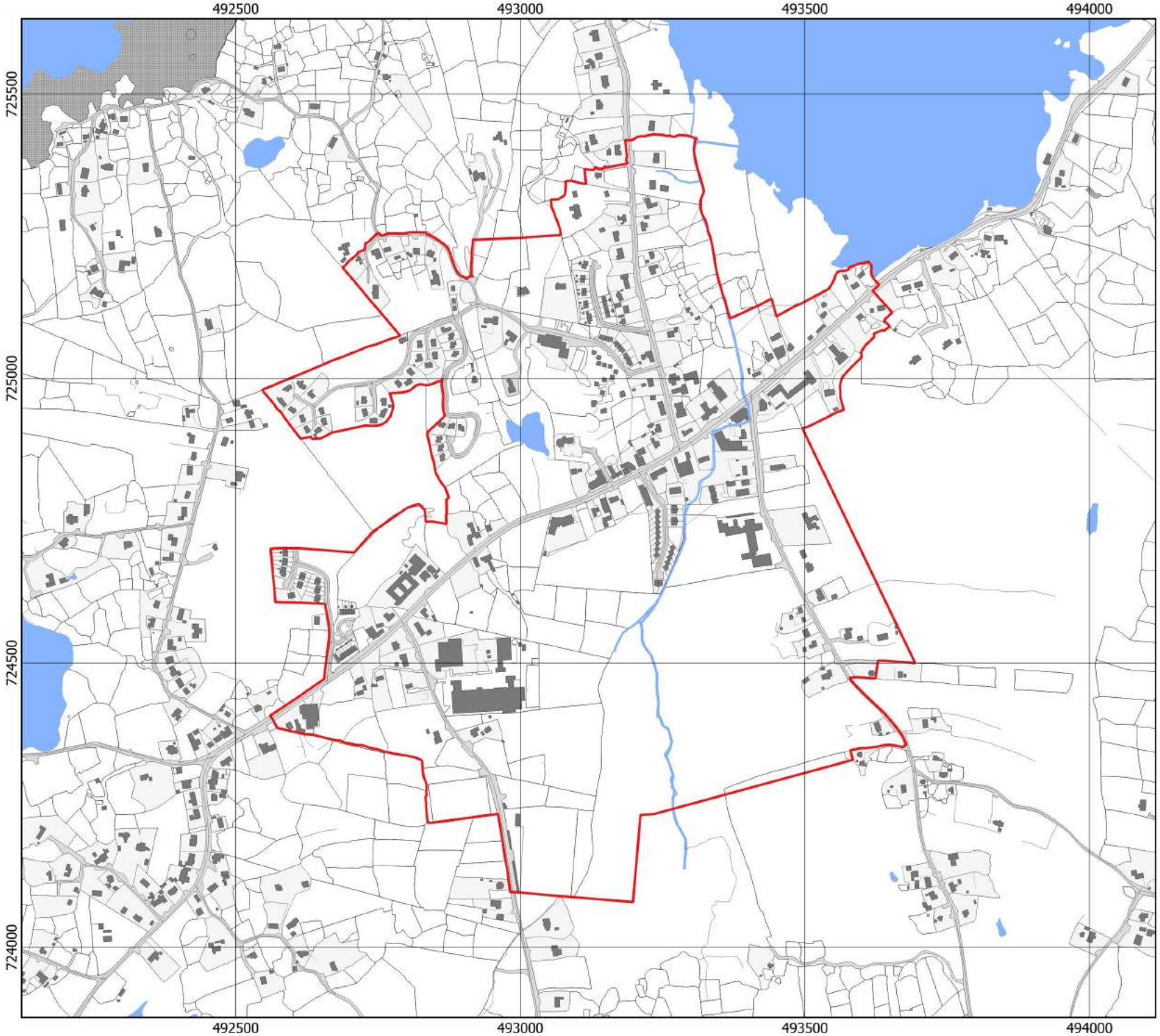

Galway CDP 2022-2028
SFRA

An Cheathrú Rua
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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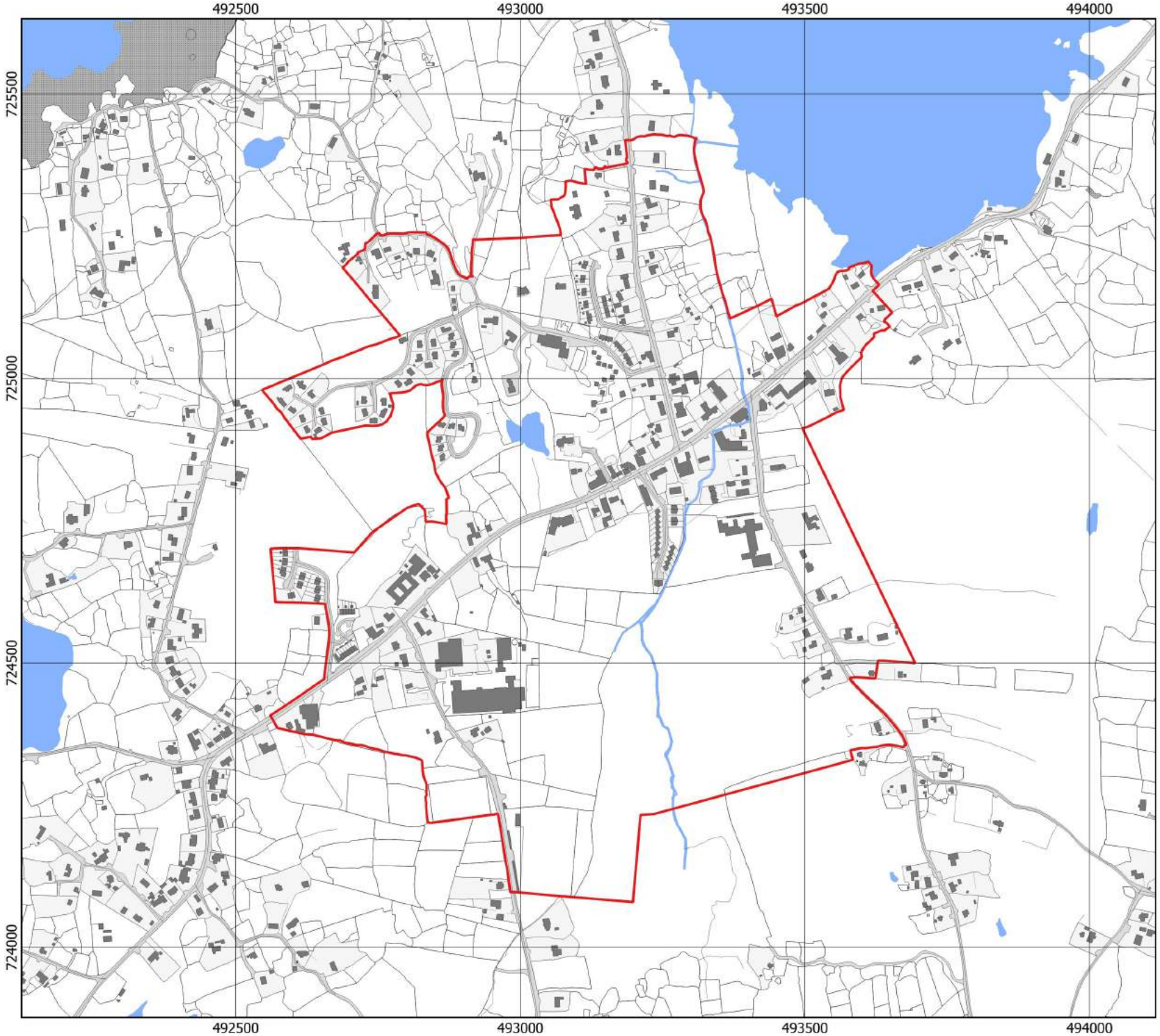

Galway CDP 2022-2028
SFRA

An Cheathrú Rua
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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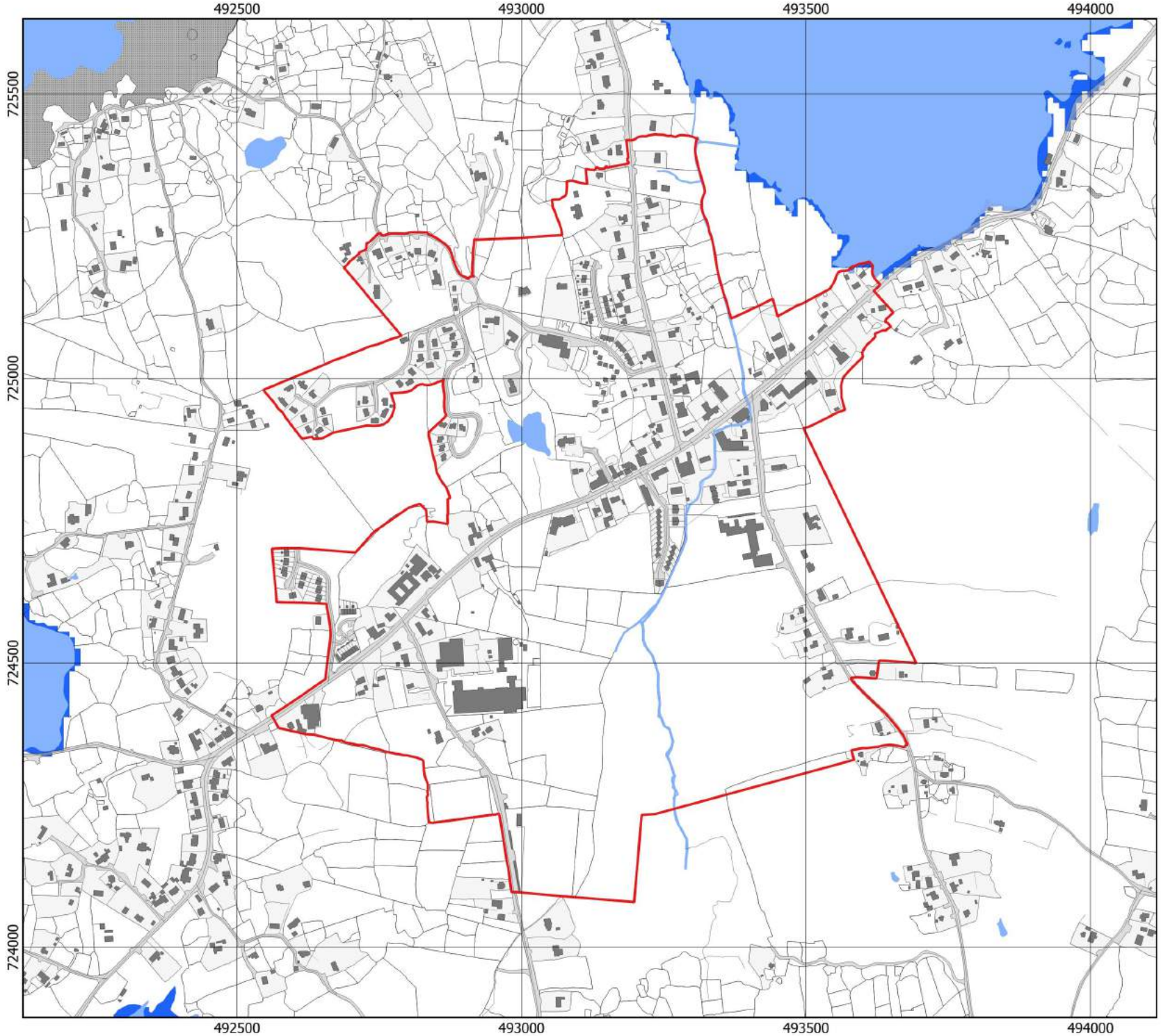

Galway CDP 2022-2028
SFRA

An Cheathrú Rua
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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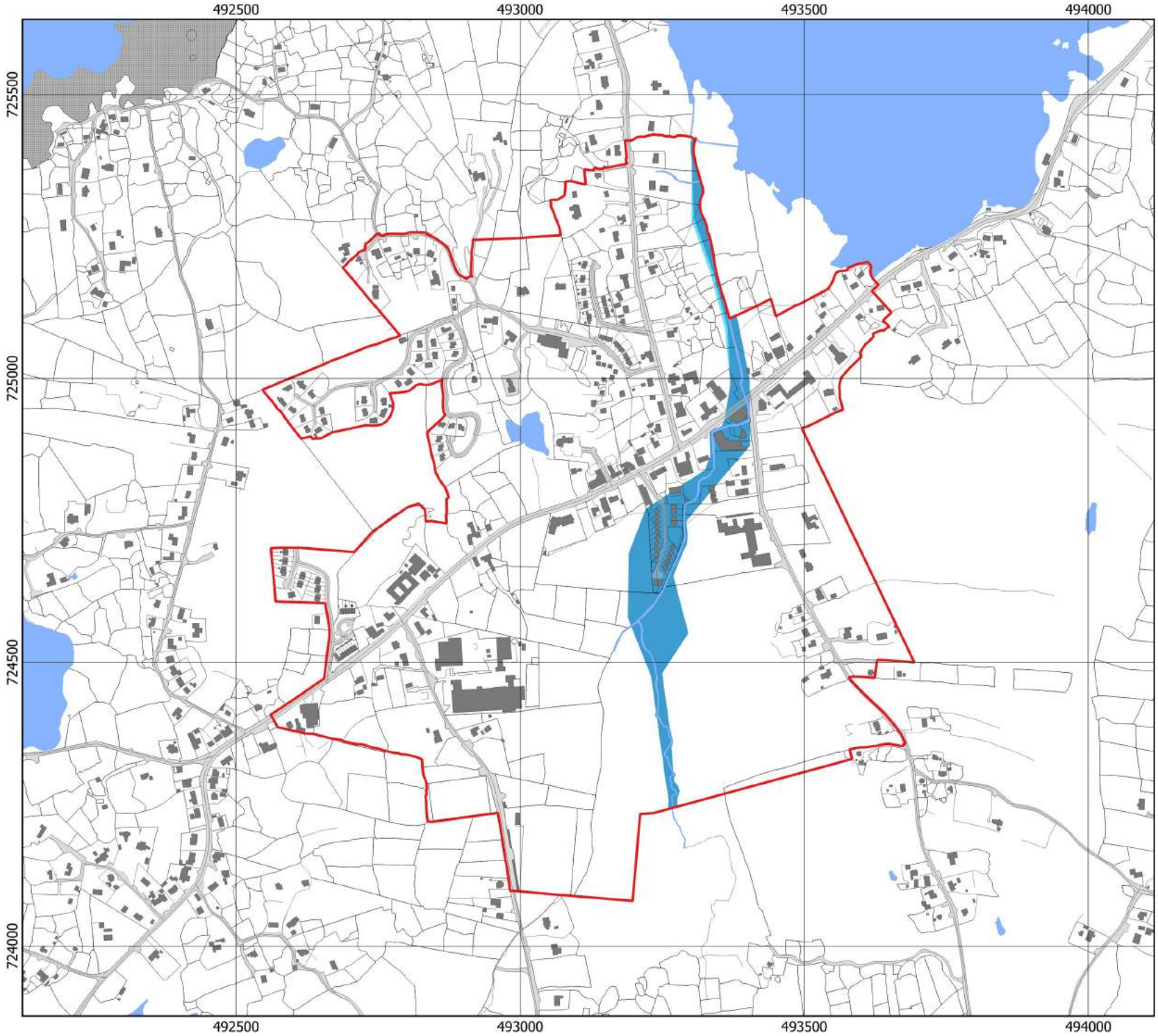

Galway CDP 2022-2028
SFRA

An Cheathrú Rua
Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

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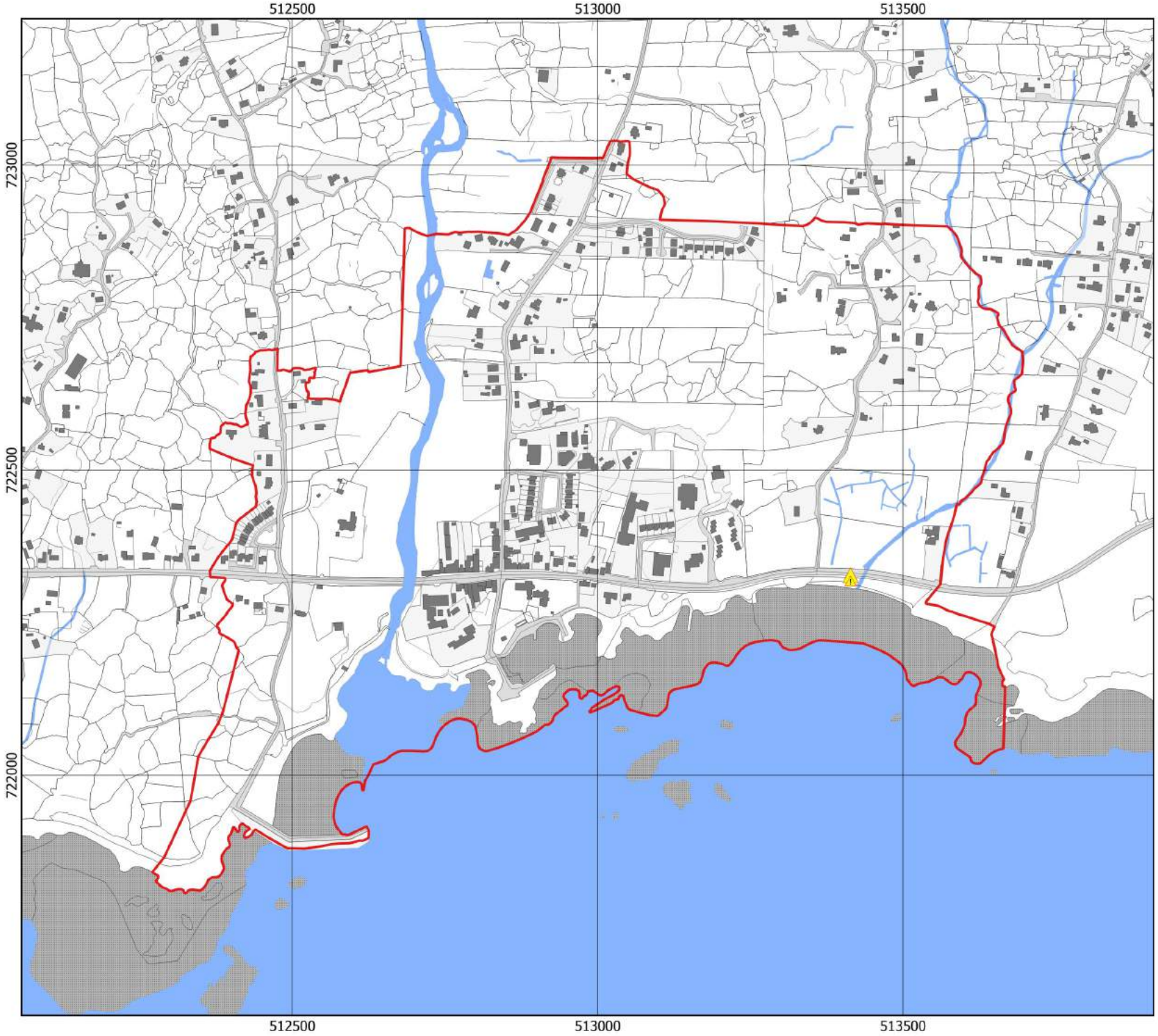

Galway CDP 2022-2028 SFRA

An Spidéal
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme
- Channel
- Embankment
- Benefited Land

Drainage Districts
- Channel
- Embankment
- Benefited Land

Land Commission
- Benefited Land

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- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data
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- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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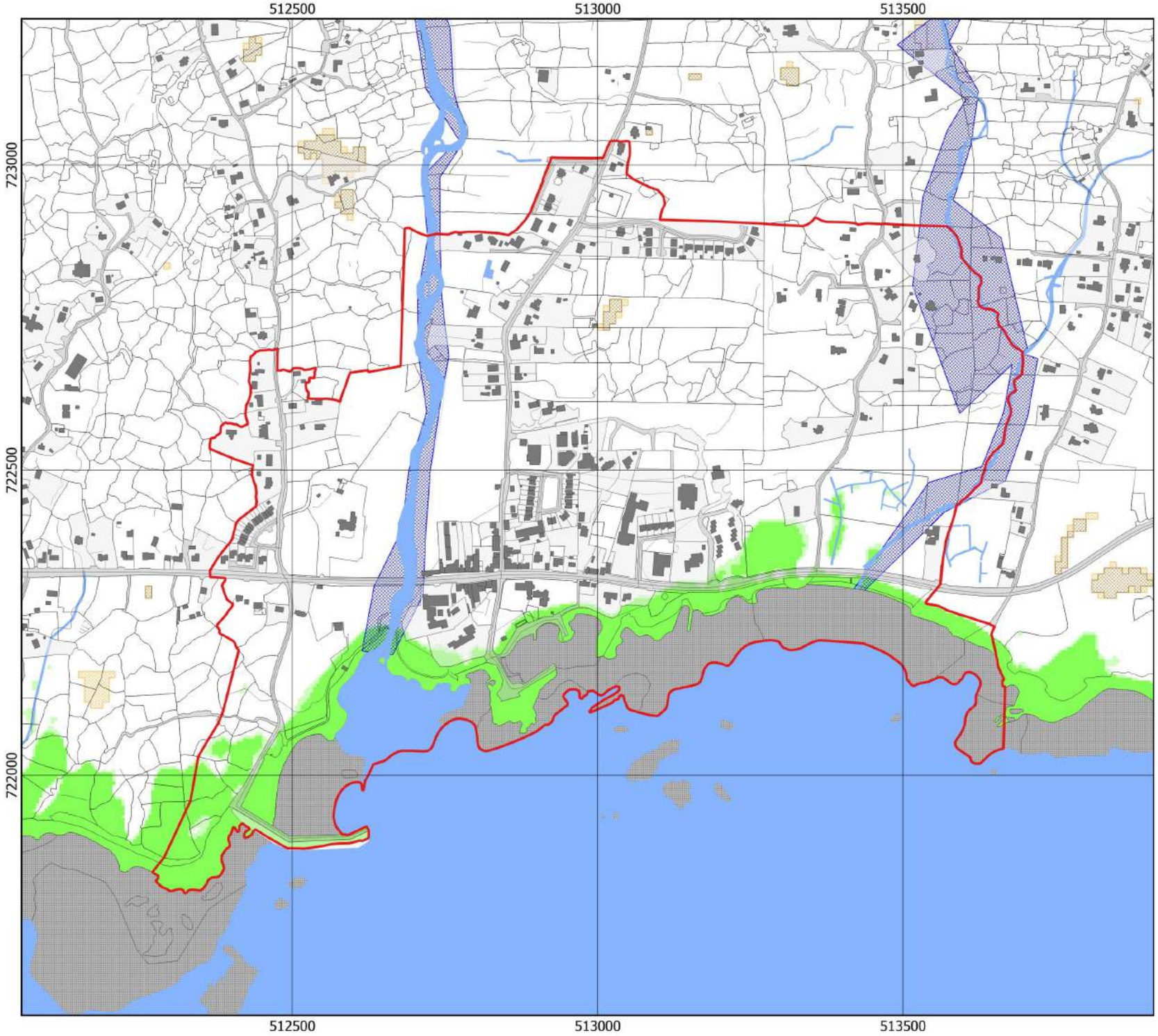

Galway CDP 2022-2028
SFRA

An Spidéal
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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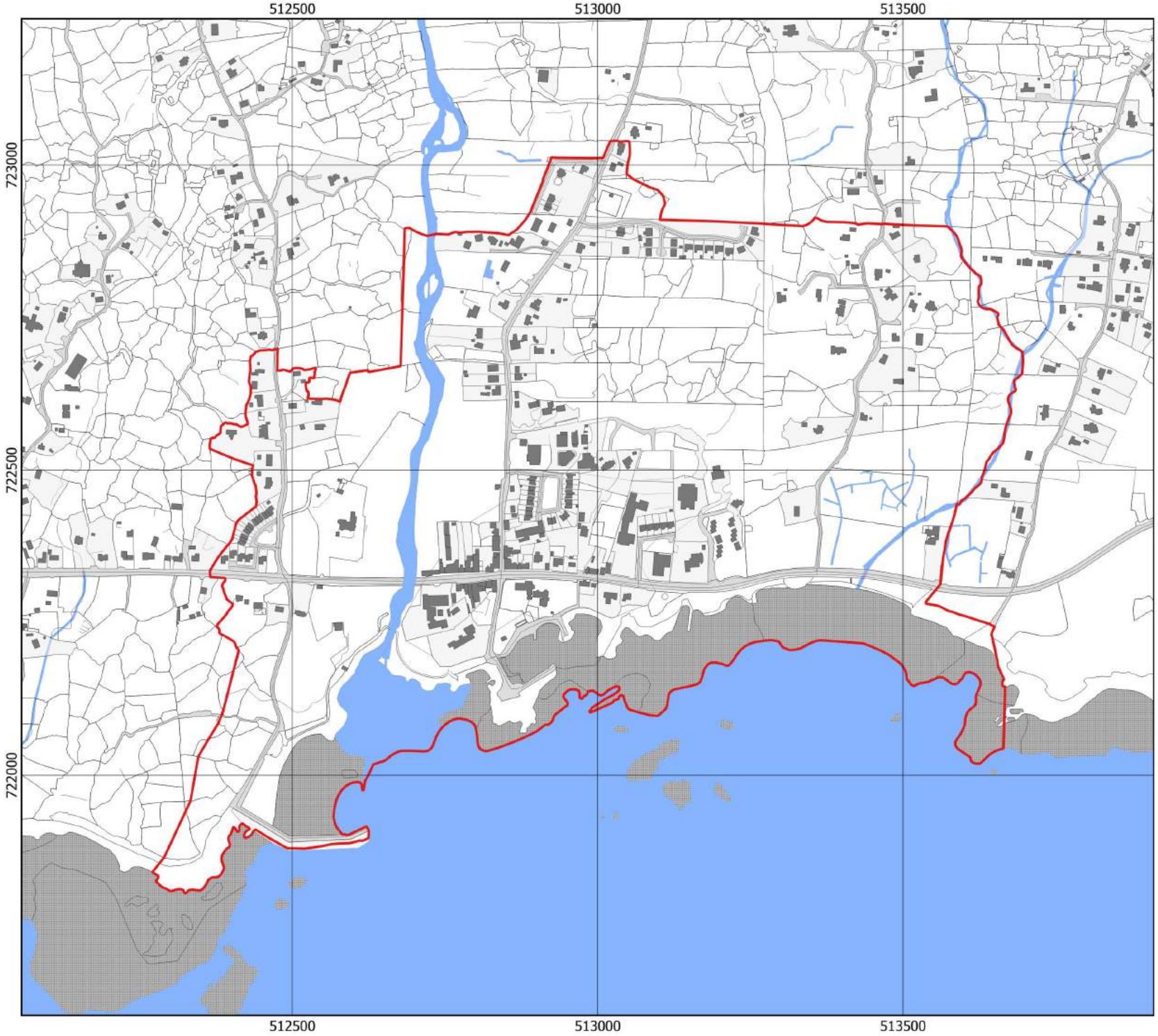

Galway CDP 2022-2028
SFRA

An Spidéal
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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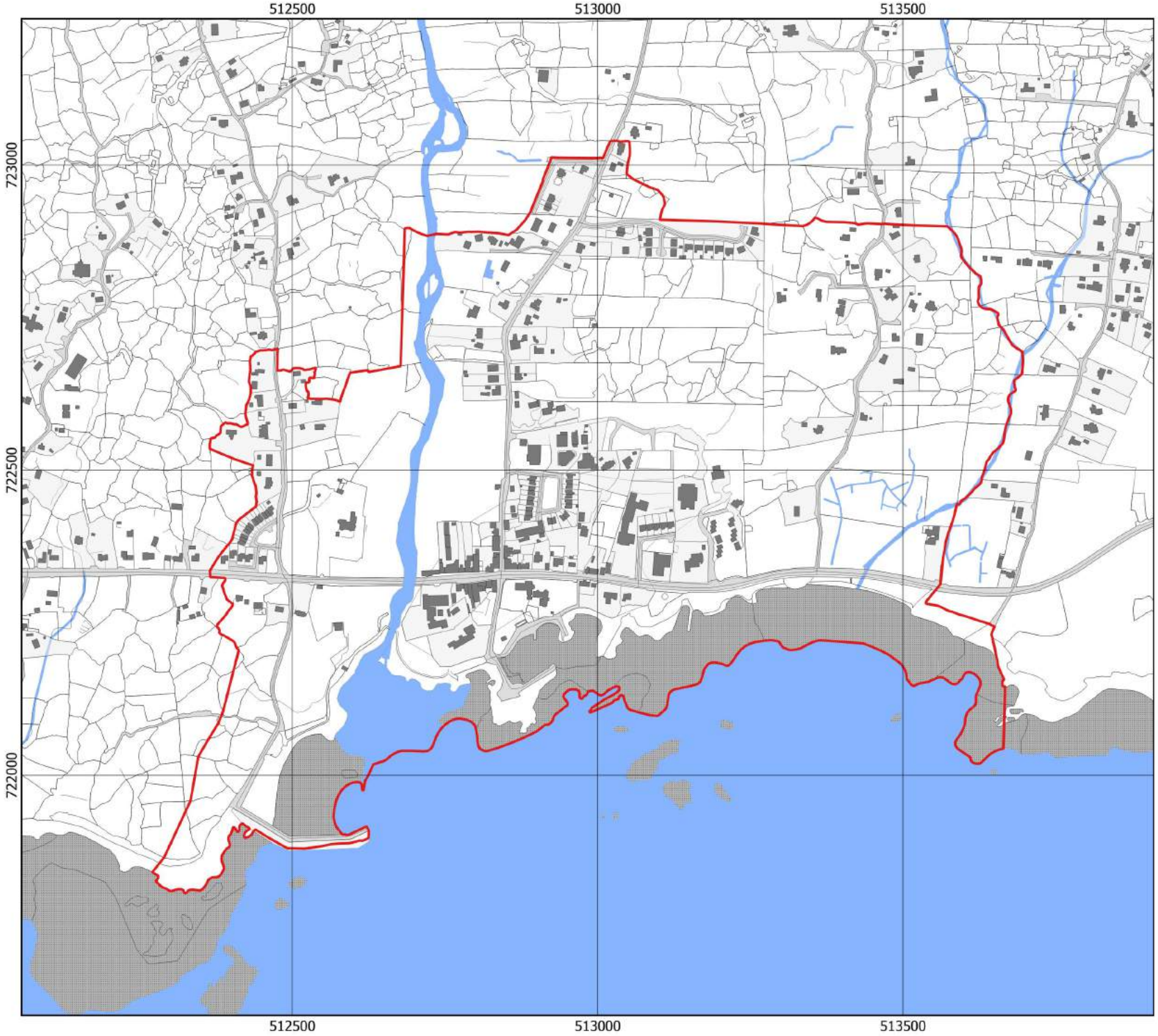
Galway County Council



Galway CDP 2022-2028
SFRA

An Spidéal
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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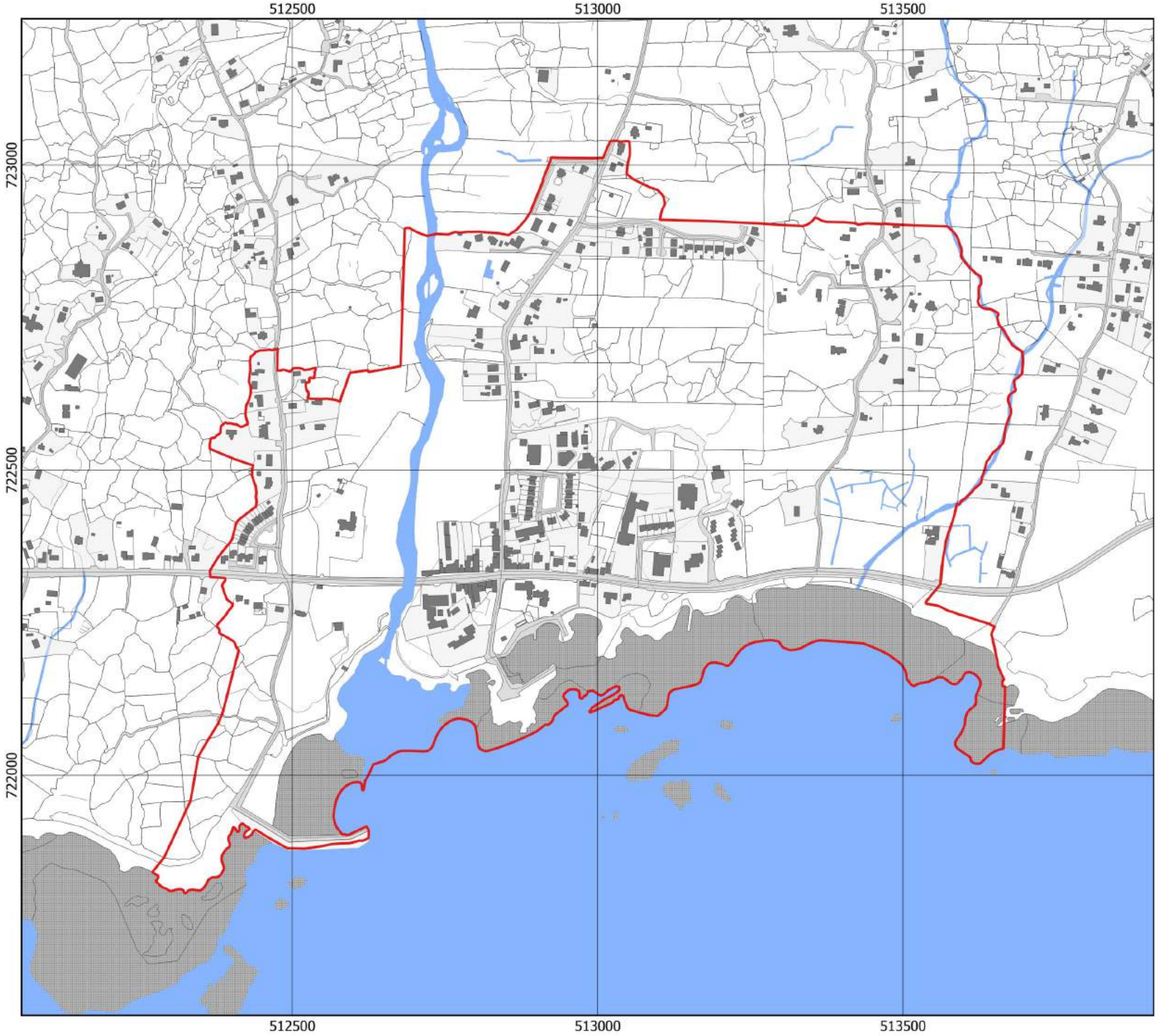

Galway CDP 2022-2028
SFRA

An Spidéal
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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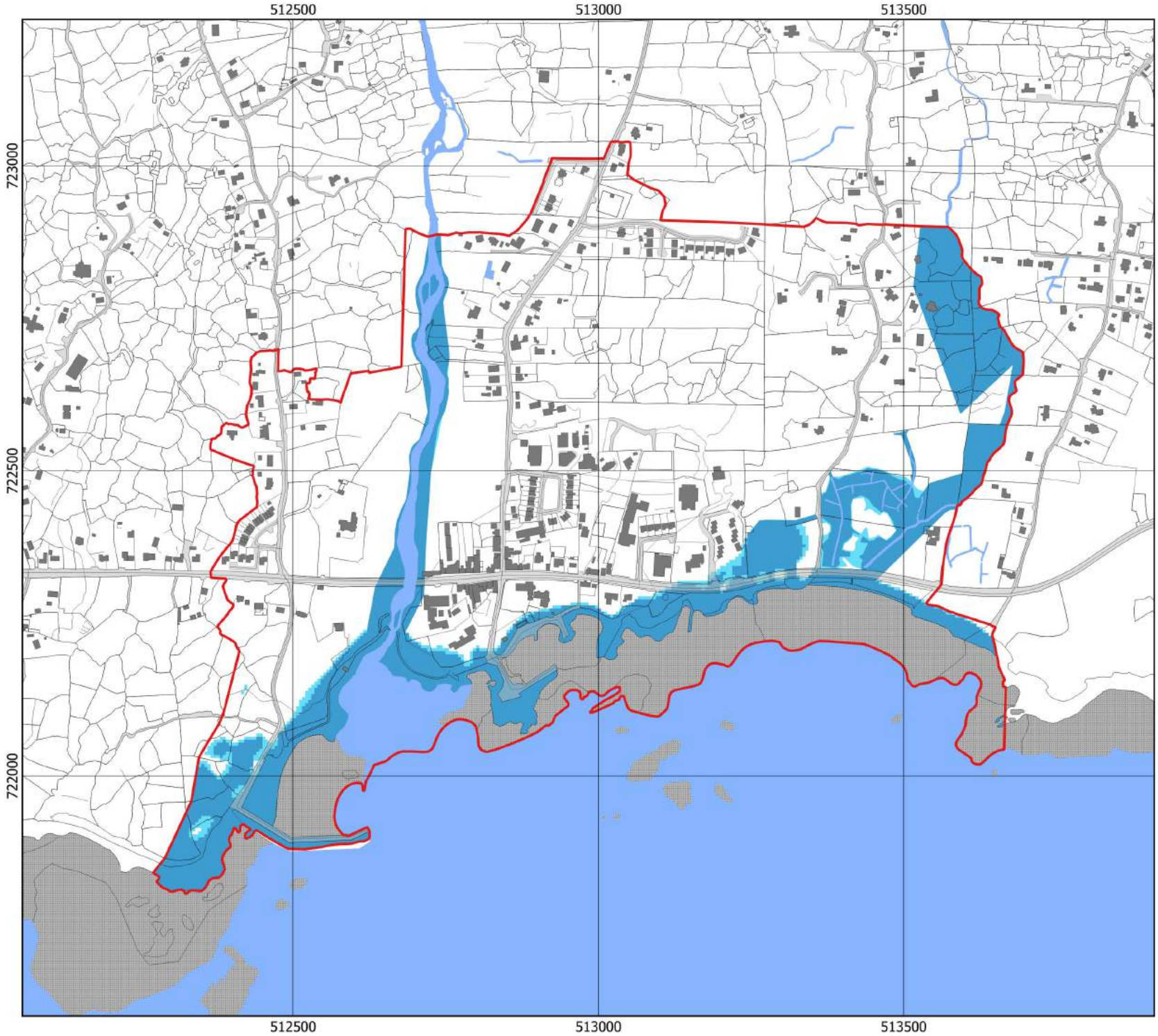

Galway CDP 2022-2028 SFRA

An Spidéal
Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

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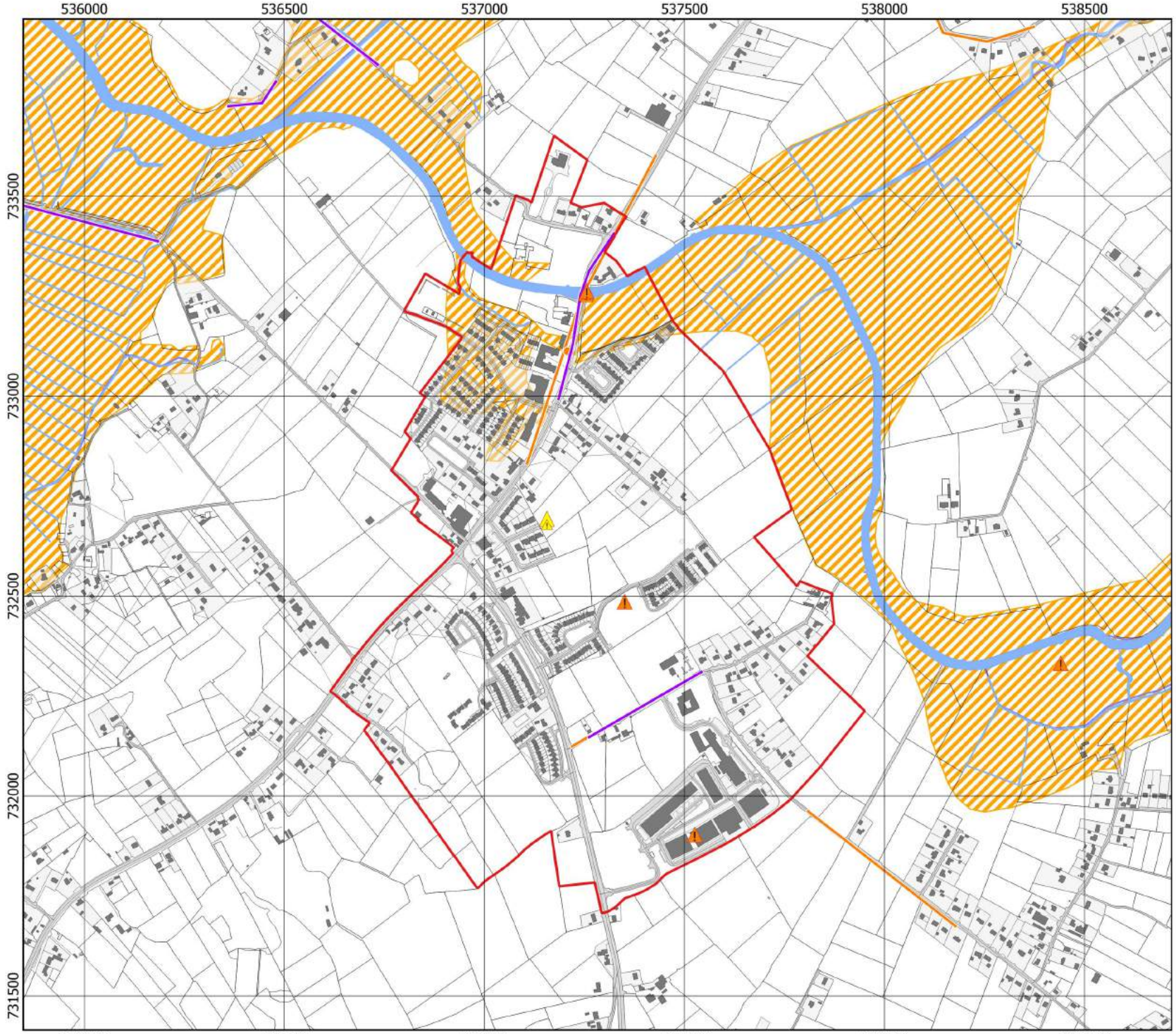

Galway CDP 2022-2028 SFRA

Baile Chláir OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

Past Flood Event

- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data

- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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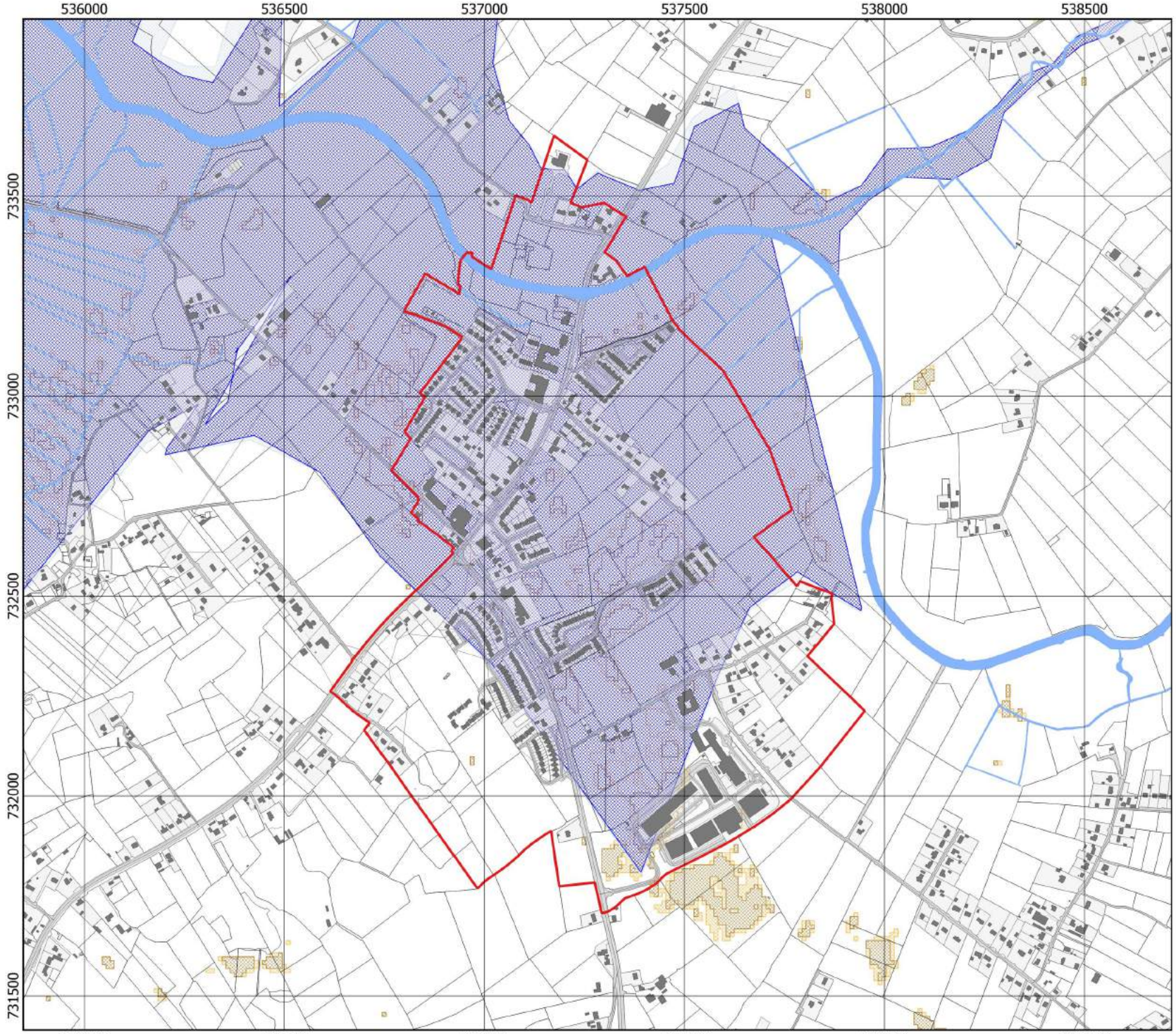

Galway CDP 2022-2028
SFRA

Baile Chláir
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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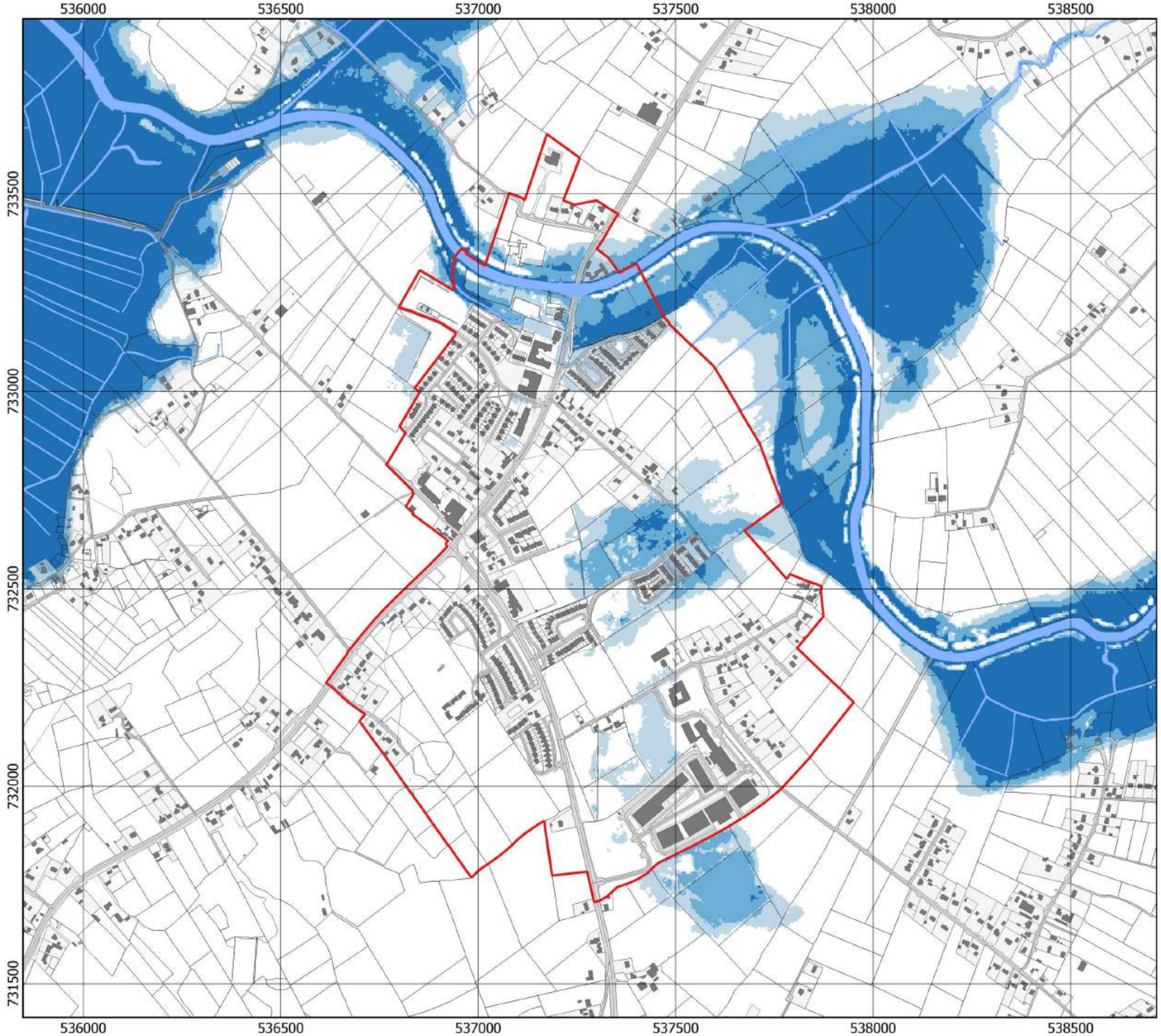

Galway CDP 2022-2028
SFRA

Baile Chláir
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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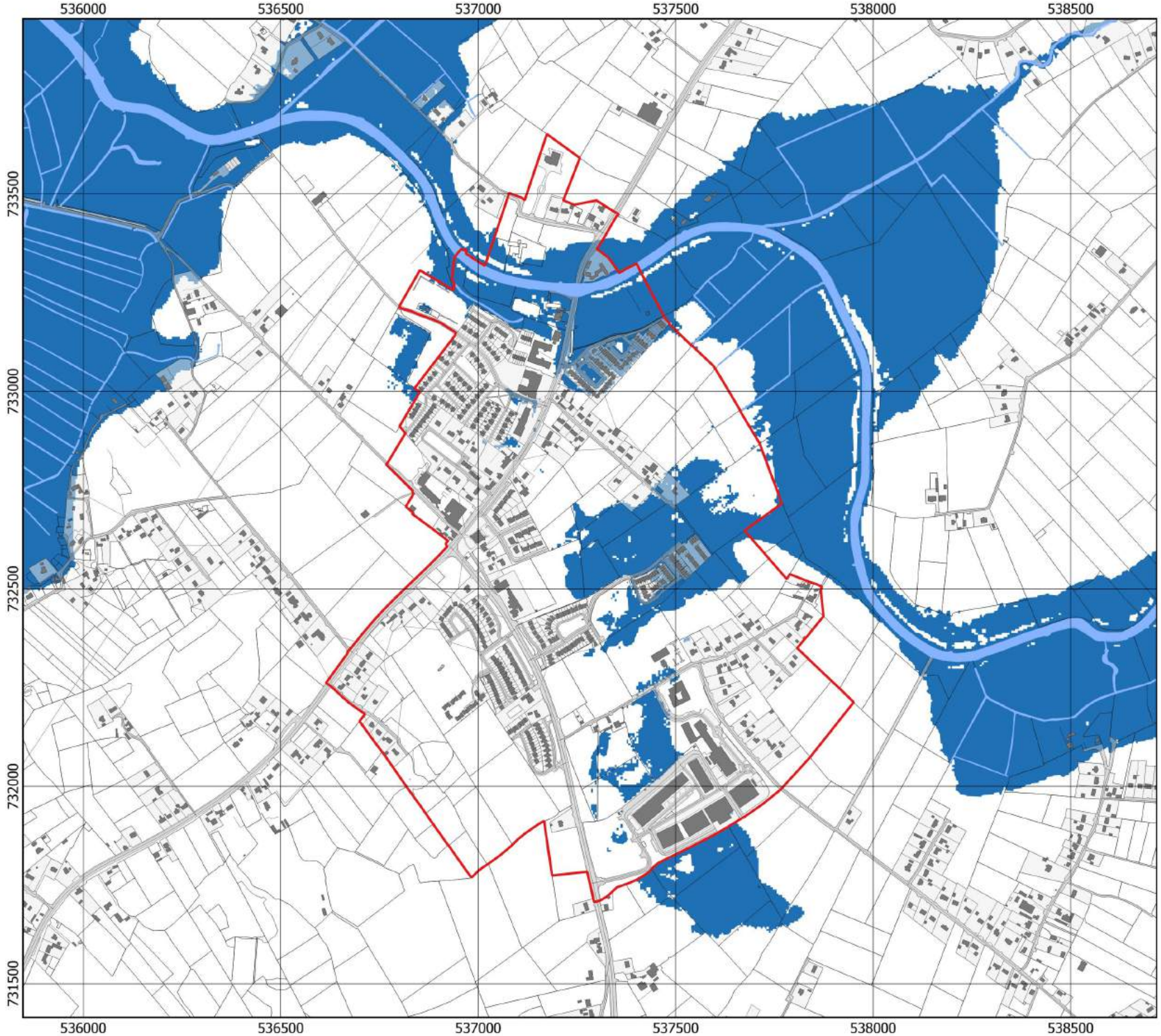

Galway CDP 2022-2028
SFRA

Baile Chláir
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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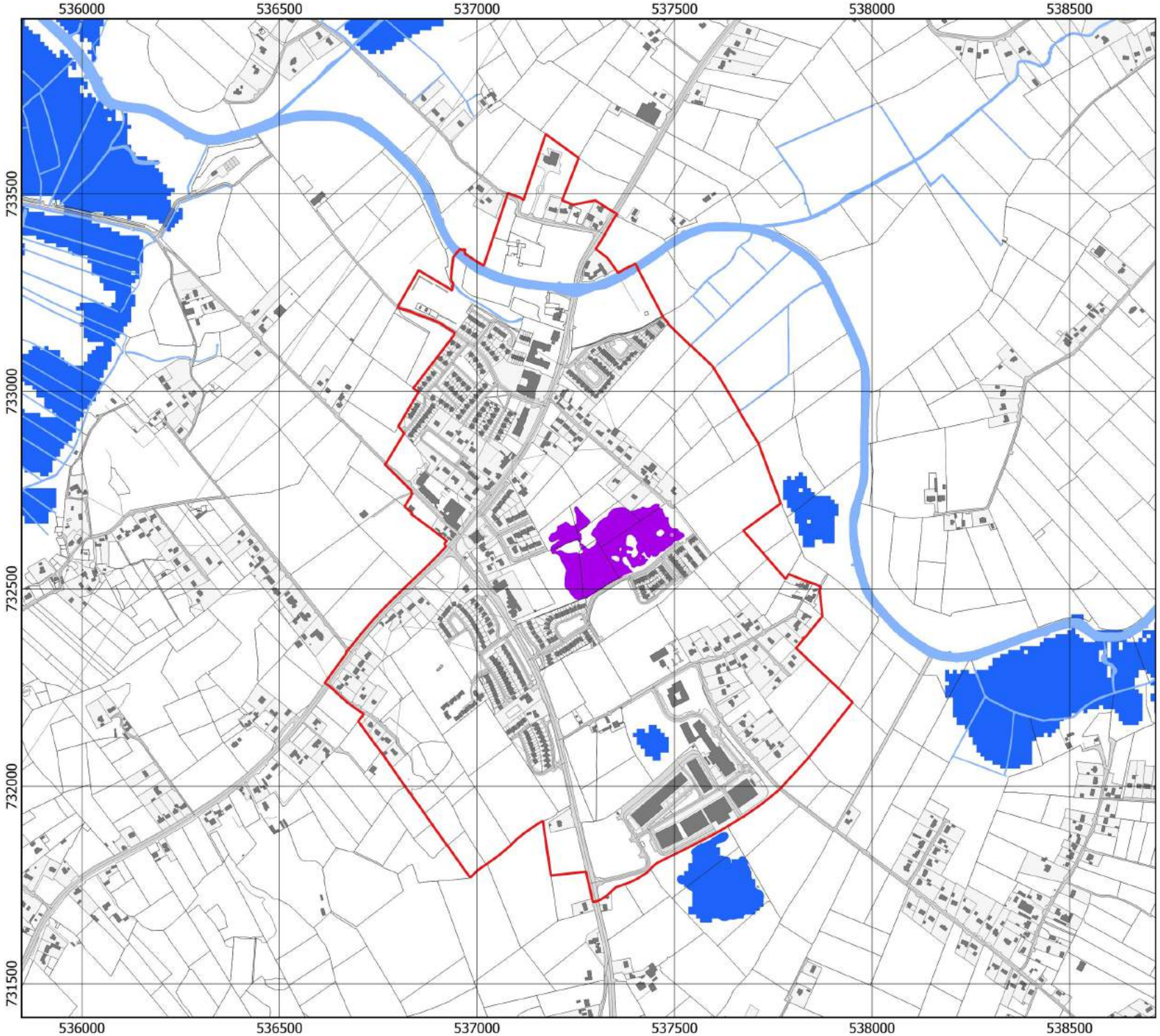

Galway CDP 2022-2028
SFRA

Baile Chláir
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council

Coordinates in ITM
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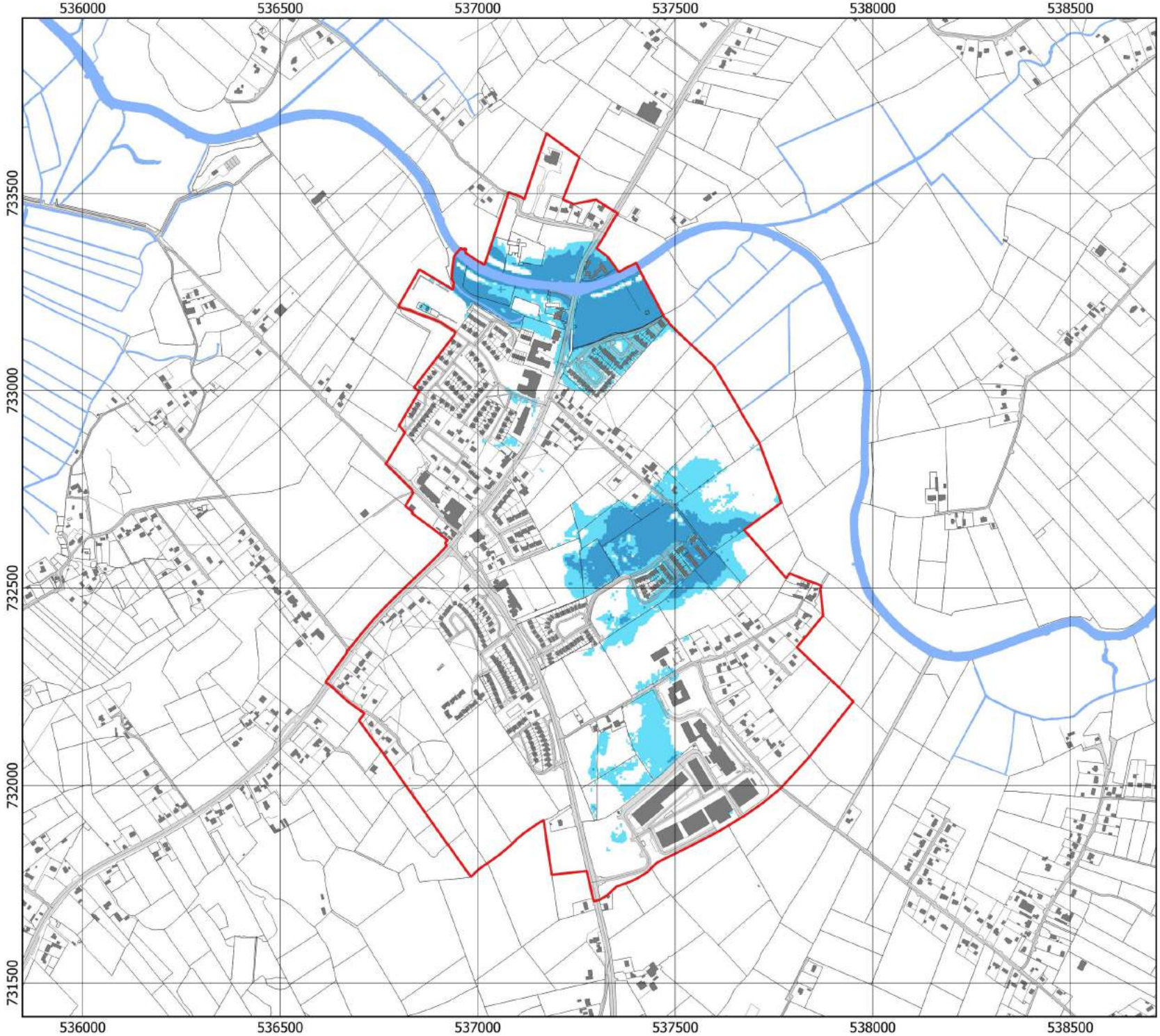


Galway CDP 2022-2028
SFRA

Baile Chláir
Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

Indicative Flood Zones

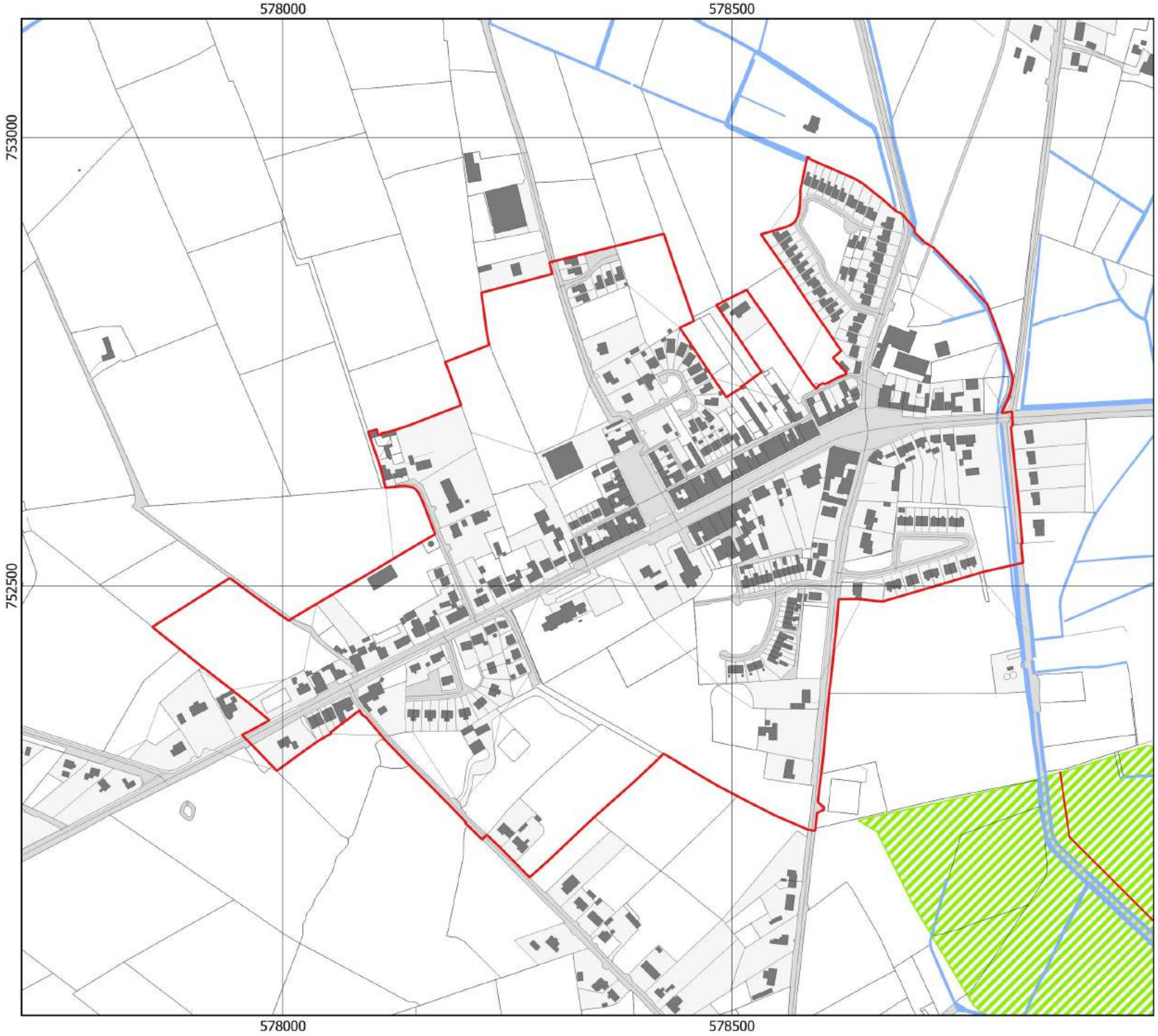
- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028
SFRA

Ballygar
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme
- Channel
- Embankment
- Benefited Land

Drainage Districts
- Channel
- Embankment
- Benefited Land

Land Commission
- Benefited Land

Past Flood Event
- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data
- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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Galway County Council

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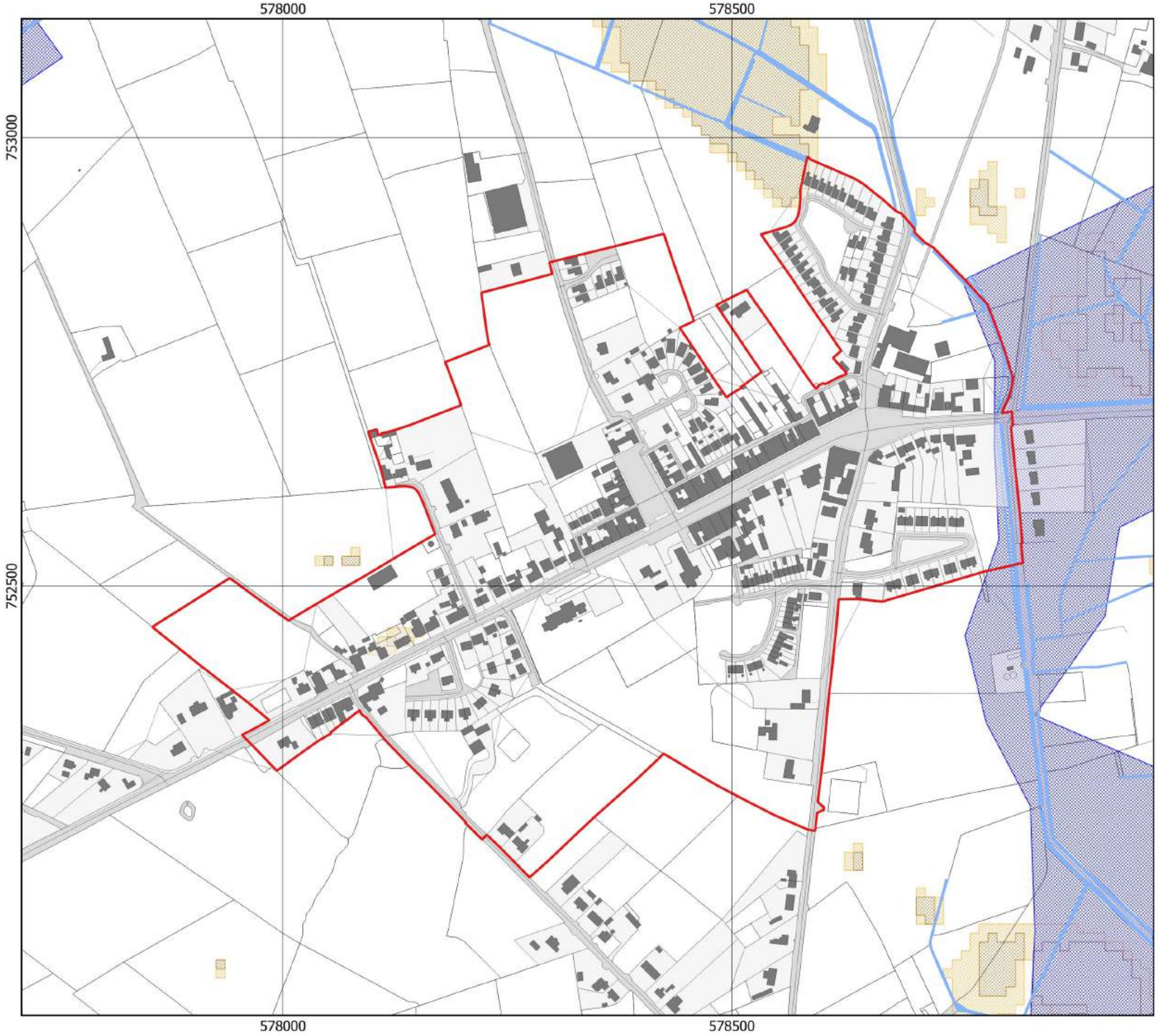

Galway CDP 2022-2028
SFRA

Ballygar
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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Galway County Council

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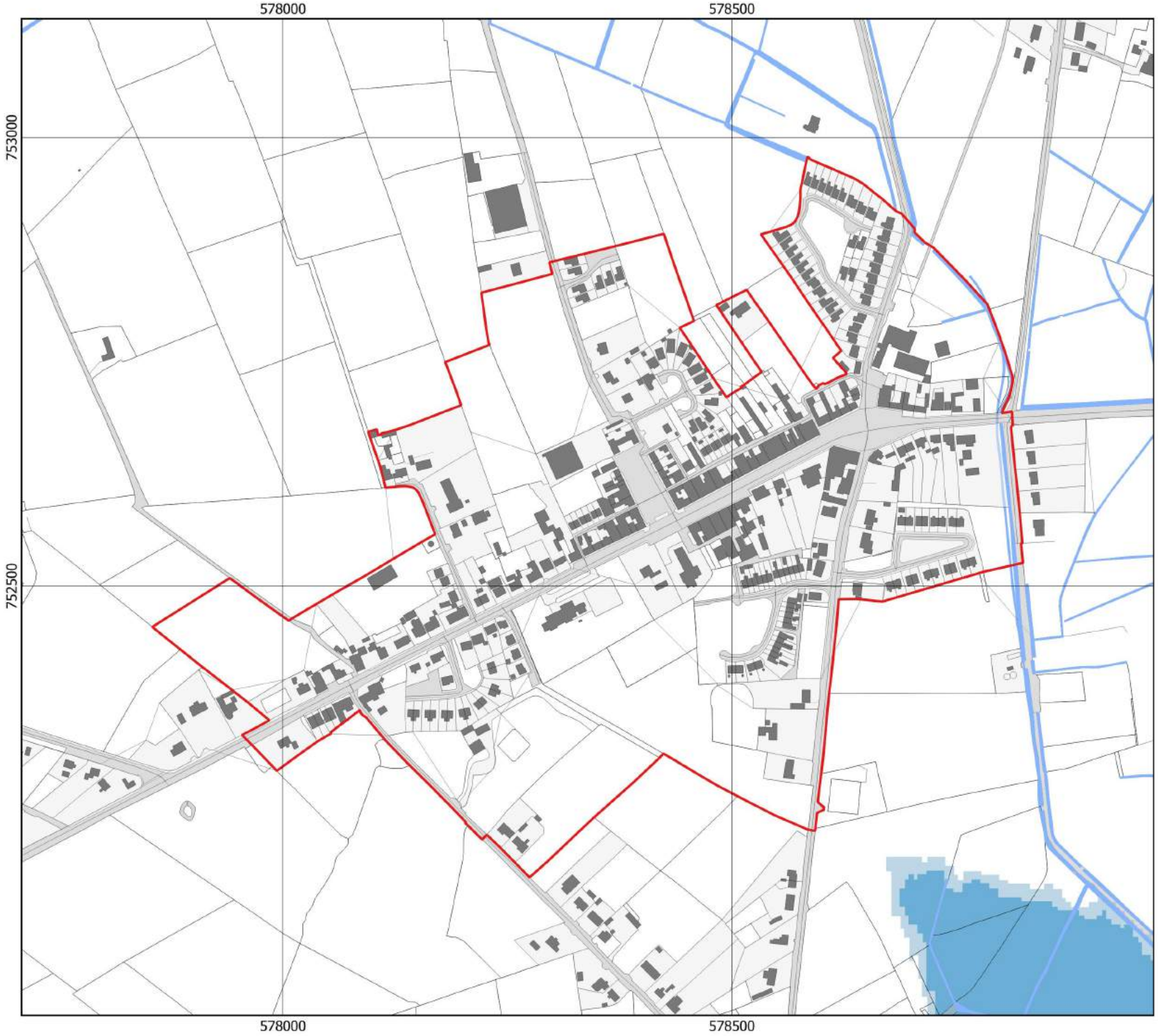

Galway CDP 2022-2028
SFRA

Ballygar
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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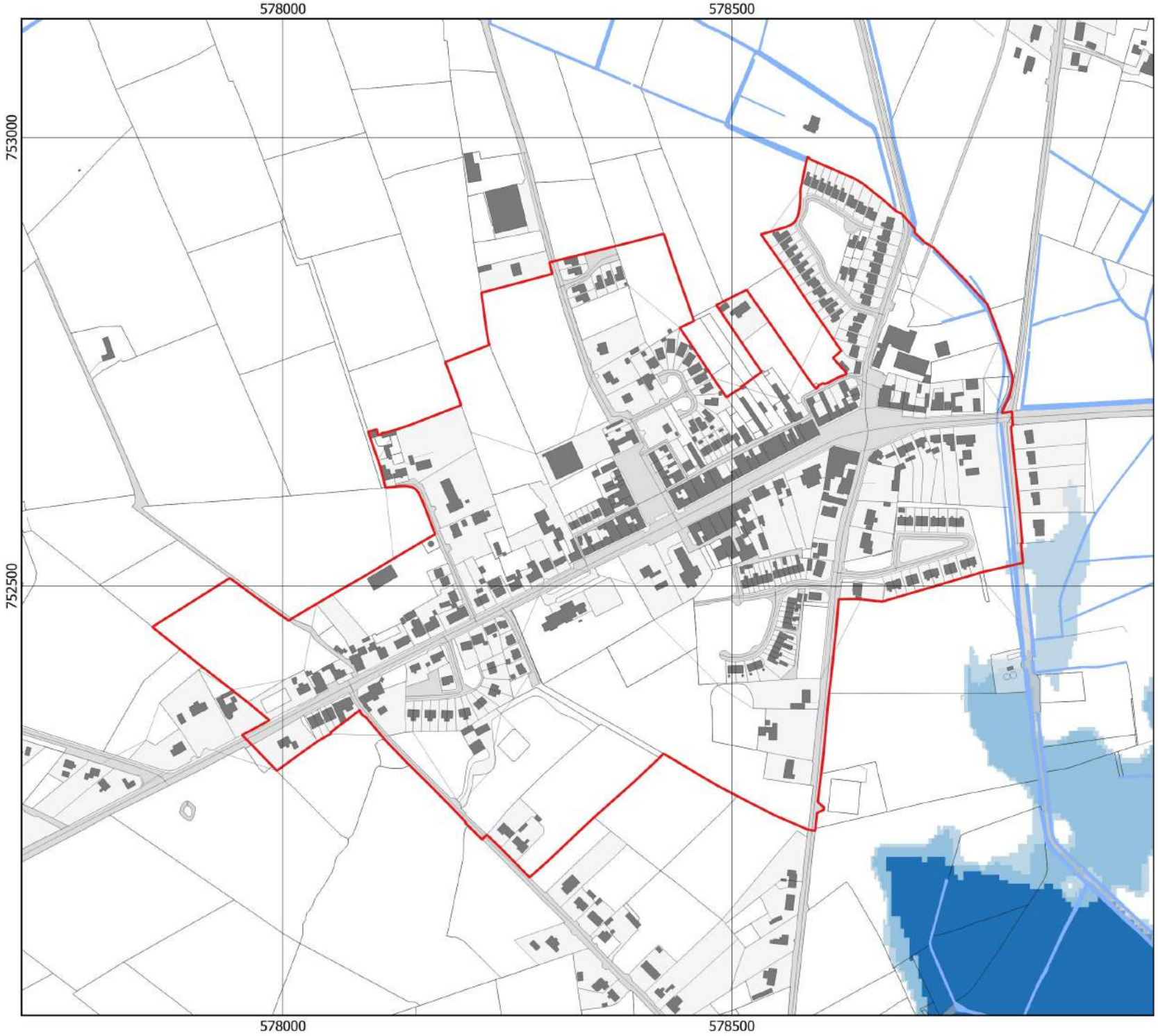


Galway CDP 2022-2028
SFRA

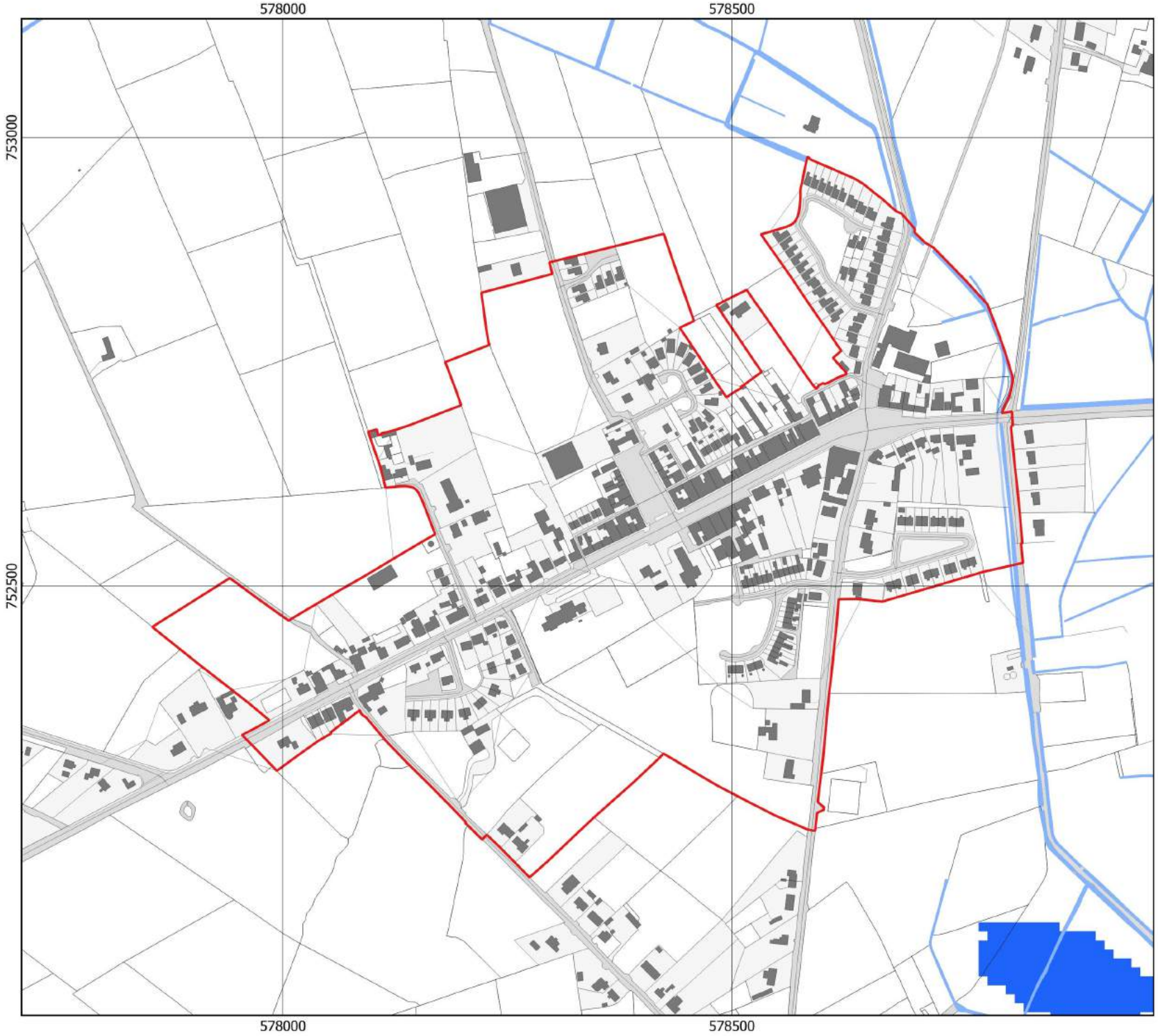
Ballygar
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028
SFRA

Ballygar
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

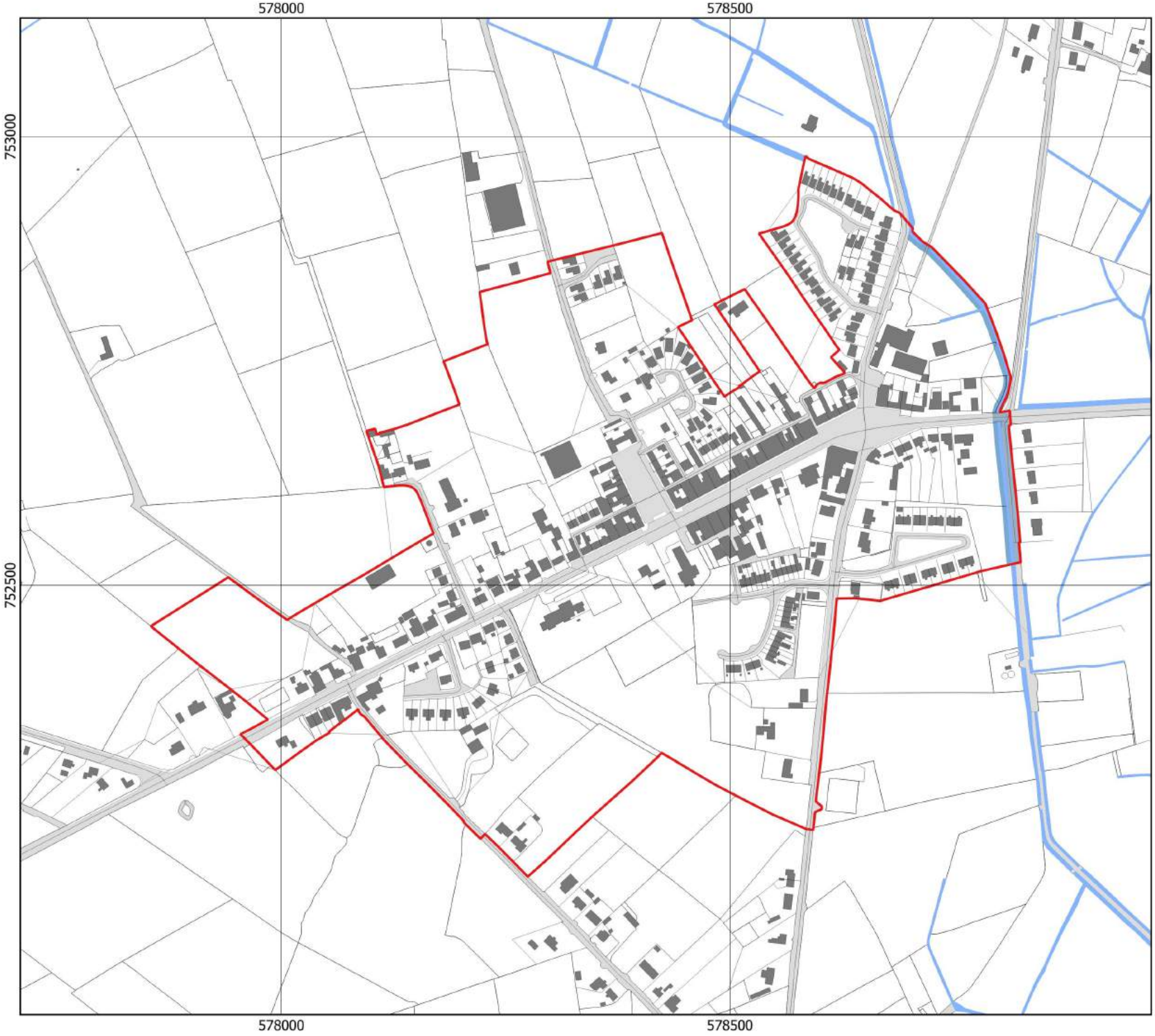
- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028
SFRA

Ballygar
Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

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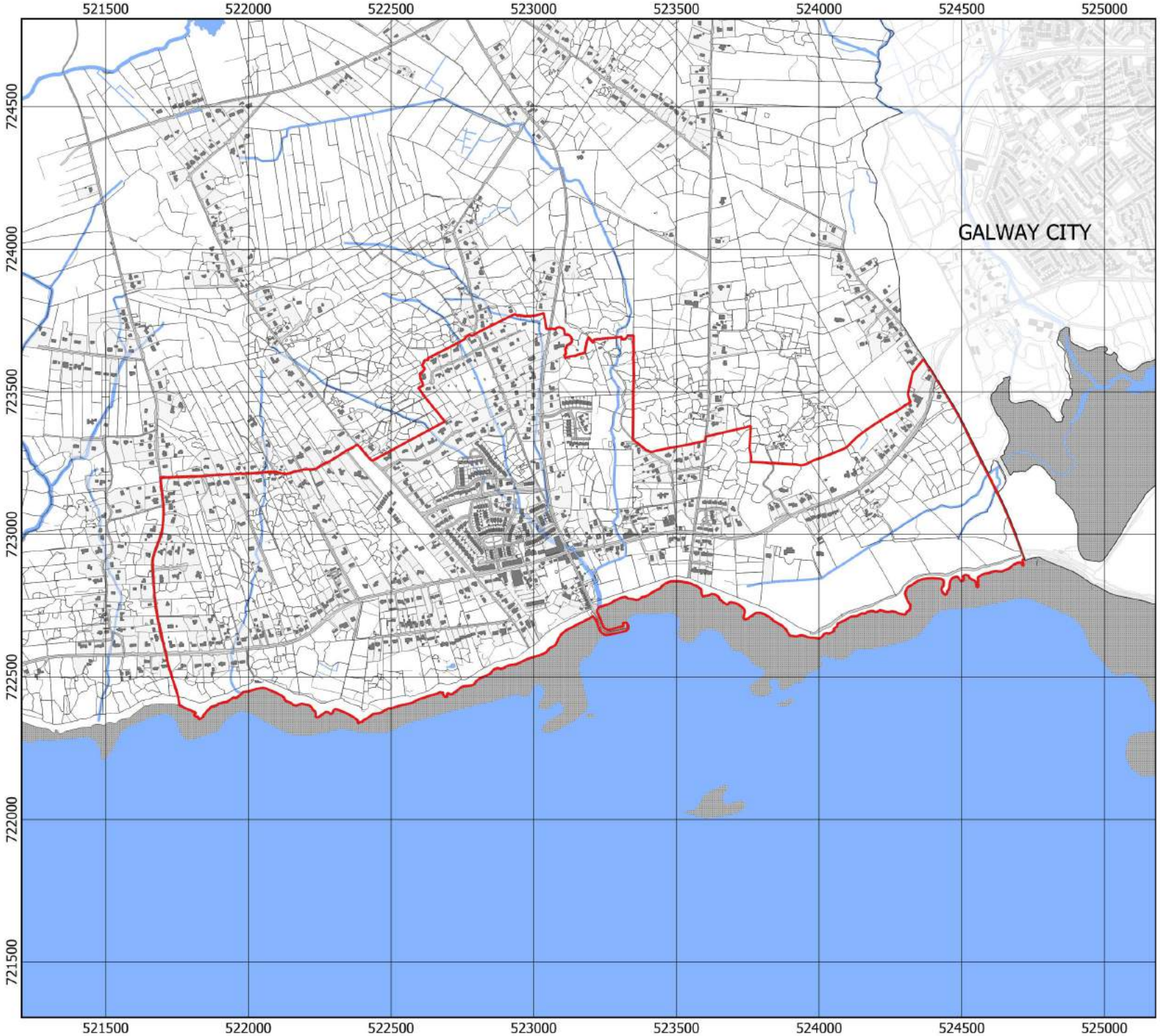

Galway CDP 2022-2028
SFRA

Bearna
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme
- Channel
- Embankment
- Benefited Land

Drainage Districts
- Channel
- Embankment
- Benefited Land

Land Commission
- Benefited Land

Past Flood Event
- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data
- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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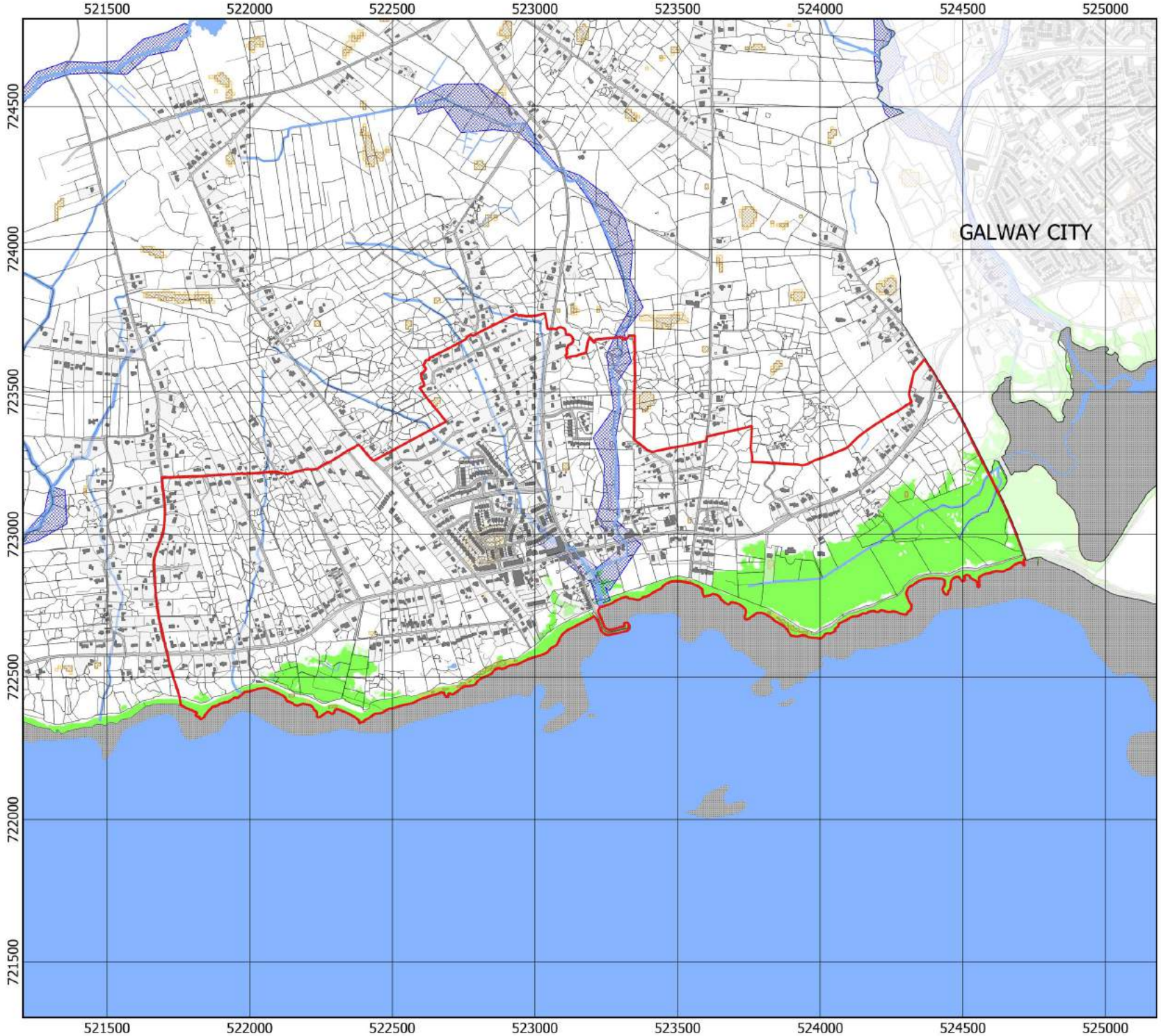

Galway CDP 2022-2028
SFRA

Bearna
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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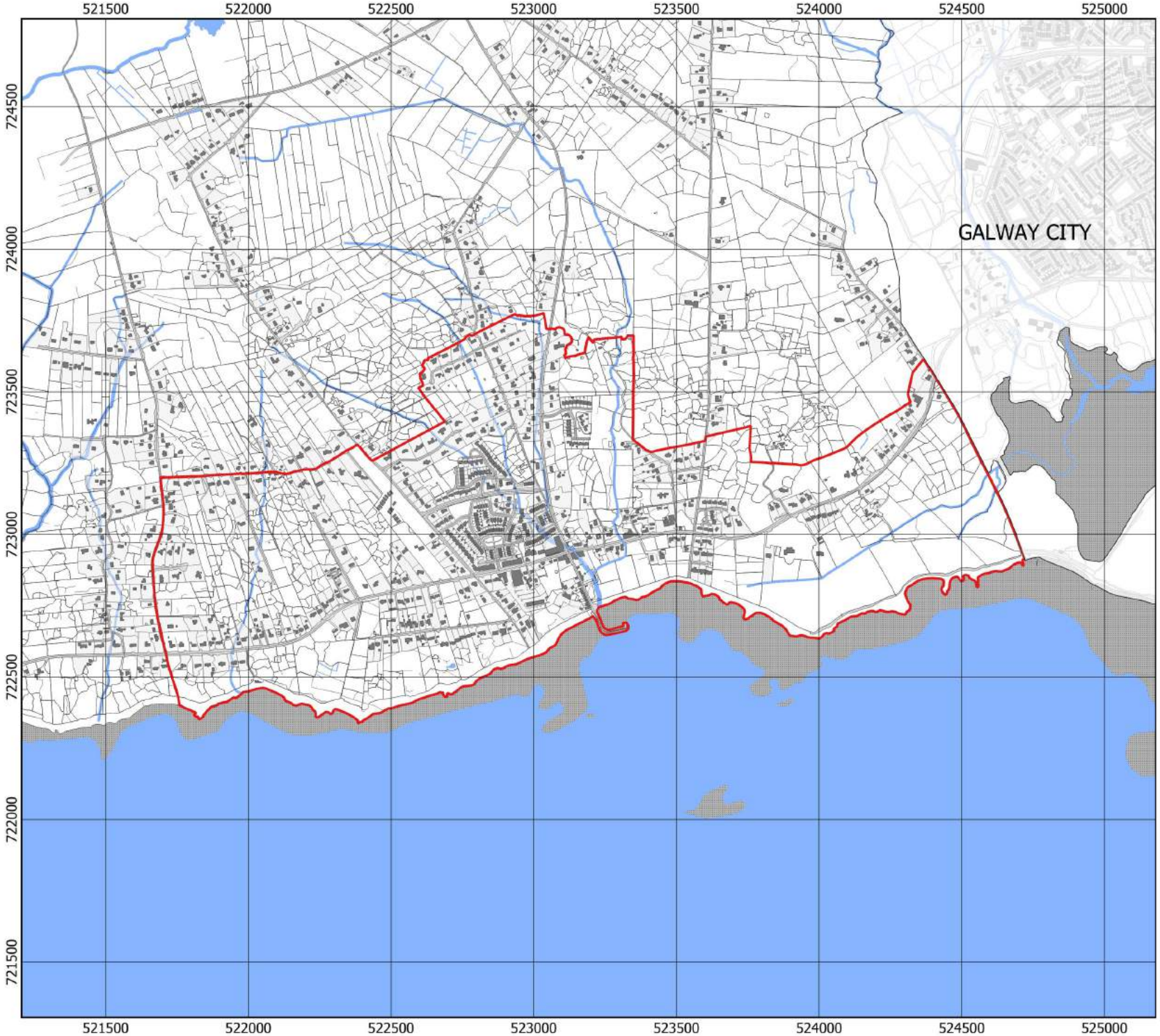


Galway CDP 2022-2028
SFRA

Bearna
OPW CFRAM Present Day

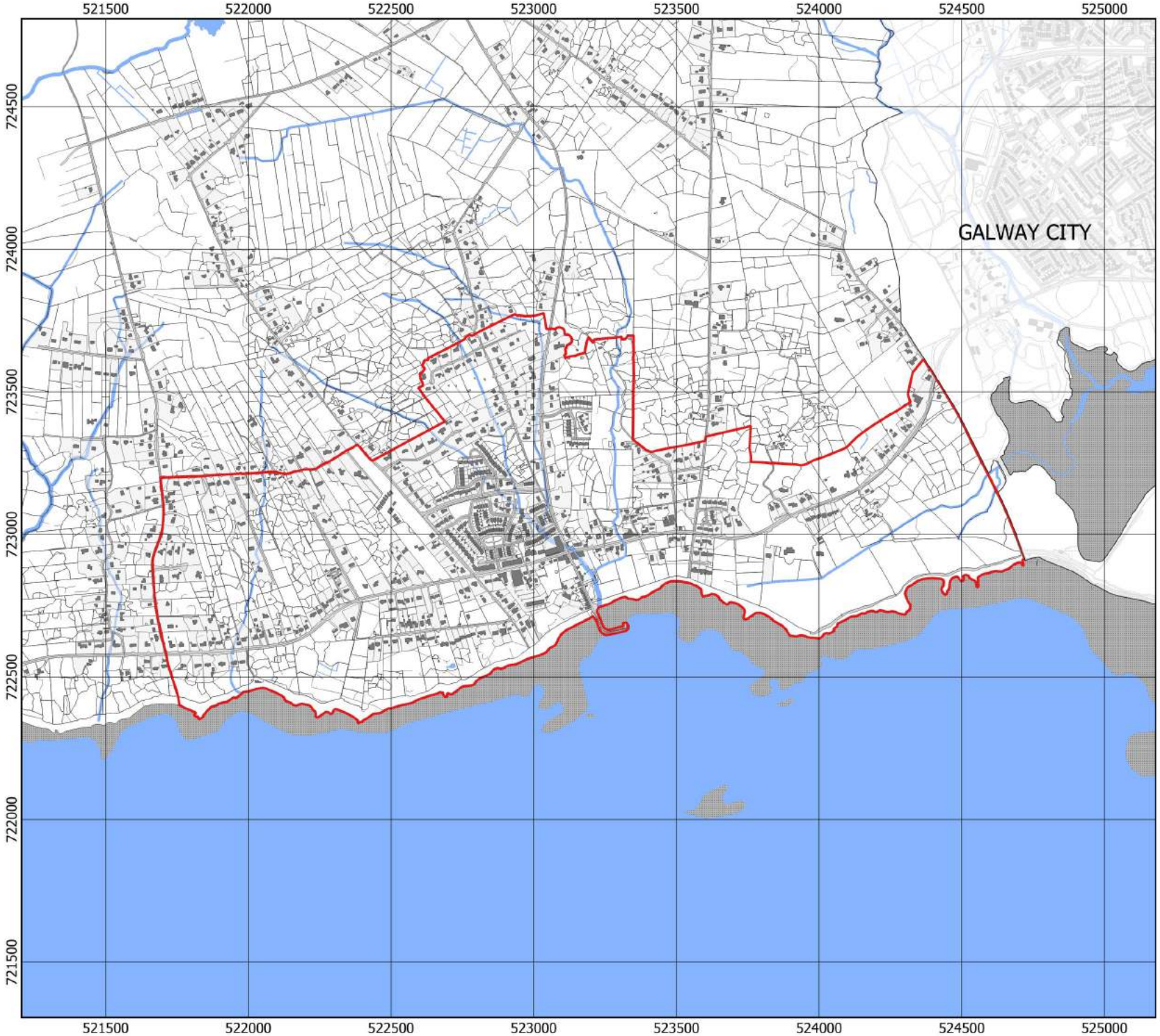
- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028
SFRA

Bearna
OPW CFRAM All Scenarios

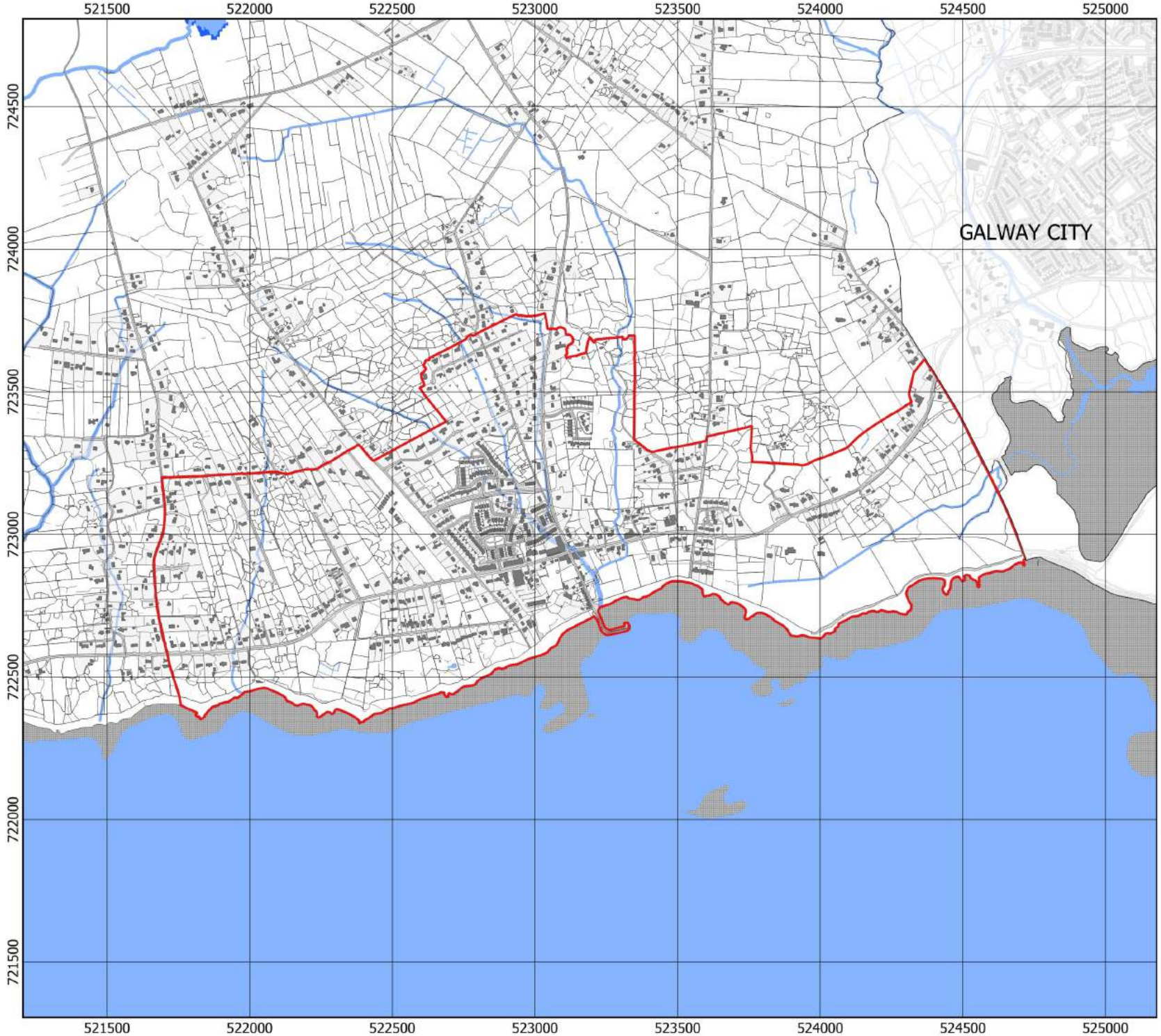
- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028
SFRA

Bearna
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

Comhairle Chontae na Gaillimhe
Galway County Council

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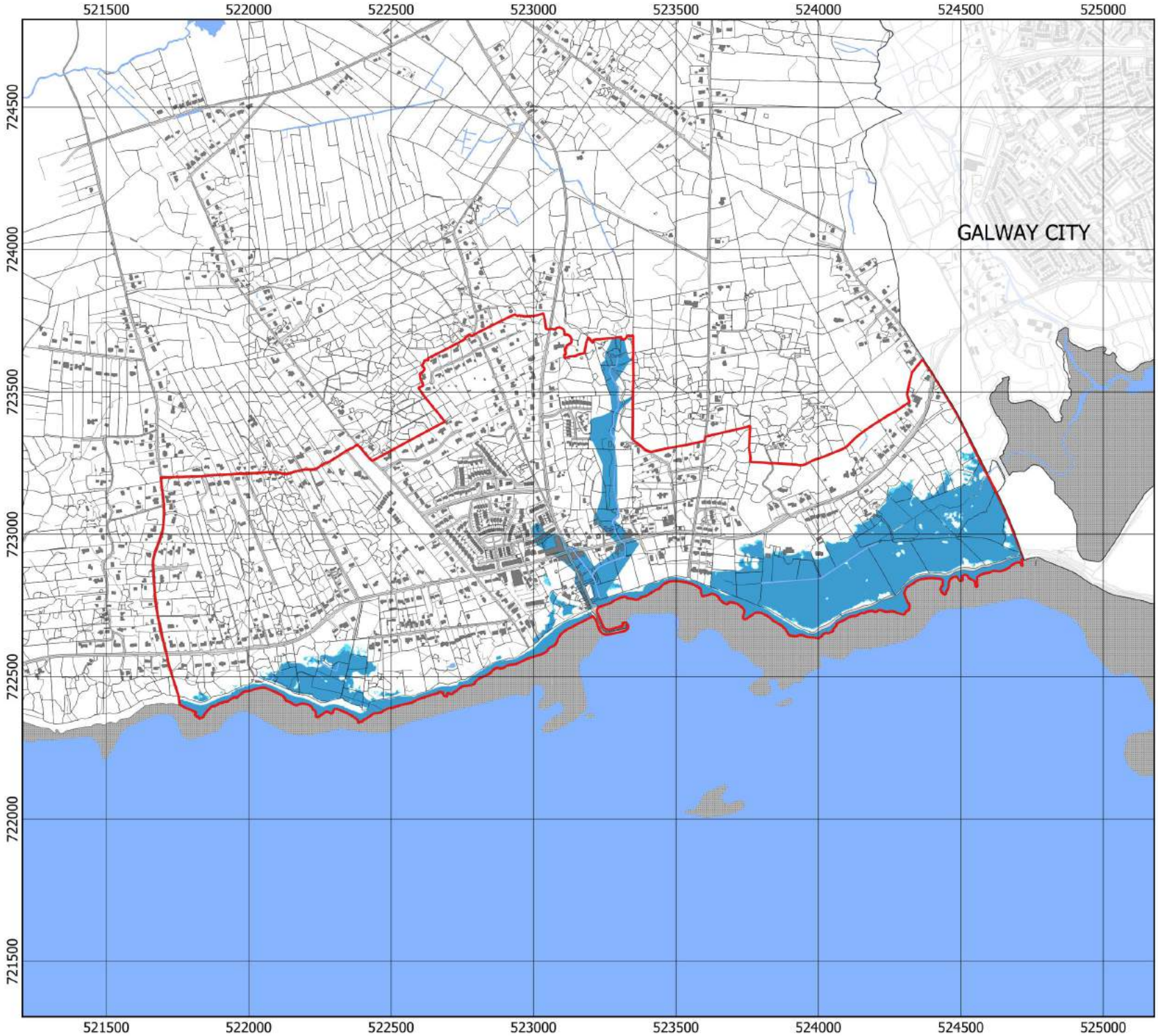

Galway CDP 2022-2028
SFRA

Bearna
Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

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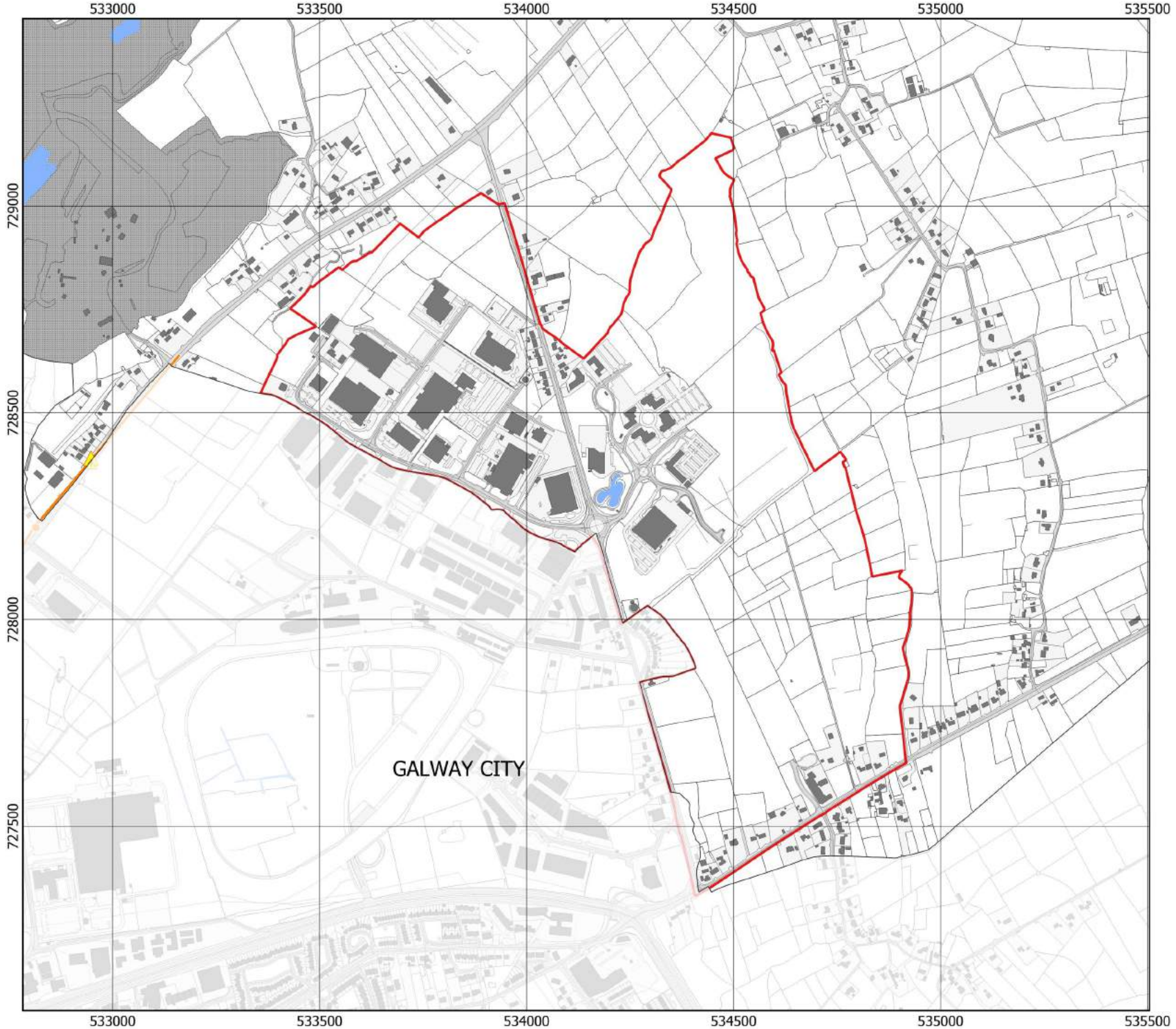

Galway CDP 2022-2028
SFRA

Briarhill
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme
- Channel
- Embankment
- Benefited Land

Drainage Districts
- Channel
- Embankment
- Benefited Land

Land Commission
- Benefited Land

Past Flood Event
- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data
- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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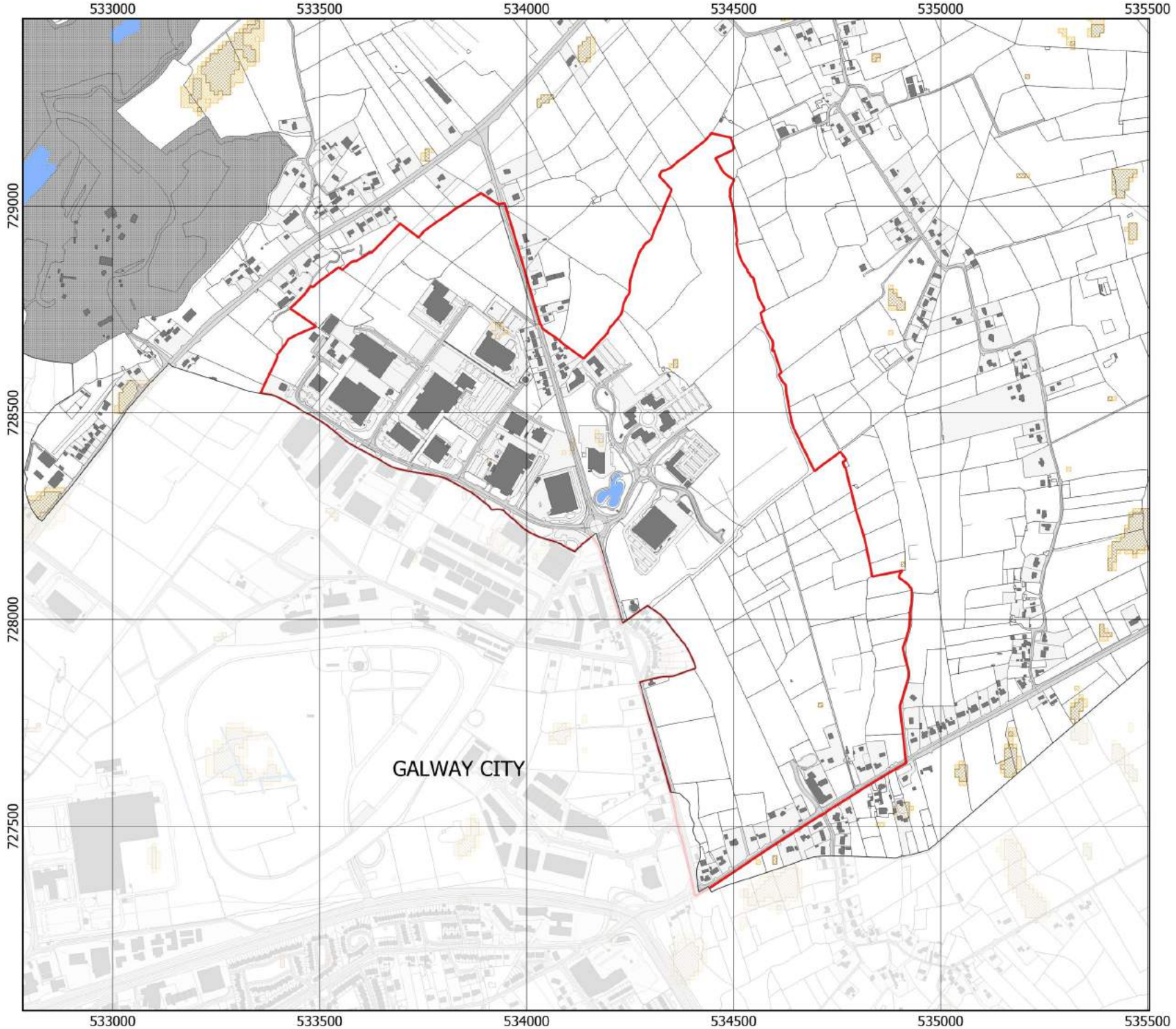

Galway CDP 2022-2028
SFRA

Briarhill
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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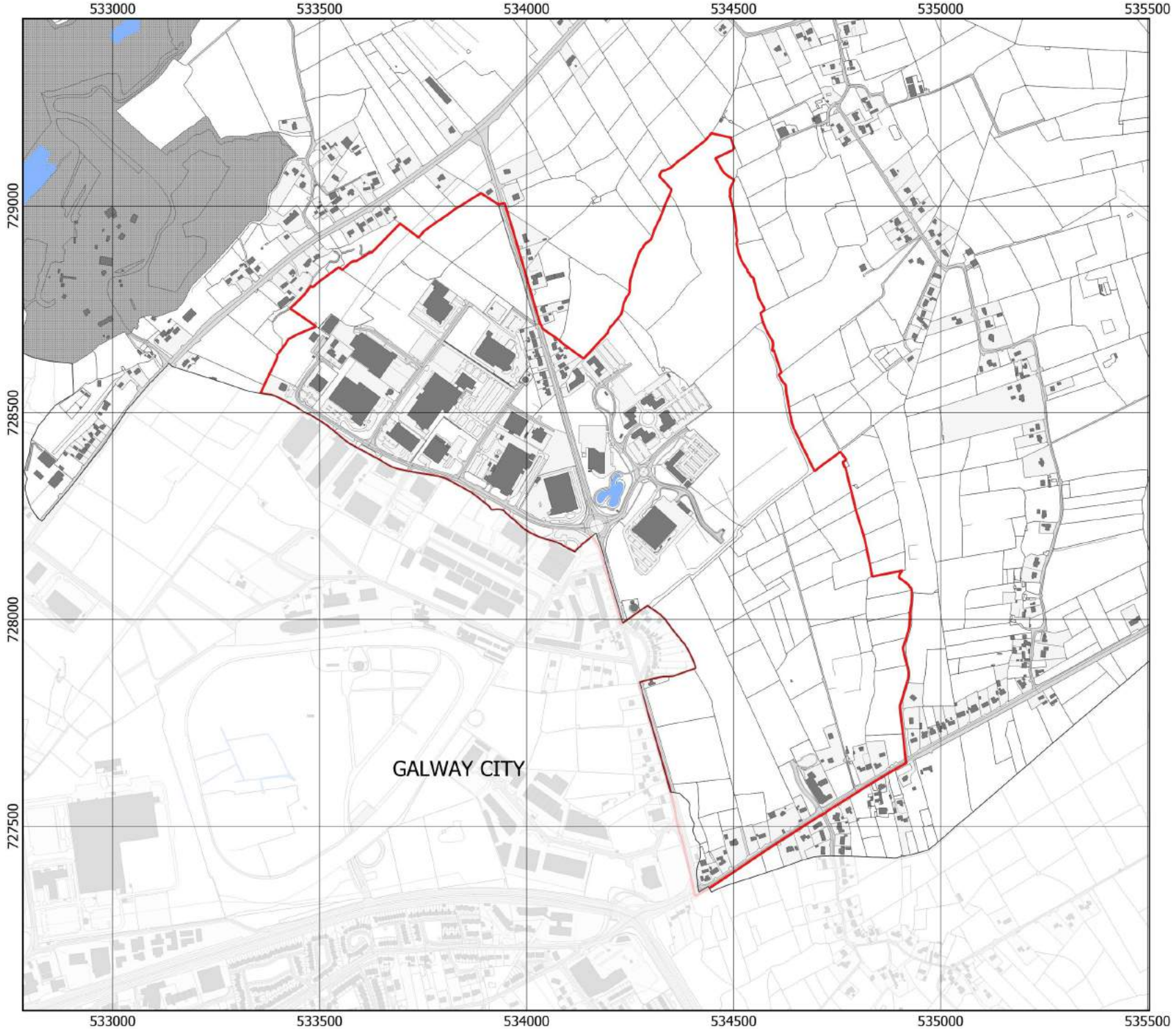


Galway CDP 2022-2028
SFRA

Briarhill
OPW CFRAM Present Day

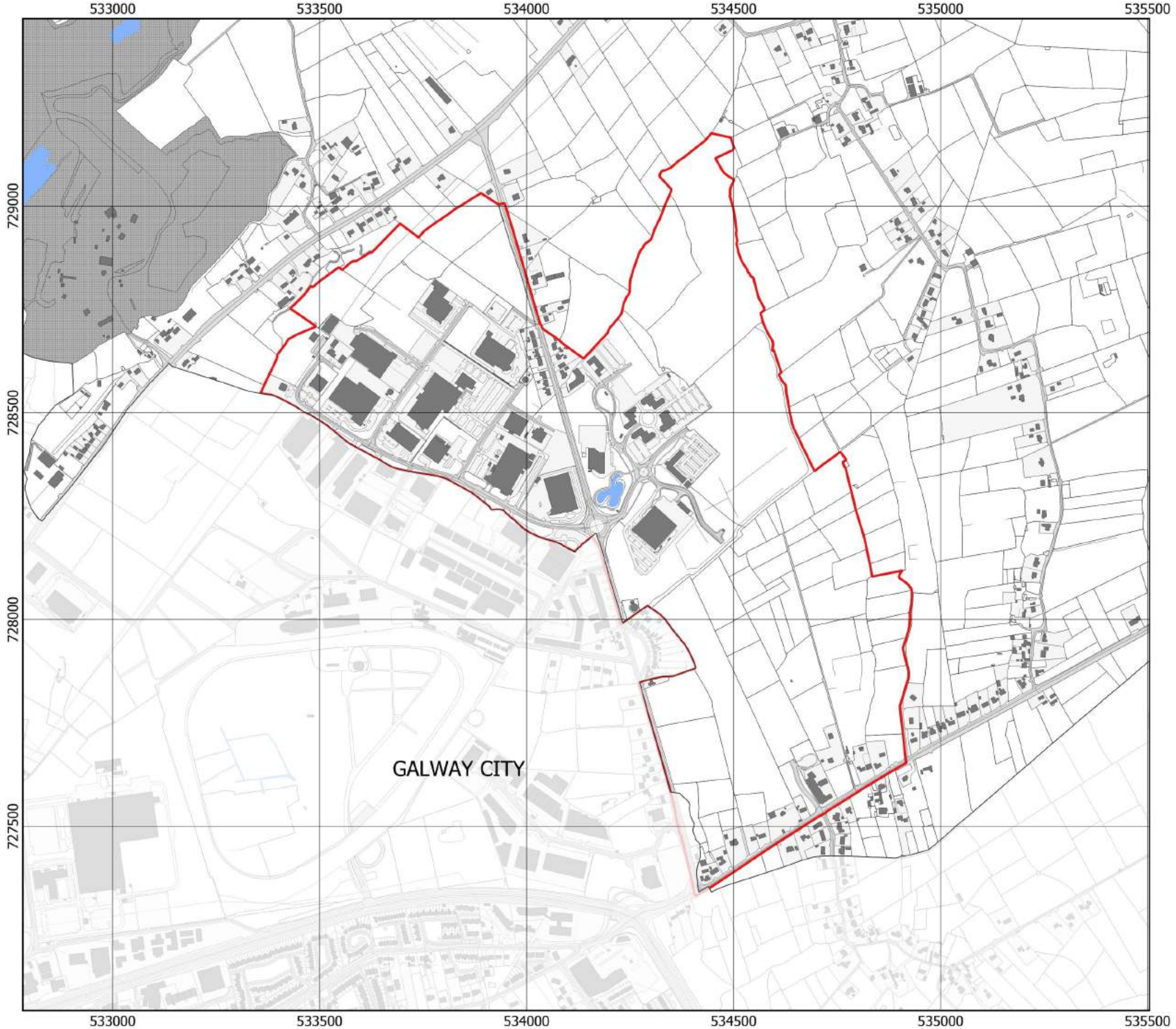
- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

Comhairle Chontae na Gaillimhe
Galway County Council

Coordinates in ITM
Galway County Council 2020/OSi_NMA_090



Galway CDP 2022-2028
SFRA

Briarhill
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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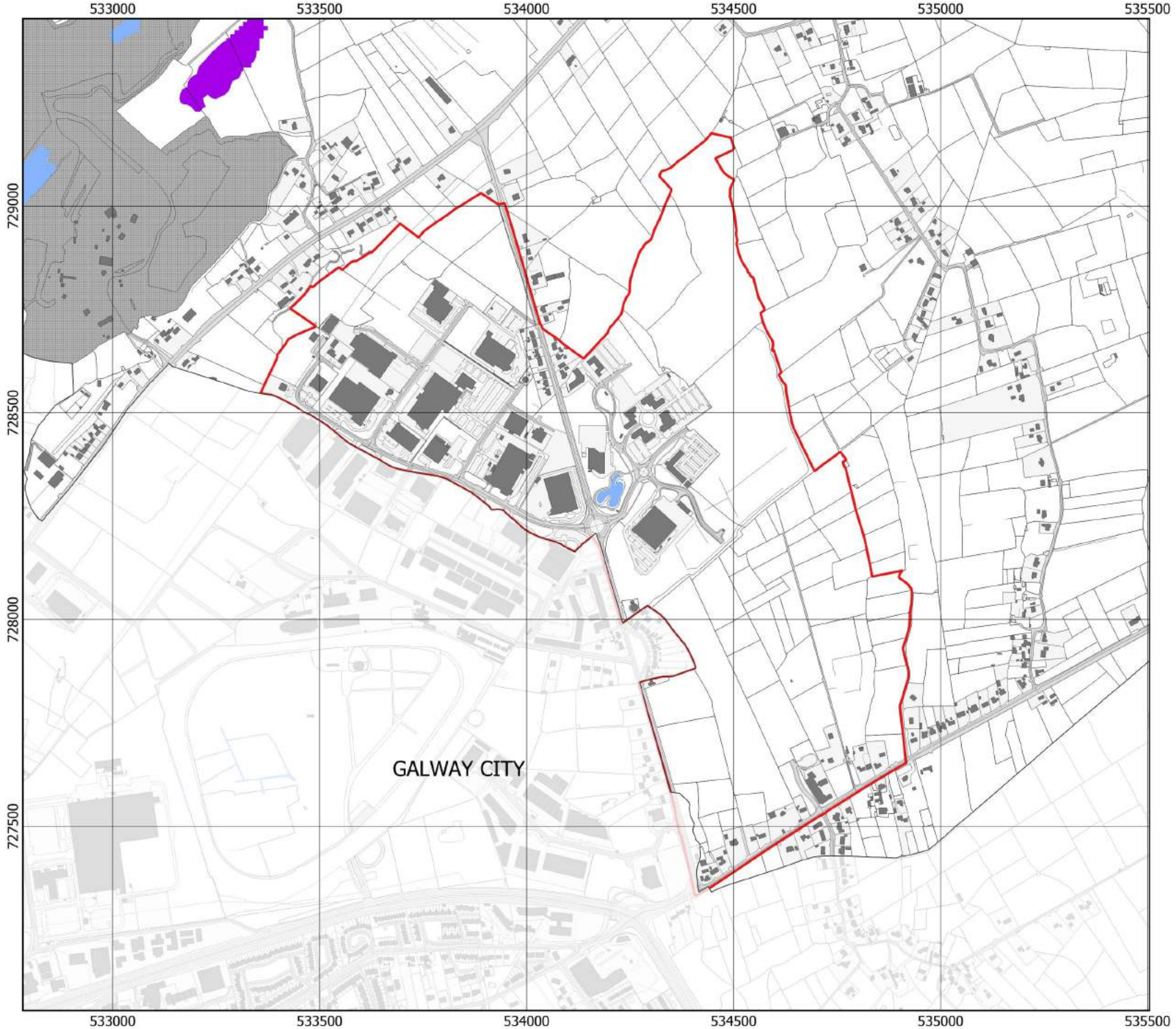

Galway CDP 2022-2028
SFRA

Briarhill
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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Galway County Council

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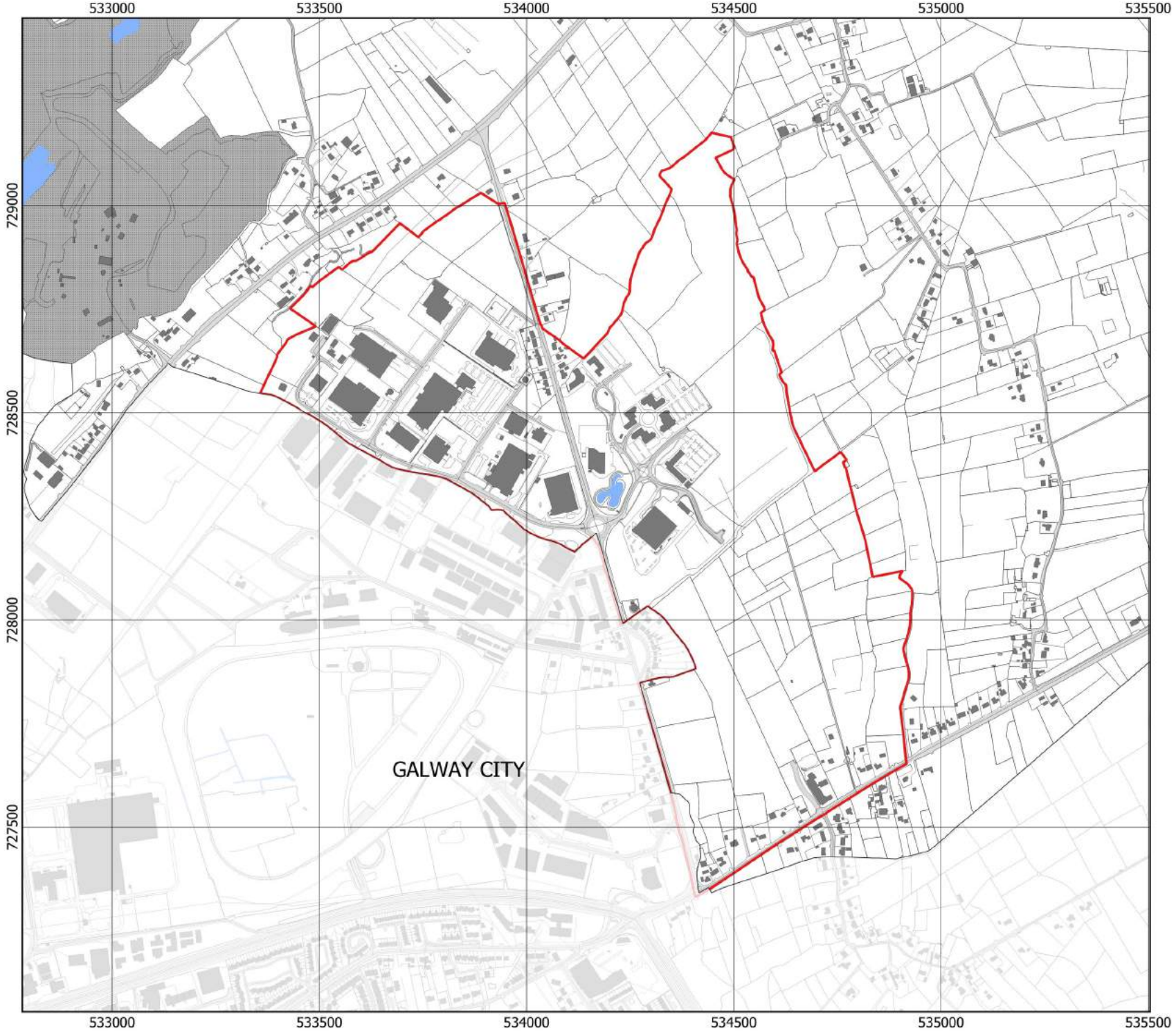

Galway CDP 2022-2028
SFRA

Briarhill
Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

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Galway County Council

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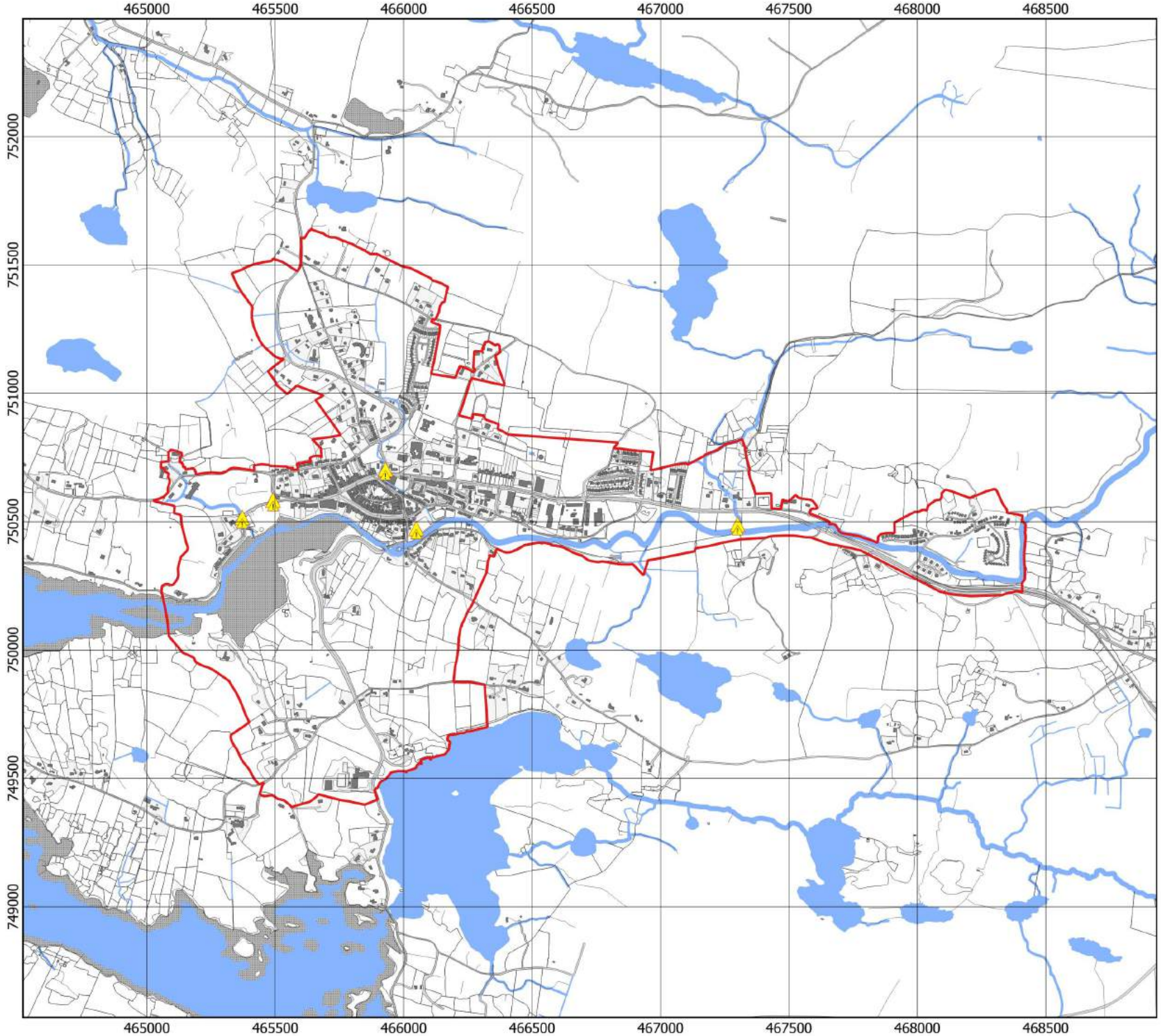

Galway CDP 2022-2028 SFRA

Clifden OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

Past Flood Event

- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data

- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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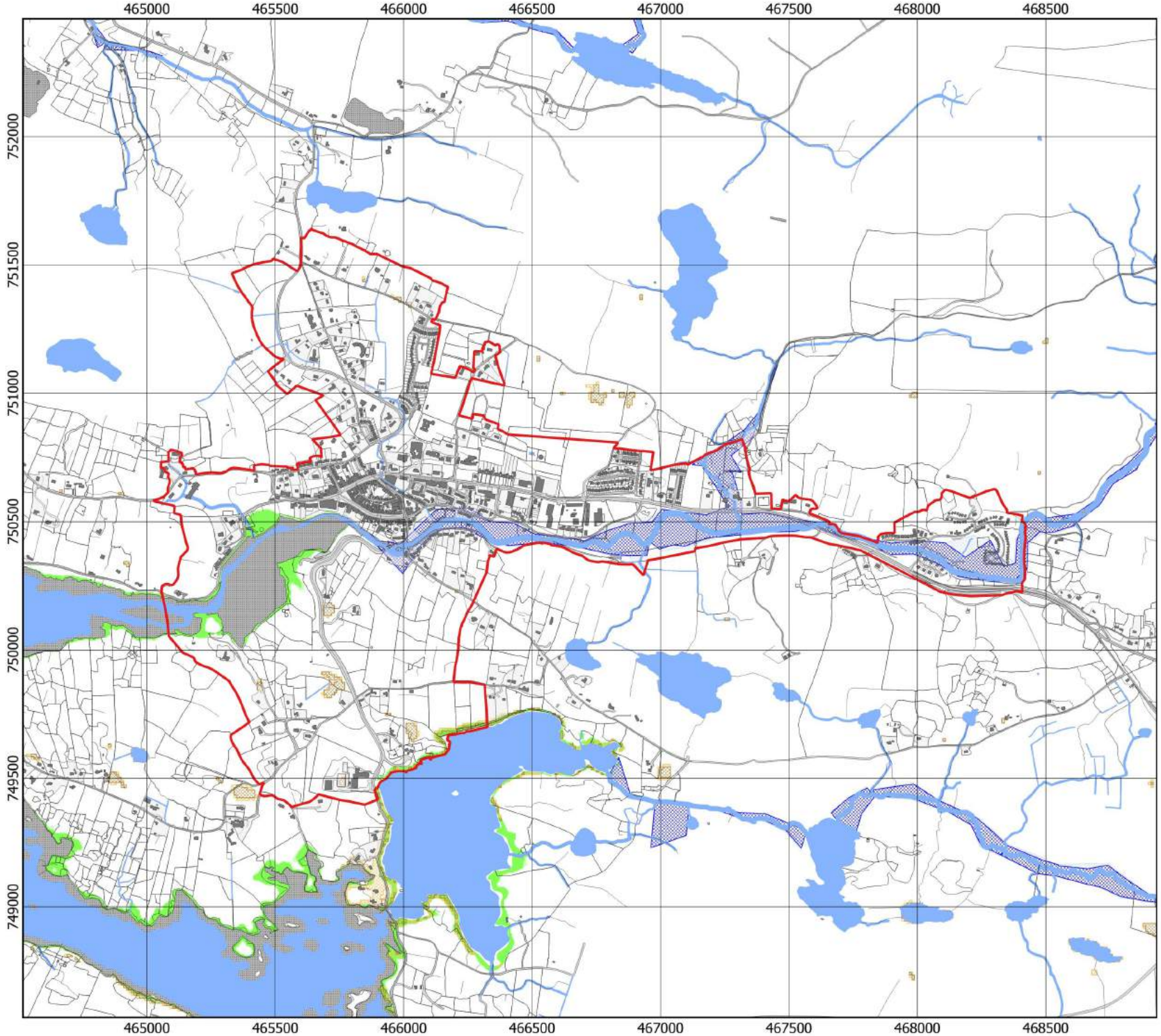

Galway CDP 2022-2028
SFRA

Clifden
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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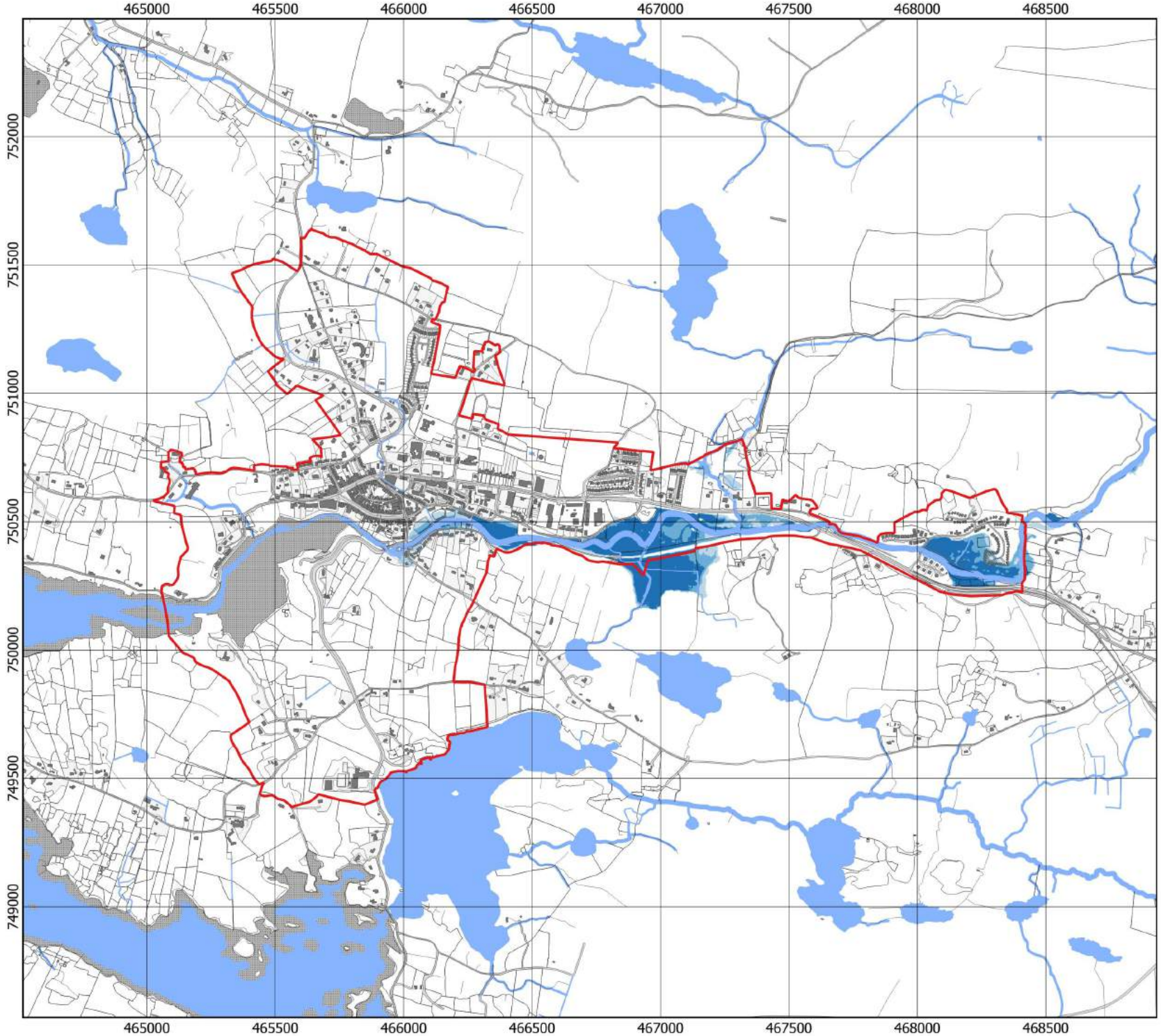

Galway CDP 2022-2028
SFRA

Clifden
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

CAAS

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Galway County Council

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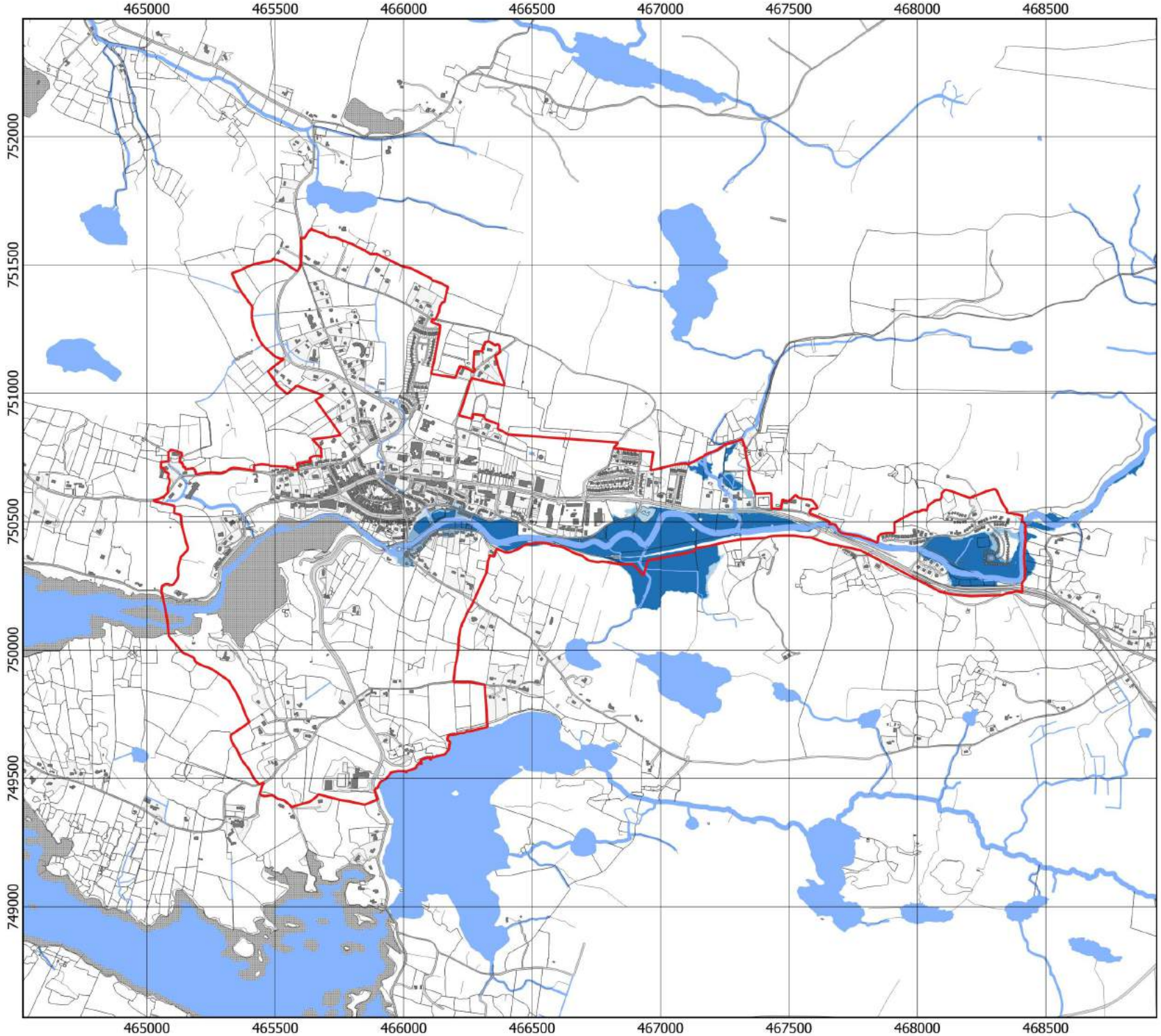

Galway CDP 2022-2028
SFRA

Clifden
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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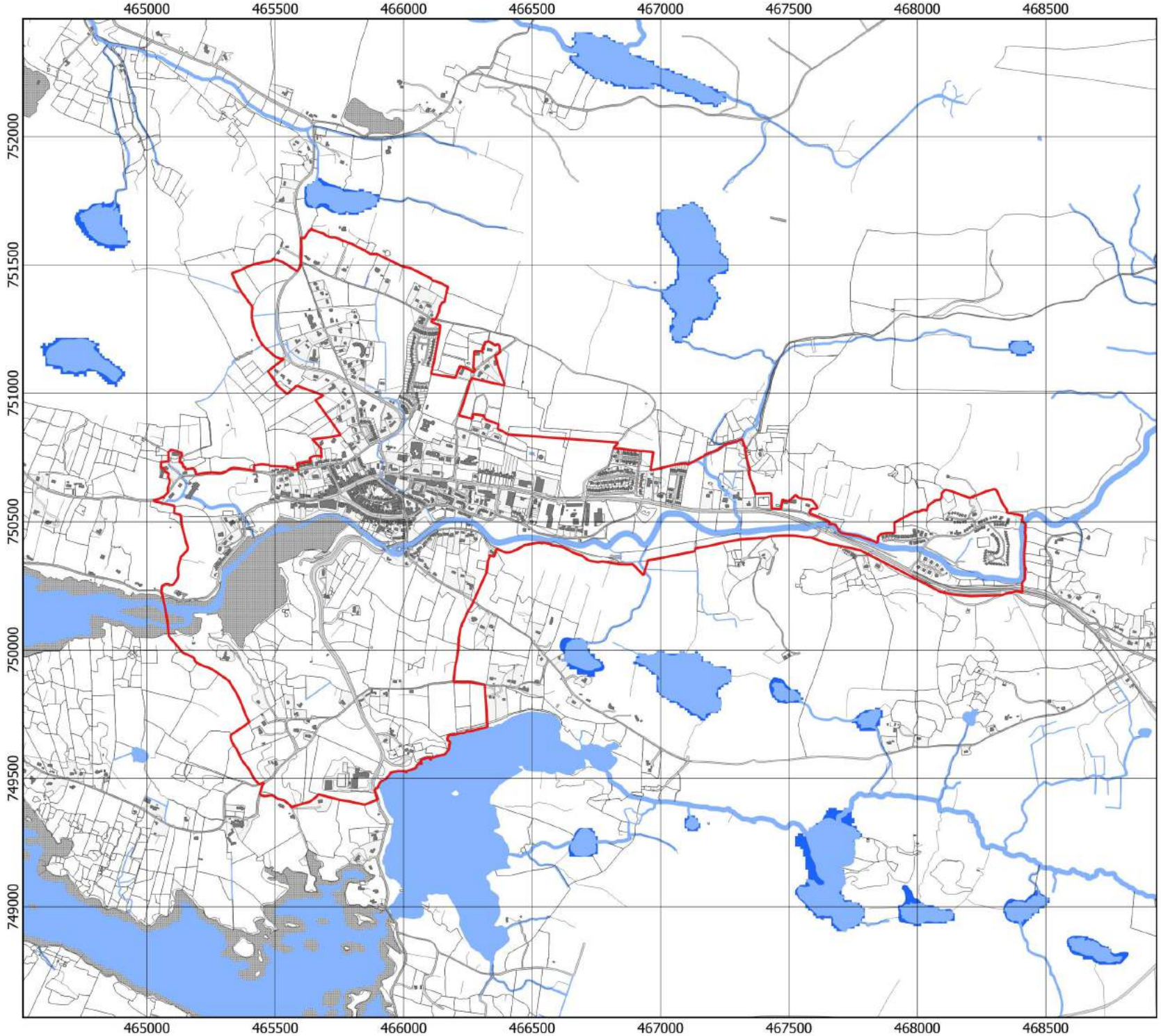

Galway CDP 2022-2028
SFRA

Clifden
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

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- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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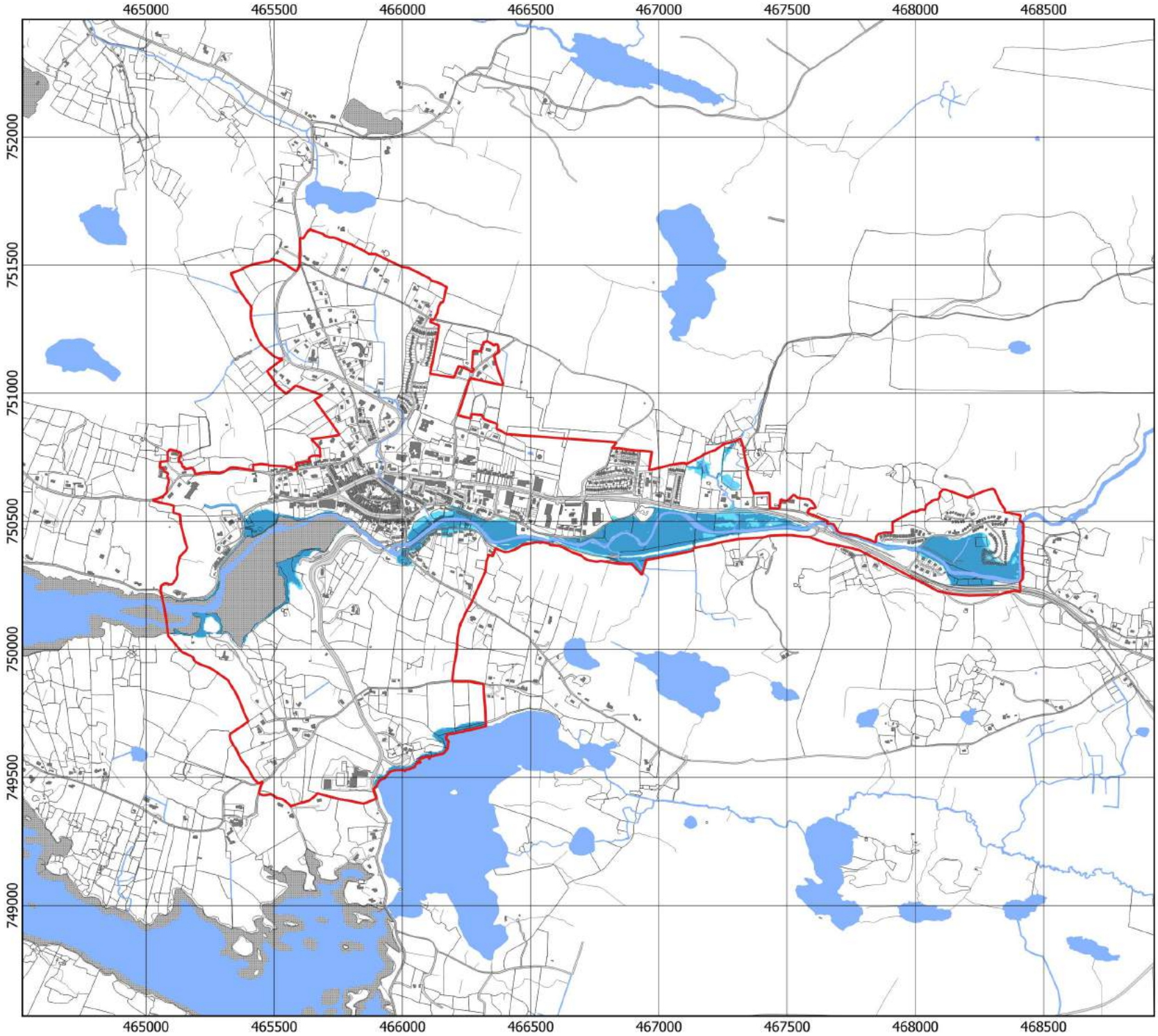

Galway CDP 2022-2028
SFRA

Clifden
Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

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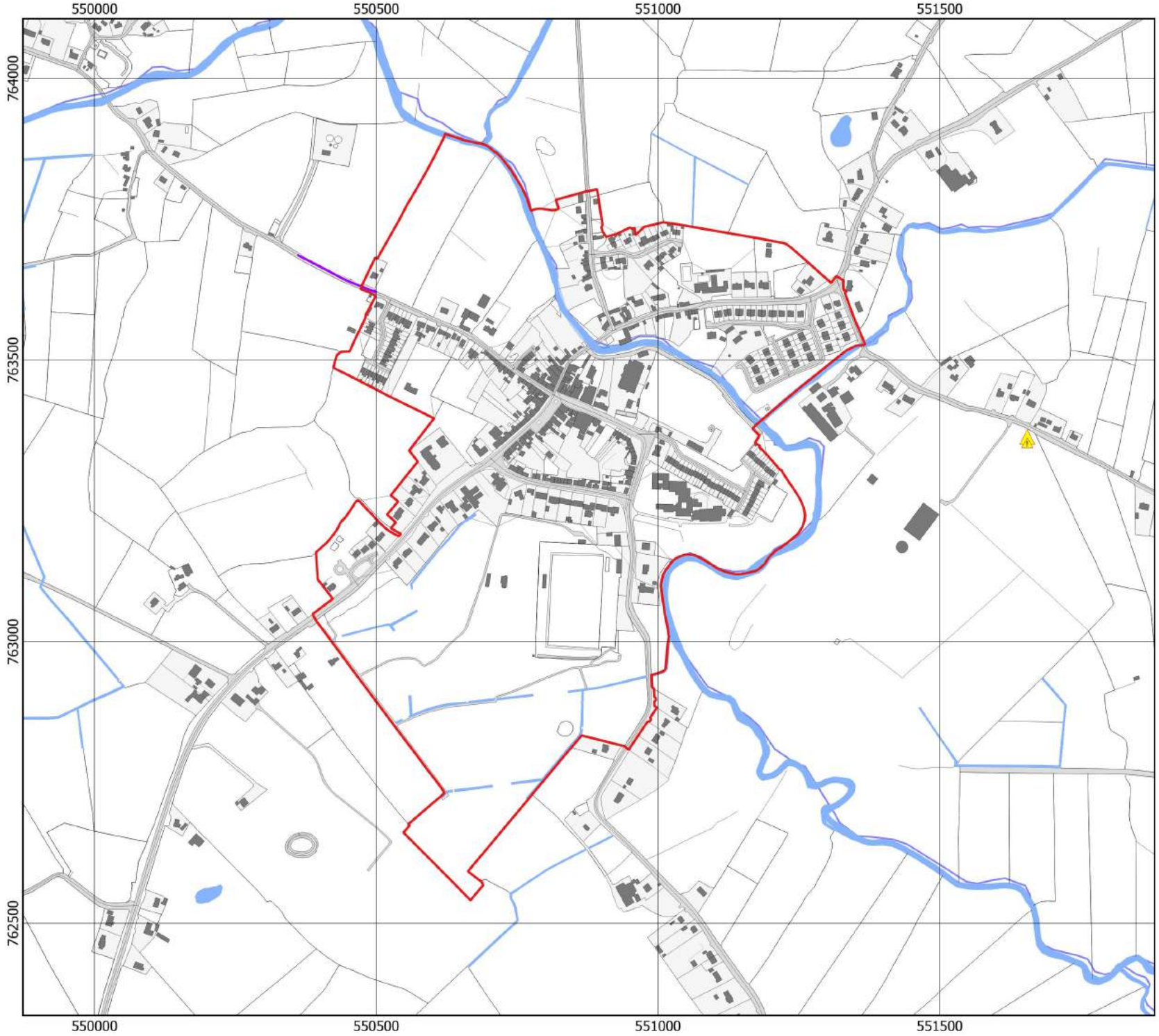


Galway CDP 2022-2028
SFRA

Dunmore
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme
- Channel
- Embankment
- Benefited Land

Drainage Districts
- Channel
- Embankment
- Benefited Land

Land Commission
- Benefited Land

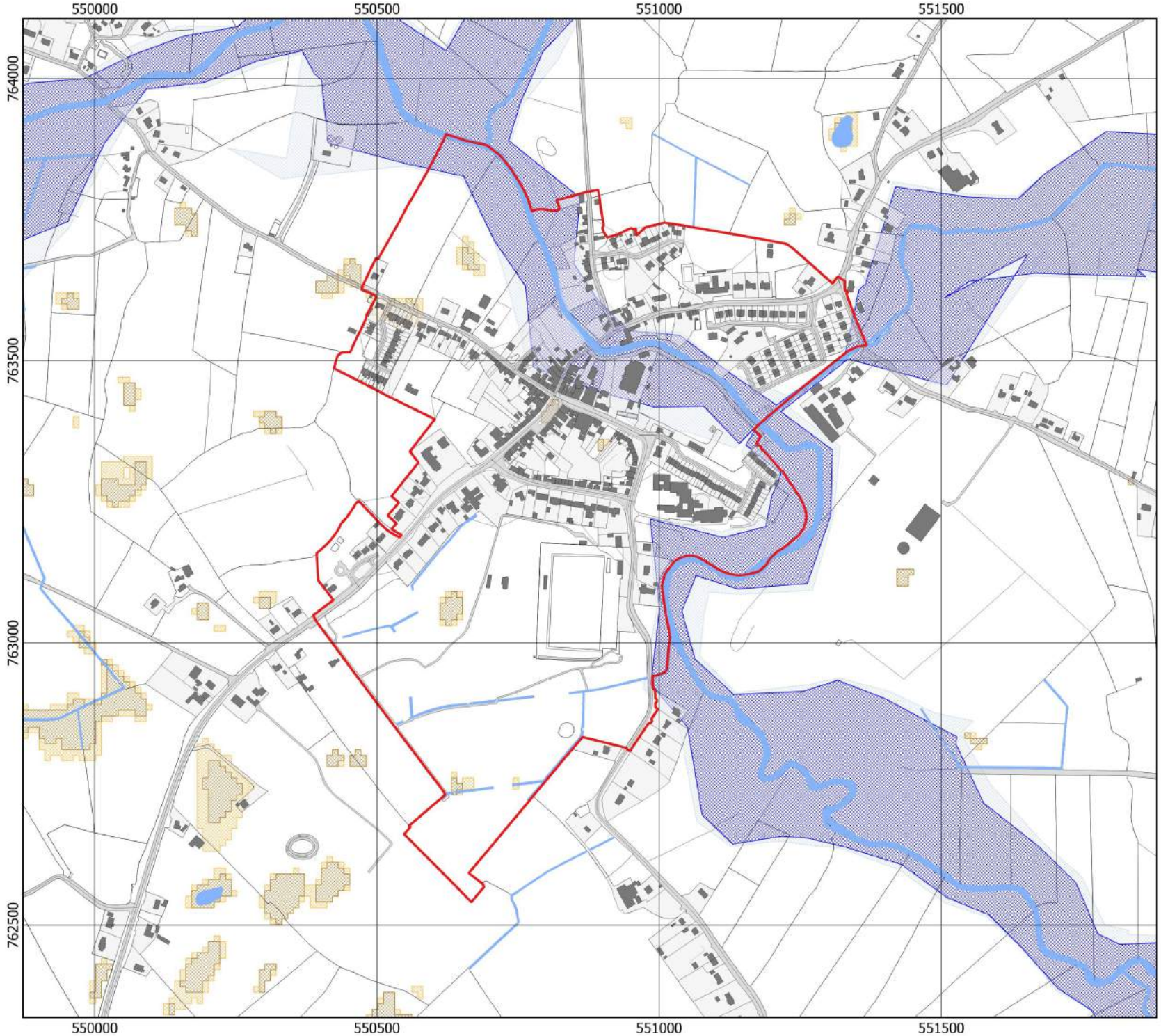
Past Flood Event
- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data
- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council

Coordinates in ITM
Galway County Council 2020/OSi_NMA_090



Galway CDP 2022-2028
SFRA

Dunmore
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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Galway County Council

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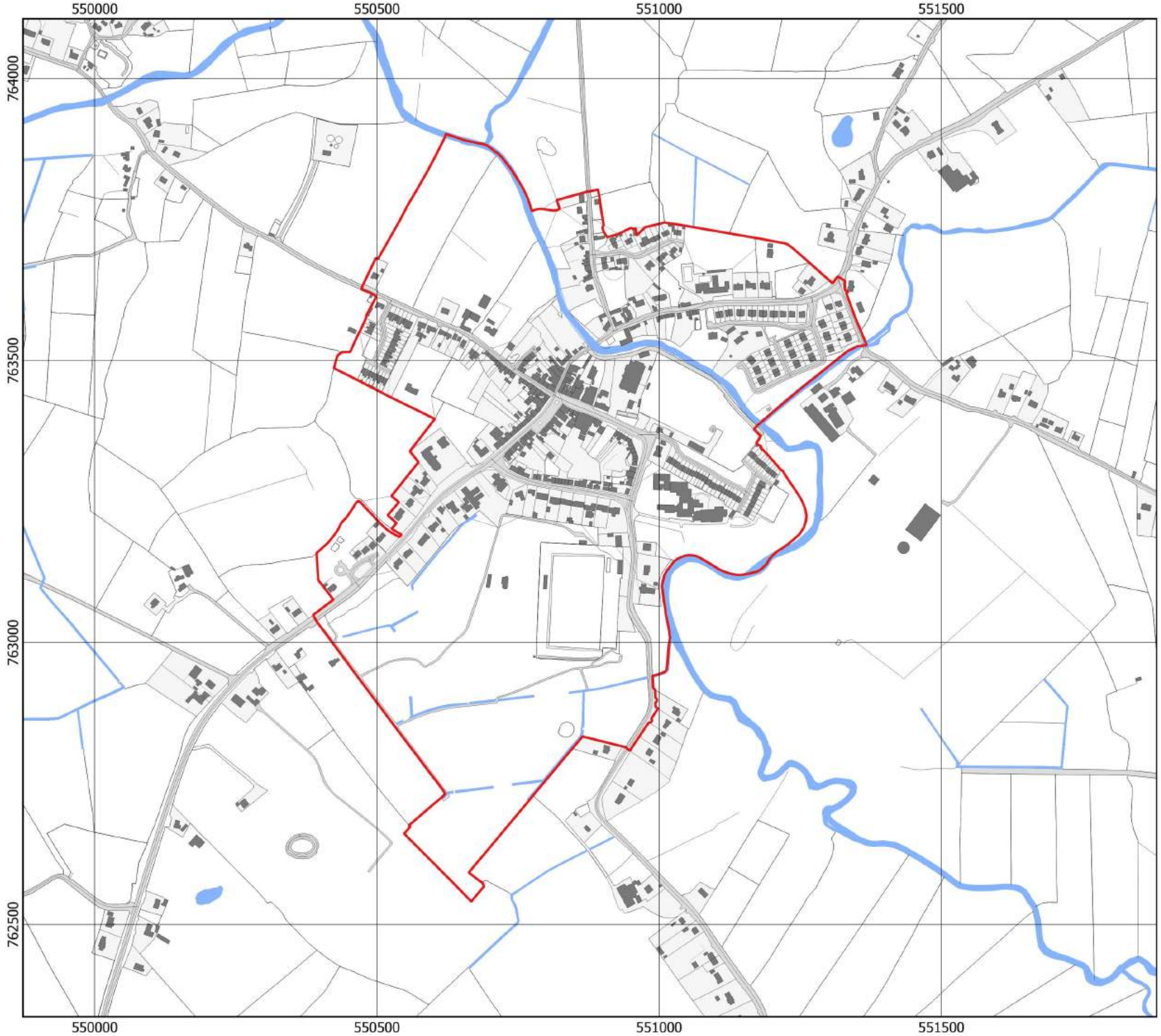

Galway CDP 2022-2028
SFRA

Dunmore
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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Comhairle Chontae na Gaillimhe
Galway County Council

Coordinates in ITM
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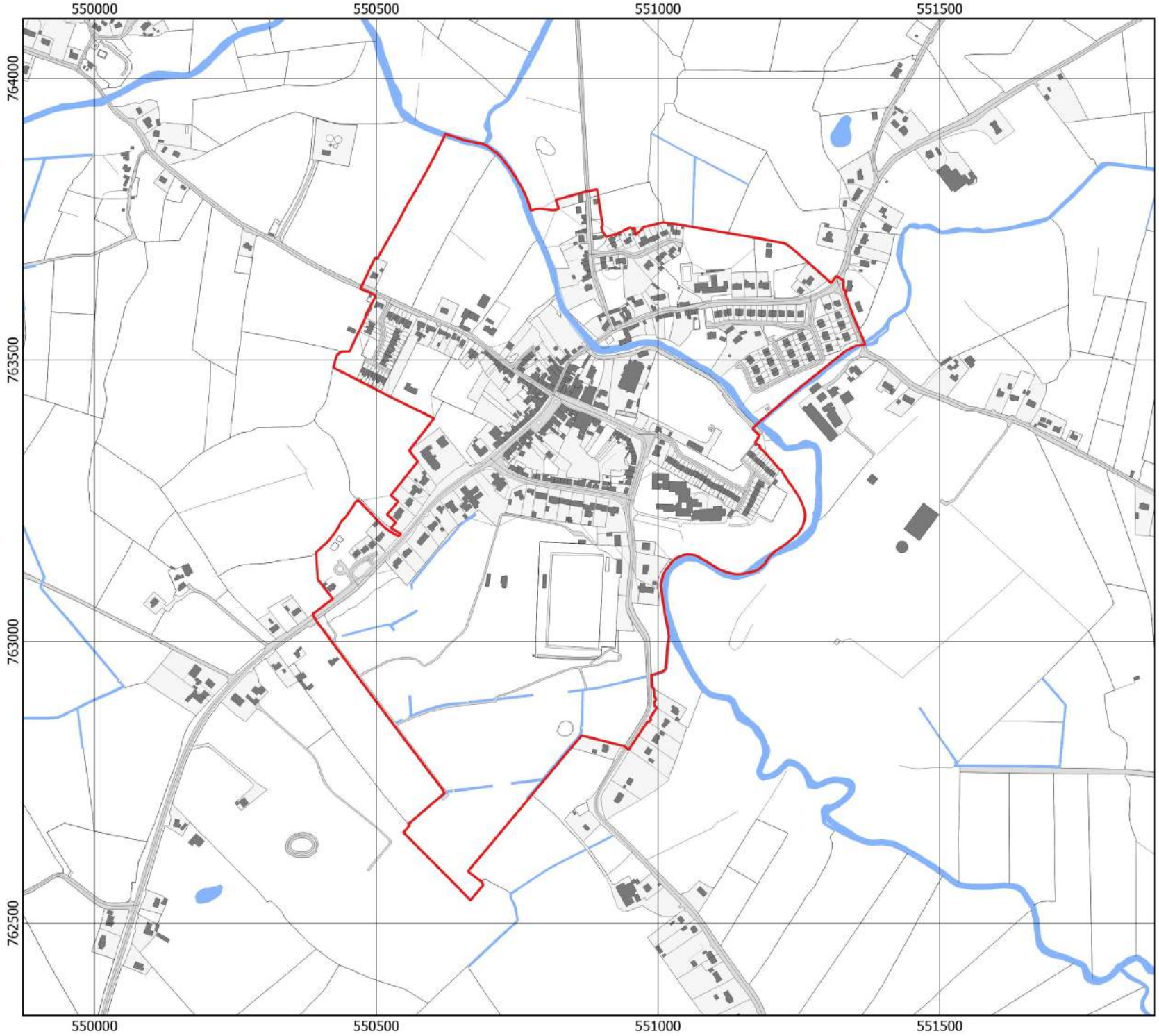

Galway CDP 2022-2028
SFRA

Dunmore
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

Comhairle Chontae na Gaillimhe
Galway County Council

Coordinates in ITM
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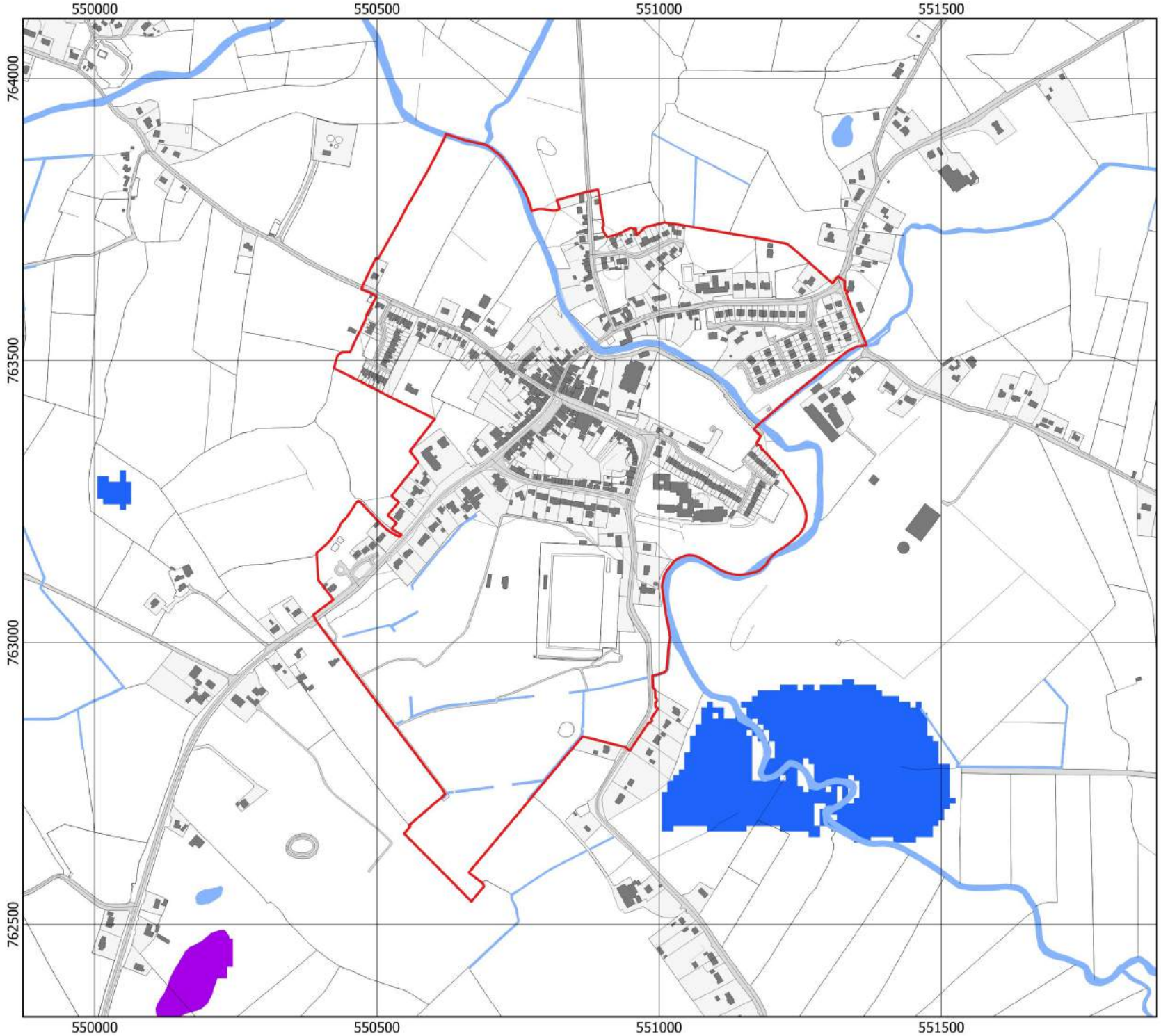

Galway CDP 2022-2028
SFRA

Dunmore
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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Galway County Council

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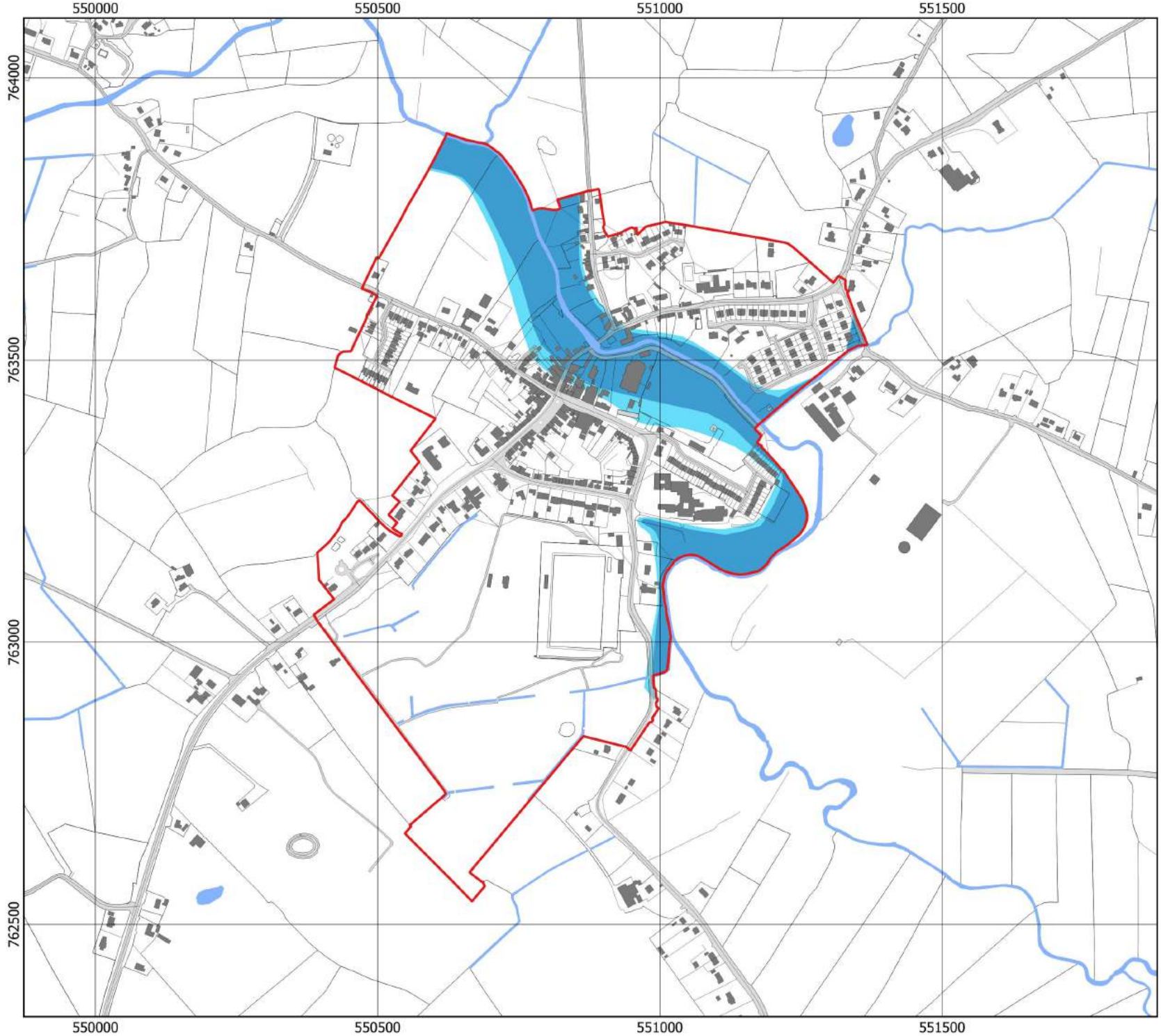

Galway CDP 2022-2028
SFRA

Dunmore
Flood Zones

Administrative Area
Settlement Boundary
Water
Rivers & Streams
River or Stream

Indicative Flood Zones

Flood Zone A
Flood Zone B

Other Zones

Possible Turlough
Wet lands, not easily drained

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Galway County Council

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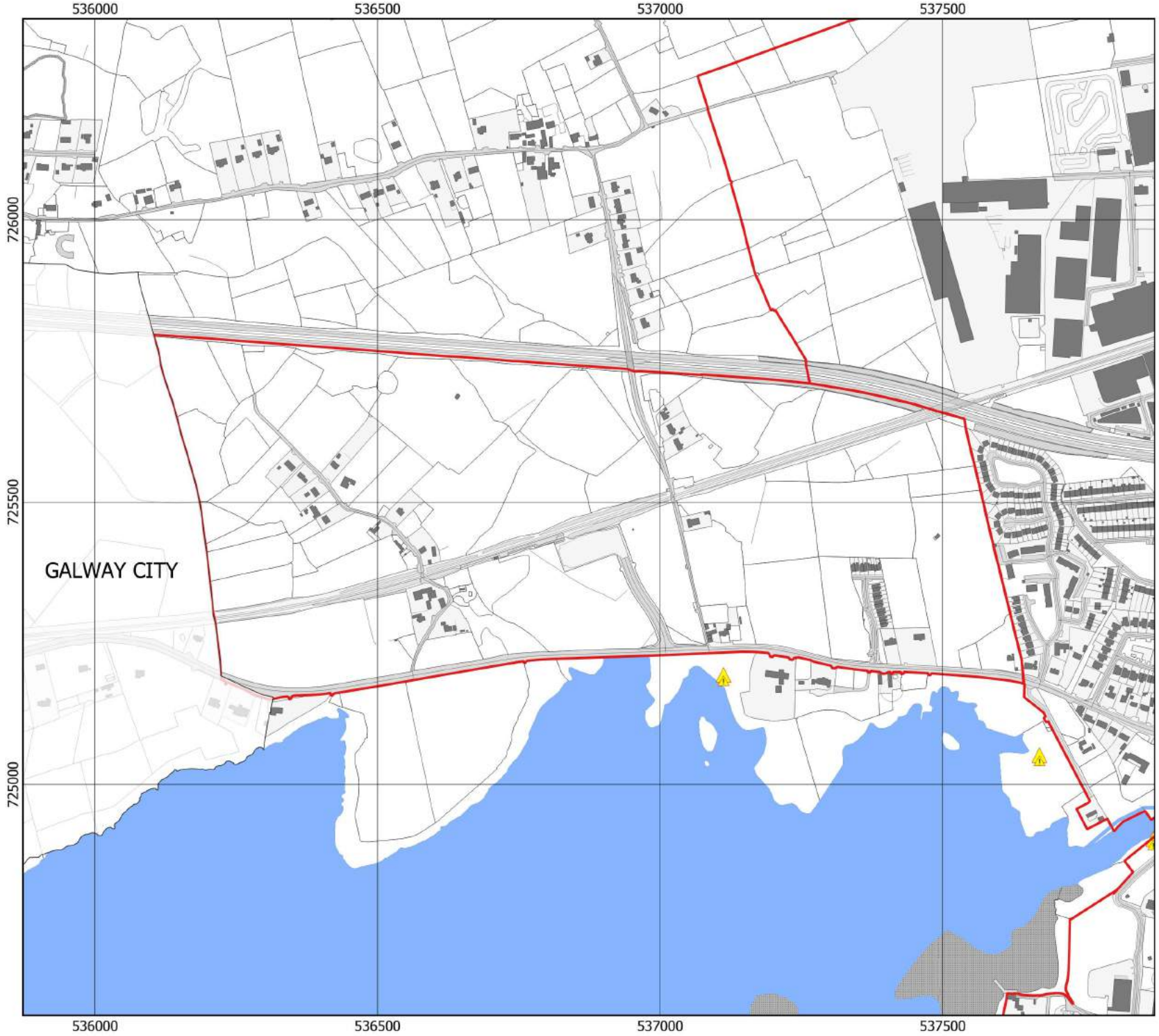

Galway CDP 2022-2028 SFRA

Garraun
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

Past Flood Event

- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data

- Flood Points 2009
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- GCC Floods 09 Combined Sources

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Galway County Council

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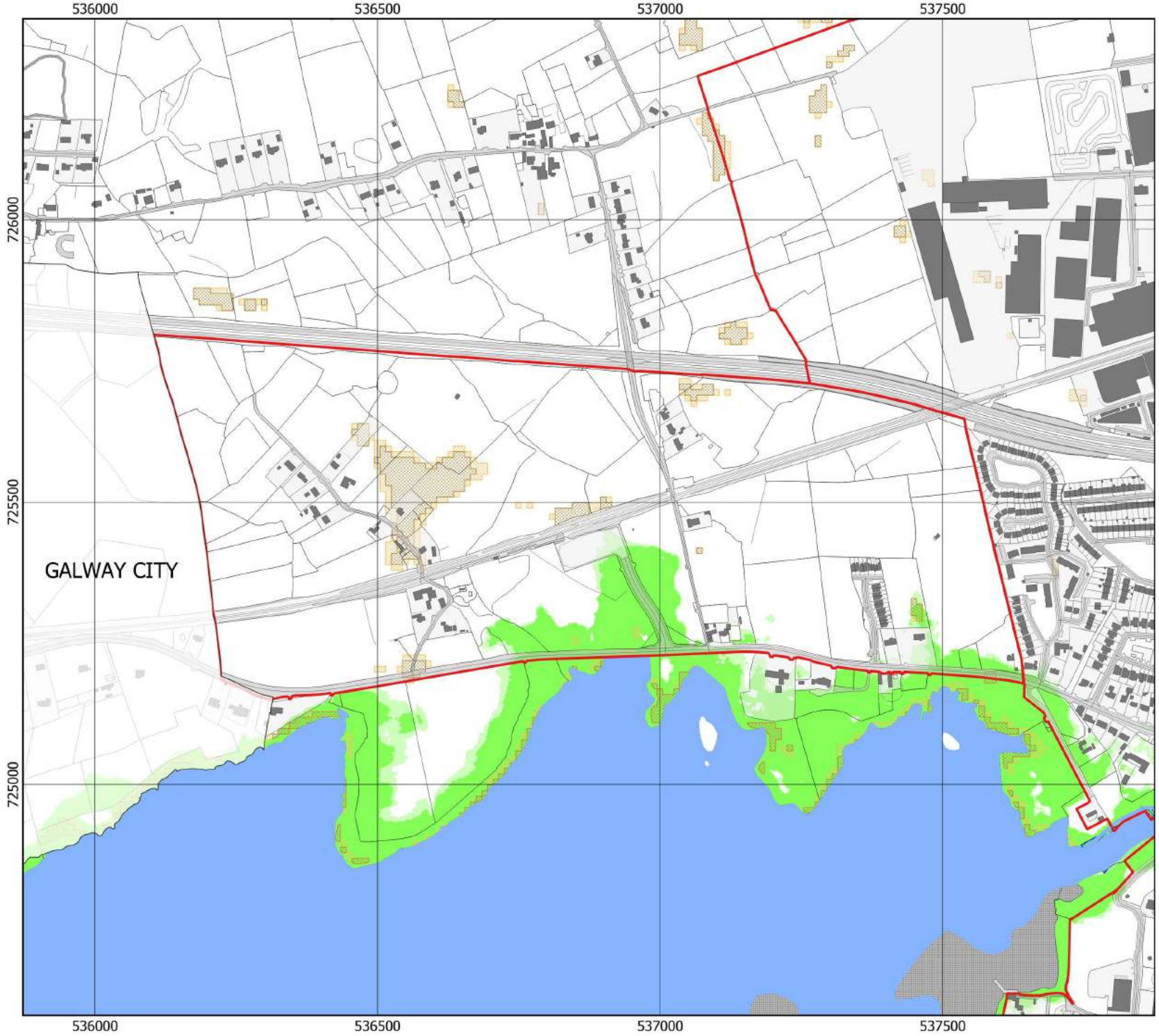

Galway CDP 2022-2028
SFRA

Garraun
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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Galway County Council

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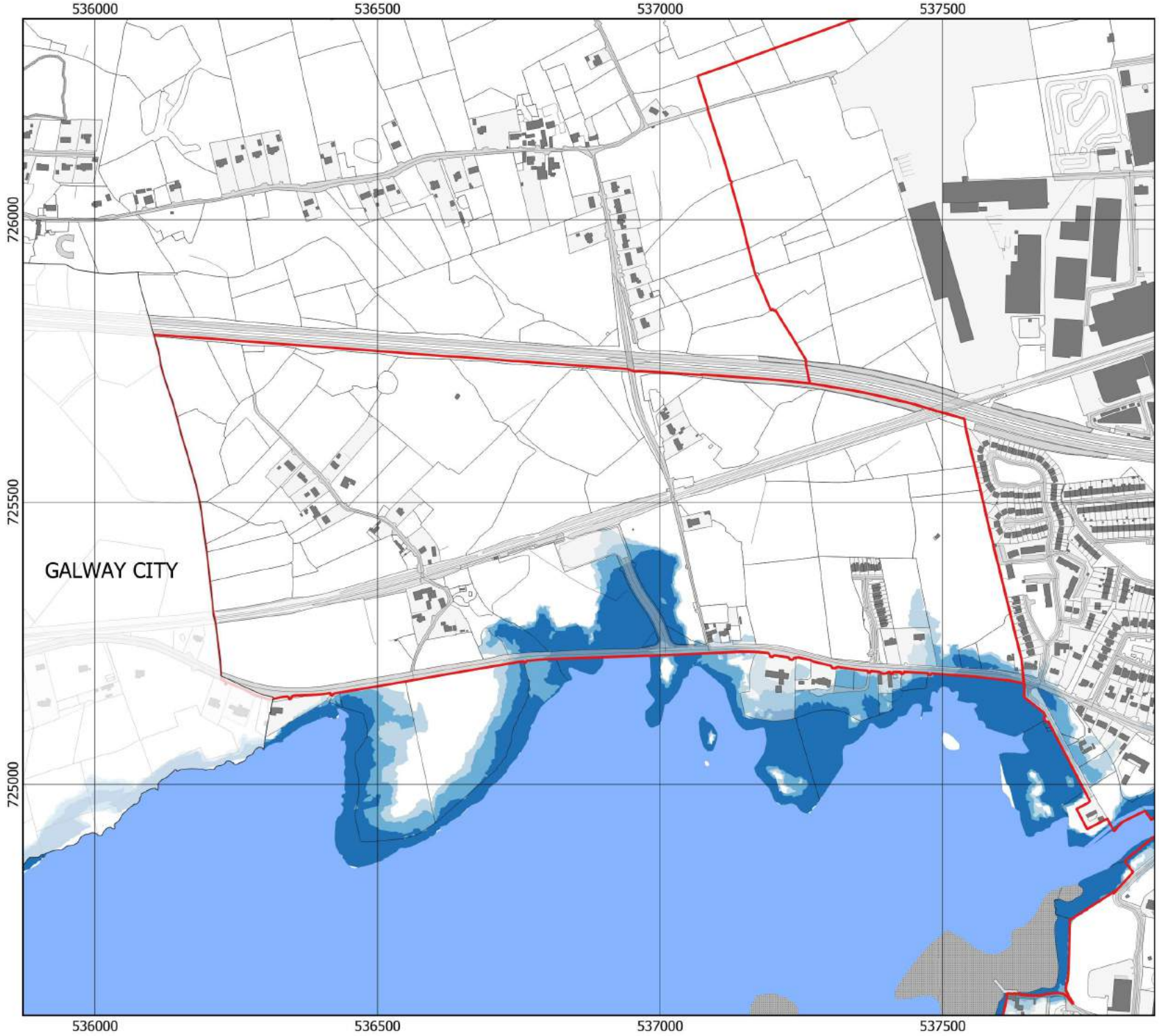

Galway CDP 2022-2028
SFRA

Garraun
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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Comhairle Chontae na Gaillimhe
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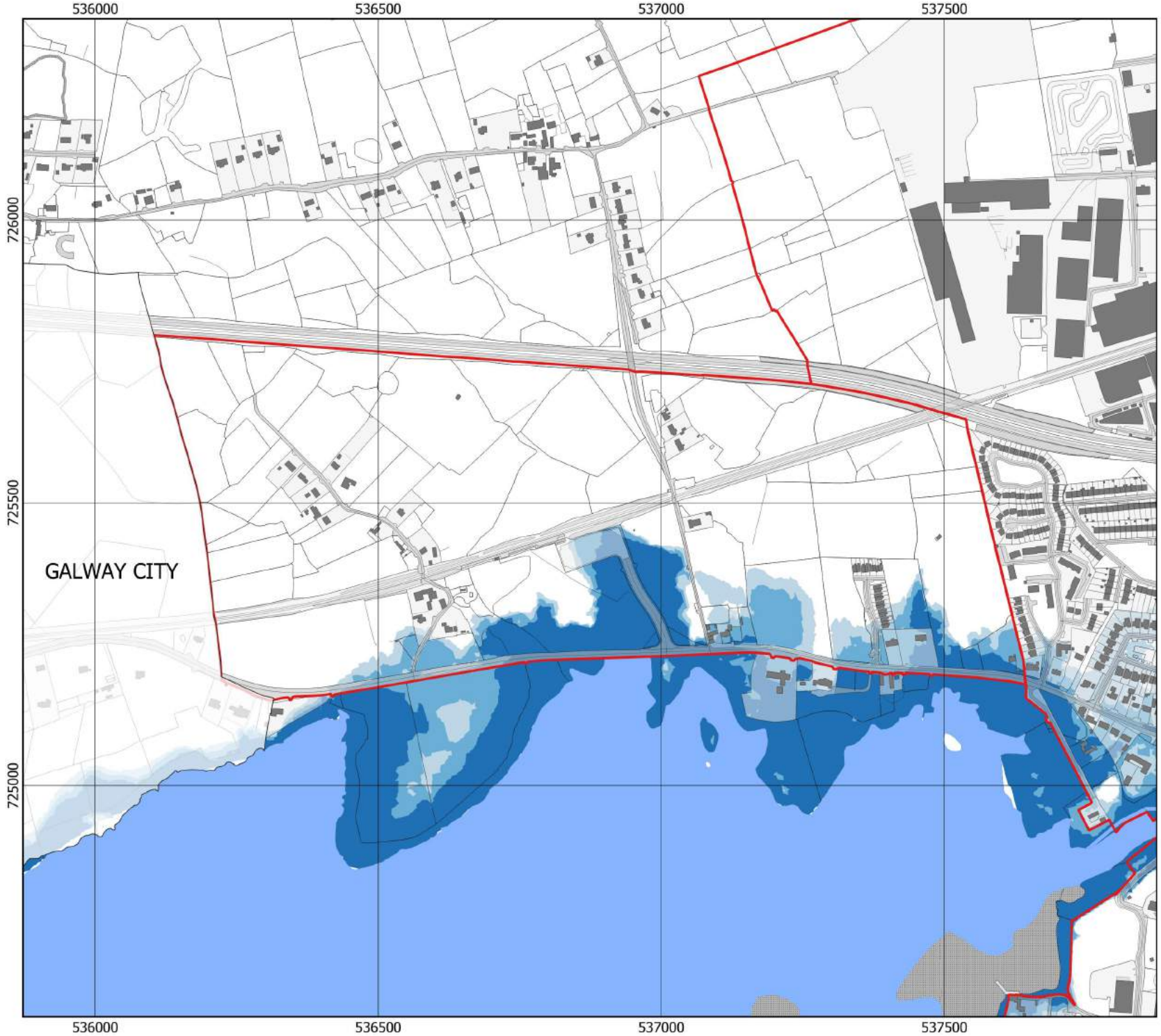

Galway CDP 2022-2028
SFRA

Garraun
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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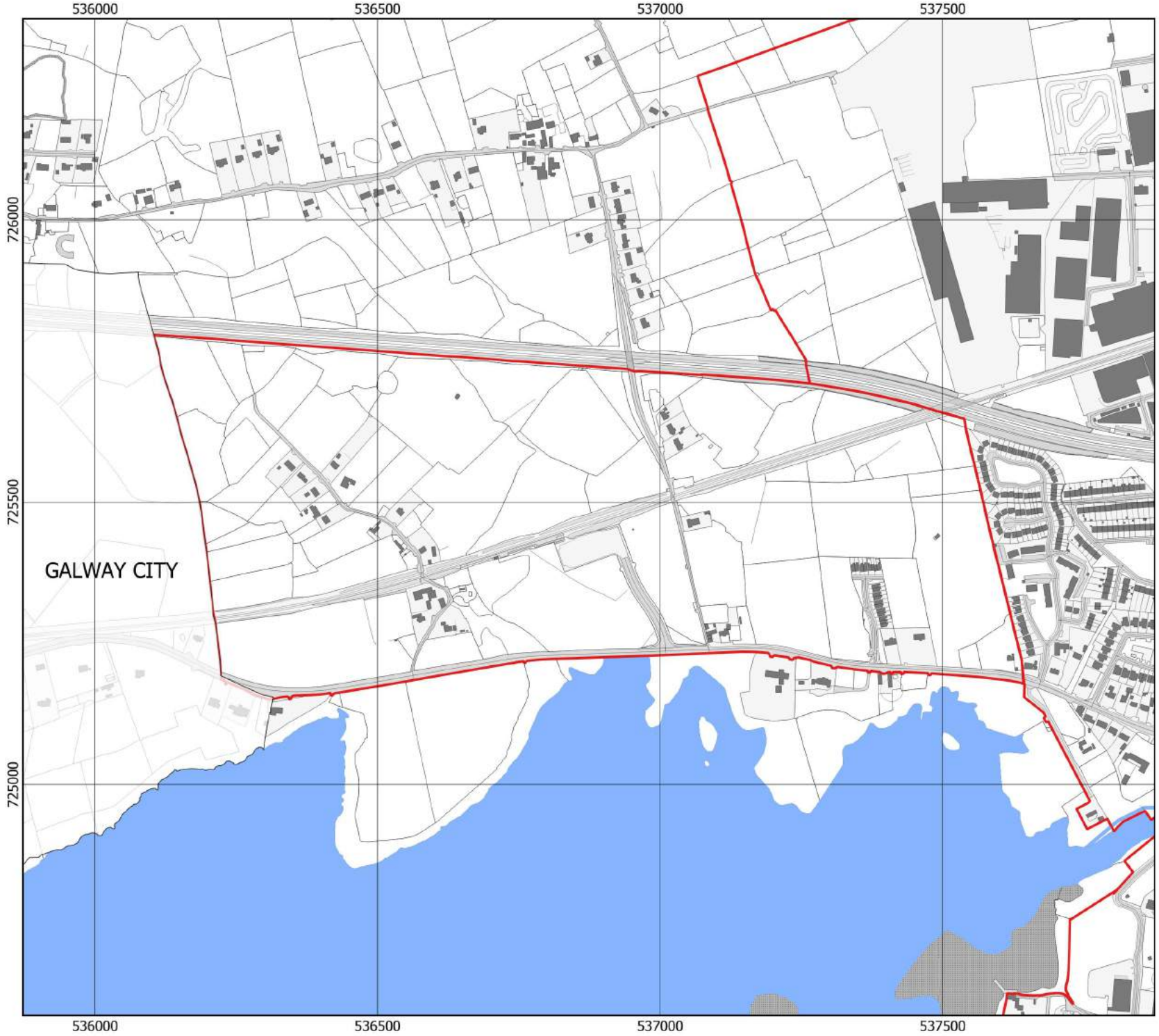

Galway CDP 2022-2028
SFRA

Garraun
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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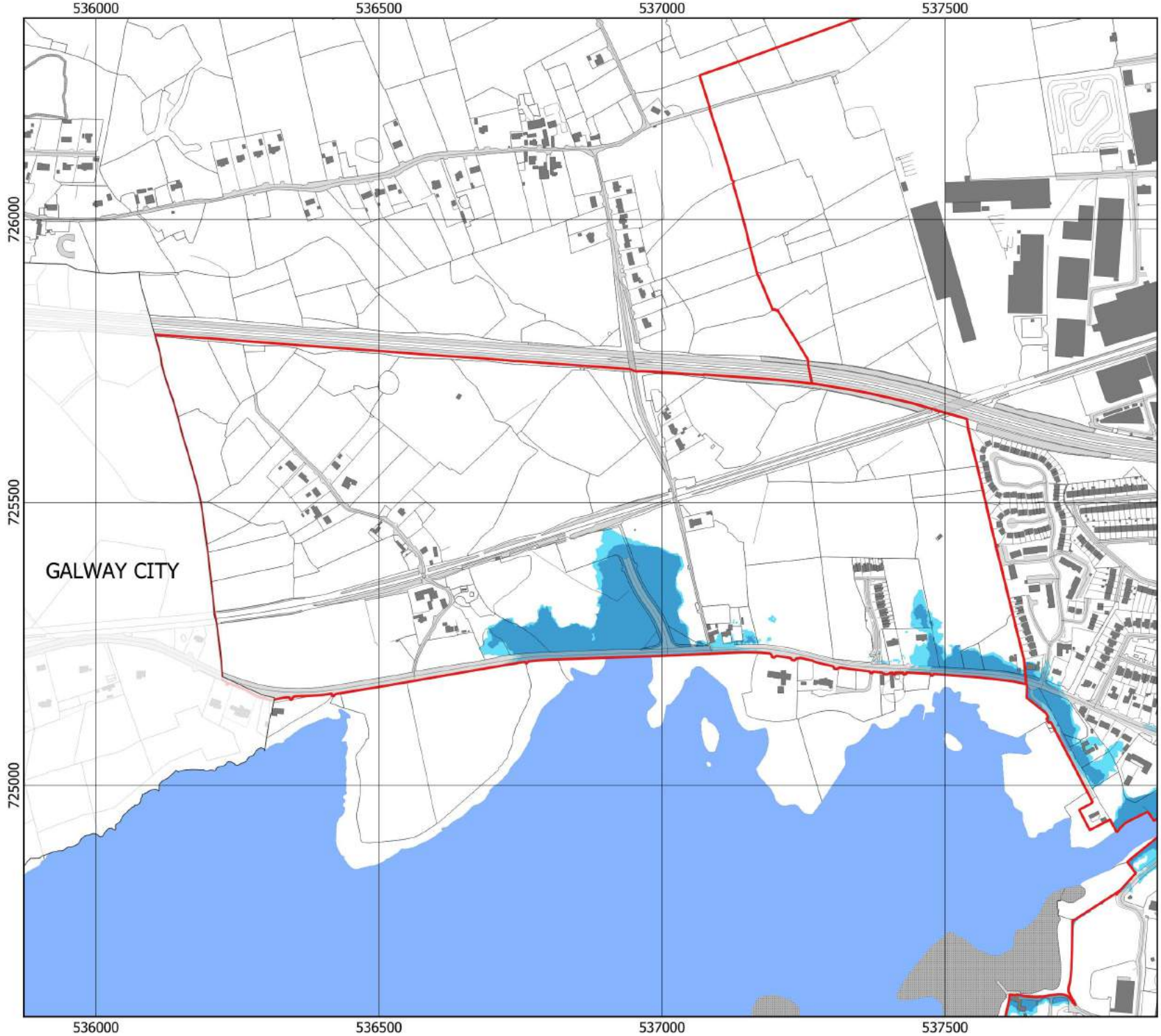

Galway CDP 2022-2028
SFRA

Garraun
Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

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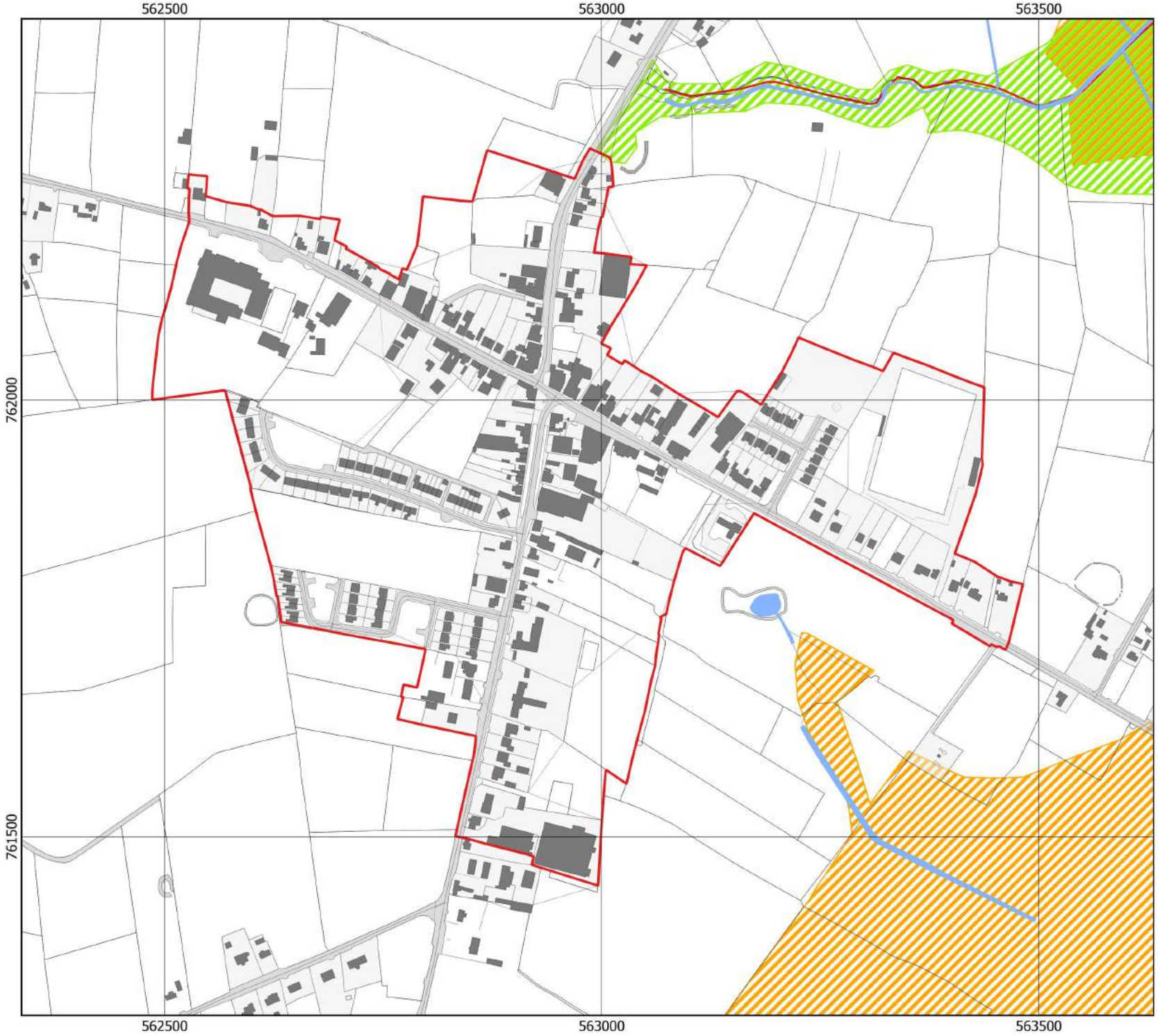

Galway CDP 2022-2028
SFRA

Glenamaddy
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme
- Channel
- Embankment
- Benefited Land

Drainage Districts
- Channel
- Embankment
- Benefited Land

Land Commission
- Benefited Land

Past Flood Event
- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data
- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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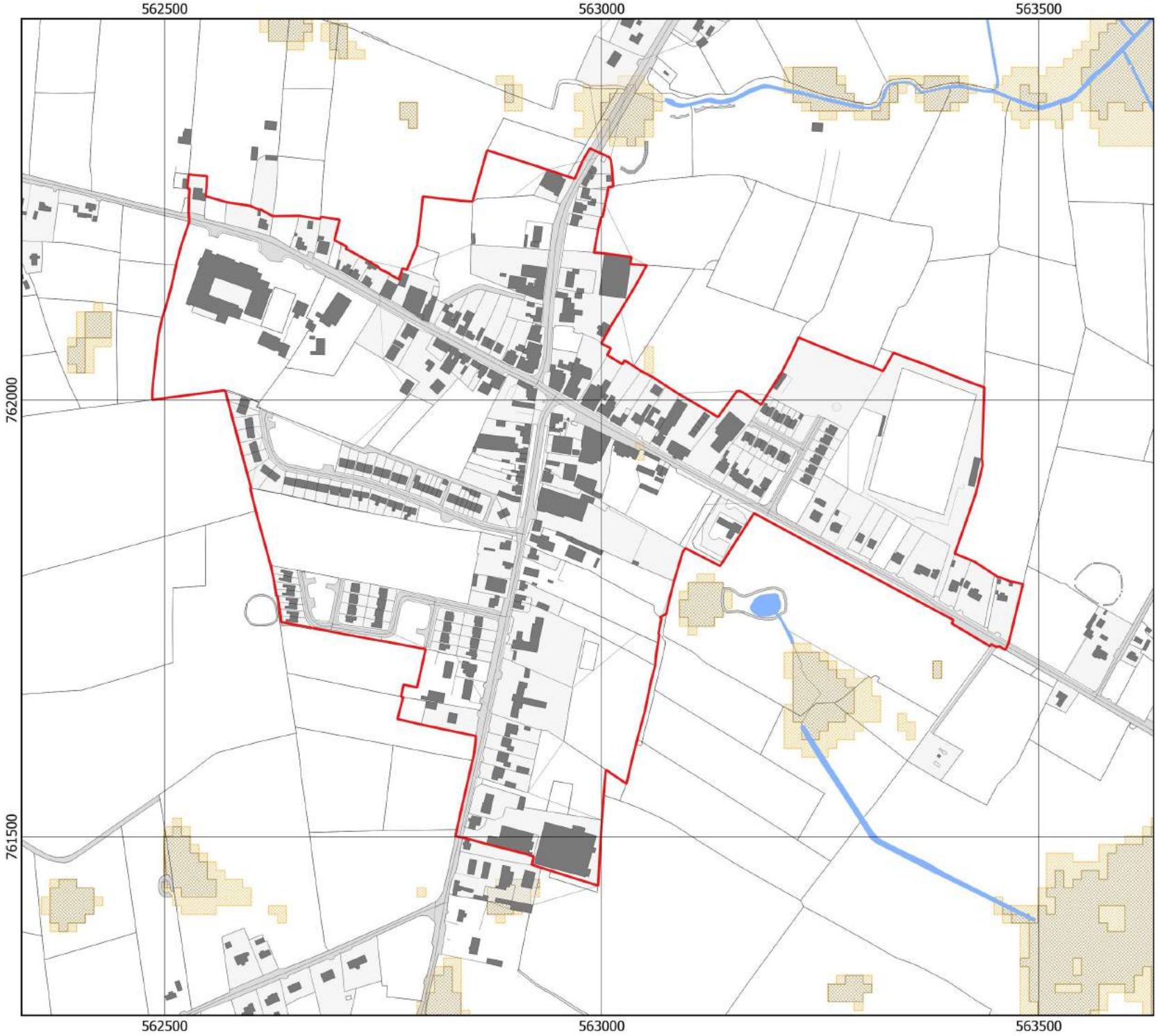

Galway CDP 2022-2028
SFRA

Glenamaddy
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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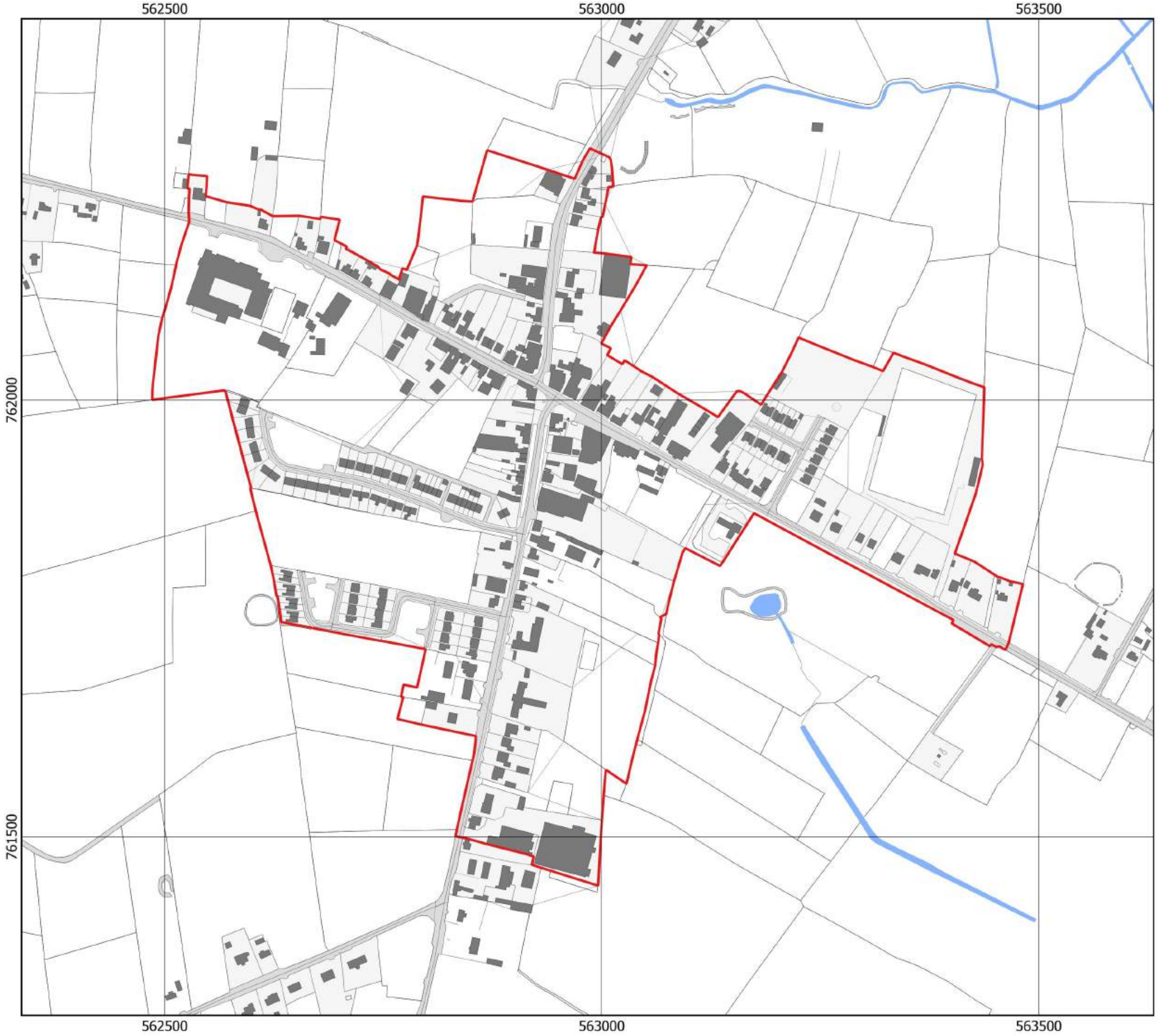

Galway CDP 2022-2028
SFRA

Glenamaddy
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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Galway County Council

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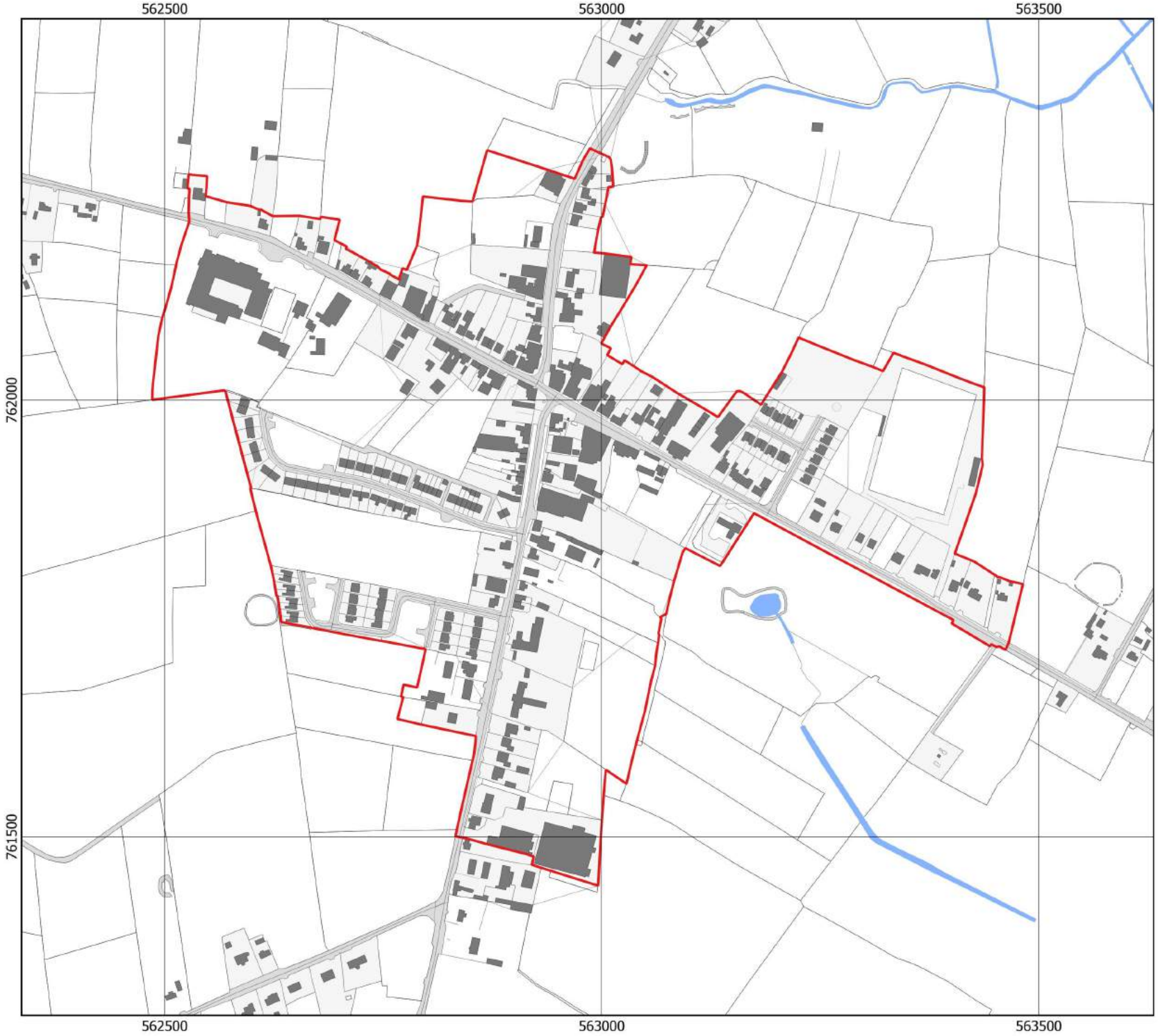

Galway CDP 2022-2028
SFRA

Glenamaddy
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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Comhairle Chontae na Gaillimhe
Galway County Council

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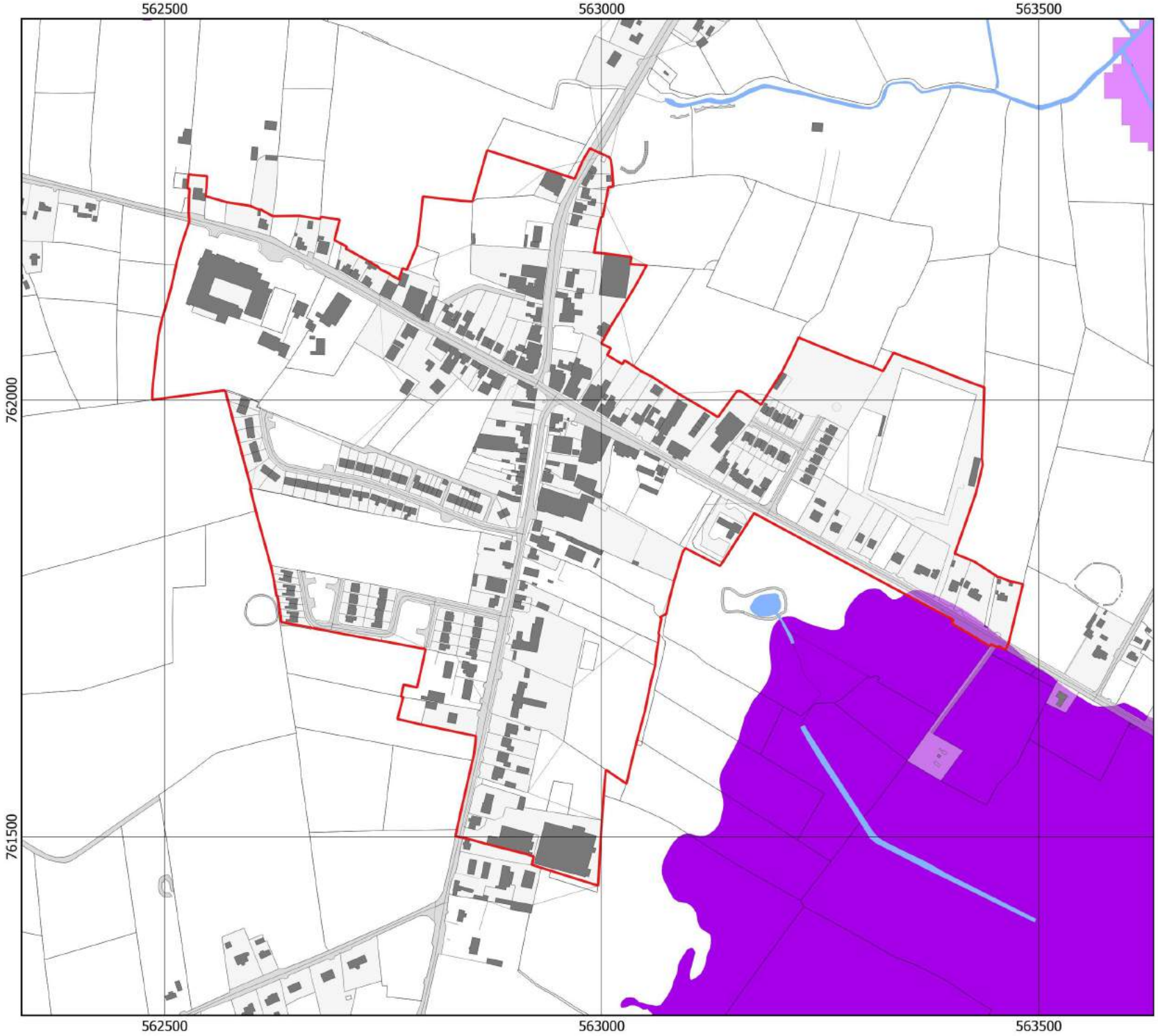

Galway CDP 2022-2028
SFRA

Glenamaddy
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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Galway County Council

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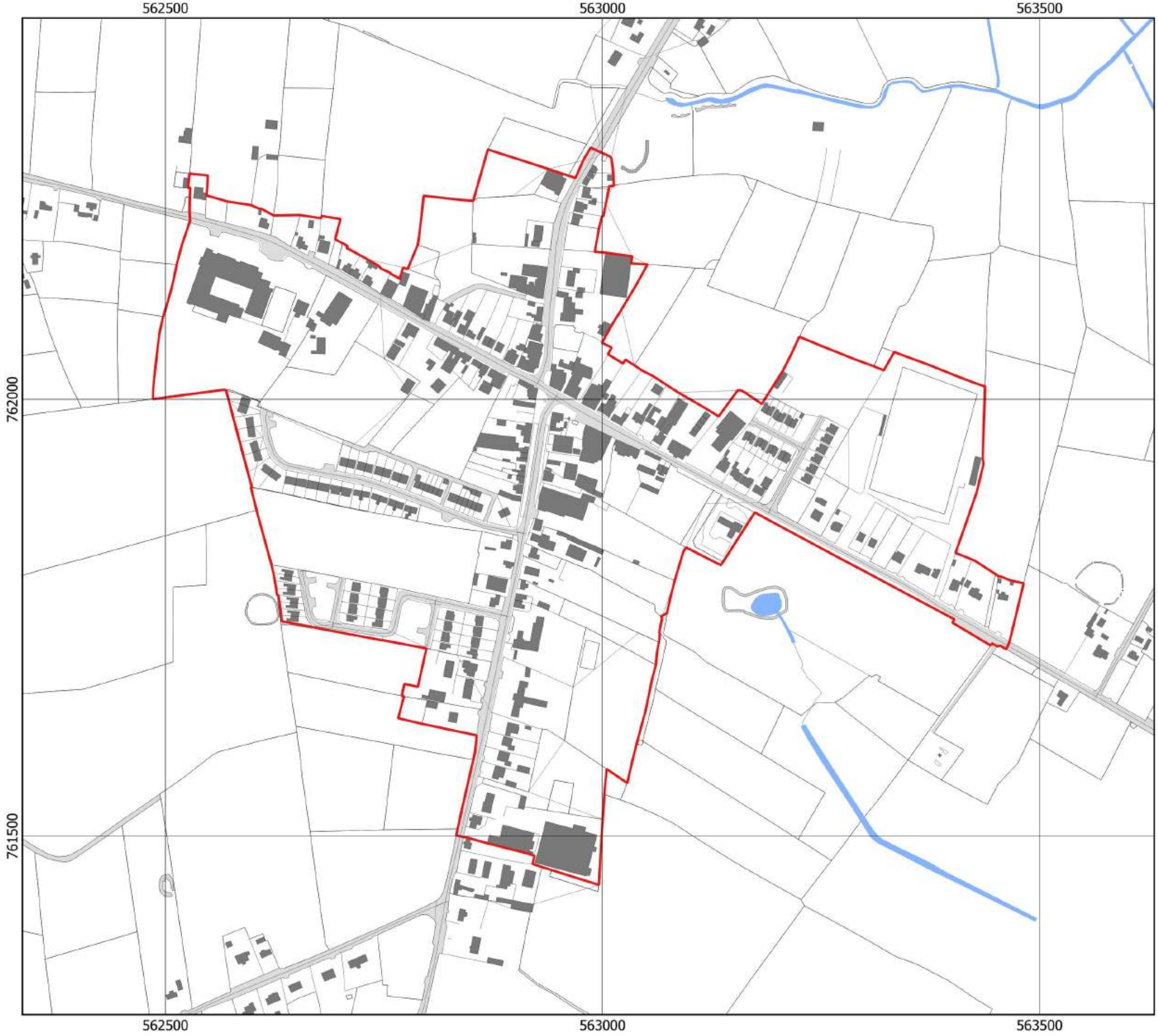


Galway CDP 2022-2028
SFRA

Glenamaddy
Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

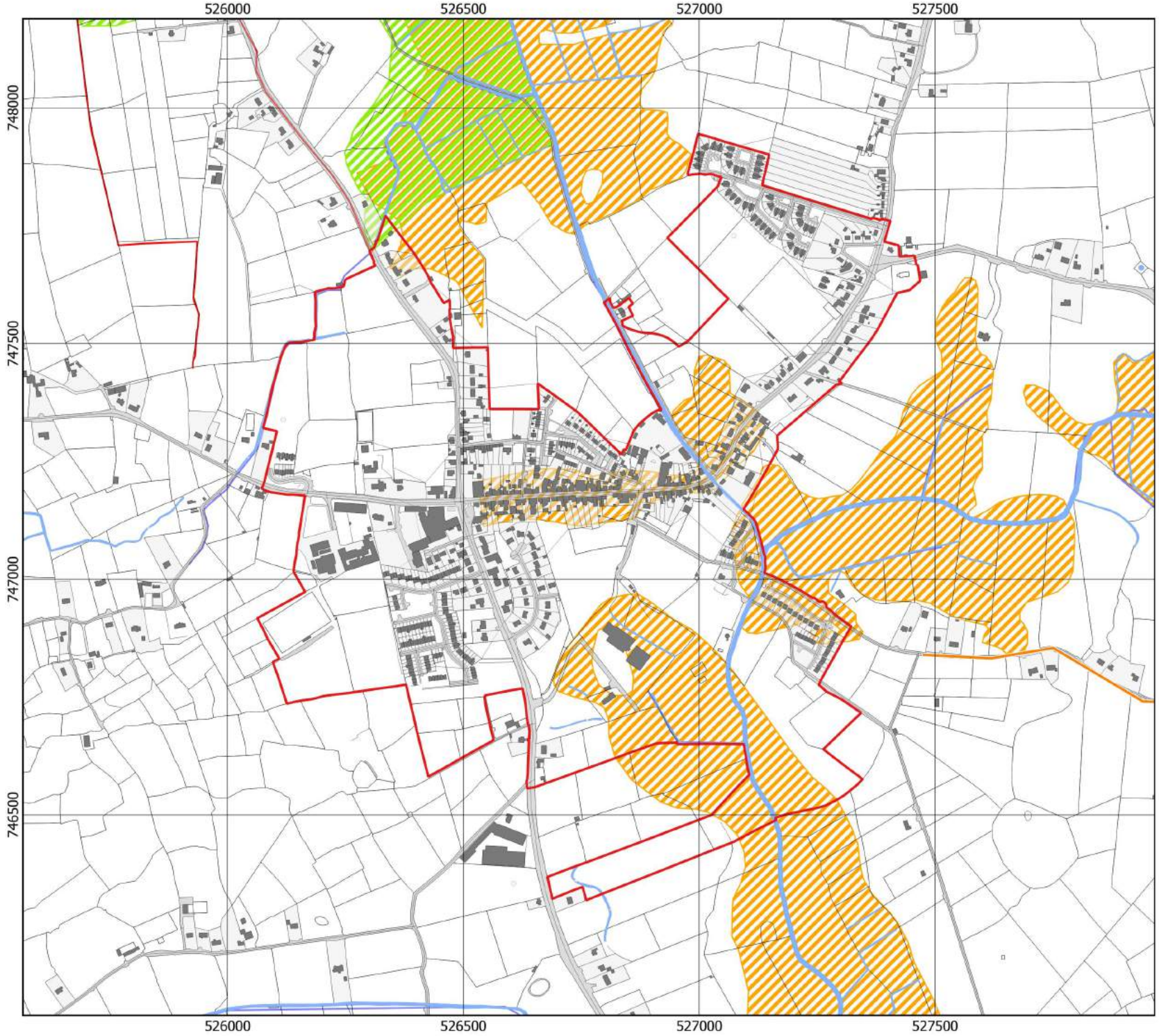
Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028 SFRA

Headford OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

Past Flood Event

- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data

- Flood Points 2009
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- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

CAAS

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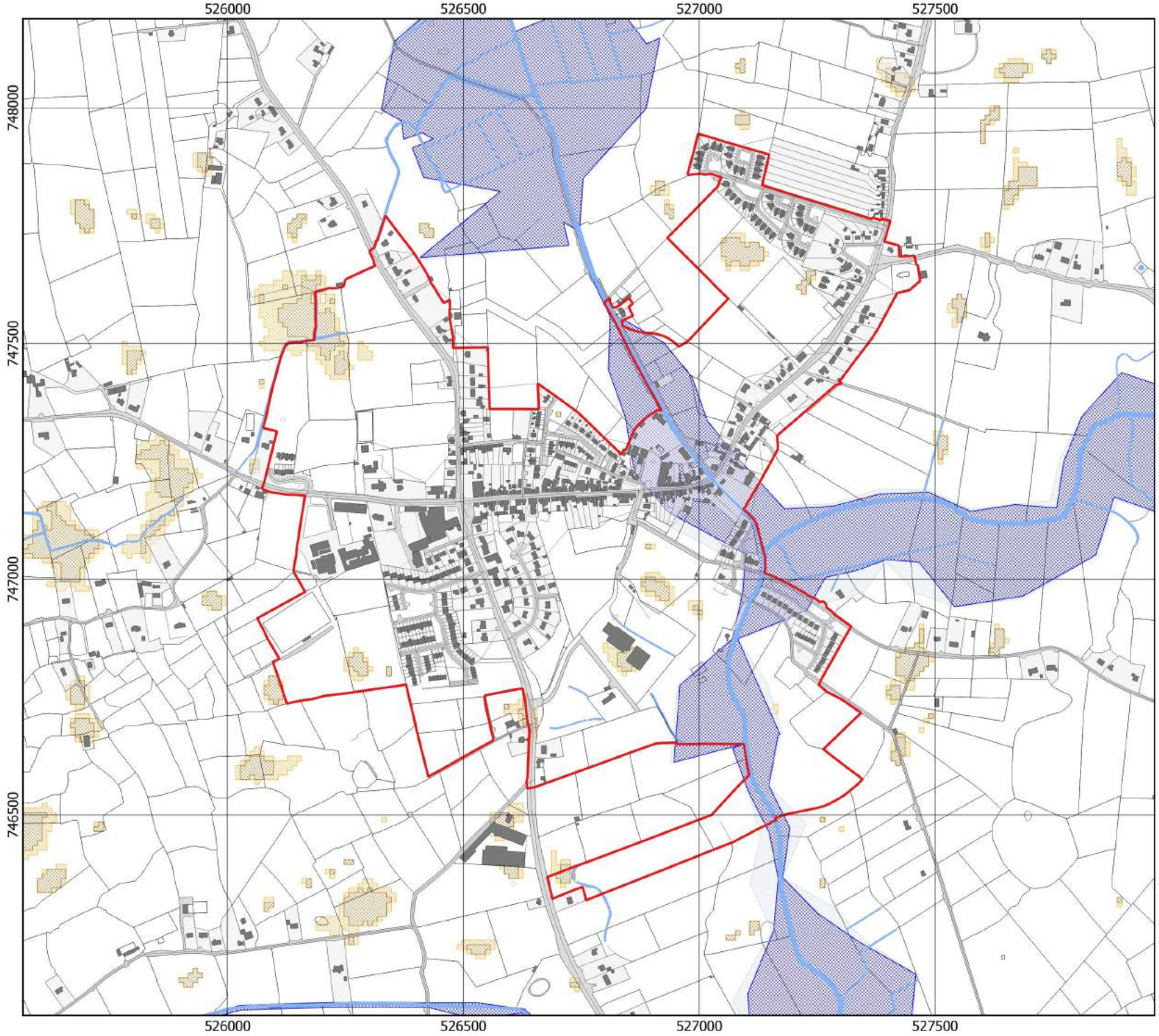


Galway CDP 2022-2028
SFRA

Headford
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

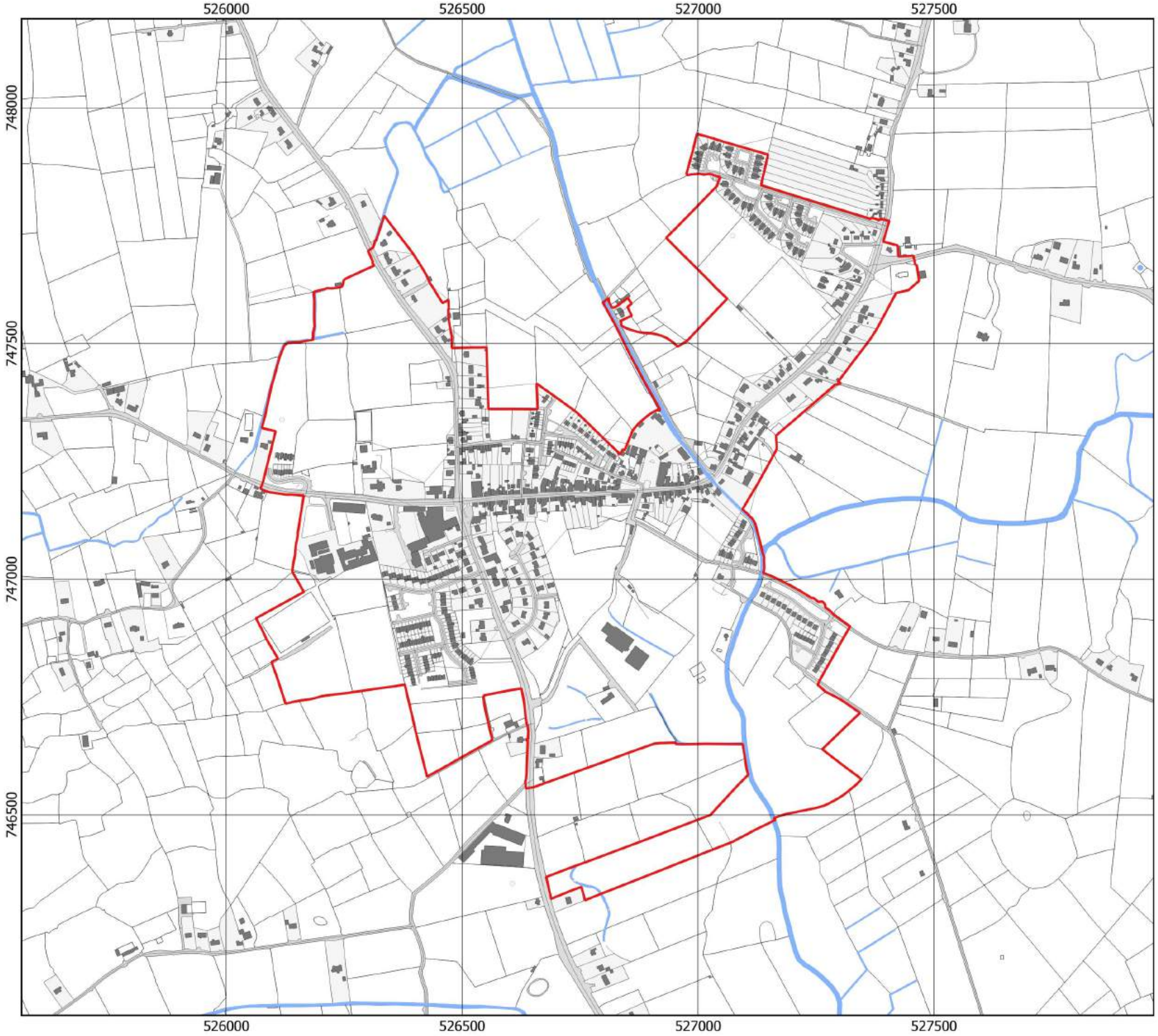
- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028
SFRA

Headford
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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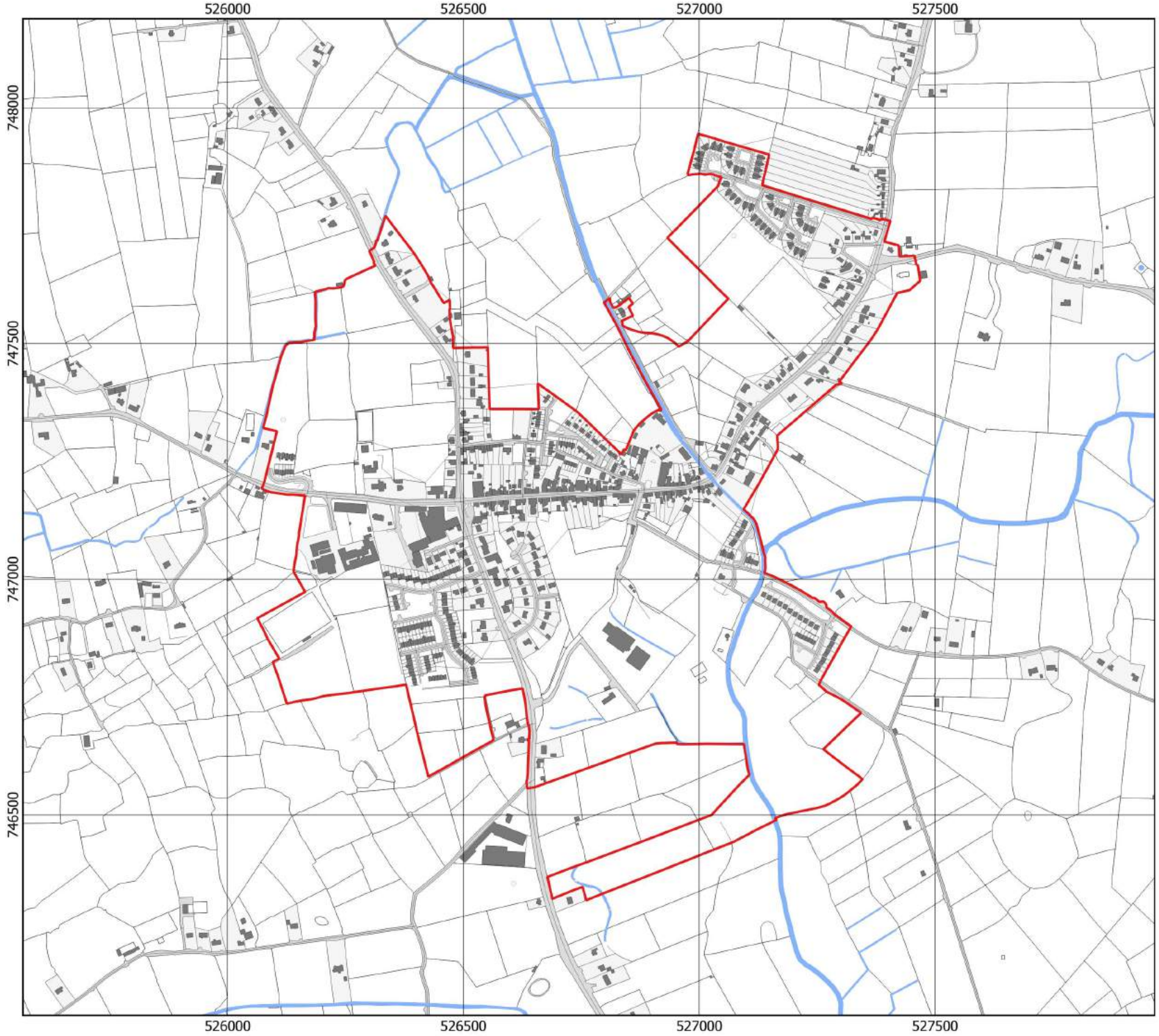


Galway CDP 2022-2028
SFRA

Headford
OPW CFRAM All Scenarios

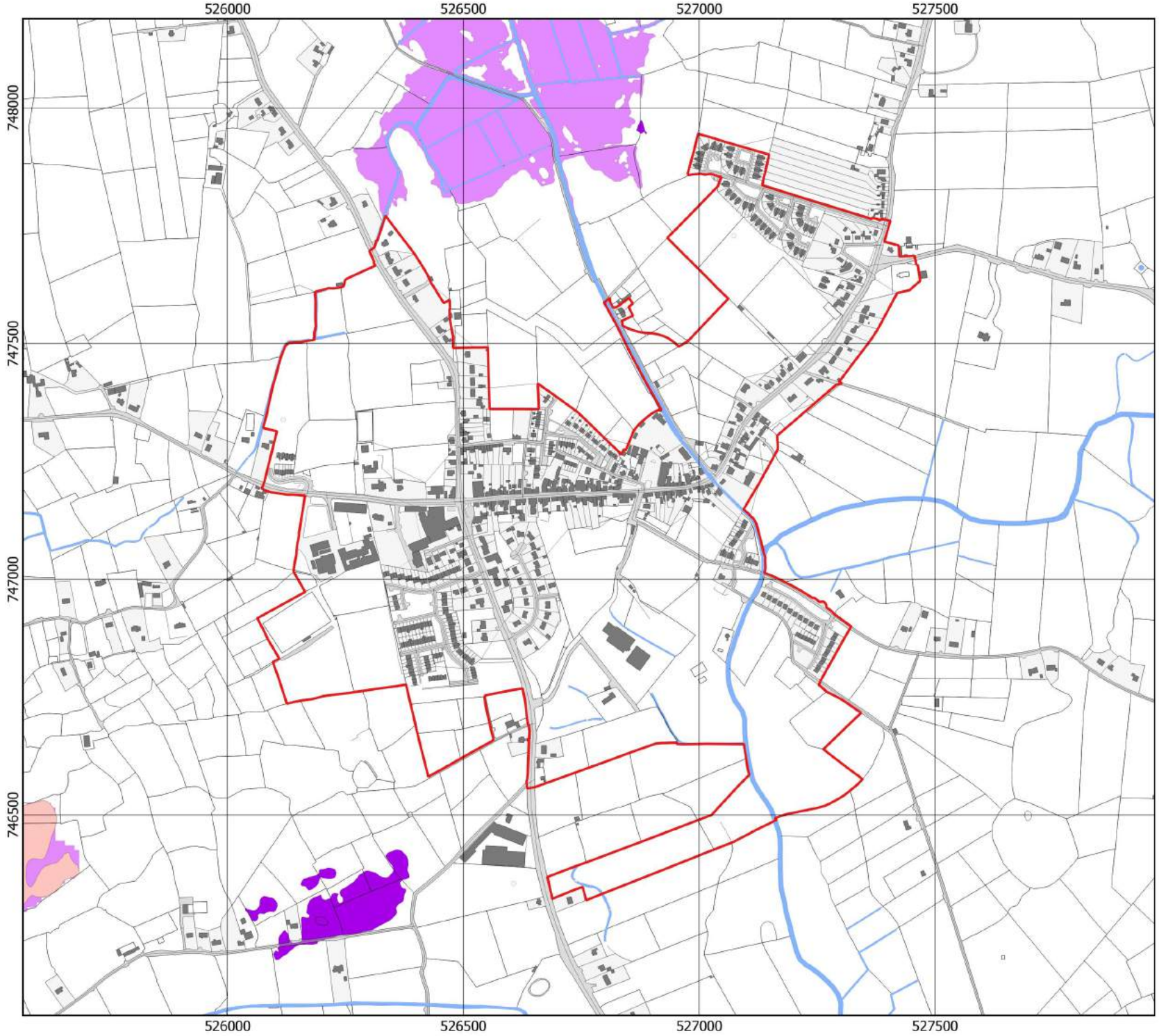
- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028 SFRA

Headford
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
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- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

Comhairle Chontae na Gaillimhe
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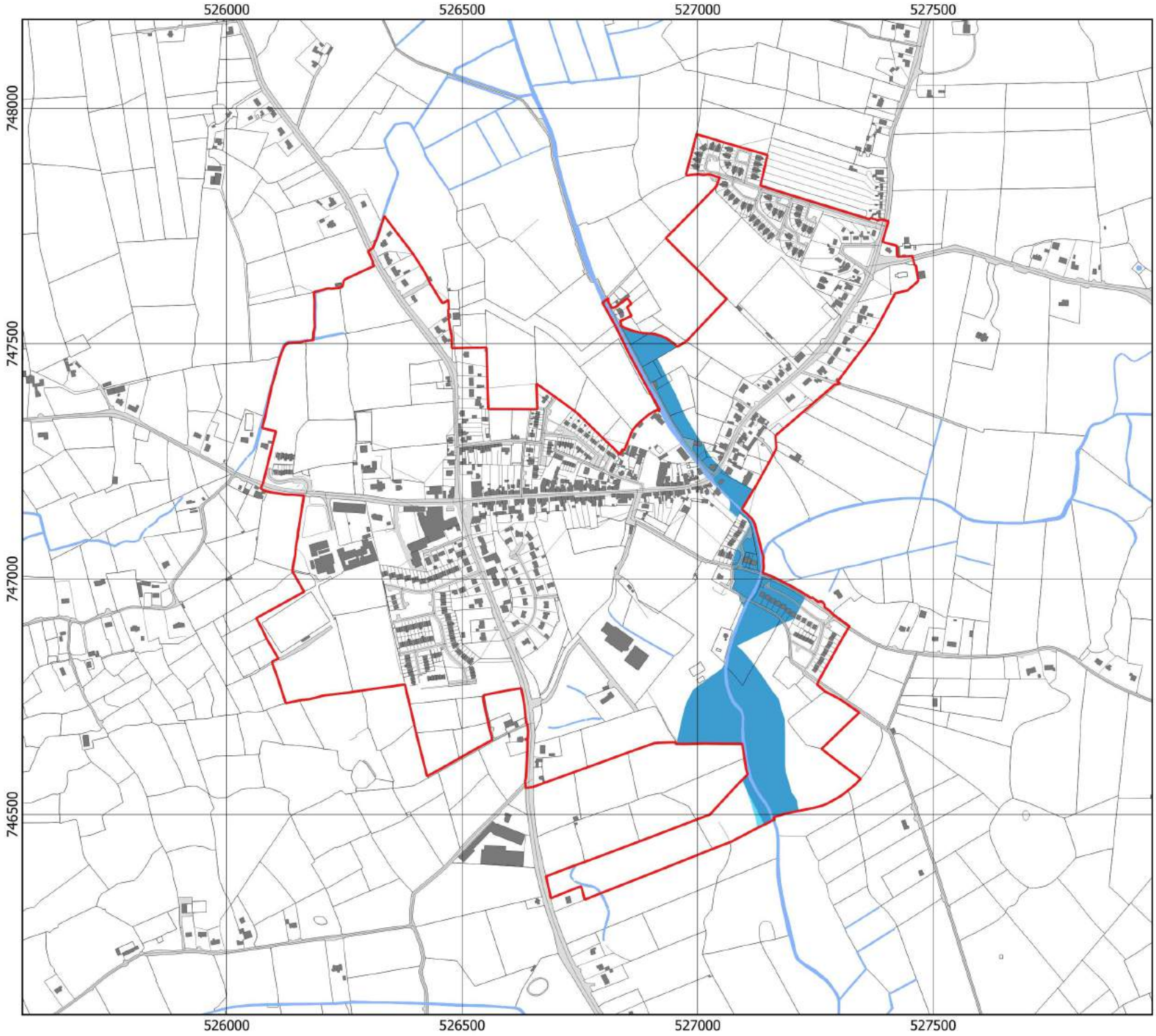

Galway CDP 2022-2028 SFRA

Headford Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

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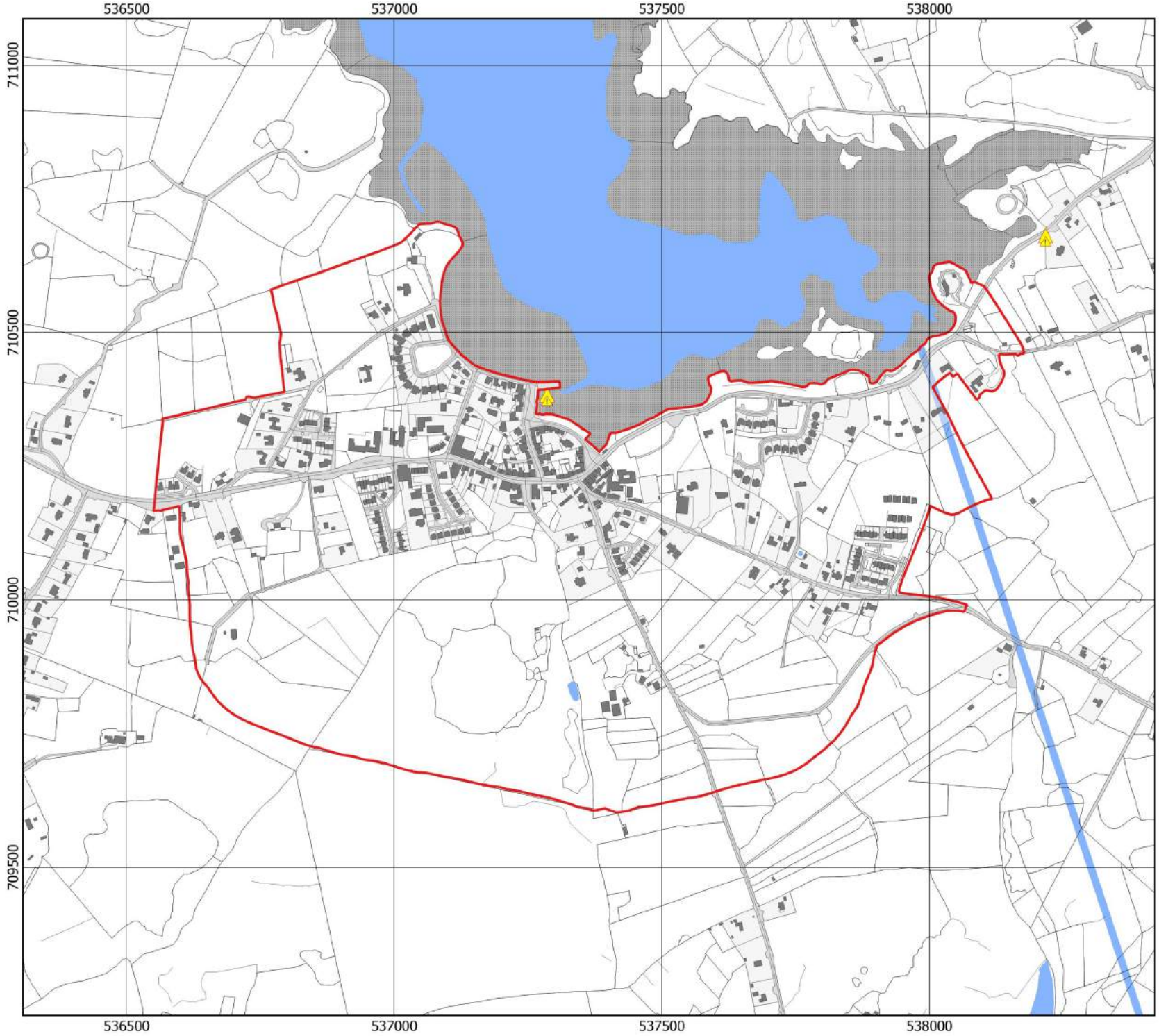

Galway CDP 2022-2028
SFRA

Kinvara
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme
- Channel
- Embankment
- Benefited Land

Drainage Districts
- Channel
- Embankment
- Benefited Land

Land Commission
- Benefited Land

Past Flood Event
- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

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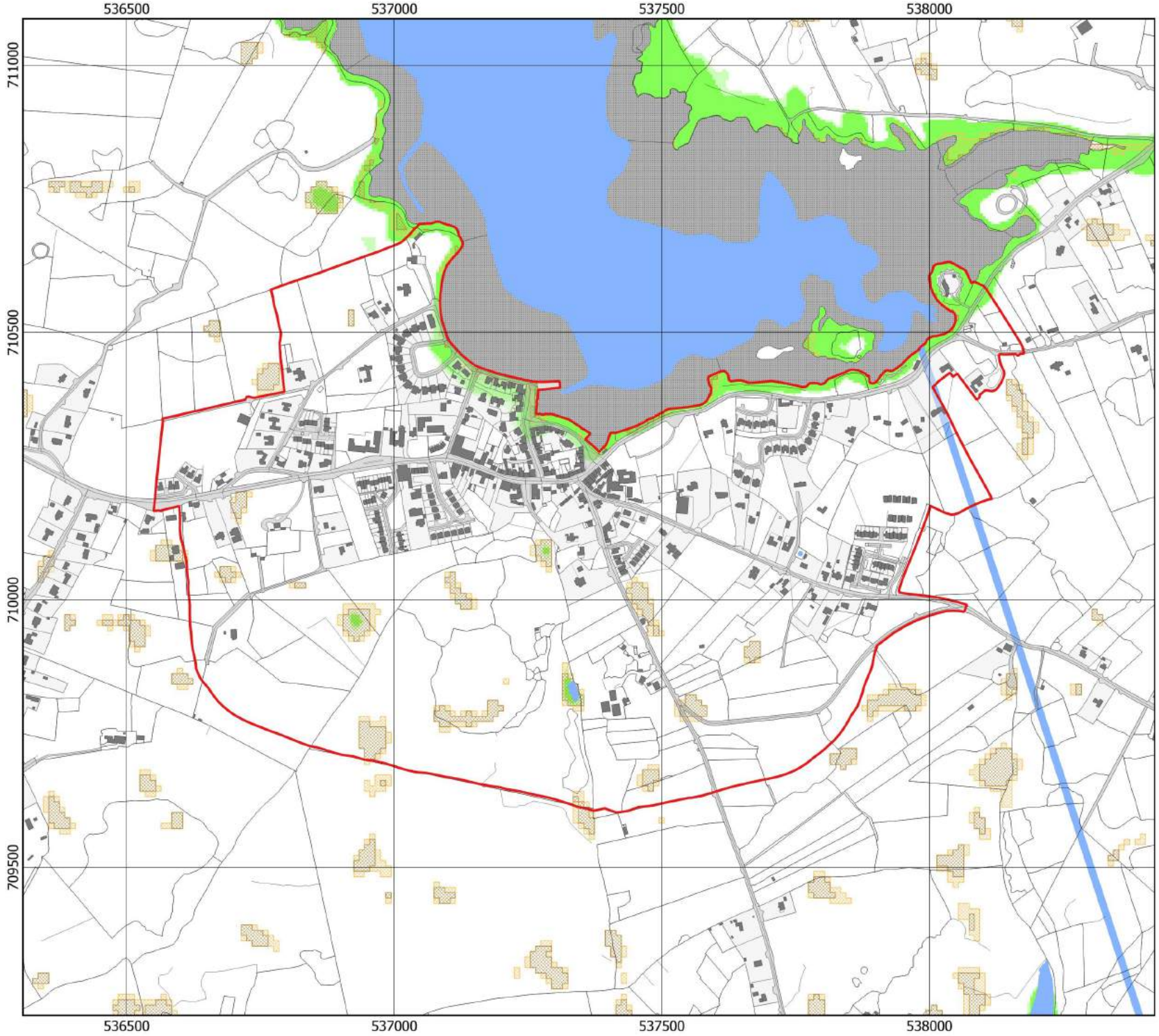
Galway County Council



Galway CDP 2022-2028
SFRA

Kinvara
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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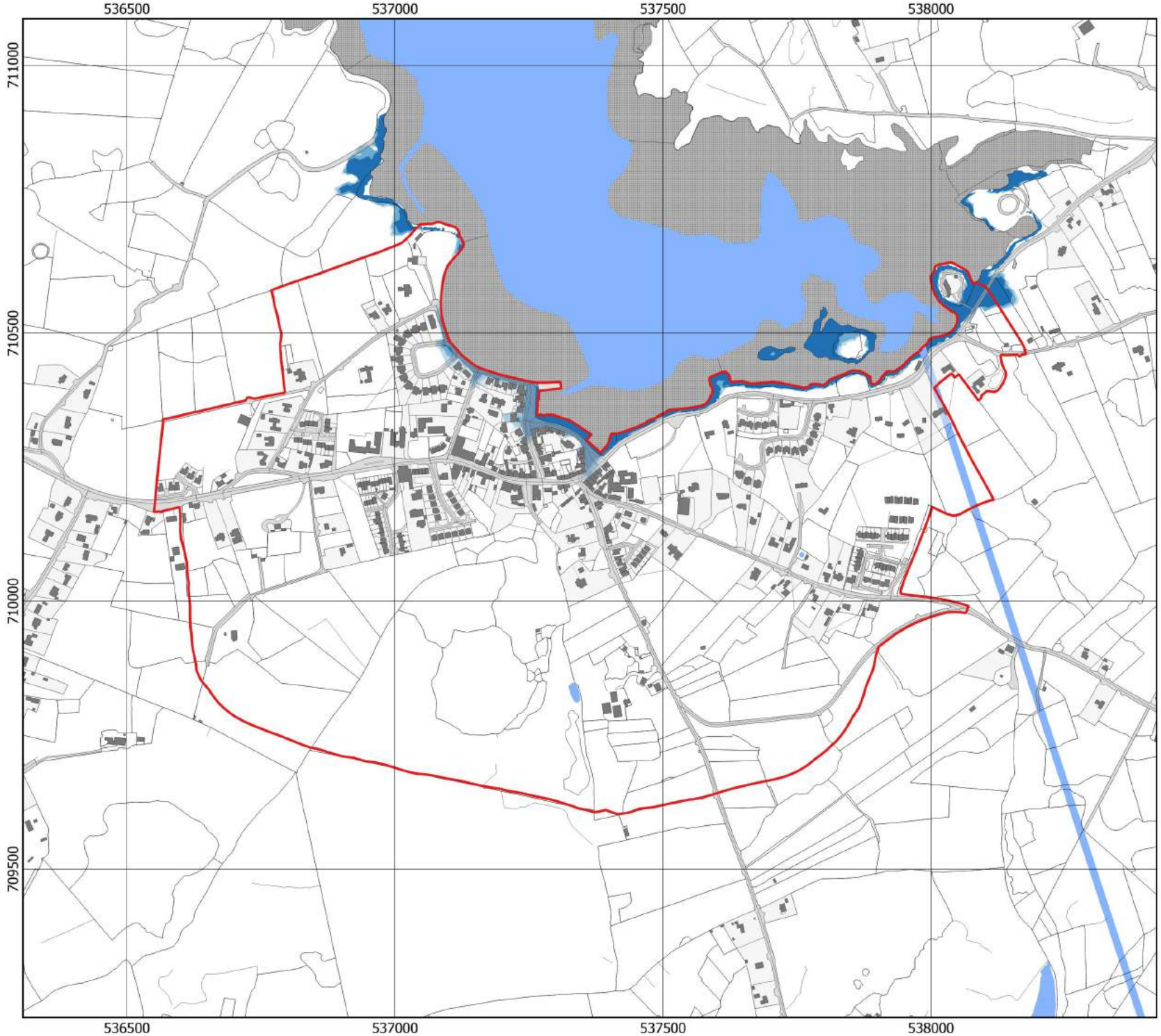


Galway CDP 2022-2028
SFRA

Kinvara
OPW CFRAM Present Day

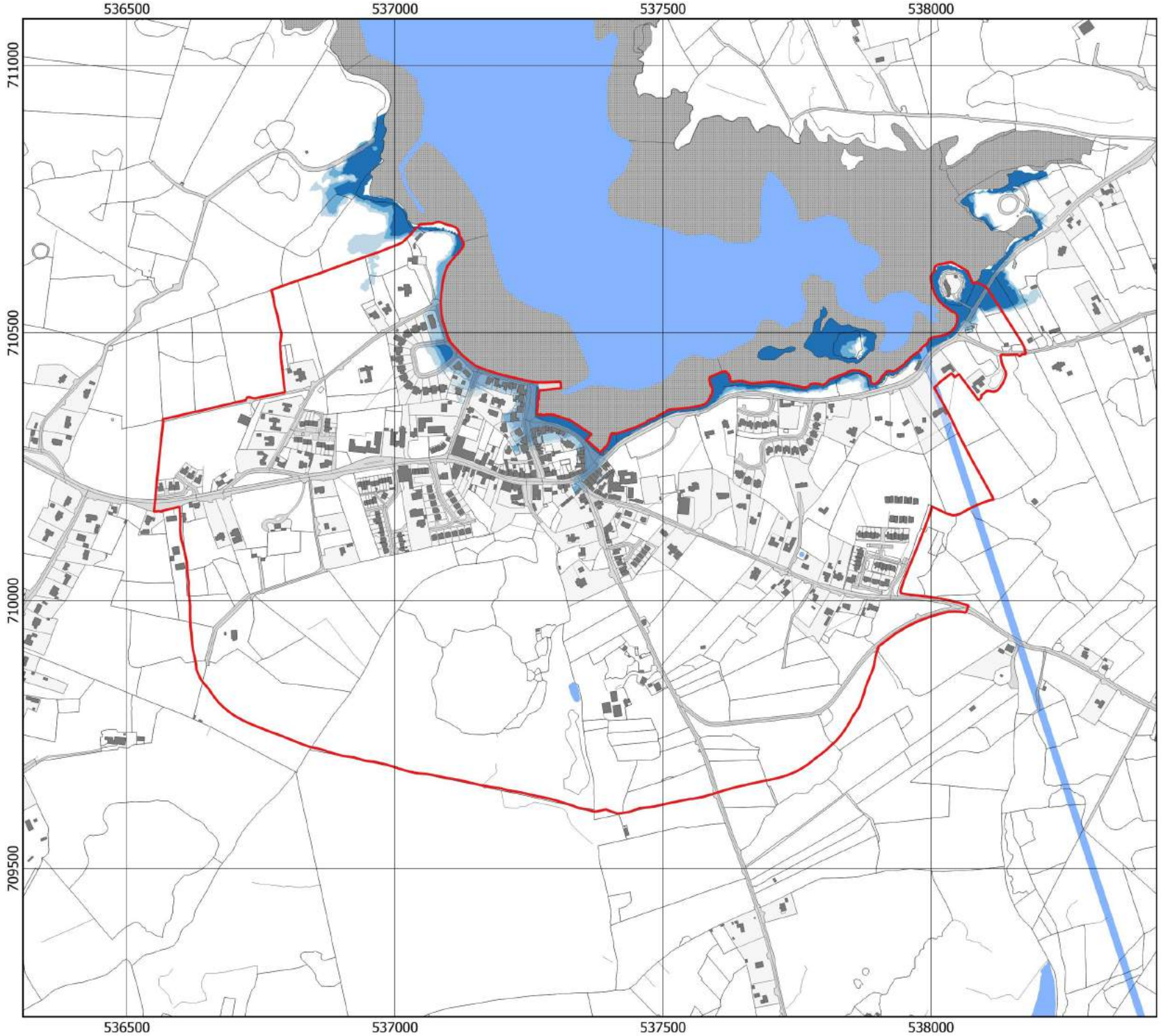
- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028
SFRA

Kinvara
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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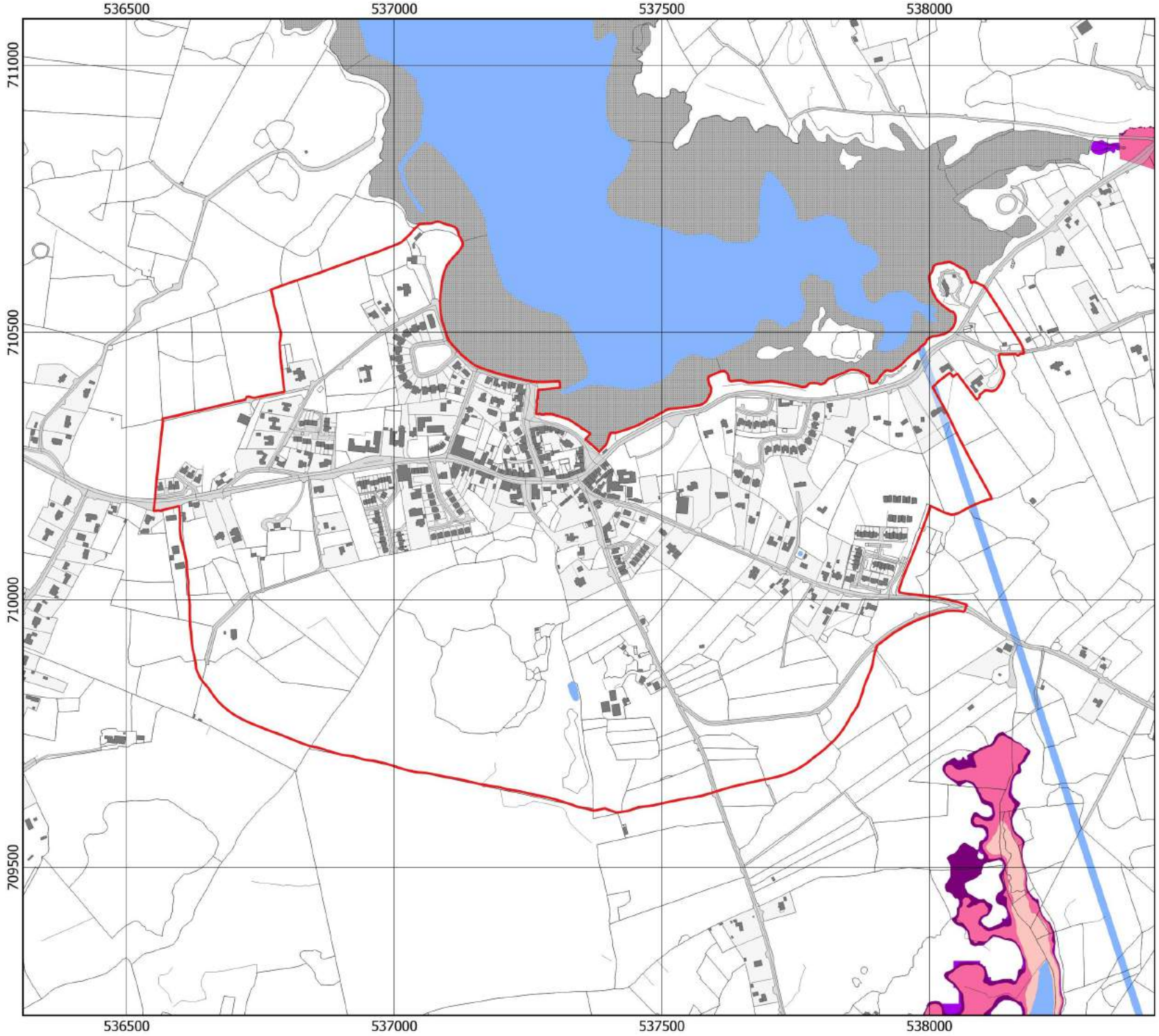
Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028
SFRA

Kinvara
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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Galway County Council

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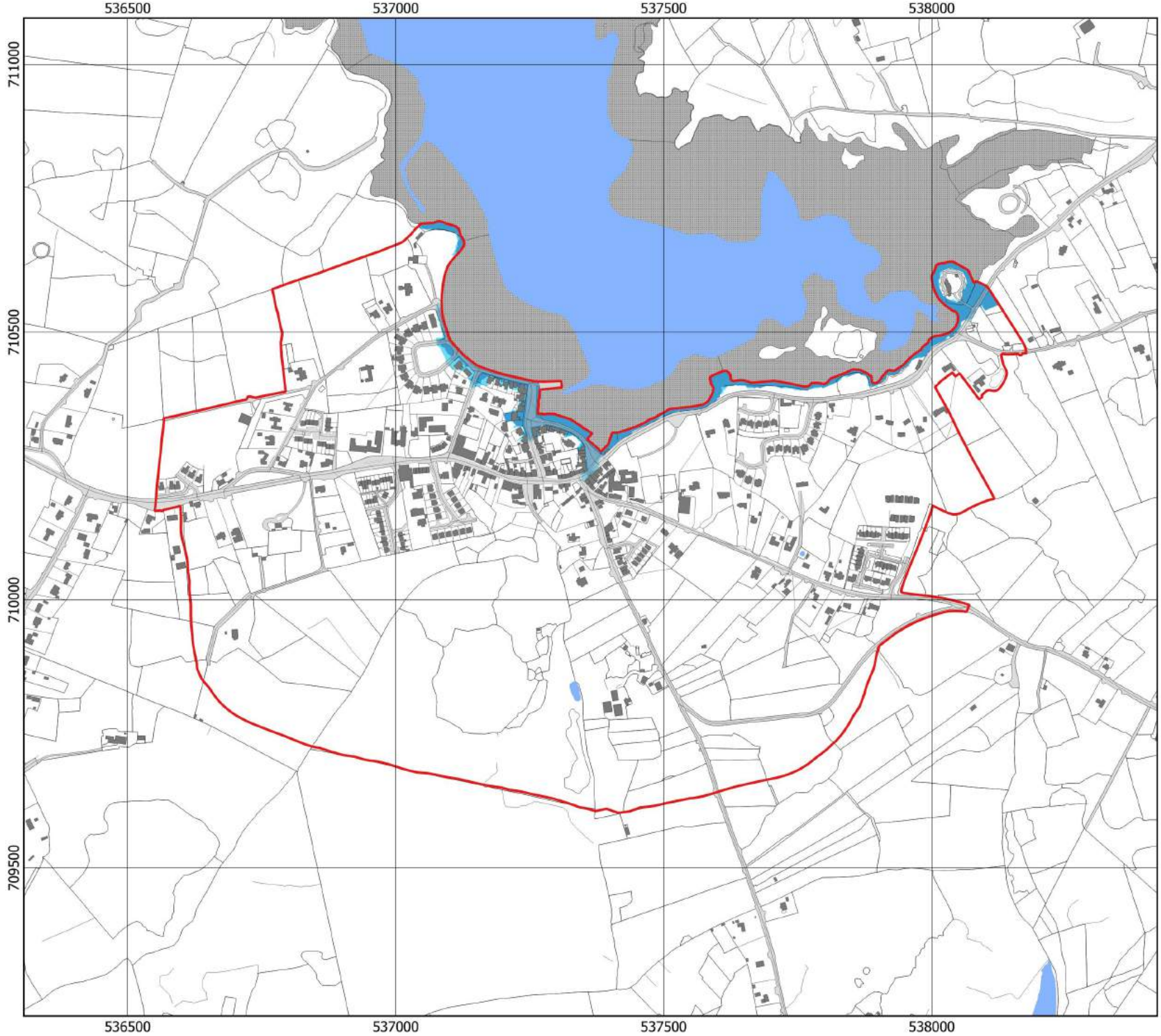

Galway CDP 2022-2028
SFRA

Kinvara
Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

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Coordinates in ITM
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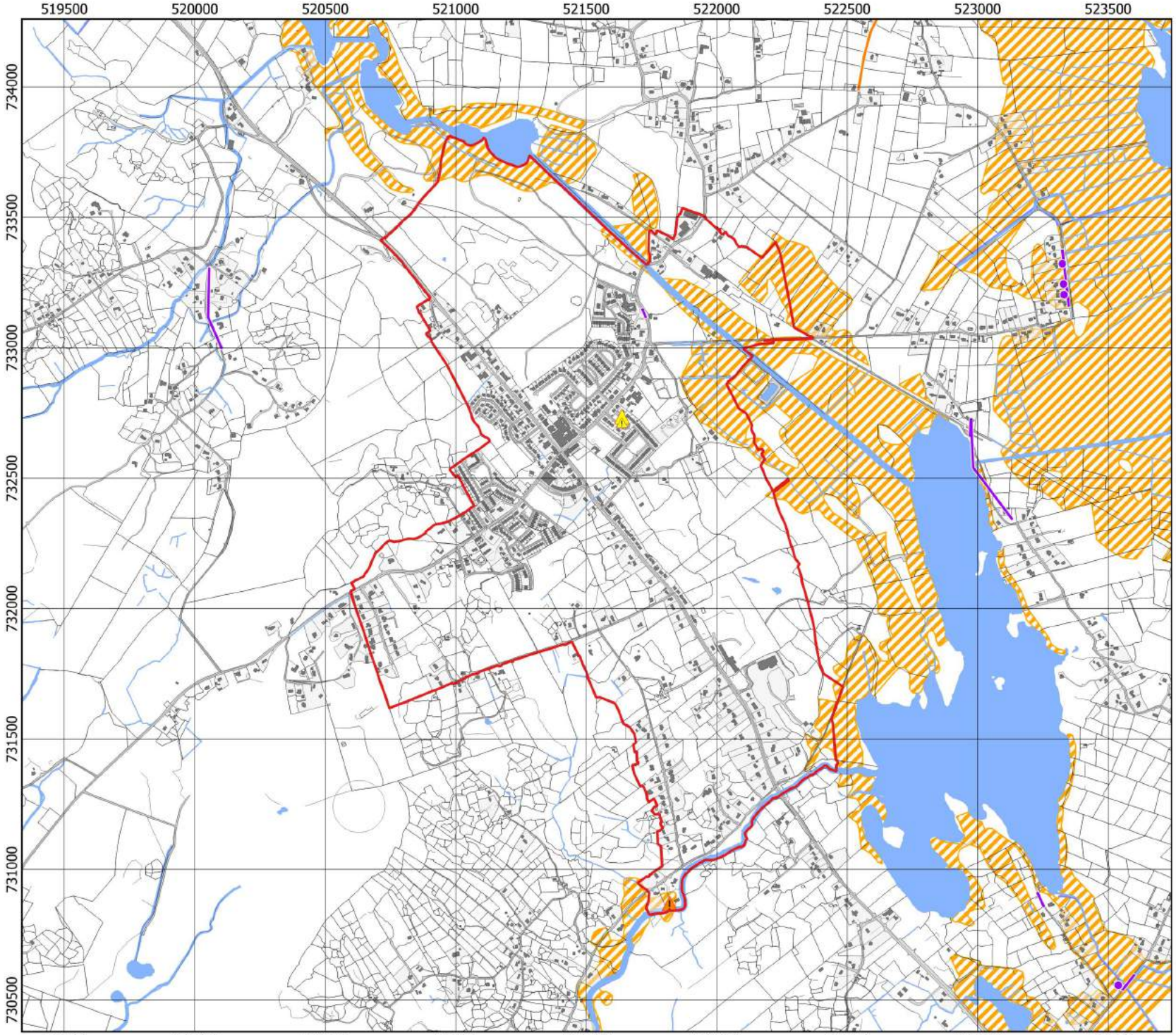

Galway CDP 2022-2028 SFRA

Maigh Cuilinn OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

Past Flood Event

- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data

- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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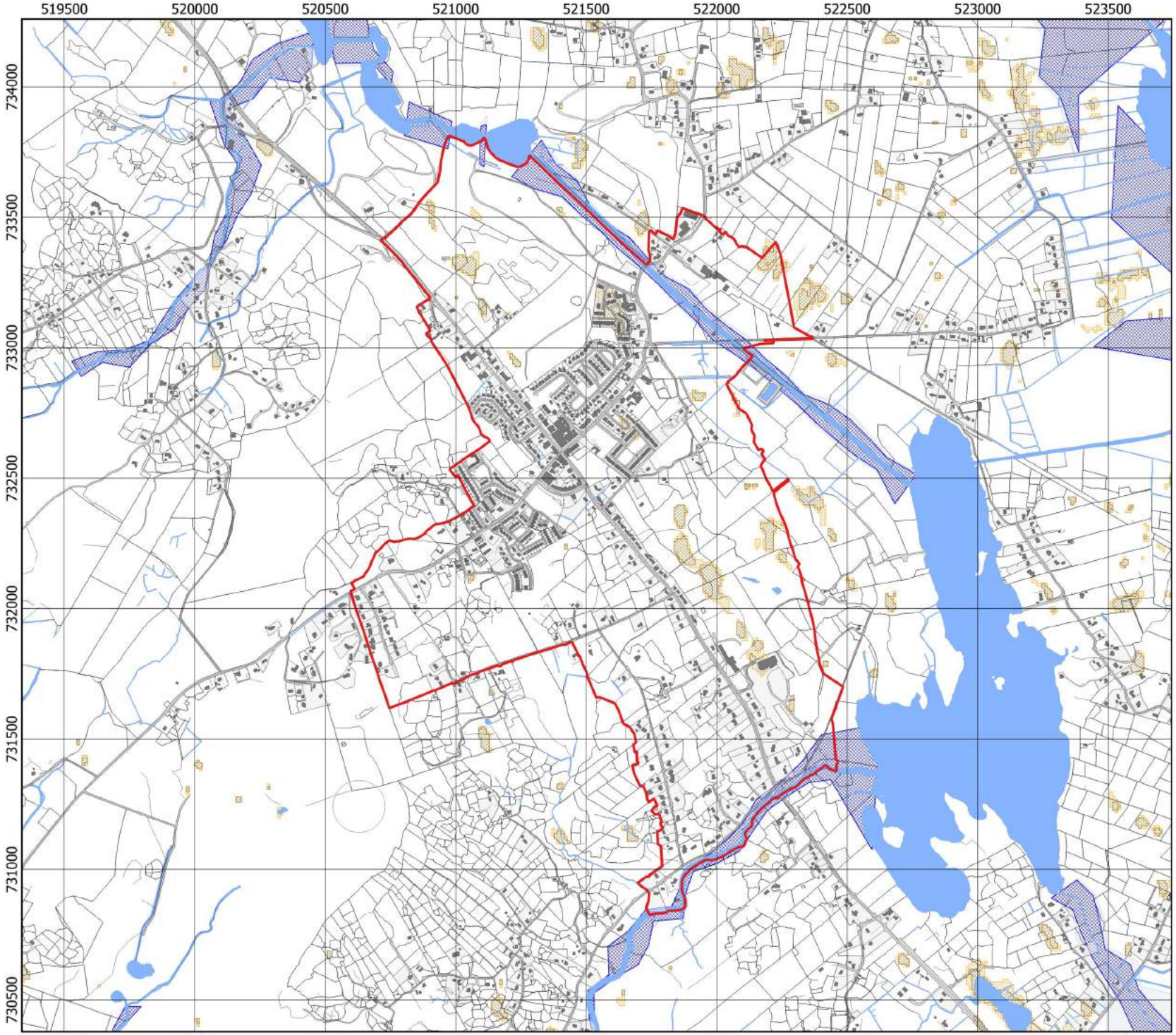

Galway CDP 2022-2028
SFRA

Maigh Cuilinn
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council

Coordinates in ITM
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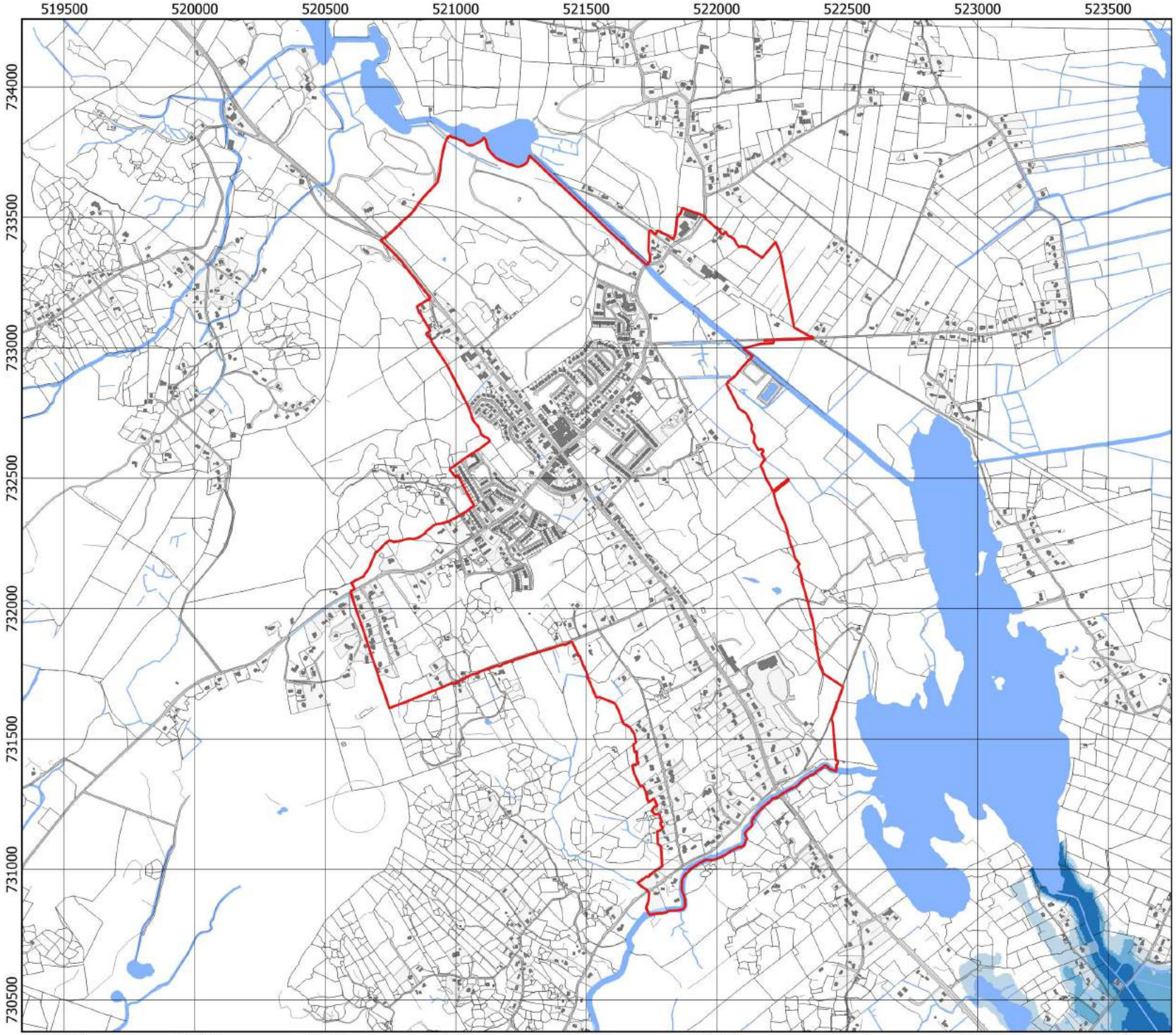


Galway CDP 2022-2028
SFRA

Maigh Cuilinn
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

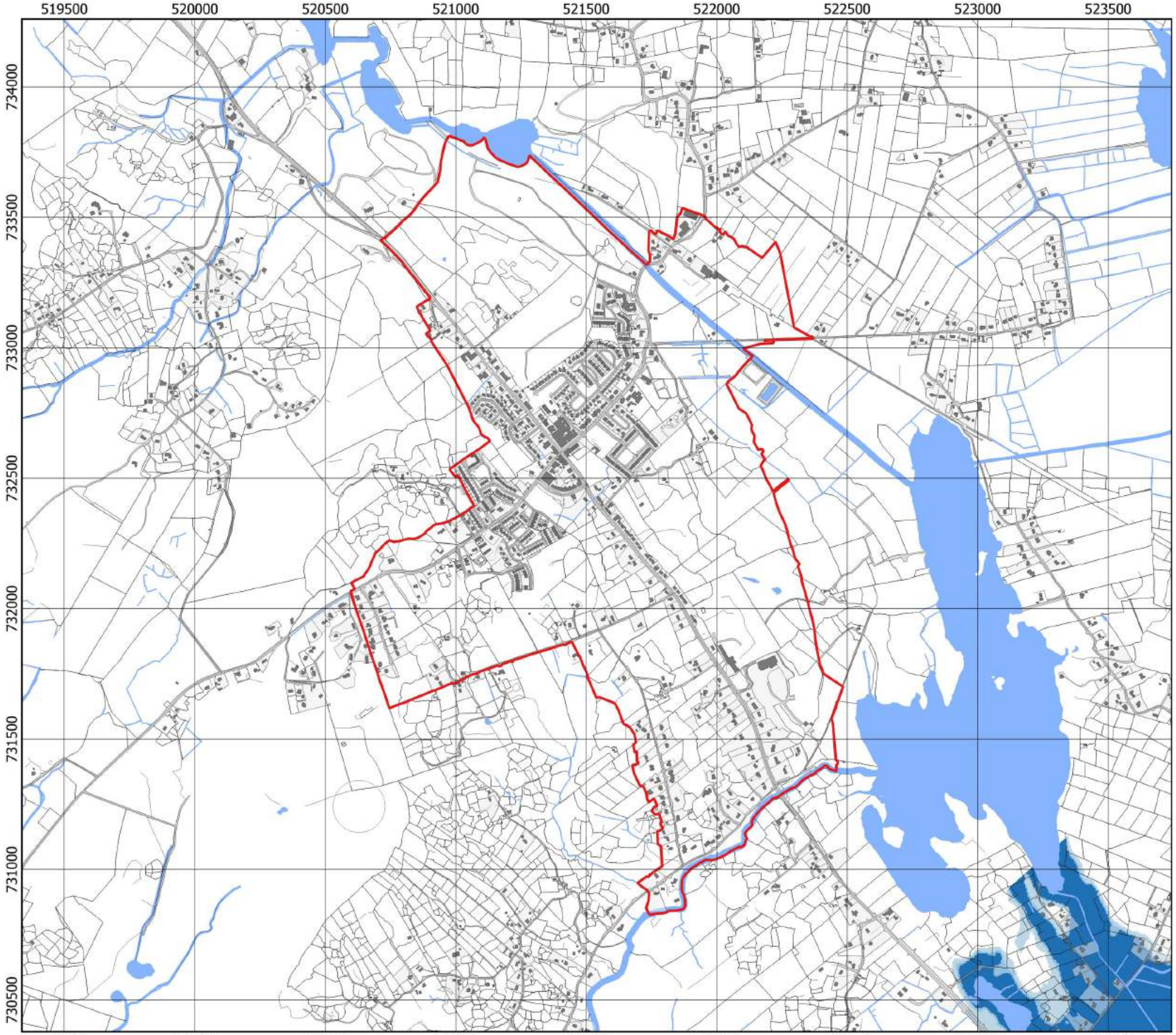
CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council

Coordinates in ITM
Galway County Council 2020 OSi_NMA_090



Galway CDP 2022-2028
SFRA

Maigh Cuilinn
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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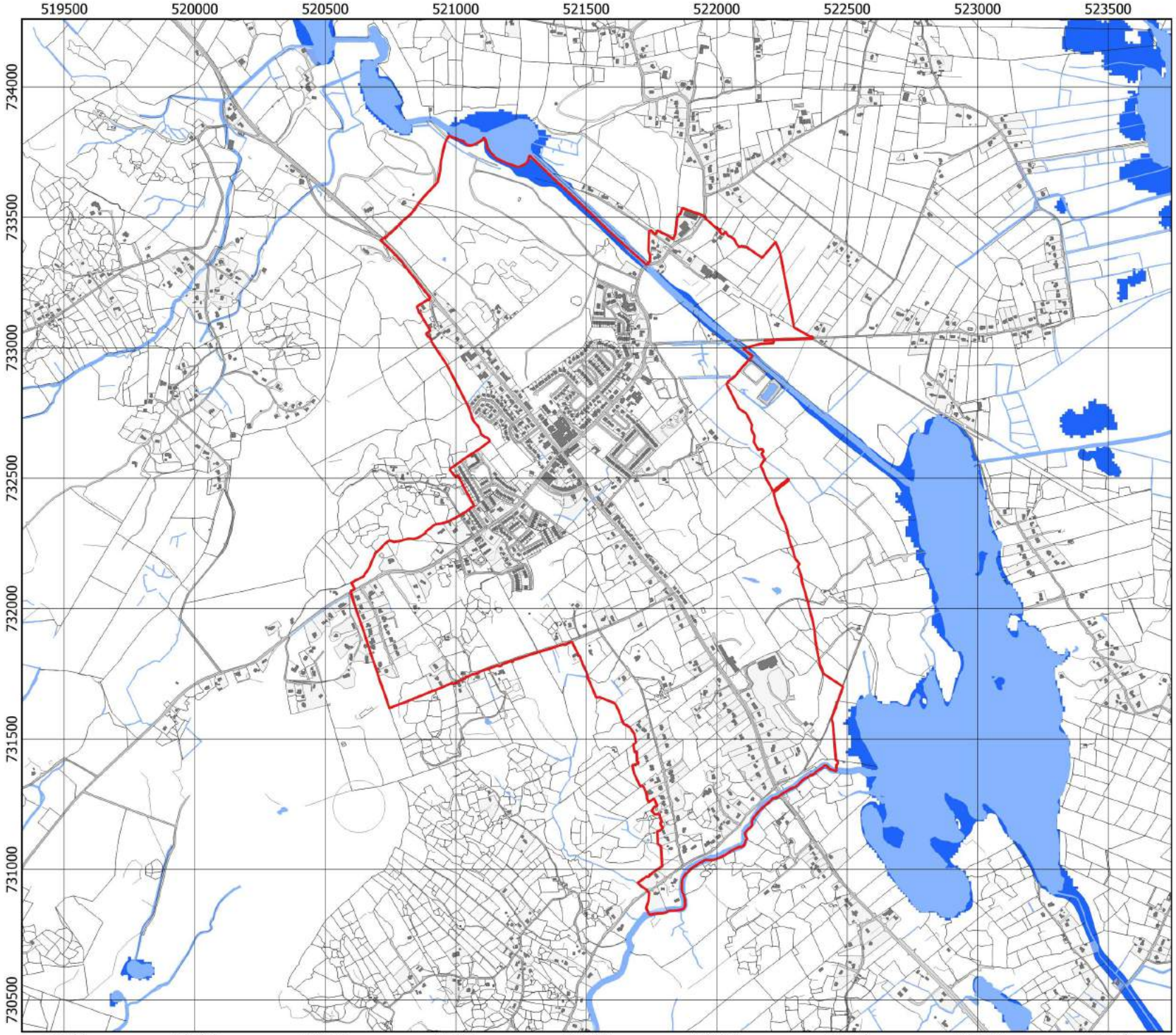

Galway CDP 2022-2028
SFRA

Maigh Cuilinn
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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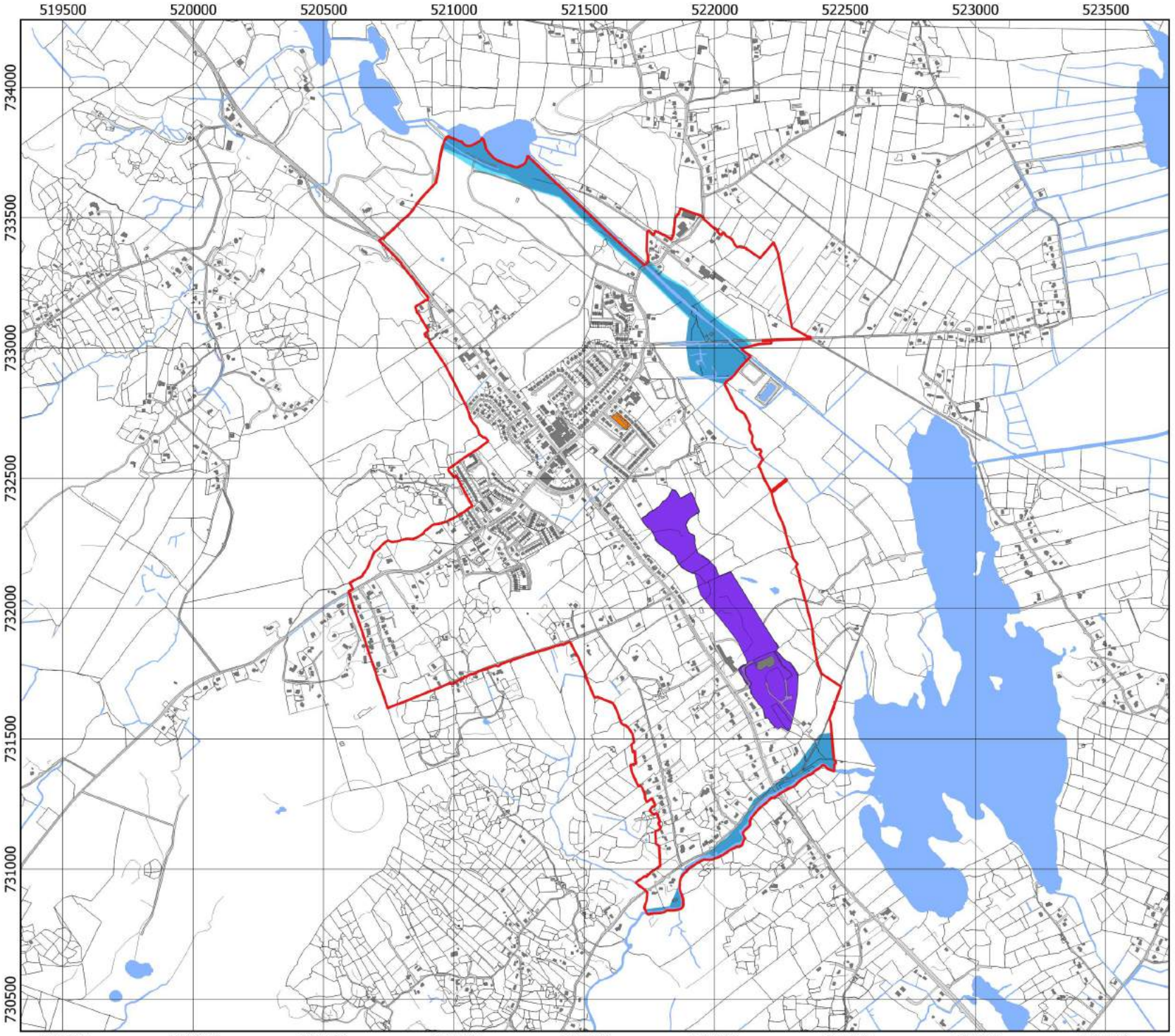

Galway CDP 2022-2028 SFRA

Maigh Cuilinn Flood Zones

Administrative Area

Settlement Boundary

Water

Rivers & Streams

River or Stream

Indicative Flood Zones

Flood Zone A

Flood Zone B

Other Zones

Possible Turlough

Wet lands, not easily drained

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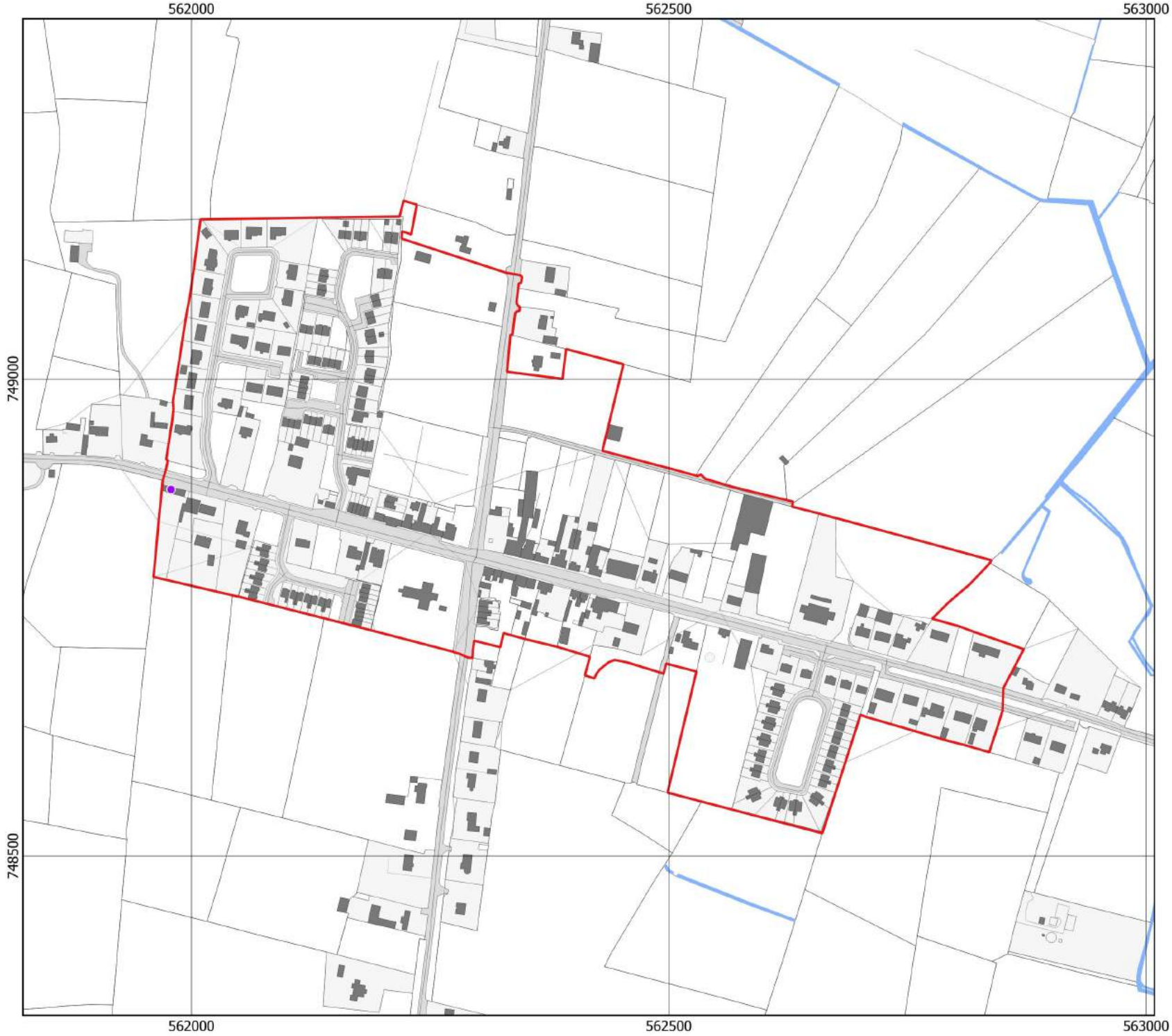

Galway CDP 2022-2028 SFRA

Moylough OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

Past Flood Event

- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data

- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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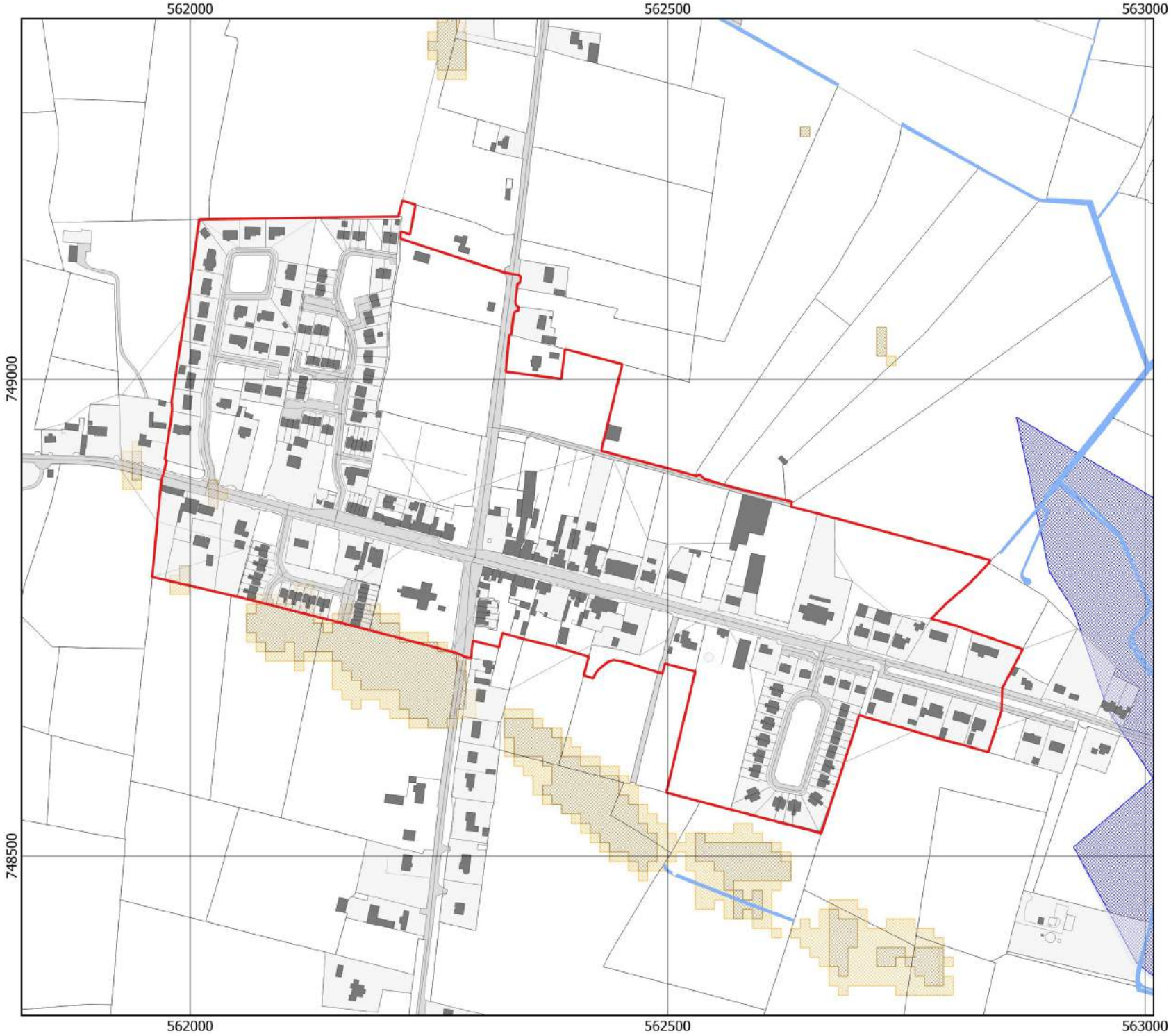

Galway CDP 2022-2028
SFRA

Moylough
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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Galway CDP 2022-2028
SFRA

Moylough
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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Galway CDP 2022-2028
SFRA

Moylough
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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Galway CDP 2022-2028
SFRA

Moylough
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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Galway CDP 2022-2028
SFRA

Moylough
Flood Zones

- Administrative Area
- Settlement Boundary
- Water
- Rivers & Streams
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Other Zones

- Possible Turlough
- Wet lands, not easily drained

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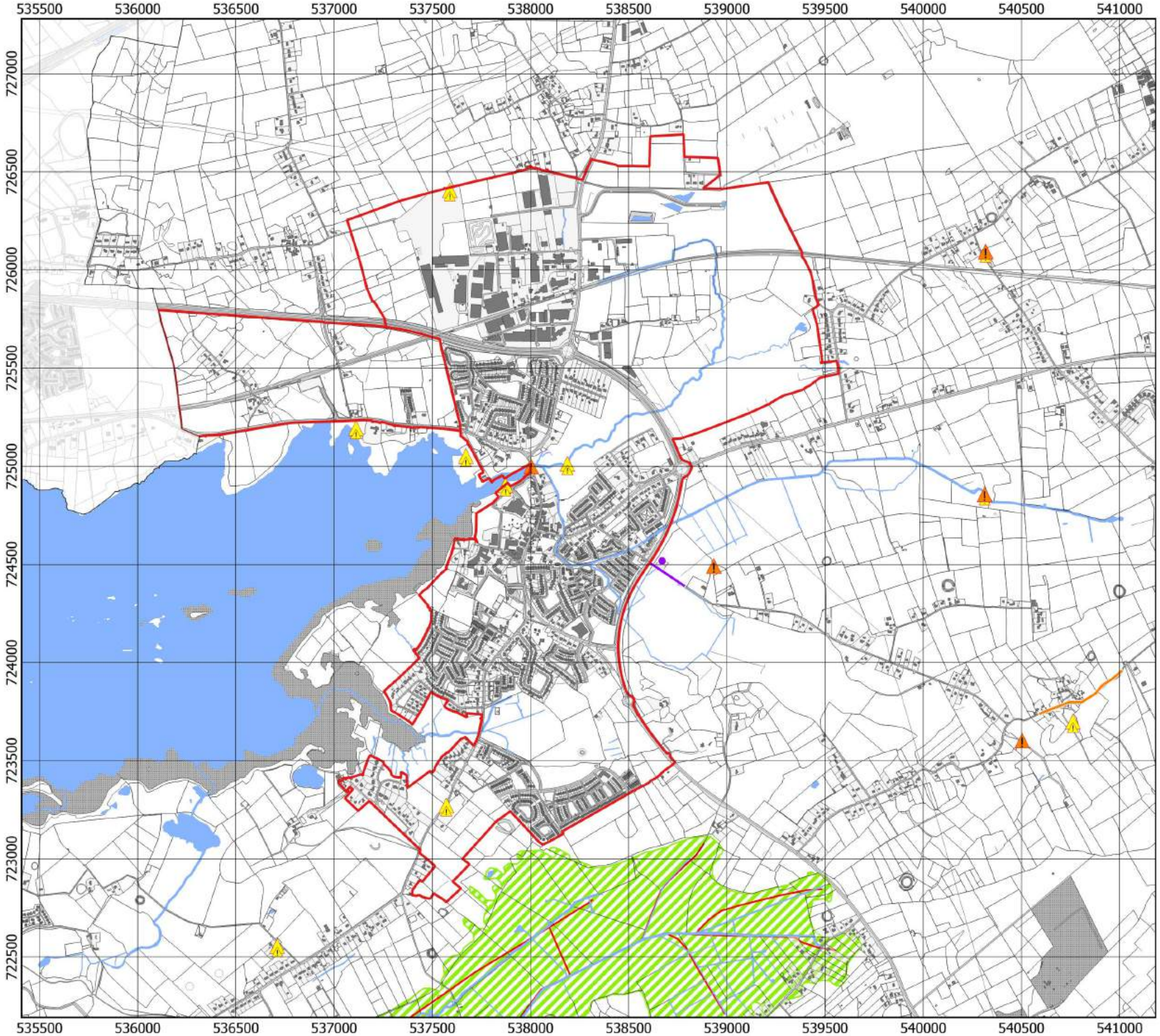

Galway CDP 2022-2028 SFRA

Oranmore OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

Past Flood Event

- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data

- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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Comhairle Chontae na Gaillimhe
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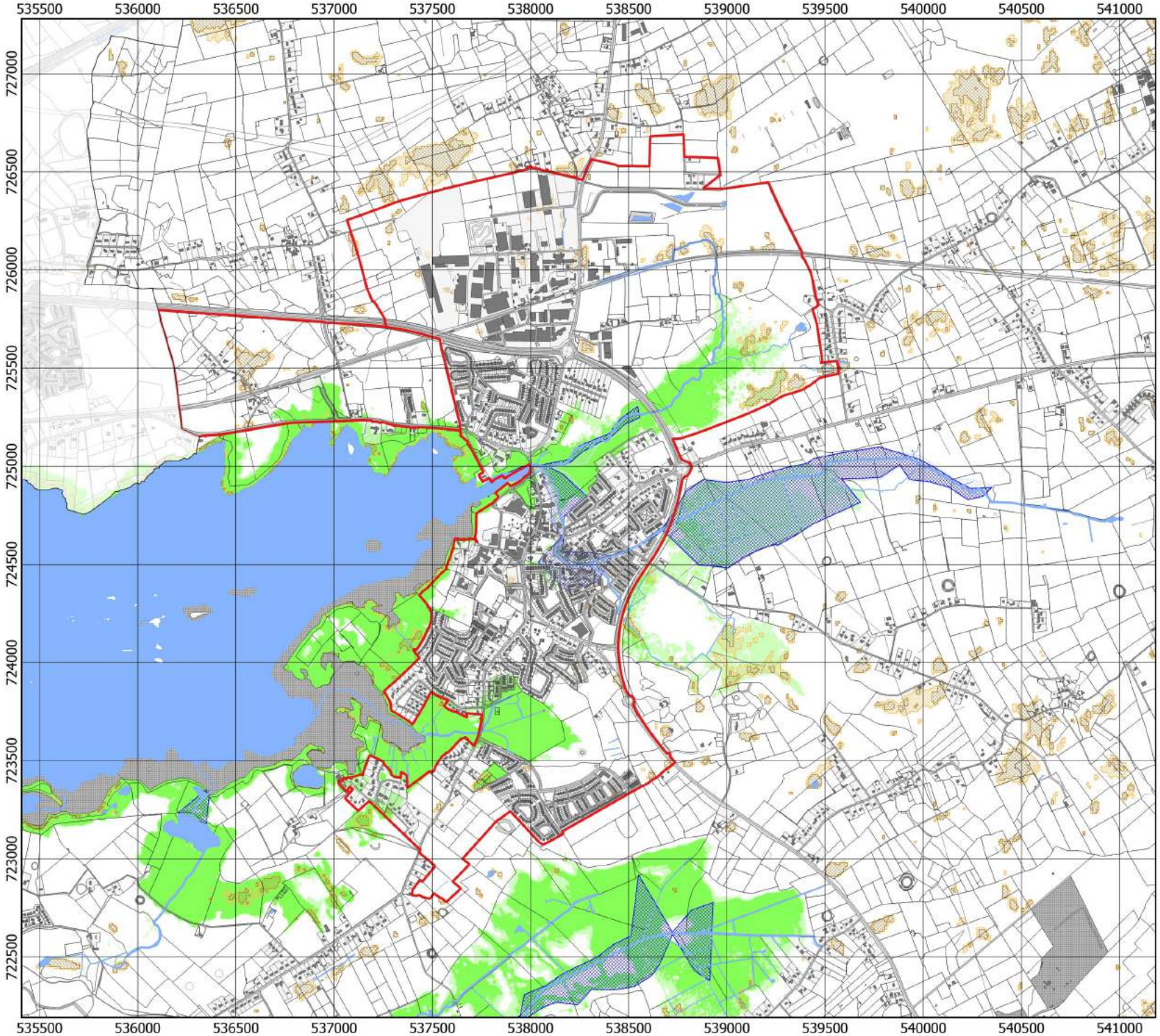


Galway CDP 2022-2028
SFRA

Oranmore
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

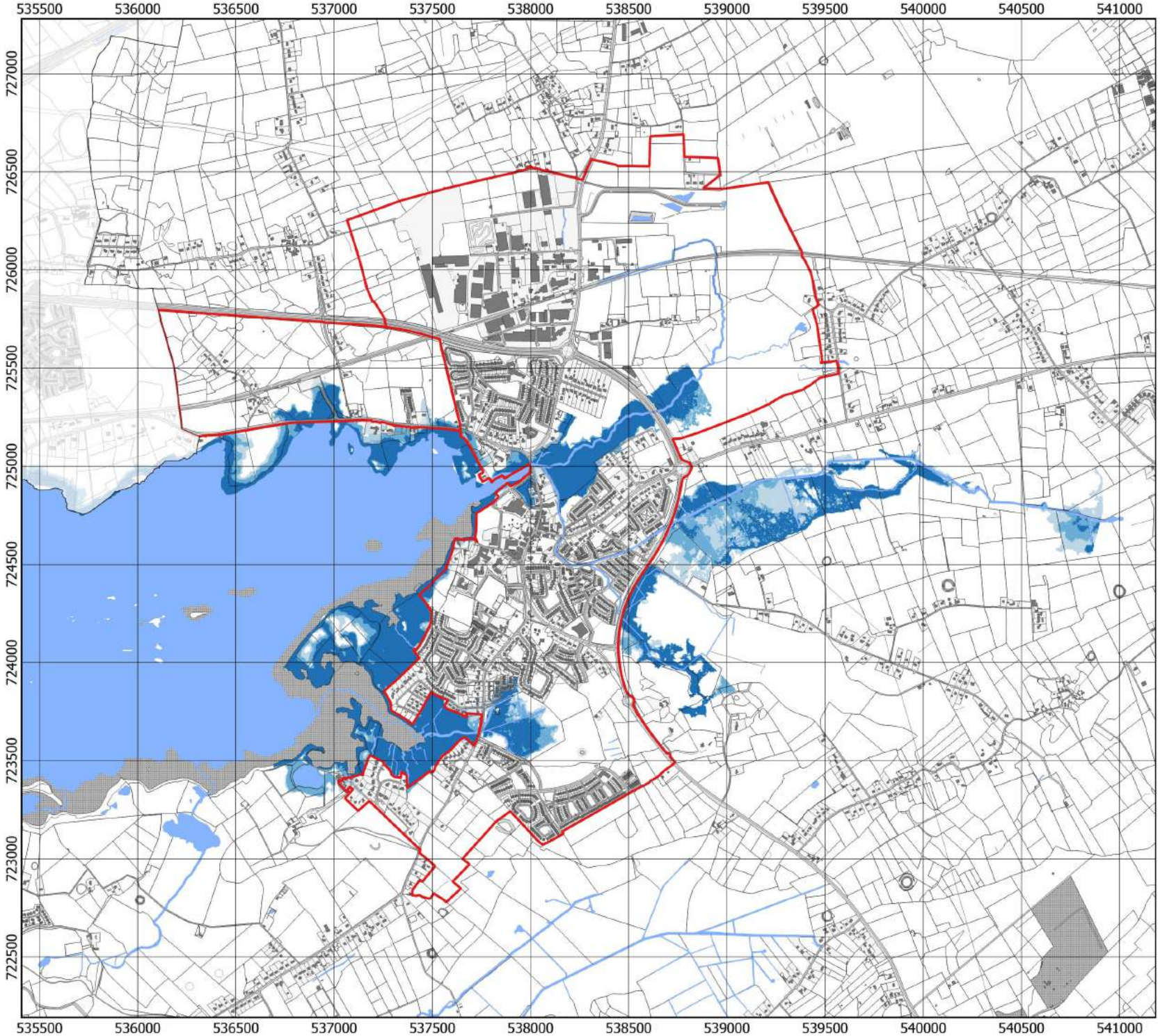
- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028
SFRA

Oranmore
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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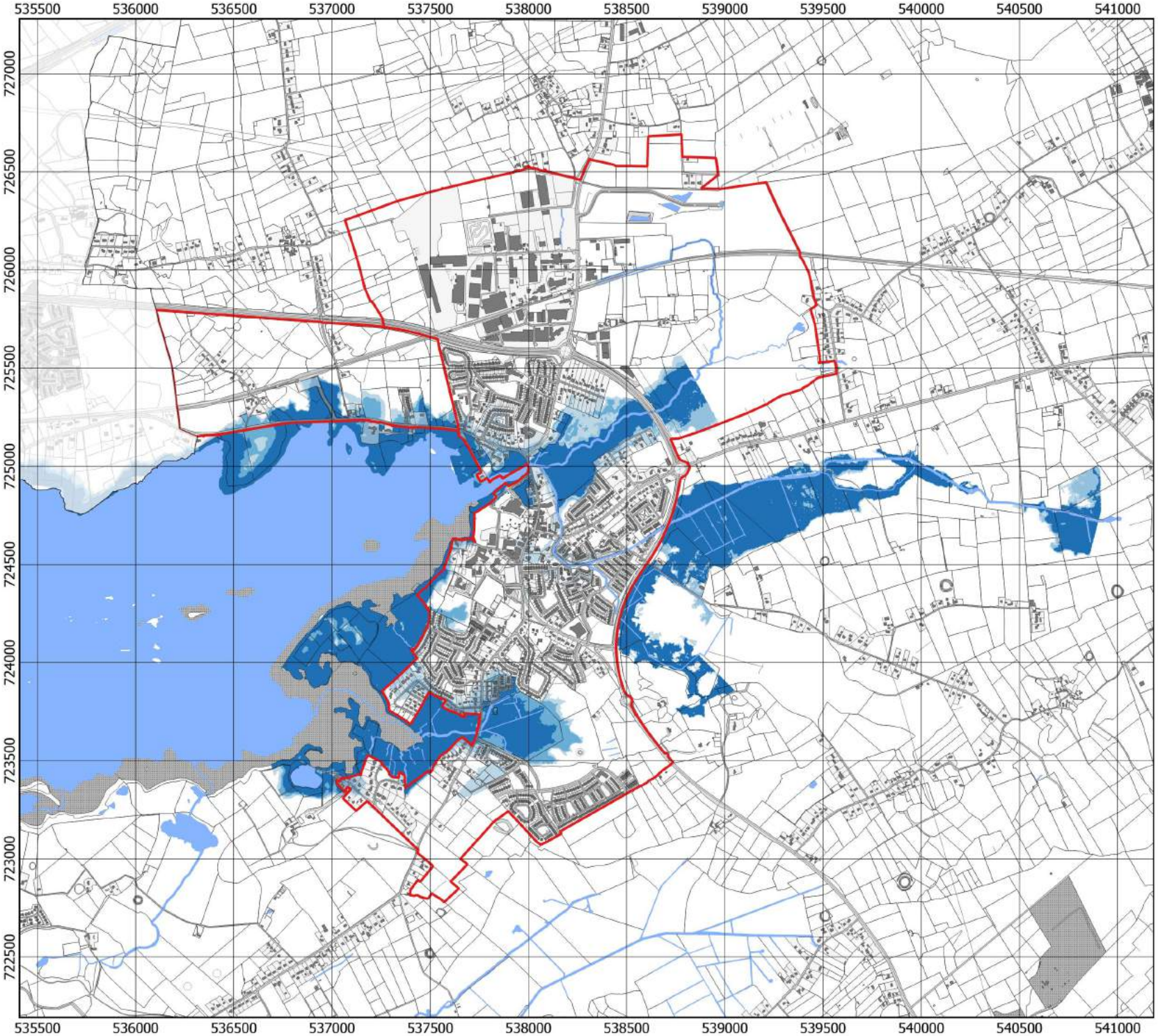

Galway CDP 2022-2028
SFRA

Oranmore
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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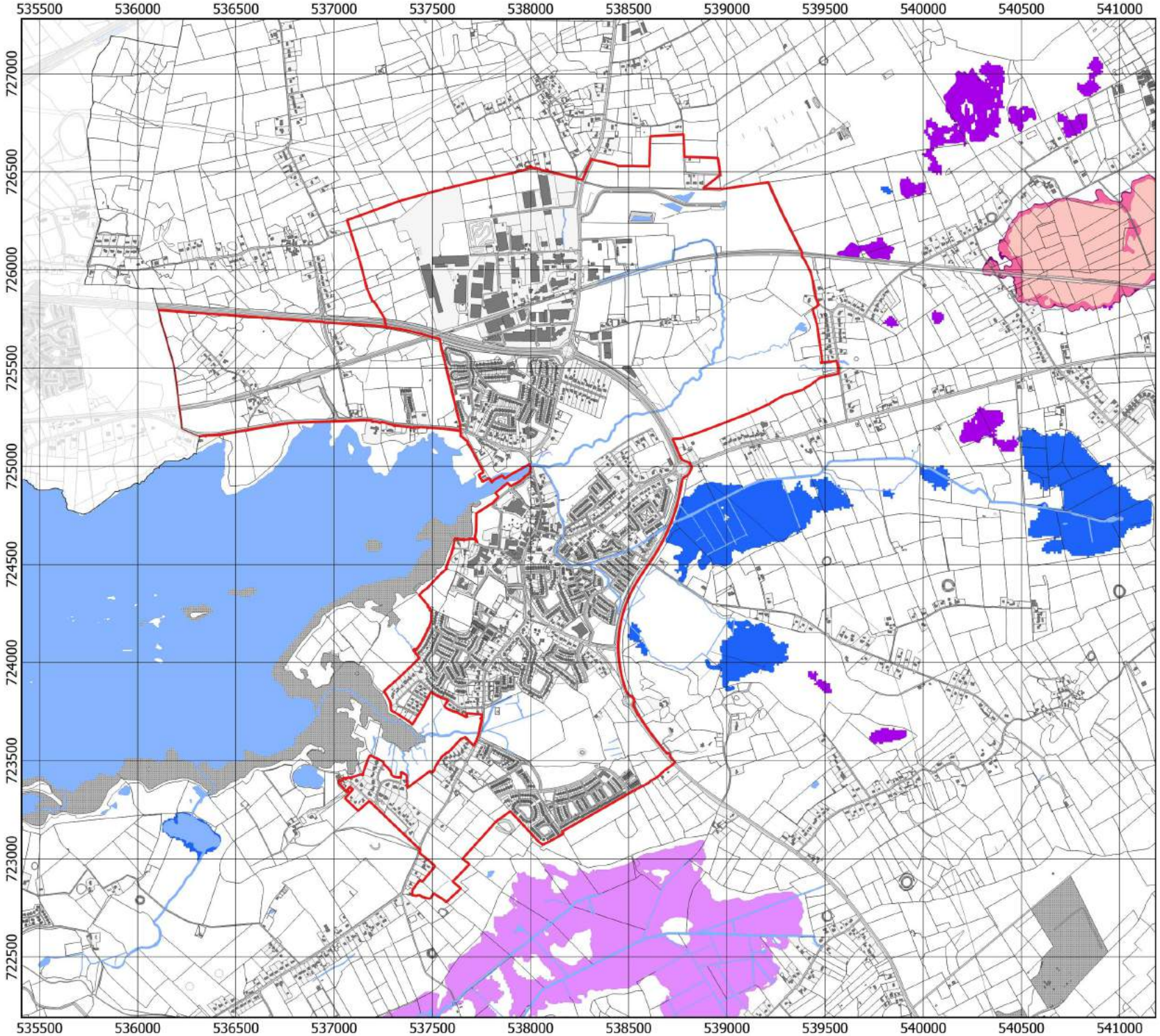

Galway CDP 2022-2028
SFRA

Oranmore
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

Comhairle Chontae na Gaillimhe
Galway County Council

Coordinates in ITM
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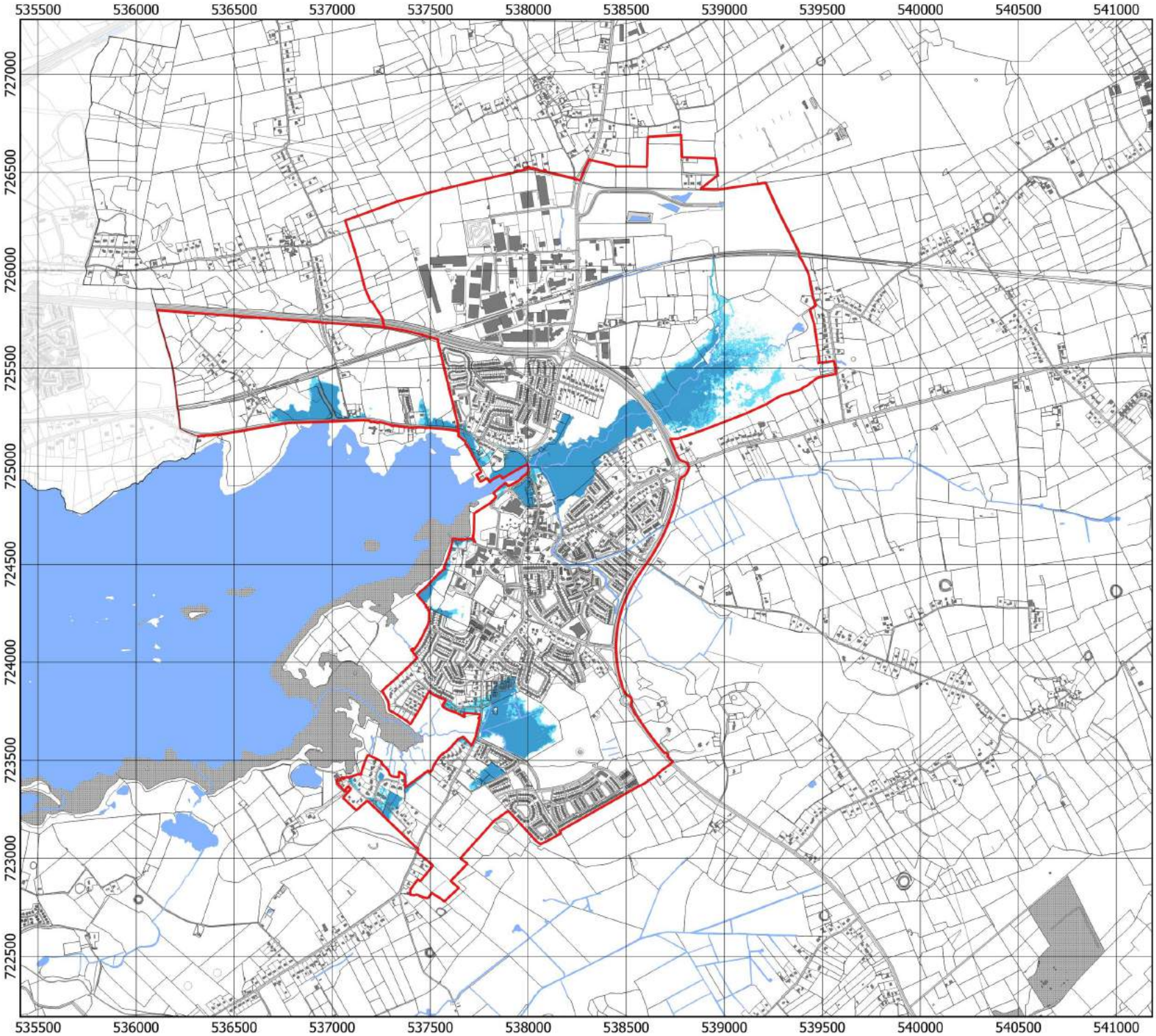

Galway CDP 2022-2028 SFRA

Oranmore Flood Zones

Administrative Area

Settlement Boundary

Water

Rivers & Streams

River or Stream

Indicative Flood Zones

Flood Zone A

Flood Zone B

Other Zones

Possible Turlough

Wet lands, not easily drained

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Galway County Council

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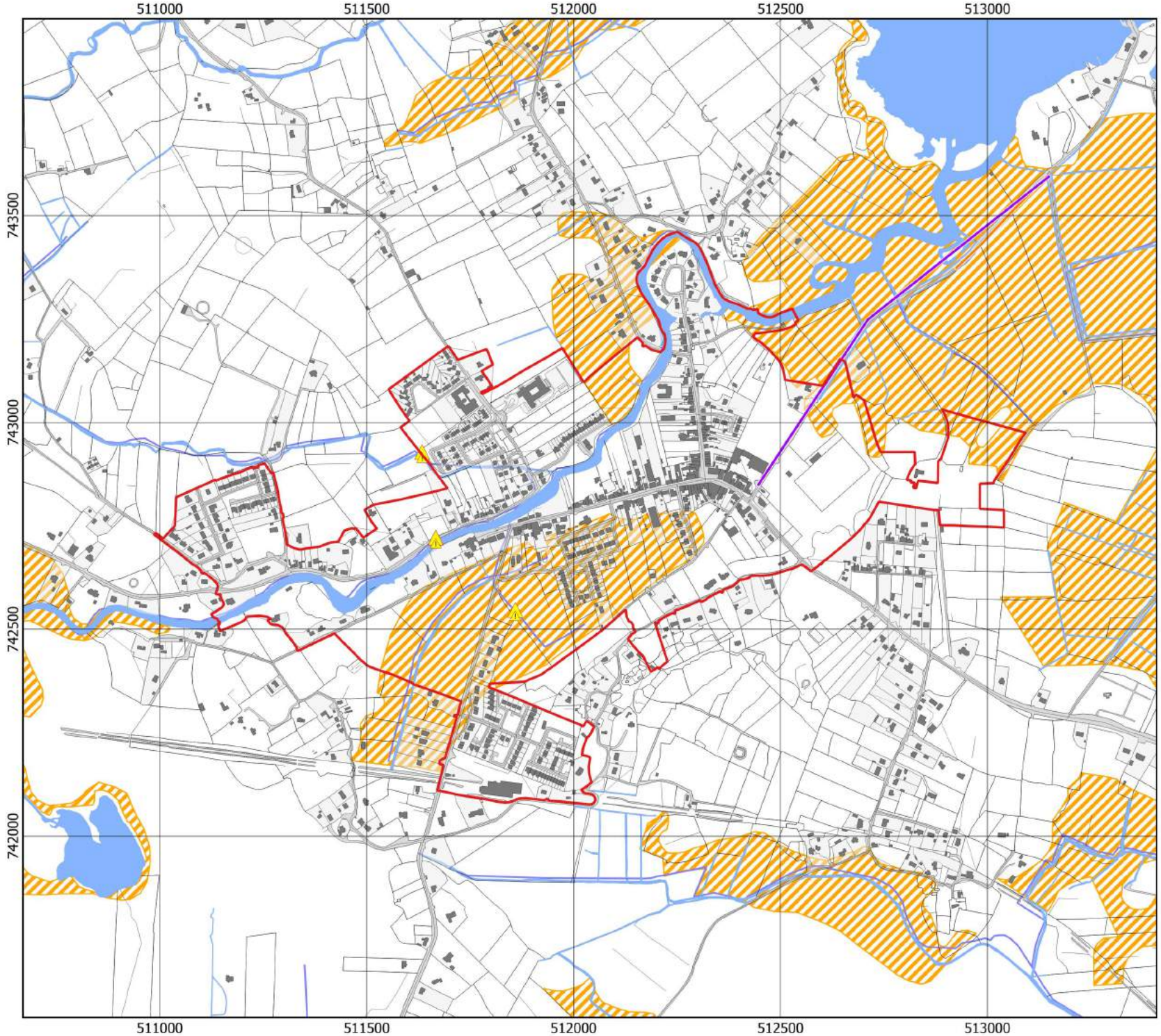

Galway CDP 2022-2028 SFRA

Oughterard OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

Past Flood Event

- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data

- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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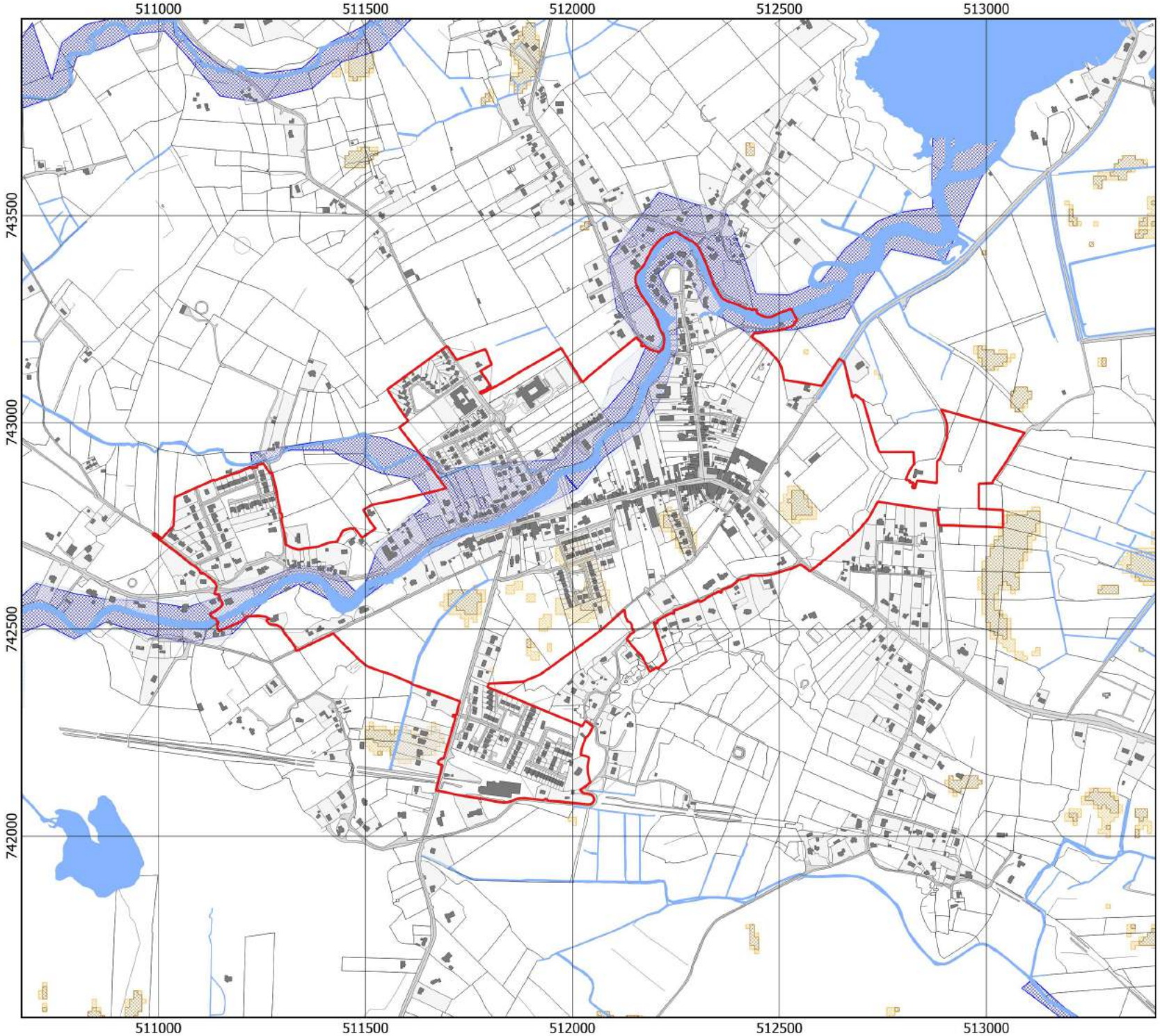


Galway CDP 2022-2028
SFRA

Oughterard
OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

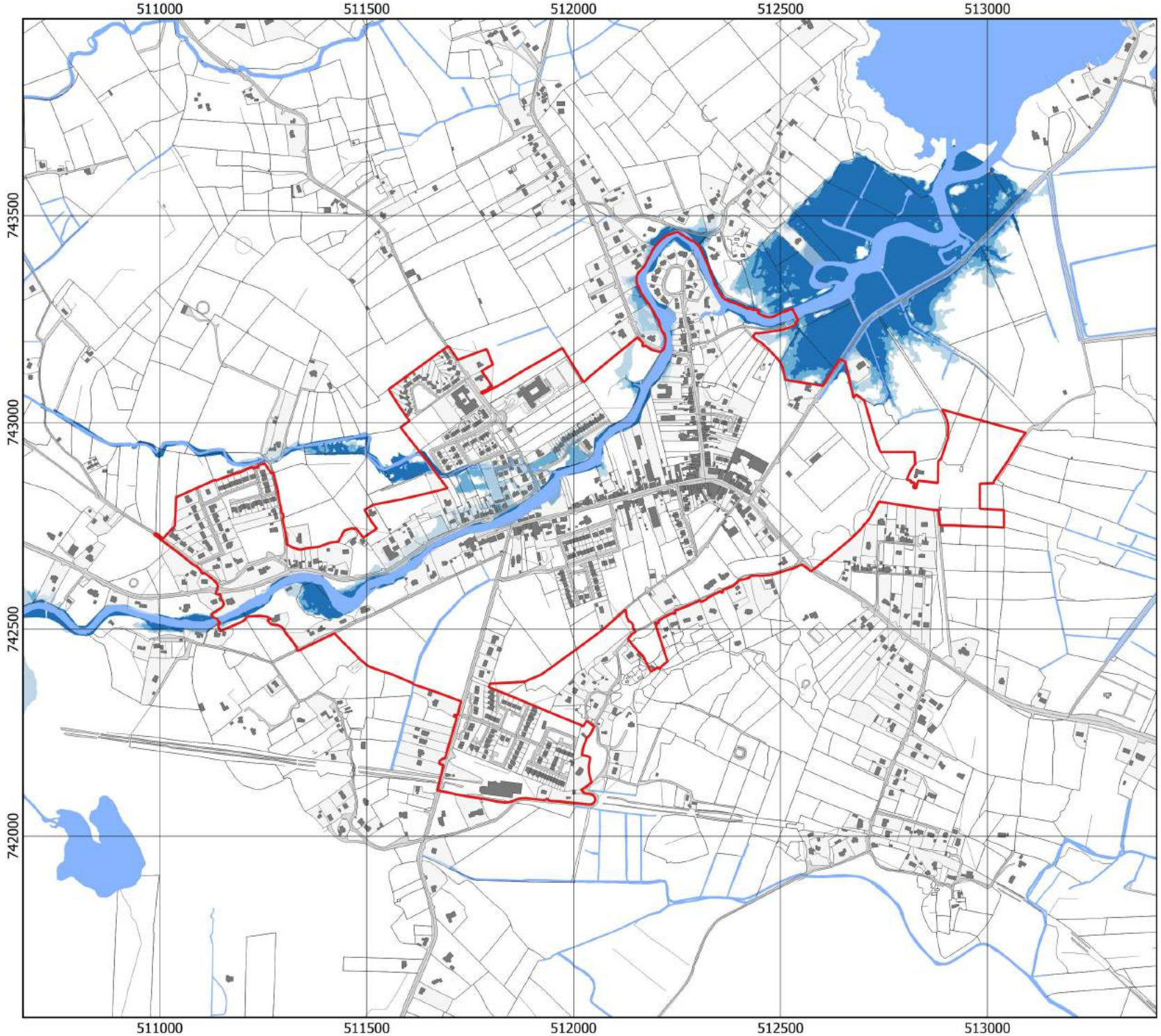
- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028
SFRA

Oughterard
OPW CFRAM Present Day

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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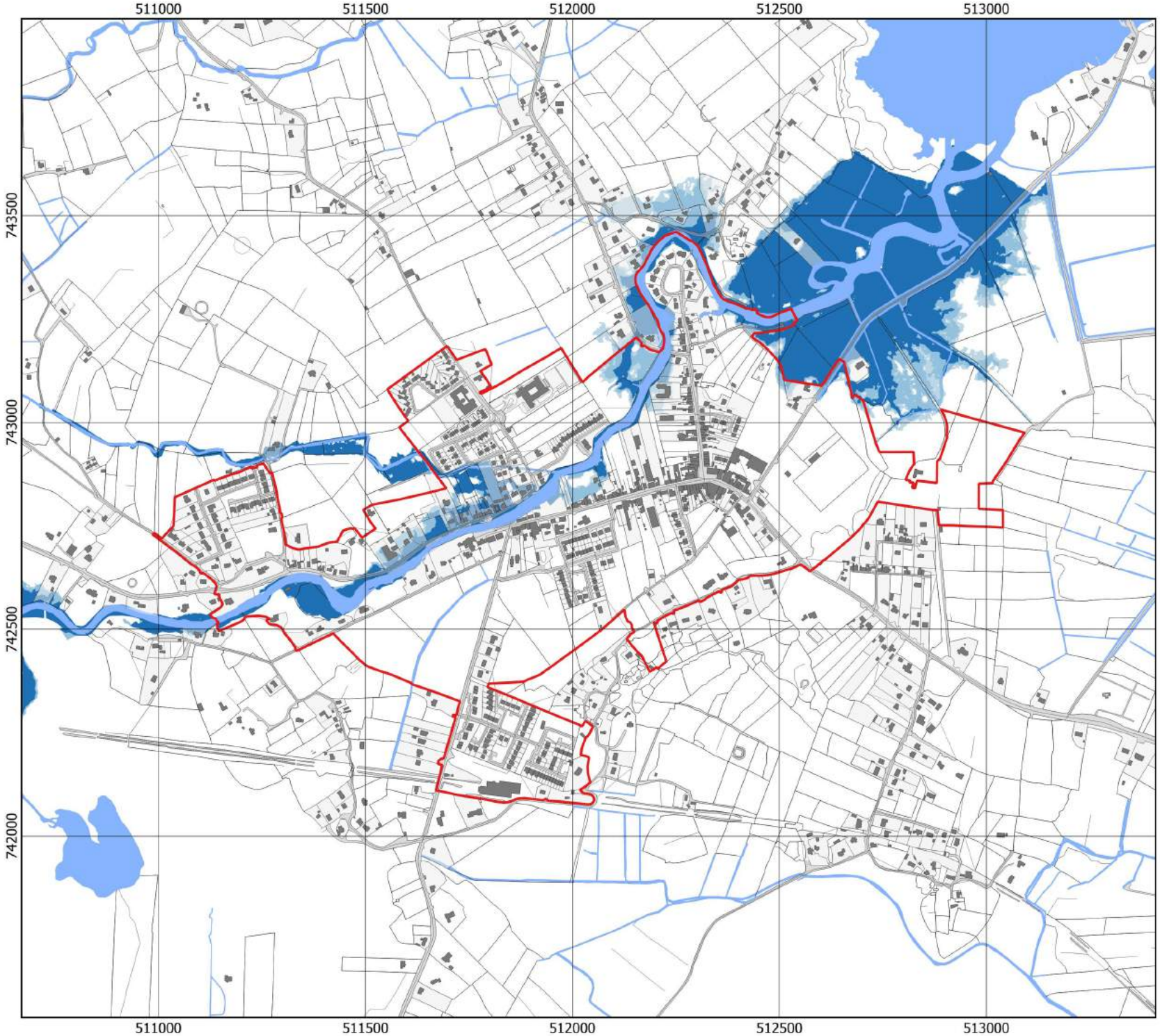


Galway CDP 2022-2028
SFRA

Oughterard
OPW CFRAM All Scenarios

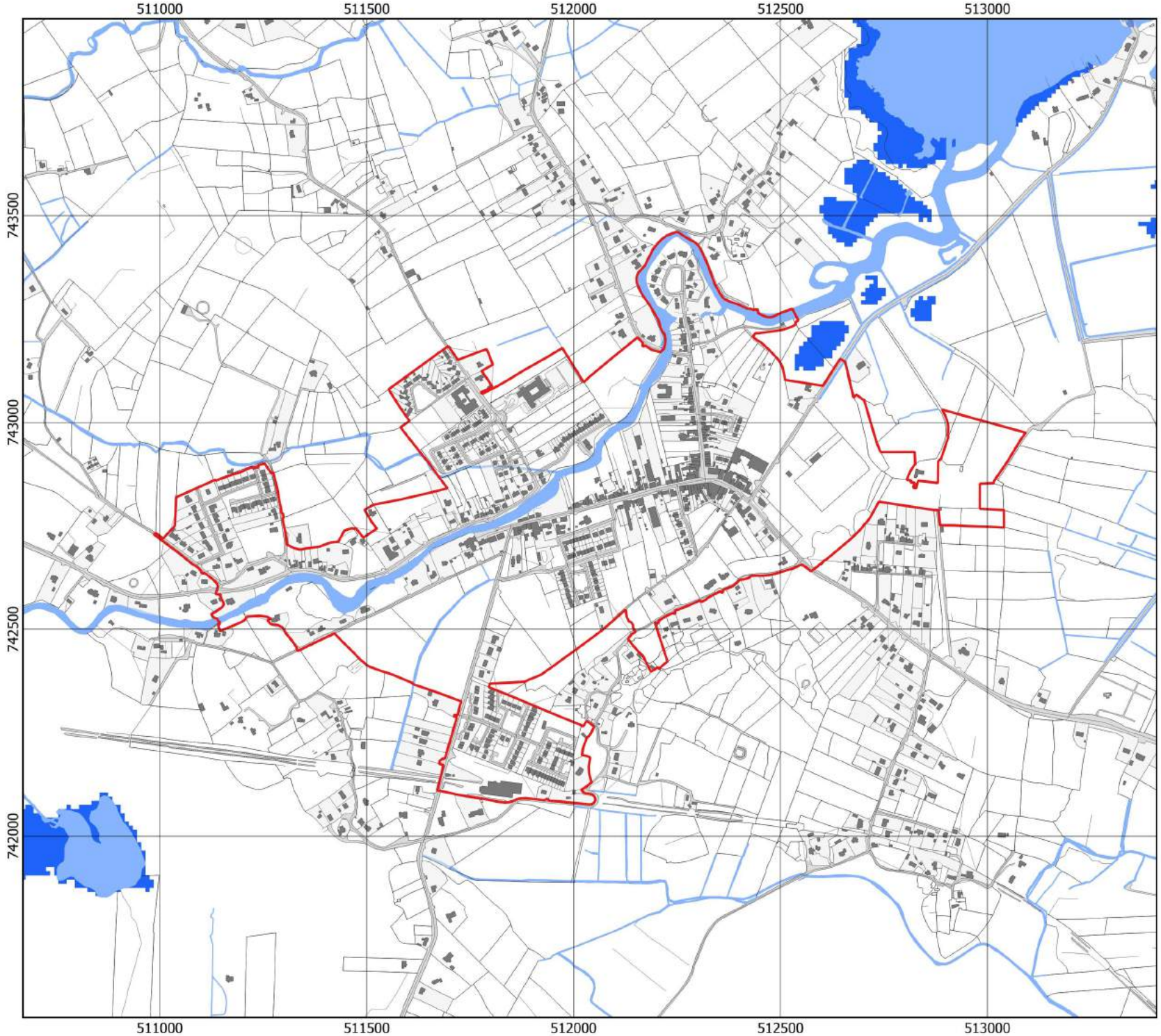
- Administrative Area
- Settlement Boundary
- River or Stream
- Water

CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

CAAS

Comhairle Chontae na Gaillimhe
Galway County Council



Galway CDP 2022-2028
SFRA

Oughterard
GSI Historical Flood Data and Groundwater Predictive Modeling

- Administrative Area
- Settlement Boundary
- River or Stream
- Water

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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Galway County Council

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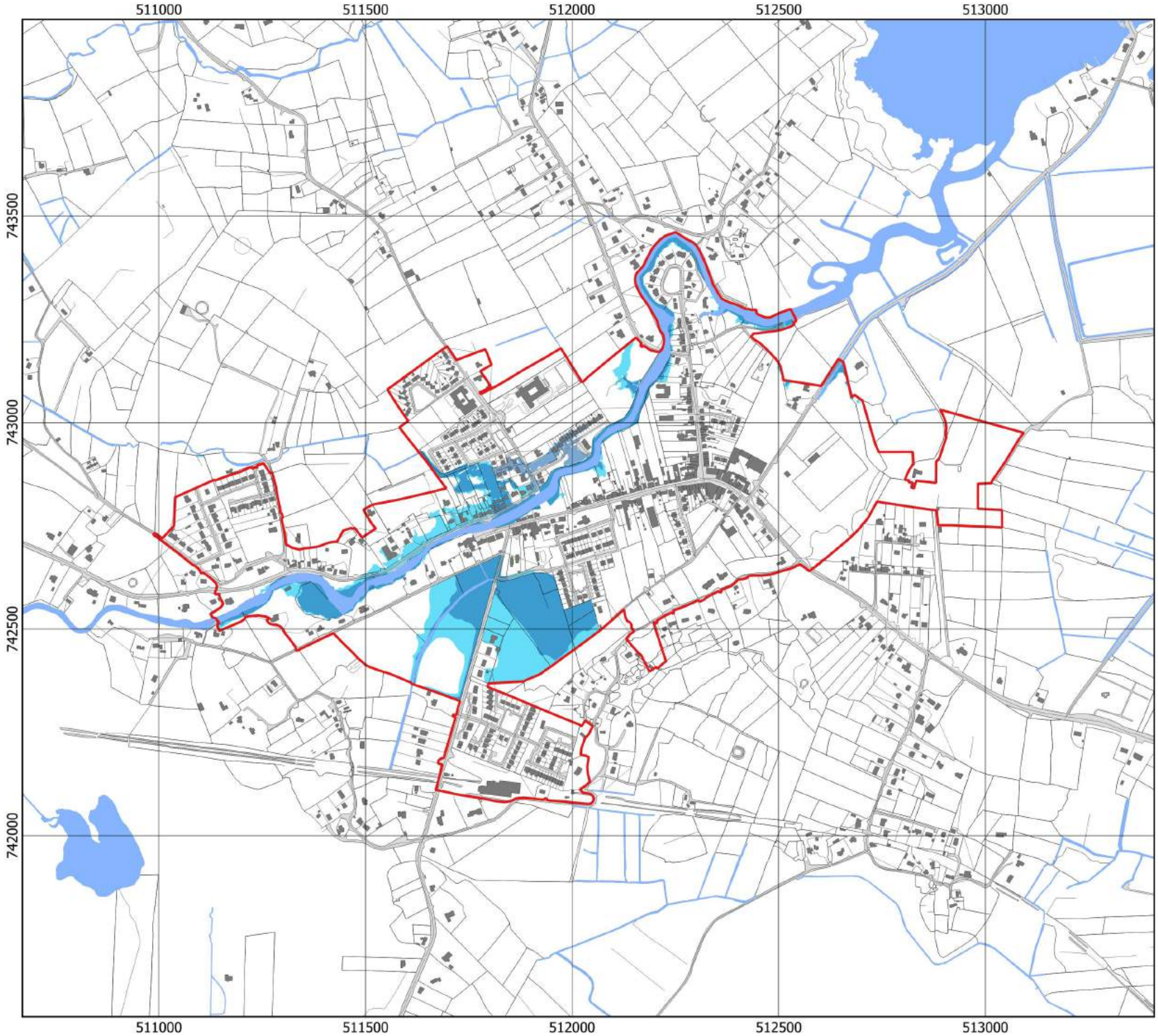

Galway CDP 2022-2028 SFRA

Oughterard Flood Zones

Administrative Area

Settlement Boundary

Water

Rivers & Streams

River or Stream

Indicative Flood Zones

Flood Zone A

Flood Zone B

Other Zones

Possible Turlough

Wet lands, not easily drained

CAAS

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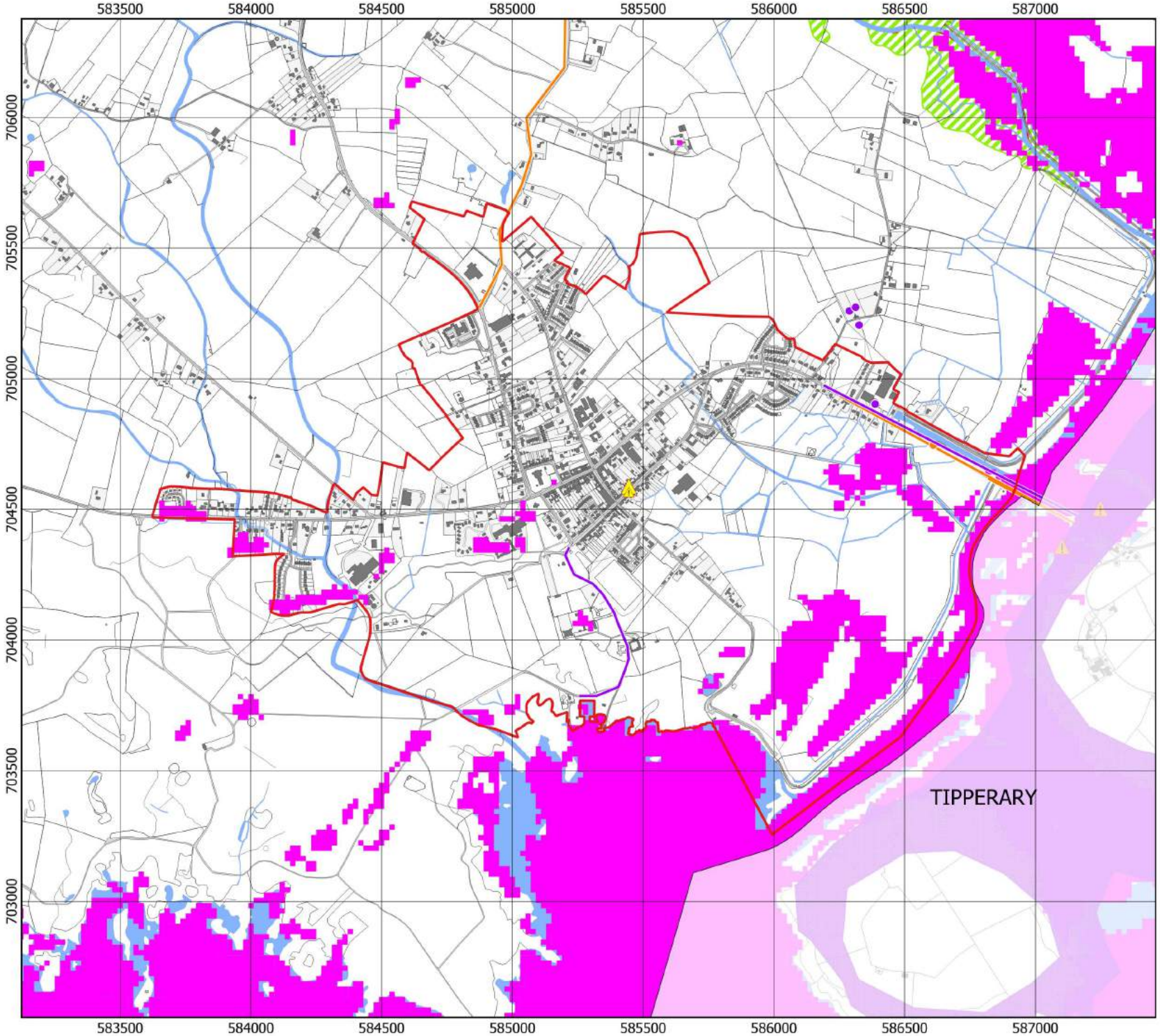

Galway CDP 2022-2028 SFRA

Portumna OPW & GCC Historical Indicators

- Administrative Area
- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

Past Flood Event

- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Galway County Concil Historical Flood Data

- Flood Points 2009
- Road Closures 2009
- Flooded Houses Dec 2015
- Flooded Roads Dec 2015
- GCC Floods 09 Combined Sources

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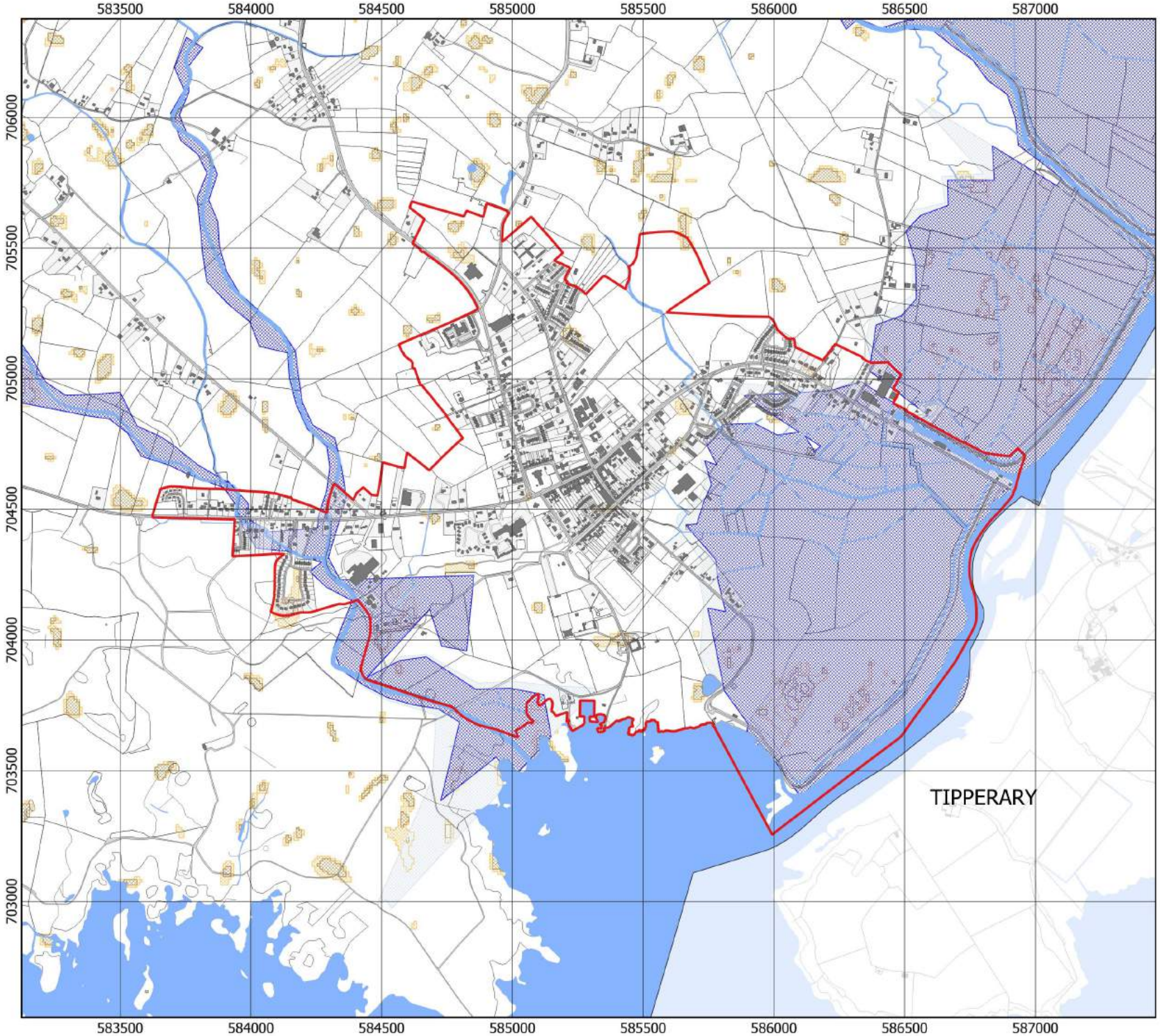

Galway CDP 2022-2028
SFRA

Portumna
OPW & GCC Historical Indicators

- Administrative Area
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PFRA Fluvial

- PFRA Fluvial 1% AEP
- PFRA Fluvial 0.1% AEP

PFRA Pluvial

- PFRA Pluvial 1% AEP
- PFRA Pluvial 0.1% AEP

PFRA Coastal

- PFRA ICPSS Coastal 0.5% AEP
- PFRA ICPSS Coastal 0.1% AEP

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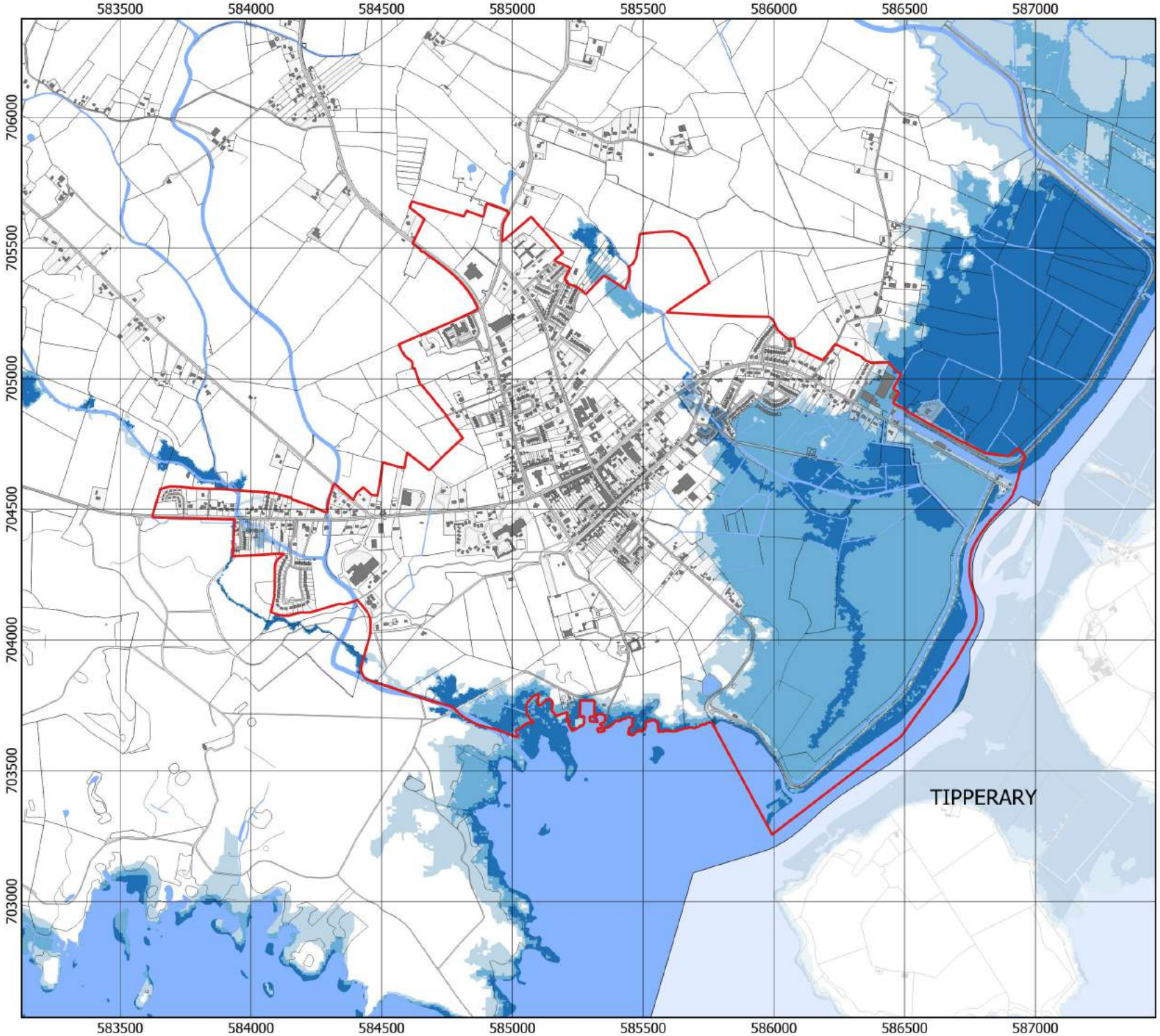

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Portumna
OPW CFRAM Present Day

- Administrative Area
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CFRAM Fluvial and/or Coastal Present Day Scenario

- 10% AEP Fluvial Extent
- 1% AEP Fluvial Extent
- 0.1% AEP Fluvial Extent

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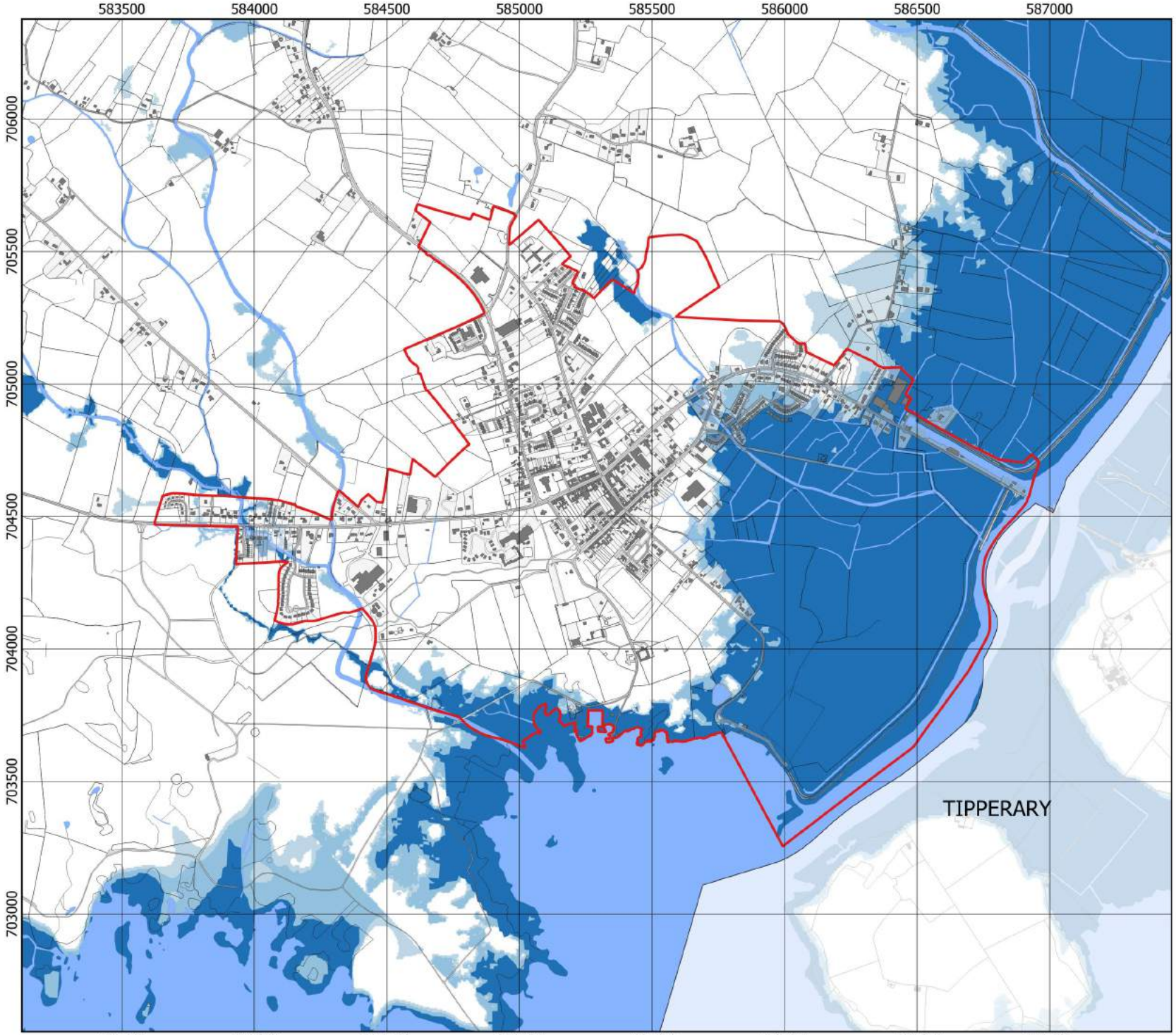

Galway CDP 2022-2028
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Portumna
OPW CFRAM All Scenarios

- Administrative Area
- Settlement Boundary
- River or Stream
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CFRAM Fluvial and/or Coastal All Scenarios

- Present Day 0.1% AEP
- Mid-Range 0.1% AEP
- High-End 0.1% AEP

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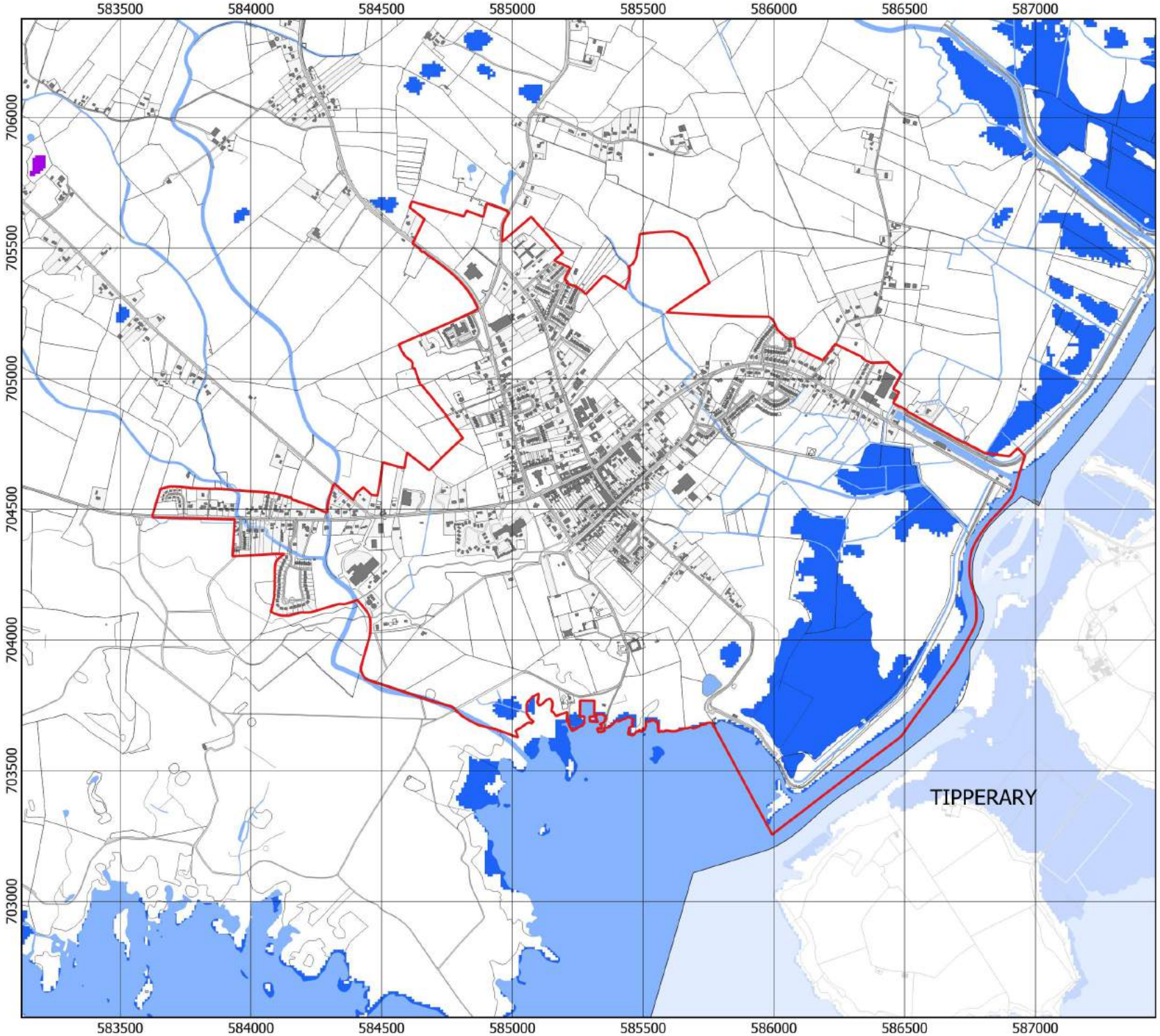

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Portumna
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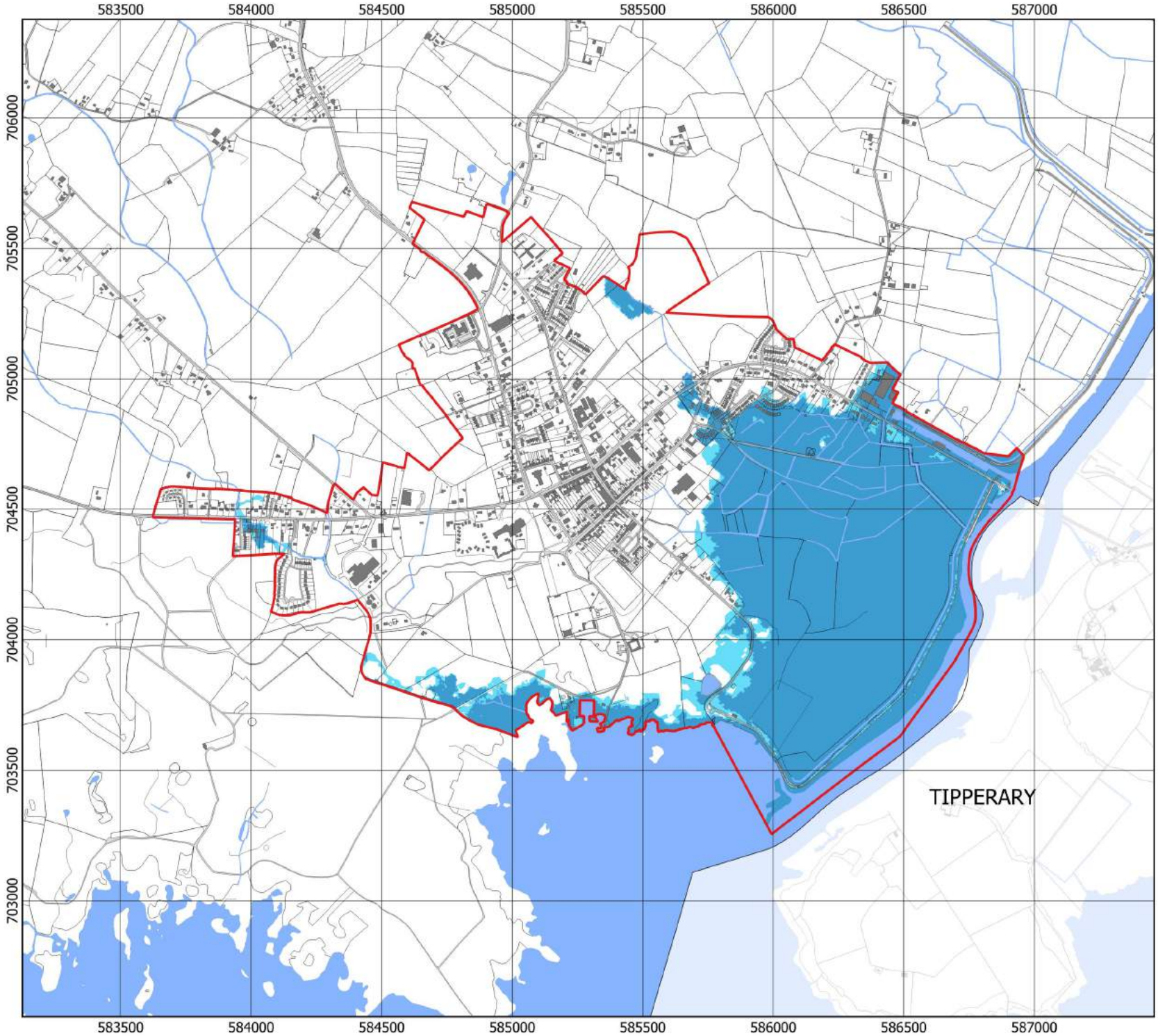

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Portumna
Flood Zones

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Settlement Boundary

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