



GRANDISON BROOK FLOOD ALLEVIATION SCHEME

Notice

This document and its contents have been prepared and are intended solely as information for Neath Port Talbot Council and use in relation to the Grandison Brook Flood Alleviation Scheme.

AtkinsRéalis UK Limited assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

This document has 43 pages including the cover.

Document history

Document title: Flood Consequences Assessment

Document reference: NE05_001-ATK-GEN-SWMWREC-RP-LW-000004

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	Issue for Pre Planning Consultation	JB	DMH	DW	RM	April 2025
1.1	Update to meet new TAN 15 guidelines	GG	RM	DW	RM	April 2026

Client signoff

Client	Neath Port Talbot Council
Project	GRANDISON BROOK FLOOD ALLEVIATION SCHEME
Job number	5192793
Client signature/date	



Contents

1.	Introduction.....	5
1.1	Background	5
1.2	Scheme Location	5
1.2.1	Grandison Brook	8
1.3	Proposed Works.....	8
1.4	Objectives of the FCA	10
2.	Planning Policy Guidance - Flooding.....	11
2.1	Background	11
2.2	TAN15 (2025).....	12
2.3	Vulnerability of Development and Acceptability of Flood Consequences.....	12
2.4	Future Wales.....	13
3.	Existing Flood Information	14
3.1	Fluvial Flood Risk.....	14
3.2	Surface Water and Small Watercourses Flood Risk.....	15
3.3	Tidal Flood Risk	16
4.	Flood Risk Assessment.....	17
4.1	Assessment of Fluvial Flood Risk	17
4.1.1	Existing Information.....	17
4.1.2	Flood Events and Boundaries Tested.....	17
4.1.3	Hydraulic Modelling.....	17
4.1.4	Hydrology	19
5.	Model Results and Flood Consequences	20
5.1	Fluvial Flood Risk.....	20
5.2	With-Scheme Model Results and Flood Consequences.	36
5.3	Acceptability of Consequences.....	37
6.	Conclusions	39
Appendix A.	Proposed Scheme Overview	41
Appendix B.	Hydrology Calculation Record.....	42

Figures

Figure 1-1 - Scheme Location Plan	6
Figure 1-2 - Proposed Site Location.....	7
Figure 3-1 – Fluvial Flood Map for Planning for Briton Ferry	14
Figure 3-2 – Surface Water and Small Watercourses Flood Map for Planning for Briton Ferry	15



Figure 3-3 – Tidal Flood Map for Planning for Briton Ferry	16
Figure 4-1 - Extent of hydraulic model.....	18
Figure 5-1 - 1% AEP flood extents – Baseline Scenario	21
Figure 5-2 - 1% AEP flood extents - Proposed Scenario	22
Figure 5-3 - Comparison of 1% AEP flood levels - Baseline and Proposed Scenarios	23
Figure 5-4 - 1% climate change AEP extents - Baseline Scenario	25
Figure 5-5 - 1% climate change AEP extents - Proposed Scenario	26
Figure 5-6 - Comparison of 1% AEP + CC Flood Levels - Baseline and Proposed scenarios	27
Figure 5-7 - 0.1% AEP flood extents - Baseline Scenario	29
Figure 5-8 - 0.1% AEP flood extents - Proposed Scenario	30
Figure 5-9 - Comparison of 0.1% AEP flood levels - Baseline and Proposed Scenarios	31
Figure 5-10 – 0.1% climate change AEP extents - Baseline Scenario	33
Figure 5-11 - 0.1% climate change AEP extents - Proposed Scenario	34
Figure 5-12 - Comparison of 0.1% AEP + CC Flood Levels - Baseline and Proposed scenarios	35

1. Introduction

1.1 Background

AtkinsRéalis has been commissioned by Neath Port Talbot Council (NPTC) to undertake the detailed design for a proposed flood alleviation scheme to address flooding from the Grandison Brook within a residential area of Briton Ferry. This project is referred to as the Grandison Brook Flood Alleviation Scheme (hereafter 'the Scheme').

This Flood Consequences Assessment (FCA) has been prepared in accordance with Technical Advice Note (TAN) 15: Development, Flooding and Coastal Erosion, 2025. The FCA assesses the existing flood risk within the Pantyrheol, Cwrt Sart and Ynysmaerdy areas of Briton Ferry and considers the likely flood consequences with and without the proposed development, in order to demonstrate compliance with Welsh planning policy.

The objective of the proposed scheme is to reduce the risk and consequences of flooding to residential and commercial properties within the catchment by addressing known capacity constraints within the Grandison Brook drainage system. The scheme has been designed to improve system performance during severe rainfall events and to provide mitigation of flooding impacts up to the 1 in 100-year (1% Annual Exceedance Probability) event, in line with TAN 15 objectives.

Flooding in the area has occurred repeatedly over many years and is primarily caused by the under-capacity of the culverted Grandison Brook system. During higher magnitude rainfall events, the culvert surcharges at the inlet near Ynysmaerdy Road and at several downstream locations, forcing flows onto the surface. These flows then follow overland flow paths downslope towards Pantyrheol, where water accumulates on the A474 due to surcharged conditions preventing effective surface water drainage, leading to flooding of adjacent properties.

The proposed scheme comprises targeted improvements to the Grandison Brook system, including modifications to the existing culvert inlet, the provision of an additional storm drainage culvert to increase conveyance capacity, downstream box culvert upgrades, and a buried attenuation tank within Jersey Park to manage peak flows. Together, these measures form an integrated flood alleviation scheme aimed at significantly reducing flood risk to the surrounding community.

1.2 Scheme Location

The Scheme is located entirely within the administrative boundary of NPTC. As shown in Figure 1-1, it is situated within the residential area of Briton Ferry, in Neath Port Talbot, which is approximately 8km northeast of Swansea and 3km south from Neath town. Briton Ferry is centred around the A474 (Pantyrheol and Cwrt Sart) which acts as the district centre. The area is located east of the River Neath, which flows in a north-east to south-west direction.

As presented in Figure 1-2 the Scheme site area contains a large cemetery at Ynysmaerdy Road, the primary school Ysgol Carreg Hir and several recreational facilities including a park, a bowling green, and the local rugby, cricket and football clubs, along with associated pitches and allotments. The site also contains an area of undeveloped land at Penrhiwtyn, formerly a railway yard and now classified as scrub land. In addition, the Scheme encompasses key transport infrastructure including the A474, as well as the South Wales Main Line and adjacent freight railway routes. The south-east extent of the Scheme lies at an elevation of approximately 64m AOD, falling gradually to around 6m AOD towards the north-west.

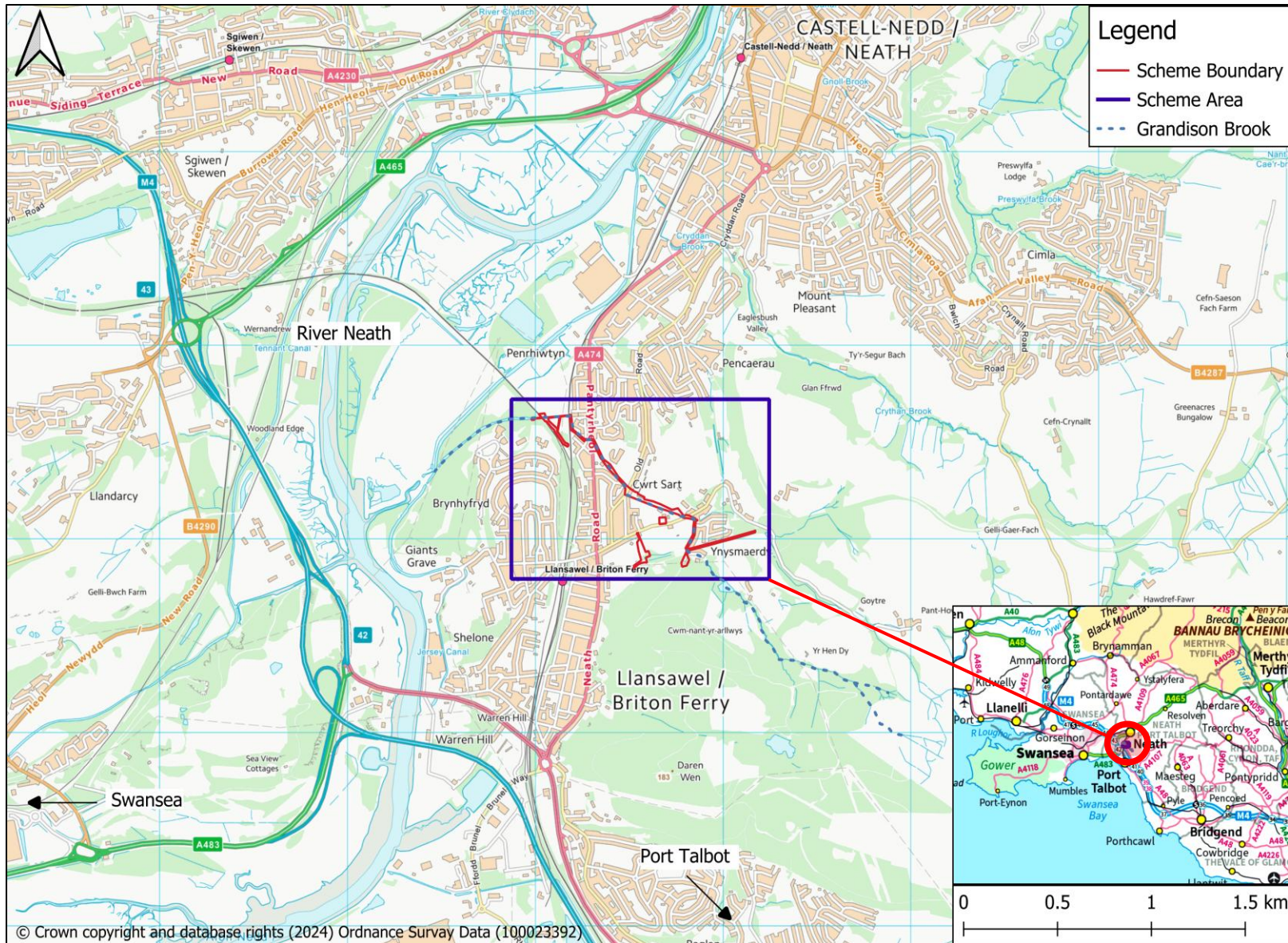


Figure 1-1 - Scheme Location Plan



1.2.1 Grandison Brook

The watercourse of interest is the Grandison Brook which flows from its source at SS 75947 93993 down a steep valley side where it passes through semi-natural woodland to the south of Ynysymaerdy Road. The watercourse is conveyed in an open channel before entering a culvert system at the upstream culvert inlet presented in Figure 1-2.

The culvert has multiple diameter changes, ranging between 1.8m under the mainline railway at the scheme north-western extent and 375mm in diameter under the road at Ynysymaerdy at the schemes south-eastern extent. The existing culvert passes under the Ynysymaerdy Road, sports and recreational grounds, Old Road, Ysgol Carreg Hir school grounds, the A474 before returning to an open channel between residential properties at the downstream culvert outlet (see Figure 1-2).

The open channel section of the brook passes under two railway embankments through existing tunnel structures, and eventually it discharges to the River Neath approximately 1.1km further downstream. The scheme therefore covers an approximate length of 1.5km of the watercourse.

1.3 Proposed Works

The objective of the Scheme is to reduce flooding to properties affected by Grandison Brook in Briton Ferry. The proposed works are focused on increasing conveyance capacity while maintaining appropriate local drainage connections.

The primary element of the works is the construction of a new culvert with a minimum internal diameter of 1200 mm, installed alongside the existing culvert between Ynysymaerdy Road and the A474 Pantyrheol Road. At the A474, the new culvert will converge with the existing culvert beneath the carriageway.

Downstream of the A474, the new culvert will continue beneath the railway infrastructure and will outfall downstream of the easternmost railway tunnel at Penrhiwtyn, discharging into an existing open channel that flows through land at Penrhiwtyn before continuing towards the existing rail culvert beneath the South Wales freight line. A short length of open channel will be retained adjacent to Brook Court to accommodate local surface water connections and maintain local drainage functionality.

To address potential increases in water levels arising from the increased upstream flow capacity, a new flood defence bund will be constructed to mitigate flood risk to the adjacent railway infrastructure.

An overview of the proposed development is shown in Appendix A on the following drawings:

- NE05_001-ATK-GEN-SWMWREC-DR-CD-000001 and
- NE05_001-ATK-GEN-SWMWREC-DR-CD-000002

In detail, the Scheme comprises the following elements, starting at the upstream end of the scheme and progressing downstream:

- Localised raising of the existing bank along the Rhodfa Clarke walk (the 'Incline') adding additional 0.5m of embankment in selected locations. An additional bund will be constructed to offer mitigation for additional conveyance to the four properties south of the Incline (Ger y Nant, Parkways, Incline Cottage and Mill Stream) which are located towards the upper end of Ynysymaerdy Road.

- Construction of a buried attenuation tank below the play area within Jersey Park including a new inlet structure, pipe inlet and a new section of ditch to intercept overland flows.
- Excavation and removal of the existing culvert between the inlet at Ynysymaerdy Road and the playing fields, with replacement by an upsized 1200 mm square box culvert to increase conveyance capacity.
- Refurbishment of the existing inlet structure of Ynysymaerdy Brook on Ynysymaerdy Road with renewal of an existing galvanised steel trash and security screen contained within a concrete structure.
- Installation of a new 1200mm diameter culvert across the playing fields, and through allotments behind the Llansawel AFC grounds to Old Road and then continuing through the school grounds towards the A474 Pantyrheol Road.
- Repairs will be undertaken to the existing culvert sections between the A474 and Ynysymaerdy Road, including localised relining where required. Existing manholes will be upgraded with pressure-rated covers and concrete jacket surrounds to provide resilience against surcharge pressures. Manholes associated with the new culvert will be constructed to the same pressure-resisting specification.
- At the A474 Pantyrheol Road the proposed culvert will transition from the 1200mm diameter pipe to twin 1250 x 750mm culverts. The culvert route will continue from Pantyrheol, through the existing gap between no. 165 and 167 Pantyrheol Road.
- A further change of pipe size to a new 1750 x 1000mm box culvert will be constructed following the alignment of the existing brook between Brook Court and Farm Road. Part of the existing section of open channel which runs along the railway embankment will become culverted and part retained as watercourse.
- Land to the north of Farm Road (above the 1750 x 1000 box culvert) will be raised slightly over the route of the proposed culvert to ensure that the culvert is fully below ground surface. Due to this raising of land, gabion baskets will be required to support the earthworks alongside the existing watercourse, part of which will be retained.
- A concrete chamber will be constructed where the new box culvert connects to the existing masonry arch railway tunnel/culvert. The culvert will outfall to the existing ditch and flow towards the freight railway line further to the west.
- Lining of the masonry culvert section under the mainline railway line will be carried out to ensure it is watertight.
- A new flood defence bund with a crest level at 6.5m AOD immediately east of the freight railway line at Penrhiwtyn, centred at grid reference 274121, 195539. This will be constructed to protect the rail line from increased flood levels during extreme storm events. As part of the proposed flood defence at this location, a 27m long section of concrete retaining wall approximately 800mm higher than the railway embankment will be constructed above an existing culvert headwall.
- These works will also include removal of silt and weeds from the existing ditch between the mainline and freight line railways, as well as localised removal of overgrowth from small trees and scrub for the works locations.



- Flap valves will be installed on surface water connections to prevent any water surcharging out from the culvert during periods of flooding.

1.4 Objectives of the FCA

The objectives of this assessment are to:

- Set out the relevant planning policy context in terms of flood risk.
- Define the baseline flood outlines and overland flow paths in the area of the proposed Scheme and the surrounding locality.
- Specifically assess the with-scheme risk and compare this with the baseline flood extents.
- Define the flood consequences for the Scheme.
- Identify the flood risk to the proposed Scheme itself and the consequences of the proposed Scheme on the existing flood risk in the locality.
- Highlight any measures required to mitigate potentially adverse impacts on the existing baseline flood risk which would otherwise arise from the Scheme.

2. Planning Policy Guidance - Flooding

2.1 Background

The Scheme has been made possible by the funding made available by the National Strategy on Flood and Coastal Erosion Risk Management (FCERM) for Wales initiative which sets out to reduce the risk of flooding to homes and businesses providing benefits are demonstrated in line with the Welsh Government's FCERM Business Case Guidance.

TAN15¹ (2025) seeks to provide technical guidance to the Local Planning Authority relating to national policy on development and flood risk. The document provides guidance on the assessment of the consequences of flooding to a number of development categories. These include highly vulnerable development (hospitals, schools, police station, fire station, residential premises, hotels, caravan parks etc), less vulnerable development (industrial, commercial and retail sites) and water compatible development (flood defences, boatyards and marinas).

The Scheme at Briton Ferry falls within the latter category, as it involves enhancement to existing drainage infrastructure to increase its capacity to manage and mitigate flood risk. Therefore, the Scheme can be classified as Water Compatible Development under TAN15. By its nature, the Scheme must be located within areas at risk of flooding in order to deliver its intended function of protecting existing development and infrastructure. The Scheme has been subject to a rigorous project justification process in which the economic benefits of the Scheme are compared against the economic losses resulting from flooding. It has also been subject to an Ecological Impact Assessment (EclA) to identify potential impacts which the Scheme proposal has on habitats, species and ecosystems.

The consequences of the Scheme to the town of Briton Ferry are set out below:

- The Scheme significantly reduces the flood risk to the area. Modelling work carried out demonstrates that properties which currently flood significantly in a 50% (1 in 2) AEP event will benefit from protection up to and including a 1% (1 in 100) AEP including an allowance for climate change.
- It will reduce the extent of flooding, which will reduce the risk to life to people who live within the town.
- The Scheme does not result in any detriment to third party properties.

The Scheme has been designed with regard to potential effects on the local community and local environment, with the aim of avoiding or mitigating adverse impacts. It follows the underlying principles of TAN15:

- Uses government resources to reduce flood risk to existing communities.
- Manages the consequences of flooding.
- Makes provision for the increase in flood risk predicted to arise as a result of climate change.

¹ [Technical advice note \(TAN\) 15: development, flooding and coastal erosion | GOV.WALES](#)
[accessed March 2026]

Without the Scheme, the area will suffer an increase in the frequency and extent of flooding. This report will demonstrate that there will be significant improvement to flood risk if the proposed scheme is constructed with a potential 292 residential and commercial properties benefitting as a result of the proposals during a 1% AEP flood event.

2.2 TAN15 (2025)

TAN15 establishes a plan-led, consequences-based approach to managing flood risk in the planning system. It directs new development away from areas at high risk of flooding unless such development is allocated in the Local Development Plan (LDP) and meets the acceptability criteria set out in Section 11 of the TAN. These criteria include defined flood frequency thresholds and tolerable conditions that must be satisfied to support a positive planning decision, based on the development's vulnerability classification and strategic importance.

In accordance with TAN15, this FCA has been prepared to assess the flood risk associated with the Scheme. The FCA evaluates whether the risks to and from flooding can be managed to an acceptable level, considering the nature of the Scheme, its location within the flood zones identified by the Flood Map for Planning (FMfP), and its potential impacts on surrounding land and existing infrastructure. The assessment follows the requirements listed in Section 11 of TAN15, which sets out the technical standards and evidence needed to demonstrate compliance with the policy; i.e. the acceptability of flood consequences. This FCA is based on the most up-to-date flood risk information available through the Natural Resources Wales (NRW) Flood Map for Planning (FMfP). The FMfP provides a comprehensive and spatially detailed representation of flood risk from fluvial, tidal, surface water and small watercourse sources, and incorporates future climate change (100-year) projections. As such, it forms the key evidence base for this assessment and ensures that the Scheme proposal is evaluated against the most current and robust data available. Detailed flood modelling has been carried out to assess the baseline flood risk and to inform the design of the Scheme. This detailed modelling has also been used to demonstrate the effects of the Scheme on the existing flood risk in the area.

TAN15 states that the prime objective of a FCA is to develop a full appreciation of:

- The risk and consequences of flooding on the development; and
- The risk and consequences (i.e. the overall impacts) of the development on flood risk elsewhere.

The FCA addresses these aspects in detail in the sections below.

2.3 Vulnerability of Development and Acceptability of Flood Consequences

TAN15 requires all development to be classified according to its vulnerability to flooding, ranging from Highly Vulnerable to Water-Compatible, with this classification informing the suitability of development within areas at risk of flooding.

Section 11 sets out the criteria for the acceptability of flood consequences, requiring that development proposals demonstrate through a Flood Consequences Assessment (FCA) that the consequences of flooding can be safely managed to an acceptable level, including its effects on flood risk elsewhere. This includes ensuring safe access and egress, no increased risk to third parties, and resilience to climate change over the lifetime of the development.

2.4 Future Wales

The Future Wales plan² sets out the strategic national development plan for Wales. It identifies key national and regional growth areas and provides national planning considerations for flood risk, climate change adaptation and resilience. The plan establishes that the Welsh Government will prioritise nature-based solutions and the enhancement of flood defences to improve protection for developed areas.

Due to Wales' geography and industrial history, many large urban communities are located within areas at risk of flooding. Several of these communities are located within National or Regional Growth Areas within Future Wales. Communities in these areas should remain viable, vibrant, and resilient to flooding.

Future Wales includes a policy commitment that the Welsh Government will support flood risk management initiatives in National and Regional Growth Areas. The area of Briton Ferry is identified as being within the Swansea Bay National Growth Area as identified in Future Wales.

² [Update to Future Wales - The National Plan 2040](#) [accessed March 2026]

3. Existing Flood Information

3.1 Fluvial Flood Risk

The NRW fluvial FMfP³ (see Figure 3-1 below) indicates that the fluvial risks to Briton Ferry are predominantly associated with the River Neath (to the north) and the Cryddan Brook (to the east). It should be noted though that not all ordinary watercourses are included in the NRW mapping, therefore, not all potential fluvial flood sources are represented in the figure below. The NRW FMfP indicates that areas of Briton Ferry have more than a 1% (1 in 100) chance of flooding from rivers in a given year, including the effects of climate change over the next century.

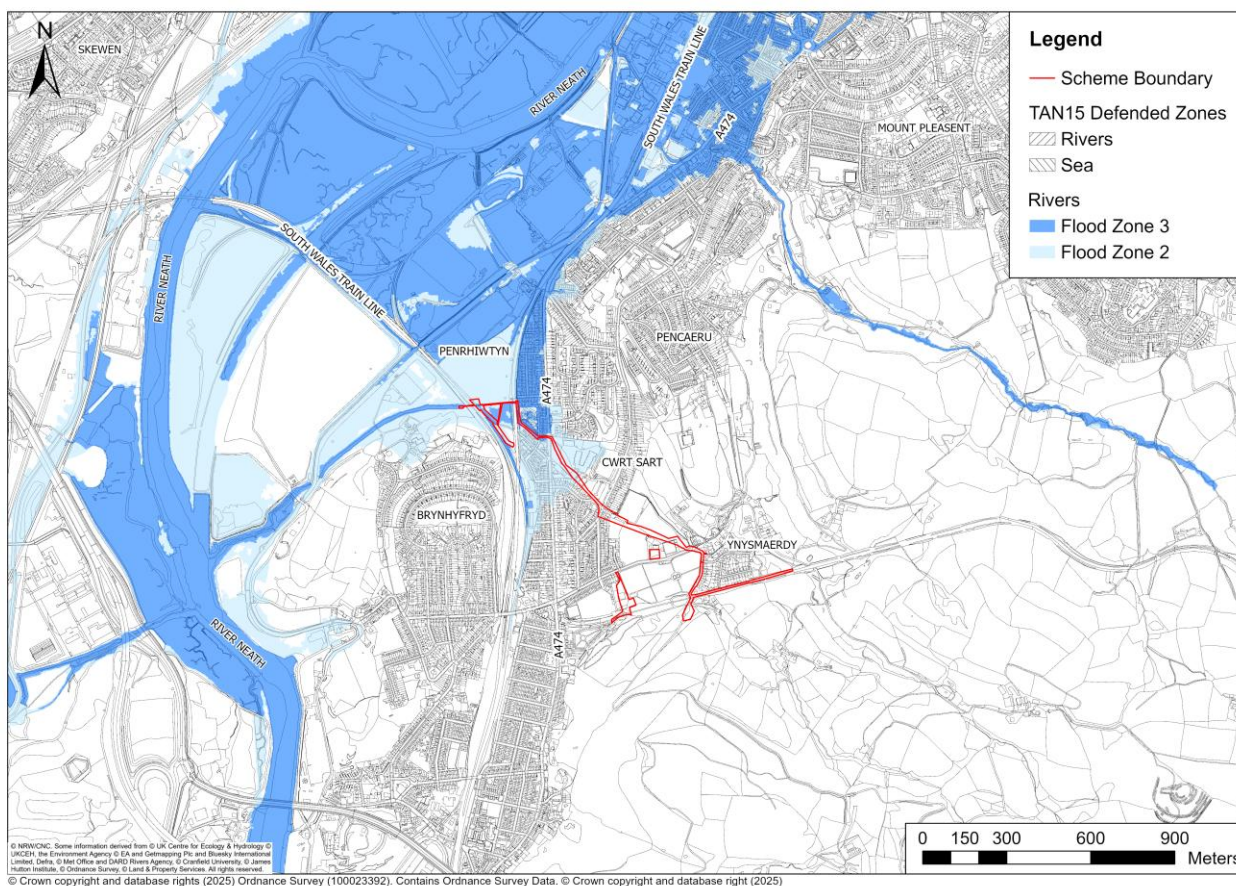


Figure 3-1 – Fluvial Flood Map for Planning for Briton Ferry

³ <https://naturalresources.wales/flooding/flood-map-for-planning> [accessed March 2026]

3.2 Surface Water and Small Watercourses Flood Risk

The NRW FMfP (see Figure 3-2 below) indicates that Briton Ferry is within an area with more than a 1% (1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change. The Grandison Brook is a source of flooding to a large area of Briton Ferry.

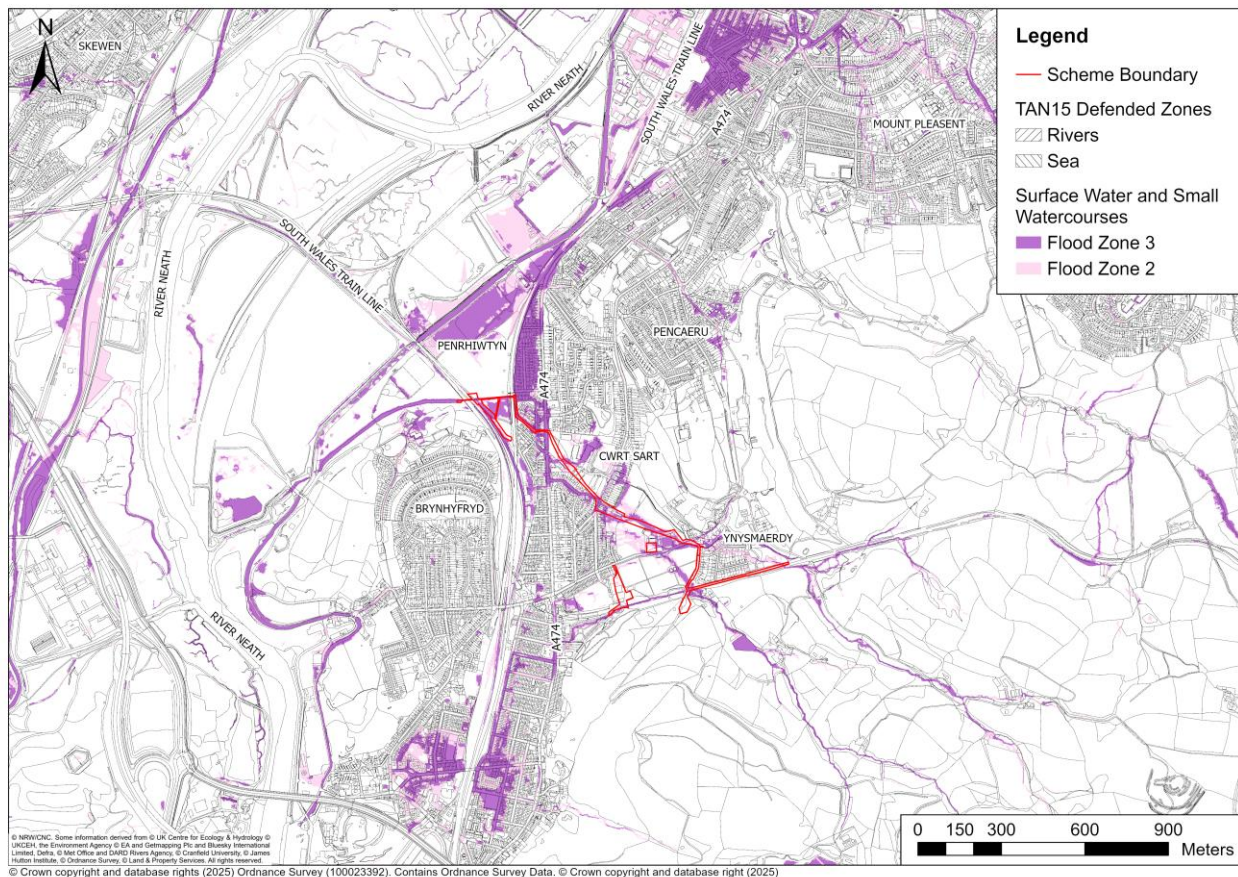


Figure 3-2 – Surface Water and Small Watercourses Flood Map for Planning for Briton Ferry

3.3 Tidal Flood Risk

The NRW FMfP (see Figure 3-3 below) indicates that Briton Ferry lies in an area with a chance of flooding from the sea greater than a 0.5% (1 in 200) in a given year, including the effects of climate change. This tidal risk is from the Neath estuary which is predicted to overtop the South Wales Mainline railway and inundate the low-lying areas of Briton Ferry.

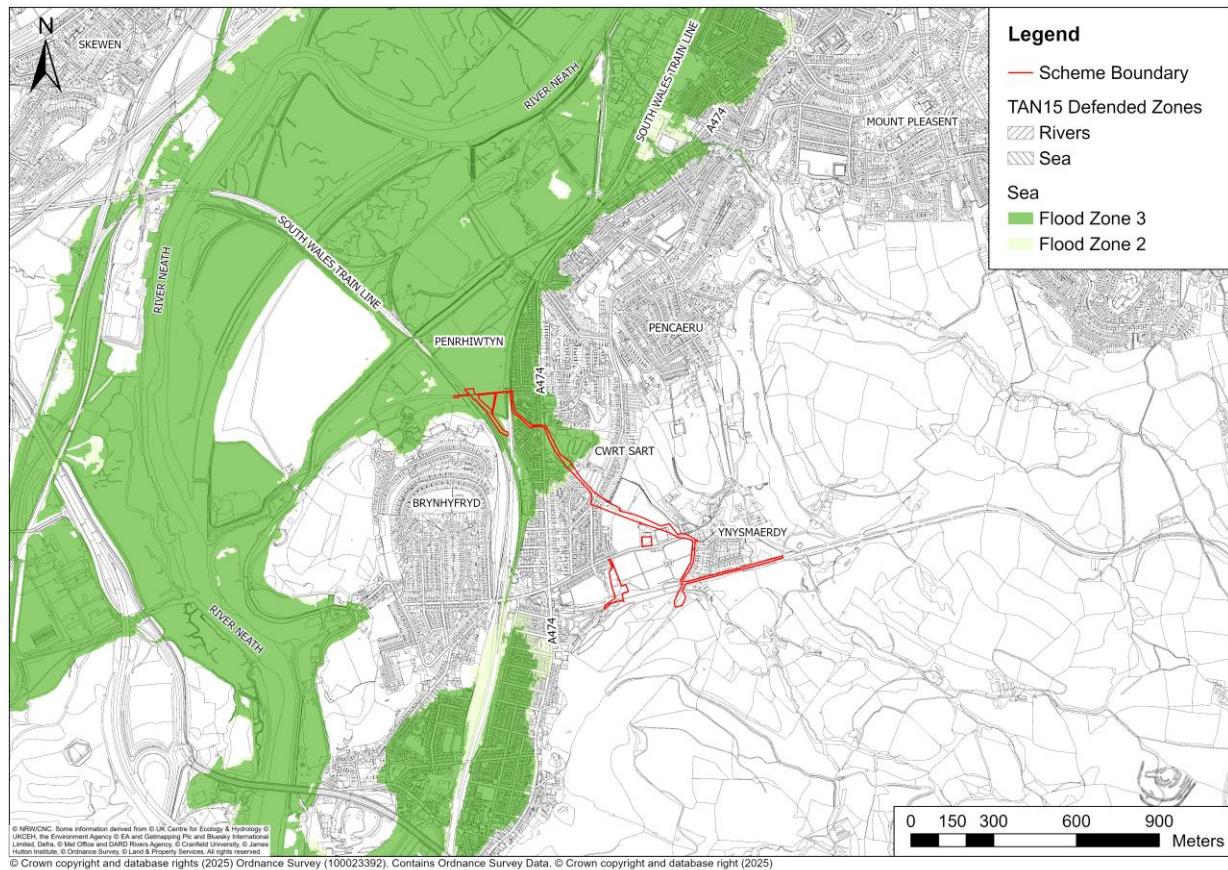


Figure 3-3 – Tidal Flood Map for Planning for Briton Ferry

4. Flood Risk Assessment

4.1 Assessment of Fluvial Flood Risk

Fluvial modelling has been undertaken to assess the baseline flood risk impact and then to implement the Scheme proposals so that the impacts of the proposed Scheme could be fully understood.

4.1.1 Existing Information

The following hydraulic models were available to inform the study:

1. JBA TUFLOW model of the **Grandison Brook**. The model extends from where the Grandison Brook outfalls to the Neath estuary to upstream of Ynysmaerdy.
2. WSP TUFLOW model of the **Cryddan Brook**.

The JBA model has been used to inform the study, with boundary conditions extracted from the WSP model. The latter model represents overland flow paths originating from the Cryddan Brook that contribute to flooding in the lower reaches of the Grandison Brook catchment.

The **Grandison Brook** model has been updated by AtkinsRéalis with additional topographic and drainage surveys at key locations.

Boundary conditions for the hydraulic model have been updated with the fluvial boundaries based on the peak flows included in the hydrological calculation record provided in Appendix B. The revised model was utilised to redefine the baseline risks. The model was then further updated to represent the proposed flood alleviation proposals to quantify the flood risk impacts of the Scheme.

4.1.2 Flood Events and Boundaries Tested

The following annual exceedance probabilities (AEP) have been tested in the model to inform the FCA:

- 1% AEP
- 1% AEP plus 30% climate change⁴
- 0.1% AEP
- 0.1% AEP plus 30% climate change

4.1.3 Hydraulic Modelling

The extent of the hydraulic model is shown in Figure 4-1 below:

⁴ 30% increase on peak flows is the central estimate or change factor for the Western Wales River Basin District, as defined in Welsh Government advice on Climate Change Allowances for Planning (CL-03-16).

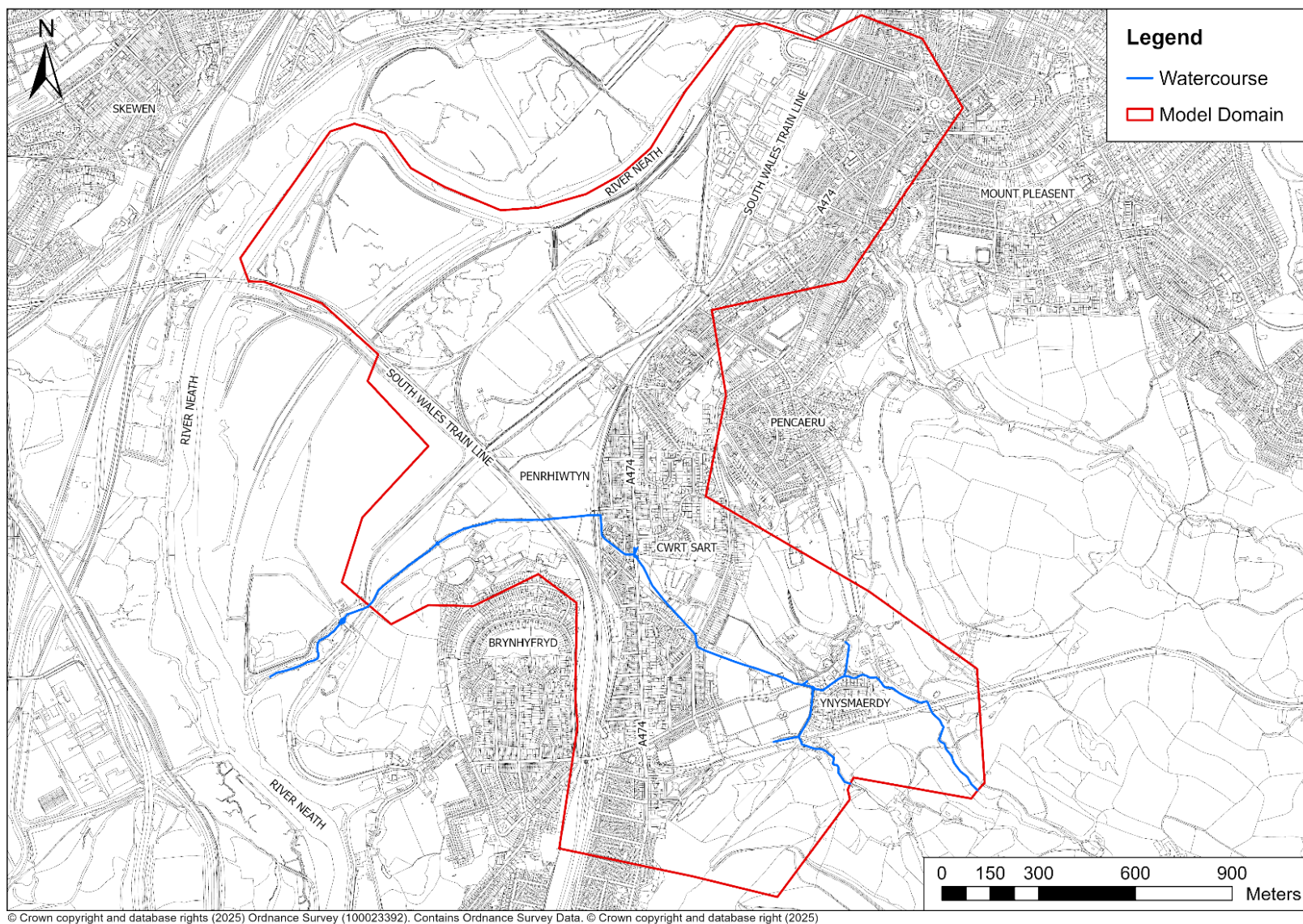


Figure 4-1 - Extent of hydraulic model

4.1.4 Hydrology

The hydrological inputs included in the existing hydraulic model were reviewed in order to ascertain if the estimates needed to be updated. The guidance⁵ for undertaking hydrological assessments in Wales has been updated since the original model was developed by JBA. A copy of the hydrological calculation record is provided in Appendix B.

⁵ NRW, GN 008 Flood estimation technical guidance v4

5. Model Results and Flood Consequences

5.1 Fluvial Flood Risk

As described in 4.1.2 the model was run to test flood events for the:

- (i) Baseline (pre-scheme) scenario and the
- (ii) Proposed case with the flood alleviation Scheme in place.

The results of the modelling for these two scenarios are described below for the four flood events tested. The consequences of the Scheme are then described in Section 5.2.

1% (1 in 100) AEP flood event

The figures below compare the flood extents for the two scenarios which evidently shows that during a 1% (1 in 100) AEP event, there is a significant improvement as a result of the Scheme. Flows are contained and directed into the culverted system at Ynysmaerdy Road resulting in a significant reduction in the proposed flood extent during the 1% (1 in 100) AEP event.

The flooding that remains in the area around Pantyrheol immediately east of the South Wales Mainline in the proposed case originates from overland flow paths from the adjacent Cryddan Brook catchment (to the north). We understand a separate study into the risks associated with the flooding from the Cryddan Brook and to assess the business case to address these risks has been commissioned by NPTC; which may lead to a separate scheme to deal with this source of flooding.

A plot of the difference in the flood levels as a result of the proposed Scheme compared to the baseline is presented in Figure 5-3 below. The results show that during a 1% AEP event, there is no negative impact/detriment to third party properties as a result of the proposed works. However, there are three areas (area between railway lines at Penrhiwtyn, along Ynysmaerdy Road and at the Incline where there is an increase in flood levels as a result of the proposals. No properties are adversely affected in these areas. This is discussed further in Section 5.2.

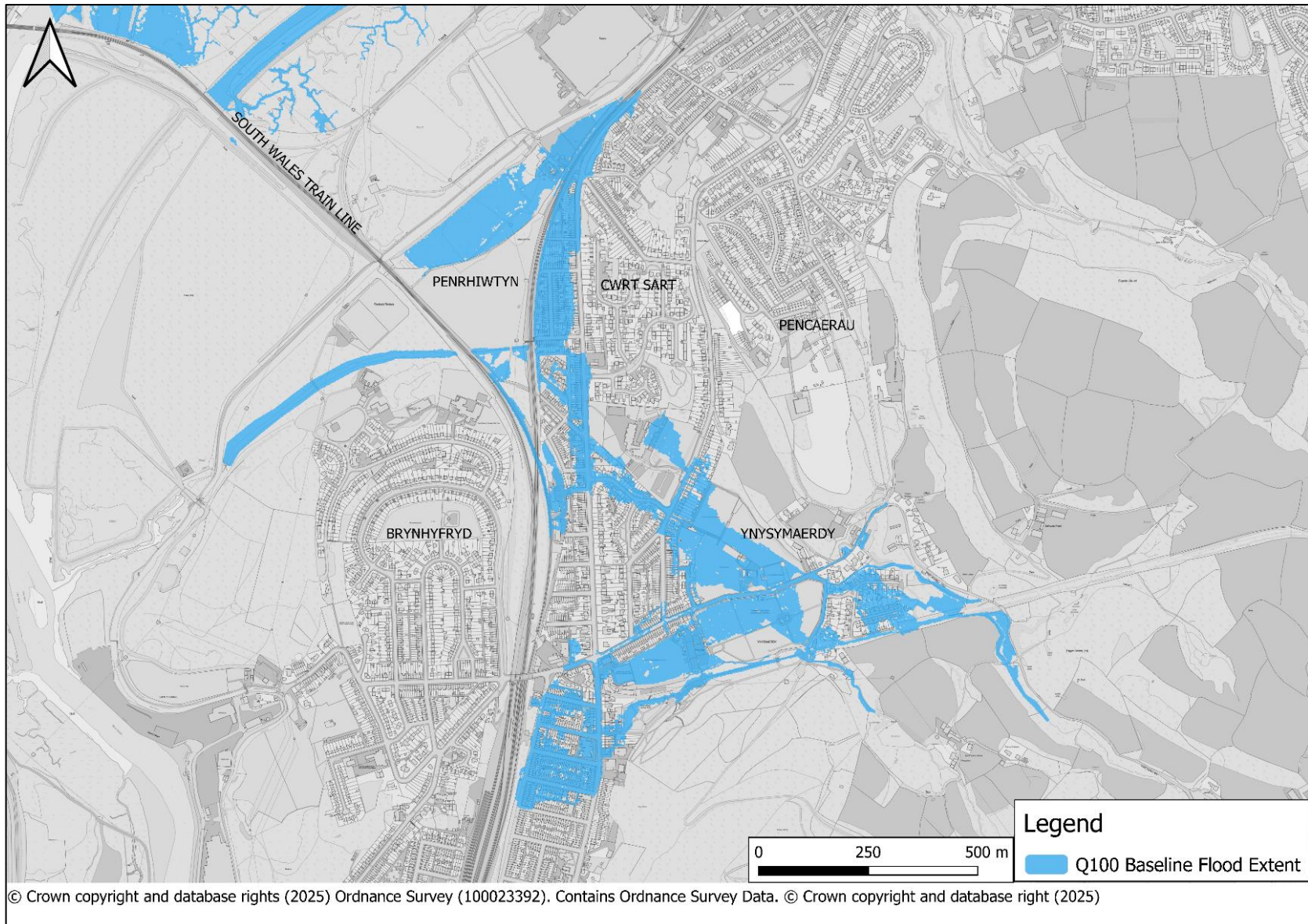


Figure 5-1 - 1% AEP flood extents – Baseline Scenario

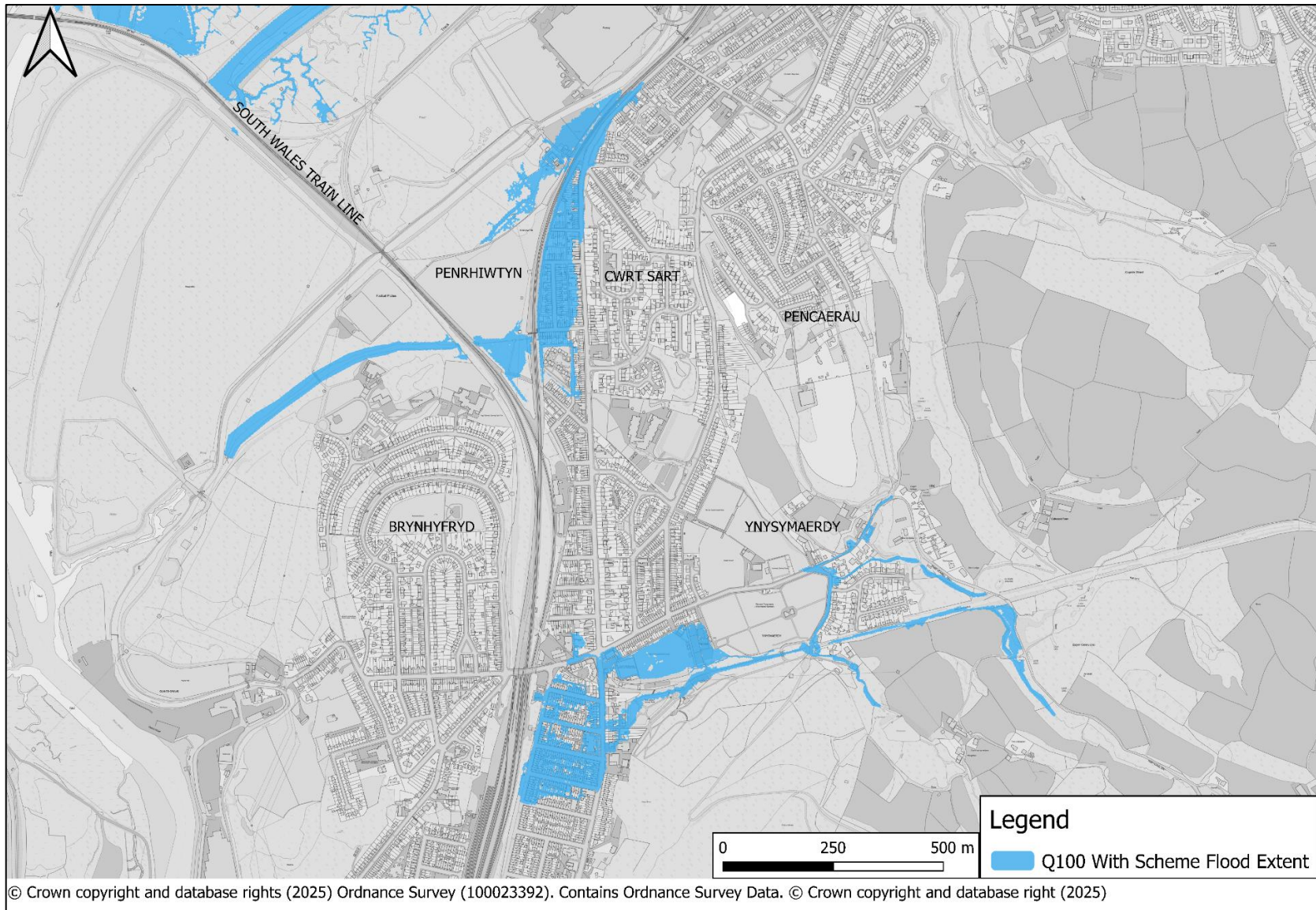


Figure 5-2 - 1% AEP flood extents - Proposed Scenario

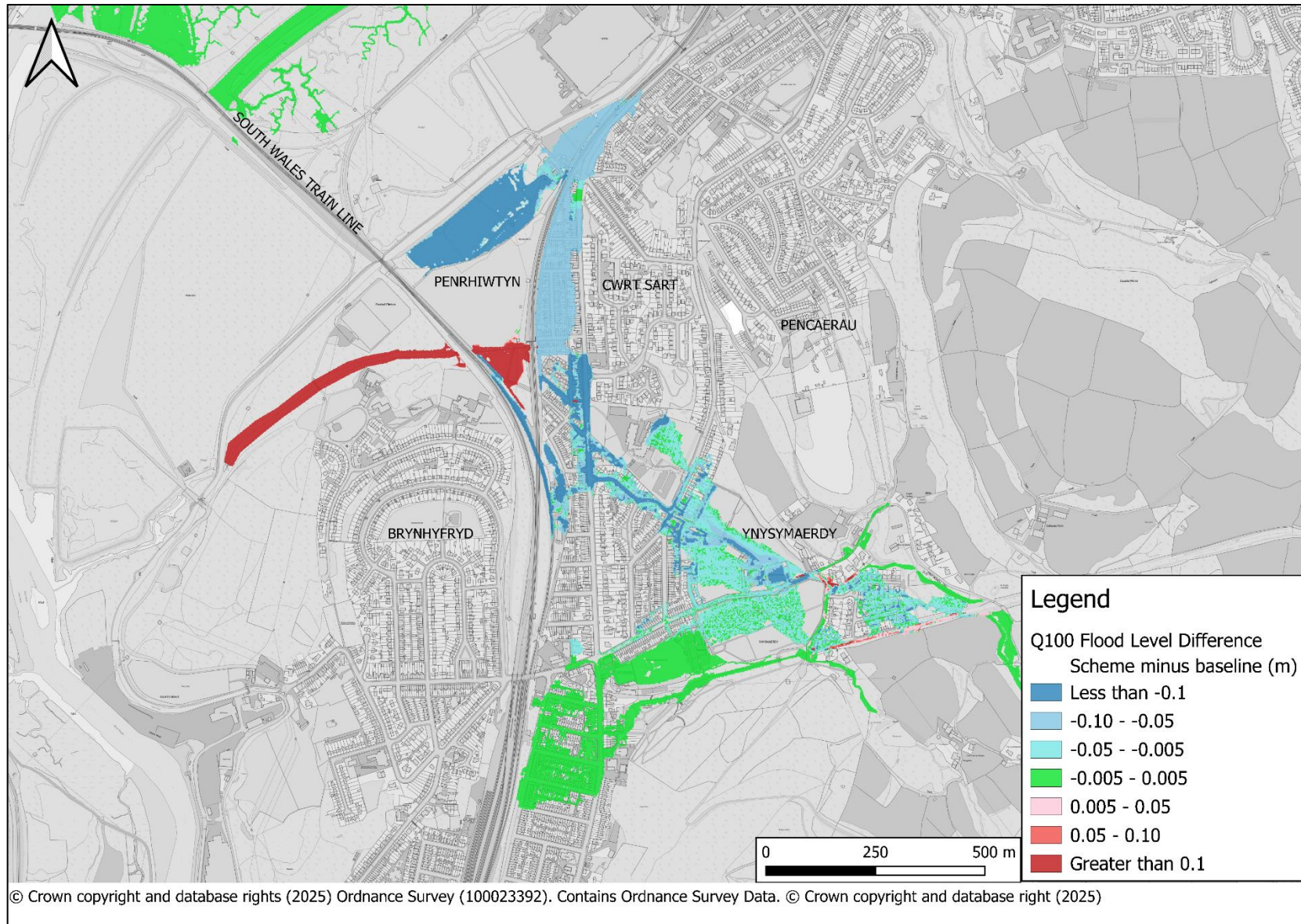


Figure 5-3 - Comparison of 1% AEP flood levels - Baseline and Proposed Scenarios

1% (1 in 100) AEP flood event plus 30% climate change.

When the effects of climate change are factored in, the results for the 1% AEP fluvial event with climate change event show extensive flooding in the baseline case. With the proposed Scheme (see Figure 5-5) in place the flows are contained in channel with significant benefit shown compared to the baseline case (Figure 5-4).

A comparison of the difference in the flood levels as a result of the proposed Scheme in place compared to the baseline case is presented in Figure 5-6 below. The results show that during a 1% AEP flood event including climate change, there is no negative impact to third parties with flood levels shown to be generally lower than the baseline. However, there are three areas: area between railway lines at Penrhiwtyn, along Ynysymaerdy Road and at the Incline where there is an increase in flood levels as a result of the proposals. No properties are adversely affected in these areas. This is discussed further in Section 5.2.

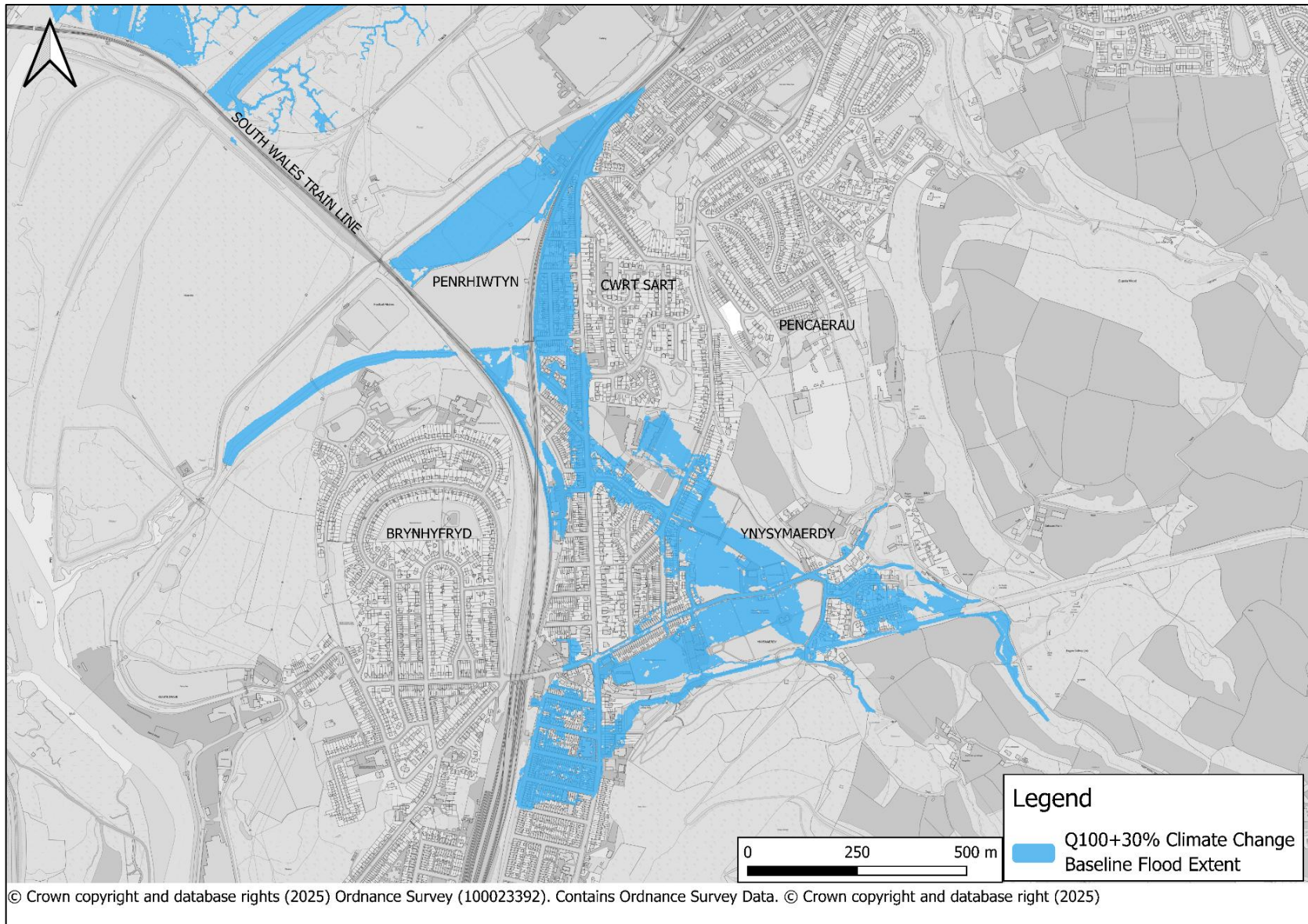


Figure 5-4 - 1% climate change AEP extents - Baseline Scenario

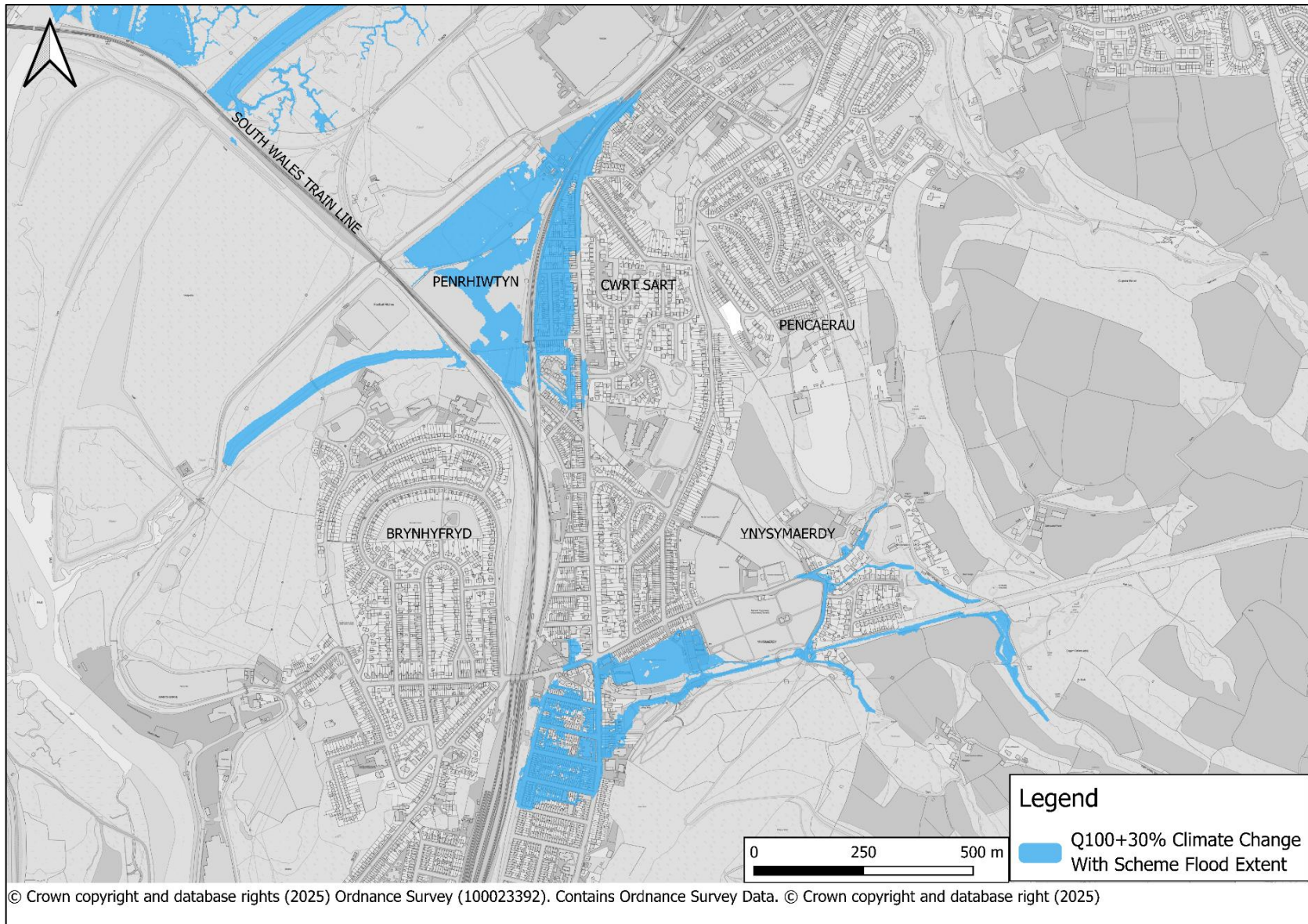


Figure 5-5 - 1% climate change AEP extents - Proposed Scenario

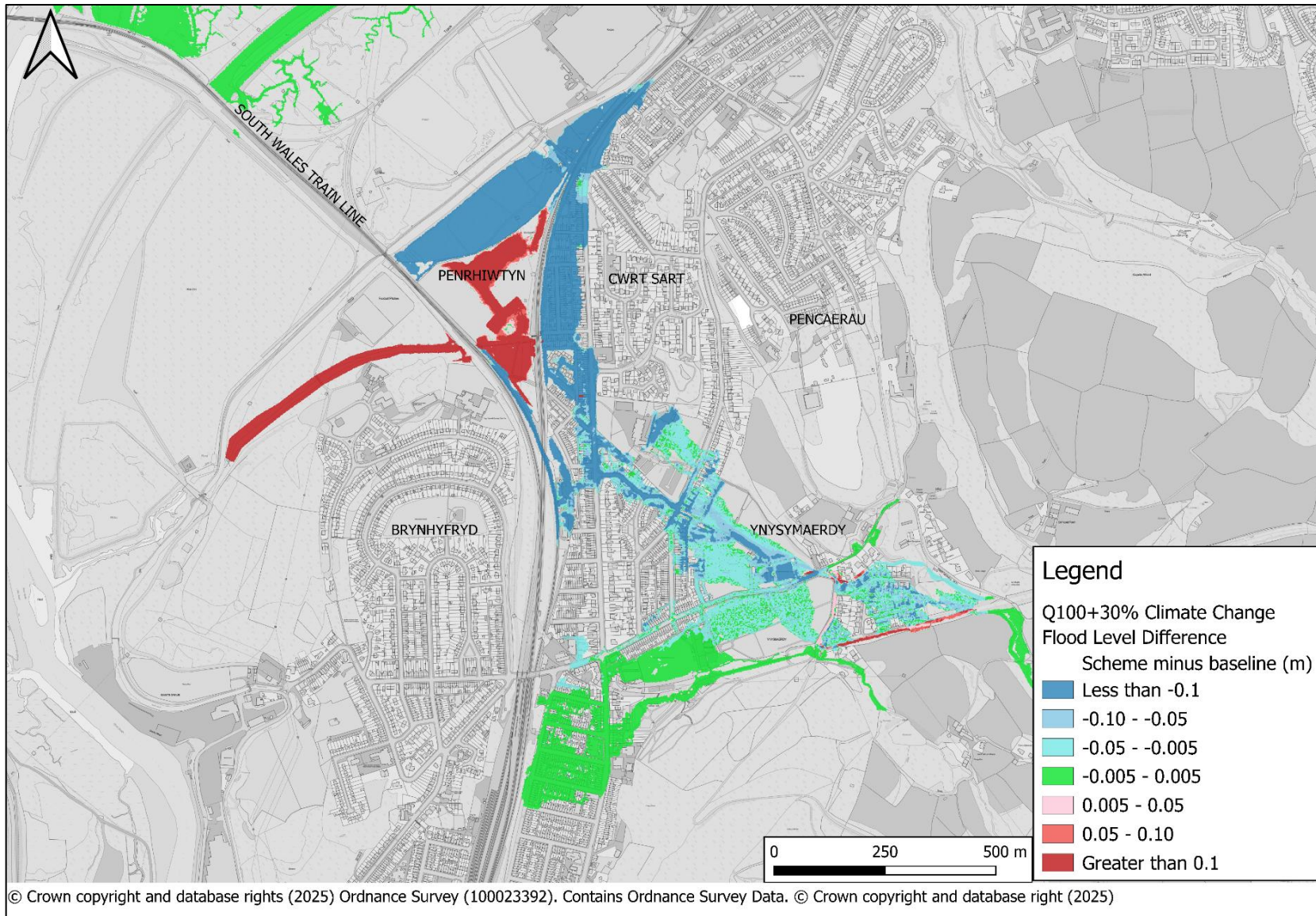


Figure 5-6 - Comparison of 1% AEP + CC Flood Levels - Baseline and Proposed scenarios

0.1% (1 in 1000) AEP flood event

The figures (Figure 5-7, Figure 5-8) below compare the flood extents for the two scenarios which evidently shows that during a 0.1% AEP flood event there remains a significant benefit as a result of the proposed Scheme with the flows being contained within channel.

A plot of the difference in the flood levels as a result of the proposed Scheme is presented in Figure 5-9 below. The results show that during a 0.1% annual chance flood there is a significant improvement in flood risk within the study area with a general lowering of flood levels as a result of the proposed works. There are areas of localised elevated levels where water is channelled along the incline footpath and the Ynysymaerdy Road along with the open channel downstream of the South Wales Mainline railway and Penrhiwtyn area. These localised areas of elevated flood levels do not impact any third-party properties.



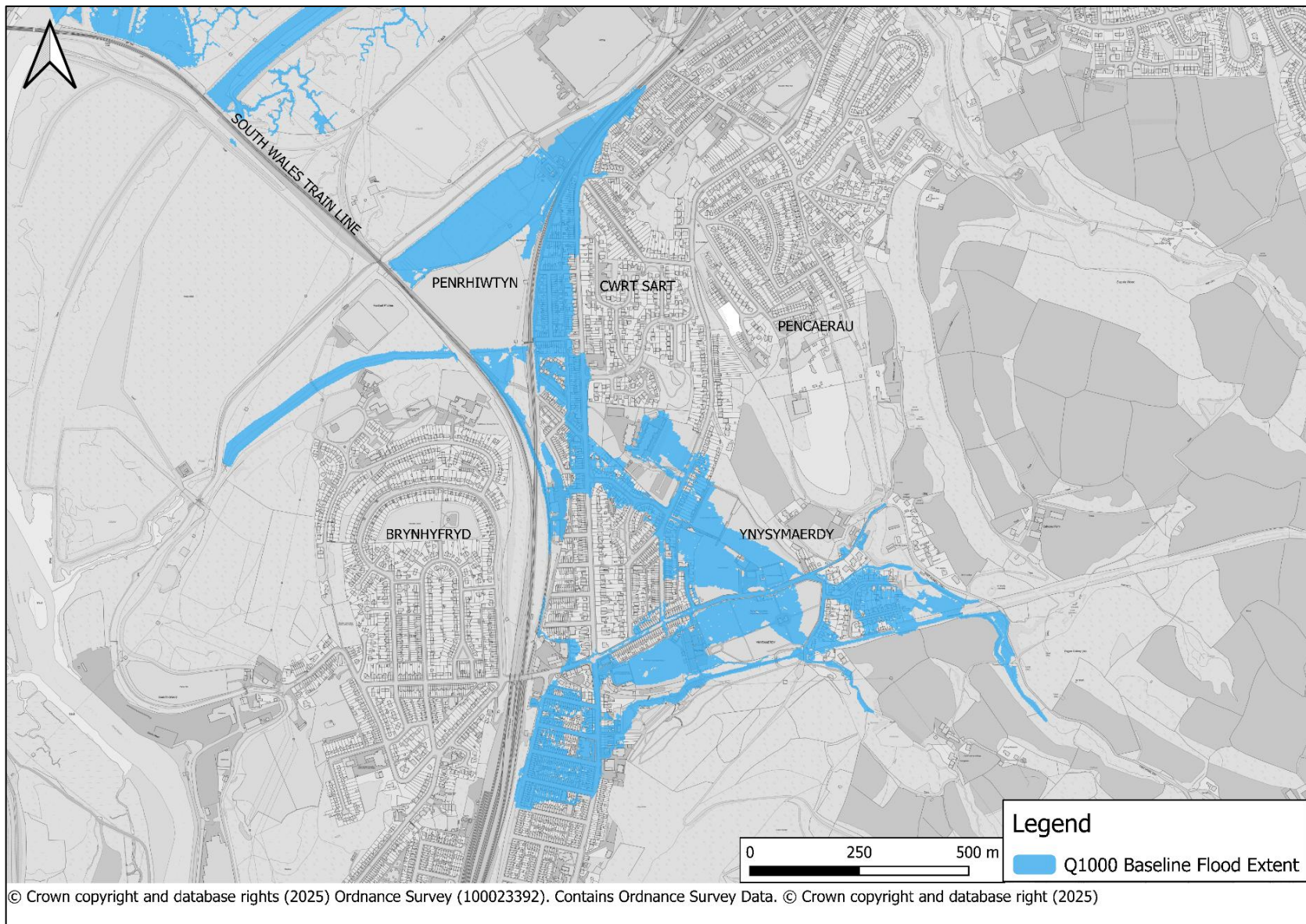


Figure 5-7 - 0.1% AEP flood extents - Baseline Scenario

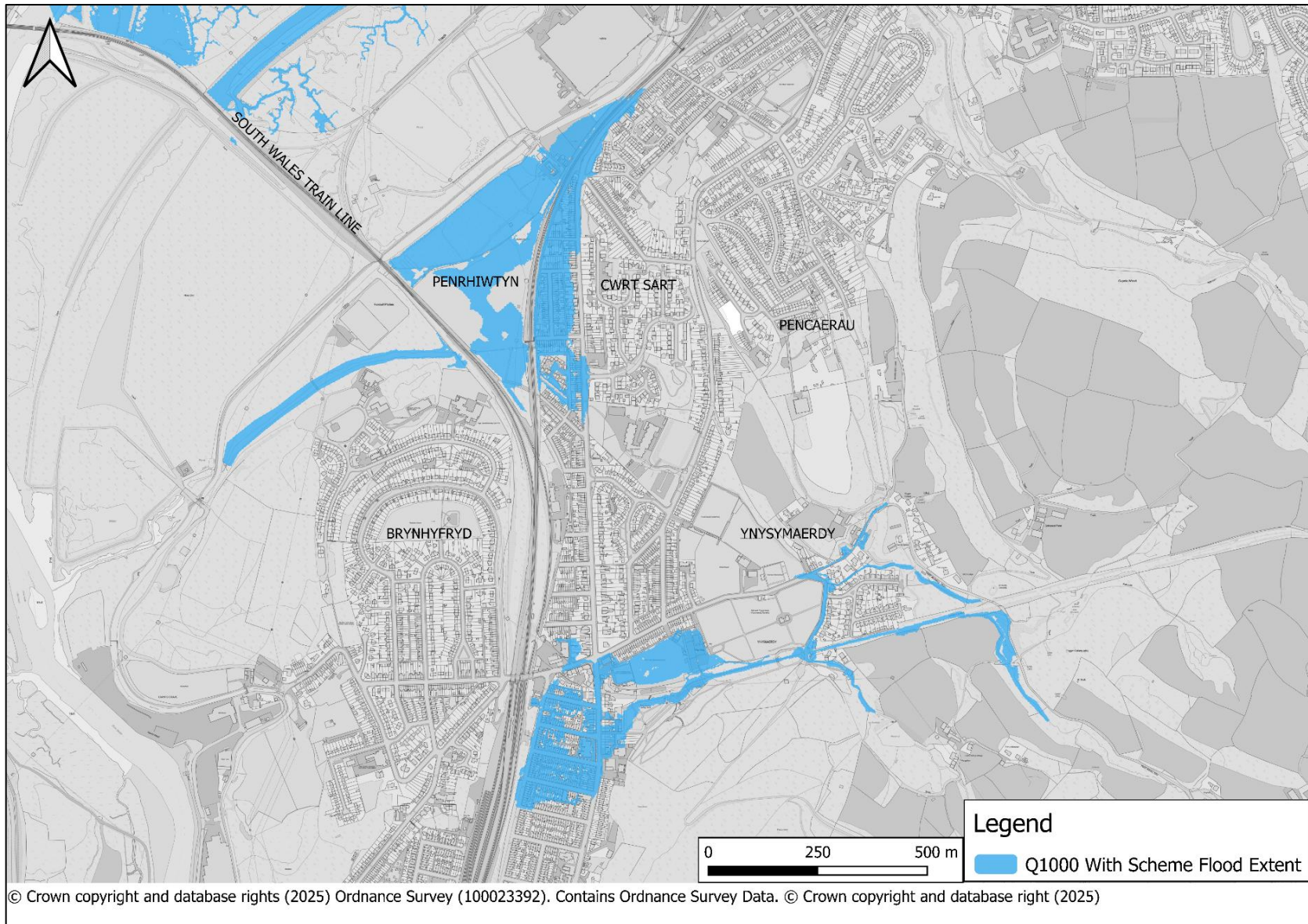


Figure 5-8 - 0.1% AEP flood extents - Proposed Scenario

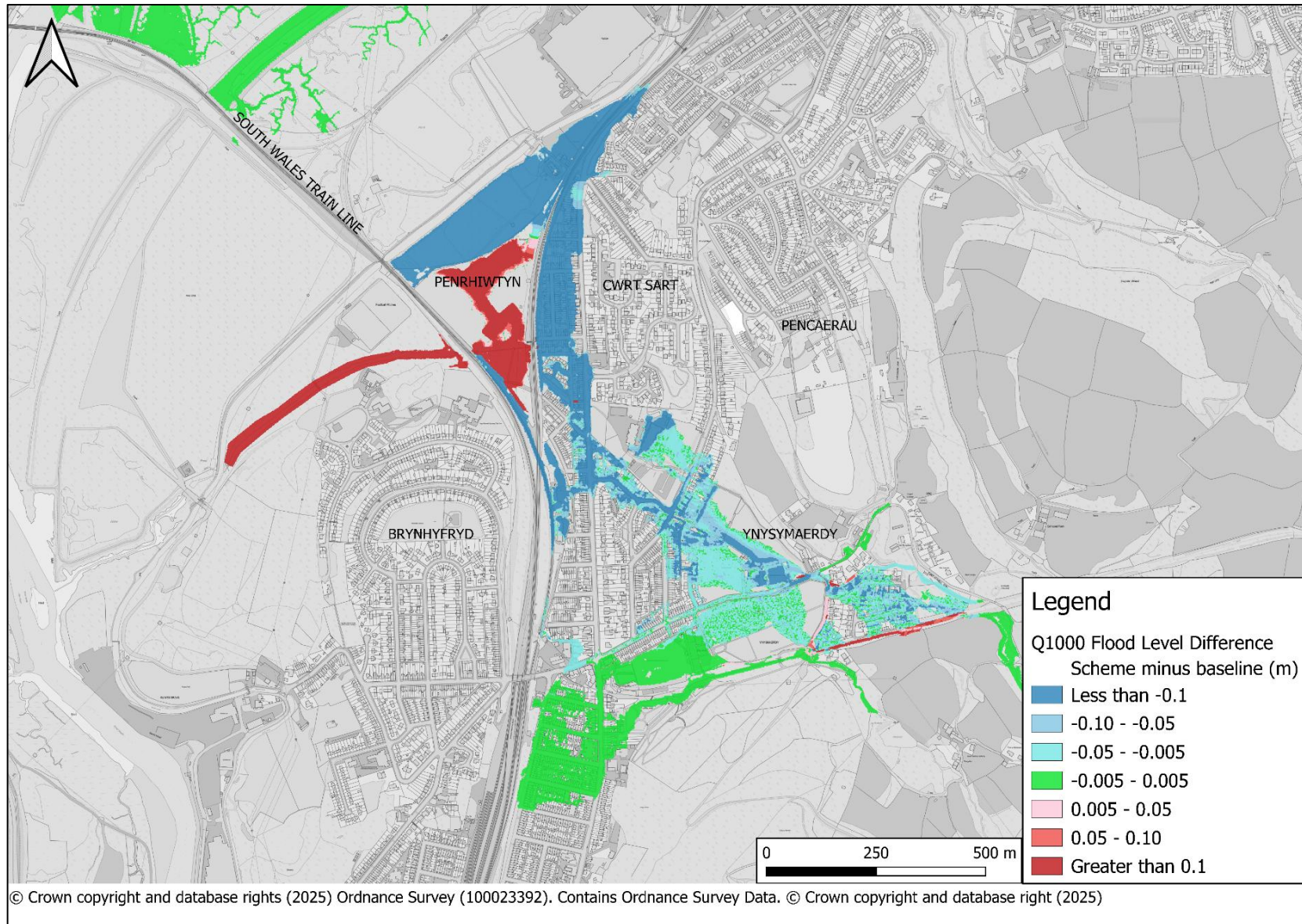


Figure 5-9 - Comparison of 0.1% AEP flood levels - Baseline and Proposed Scenarios

0.1% (1 in 1000) AEP flood event plus 30% climate change.

When the effects of climate change are factored in, the results for the 0.1% AEP fluvial event with climate change event show extensive flooding in the baseline case. With the proposed Scheme in place the flows are also not contained in channel. However, the flooding predicted for the proposed Scheme (see Figure 5-11), is less extensive than that predicted for the baseline case (Figure 5-10).

A comparison of the difference in the flood levels as a result of the proposed Scheme in place compared to the baseline case is presented in Figure 5-12 below. The results show that during a 0.1% AEP flood event including climate change (in the Ordinary Watercourses), there is no negative impact to third parties with flood levels shown to be generally lower than the baseline. However, there are three areas (area between railway lines at Penrhiwtyn, at the Incline near Ynysymaerdy Road and within Jersey Park and along Neath Road) where there is an increase in flood levels as a result of the proposals. This is discussed further in Section 5.2.

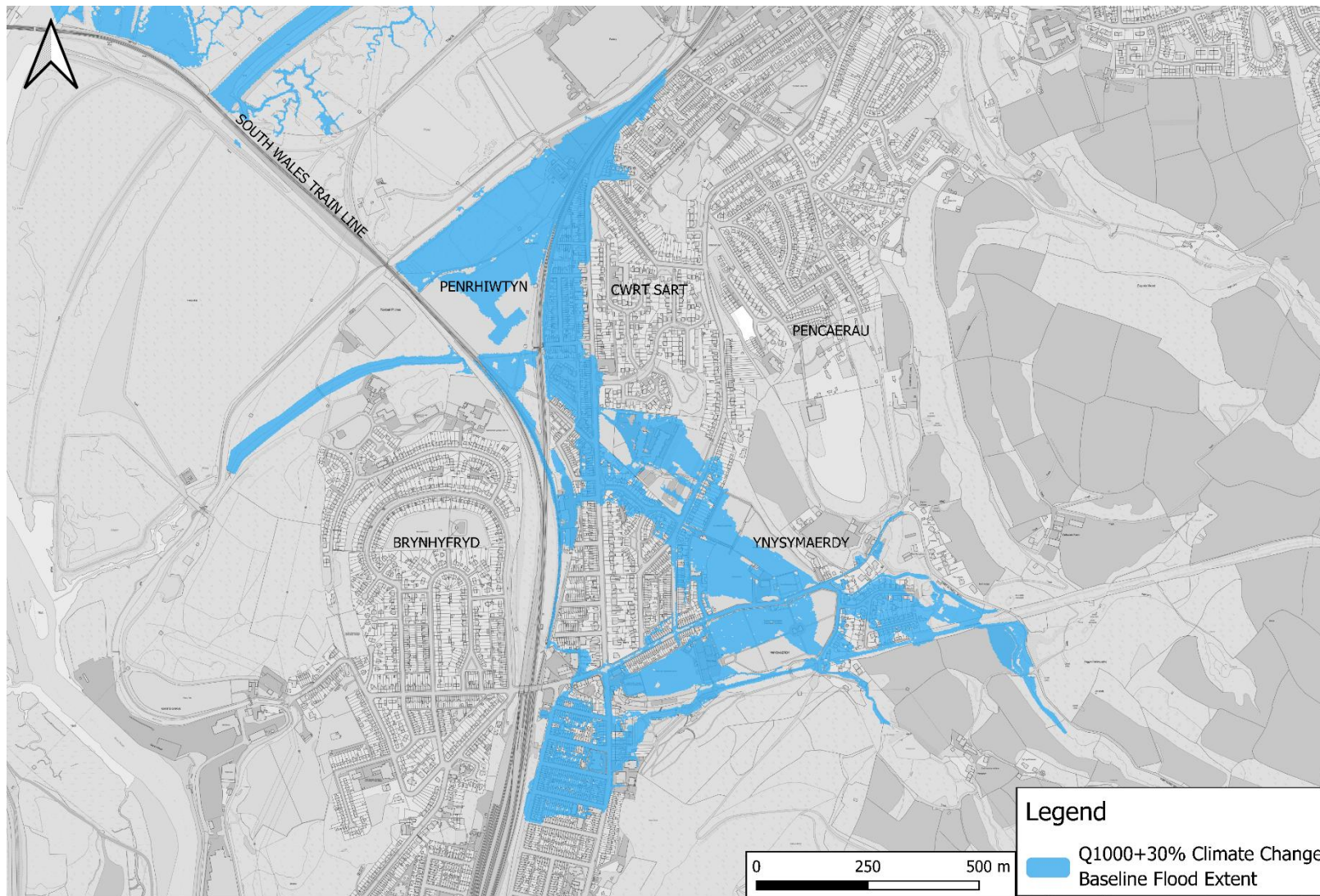


Figure 5-10 – 0.1% climate change AEP extents - Baseline Scenario

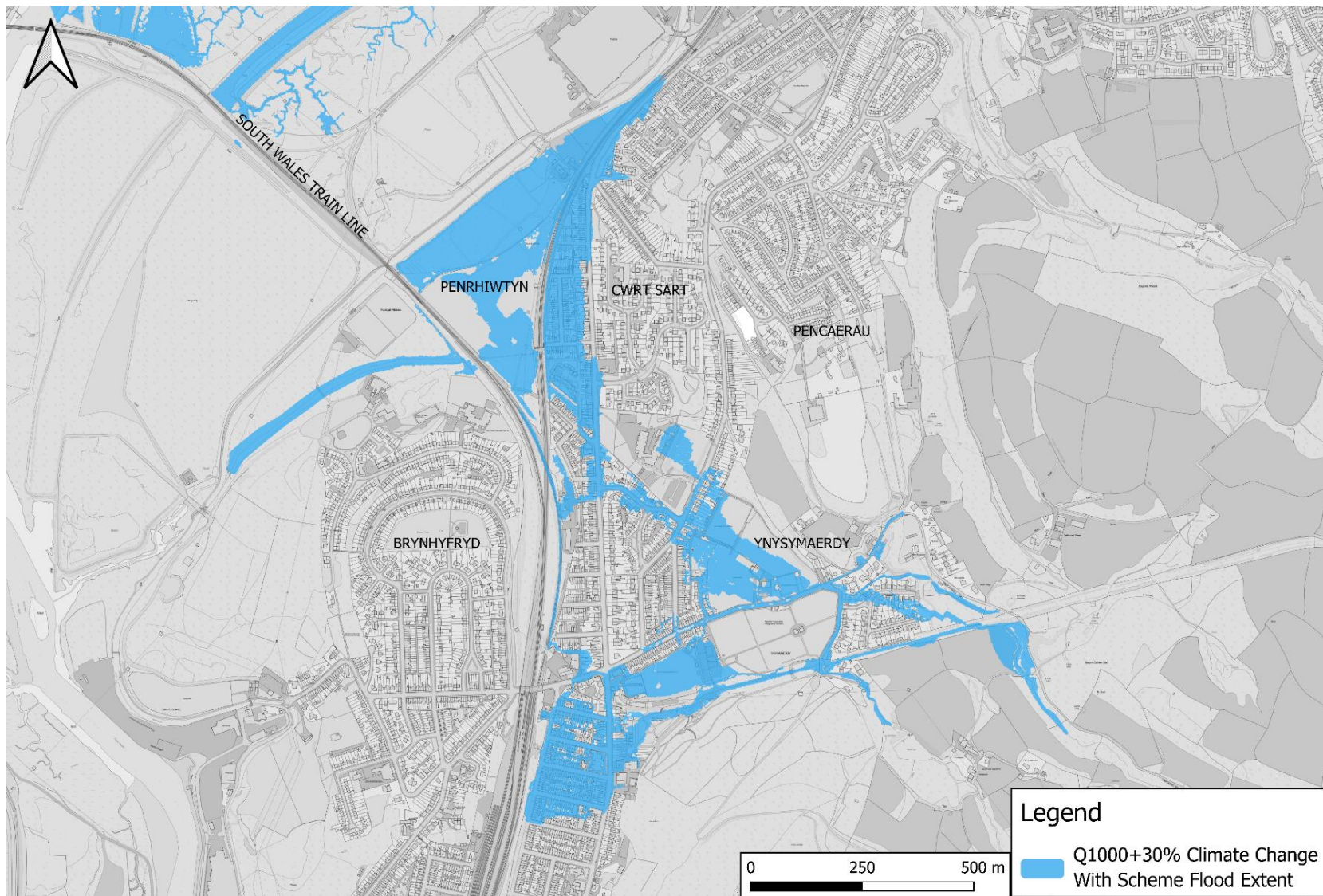


Figure 5-11 - 0.1% climate change AEP extents - Proposed Scenario

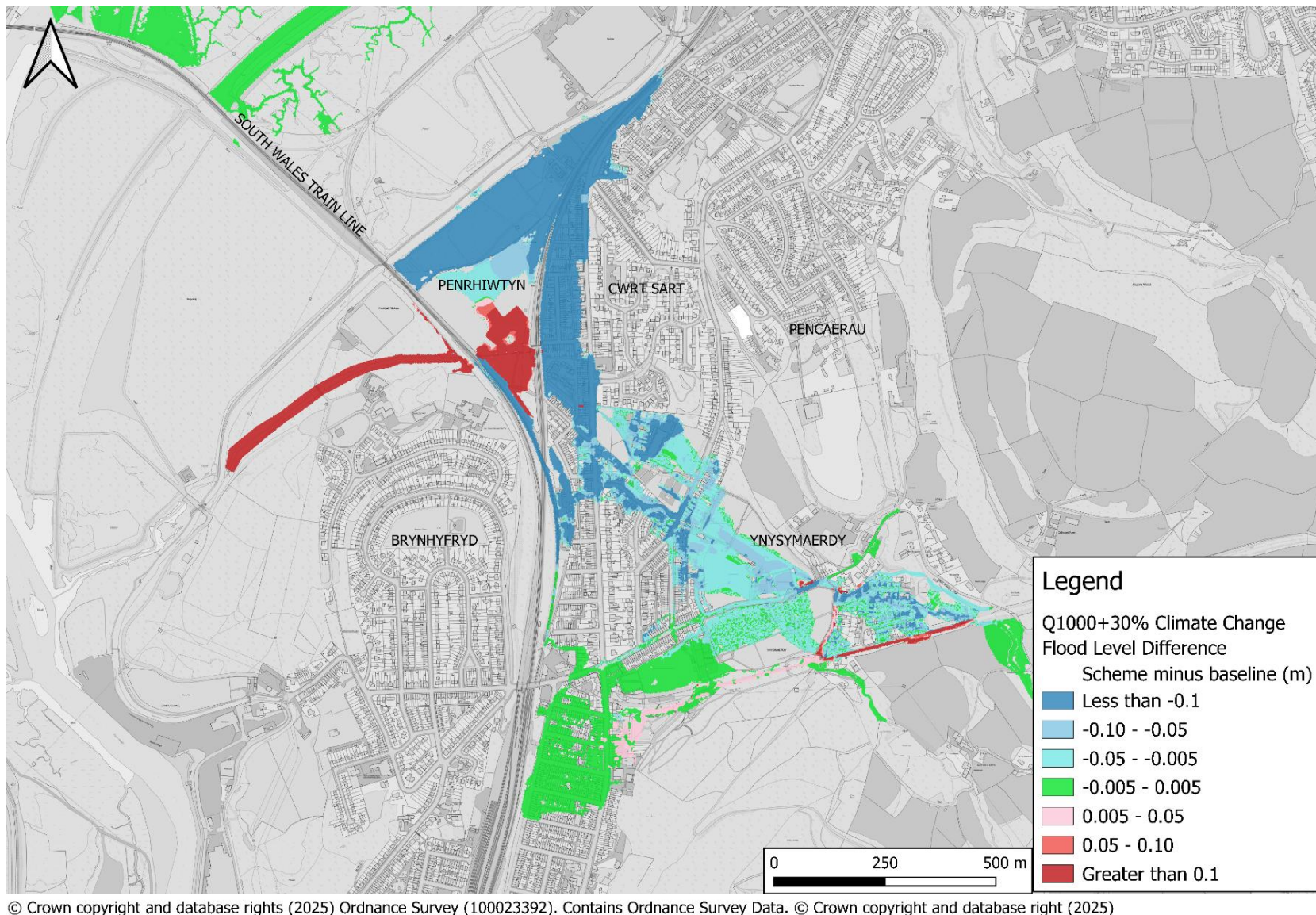


Figure 5-12 - Comparison of 0.1% AEP + CC Flood Levels - Baseline and Proposed scenarios

5.2 With-Scheme Model Results and Flood Consequences

This section considers the assessed consequences associated with the proposed flood alleviation scheme. TAN15 requires that the development should remain flood free during a 1% AEP fluvial event for the lifetime of the development. TAN15 also does not permit flood risk elsewhere to be increased as a result of developing a scheme.

1% AEP Fluvial Flood Event

- There is reduction in flooding to the town of Briton Ferry, with the flows in the Grandison Brook and various other ordinary watercourses being diverted into the culverted system.
- There is residual flooding in the area between Pantyrheol and the South Wales Mainline which is less significant than in the baseline case. This residual flooding is from overland flow paths that develop from the neighbouring Cryddan Brook catchment.
- There are areas of localised elevated levels where water is channelled along the Incline footpath and Ynysmaerdy Road together with the open channel section immediately downstream of the South Wales Mainline. These localised areas of elevated flood levels do not impact any third-party properties and have been discussed with NPTC and Network Rail who are responsible for the affected parcels of land. No detriment to the freight line is predicted due to the mitigation works proposed, namely the flood defence embankment and wall running parallel with the railway.

1% AEP flood event plus 30% climate change

- There is limited flooding to Briton Ferry from the Grandison Brook in the proposed case during a 1% AEP plus climate change event with the flood extents being broadly similar to the 1% AEP event. In the residential area to the east of the railway line, overall depths are approximately 140mm lower than the baseline.
- There is no detriment or negative effects to fluvial flooding as a result of the Scheme that would increase flood risk to any properties. There are areas of elevated water levels that are constrained to roads, footpaths and land operated by Network Rail that is already predicted to flood in the baseline case. The Scheme includes measures, in the form of a raised defence to ensure that there is no increase in risk to the rail lines.

0.1% AEP Fluvial Flood Event

- The Scheme continues to operate effectively during a 0.1% annual chance event with sufficient capacity to constrain the flows within the channel. In the residential area to the east of the railway line, overall depths are approximately 140mm lower than the baseline.
- There is no detriment or negative effects to fluvial flooding as a result of the Scheme that would increase flood risk to any properties. However, there are areas of elevated water levels that are constrained to roads, footpaths and land operated by Network Rail that is already predicted to flood in the baseline case.

1 in 1000 year (0.1% AEP) flood event plus 30% climate change

- There is flooding to Briton Ferry from the Grandison Brook in the proposed case during a 0.1% AEP although the overall depths are lower than those predicted for the baseline case. In the residential area to the east of the railway line, overall depths are approximately 110mm lower than the baseline.

- The modelling indicates areas of elevated water levels that are largely confined to roads, footpaths and land operated by Network Rail, all of which are already shown to flood under the baseline scenario. In addition, the modelling identifies some localised increases in water levels within Jersey Park and along Neath Road. These localised effects have been assessed in more detail and addressed through the provision of a proposed storage tank beneath the existing playground adjacent to Jersey Park. Hydraulic modelling has been used to define the extent and nature of the potential detriment, and the proposed storage tank has been conservatively sized to attenuate the additional runoff volume entering Jersey Park during the modelled event. While the storage tank is not explicitly represented within the hydraulic model geometry, its capacity has been defined to provide sufficient attenuation for the identified increase in runoff. With the proposed mitigation in place, the development is not expected to result in any adverse impacts on flood risk.

5.3 Acceptability of Consequences

The proposed structures in this Scheme, lie within the FMfP Flood Zone 3 for both Rivers and Sea along with the mapped extents for surface water and small watercourses. The site is therefore acknowledged to be at risk of flooding, and the focus of assessment is on managing and mitigating the potential consequences of flooding.

Section 11.5 of TAN 15 describes the acceptability criteria of the consequences of flooding that should be considered. TAN15 requires that for any new development, that suitable avoidance and mitigation measures can be incorporated into the Scheme to ensure that there is:

- Minimal risk to life;
- Minimal disruption to people living and working in the area;
- Minimal potential damage to property;
- Minimal impact of the proposed development on flood risk generally;
- Minimal disruption to the sustainable management of natural resources.

These are discussed below:

Flood protection

The Scheme reduces the impact of flooding to 292 properties from the predicted 1% (1 in 100) AEP flood extent and in comparison to the Do Minimum (Business as Usual) scenario provides a very high level of economic flood benefits. The Scheme also provides considerable benefit during a 0.1% (1 in 1000) AEP flood event.

Minimal risk to life

The proposed Scheme reduces flood risk at Briton Ferry to the 0.1% (1 in 1000) AEP event, and therefore reduces the risk to life.

Minimal disruption to people living and working in the area

By minimising the flood risk at Briton Ferry, disruption to residents, workers and visitors will be reduced.

Minimal potential damage to property

The proposed Scheme will reduce the expected damages to residential and commercial properties.



Minimal impact of the proposed development on flood risk generally

Flood risk has been shown to reduce at Briton Ferry with no detriment to any third parties being predicted as a result of the with scheme proposals.

Minimal disruption to the sustainable management of natural resources

The Scheme has been designed to ensure that it presents negligible adverse impact on the natural environment, including its capacity to function, recover and continue to be used sustainably in the future. The proposed works avoid designated sites wherever possible, incorporate appropriate heritage and ecological safeguards, and include measures to enhance biodiversity.

Within the Scheme boundary, two heritage designations are present:

- Scheduled Monuments – The Ynysmaerdy Railway Incline lies within the development area, and the Carreg Hir Standing Stone (Pen-Rhiw-Tyn) is located approximately 160 m to the north-east within the grounds of Ysgol Carreg Hir.
- Registered Historic Parks and Gardens – Part of the application site overlaps with Jersey Park, a designated historic park and garden.

Works affecting these features are being addressed through the Scheduled Monument Consent process, supported by appropriate heritage impact assessments, which will be progressed separately from this FCA.

A number of additional designated sites lie outside the Scheme footprint and will therefore not be affected by the proposed works. These include:

- Earlswood Road Cutting, designated for its ecological value;
- Ferryboat Inn Quarries SSSI, approximately 1.5 km south-west of the site, designated for geological interest;
- Four locally designated sites within 1 km: Eaglesbush Valley Local Nature Reserve, the River Neath SINC, ancient semi-natural woodland to the south, and restored ancient woodland near Jersey Park;
- Five SINCS within 1 km: Neath Canal, Giant's Grave, Shelone Woods, Garth Mor, and the Waun, Cimla.

As the Scheme does not involve works within these areas, no direct impacts on the designated areas are anticipated, and disruption to surrounding ecosystems is expected to be minimal.

In accordance with the biodiversity duty under Section 6 of the Environment (Wales) Act 2016, a Green Infrastructure Statement will accompany the planning application. This identifies opportunities for biodiversity enhancement and carbon offsetting, including the installation of bat boxes on retained trees, enhancement of retained amenity grassland, management and cutting regimes that encourage natural wildflower establishment, localised turf removal to expose bare ground for natural recolonisation from the local seed bank and replacement tree planting where removals are required.

Through avoidance of sensitive sites, incorporation of targeted enhancement measures, and adherence to relevant environmental and heritage legislation, the Scheme is considered to pose minimal risk to the sustainable management of natural resources.

6. Conclusions

This assessment has demonstrated that the consequences of flooding associated with the proposed Scheme are understood, are acceptable and that the flood risk can be managed. Crucially, the Scheme will reduce the flood risk to the people and properties of Briton Ferry.

- A total of 292 residential and commercial properties benefit from flood reduction from the 1% (1 in 100) AEP flood extents.
- The 0.1% AEP fluvial events have been tested in the hydraulic model for the current day pre-scheme (Baseline), and With-scheme situations.
- A 100-year development lifetime has been assumed. Climate change effects on fluvial flows up to a 0.1% AEP event have been applied. The proposed works have been shown to provide a 1% (1 in 100) AEP standard of service over the development lifetime. Further benefits from floodings are shown up the 0.1% AEP event.
- There is no detriment or negative effects to fluvial flooding as a result of the Scheme that would increase flood risk affecting any third-party property for the flood events tested.
- There are some areas where elevated flood levels are predicted to result as a consequence of the proposed flood alleviation scheme. These areas are limited to footpaths, roads and land adjacent to the railway lines. The proposals have been discussed at length with both NPTC and Network Rail who are responsible for these areas of land. Both bodies have confirmed in principle that they accept the consequences of the Scheme proposals.