

Local Flood Risk Management Strategy

2024



Kirklees Local Flood Risk Management Strategy

2024

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EXECUTIVE SUMMARY

This Local Flood Risk Management Strategy (part of the Local Strategy) sets out how Kirklees Council undertakes its flood risk management responsibilities to meet the requirements of the Flood and Water Management Act 2010. Kirklees Council is a Lead Local Flood Authority (LLFA) and is required to establish a strategy to define how local flood risk will be managed locally.

In Kirklees, there are over 35,000 properties currently at risk or will be affected from surface water flooding in a 1 in 1,000-year rainfall event, and 9,000 at risk from main rivers in a 1 in 1,000-year fluvial event. These numbers will rise in the future due to climate change. Our vision is to make our communities more resilient to flooding both now and, in the future, to enhance the environment for future generations. A complex and changing climate requires a variety of risk management interventions like nature-based solutions such as Natural Flood Management (NFM). NFM includes slow the flow methods and adaptive land management techniques.

The objectives we set for the Local Strategy reflect those of the National Strategy and are based on a long-term approach to achieving our vision, which is to make our communities, businesses, and land more resilient to flooding both now and in the future. The objectives are delivered through a set of shorter term, measurable actions which formulate our Flood Risk Action Plan. Our overarching objectives for managing flood risk are:



This Local Strategy considers resilience a key aim in supporting existing and new communities in dealing with future flood risk. Resilience is defined in the National Strategy as:

“The capacity of people and places to plan for, better protect, respond to, and to recover from flooding and coastal change.

This Strategy is based around the four key themes of resilience:

1. **Place making** – to make our local places more climate resilient to flooding by considering land use in combination with flood risk
2. **Protect** – ensure our communities are better protected from flooding both now and in the future
3. **Response** – being adequately prepared to ensure we can better respond to a flood event
4. **Recovery** – recovering quickly and effectively from a flood event.

The Strategy identifies high risk catchments and localities based on flood risk from surface water, historic flood events, existing properties and infrastructure, and social deprivation. This has helped us to identify areas which may require more focused consideration.

A Flood Risk Action Plan has been developed so that we can implement the right measures in much needed areas and can track progress of these actions over time. The Flood Risk Action Plan will be undertaken in partnership and collaboratively with other Risk Management Authorities, to manage local flood risk across the district. The Strategy will be reviewed and monitored to ensure it is still current and measures remain applicable.

The disastrous impact flooding can have on communities is understood. Research carried out by the University of York and the Centre for Mental Health reported that the risk of long-term mental health problems was up to nine times more likely for flood victims compared to those who had never experienced flooding¹. Therefore, we strive to support communities to recover more quickly and effectively after major flood incidents.

This Strategy sets out to mitigate the impacts of flooding, however, the approach set out cannot remove all the flood risks that exist in our communities.

¹ [University of York | January 2021](#)

INTRODUCTION

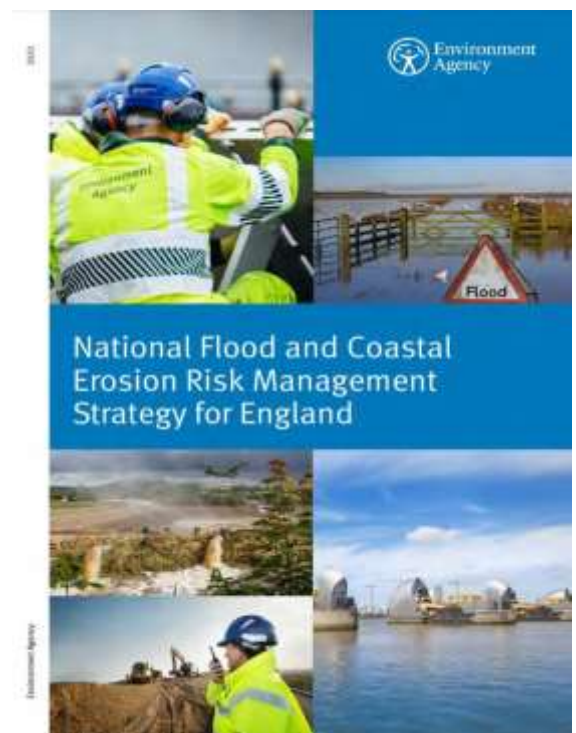
The risk of flooding in England is predicted to increase due to climate change and population growth. It is not possible to prevent all flooding but there are actions that can be taken to manage these risks, increase resilience, and reduce the impacts on communities. Climate change estimates will evolve therefore the challenge we face due to the unpredictability of climate change is unprecedented and if we are to give our communities the best chance of protection; we need to be bold, innovative and try new approaches to managing flood risk and be adaptive in our approach.

As the Lead Local Flood Authority (LLFA), we will provide strategic leadership in relation to flooding to all Risk Management Authorities (RMAs). Part of this duty is to develop, maintain, apply and monitor a strategy for local flood risk management in our area, which must be consistent with the National Flood and Coastal Erosion Management Strategy² produced by the Environment Agency for England.

The National Strategy sets out the long-term delivery objectives that we as a country should be taking over the next 10 to 30 years as well as shorter term, practical measures we should take working with partners and local communities.

Alongside traditional flood defences, there is the need for a broader range of actions for achieving climate resilient places. This includes avoiding inappropriate development in the floodplain and using nature-based solutions to slow the flow or store floodwaters. We need to better prepare for and respond to flooding incidents through more timely and effective flood forecasting, warning and evacuation. A strong theme throughout the National Strategy is concerned with helping communities and local economies recover more quickly after a flood or 'building back better' so that properties, infrastructure and key services such as hospitals and schools are more resilient to flooding in the future.

This Local Flood Risk Management Strategy (Local Strategy) for Kirklees sets out how we strategy will replace the existing 2012 Local Strategy for Kirklees.



² [National Flood and Coastal Erosion Risk Management Strategy for England. Environment Agency. 2020](#)

We will address, through the form of a targeted Flood Risk Action Plan, the management of local flood risk and how it undertakes its flood risk management responsibilities over the next five to ten years. This Local flood risk as defined by the FWMA (2010) includes risk from:

- **Surface runoff** – rainwater (including snow and other precipitation) which is on the surface of the ground (whether or not it is moving) and has not entered a watercourse, drainage system or public sewer
- **Groundwater** – all water which is below the surface of the ground and in direct contact with the ground or subsoil
- **Ordinary watercourses** – any watercourse that does not form part of a main river. Ordinary watercourses can vary in size considerably and can include rivers, streams and all ditches, (the Water Industry Act 1991) and passages, through which water flows.



OUR VISION

OUR VISION IS TO MAKE OUR COMMUNITIES MORE RESILIENT TO FLOODING BOTH NOW AND IN THE FUTURE AND TO ENHANCE THE ENVIRONMENT FOR FUTURE GENERATIONS.

A changing climate requires a variety of risk management techniques with a focus on nature-based solutions such as Natural Flood Management (NFM). NFM includes the use of slow the flow methods and using adaptive land management techniques. It requires integrated catchment management and can be particularly effective within upper catchment areas with the aim to:

- Maximise water retention (in flood storage areas, wetlands)
- Slow water flows and/or the rate at which water enters a watercourse (through leaky dams, peatland restoration)
- Intercept rainfall to prevent it from reaching the watercourse (through tree planting).

NFM requires partnership working with those who use and influence the land including the Local Planning Authority, land managers and owners and water management bodies. While conventional flood prevention schemes may sometimes be preferred, NFM can be used as a longer term, more cost-effective, and multi-beneficial option (including carbon sequestrations and biodiversity gain).

In our current approach, the LLFA planning function and Land Drainage Consents are critical in how we shape and ensure future development that is climate resilient. The Local Strategy considers the planning and enforcement function of Kirklees Council in ensuring new development and infrastructure are appropriately planned and delivered. It also addresses the built environment and the importance of include community resilience. We will look to engage with landowners and developers whose roles can be important in managing and reducing flood risk in high-risk areas.

Asset management function is also critical in making sure that we are confident that drainage infrastructure is being effectively managed, monitored and maintained. This Strategy encourages more effective risk management by enabling people, communities, businesses and the public sector to work together to balance the needs of the community, environment and economy.

The Strategy also aims to ensure that we look favourably towards local flood warning systems in partnership with the Environment Agency which will ensure we are better prepared in supporting community resilience. It ensures that emergency plans and responses to floods and incidents are effective and that communities can respond properly to flood warnings. Another key part of the Strategy is ensuring we target our investment in areas most in need.

LOCAL STRATEGY OBJECTIVES

The objectives we set for the Local Strategy are based on a long-term approach to achieving our vision, which is to make our communities, businesses, and land more resilient to flooding both now and in the future. The objectives will underpin our objectives through a set of shorter term, measurable actions which formulate our Flood Risk Action Plan.

EVIDENCE

We will enhance our strategic understanding of flood risk from local sources, both in the present day and in the future considering new data, studies, research and science in climate change impacts for Kirklees.

COMMUNITIES

We will work with communities and businesses to raise greater awareness of present and future flood risk through engagement, support and education to help them to become more resilient to future flood risk.

ADAPT

We will work to implement adaptive approaches so we can continue to keep our natural and built environment resilient in response to a changing climate.

SUSTAINABLE

We will contribute positively to sustainable growth and support environmental net gain by influencing development and regeneration plans to deliver flood risk benefits, which will benefit society and the local economy whilst enhancing biodiversity in promoting measures that work with the natural processes of our catchments.

PARTNERSHIP

We will work with all Risk Management Authorities, stakeholders, landowners and developers to achieve a consistent, coordinated and catchment-based approach to flood risk management.

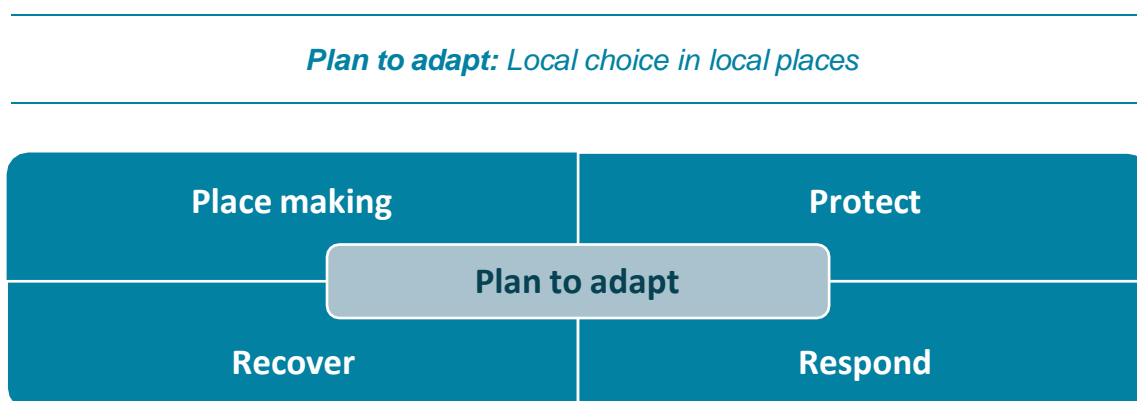
INNOVATION

We will seek opportunities (including funding, technological, research) to be innovative and try new approaches in making communities resilient to flooding now and in the future.

FLOOD RESILIENCE AND ADAPTION

This Local Strategy considers resilience and adaptation to be a principal aim in supporting existing and new communities in dealing with future flood risk. Adaptation is about strengthening our approach to adapting to climate change. It will reduce the potential impact that our changing climate, through flooding, storms and higher temperatures, will have on Kirklees.

There are four key areas when managing flood resilience as shown below, based on the National Strategy³.



1. PLACE MAKING

IMPROVE PLACE MAKING: MAKING THE BEST LAND USE AND DEVELOPMENT CHOICES TO MANAGE FLOODING AND COASTAL CHANGE.

Communities, planners, developers and land managers making the best land use and design choices for development and infrastructure to manage the damages from flooding and coastal change. This includes making space for water to manage risk and support wider environmental benefits.

2. PROTECT

BETTER PROTECT: BUILDING AND MAINTAINING DEFENCES AND MANAGING THE FLOW OF WATER

Sustained and long-term investment in building and maintaining flood and sea defences ensuring they provide an appropriate standard of protection, operate reliably and perform as expected when exceeded. Better protection includes nature-based solutions that manage the flow of water to reduce the risk of flooding and coastal change.

3. RESPOND

READY TO RESPOND: PREPARING FOR AND RESPONDING EFFECTIVELY TO INCIDENTS.

Organisation and communities working together to prepare for and respond to flood and coastal incidents through timely and effective forecasting, warning and evacuation.

³ [National Flood and Coastal Erosion Risk Management Strategy for England. Environment Agency. 2020](#)

4. RECOVER

RECOVER QUICKLY: GETTING BACK TO NORMAL AND BUILDING BACK BETTER

Helping people and local economies recover more quickly by clearing up the damages, returning water and power supplies or draining floodwaters from farmland. Recovery should also include building back better so that properties and infrastructure are more resilient to future events.

This combination of engineered flood alleviation schemes alongside wider catchment and community resilience actions is a vital response as flood risk increases with climate change.

. This integration to manage the risk will mean that more vulnerable communities are resilient to flooding and are able to remain sustainable and thriving places.

Resilience to flooding can be achieved through a suite of tools and services. These are aimed at homeowners and maintaining essential functions of organisations, businesses, communities, key infrastructure, services and land. Disasters are caused by extreme weather which are worsened by being vulnerable and unprepared. By reducing vulnerability and having targeted emergency flood response plans, the impacts of a flood event can be greatly reduced.

Flood resilience has several core themes, including:

- **Property Flood Resilience** – providing practical and cost-effective steps to help lower flood risk through the reduction of the impact of flooding on a building which in turn may help lower home and business insurance premiums.
- **Flood Emergency Plans** – being prepared helps to reduce, control or mitigate the impact and consequences of flooding.
- **Informing** – increasing the awareness of the risks of flooding through effective communications with communities and stakeholders.

PURPOSE OF THE LOCAL STRATEGY

Much has changed since the 2012 Local Strategy, including flood risk data and information, studies, strategies, climate change science, and the drive for natural flood management, sustainable development and resilience. The Local Strategy will take into consideration current thinking and understanding to tackling flood risk in our district. Our Local Strategy will encourage more effective risk management by enabling local communities and business owners to work together to:

- Balance the needs of the community, environment, and economy.
- Enhance and extend our partnership working between us and other key stakeholders (e.g., charities, community groups, Parish Councils and health bodies).
- Improve community awareness of flood risk, respond to their expectations and their priorities.
- Ensure a clear understanding of local flood risks and prioritise high risk catchments and communities.
- Encourage innovative flood risk management techniques.
- Support the development of emergency plans and responses to flood incidents are effective and that communities are better prepared.
- Support communities to recover more quickly and effectively after major flood incidents. Research carried out by the University of York and the Centre for Mental Health reported that the risk of long-term mental health problems was up to nine times more likely for flood victims compared to those who had never experienced flooding⁴
- Enable continued learning to ensure we remain progressive.

The Kirklees Local Strategy is a “living document” which will develop as new evidence, expertise and resources influence flood risk management in the district.

⁴ [University of York | January 2021](#)

THEMES OF OUR LOCAL STRATEGY

This Local Strategy establishes four key areas in which to focus our efforts in better protect and better supporting our communities against the risk of flooding.

PLACE-MAKING



To make our local places more climate resilient to flooding by considering land use in combination with flood risk. We will make space for floodwater, ensure buildings and infrastructure consider current and future flood risks including supporting the use of climate resilient local planning policies and avoiding inappropriate development in flood risk areas through spatial planning. We will ensure early engagement with developers in the pre-planning process.

Figure 1.1 examples of place making.



PROTECT



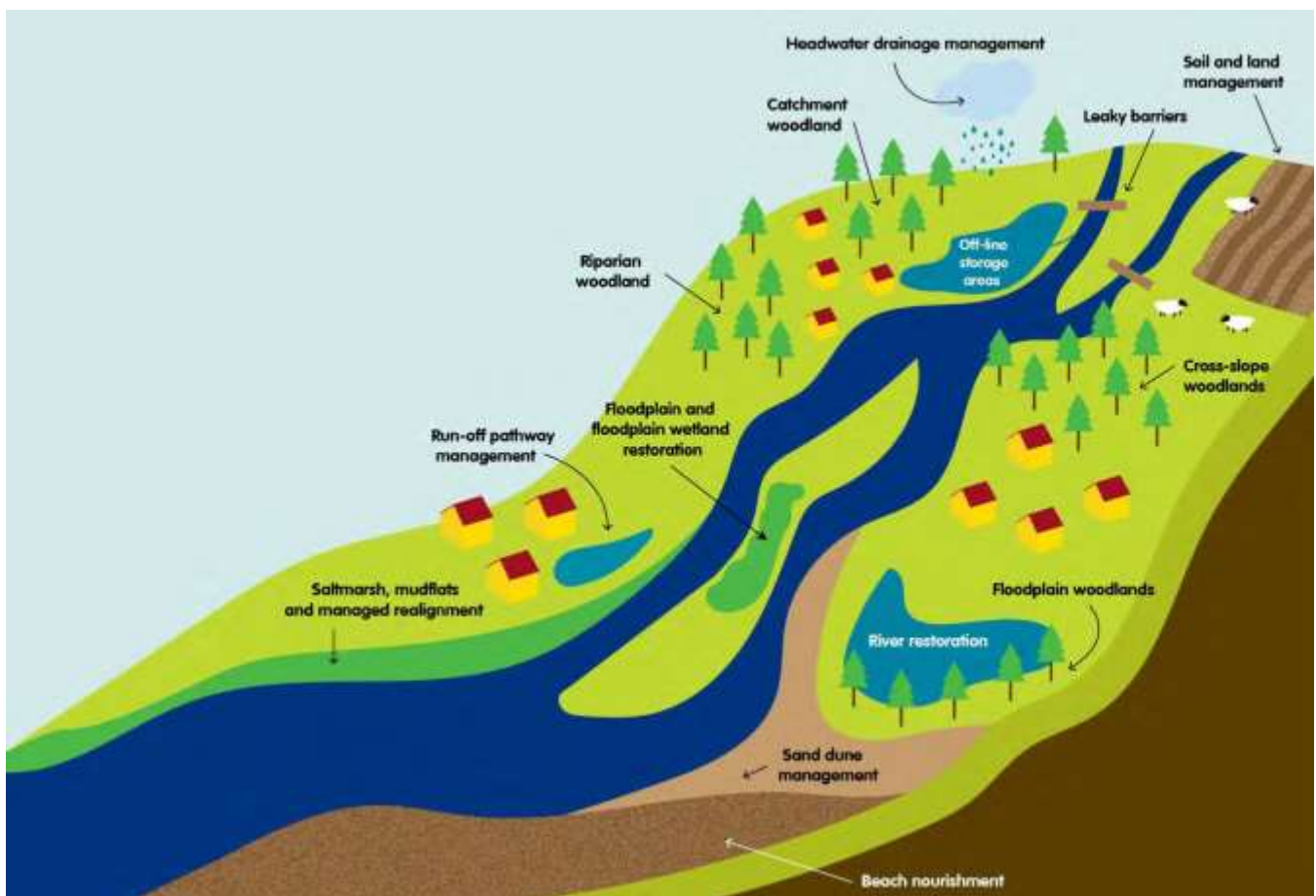
Ensure our communities are better protected from flooding both now and in the future. We will support existing communities through implementing nature-based solutions in catchments such as utilising upland water storage, better planned land management practices, de-culverting, blockage clearance of assets, construction of new defences, retrofitting to existing homes, businesses, infrastructure and key services.

Natural Flood Management – maximising water retention, slowing the flow, slowing the rate at which water enters a watercourse, rainfall interception, floodplain restoration, gully-blocking.

Environmental Land Management – Government support schemes for landowners to alter their land management practices, to enhance the local environment and provide flood risk benefits.

Adaptive pathways – allow communities to be agile to climate change where land use can easily adapt to future changes to the local environment.

Figure 1.2 examples of natural flood management

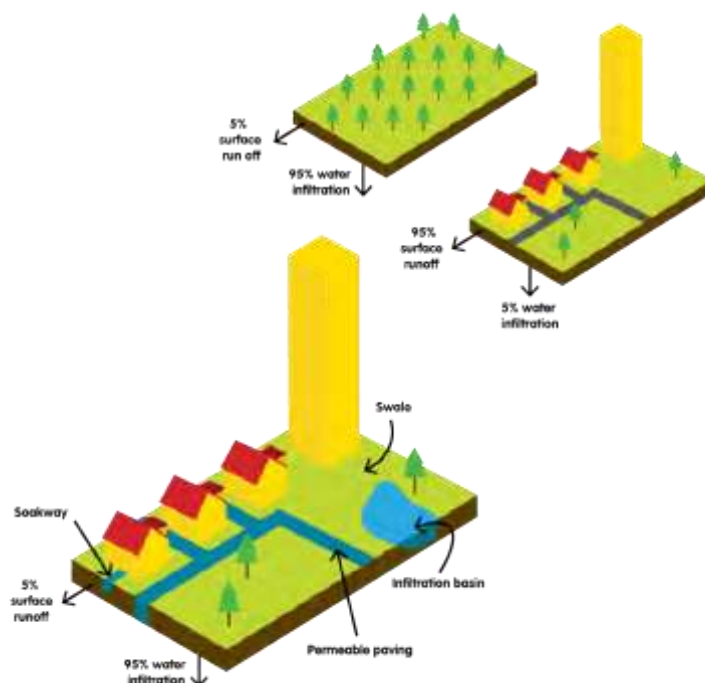


Property Flood Resilience – using various techniques to lower flood risk through the reduction of the impact of flooding on a property.



Sustainable Drainage Systems (SuDS) – used in new development or retrofitted to existing development, SuDS manage surface water and runoff as close to the source as possible and should mimic natural drainage through infiltration and attenuation following the SuDS hierarchy.

1. Rural environment where 95% of water infiltrates into the ground and 5% runs off as overland flow.
2. Urban development within the rural environment. Less infiltration and more runoff.
3. SuDS implementation including permeable paving, soakways, infiltration basins and swales.



RESPONSE



Being adequately prepared to ensure we can better respond to a flood event. We will assist organisations and communities in ensuring they are adequately prepared for a flood event occurring, for example, through early flood warnings, emergency flood and evacuation plans, and education and training and to enable local community flood groups to become resilient.

Kirklees Council publication: information leaflet regarding the use of sandbags.



Kirklees Council publication: social media graphic with emergency contact information.



RECOVERY



Recovering quickly and effectively from a flood event. We will aim to provide post-flood event recovery support, signpost affordable flood damage insurance, support community wellbeing and implement a build back better approach. We will also aim to review and record flood impacts to increase intelligence and review flood risk assets.

Figure 1.5 examples of responses to flooding



WHAT WE HAVE BEEN DOING

THIS SECTION BRIEFLY OUTLINES THE WORK WE HAVE BEEN DOING SINCE THE PUBLICATION OF OUR PREVIOUS STRATEGY IN 2012.

Since the publication of the previous Local Strategy for Kirklees, we have been working to satisfy the objectives of the Strategy and to implement actions from the Action Plan. A substantial amount of work has been carried out which has improved both the Council's evidence base, and to help manage local flood risk.

The main headline schemes from the previous few years include:

- £1 million DEFRA Property Flood Resilience Grant Support was put in place for flood victims in 2020 following Storm Ciara and Storm Dennis in February 2020. The scheme has helped to better protect 33 properties.
- £1.3 million Kirklees Culvert Programme completed April 2022 which has better protected 800 properties. A detailed survey of over 50 culverts were highlighted to pose a risk to residential properties. The project was delivered using in-house Council resources over a 6-year programme. Some culverts were completely replaced, and some required isolated repairs / replacements and improved access points.
- A £550k Kirklees Debris Screen Study was granted approval to review our high-risk debris screen assets from 2022-2024.
- A number of flood alleviation studies have been undertaken to improve our understanding of the sources of flood risk in our communities.
- A local flood innovation programme has been developed to scale up funding for five themes:
 1. Integrated Water Management
 2. Community Voluntary Sector
 3. Property Flood Resilience
 4. Natural Flood Management
 5. Local Flood Warning Systems.
- A community flood risk education programme has been completed reaching 1,000 properties.

Many of the measures outlined in the 2012 Strategy involved establishing new Council procedures to investigate flood events, introduce more robust data collection processes and to establish the LLFA as the main point of contact for the management of local flood risk.

Other measures in the 2012 Strategy involved improving the Council's understanding of the location and size of local flood risk and developing a programme of mitigation measures to manage the risk.

Additional studies have been completed to understand the surface water flood risk in Kirklees with outline recommendations being made. From these studies, an ongoing programme of mitigation measures is in place to address the locations at highest risk with greatest impact.

KIRKLEES FLOOD RESPONSE AND RECOVERY POLICY

This policy sets out the principles that the Council follows during flooding events which have a major disruptive impact in the area.

Arrangements are in place between the Council and the Met Office to highlight forthcoming severe rainfall events as part of the Met Office's National Severe Weather Warning System (NSWWS). Advance information on extreme rainfall events is provided by several partners and service areas within the Council. Work will continue with partners and other organisations to monitor new technology and information which may help to give more certainty to forecast information.

The Flood Response and Recovery Policy complements other Council initiatives to better protect local communities from the effects of flooding, namely:

- **Flood Risk Management programme** – identifying and delivering mitigation projects in areas that have flooded or are of higher flood risk.
- **Drainage Asset Improvement** – assessing the capacity requirements for highway drainage systems and establishing effective maintenance programmes.
- **The Severe Weather Management Plan** – forms the basis of the Council's response to severe weather in maintaining a resilient network to keep Kirklees safe and operating at times of severe weather.
- **Community wide engagement** on local flood risk to help communities and individuals to better understand the flood risk they face and to encourage a self-help approach.

Post flood recovery is concerned with getting communities back to normal as quickly as possible and building back better. The Council endeavours to help people and local economies recover by providing household skips and street cleansing operations to assist with clean-up operations. To build back better, the Council ensures appropriate flood incident data capture is undertaken by encouraging the public to report flood incidents. This helps to provide more focused support to communities and infrastructure where it is most needed to help ensure increased resilience in the future.

The Council has committed operational resources to provide community support during flood events when resources permit. The level of service will be proportionate to the level of risk but will be assessed following significant flood events to determine whether it remains suitable.

KIRKLEES PRE FLOODING OPERATIONAL PLAN

The Pre-Flooding Operational Plan provides procedural and functional arrangements necessary to deliver the commitment within the Flood Response and Recovery Policy. The plan aims to deliver an appropriate series of actions to mitigate the risk of flooding from severe rainfall events in the district. Low level actions in the Plan may be implemented prior to surface water flood events but it is challenging to have "spotters", who volunteer, mobilised in the right locations at the right time during such events.

OUR FUTURE LANDSCAPES AND CALDER CATCHMENT

Our partnerships involve a range of organisations collaborating and focusing on sustainable water management in the Calder, Upper Colne and Holme Catchments, West Yorkshire. The main aims of these groups are to reduce flood risk, increase the biodiversity of habitats, carbon capture and storage, green enterprise and access and recreation.

NATIONAL POLICY, GUIDANCE AND SUPPORTING DOCUMENTS

THIS SECTION LISTS NATIONAL POLICY, GUIDANCE AND RELEVANT DOCUMENT USED TO HELP SUPPORT THE FORMATION OF THE LOCAL STRATEGY. THE STRATEGY SHOULD BE CONSISTENT AND ALIGN WITH THESE POLICIES AND SUPPORTING DOCUMENTS.

NATIONAL POLICY AND GUIDANCE

THE FLOOD AND WATER MANAGEMENT ACT

The Flood and Water Management (2010) sets out how flood risk is managed in England and introduced new powers and responsibilities to Risk Management Authorities. The Act created the role of the LLFA for Unitary Authorities (such as Kirklees Council) and County Councils and set out the requirements for an LLFA to produce Local Flood Risk Management Strategies.

NATIONAL PLANNING POLICY FRAMEWORK

The National Planning Policy Framework⁵ (NPPF) received a major update in July 2021. In terms of flood risk, this included a focus on making sure local plans account for all sources of flood risk and encourage the use of green infrastructure and natural flood management. The theme of resilience was also expanded in this version, stating that development should be flood resistant and resilient “such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment”.

FLOOD RISK AND COASTAL CHANGE PLANNING PRACTICE GUIDANCE

The Flood Risk and Coastal Change Planning Practice Guidance⁶ (FRCC-PPG) was updated in August 2022 to reflect the changes made to the NPPF in 2021. Whilst the NPPF concentrates on high level national policy, the FRCC-PPG is more detailed and advises on how planning can take account of the risks associated with flooding in plan making and the development management process.

⁵ [National Planning Policy Framework](#)

⁶ [Flood Risk and Coastal Change Planning Practice Guidance](#)

STRATEGIES, PLANS AND ASSESSMENTS

All strategies, plans and assessments listed below are available to view online.

- [River Calder Catchment Flood Management Plan](#)⁷
- [Kirklees Surface Water Management Plan](#)⁸
- [Preliminary Flood Risk Assessment](#)⁹
- [Kirklees Local Flood Risk Management Strategy](#)¹⁰
- [Humber River Basin District Flood Risk Management Plan](#)
- [Calder Catchment Level 1 Strategic Flood Risk Assessment](#)¹¹
- [Climate Change Risk and Vulnerability Assessment](#)
- [Kirklees Development Plan](#)¹²
- [National Flood and Coastal Erosion Risk Management Strategy for England](#)
- [25 Year Environment Plan](#)¹³

STRATEGIC ENVIRONMENTAL ASSESSMENT

A Strategic Environmental Assessment (SEA) is required to underpin the Local Strategy so that there is confidence that implementation of the Strategy will be sustainable and avoid adverse environmental impacts. The SEA Directive: Guidance for Planning Authorities states that the objective is “to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development”.

See Appendix A for the SEA.

HABITAT REGULATIONS ASSESSMENT

A Habitat Regulations Assessment (HRA) is a process that determines whether development plans could negatively impact local plans on a recognised site beyond reasonable scientific doubt. A HRA is required any time a development project is being carried out on a European site that is protected by Habitat Regulations.

See Appendix B for the HRA.

⁷ [River Calder Catchment Flood Management Plan 2009](#)

⁸ [Kirklees Surface Water Management Plan 2011](#)

⁹ [Preliminary Flood Risk Assessment for Kirklees. Kirklees Council. 2011](#)

¹⁰ [Kirklees Local Flood Risk Management Strategy. Kirklees. 2012](#)

¹¹ [Calder Catchment Level 1 Strategic Flood Risk Assessment 2016](#)

¹² [Kirklees Development Plan](#)

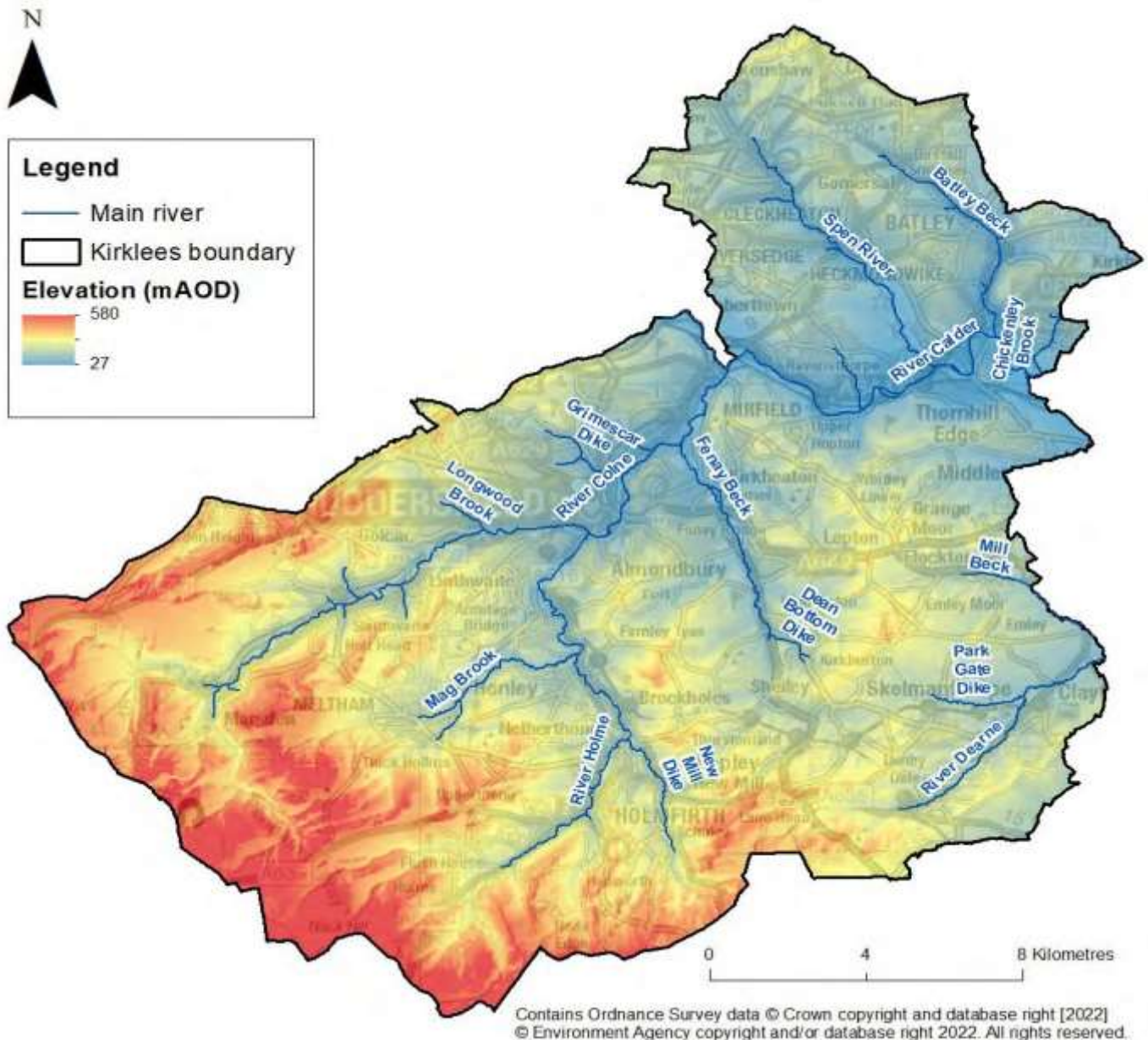
¹³ [25 Year Environment Plan](#)

FLOOD RISK IN KIRKLEES

STUDY AREA

According to the mid-2020 Office for National Statistics population estimates 14, 441,290 people live in the local authority area of Kirklees. Kirklees is situated in West Yorkshire and covers an area of approximately 409 square kilometres and includes the towns of Huddersfield, Dewsbury, Batley, Heckmondwike and Cleckheaton. Kirklees is bordered by the neighbouring authorities of Bradford, Barnsley, Calderdale, High Peak District, Leeds, Oldham and Wakefield.

Figure 4.1 Topography and main rivers in Kirklees



RIVER BASIN DISTRICTS AND CATCHMENTS

Kirklees is within the Humber River Basin District (RBD). There are 18 Environment Agency (EA) management catchments within the Humber RBD, three cover parts of Kirklees, namely:

- Aire and Calder
- Don and Rother
- Upper Mersey.

As can be seen in Figure 4.2 the majority of Kirklees is within the Aire and Calder management catchment with the exception of the upper catchment of the River Dearne which is in the Don and Rother management catchment in the southeast of Kirklees. The Upper Mersey management catchment almost forms the southwestern boundary of Kirklees at the ridge of the Pennine Mountains.

There are 19 Water Framework Directive (WFD) catchments, Figure 4.3, within or partially within Kirklees that will have an influence on flood risk within the district, the majority of which flow into the Calder catchment in the north of the district. The WFD catchments loosely align with the Council's local catchments which are in place to enhance local flood warning systems by setting virtual flood alerts.

Figure 4.2 EA management catchments

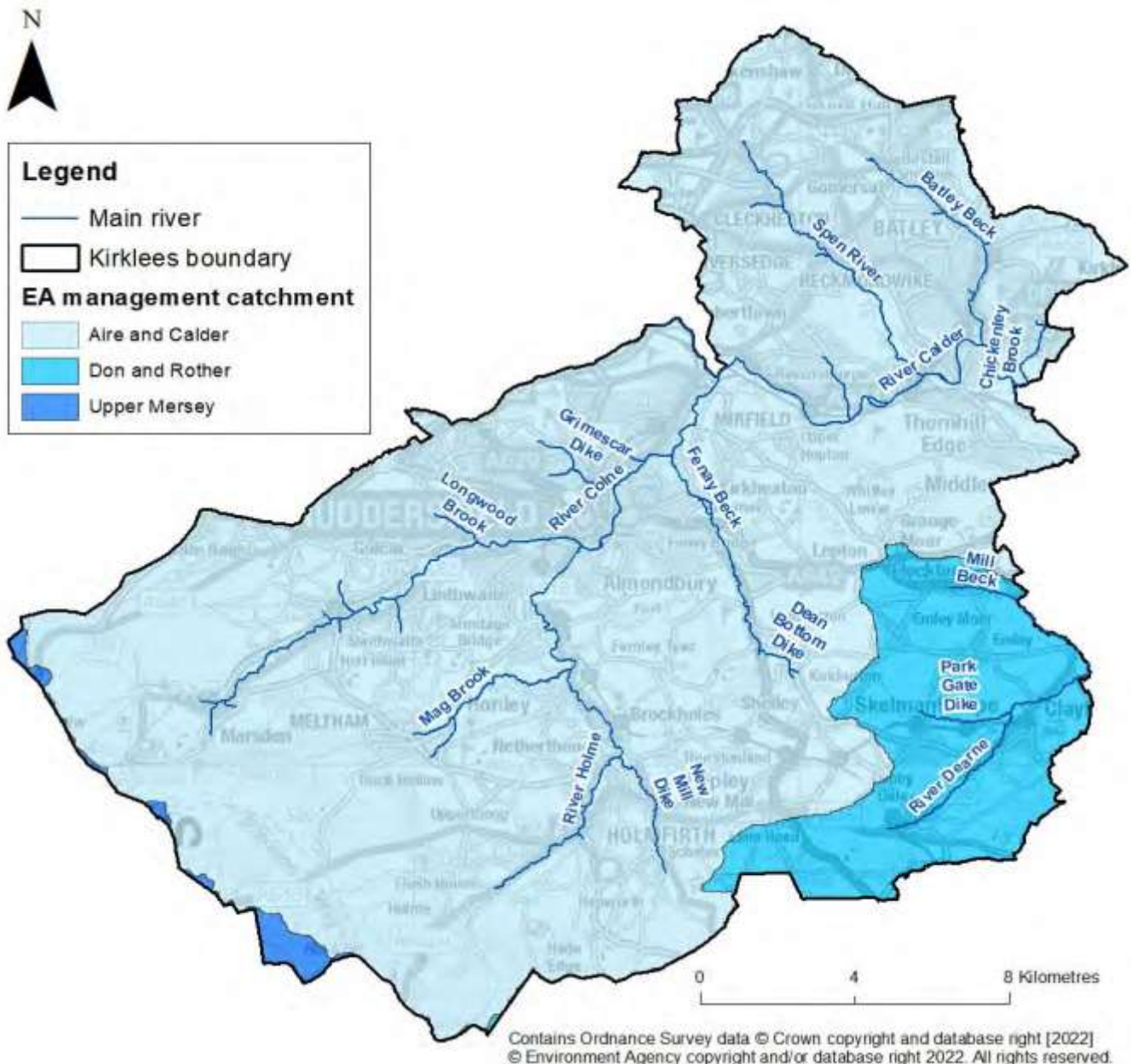
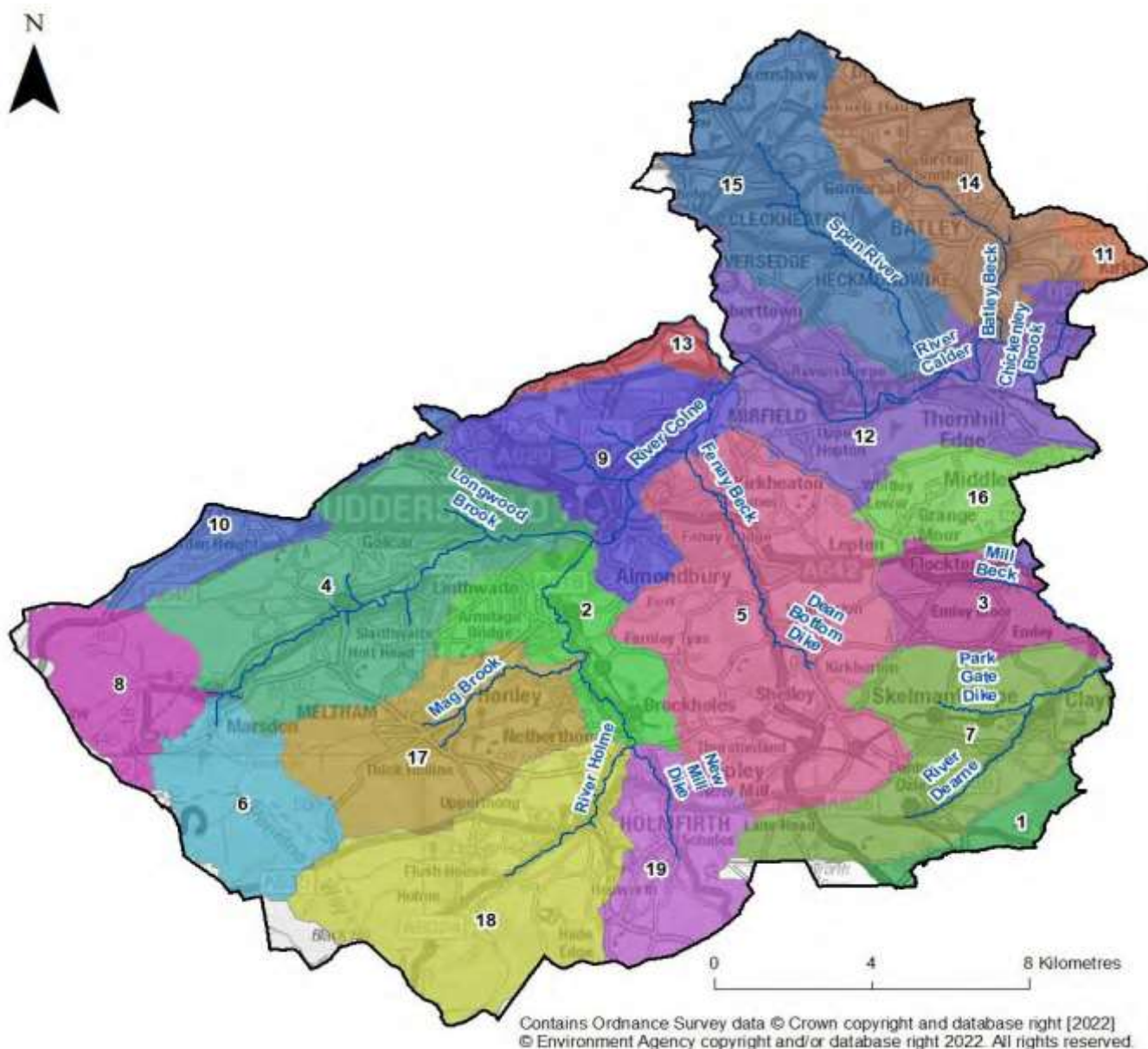


Figure 4.3 WFD catchments influencing flood risk in Kirklees



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Legend

- Main river
- Kirklees boundary
- WFD river catchments**
- 1 - Cawthome Dyke from Source to River Dearne
- 2 - Holme from New Mill Dike to R Colne
- 3 - Bentley Brook from Source to River Dearne
- 4 - Colne from Wessenden Brook to R Holme
- 5 - Fenay beck from Source to River Colne
- 6 - Wessenden Bk from Butterly Resr to River Coln
- 7 - Dearne from Source to Bentley Brook
- 8 - Colne from Source to Wessenden Brook
- 9 - Colne from River Holme to River Calder
- 10 - Black Brook from Source to River Calder
- 11 - Chald from Source to River Calder
- 12 - Calder from River Colne to River Chald
- 13 - Calder from Ryburn Confluence to River Colne
- 14 - Batley Beck from Source to River Calder
- 15 - Spem Beck from Source to River Calder
- 16 - Smithy Brook from Source to River Calder
- 17 - Mag Brook from Source to River Holme
- 18 - Holme from Source to New Mill Dike
- 19 - New Mill Dike from Source to River Holme

RAPID RESPONSE CATCHMENTS

The Environment Agency has a Rapid Response Catchment (RRC) register which was prepared using a combination of flood event factors such as time to peak, flood depths and velocities and the amount of debris carried in the floodwater. Potential property numbers affected and vulnerable sites such as care homes and camp sites were also considered.

The RCC register states the following for Kirklees:

- **Very High-Risk catchments** – Brockholes (River Holme), Holmfirth (River Holme), Oakenshaw (Hunsworth Beck)
- **High Risk catchments** – Marsden (River Colne), New Mill (New Mill Dyke), Ravensthorpe (River Spen)

These Rapid Response Catchments are shown in Appendix C.

Many communities in the Colne/Holme catchment, with its steep sided valleys, small watercourses draining off hillsides and through urban areas, could be vulnerable to flash flooding if subject to particularly intense rainfall over a sustained period.

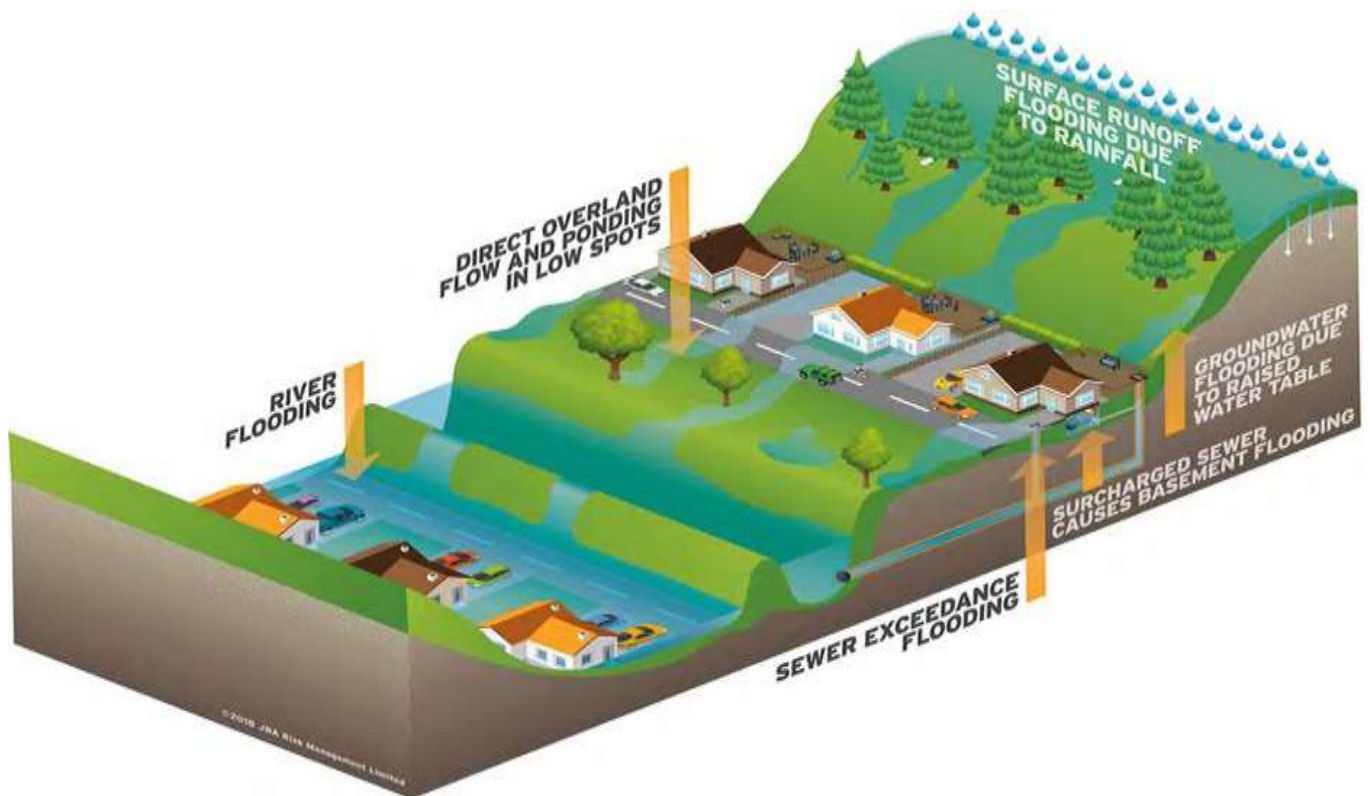
Along with other high-risk communities, we will look to provide appropriate support to the communities affected by these rapid response catchments.

FLOOD RISK

Flooding is a natural process and can happen at any time in a wide variety of locations. It constitutes a temporary covering of land not normally covered by water and presents a risk when human or environmental assets are present in the area that floods. Assets at risk from flooding can include housing, transport and public service infrastructure (including vulnerable services such as hospitals and schools), commercial and industrial enterprises, agricultural land and environmental and cultural heritage. Flooding in Kirklees can occur from many different and combined sources such as fluvial (from main rivers and ordinary watercourses), surface water, groundwater, sewers or indirectly from infrastructure failure, as illustrated in Figure 4-4 below.

Different types and forms of flooding present a range of different risks and the flood hazards of speed of inundation, depth and duration of flooding can vary greatly. With climate change, the frequency, pattern and severity of flooding are expected to change and become more damaging.

Figure 4-4 examples of flood risks in Kirklees



The different examples of flood risks in Kirklees are:

- Surface runoff flooding due to rainfall
- River flooding
- Direct overland flow and ponding in low spots
- Groundwater flooding due to raised water table
- Sewer exceedance flooding
- Surcharged sewer causes basement flooding.

FLOODING IN KIRKLEES

An important aspect of the strategy is to assess the local flood risk within the administrative area constituting risk from surface water, groundwater, and ordinary watercourses.

To assess the potential impacts of surface water flooding, property counts (both residential and non-residential) have been derived based on the Risk of Flooding from Surface Water (RoFSW) dataset. The counts revealed that Kirklees has approximately 6,600 residential properties and 3,700 non-residential properties at risk of flooding during a 1 in 100-year (1% Annual Exceedance Probability (AEP)) rainfall event. This is predicted to increase to approximately 11,600 residential and 5,500 non-residential properties as a result of the impact of climate change (based on the 45% climate change uplift as advised by the EA for the Aire and Calder Management Catchment, based on UKCP18 local projections).

HISTORIC FLOOD EVENTS

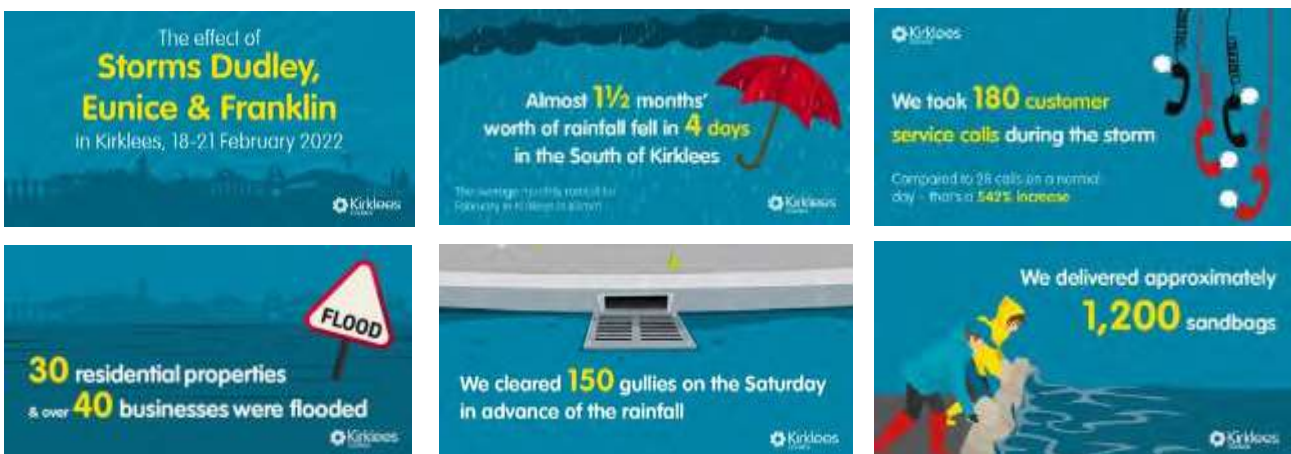
Kirklees has a history of flooding in many different locations from fluvial, surface water and sewer sources. Information on incidents of flooding is recorded by the EA and Kirklees Council. The following information sources were assessed to understand historic flooding in the district:

- EA Recorded Flood Outlines dataset.
- Kirklees Council historic floods database.

Figure 4.5 below shows flood incidents, from any source, recorded as locally significant by Kirklees since 2007. These incidents include internal and external flooding of properties and businesses, and also roads, footpaths and gardens. The major flooding events within Kirklees have mainly occurred around the main rivers; the River Colne, River Calder and Spen River. Also shown is the Recorded Flood Outlines Dataset which is associated with fluvial flooding from main rivers, such as the River Calder and its tributaries.

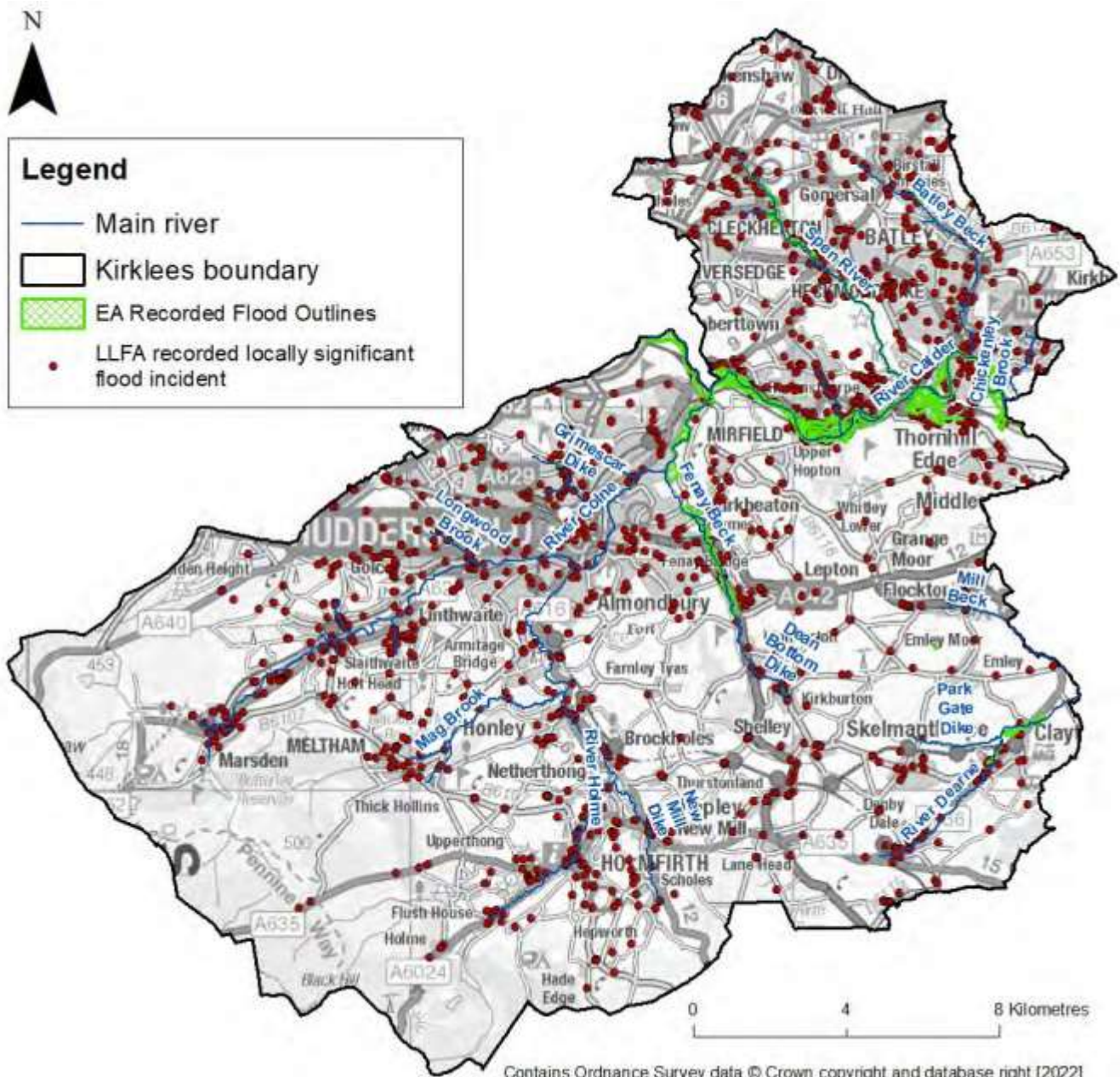
Notable recorded historic flood incidents include:

- February 2022 – Storm Dudley, Eunice and Franklin; triple storm week brought strong winds and rain to the district. A number of internal property flooding was reported to both residential properties and businesses.



- February 2020 – Storm Ciara and Storm Dennis; channel capacity exceeded on main rivers, including the River Calder, and ordinary watercourses.
- December 2015 – Channel capacity exceeded on the River Calder upstream of Sands.
- June 2007 - Estimated 500 properties flooded due primarily to surface water where rainwater was unable to enter drainage systems due to design capacity being exceeded. The flooding was widespread across the district, but hotspots occurred around Ravensthorpe, Liversedge, Cleckheaton, Chickenley, Mirfield, Milnsbridge, Brockholes, New Mill, Denby Dale, Scissett and Clayton West.

FIGURE 4.5 HISTORIC FLOODING EVENTS IN KIRKLEES

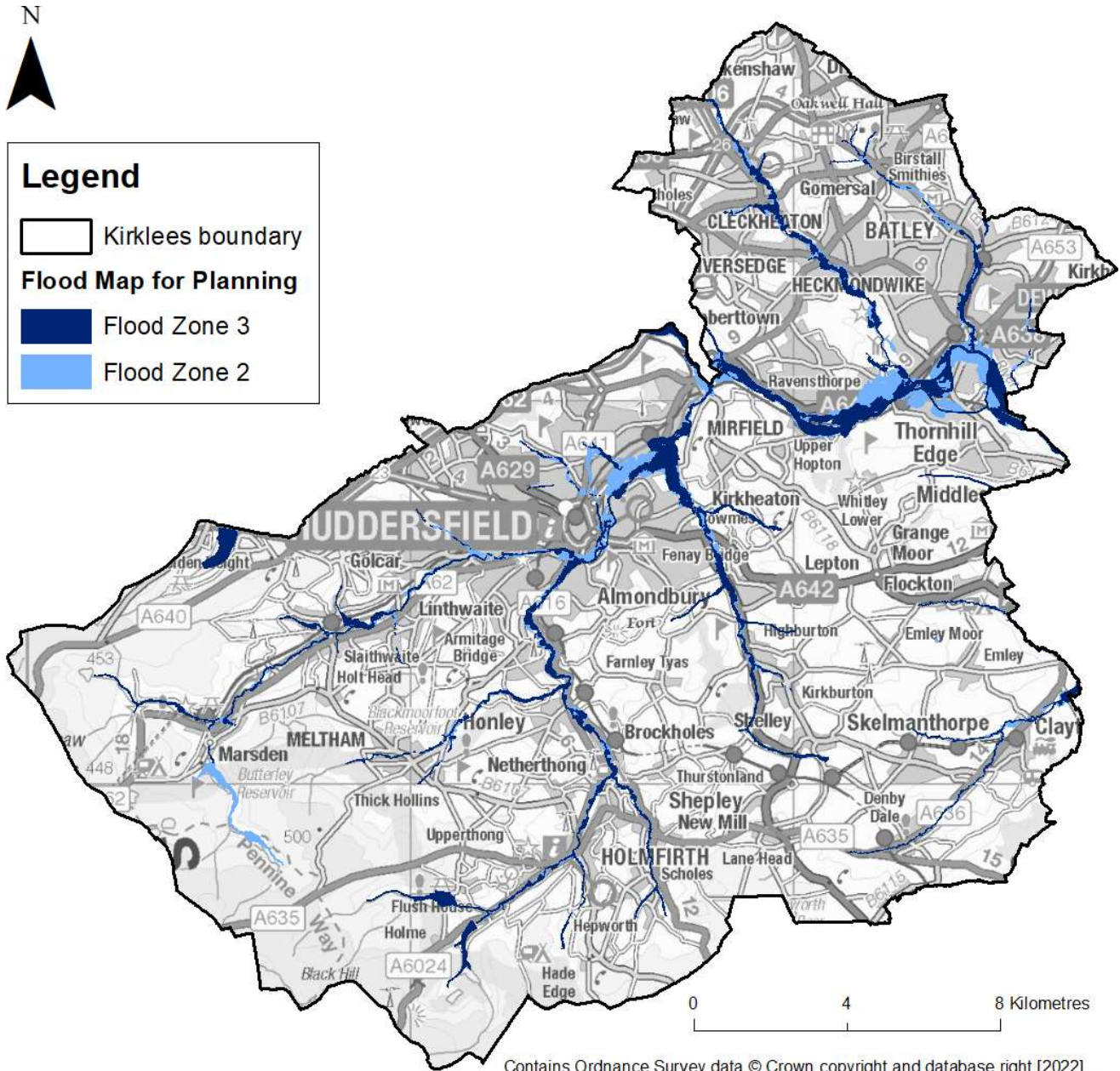


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RIVER FLOODING

Figure 4.6 highlights the areas at risk of flooding from main rivers within Kirklees, as indicated by the Environment Agency's Flood Map for Planning dataset. Note that the Flood Map for Planning is based on an undefended, worst-case scenario and does not include for the effects of climate change. Flooding from main rivers is the management responsibility of the Environment Agency.

Figure 4.6 Flood risks from main rivers, Environment Agency Flood Map for Planning



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MAIN RIVER

Main rivers are generally major watercourses for which the EA have a regulatory responsibility with permissive powers to carry out maintenance, improvement or construction work to manage flood risk. The hydraulic characteristics of the main rivers in Kirklees are generally well understood with computer modelling of flood risk having been carried out over the past 15 years. The Environment Agency also regulate development or works in, on, over, under or within 8 metres of fluvial main river watercourses under the Environmental Permitting (England and Wales) Regulation 2016. This also includes within the floodplain if works do not have planning permission and require quarrying or excavation within 16 metres of any main river, flood defence or culvert.

Although flooding from main rivers falls under the remit of the Environment Agency, we will work closely in partnership with the Environment Agency to understand and help to reduce risk from main rivers to our communities.

The range of activities subject to regulation are listed online at <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits#check-if-the-activity-is-on-a-main-river>. Figure 4.7 below illustrates the main rivers within Kirklees.

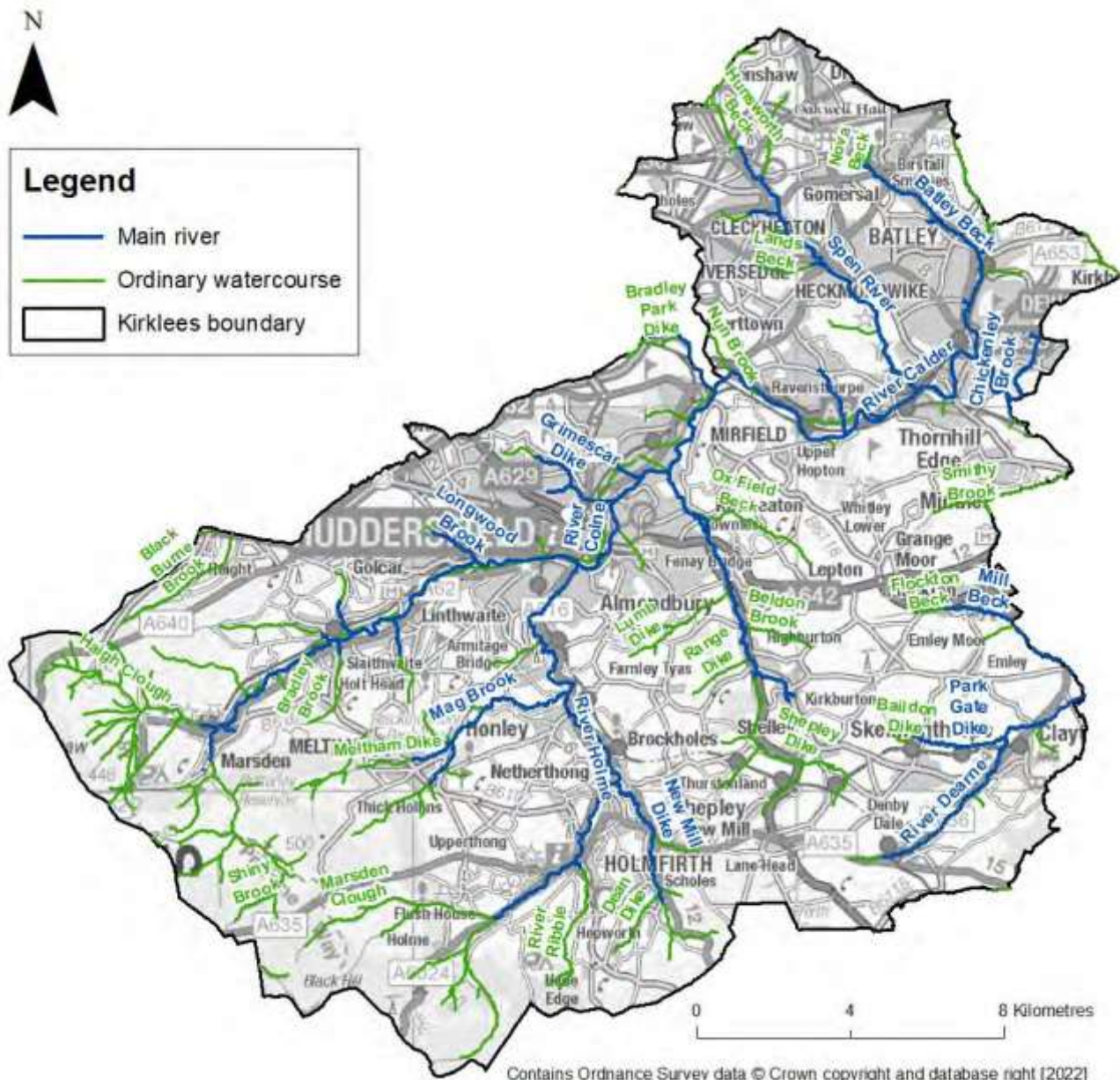
ORDINARY WATERCOURSES

Ordinary watercourses are any watercourse that is not designated main river. These watercourses can vary in size considerably and can include rivers, streams and all ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows. Ordinary watercourses do not always contain flowing water all year long; there may be times where the watercourses run dry, particularly over prolonged dry spells. Such watercourses can be described as ephemeral watercourses.

Ordinary watercourses come under the regulation of Kirklees Council as Lead Local Flood authority, which has permissive powers to carry out works, should this be deemed necessary, and has regulatory control over certain development activities within the watercourse channel. Many ordinary watercourses exist across the district (see Figure 4.7 below), the condition and capacity of which has not historically been recorded hence limited information is available on culverted sections.

As LLFA, we aim to increase our understanding of flood risk from ordinary watercourses and the impacts such flooding is having and/or could have in the future as a result of climate change on our communities.

Figure 4.7 Main rivers and known ordinary watercourses within Kirklees

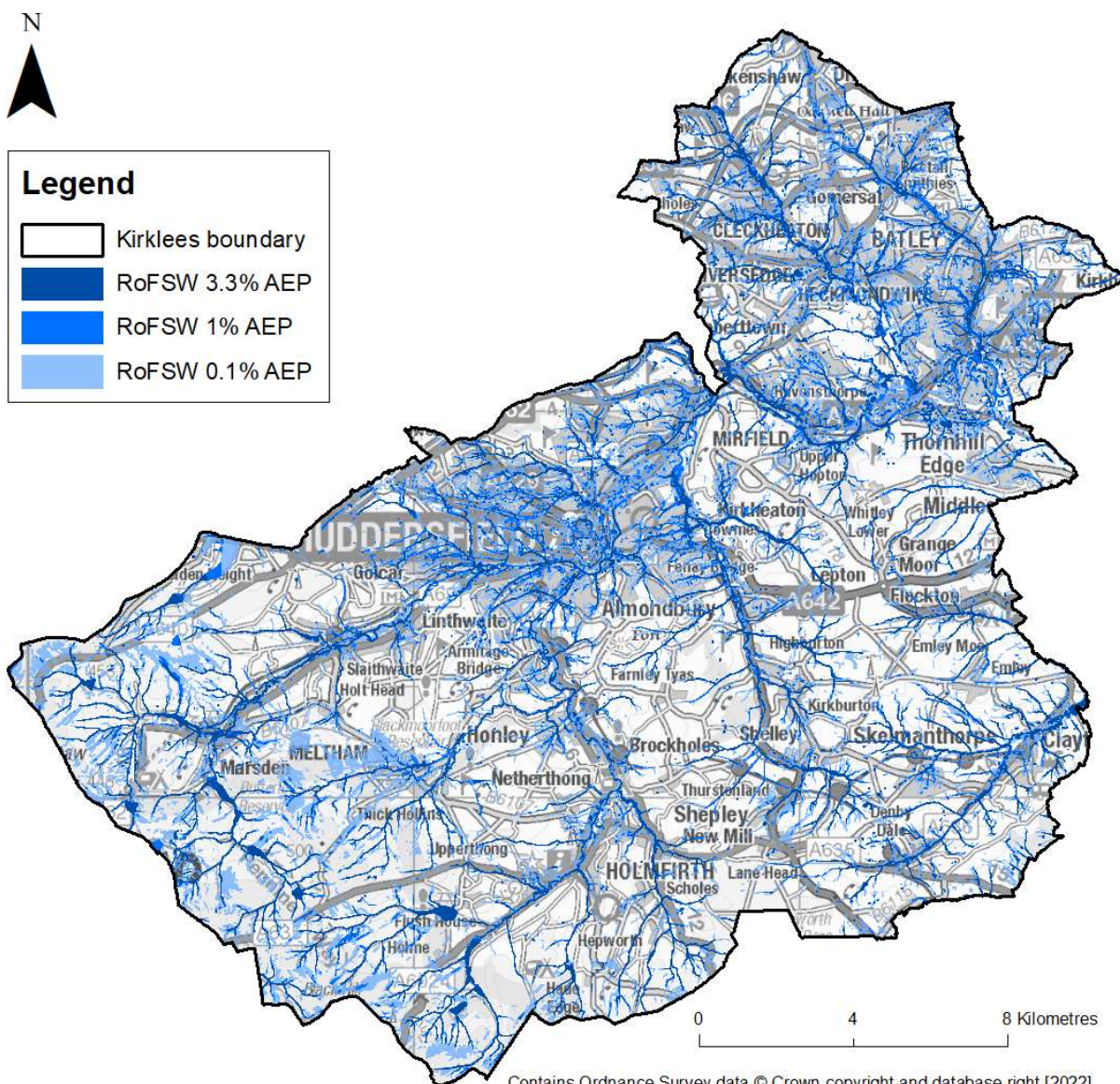


SURFACE WATER FLOODING

Surface water flooding is caused as a result of periods of high rainfall intensity or rainfall occurring when the ground is already saturated. Impermeable surfaces in urban areas are likely to heighten the risk of surface water flooding due to water not being able to infiltrate the surface. In addition, significant periods of heavy rainfall in areas with poor drainage systems may lead to blocked drains and sewer flooding. High summer temperatures can also harden the ground which can limit infiltration and cause problems during convective thunderstorms which often follow hot weather.

Figure 4.8 illustrates the Risk of Flooding from Surface Water (RoFSW) dataset which shows significant risk in the more urban areas of Huddersfield and Dewsbury and Batley in the north of the district. The more significant risk is apparent in these areas due to the greater proportion of less permeable and impermeable land surfaces. Surface water flood flows generally mimic the topography, following the watercourse channels and floodplains with areas of isolated ponding in topographic low spots.

Figure 4.8 flood risk from surface water, based on the EA Risk of Flooding from Surface Water dataset



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EA RISK OF FLOODING FROM SURFACE WATER DATASET

The national Risk of Flooding from Surface Water (RoFSW) dataset identifies areas where localised flooding can cause problems even if main rivers are not overflowing. The RoFSW presents a worst-case scenario; therefore, any location identified to be at risk from surface water flooding according to the RoFSW should be assessed in more detail, usually through an appropriate Flood Risk Assessment (FRA). The RoFSW is the primary dataset available to the LLFA for assessing surface water flood risk in the district.

The RoFSW includes surface water flood outlines, depths, velocities and hazards for the following events:

- Greater than 1 in 30-year event (3.3% AEP) – high-risk
- Between 1 in 30-year event and 1 in 100-year event (1% AEP) – medium risk
- Between 1 in 100-year event and 1 in 1,000-year event (0.1% AEP) – low risk
- Less than 1 in 1,000 year (0.1% AEP) – Very low risk (not shown).

At the time of writing, the EA is also carrying out a national update of the RoFSW as part of the National Flood Risk Assessment 2 (NaFRA2) project which is due for completion in 2024.

As LLFA, we will continue to manage surface water flood risk and will work in partnership with local communities to raise awareness and encourage the participation in local flood risk management. Such awareness of local flood risk and participation in flood risk management will become increasingly more important in our changing climate.

GROUNDWATER FLOODING

Groundwater flooding is caused by the emergence of water from beneath the ground, either at point or diffuse locations. The occurrence of groundwater flooding is usually local and unlike flooding from rivers, does not generally pose a significant risk to life due to the slow rate at which the water level rises. However, groundwater flooding can cause significant damage to property, especially in urban areas and can pose further risks to the environment and ground stability.

Warmer, wetter winters and hotter, drier summers due to climate change are likely to have significant impacts on groundwater levels within Kirklees. Increased periods of rainfall within the district are likely to increase the susceptibility of groundwater flooding in areas currently at risk. It is considered unusual to see groundwater breaking through the surface of the ground but the high number of basements in older properties, means that groundwater flooding to “below ground” rooms is increasingly common.

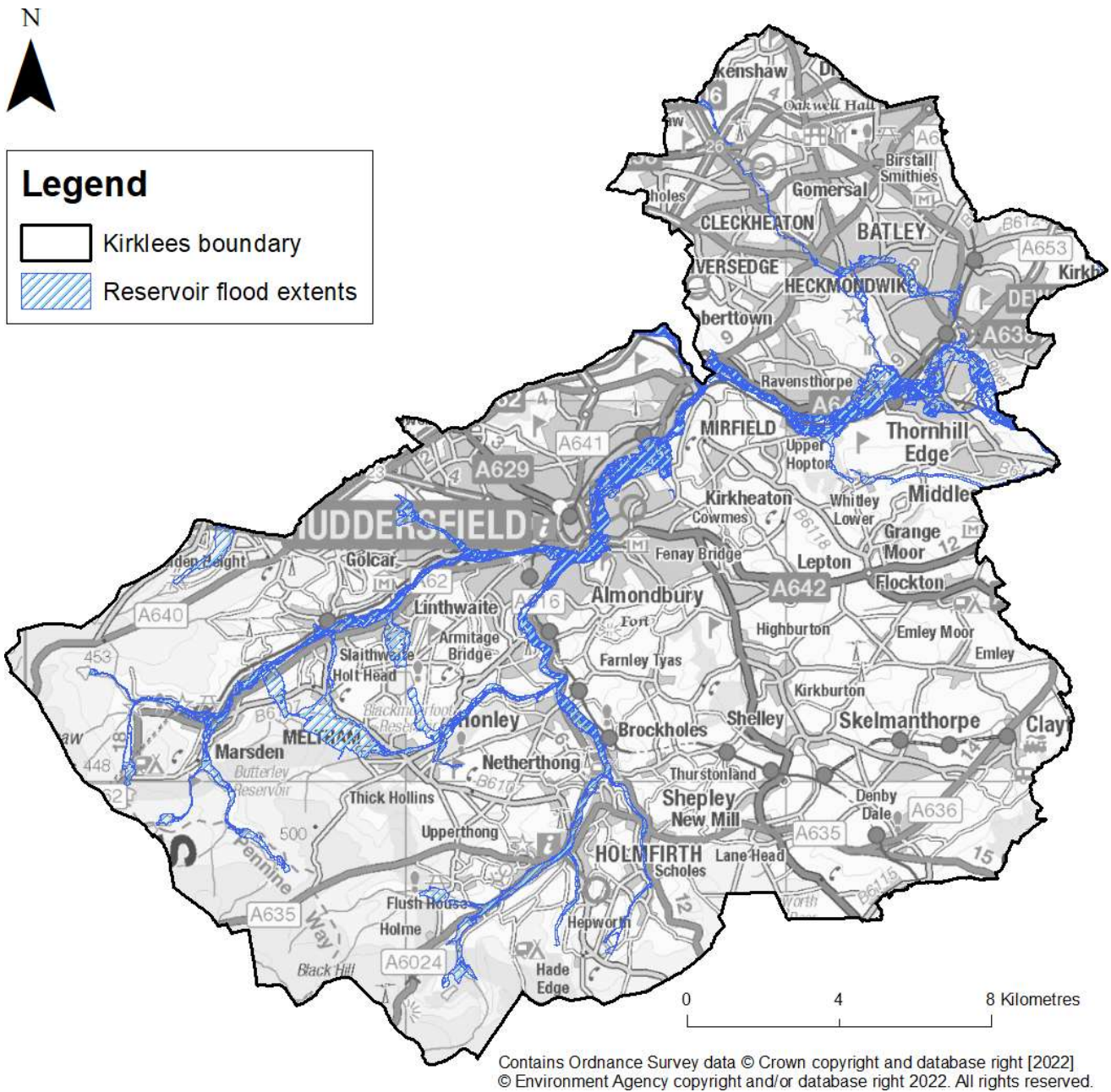
Development within areas that have a periodic high-water table will generally not be suited to infiltration SuDS. However, this is dependent on a detailed site investigation and at the Flood Risk Assessment A stage. Within Kirklees there are a high number of older properties containing cellars and basements, which can be particularly prone to rising water tables and therefore groundwater flooding. We will continue to work with homeowners concerning possible groundwater flood risk to existing properties.

Recorded incidents of groundwater flooding in Kirklees are rare. However, we will continue to raise awareness in local communities of the risks associated with groundwater flooding and how such risks can be mitigated.

RESERVOIR FLOODING

The EA has produced Reservoir Flood Maps (RFM) for all large, raised reservoirs that are regulated under the Reservoirs Act 1975 (reservoirs that hold over 25,000 cubic metres of water). Figure 4-9 highlights the risk of reservoir flooding across Kirklees in the event of a dry day i.e., when it isn't raining. The RFM extent shows the worst credible area that is susceptible to dam breach flooding. The map should be used to prioritise areas for evacuation/early warning. The RFM shows that there are 51 large-raised reservoirs which have the potential to impact Kirklees in the event of a breach. 32 of these large-raised reservoirs are located within the Kirklees boundary.

Figure 4.9 risk of flooding from reservoirs (EA Reservoir Flood Map)



We will work with and support reservoir owners to ensure the risk of flooding from reservoirs remains very low.

SEWER FLOODING

Sewer flooding has the potential to occur where significant amounts of intense rainfall overload the sewer system capacity causing water to back up through the sewers and surcharge through manholes. This has the potential to flood both road infrastructure and property. Pinch points and failures within the drainage network may also restrict flows.

Yorkshire Water owns the majority of the combined and surface water sewers within the district. Since 1980, sewer systems have been designed not to flood during a 1 in 30-year (3.3% AEP) rainfall event. However, higher magnitude events, e.g., a 1 in 100 chance of occurring in any given year (1% AEP), can still overwhelm the sewerage system through both surface water and fluvial sources. Existing sewerage systems can be placed under additional pressure where development reduces the permeable area within a catchment and through the impacts of climate change. This can lead to increased overland flows and therefore can occur in any location across Kirklees.

The Council continues to work in partnership with Yorkshire Water, the Environment Agency and other parties to better understand the interaction of the sewerage and drainage networks and provide improvements that will help further reduce the risk of flooding from sewers.

FLOOD MITIGATION

EXISTING FLOOD DEFENCES

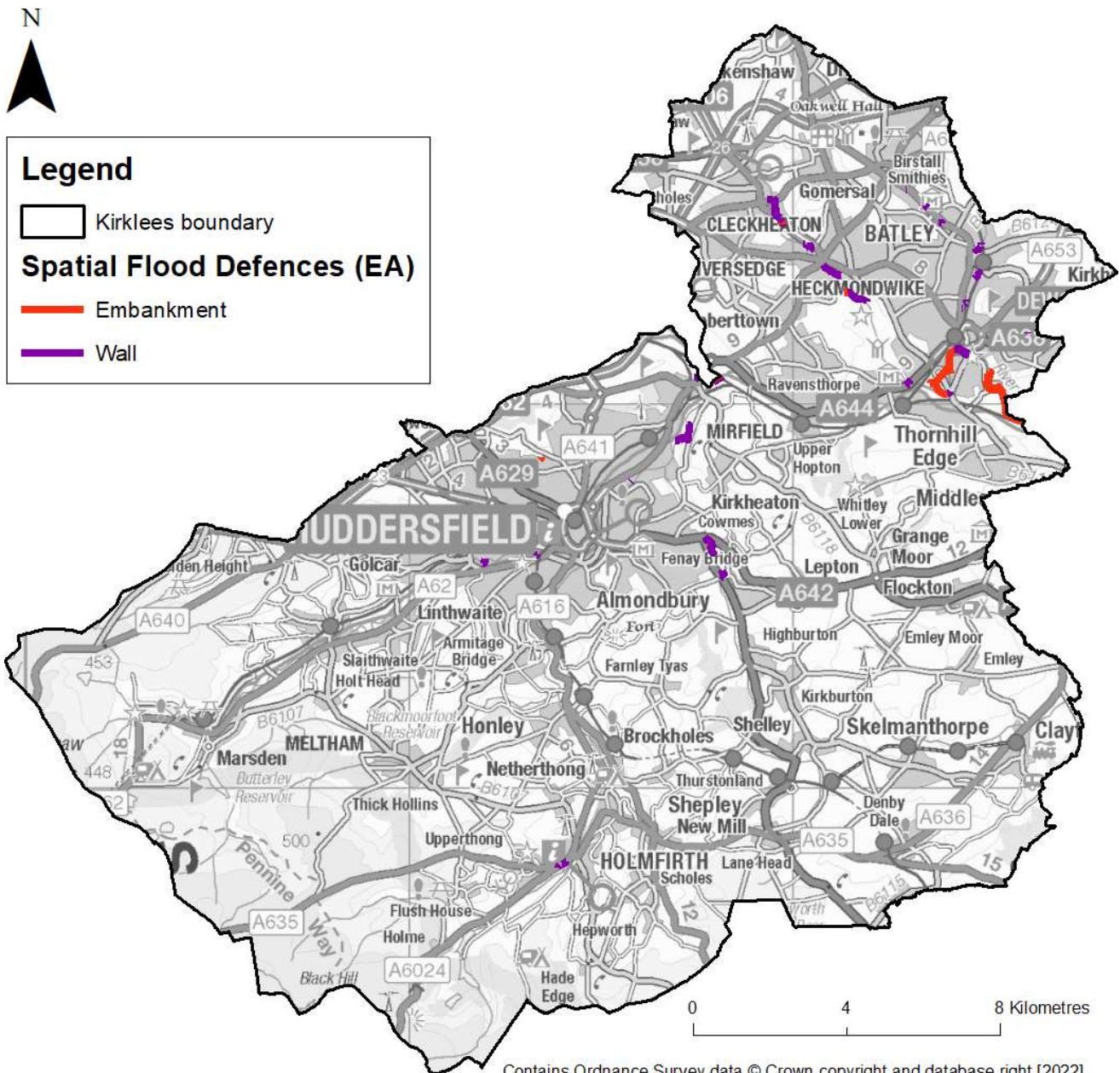
The EA's Spatial Flood defences dataset shows major flood defence walls and embankments currently owned, managed or inspected by the EA (Figure 4-10). Flood defences can be structures, buildings or parts of buildings, and can include manmade defence assets such as flood walls or embankments, or natural defences such as high ground.

Most main rivers within Kirklees have some form of flood defence along their reaches. These consist mostly of areas of natural or engineered areas of high ground which are not shown on Figure 4-10. Manmade defences include embankments, flood walls and flood gates. Flood defences are given a standard of protection and asset condition rating. An assessment of flood defences within the district highlights the majority of assets have a standard of protection to an annual exceedance probability of between 20 and 50 years, meaning protection is provided until a flood event exceeds a 1 in 50-year (2% AEP) flood event. The condition rating of the flood defence assets is mostly either 2 or 3, rated as good or fair when they were last inspected between 2021 and 2022.

ASSET MANAGEMENT

Kirklees own and maintains assets across the district, which includes culverts, bridge structures and trash screens. We are also responsible for its highway drainage systems such as highway gullies and carrier drains which are required to drain the public highway. The Council maintains these in accordance with the Well Managed Highway Infrastructure Code of Practice.

Figure 4.10 EA Spatial Flood Defences dataset indicating major flood walls and flood embankments within Kirklees



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WORKING WITH NATURAL PROCESSES

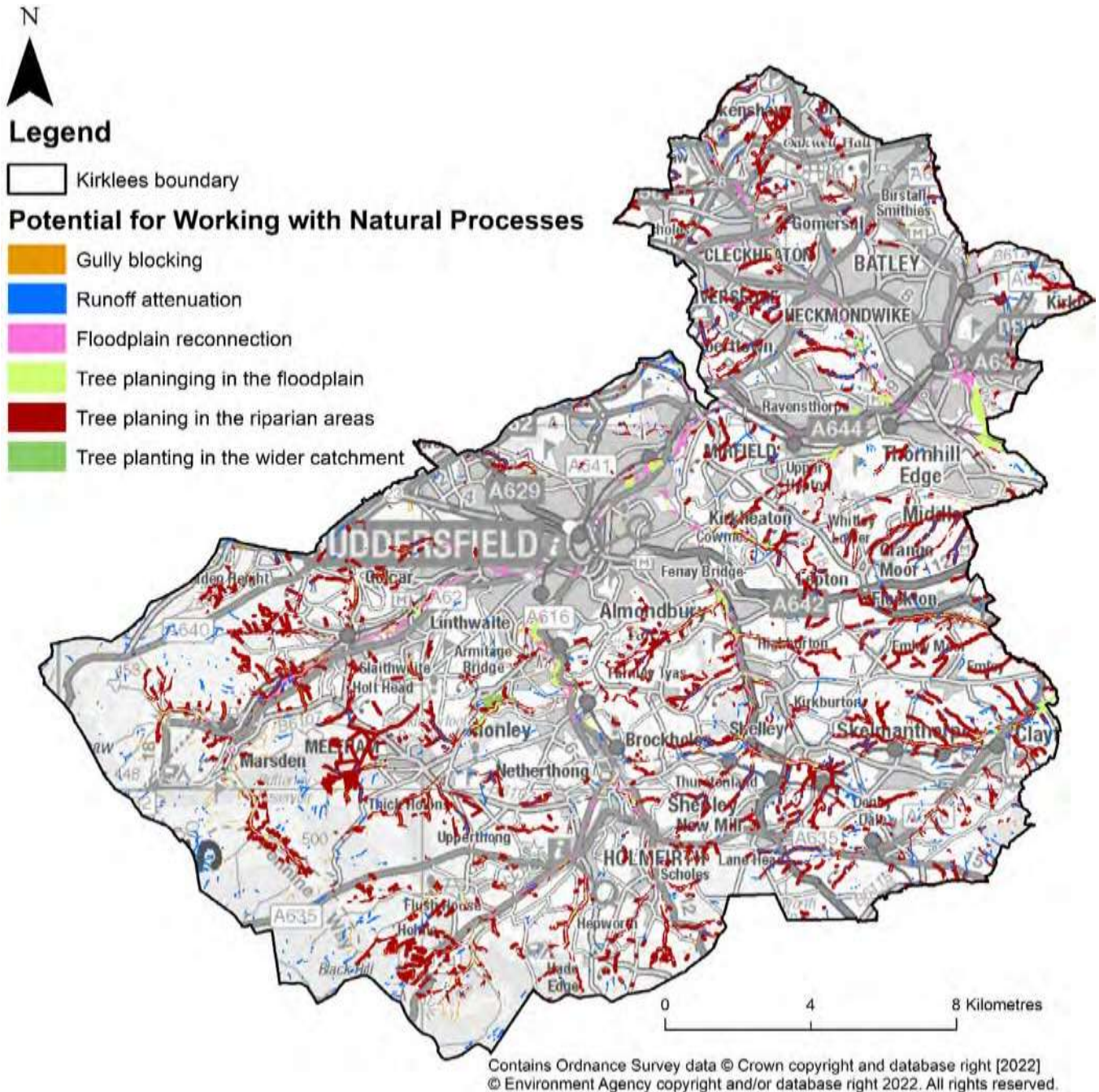
Working with Natural Processes (WwNP) or Natural flood management (NFM) is a type of flood risk management used to protect, restore and re-naturalise the function of catchments and rivers to reduce flood and coastal erosion risk. WwNP has the potential to provide environmentally sensitive approaches to minimising flood risk, to reduce flood risk in areas where hard flood defences are not feasible and to increase the lifespan of existing flood defences.

A wide range of techniques can be used that aim to reduce flooding by working with natural features and processes in order to store or slow down flood waters before they can damage flood risk receptors

(e.g. people, property, infrastructure, etc.). WwNP involves taking action to manage flood and coastal erosion risk by protecting, restoring and emulating the natural regulating functions of catchments, rivers, floodplains and coasts.

Figure 4.11 illustrates the EA's Working with Natural Processes dataset. There is considerable opportunity across Kirklees for tree planting along flow pathways within smaller floodplains to attenuate flooding. The opportunities for tree planting are mainly confined to less urban areas.

Figure 4.11 Working with Natural Processes



Within Huddersfield the only opportunity for WwNP is floodplain reconnection, which aims to reconnect a watercourse and its natural floodplain, especially during high flows, to reduce the rapid propagation of flows downstream. These opportunities have been identified in areas of low risk where there are no existing developments but where natural river features or landscape modifications, such as historic embankments, disconnect the channel from the floodplain.

CLIMATE CHANGE – UK CLIMATE PROJECTIONS

THIS SECTION OF THE REPORT HIGHLIGHTS THE POSSIBLE IMPACTS OF CLIMATE CHANGE ON SURFACE WATER IN KIRKLEES AND THEREFORE WHY BUILDING RESILIENCE INTO OUR COMMUNITIES IS SO IMPORTANT.

Following on from the UK Climate Projections 2009 (UKCP09), the UK Climate Projections 2018 (UKCP18) delivered a major upgrade to the range of UK climate projection tools designed to help decision-makers assess their risk exposure to our changing climate.

The UKCP18 project used cutting-edge climate science to provide updated observations and climate change projections up to the year 2100 across the UK. The project builds upon UKCP09 to provide the most up-to-date assessment of how the climate of the UK may change over the 21st century.

UKCP18 updates the projections over land and provides a set of detailed future climate projections for the UK at a 12km scale. Models of high impact events such as from localised heavy rainfall in summer months were created. UKCP18 enables the UK to adapt to the challenges and opportunities presented by climate change.

KIRKLEES CLIMATE EMERGENCY¹⁶



The Council declared a climate emergency in 2019 in the knowledge that we must all take urgent action to improve and protect our environment.

Our vision is for a Net Zero and Climate Ready Kirklees by 2038. This provides us with focus on both mitigation and adaptation to climate change.

For mitigation, carbon emissions from human activities will need to be dramatically reduced to zero, with any remaining emissions safely removed from the atmosphere.



15 Met Office UKCP18

16 [Kirklees Climate Emergency](#)

IMPACTS OF CLIMATE CHANGE ON SURFACE WATER IN KIRKLEES

As part of this Strategy, we have modelled the climate change allowances for peak rainfall to give an insight into the effects of climate change on surface water flows and the subsequent impacts on communities in Kirklees.

The likely impacts of climate change are well documented and will have a significant impact on flood risk. Increases in duration and intensity of extreme rainfall events as a result of climate change will increase flood risk from multiple sources.

Surface water flooding is caused by periods of high rainfall intensity or rainfall occurring when the ground is already wet. As part of this Strategy, we have modelled the climate change allowances for peak rainfall to give an insight into the effects of climate change on surface water flows and the subsequent impacts on communities in Kirklees.

To gauge the impacts of climate change on surface water and for small scale drainage design, the Environment Agency updated their allowances for peak rainfall intensities in 2021 based on management catchments, provided in Table 5-1, which should be used as a guide for small (less than 5km²) and urbanised drainage catchments when carrying out modelling as part of a Flood Risk Assessment. The allowances are based on the high emission scenario of UKCP18, with the central allowance representing a 4°C increase by 2100.

TABLE 5.1: EA PEAK RAINFALL INTENSITY ALLOWANCES FOR MANAGEMENT CATCHMENTS IN KIRKLEES

Total potential change anticipated for peak rainfall intensities (based on a 1961-1990 baseline).

Management catchment – allowance category	3.3% annual exceedance rainfall event: 2050s (up to 2060)	3.3% annual exceedance rainfall event: 2070s (2061-2125)	1% annual exceedance rainfall event: 2050s (up to 2060)	1% annual exceedance rainfall event: 2070s (2061-2125)
Aire and Calder – Upper end	35%	40%	40%	45%
Aire and Calder – Central	20%	25%	25%	30%
Don and Rother – Upper end	35%	35%	40%	40%
Don and Rother – Central	20%	25%	20%	25%
Upper Mersey – Upper end	35%	40%	40%	45%
Upper Mersey – Central	20%	30%	25%	30%

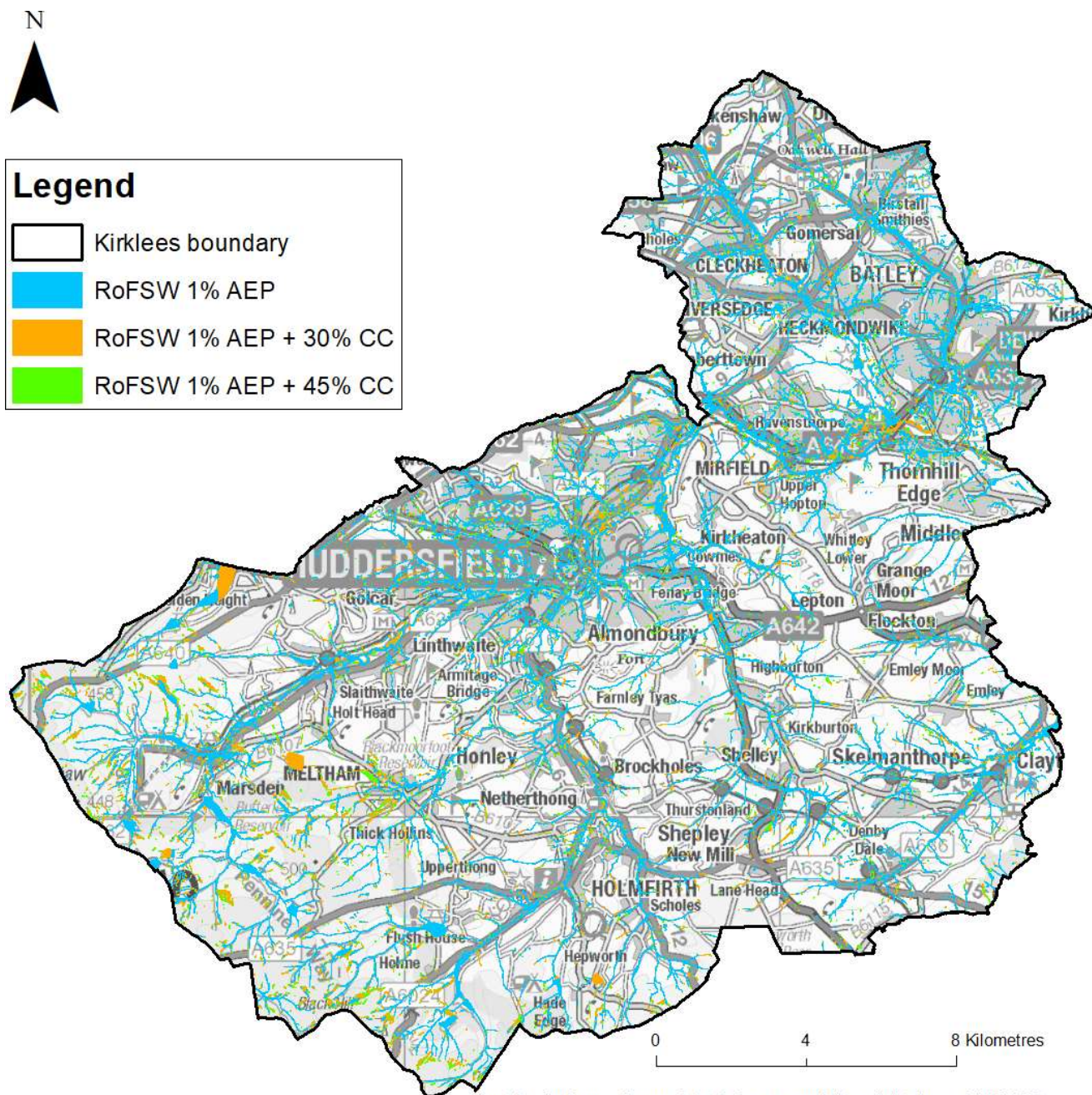
To assess the impacts of climate change on surface water flood risk, the Risk of Flooding from Surface Water (RoFSW) 1 in 100-year (1% AEP) mapping has been updated with 30% (Central) and 45% (Upper End) uplifts.

Figure 5-1 shows that the extent of surface water flooding is likely to increase with climate change across Kirklees, particularly within the low-lying floodplains of the River Colne and River Calder and along topographical flow paths of existing watercourses and their tributaries. Across the whole of the

district, it is predicted that there will be a 36% increase in the number of properties at risk of surface water flooding in a 1% AEP event as a result of a 30% increase in rainfall intensity.

This Local Flood Risk Management Strategy sets out how it plans to manage the flood impacts of Climate Change. It recognises the importance of addressing the causes of climate change by promoting nature-based solutions like tree planting and peatland restoration initiatives with our partners. In restoring and adapting our landscapes, we are mitigating the impact of Climate Change.

Figure 5.1 Flood risk from surface water with 30% and 45% climate change allowances, based on the Risk of Flooding from Surface Water dataset



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FLOOD INVESTIGATION AND ASSET RECORDING

THIS SECTION BRIEFLY OUT THE ROLES AND RESPONSIBILITIES OF THE KEY RISK MANAGEMENT AUTHORITIES IN KIRKLEES, UNDER THE PROVISIONS OF THE FLOOD AND WATER MANAGEMENT ACT 2010 (FWMA). APPENDIX D INCLUDES A MORE COMPREHENSIVE LIST.

In relation to Kirklees, the Risk Management Authorities in the district include:

- Lead Local Flood Authority – Kirklees Council
- Environment Agency
- Water and sewerage companies – Yorkshire Water
- Highways Authority – Kirklees Council and National Highways (strategic roads e.g., motorways)

Under the provisions of the Flood and Water Management Act the following duties and powers are common to all risk management authorities:

- Duty to cooperate with other risk management authorities.
- Duty to act consistently with the national and local strategies.
- Powers to take on flood risk functions from another Risk Management Authority
- Duty to contribute towards the achievement of sustainable development.
- Duty to be subject to scrutiny from the LLFA's democratic process.

This underpins our understanding that the very same rainwater passes through our drainage assets as it continues along its water cycle journey. The LLFA will therefore ensure it continues to work collaboratively in partnership with all partners to reduce flood risk.

SCHEDULE 3 SUSTAINABLE DRAINAGE (FWMA)

The future enactment of Schedule 3¹⁷ of the FWMA means there is a requirement for the inclusion of SuDS in all new development which must be approved by the Council as the 'approving body'. The Council may be required to adopt and maintain SuDS for new developments once the development is complete. It is expected that legal, statutory guidance will be produced which will provide a more consistent approach to SuDS design and approval. The Council will engage with Government and its partners to ensure it will offer an effective approach to managing flood risk for our communities.

KIRKLEES FLOODING RESPONSIBILITIES



- Kirklees Council Lead Local Flood Authority (LLFA) – manage flood risk from ordinary watercourses, surface water and groundwater.
- Environment Agency – responsible for main rivers and regulate operation of large raised reservoirs.
- Highways Authority (Kirklees Council and National Highways) – responsible for providing and managing highway drainage and some roadside ditches/gullies.
- Yorkshire Water – responsible for public water supply and sewerage systems.

¹⁷ [Schedule 3 Flood and Water Management Act 2010](#)

FLOOD INVESTIGATIONS

We have a duty to investigate and publish reports on significant flood incidents (where appropriate and necessary) to identify which authorities have relevant flood risk management functions, and what they have done or intend to do (FWMA 2010).

We will endeavour to investigate flood incidents which meet the following criteria:

- where one or more residential or business property suffers internal flooding
- where there is a risk to life as a result of the depth and / or velocity of floodwater
- where critical infrastructure (e.g. emergency services buildings, utility company infrastructure, schools, day centres, hospitals and main transport routes) suffer flooding or obstruction, or were in imminent danger of flooding
- where five or more properties were in imminent danger of flooding, or
- where local democratic pressures from elected members, committees, or other elected bodies, might be considered as a factor in determining whether a formal investigation should be carried out.

Note: we will only formally publish details if considered appropriate.

ASSET RECORDING

The LLFA has a duty to maintain a register of structures or assets that have a significant effect on flood risk (FWMA 2010). The LLFA has discretion to set a local indication of “significance” to determine which assets it records on the register, which is available for inspection.

The Council's register of drainage assets aims to include the following structures or features:

- Pipes and culverts:
 - Where the diameter is greater than 600mm or cross-sectional area is greater than 0.3m², or
 - Where the pipe/culvert has a recorded history of flooding, or
 - Where the pipe/culvert is within 20m of a cluster of 5 or more recorded flood incidents (non-cellar) – excluding pipes of 225mm diameter or less.
- Debris screen:
 - where a debris screen is blocked.
- Others:
 - reservoirs
 - mill ponds
 - environment Agency assets.
- SuDS:
 - all new SuDS adopted by Kirklees.

HIGH RISK CATCHMENTS

Kirklees Council has carried out a high-level strategic study into which are the highest risk hydrological catchments in the district based on surface water flood risk and flood risk from main rivers to existing properties and infrastructure.

At a strategic level, this will help us to identify the communities within these high-risk catchments that may be in greatest need of action on flood risk management.

STRATEGIC APPROACH

To identify areas that may be at the highest risk of flooding from surface water and main rivers, an assessment of surface water and fluvial flood risk has been undertaken for Kirklees. We have identified the top ten catchments where risk to existing properties and critical and vulnerable infrastructure is highest from both surface water and main rivers. We have also considered recorded historic flood events and levels of social deprivation to help to help us to prioritise our flood risk management actions to less well-off communities to ensure they receive the same consideration as more affluent areas where damages as a result of flooding may be higher in monetary terms.

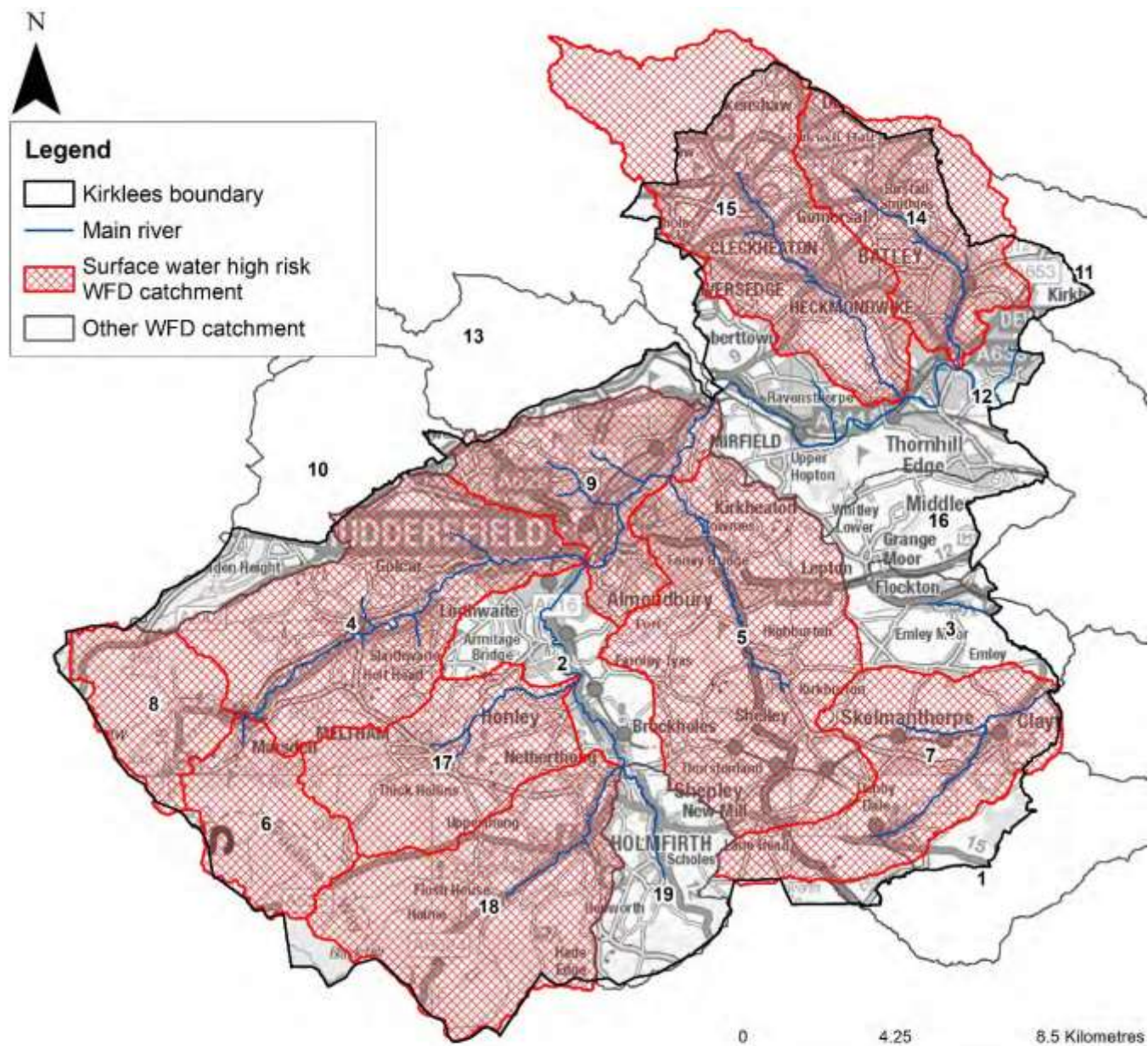
Note this is a strategic approach to identifying those areas most at risk. It is not a detailed investigation designed to target locations where specific flood risk management schemes are required.

For the purposes of this assessment, the district has been split into 19 areas based on the Water Framework Directive (WFD) watercourse catchments to allow a catchment-based approach to be taken. To identify the high-risk surface water catchments the RoFSW dataset and modelled surface water climate change data have been used. The Flood Map for Planning has been used to identify the high-risk fluvial catchments. We have also used property and critical infrastructure data, historic flood event information recorded by Kirklees and social deprivation data. The methodology process is detailed in Appendix E.

Figures 7.1 and 7.2 show the top ten WFD catchments with the largest number of receptors (residential properties, non-residential and infrastructure) at risk from surface water and main river flooding respectively, within Kirklees. The historic flood event data has been used to help corroborate the catchments shown to be at highest risk. Figures 7-3 and 7-4 show a comparison of the high-risk catchments with the social deprivation data.

We will ensure all communities are afforded the required support that is proportionate to risk and consequence.

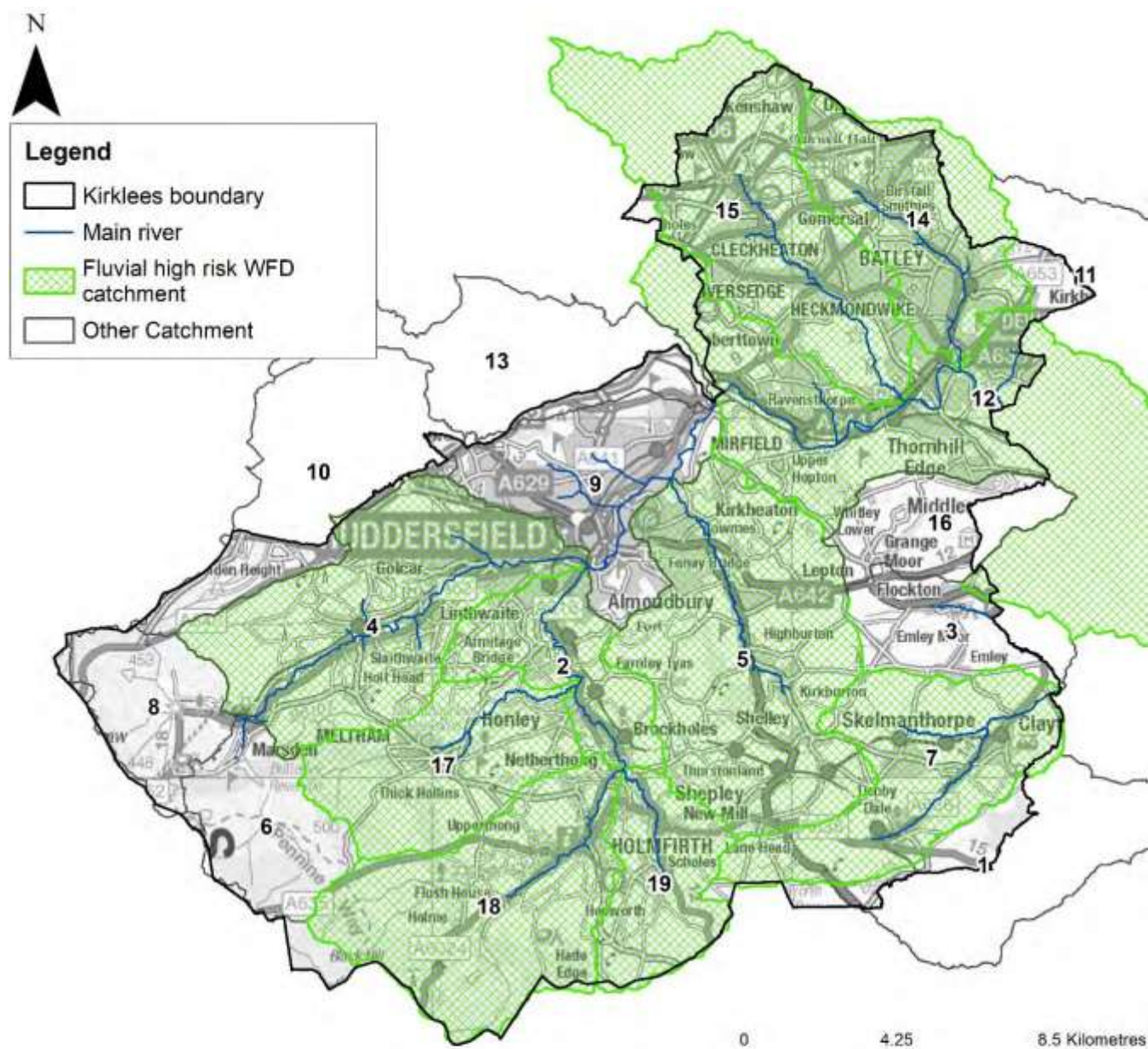
Figure 7.1 Top ten WFD catchments with the largest number of receptors at risk from surface water



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- | | | |
|--|---|---|
| 1 - Cawthorne Dyke from Source to River Dearne | 8 - Colne from Source to Wessenden Brook | 15 - Spen Beck from Source to River Calder |
| 2 - Holme from New Mill Dike to R Colne | 9 - Colne from River Holme to River Calder | 16 - Smithy Brook from Source to River Calder |
| 3 - Bentley Brook from Source to River Dearne | 10 - Black Brook from Source to River Calder | 17 - Mag Brook from Source to River Holme |
| 4 - Colne from Wessenden Brook to R Holme | 11 - Chald from Source to River Calder | 18 - Holme from Source to New Mill Dike |
| 5 - Fenay beck from Source to River Colne | 12 - Calder from River Colne to River Chald | 19 - New Mill Dike from Source to River Holme |
| 6 - Wessenden Bk from Butterfly Resr to River Coln | 13 - Calder from Ryburn Confluence to River Colne | |
| 7 - Dearne from Source to Bentley Brook | 14 - Batley Beck from Source to River Calder | |

Figure 7.2 Top ten WFD catchments with the largest number of receptors at risk from main rivers



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- | | | |
|---|---|---|
| 1 - Cawthorne Dyke from Source to River Dearne | 8 - Colne from Source to Wessenden Brook | 15 - Spen Beck from Source to River Calder |
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| 6 - Wessenden Bk from Butterly Resr to River Coln | 13 - Calder from Ryburn Confluence to River Colne | |
| 7 - Dearne from Source to Bentley Brook | 14 - Batley Beck from Source to River Calder | |

Figure 7.3 Top ten WFD catchments with the largest number of receptors at risk from surface water compared to social deprivation

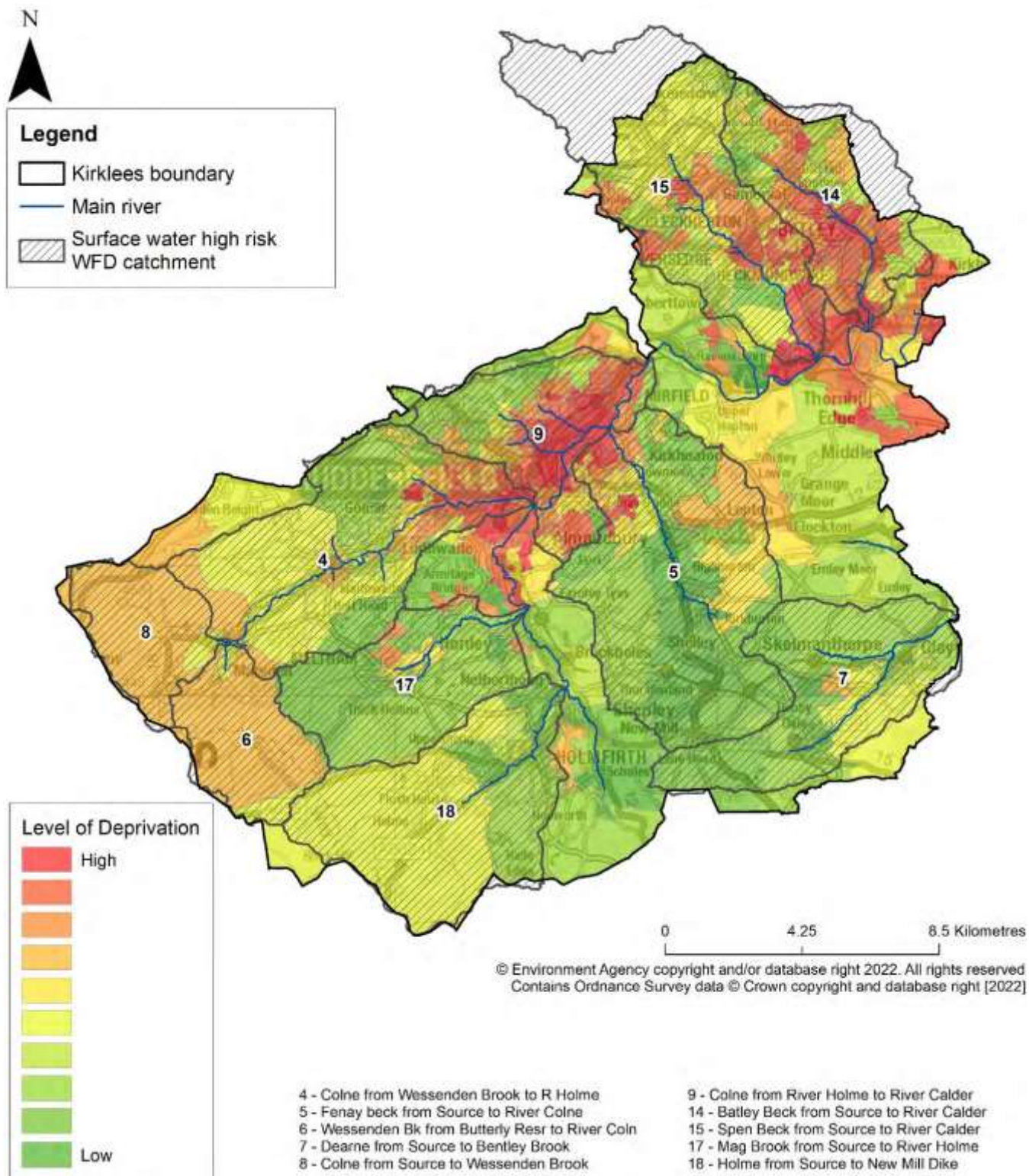
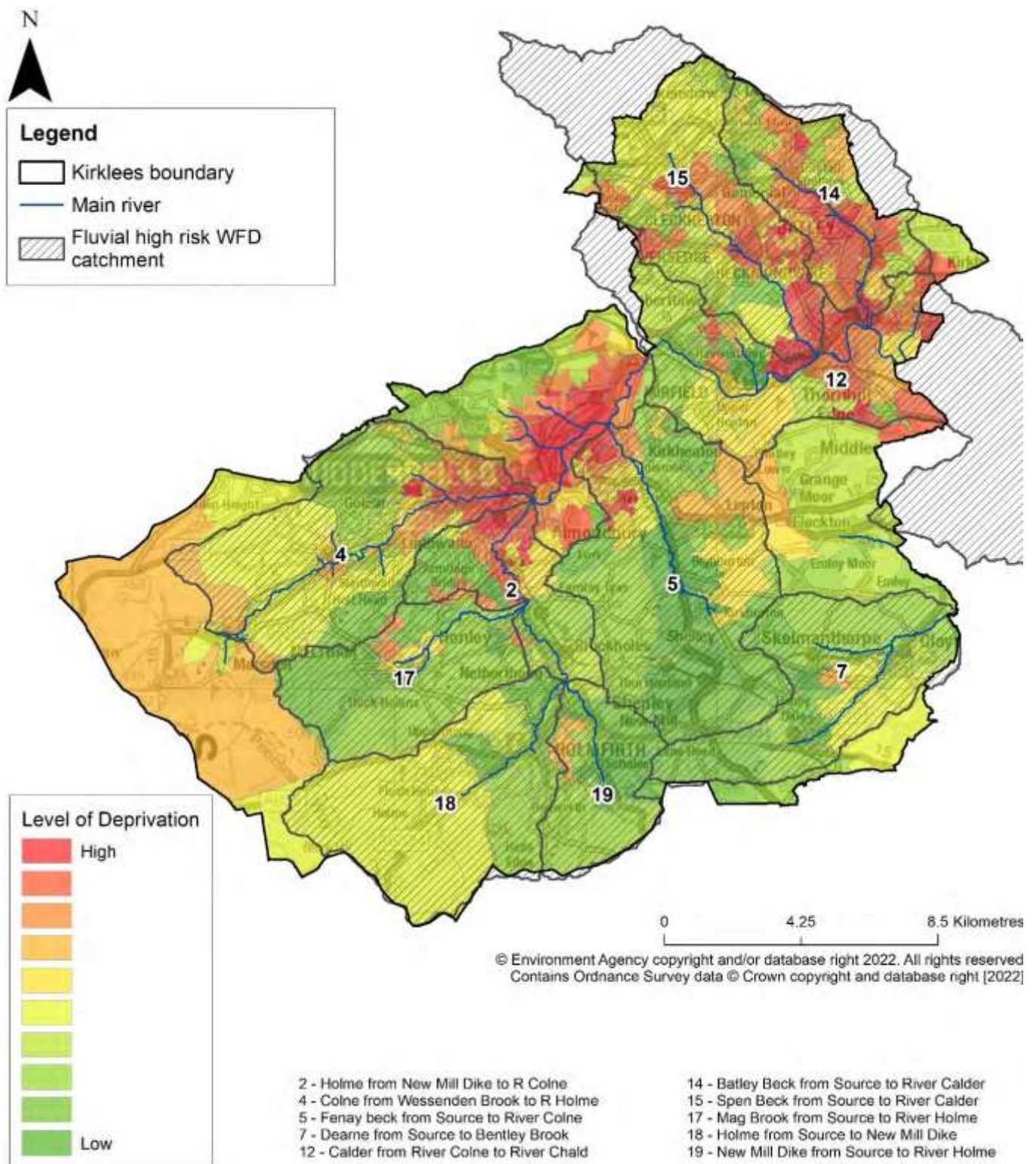


Figure 7.4 Top ten WFD catchments with the largest number of receptors at risk from main rivers compared to social deprivation



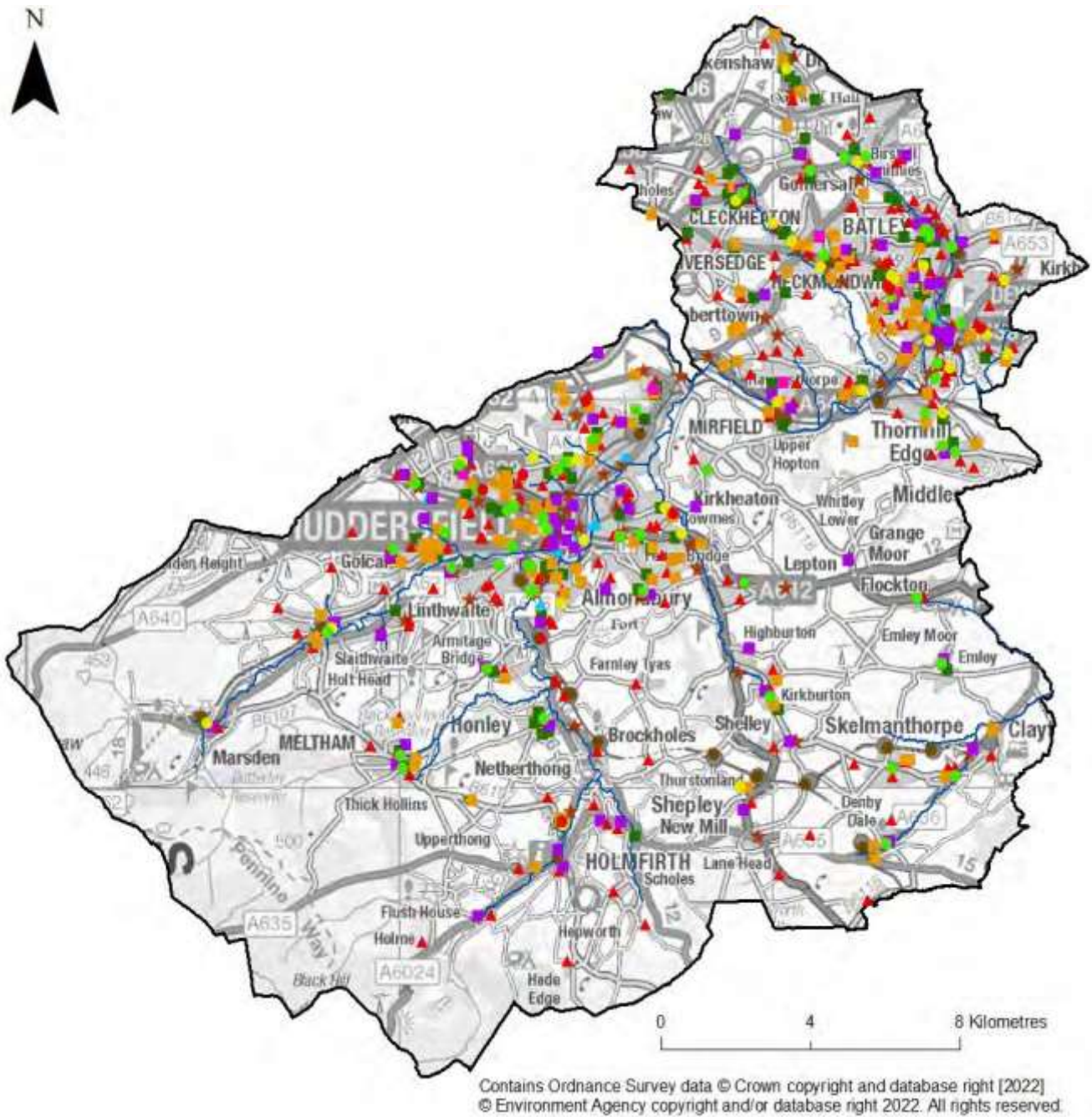
There are a number of critical and vulnerable infrastructure sites in Kirklees where the consequences of being flooded would impact on a large number of people and also the vulnerable people in society. It is therefore important that such infrastructure is protected and resilient to the impacts of climate change on flooding. Such critical and vulnerable infrastructure includes the following:

- hospitals, clinics and GP surgeries
- care homes and rest centres
- sheltered housing centres
- schools, colleges and universities

- children’s homes
- bus and train stations
- petrol stations.

Figure 7.5 shows the locations of the critical and vulnerable infrastructure which are mainly centred around Huddersfield, Dewsbury and Batley. These communities are located in the high-risk surface water catchments and areas of high social deprivation based on the above figures. Tables 7.1 and 7.2 list the number of ground floor residential properties, ground flood non-residential properties, and critical services at risk within each high-risk surface water and high-risk fluvial catchment respectively.

Figure 7.5 Critical and vulnerable infrastructure in Kirklees



Legend

- | | | | | |
|-------------------|--------------------|-----------------|----------------------|---------------------|
| Kirklees boundary | Hospital / hospice | Children's home | Sheltered housing | Bus / rail stations |
| Main river | GP surgery | Rest centre | School | Petrol station |
| | Clinic | Care home | College / university | |

TABLE 7-1 RESIDENTIAL AND NON-RESIDENTIAL PROPERTIES, AND CRITICAL SERVICES AT RISK FROM SURFACE WATER IN THE 1 IN 1,000-YEAR EVENT IN HIGH-RISK SURFACE WATER CATCHMENTS

WFD high risk catchment ID	WFD high risk catchment name	Main communities at risk	Number of residential properties at risk	Number of non-residential properties at risk	Number of critical/vulnerable infrastructure at risk
8	Colne from Source to Wessenden Brook	Rural, Marsden	114	30	1
6	Wessenden Bk from Butterly Resr to River Coln	Rural, Marsden	225	68	0
4	Colne from Wessenden Brook to R Holme	Marsden, Slaithwaite, Huddersfield, rural	3749	1085	41
17	Mag Brook from Source to River Holme	Meltham, Honley, rural	1376	293	9
7	Dearne from Source to Bentley Brook	Marsden, rural	948	357	8
9	Colne from River Holme to River Calder	Huddersfield	3343	1295	50
18	Holme from Source to New Mill Dike	Holmfirth	830	354	11
15	Spenn Beck from Source to River Calder	Heckmondwike, Liversedge, Cleckheaton	4554	1193	39
14	Batley Beck from Source to River Calder	Dewsbury, Batley, Gomersal, Birstall Smithies	2966	1435	53
5	Fenay beck from Source to River Colne	Dalton, Fenay Bridge	3309	601	25

Total at risk:

- Residential properties = 21,414
- Non-residential properties = 6,711
- Critical/vulnerable infrastructure = 237

Note: Some properties straddle two or more catchment boundaries.

TABLE 7-2 RESIDENTIAL AND NON-RESIDENTIAL PROPERTIES, AND CRITICAL SERVICES AT RISK FROM RIVERS IN THE 1 IN 1,000-YEAR EVENT IN HIGH-RISK FLUVIAL CATCHMENTS

WFD high risk catchment ID	WFD high risk catchment name	Main communities at risk	Number of residential properties at risk	Number of non-residential properties at risk	Number of critical/vulnerable infrastructure at risk
12	Calder from River Colne to River Chald	Dewsbury, Mirfield	1446	1024	14
15	Spenn Beck from Source to River Calder	Dewsbury, Cleckheaton, Heckmondwike	1401	504	11
7	Dearne from Source to Bentley Brook	Denby Dale, Skelmanthorpe, rural	50	80	1
5	Fenay beck from Source to River Colne	Dalton, Fenay Bridge	461	174	2
2	Holme from New Mill Dike to R Colne	Brockholes, Newtown, Honley, Lockwood	238	282	4
14	Batley Beck from Source to River Calder	Dewsbury, Batley	115	556	6
4	Colne from Wessenden Brook to R Holme	Huddersfield, Marsden	276	279	4
18	Holme from Source to New Mill Dike	Holmfirth	128	148	2
19	New Mill Dike from Source to River Holme	Hepworth, New Mill, rural	61	33	0
17	Mag Brook from Source to River Holme	Meltham	36	45	0

Total at risk:

- Residential properties = 4,212
- Non-residential properties = 3,125
- Critical/vulnerable infrastructure = 44

Note: Some properties straddle two or more catchment boundaries.

FLOOD RISK ACTION PLAN

Together with the longer-term Local Strategic themes, we have also formulated a set of shorter term, measurable actions which formulate our Flood Risk Action Plan (Appendix F)

The Action Plan is to remain a live document and be continually updated as and when new measures and actions are defined, when new funding sources or delivery partners are found, and when the action has been delivered or a programme for delivery has been formulated. The Strategy is to be in place for the next five to ten years, during which the measures in the Action Plan will be delivered.

The measures making up the Flood Risk Action Plan have been developed from the following sources:

- Rollover actions from the current Implementation Plan where still appropriate.
- Feedback and suggestions from stakeholders following the stakeholder engagement workshops carried out as part of this Local Strategy.
- The Humber Flood Risk Management Plan 2 (2021 – 2027) consultation responses on measures included in the latest FRMP update.
- Identified high flood risk catchments and communities.

The measures listed within the Flood Risk Action Plan shows how it aligns with the following:

- Resilience themes:
 - Place making
 - Protect
 - Respond
 - Recover
- Geographical areas where actions are required.
- Key delivery partners for delivering the action.

FUNDING FOR IMPLEMENTING THE FLOOD RISK ACTION PLAN

In the flood industry there are number of funding streams that are available to support the development and delivery of capital flood measures. These include:

- Flood and Coastal Erosion Risk Management Grant in Aid (FCERM GiA)
- Local Levy
- Council's Flood Management Capital Programme
- Central government grants
- Private / local funding.

The Council will remain abreast with alternative funding sources and work with its partners to support bids to increase investment within the district.

IMPLEMENTATION, MONITORING AND REVIEW

THIS SECTION SETS OUT THE PROCESS BY WHICH THE COUNCIL WILL IMPLEMENT, MONITOR AND REVIEW THIS STRATEGY. OUR LOCAL STRATEGY HAS BEEN DEVELOPED TO SUPPORT OUR UNDERSTANDING AND MANAGEMENT OF LOCAL FLOOD RISK OVER THE NEXT TEN YEARS AND THEREFORE WILL REQUIRE PERIODIC REVIEW TO ENSURE IT REMAINS CURRENT AND IN LINE WITH LOCAL AND NATIONAL POLICY, CHANGES IN CLIMATE CHANGE SCIENCE AND LOCAL FLOOD RISK

IMPLEMENTATION AND MONITORING

Our Local Strategy sets out the roles, responsibilities, objectives, and the priorities of all the organisations that have a statutory role in managing flood risk. In partnership with these organisations and key stakeholders, we will use this Strategy to guide our approach to local flooding issues across Kirklees.

The overarching objective of the Strategy is to reduce local flood risk to residents, businesses, key infrastructure, and communities by increasing resilience in our communities. This will be achieved through the implementation of our Flood Risk Action Plan with a focus on nature-based solutions and helping communities to be more resilient. The measures and actions will be delivered over the next five to ten years. The successful implementation of the Strategy will be influenced by external factors such as funding and resource availability. Funding of capital works may prove to be a challenge in Kirklees, particularly where schemes must receive partnership contributions. Where appropriate, we will seek to fund schemes through multiple routes.

Additionally, the Council will continually seek new sources of funding to support our flood risk management objectives. Where required, we will still look to carry out improvements to flood defence infrastructure to address known local flooding problems from surface water, ordinary watercourses and groundwater. However, it may be that in many areas the risk of flooding is managed through early flood warnings and local resilience measures. The Council will act as enablers to help communities take action to help themselves and carry out their own riparian responsibilities.

We will also seek to reduce flood risk through other actions such as planning and development control, working with landowners and land managers, progressing investment and increasing resilience. We will seek to retain and develop the expertise already present in the Council as well as increasing capacity where required. Through collaborative working and addressing issues at the appropriate authority level, we will make the best use of the resources and funding available.

Our partners are committed to delivering the objectives of the Flood Risk Action Plan to reduce flood risk to the communities of Kirklees over the next five to ten years. We will continue to take responsibility for implementing the Strategy and will lead on developing and continuing existing relationships with partners and stakeholders.

REVIEW

The Local Strategy will be reviewed and updated as and when required, specifically when there is a material change to legislation, the National Strategy, or the approach to flood risk in the district which may not be compatible to the Local Strategy. The Flood Risk Action Plan will be reviewed annually to check that the measures and actions taken undertaken continue to be appropriate and achievable. It should be noted that this Strategy represents the current situation (at the time of publishing) based on the current evidence base.

APPENDIX

A – Strategic Environmental Assessment

B – Habitat Regulation Assessment

C – Rapid Response Catchments

D – FWMA Roles and Responsibilities

E – High Risk Catchments

F – Flood Risk Action Plan



Local Flood Risk Management Strategy

2024



LFRMS SEA Environmental Report

Final Report

2024

KIRKLEES LOCAL FLOOD RISK MANAGEMENT STRATEGY

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ABBREVIATIONS

Acronym	Description
BAP	<p>Biodiversity Action Plan</p> <p>Plans developed by organisations to protect and enhance the biodiversity of an area.</p>
EA	<p>Environment Agency</p> <p>Non-departmental public body responsible for protecting and improving the environment.</p>
FCERMS	<p>Flood and Coastal Erosion Risk Management Strategy</p> <p>The strategy describes what needs to be done by all risk management authorities involved in flood and coastal erosion risk management for the benefit of people and places.</p>
HER	<p>Historic Environment Record</p> <p>Information service that provides access to comprehensive and dynamic resources relating to the archaeology and historic built environment of a defined geographic area.</p>
IMD	<p>Indices of Multiple Deprivation</p> <p>The Index of Multiple Deprivation measures relative deprivation in an area. It is a combined measure of deprivation based on 37 separate indices of deprivation, grouped into seven key domains reflecting different aspects of deprivation.</p>
LCA	<p>Landscape Character Assessment</p> <p>The process of identifying and describing variation in character of the landscape, the assessment identifies and explains the unique combination of elements and features that make landscapes distinctive by mapping and describing character types and areas.</p>

Acronym	Description
LFRMS	<p>Local Flood Risk Management Strategy</p> <p>Strategies produced by lead local flood authorities, considering local issues and policy. It should also consider the extent and severity of flood risk and the geography of the authority area including the environmental or social setting.</p>
LGeoS	<p>Local Geological Site</p> <p>Geological sites that are important for historical, scientific research or educational reasons.</p>
LLFA	<p>Lead Local Flood Authority</p> <p>County councils and Unitary Authorities which lead in managing local flood risks.</p>
LNR	<p>Local Nature Reserve</p> <p>Local Nature Reserve are statutory designation under the National Parks and Access to Countryside Act 1949. These can be declared by Parish and Town Councils, but these must be delegated to by principle local authority.</p>
NCA	<p>National Character Area</p> <p>National Character Area is a natural subdivision of England based on a unique sense of place. The Character Area framework is used to describe and shape objectives for the countryside, its planning and management.</p>
NFM	<p>Natural Flood Management</p> <p>The utilisation of natural processes to reduce the risk of flooding and coastal erosion</p>
NNR	<p>National Nature Reserve</p> <p>Reserves established to protect some of our most important habitats, species, and geology, and to provide outdoor laboratories for research.</p>
NPPF	<p>National Planning Policy Framework</p> <p>The National Planning Policy Framework constitutes all policy statements and guidance documents into one document which forms a core part of the national planning system.</p>
ODPM	<p>Office of the Deputy Prime Minister</p>

Acronym	Description
	Central department to bring together key responsibilities for regional and local government, fire, housing, planning and regeneration, social exclusion, and neighbourhood renewal.
ONS	<p>Office of National Statistics</p> <p>The Office for National Statistics is the executive office of the UK Statistics Authority, a non-ministerial department which reports directly to the UK Parliament.</p>
RBMP	<p>River Basin Management Plan</p> <p>River basin management plans set the locally specific environmental objectives that underpin water regulation (such as permitting) and planning activities.</p>
RIGS	<p>Regionally Important Geological Sites</p> <p>Regionally Important Geological Sites are designated by locally developed criteria, and are important educational, historical, and recreational resources. The designation aims to recognise and protect earth science and landscape features.</p>
SAC	<p>Special Area of Conservation</p> <p>Special Areas of Conservation are protected in the UK under, the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales. The purpose of this designation is to conserve the habitat and species identified in the EU Habitats Directive.</p>
SEA	<p>Strategic Environmental Assessment</p> <p>Strategic Environmental Assessment is a decision support process which aims to promote sustainable development by assessing the extent to which the emerging plan will help achieve relevant environmental, economic, and social objectives.</p>
SPA	<p>Special Protection Areas</p> <p>Special Protection Area are protected areas are protected areas for birds in the UK, under the Wildlife & Countryside Act 1981 and the Conservation Regulations 2010.</p>
SPZ	<p>Source Protection Zones</p> <p>Areas defined around large and public potable groundwater abstraction sites, to provide additional protection to safeguard drinking water though constraining the proximity of an activity that may impact upon a drinking water abstraction.</p>

Acronym	Description
SSSI	<p>Sites of Special Scientific Interest</p> <p>Sites of Special Scientific Interest is a conservation designation legally protected under the Wildlife and Countryside Act 1981 (as amended). These sites are selected for wildlife and natural features in England.</p>
SuDS	<p>Sustainable Drainage Systems</p> <p>Drainage solutions that provide an alternative to the direct channelling of surface water through networks of pipes and sewers to nearby watercourses.</p>
SWMP	<p>Surface Water Management Plan</p> <p>A plan which outlines the preferred surface water management strategy in each location. In this context surface water flooding describes flooding from sewers, drawings, groundwater and runoff from land small water course and ditches that occurs because of heavy rainfall.</p>
WFD	<p>Water Framework Directive</p> <p>The Water Framework Directive is a European Union directive which aims to get polluted waters clean again, and ensure they stay clean.</p>
WRMP	<p>Water Resources Management Plan</p> <p>Plan developed by water companies which sets out how they intend to achieve a secure supply of water for customers and protect and enhance the environment.</p>

NON-TECHNICAL SUMMARY:

Kirklees Council is developing a comprehensive Local Flood Risk Management Strategy (LFRMS) that covers the risks associated with local flood risk sources, as required by Section 9 of the Flood and Water Management Act 2010. The LFRMS update is required to bring the document in line with the National Flood and Coastal Erosion Risk Management Strategy (NFCERM) for England, published by the Environment Agency in 2020 to set out the principles for flood risk management and which organisations are responsible for implementation.

As the Lead Local Flood Authority (LLFA), the council is responsible for maintaining, applying and monitoring this strategy. The strategy document will be available for public consultation.

To identify any potentially significant environmental effects resulting from the implementation of the LFRMS, a Strategic Environmental Assessment (SEA) has been conducted. This assessment forms stage 'B: Environmental Report' of the SEA process. The report will summarise how the SEA has been conducted and how it informs the current emerging LFRMS; the likely significant effects on the emerging LFRMS on people, communities, the economy, and the environment; and how the SEA will continue to inform the implementation of the emerging LFRMS. The Environmental Report evaluates the SEA objectives based on three management approaches: Do Nothing, Maintaining the Current Kirklees Council Local Flood Risk Strategy (2012), and Manage and Reduce Local Flood Risk. The report analyses the potential environmental impacts of these three approaches.

The Do-Nothing approach is deemed unsuitable for managing flood risk and is likely to have overall negative impacts on the environment. This approach would not align with Kirklees Council's responsibilities as LLFA under the Flood and Water Management Act.

Maintaining the current flood risk management outlined in the existing Kirklees Council Local Flood Risk Management Strategy (2012) is unlikely to result in significant changes to baseline levels. However, this strategy does not fully account for adaptation to climate change and the associated increase in flood risk. Therefore, this approach is also considered inappropriate.

The implementation of the Local Flood Risk Management Strategy (LFRMS) will have positive impacts on several objectives in the SEA by improving water management and reducing flood risks. This will help to preserve the quality of ecological, visual, heritage, water, and geological receptors in the council area. The majority of LFRMS actions will not impact many SEA objectives, but most will positively affect SEA objectives relating to population and human health and material assets by actively managing flood risks and promoting community involvement and resilience.

The LFRMS presents opportunities for environmental enhancements through the implementation of natural flood management and sustainable drainage schemes. Which may have broad, long-term positive benefits to many SEA objectives.

There are significant uncertainties around actions relating to the implementation of flood alleviation schemes, as the exact location, nature, and scale of these schemes are uncertain, and as such the potential effects on SEA objectives cannot be determined without a specific implementation methodology.

The majority of LFRMS actions do not directly contribute to climate change objectives. It is important to consider the impacts of climate change in decision making around flood alleviation.

INTRODUCTION

OVERVIEW

Kirklees Metropolitan Borough Council as Lead Local Flood Authority (LLFA) is working to produce an updated Local Flood Risk Management Strategy under the Flood and Water Management Act 2010, and in accordance with the National Flood and Coastal Erosion Risk Management Strategy for England published by the Environment Agency in 2020. The current LFRMS, which was adopted in 2012, has been reviewed and is being updated to provide an overall strategic approach to the management of flood risk in Kirklees.

The aim of a LFRMS is to guide the management of local flood risk, reflecting local circumstances such as the level of risk and the potential impacts of flooding. Kirklees' updated LFRMS must assess local flood risk, set out measures for managing local flooding and determine the costs and benefits associated with the implementation of such measures.

When preparing a flood management plan that will inform decision making and identify actions to be taken to reduce the risk of flooding, it is a statutory requirement to conduct a Strategic Environmental Assessment (SEA) in accordance with the SEA Regulations (implementing the European SEA Directive into UK law).

Due to the scale of the changes proposed in the updated LFRMS and the potential for significant environmental effects, it was considered appropriate that an update to the SEA be undertaken.

The SEA process, culminating in the preparation of this Environmental Report, will inform the preferred long-term flood risk management strategy through the identification of likely significant impacts upon the environment, resulting from the implementation of the LFRMS.

This SEA Environmental Report will outline how objectives, measures and options have been appraised.

SEA PROCESS AND METHODOLOGY

The Environmental Assessment of Plans and Programmes Regulations 2004, or SEA Regulations, were originally transposed from the European Directive 2001/42/EC (the SEA Directive) into English Law, prior to the UK's departure from the EU. The Environmental Assessment of Plans and Programmes (Amendment) Regulations 2020 (the 'SEA Regulations') now apply to this work. These Regulations require a SEA to be undertaken for certain types of plans or programmes that could have a significant environmental effect.

The SEA Regulations form the basis by which all SEAs are carried out to assess the effects and impacts of certain plans and programmes on the environment. Detailed practical guidance on these regulations can be found in the Office of the Deputy Prime Minister (ODPM) Government publication, A Practical Guide to the Strategic Environmental Assessment Directive (ODPM, 2005). This document has been used as the basis for undertaking this environmental report, in conjunction with the SEA Regulations.

SEA involves the systematic identification and evaluation of the potential environmental impacts of the LFRMS. This information is then used to aid the selection of a preferred option(s) for the strategy, which are those that best meet its economic, environmental and social objectives, and legal requirements. Carrying out an SEA in conjunction with developing the LFRMS helps influence flood risk management at an early stage and influences the selection of preferred measures or ways forward where alternatives exist.

Schedule 2 of the SEA Regulations sets out the scope of information to be provided by the SEA. This is described in Table 2-1 below, which also identifies where in the SEA process for the LFRMS that the relevant requirement will be met.

Table 2-1 Stages in the SEA Process as Identified within Schedule 2 of the SEA Regulations

SEA Regulations Requirements	Where Covered in the SEA Process
a) an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes;	SEA Scoping Report (Section 3, 4 and 5); SEA Environmental Report (Sections 3, and 5 and Appendix A).
(b) the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme;	SEA Scoping Report (Section 4); SEA Environmental Report (Section 5).
() the environmental characteristics of areas likely to be significantly affected;	SEA Scoping Report (Section 4); Environmental Report (Section 5).
(a) any existing environmental problems	SEA Scoping Report (Section 4); Environmental Report (Section 5).
(b) the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation;	SEA Scoping Report (Sections 3 and 4); Environmental Report (Section 5 and Appendix A).

SEA Regulations Requirements	Where Covered in the SEA Process
(f) the likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape, and the interrelationship between the above factors;	SEA Environmental Report (Section 8)
(g) the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme;	SEA Environmental Report (Section 8)
(h) an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;	SEA Environmental Report (Section 7)
(i) a description of the measures envisaged concerning monitoring in accordance with regulation 17.	SEA Environmental Report (Section 9)
(j) a non-technical summary of the information provided under the above headings.	SEA Environmental Report (Non-technical Summary)

STAGES IN THE SEA PROCESS

This report has been produced in conjunction with the SEA Regulations and follows the guidance contained within the OPDM *A Practical Guide to the Strategic Environmental Assessment Directive* (ODPM, 2005). The guidance outlines the stages that should be carried out in the SEA process; these are outlined in Table 2-2. In accordance with this process, this report addresses 'Stage C' of the SEA process; wherein the predicted environmental effects of the plan, including alternatives, are presented, to be used by decision-makers and in public consultation.

Table 2-2 Stages in the SEA Process

SEA Stages and Tasks	Purpose	Where Covered in the SEA
Stage A	Setting the context and objectives, establishing the baseline, and deciding on the scope	SEA Scoping Report
(A1) Identifying other relevant plans, programmes and environmental protection objectives	To establish how the plan or programme is affected by outside factors, to suggest ideas for how any constraints can be addressed and to help to identify SEA objectives.	SEA Scoping Report
(A2) Collecting baseline information	To provide an evidence base for environmental problems, prediction of effects, and monitoring; to help in the development of SEA objectives.	SEA Scoping Report
(A3) Identifying potential environmental problems	To help focus the SEA and streamline the subsequent problems, prediction of effects, and monitoring; to help in the development of SEA objectives.	SEA Scoping Report
(A4) Developing SEA objectives	To provide a means by which the environmental performance of the plan or programme	SEA Scoping Report

SEA Stages and Tasks	Purpose	Where Covered in the SEA
	and alternatives can be assessed.	
Stage B	Developing and refining options and assessing effects	Options development phase
Stage C	Preparing the Environmental Report	SEA Environmental Report
Stage D	Consulting on the draft LFRMS and the Environmental Report	Consultation phase
Stage E	Monitoring the significant effects of implementing the LFRMS	Monitoring phase

Stage A of the process (scoping) was carried out in October 2022 and a SEA Scoping Report was submitted for consultation in November 2022. An updated Scoping Report was then produced in November 2022 to incorporate responses from statutory consultees. Further details on the scoping process are provided in Section 4 of this report.

The purpose of this Environmental Report is to report the findings of the SEA of the Kirklees LFRMS. This Environmental Report summarises;

- how the SEA has been conducted and how it informs the current emerging LFRMS;
- the likely significant effects on the emerging LFRMS on people, communities, the economy, and the environment; and
- how the SEA will continue to inform the implementation of the emerging LFRMS, such as through recommended mitigation and monitoring.
- This report documents Stage B of the SEA process and fulfils the requirements of Stages C and D.

HABITATS REGULATIONS ASSESSMENT (HRA)

Due to the potential for the LFRMS to have significant effects on sites of international nature conservation importance (Ramsar sites, Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), a Habitats Regulations Assessment (HRA) has been undertaken in parallel with this SEA. This has been produced a separate standalone report, details of which are summarised in Section 5.3.3 of this report.

BACKGROUND TO THE KIRKLEES LFRMS

OVERVIEW

The Flood and Water Management Act (2010) determined the need for flood risk to be managed within the framework of National Strategies for England and Wales and within Local Strategies for each Local Flood Authority Area.

The National Flood and Coastal Erosion Risk Management Strategy for England, published by the Environment Agency in 2020, sets out the principles for flood risk management and which organisations are responsible for implementation.

In accordance with the national strategy for England, LLFAs have been allocated responsibility for developing independent LFRMSs to address sources of local flooding.

Local flooding is defined by the Flood and Water Management Act 2010 as flood risk derived from:

- surface runoff,
- groundwater, and
- ordinary watercourses.

Groundwater flooding occurs when the water table within the underlying rock or soil rises above ground level or interacts with properties or infrastructure below ground level. The level of the table varies as a result of seasonal changes in precipitation, recharge, and groundwater abstraction. When the water level reaches ground level, water can start to emerge causing flooding, which can result in significant property damage.

Flooding from ordinary watercourses occurs when water levels in a non-main river, canal, sewer, lake, ditch, reservoir, or stream rises and overflows onto the neighbouring land.

Flood risk from the sea, main rivers and large reservoirs is therefore not defined as local flood risk and is the concern of the Environment Agency. Such sources of flood risk do, however, need to be considered insofar as they may interact with those flood risks defined as “local”, to ensure that all joint risks of flooding are assessed at the local scale.

Each LFRMS identifies which local organisation is accountable for managing flood risk and establishes roles and responsibilities and partnership agreements, as well as undertaking an assessment of flood risk and developing plans / actions for tackling these risks.

As stipulated by the Flood and Water Management Act 2010, Kirklees Council as a LLFA has a responsibility to develop, maintain, apply and monitor a strategy for local flood risk management, considering flood risk from surface water, groundwater and ordinary watercourse.

STUDY AREA

Kirklees Metropolitan Borough is a local authority located in West Yorkshire in the northeast region of England. The urban areas in the borough are concentrated to the north and west, the most significant of which is Huddersfield. The south of the borough is more rural and located within the Peak District National Park. According to mid-2020 Office for National Statistics population estimates, 441,290 people live in the local authority area of Kirklees (ONS, 2021).

As part of the LFRMS update, a flood risk appraisal was undertaken to identify and prioritise the areas of Kirklees most at risk of surface water flooding and to help inform where actions should be focussed. The district has been spilt into 19 areas based on the Water Framework Directive (WFD) watercourse catchments to allow for a catchment-based approach to be taken. 10 priority catchments were identified using the EA's Risk of Flooding from Surface Water dataset, modelled surface water climate change impacts, as well as a series of secondary flood risk datasets (Environment Agency, 2021). The secondary datasets included historic flood incidents and flood risk from other sources (fluvial and groundwater). The catchment priority is shown in both Table 3-1 and Figure 3-1.

Table 3-1 Catchments across Kirklees and their associated prioritisation in the LFRMS.

Catchment Affected by Flooding	Priority
Colne from River Holme to River Calder	1
Spenn Beck from Source to River Calder	2
Calder from River Colne to River Chald	3
Batley Beck from Source to River Calder	4
Colne from Wessenden Brook to River Holme	5
Fenay beck from Source to River Colne	6
Wessenden Beckk from Butterly Reservoir to River Colne	7
Holme from New Mill Dike to River Colne	8
Calder from Ryburn Confluence to River Colne	9
Colne from Source to Wessenden Brook	10
Mag Brook from Source to River Holme	11
Holme from Source to New Mill Dike	12

New Mill Dike from Source to River Holme	13
Dearne from Source to Bentley Brook	14
Chald from Source to River Calder	15
Bentley Brook from Source to River Dearne	16
Cawthorne Dyke from Source to River Dearne	17
Smithy Brook from Source to River Calder	18
Black Brook from Source to River Calder	19

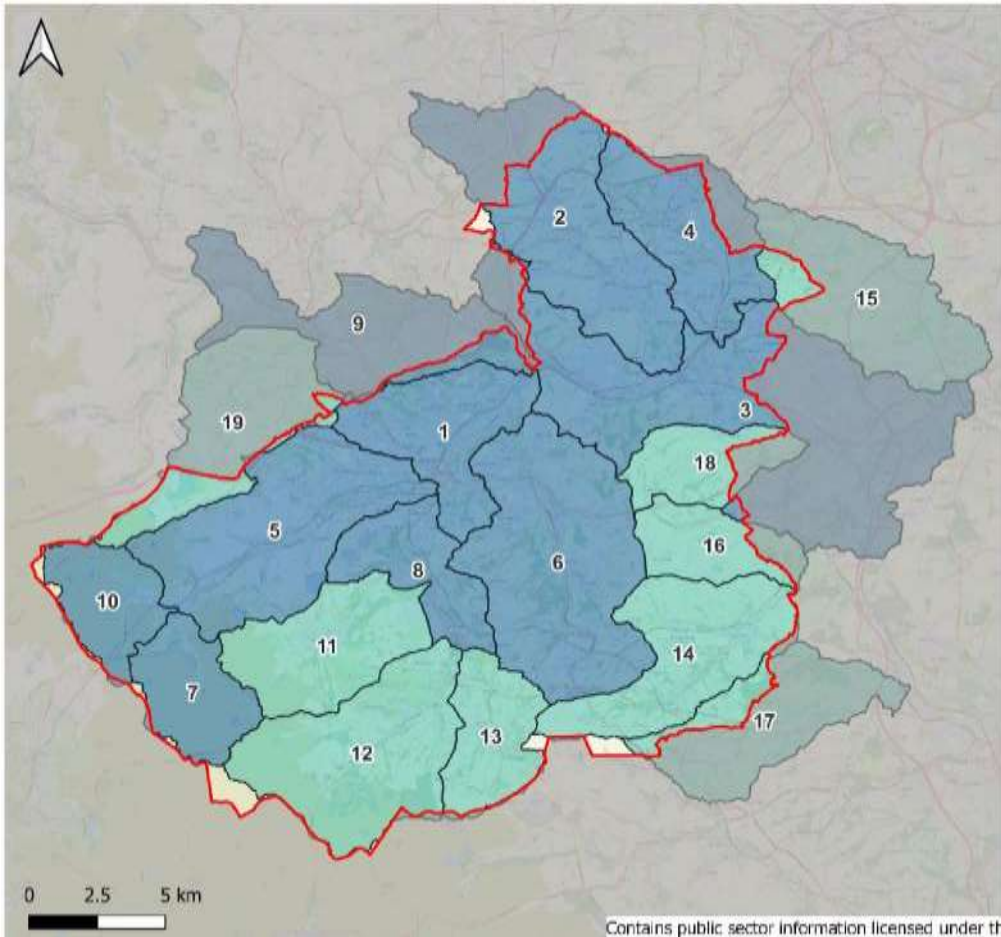


Figure 3-1 Catchments in Kirklees Metropolitan Borough.

HISTORIC FLOODING IN THE STUDY AREA

Kirklees has a history of flooding in many different locations from fluvial, surface water and sewer sources. Information on significant incidents of flooding is recorded by the EA and the LLFA. The following information sources were assessed to understand historic flooding across the borough:

- EA Recorded Flood Outlines dataset (2022) which is mainly associated with fluvial flooding from main rivers, such as the River Calder and its tributaries.

The major flooding events within Kirklees have mainly occurred around the main rivers: the River Colne, River Calder and Spennings River.

Notable recorded historic flood incidents include:

- February 2022 – Storms Dudley, Eunice and Franklin; three storm week brought strong winds and rain to the borough. A considerable number of internal property flooding was reported to both residential properties and businesses.
- February 2020 – Storm Ciara and Storm Dennis; channel capacity exceeded on main rivers, including the River Calder, and ordinary watercourses.
- December 2015 – Channel capacity exceeded on the River Calder upstream of Sands.
- June 2007 – An estimated 500 properties flooded due primarily to surface water where rainwater was unable to enter drainage systems due to design capacity being exceeded. The flooding was widespread across the district, but hotspots occurred around Ravensthorpe, Liversedge, Cleckheaton, Chickenley, Mirfield, Milnsbridge, Brockholes, New Mill, Denby Dale, Scissett and Clayton West.

FUTURE FLOOD RISK

There is considerable uncertainty regarding the localised impact of climate change, but it is likely that the risk of flooding will increase under climate change scenario. This increased risk could manifest itself as more frequent flooding; an increase in flood extent; and increase in flood depth.

The climate in the UK is generally anticipated to shift toward warmer, wetter winters and hotter, drier summers (Met Office, 2022). Climate change is increasing the frequency and magnitude of hazardous weather events such as floods and heatwaves. A review of recent evidence of the anthropogenic intensification of short-duration rainfall extremes concluded that heavy rainfall extremes are intensifying (Fowler et al. 2020). Combined with warmer, generally drier summers, the harder ground struggles to instantly absorb water from rainfall which in turn intensified the frequency of flood flooding (Met Office, 2022).

This increased risk could manifest itself as more frequent flooding, increase in flood event and increase in flood depth.

STAGE A: SCOPING STAGE FINDINGS

Stage A of the SEA process involves gathering evidence to help set the context and objectives, establish the environmental baseline, and determine the scope of the SEA.

The Scoping Report produced as part of Stage A outlined the findings of the evidence gathering and the scope of the SEA.

Table 4-1 below describes the SEA topics which were scoped into the assessment. Further details on the environmental baseline for each of the topics is provided in Section 5: Environmental Characteristics and Key Issues.

Table 4-1 Environmental Topics Scoped in

SEA Regulations Requirements	Definition in relation to this report	Relevance
Biodiversity (including flora and fauna)	Designated nature conservation sites; protected and notable species and habitats; trends in condition and status; invasive non-native species (INNS).	Potential impact on designated and priority habitats both from the LFRMS and a scenario without it. There is the potential for both positive and negative impacts as a result of the LFRMS. Potential impacts to protected species and sites must be considered throughout development and implementation of the LFRMS.
Climatic factors	As the LFRMS is a flood risk strategy, this topic will focus on greenhouse gas emissions. Flood risk and adaptation to climate change will be assessed under each of the other SEA topics.	Scope to include greenhouse gas emissions only (e.g. embodied carbon and emissions from plant and vehicles). The impact of climate change on flood risk will be considered as part of the LFRMS itself. In addition, the LFRMS is unlikely to have a significant impact on climate.
Cultural heritage	Designated and non-designated heritage assets, including historic landscapes; pressures on heritage assets (including changes to setting).	Flooding and flood risk management measures have the potential to impact sites and monuments of archaeological and historical importance, including listed buildings and Scheduled Monuments.

SEA Regulations Requirements	Definition in relation to this report	Relevance
Human health	Trends and patterns in human health, including life expectancy.	People, properties and settlements potentially affected by flood risk, as well as the community infrastructure around them. The LFRMS has the potential to provide benefits to the population of the study area by managing flood risk.
Landscape	National and local landscape character; protected and notable landscapes; key local landscape features.	Local landscape qualities and integrity across the study area could be affected by changes to the way watercourses and flood risk is managed in the area. Furthermore, impacts on locally important urban and rural landscapes and landscape features may occur, for example as a result of flood defence construction.
Material assets	Critical infrastructure (including transport and other infrastructure), community services; and Green Infrastructure	The study area contains several important infrastructure assets including motorways and railways. Flooding may compromise the function of these assets and the LFRMS must take this into account.
Population	Population trends and demographics; education; inequality and deprivation; key community facilities; recreation opportunities; trends and patterns in human health.	People, properties and settlements potentially affected by flood risk, as well as the community infrastructure around them. The LFRMS has the potential to provide benefits to the population of the study area by managing flood risk.
Soil	Variety of rocks, minerals and landforms; the quantity and distribution of agricultural land including	Flooding has the potential to affect geodiversity and soil quality, which support designated sites within the area. Flood risk management of potentially contaminating land uses or

SEA Regulations Requirements	Definition in relation to this report	Relevance
	the highest quality soils; soil health and functions; designated geological sites; land contamination.	sources of land (or water) contamination. Conversely, flooding may provide a beneficial effect through mitigation such as natural flood management processes, catchment sensitive farming and soil erosion reduction.
Water	The availability/supply and quality of water. It considers in turn surface and groundwater resources, chemical and biological water quality; surface and groundwater resources.	Flood risk management has the potential to impact on water availability and quality within the study area and WFD objectives. There is also the potential for indirect impacts on water dependent designated sites/ species. Impact on water resources and quality must be considered in developing the strategy. Effects on flood risk have not been considered as an explicit theme or topic within the SEA.
Interrelationship between the above factors	The relationship between environmental features and issues	The effect of known proposals/commitments.

The LFRMS and SEA have been influenced by many different plans and programmes. This is recognised by the SEA Regulations, which require a review of relevant plans and programmes to be completed in the preparation of documents.

Key international, national, regional and local documents were reviewed as part of the SEA Scoping stage. The full review can be found in Appendix A. The review process has provided a valuable source of information and a framework for developing different components of the LFRMS and SEA. In particular:

- At a high level, key legislation and national policies provided the planning context for the LFRMS; and
- Regional and local documents provided a valuable source of baseline information and identified local priorities and objectives as well as conditions that the LFRMS and SEA should adhere to'.

As part of the SEA process, an assessment of the integration of existing policies, plans and programmes on the LFRMS has been undertaken. This is required under Schedule 1 of the SEA Regulations:

- (i) *'The degree to which the plan or programme sets a framework for projects and other activities either with regard to the location, nature, size and operating conditions or by allocating resources.*

- (ii) *The degree to which the plan or programme influences other plans and programmes including those in a hierarch.*

The relevance of the plan or programme for the integration of environmental considerations in particular with a view to promoting sustainable development.

ENVIRONMENTAL CHARACTERISTICS AND KEY ISSUES

INTRODUCTION

This section covers information on the current environmental baseline in Kirklees and summarises the key information from policies, plans and programmes which need to be considered in the SEA for each environmental topic.

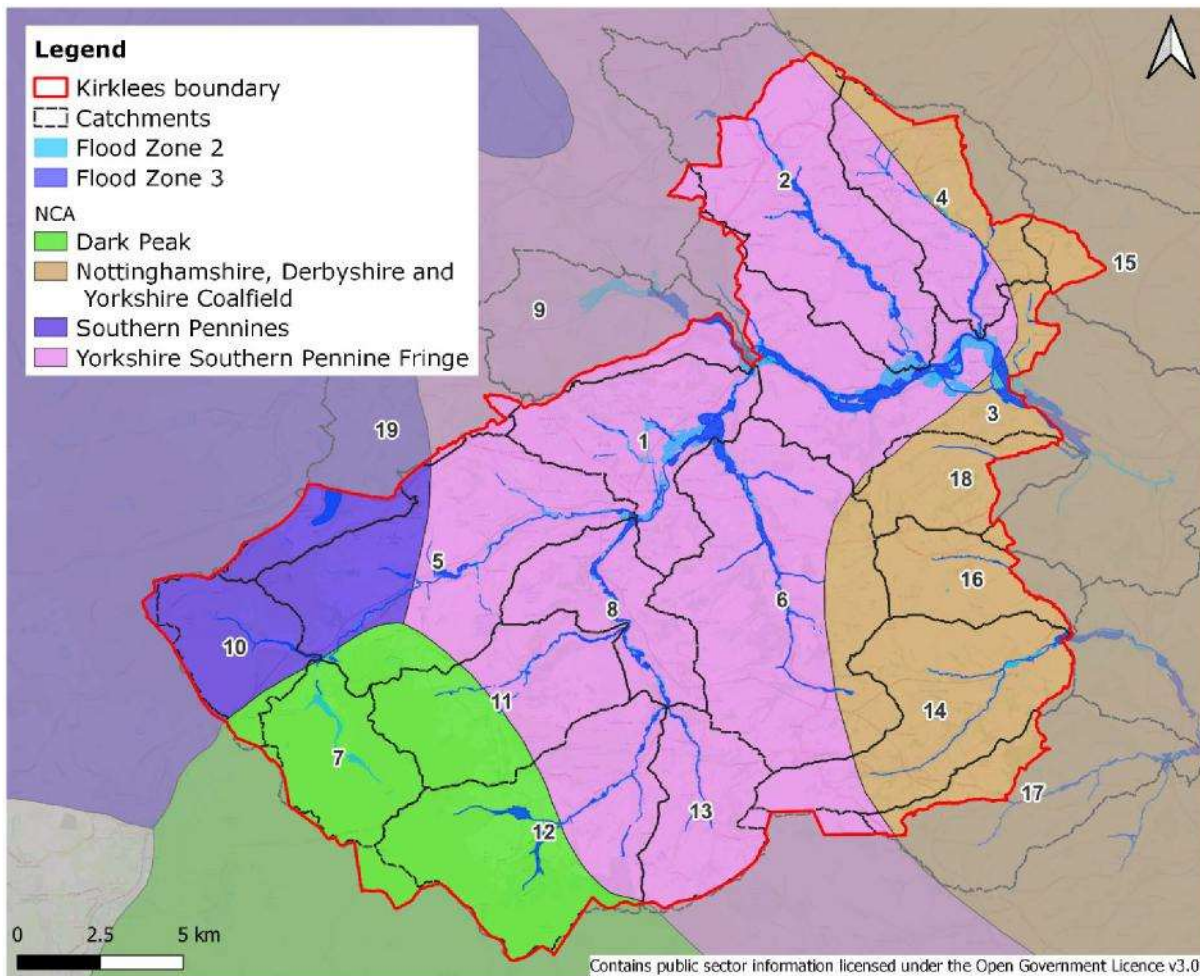
A desk-based study of baseline environmental data was undertaken to identify the key environmental characteristics, the findings of which are presented below.

The baseline information may require updating throughout the duration of the SEA process as the LFRMS is developed further and new information becomes available.

LANDSCAPE AND VISUAL AMENITY

As outlined by Natural England, Kirklees Metropolitan Borough Council falls predominantly within the National Character Area (NCA) 37 Yorkshire Southern Pennine Fringe, with areas of NCA 38 Nottinghamshire, Derbyshire and Yorkshire Coalfields, and smaller areas of NCA 51 and NCA 36. These are described as follows, and shown in Figure 5-1:

- **NCA 37 Yorkshire Southern Pennine Fringe:** comprises a landscape dominated by industrial buildings and structures from former industries, with pastoral treeless hill tops, and wooded valleys.
- **NCA 38 Nottinghamshire, Derbyshire and Yorkshire Coalfields:** over half of the NCA is designated as greenbelt land and is dotted with many pockets and patches of habitat where species find refuge. Often land which was once occupied by industry.
- **NCA 51 Dark Peak:** a landscape of large-scale sweeping moorland, in-bye pastures enclosed by drystone walls, and gritstone settlements within the Pennine chain. It forms a large part of the Peak District National Park.
- **NA 36 Southern Pennines:** part of the Pennine ridge of hills, lying between the Peak District National Park and the Yorkshire Dales National Park. A landscape of large-scale sweeping moorlands, pastures enclosed by drystone walls, and gritstone settlements within narrow valleys.



KEY ISSUES

Flooding has the potential to affect local landscape characteristics in Kirklees Metropolitan Borough Council. This includes impacts on existing character areas and on the setting of local landmarks and landscape features. The key issues relating to the landscape and visual amenity are summarised below:

- Alteration of existing landscapes due to increased flooding.
- Disturbance to existing views.

To maintain the landscape within the borough, the LFRMS should consider and take account of the key issues.

BIODIVERSITY, FLORA AND FAUNA

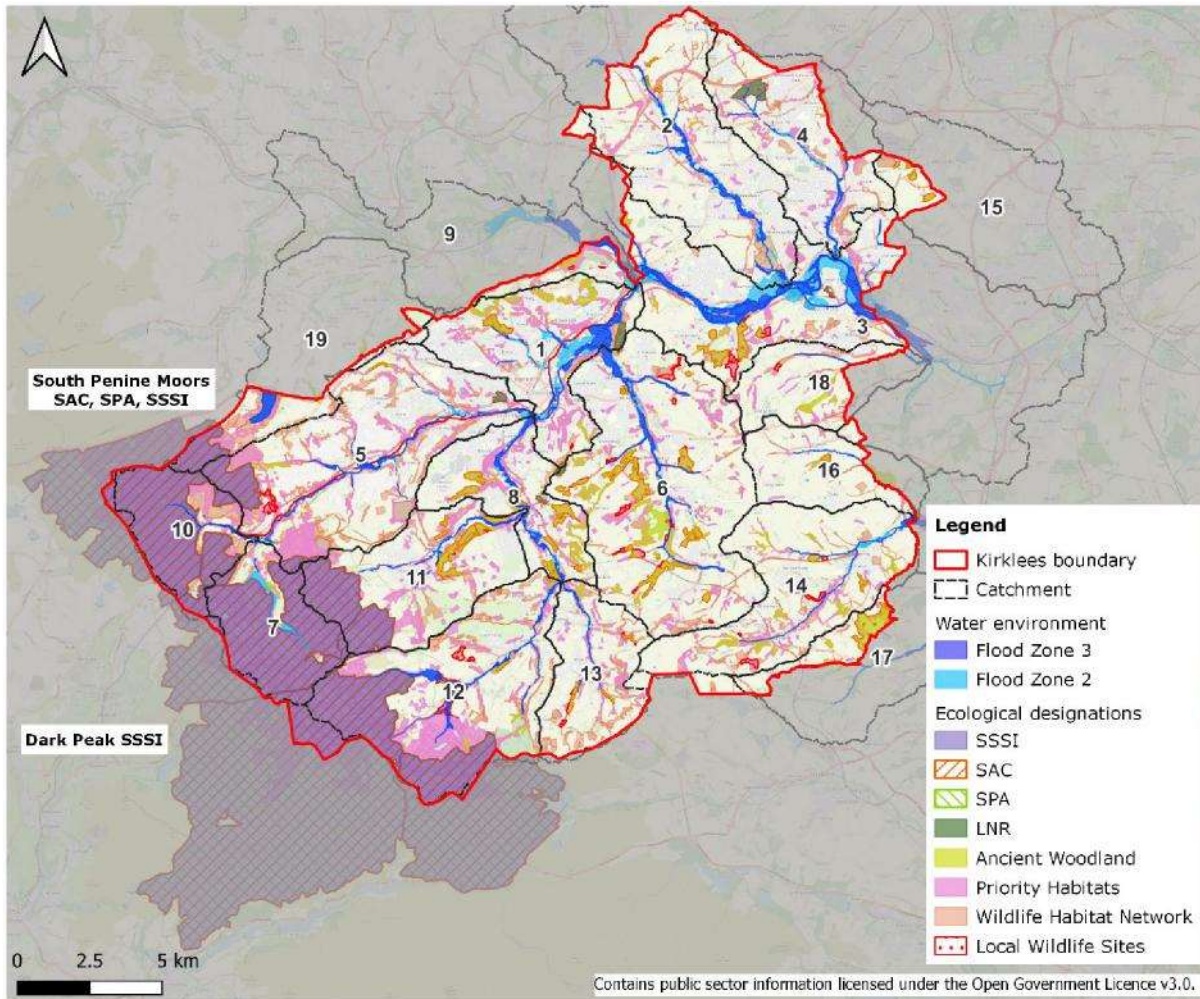
STATUTORY PROTECTED SITES

The Kirklees Metropolitan Borough encompasses many high-quality environments which have been recognised through international, national and local ecological designations. These are outlined in Table 5-1.

Kirklees Metropolitan Borough has several locally designated ecological sites such as Local Nature Reserves (LNR) and Local Wildlife Sites (LWS). There are nine LNRs and 88 LWSs across the borough. A complete list can be found in Appendix B. Ecological designations in Kirklees are outlined on Figure 5-2.

Table 5-1 Internationally and nationally designated ecological assets.

Site	Designation	Condition	Priority Catchment	Qualifying features
South Pennine Moors (Phase 1 and 2)	Special Area of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI),	Unfavourable – Recovering	5, 9, 10, 19, 22, 24, 25, 26, 27	Provides habitat for an important assemblage of breeding moorland birds and moorland fringe birds. The site is primarily designated as an SAC due to the following Annex I habitats: European dry heaths, Blanket bogs, and Old sessile oak woods with Ilex and Blechnum in the British Isles.
Dark Peak	SSSI	Unfavourable – Recovering	5, 7, 10, 11, 12, 23, 25, 27, 28, 29.	This is wild, open and more or less continuous moorland, predominantly at an altitude of 400–600 m and broken only by transpennine roads from Manchester to Sheffield, over the Snake Pass; from Manchester to Barnsley along the Longdendale valley and over the Woodhead Pass and from Oldham to Huddersfield over Wessenden Head Moor.



NOTABLE HABITATS AND SPECIES

Numerous priority species and habitats of principle importance listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act are known to be present in Kirklees and are included within the LBAP (Local Biodiversity Action Plan). The species and habitats of principal importance within rivers, riverine corridors and associated habitats are summarised in Table 5-2 below.

Table 5-2 Priority species and habitats of principal importance listed in Section 41 of the NERC Act listed in the Local Biodiversity Action Plan

Priority species and habitats of principal importance within Rivers, Riverine Corridors and Associated Habitats	
Species	
Plants	Floating water plantain
Fish	Various fish species
Birds	Reed Bunting
	Bullfinch
	Song thrush

Priority species and habitats of principal importance within Rivers, Riverine Corridors and Associated Habitats

Mammals	Otter
	Daubenton's bat
	Water Vole

HABITATS REGULATIONS ASSESSMENT

Under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, a screening assessment must be undertaken to consider the potential direct or indirect adverse effects of the LFRMS on protected habitats and species, with a Habitats Regulations Assessment (HRA) to be undertaken if there is a possibility of a significant effect. Mitigation or avoidance measures must then be applied should the HRA determine that significant adverse effects on site integrity, in view of a site's conservation objectives, are likely. HRA screening has been undertaken to consider potential direct or indirect adverse effects of the LFRMS on designated sites.

The assessment identified the potential for hydrological changes, water quality effects and impacts to habitats and species that may arise as an indirect result of the implementation of the LFRMS.

No likely significant effects arising from the KMDC LFRMS's proposed objectives that might significantly affect the European Sites identified within 15km of the District. This was largely due to the high-level nature of the LFRMS and purpose of achieving environmental gain. It was concluded that an Appropriate Assessment was not required.

KEY ISSUES

The key issues relating to ecological receptors in the Kirklees Metropolitan Borough are summarised below:

Sensitive designated sites for nature conservation, including priority habitats and species, which are at increased risk of flooding due to surface water flooding and groundwater flooding.

Many of the designated nature conservation sites within Kirklees Metropolitan Borough are dependent on specific hydrological regimes and support water-dependent habitats and species. Flooding may introduce contaminated or nutrient enriched waters to designated sites which could adversely impact on interest features.

To maintain and improve existing habitats, species and ecologically designated sites, the LFRMS must consider and take account of the issues outlined above.

Often traditional flood risk management methods can result in the physical modification of water bodies. The LFRMS should consider how to implement natural flood management methods which may deliver multiple benefits such as maintaining and restoring biodiversity whilst providing recreational green infrastructure.

WATER ENVIRONMENT

WATERCOURSES

Kirklees is located within the Humber River basin district which covers an area of 26,100 km². The Humber River Basin Management Plan (2016) outlines the significant water management issues in the region these are categories as follows:

- Physical modifications are currently affecting 42% of water bodies. Physical modifications to water bodies alter the natural flow levels causing additional sediment to build up, and loss of habitats and recreational opportunities.
- Pollution from wastewater – affecting 38% of water bodies. Wastewater or sewage can contain large amounts of nutrients, ammonia, bacteria, harmful chemicals and substances. Additional pressure is being placed on sewer networks due to population growth and changes to rainfall patterns as a consequence of climate change.
- Pollution from towns, cities and transport – affecting 16% of water bodies. Surface water which passes over roads and pavements accumulate pollutants and drains to surface waters.
- Changes to the natural flow and level of water – affecting 6% of water bodies. Reduced flow and water levels can have consequences for water abstraction, and wildlife.
- Negative effects of invasive non-native species – affecting <1% of water bodies. Invasive non-native species can have significant consequences for the natural environment. The process of controlling invasive species can have significant economic impacts.
- Pollution from rural areas – affecting 32% of water bodies. Soils and sediment are being washed off the land carrying phosphorus and nitrate from fertilisers into water bodies. Other impacts include sedimentation from erosion, and compacted fields. There are also bacteriological contaminants from faecal matter.
- Pollution from abandoned mines – affecting 4% of water bodies. Surface waters and groundwater flooding abandoned mines are becoming contaminated with dissolved metals.

At a more local level, Kirklees lies predominantly within the Calder catchment, with a small area to the southeast of the borough within the Don catchment.

The Calder Catchment Flood Management Plan (2010) describes a long history of flooding within the catchment. The most damaging floods occurred in 2007, when 1,700 properties across the catchment flooded from surface water, sewers and rivers. In June 2020, over 700 properties flooding from surface water. At present the two main sources of flood risk are flooding from rivers especially within urban communities, and surface water and sewer flooding (Environment Agency, 2010).

The Don Catchment Flood Management Plan (2010) also describes a long history of flooding. In 2007, over 6750 properties flooding across the catchment, and in 2000 over 240 properties were flooded across the catchment. The primary sources of flooding across the catchment include; rapid river flooding in urban watercourse, sewer and surface water drainage, groundwater and artificial sources.

WATER RESOURCES

Yorkshire Water is responsible for water supply across the area, water is obtained from three main water sources, reservoirs, river abstractions and boreholes. According to the Water Resources Management Plan (2019), the key challenges water resources challenges in Kirklees are as follows:

- Increasing population of Yorkshire by approximately one million by 2050;
- Increased loss of deployable output as a result of climate change;

- Environmental pressure (ongoing) to reduce the amount of water abstracted;
- Providing a resilient service.

According to the plan, climate change remains the biggest single influence on long-term future water resource prospects.

WATER QUALITY

The study area falls entirely within the Humber River Basin District which consists of eighteen management catchments. Management catchments are further broken down into operational catchments.

Kirklees Metropolitan Borough is within the Colne and Holme Operational Catchment of which there are 21 water bodies. As shown in Table 5-3, all of the water bodies are heavily modified and according to the most recent testing (2019), of moderate ecological status, and fail chemical status.

Table 5-3 Hydromorphological designation, ecological and chemical status of water bodies within the Colne and Holme operational catchment

Water Body	Hydromorphological designation	Ecological Status (2019)	Chemical Status (2019)
Bilberry Reservoir	Heavily modified	Moderate	Fail
Blackmoor-foot Reservoir	Heavily modified	Moderate	Fail
Blakeley Reservoir	Heavily modified	Moderate	Fail
Brownhill Reservoir	Heavily modified	Moderate	Fail
Butterly Reservoir	Heavily modified	Moderate	Fail
Colne from River Holme to River Calder	Heavily modified	Moderate	Fail
Colne from Source to Wessenden Brook	Heavily modified	Moderate	Fail
Deer Hill Reservoir	Heavily modified	Moderate	Fail

Water Body	Hydromorphological designation	Ecological Status (2019)	Chemical Status (2019)
Digley Reservoir	Heavily modified	Moderate	Fail
Fenay beck from Source to River Colne	Heavily modified	Moderate	Fail
Holme from New Mill Dike to R Colne	Heavily modified	Moderate	Fail
Holme from Source to New Mill Dike	Heavily modified	Moderate	Fail
Mag Brook from Source to River Holme	Heavily modified	Moderate	Fail
New Mill Dike from Source to River Holme	Heavily modified	Moderate	Fail
Ramsden Reservoir	Heavily modified	Moderate	Fail
Riding Wood Reservoir	Heavily modified	Moderate	Fail
Wessenden Bk from Butterly Resr to River Coln	Heavily modified	Moderate	Fail
Wessenden Head Reservoir	Heavily modified	Moderate	Fail
Wessenden Reservoir	Heavily modified	Moderate	Fail
Yateholme Reservoir	Heavily modified	Moderate	Fail

SUMMARY OF KEY ISSUES

The key issues relating to the water environment within the study area are summarised below:

- Poor water quality across the Colne and Holme operational catchment.
- Increasing pressures on water resources across the district from population growth and climate change.

To maintain and improve flood management across the district, the LFRMS should consider the issues outlined above.

GEOLOGY AND SOILS

The geology of a catchment can be an influential factor on the way water runs off the ground surface. This is primarily due to variations in the permeability of the surface material and bedrock stratigraphy.

There are five nationally designated sites for geological importance within Kirklees Metropolitan Borough. Table 5-4 shows the designation and qualifying features of each of the sites.

Table 5-4 Nationally designated geological assets.

Site name	Designation	Catchment	Qualifying features
Park Clough	SSSI	10	The rock sequence shown at Park Clough shows exposures of sandstone and shales of the Namurian Series formed during the Carboniferous Period. The sequence of rock layers includes an important junction between the two major subdivisions of the Carboniferous Period.
Dark Peak	SSSI	5, 7, 11, 12, 23, 25, 27, 28, 29	Six locations of special geological interest are identified within the Dark Peak: a landslip, the rocks exposed behind the land-slip, a classic example of stream erosion on peat, an area of delta-formed sedimentary rock, an area of river evolution and an area of classic peat erosion.
Honley Station Cutting	SSSI	8	It is a site of great importance for understanding this part of the lower Westphalian A and is significant to geologists working in most of the coal-fields in northern and central Europe, and in eastern North America.
Rake Dike	SSSI	12	The Rake Dike valley contains exposures of rocks of the Namurian Series of the Carboniferous Period laid down some 320 million years ago. The rocks consist of layers of sandstone and shale, some of the shale layers

Site name	Designation	Catchment	Qualifying features
			containing important fossil remains.
Standedge Road Cutting	SSSI	10	This road cutting provides important exposures of the Kinderscout Grit which formed during the Carboniferous Period of geological time, about 320 million years ago.

There are 18 Local Geological Sites (LGeoS) in Kirklees Metropolitan Borough.

The Agricultural Land Classification (ALC) provisional data outlines the agricultural potential of land, categorising it into five grades (Natural England, 2020). The best and most versatile land is defined as Grades 1 (excellent quality agricultural land), 2 (very good quality), 3a (good), 3b (moderate), 4 (poor) and 5 (very poor). There are no areas of Grade 1 or 2 in the borough as shown in Figure 5-3. Therefore, the highest-grade agricultural land in Kirklees is located within the north and east of the borough. These areas are classified as Grade 3.

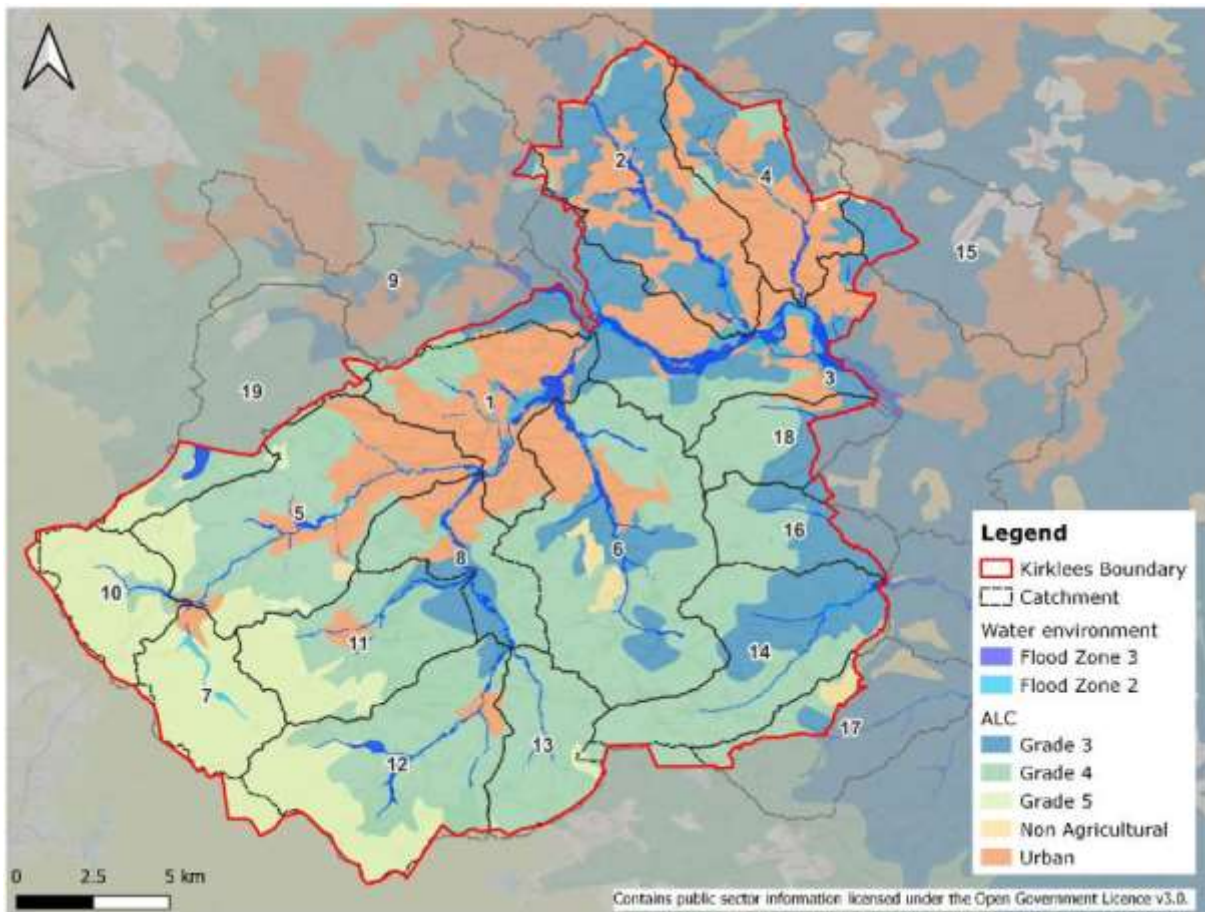


Figure 5-3 ALC in Kirklees Metropolitan Borough

Soil classifications by the Soil Landscapes Online Viewer (Defra, 2022) have classified the study area as containing multiple soil landscapes, but the study area predominantly consists of freely draining slightly acid loamy soils. This soil landscape is freely draining, of loamy texture, mainly covered by arable and grassland.

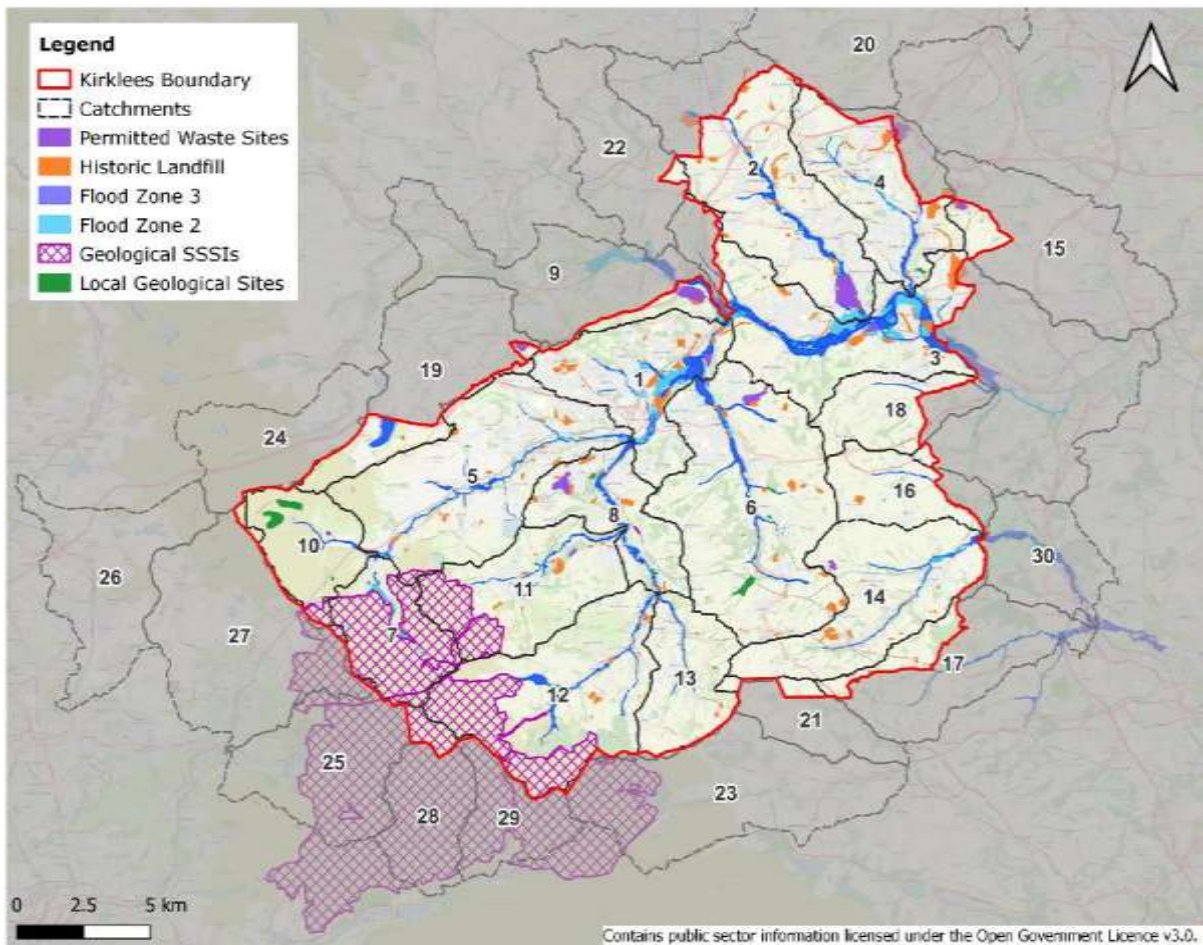


Figure 5-4 Geological SSSIs, Historic and Current Landfill sites in Kirklees.

Contaminated land contains substances in or under the land that are actually or potentially hazardous to health or the environment. Landfill sites are areas of potential contamination. There are 19 permitted waste sites, 222 historic landfill sites, and 19 Local Geological Sites within the study area, as shown on Figure 5-4.

5.5.1 Key Issues

The geological context of the study area, including designations and historic and current landfill is outlined above. The key issues identified are summarised below:

- Flood risk may result in contaminants leaching into surface water, increasing levels of pollution, and threatening human health and the environment; and
- Risk of damage or disturbance to geologically designated SSSIs or LGeoS.

The LFRMS must consider the issues outlined above to prevent erosion of landfill waste into the water course, which would threaten human health and the environment.

HISTORIC ENVIRONMENT

There are a number of heritage assets within the study area, reflecting a rich and diverse built and historic environment. There are approximately 2,974 listed buildings of which 18 are on the Heritage at Risk Register (2021).

The borough also contains 22 Scheduled Monuments. These are awarded protection against potentially damaging activities, including those associated with development, under the Ancient Monuments and Archaeological Areas Act 1979. Three of these Scheduled Monuments are on the Heritage at Risk Register.

The Register of Historic Parks and Gardens by Historic England identifies historic landscapes of note. This can include gardens, grounds and other planned open spaces, the emphasis of the Register is on designed landscapes (Historic England, 2022). There are also six Registered Historic Parks and Gardens in the borough, these are as follows:

- Beaumont Park (8)
- Bretton Hall (14,16)
- Crow Nest Park (2,3)
- Dewsbury Cemetery (2,3)
- Greenhead Park (1,5)
- Kirklees Park (3,9)

The Heritage at Risk Register includes historic buildings and sites of being lost through neglect, decay and deterioration. It includes all types of heritage designations. The overarching purpose of the register is to focus attention on assets in the most need. These heritage assets are outlined in Table 5-5 and on Figure 5-4.

Table 5-5 Historic assets in Kirklees Metropolitan Borough on the Heritage at Risk Register

Name	Designation	Catchment	Condition
Former Huddersfield Infirmary	Listed building Grade II*, CA	1	Poor
New House Hall, Newhouse Road	Listed building Grade II*	1	Very bad
Boiler house, engine house, rope race, water tower and powerhouse at Westwood Mills, Lowestwood Lane, Linthwaite, Huddersfield	Listed building Grade II*, CA	5	Very bad
Mill Dam, at Westwood Mills, Lowestwood Lane, Linthwaite, Huddersfield	Listed building Grade II*, CA	5	Poor
North Range at Westwood Mills, Lowestwood Lane, Linthwaite, Huddersfield	Listed building Grade II*, CA	5	Very bad
Offices and workshop ranges at Westwood Mills, Lowestwood Lane,	Listed building Grade II*	5	Very bad

Name	Designation	Catchment	Condition
Linthwaite, Huddersfield			
West Block at Westwood Mills, Lowestwood Lane, Linthwaite. Huddersfield	Listed building Grade II*	5	Very bad
Hopton Congregational Church, Calder Road, Mirfield	Listed building grade II*	3	Fair
Christ Church, Church Lane, Bately and Liv-ersedge	Listed Place of Worship Grade II	2	Poor
Church of St Stephen, Lidget Street, Huddersfield	Listed Place of Worship Grade II	1	Poor
Church St Thomas, Manchester Road, Huddersfield	Listed Place of Worship Grade II*	5	Poor
Church of St John, St John's Road, Huddersfield	Listed Place of Worship Grade II*, CA	1	Poor
Church of St Mark St Marks Road, Huddersfield	Listed Place of Worship Grade II	5	Poor
Church of the Holy Trinity, Trinity Street, Huddersfield	Listed Place of Worship, Grade II*, CA	1	Poor
Christ Church, Woodhouse Hill, Huddersfield	Listed Place of Worship Grade II	1	Poor
Church of Emmanuel, Huddersfield Road, Kirkburton	Listed Place of Worship Grade II	14	Poor
Church of St Thomas, Marsh Hall Lane, Kirkburton	Listed Place of Worship Grade II, CA	6	Poor
Church of St Mary, Church Lane, Mirfield	Listed Place of Worship Grade II*	3	Poor
Emley Day Holes, 200m east of Churchill Farm, Denby Dale	Scheduled Monument	14	Generally unsatisfactory with major localised problems.
Medieval ironstone pits south of Bentley	Scheduled Monument	16	Generally unsatisfactory

Name	Designation	Catchment	Condition
Grange, Denby Dale			with significant localised problems
Crosland Lower Hall moated site, Meltham	Scheduled Monument	11	Generally satisfactory but with significant localised problems.
Birkby, Huddersfield	Conservation Area, 33 listed buildings	1	Poor
Dewsbury	Conservation Area, 41 listed buildings	3,4	Very bad
Holmfirth	Conservation Area, 38 listed buildings	12	Very bad
Huddersfield	Conservation Area, 214 listed buildings	1	Very bad

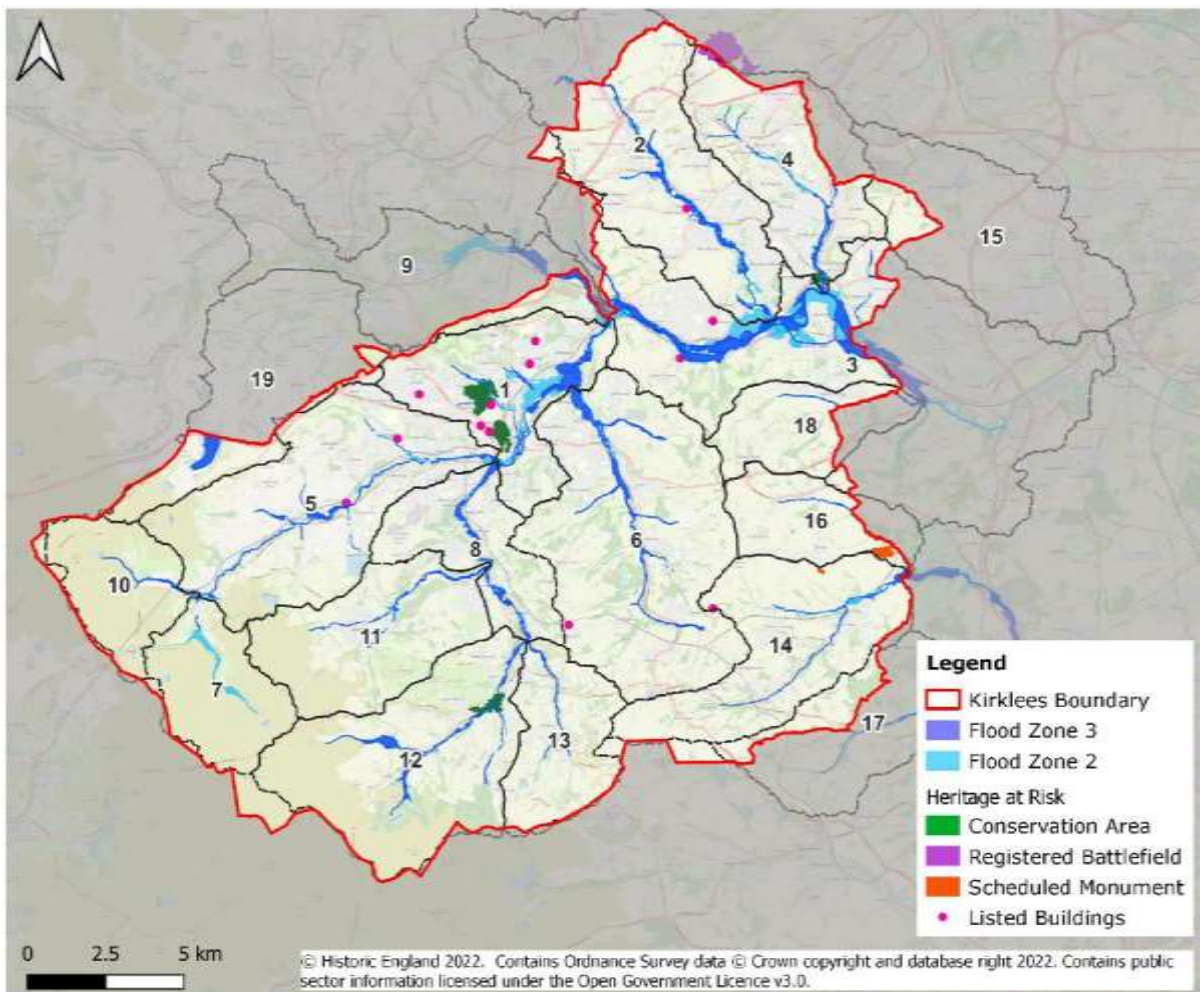


Figure 5-5 Location of Heritage at Risk in Kirklees Metropolitan Borough

The West Yorkshire Joint Services undertook the West Yorkshire Historic Characterisation Project between 2011 and 2017. This developed Historic Land Classification for Kirklees, which evaluates the changes in the historic landscape since 1066. The maps focus upon the key land use areas of commercial, communication, enclosed land, extractive, horticulture, industrial, institutional open land, parkland and recreation, residential, water and woodland (West Yorkshire Joint Services, 2017).

Historic England and Kirklees Metropolitan Council are working in collaboration to deliver a High Street Heritage Action Zone (HSHAZ) in the centre of Huddersfield. The overarching aim of the Action Zone is to rejuvenate the many of listed buildings around Huddersfield town centre which have been in decline.

The West Yorkshire Archaeology Advisory Service have produced a selection of research agenda documents on the:

- Palaeolithic & Mesolithic
- The Later Prehistoric
- Late Iron Age and Roman
- Post Roman to Conquest
- Industrial Archaeology
- Historic Buildings
- Medieval Rural Settlements.

These documents evaluate the historic record of West Yorkshire across the above periods.

KEY ISSUES

There are a variety of heritage assets present within the study area. The key issues are summarised below:

- Potential flood-related damage to many historical, cultural and archaeological features within the study area due to changed water levels or through the force and inundation of flood waters.
- Watercourses and their surrounding fluvial landscapes are important components of the historic environment, containing a wider range of heritage assets.

The provision of flood protection provided by the LFRMS must consider the potential consequences for the historic environment. Where required, early consultation with Local Government Archaeological Officers will help identify the presence of any unknown un-designated archaeological assets and any mitigation to be factored in.

POPULATION

In 2019, the population in Kirklees is 437,000 residents (Kirklees Metropolitan Borough Council, 2019). Only 9% of areas in Kirklees are in the most 10% deprived in England, down from 14% in 2010 and in contrast to rising deprivation in neighbouring areas (Kirklees Metropolitan Borough Council, 2019). Approximately 169,00 households in West Yorkshire are in fuel poverty which is equivalent to 17% (West Yorkshire Combined Authority, 2021).

In Kirklees, 18% of residents have local nature greenspace within 5 to 10 minutes walking distance, which is less than the regional average of 23% (West Yorkshire Combined Authority, 2021).

Kirklees Metropolitan Council are currently running a property Flood Resilience (PFR) Grant 2020-2022 which allows for any measures to be applied to building to make people and the property less vulnerable to the physical impacts of flooding to encourage resilience.

The most densely populated wards in Kirklees are Batley East, Batley West and Greenhead with 36.2 to 47.5 persons per hectare (Kirklees Metropolitan Borough Council, 2020).

The Living Environment domain measures the quality of the local environment. The domain consists of two sub-domains. The 'indoors' living environment measures the quality of housing; while the 'outdoors' living environment contains measures of air quality and road traffic accidents (Ministry of Housing, Communities & Local Government, 2019).

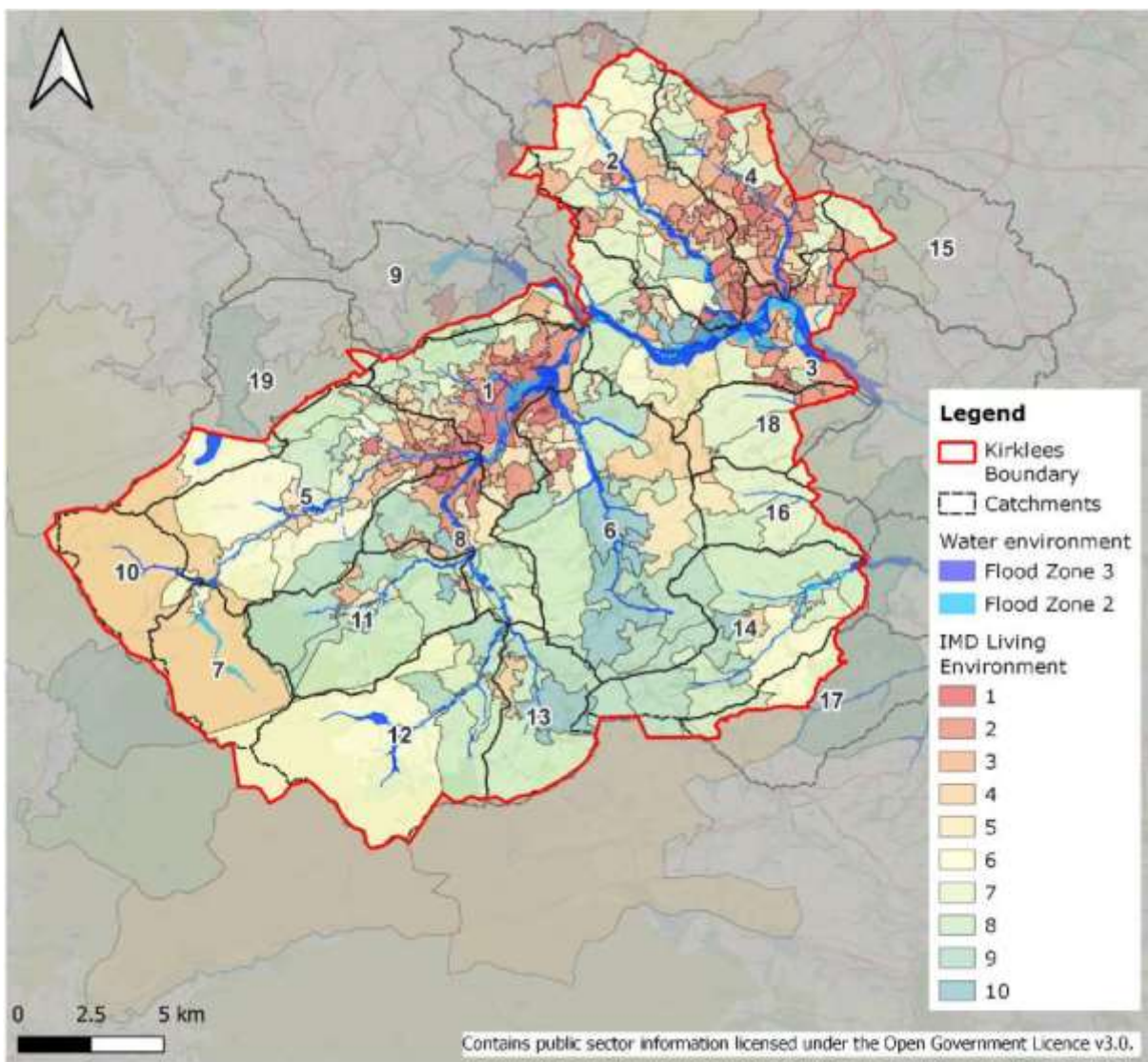


Figure 5-6 IMD Living Environment domain (2019) in Kirklees Metropolitan Borough

Figure 5-5 shows the Index of Multiple Deprivation (IMD) scores for Kirklees. It shows that the greatest deprivation is concentrated around catchments 1 and 4. These relate to the more urban areas of the Huddersfield and Dewsbury. Broadly the more rural areas of the borough experience relatively less deprivation.

SUMMARY OF KEY ISSUES

The key issues relating to the population and health of the study area are outlined above and summarised below:

- Predicted increase in proportion of younger children and older adults within the population, resulting in a relatively small working age population supporting a larger dependent population.
- Consider the sensitivity of areas of deprivation and flood risk exposure across the borough.

The provision of flood management strategies provided by the LFRMS should consider the potential consequences for the local population.

MATERIAL ASSETS

There are 16 train stations in Kirklees, the main rail route is the East/West Trans Pennine Route which links Huddersfield and Dewsbury to Leeds, York, Manchester, and Manchester Airport. There are also local rail connections to Wakefield which provide a further connection to London. The Penistone Line makes a local connection to the Sheffield City Region and Midland Main Line railway (Kirklees Metropolitan Borough Council, 2015).

Between 2009/10 and 2014/25 the number of bus passengers fell from 169.2 million per annum to 156.8 million per annum across West Yorkshire. The current bus service in Kirklees is good, with services mainly focused between corridors of the main towns and urban areas. There are services operating in the rural south of the borough, but these are generally at a lower frequency and require greater public subsidy (Kirklees Metropolitan Borough Council, 2015).

At a regional level, the West Yorkshire transport strategy highlights a number of challenges. The investments in road and rail have not kept pace with economic and population growth, which is manifesting in the congestion and insufficient capacity on public services. At a wider scale, the current transport provision lacks resilience (West Yorkshire Combined Authority, 2017).

Figure 5-6 demonstrates some of the potential critical infrastructure at risk of flooding across the borough.

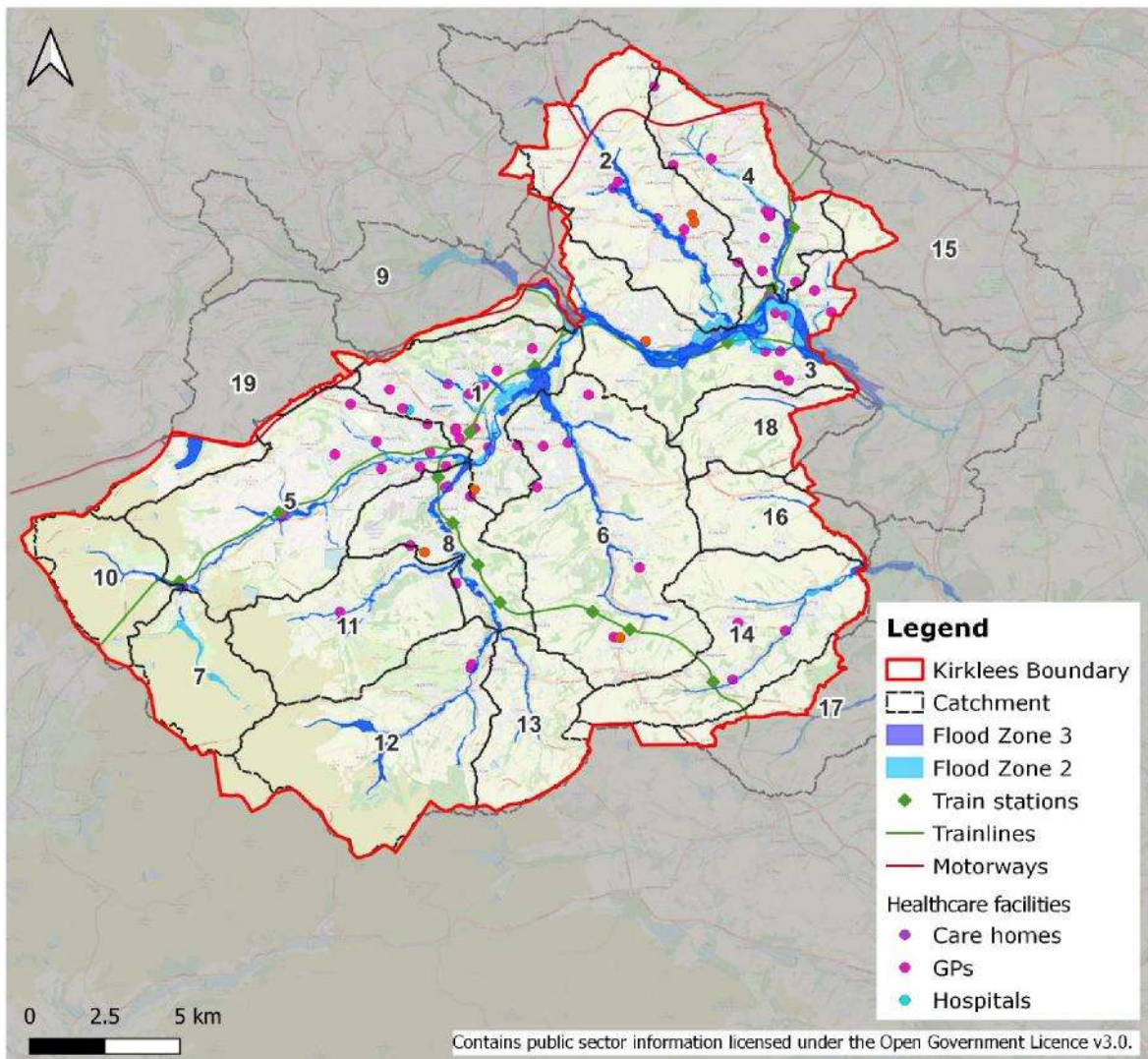


Figure 5-7 Material assets in Kirklees Metropolitan Borough

The overarching conclusion of the Kirklees Infrastructure Delivery Plan (2015) was that there is broadly sufficient infrastructure, either current or planned to support the housing and economic growth aspirations for Kirklees district up to 2031. Specific risks to infrastructure include:

KEY ISSUES

Kirklees Metropolitan Borough is large district with an established network of infrastructure, transport routes, including rural and urbanised areas. The associated key issues are summarised below:

- Critical infrastructure including energy infrastructure, industrial areas, public amenity and transport routes may be vulnerable to flood risk; and
- Sensitivity of infrastructure to damage/disturbance from flooding and associated socio-economic costs.

The provision of flood protection provided by the LFRMS must consider the potential consequences for established and future material assets.

CLIMATE

Recent data indicates that CO₂ end-user emissions in West Yorkshire are approximately 10.8 Mt CO₂ which is equivalent to 4.7 tonnes per capita, below the nation average of 4.9 tonnes. Whilst West Yorkshire's current rates of emissions is lower than the national average, a continuation of the emissions reduction will not achieve its existing target of net zero by 2038 (West Yorkshire Combined Authority, 2021).

Approximately 39% of energy used in the borough is for domestic purposes, domestic electricity uses account for around 8%. Around 2% of energy used is sourced from renewables and waste (Kirklees Metropolitan Borough Council, 2020).

Kirklees falls within one climate region, North-East England, as classified by the Met Office. The annual temperature range in low-lying areas are around 8.5 °C to around 10 °C, mean annual temperatures depend strongly on altitude with a decrease of about 0.5 °C for each 100m increase in altitude (Met Office, 2016).

Kirklees Metropolitan Council developed a Local Climate Impacts Profile (LCLIP) to support the West Yorkshire Adaptation Action Plan, where highlighted the impacts of a changing climate on citizens, businesses and partner organisations by detailing the extreme weather events between 2003-2010. Kirklees Council found that extreme weather events had cost the authority £283,030 - £1,255,200 a year, mainly through highway repair and maintenance (West Yorkshire Combined Authority, 2010). The results of LCLIP's across the West Yorkshire region have identified that the main impacts of extreme weather events are:

- Damage to infrastructure e.g., flooding of properties,
- Disruption to travel and accessibility across the region, e.g., traffic congestion and public transport cancellations, and.
- Difficulty or failure in delivering essential services e.g., provision of health and social care.
- Climatic change is likely to result in increased frequency and intensity of severe weather types already experienced across the Yorkshire and Humber region. These effects are likely to have significant implications for businesses and residents (West Yorkshire Combined Authority, 2010).

KEY ISSUES

The key issue relating to climate change is projected increased variability in precipitation events. This is likely to result in the overwhelming of drains and sewers due to increased surface run-off. In turn, this could result in localised flood events, which will have implications for human health, infrastructure, and designated sites.

During the summer months, projected rain increases would have an impact on the capacity of drainage systems. More intense events would exceed the capacity of drainage systems and cause surface water runoff and flooding causing localised surface water runoff and flooding from smaller watercourses, particularly in urban areas.

During the winter months, projected rainfall increases are likely to cause saturation of clayey soils, resulting in wet antecedent conditions, which may result in greater vulnerability to further storms, particularly in rural areas.

To ensure that the region is resilient to impacts of climate change, the LFRMS must consider how to implement measures aimed at coping with them.

SEA FRAMEWORK

INTRODUCTION

The SEA framework, developed at the scoping stage, is used to identify and evaluate the potential environmental issues associated with the implementation of the LFRMS. The framework comprises a set of SEA objectives that have been developed to reflect the key environmental issues identified through the baseline information review. These objectives are supported by a series of indicators, which are used as a means to measure the potential significance of the environmental issues and can also be used to monitor implementation of the LFRMS objectives. These LFRMS objectives are tested against the SEA framework to identify whether each option will support or inhibit achievement of each objective.

Table 6-1 below summarises the purpose and requirements of the SEA objectives, sub-objectives and indicators.

Table 6-1 Definition of SEA Objectives, Criteria and Targets

	Purpose
Objective	Provide a benchmark 'intention' against which environmental effects of the plan can be tested. They need to be fit-for-purpose.
Sub-objective	Aid the assessment of impact significance. Provide a means of ensuring that key environmental issues are considered by the assessment process.
Indicator	Provide a means of measuring the progress towards achieving the environmental objectives over time. They need to be measurable and relevant and ideally rely on existing monitoring networks.

SEA OBJECTIVES AND CRITERIA

SEA objectives and indicators have been compiled for each of the environmental receptors (or groups of environmental receptors) scoped into the SEA. The SEA objectives for the LFRMS are given in Table 6-2 below. These objectives can be refined or revised in light of any additional information obtained during the life of the project.

Table 6-2 SEA Objectives and Criteria

Receptor	Objective	Sub-objective	Indicator
Landscape and Visual Amenity	1 Protect the integrity of local urban and rural landscapes in the area.	Prevent changes to the landscape character of NCAs and local landscape character types.	Changes in the condition and extent of existing characteristic elements of the landscape. The condition and quality of new landscape features introduced to

Receptor	Objective	Sub-objective	Indicator	
			the environment (i.e. new flood defences).	
Biodiversity, Flora and Fauna	2	Maintain, and enhance and extend biodiversity, wildlife and habitat connectivity.	<p>Protect and enhance protected, important and notable habitats and species and designated nature conservation sites in the area.</p> <p>Increase biodiversity by enhancing, expanding and connecting existing natural areas and wildlife refuges.</p> <p>Increase biodiversity resilience to flood risk and climate change.</p>	<p>Recorded numbers of protected habitats and species.</p> <p>Percentage change in area of priority habitats.</p> <p>'Condition' of designated wildlife, geological sites, and habitats.</p> <p>Deliver measures which also improve the ecological status of WFD waterbodies.</p> <p>Biodiversity net gain and other enhancements achieved in projects delivered through the LFRMS.</p>
Water Environment	3	Protect and enhance the quality of water features and resources.	Do not inhibit achievement of WFD objectives and contribute to their achievement where possible.	WFD chemical or ecological status of water bodies within catchment.
Geology and Soils	4	Maintain soil quality and conserve geological designations.	<p>Reduce risk of contamination from all sources.</p> <p>Maintain soil quality and quantity.</p> <p>Conserve the condition of geological designated sites.</p>	<p>Number of contamination incidents.</p> <p>Risk levels of contamination.</p> <p>Soil quality.</p> <p>'Condition' of geological designated sites.</p>
Historic Environment	5	Preserve and where possible enhance important heritage assets.	<p>No adverse impact on designated and non-designated heritage assets as a result local flooding.</p> <p>No adverse impact on the integrity/setting of designated and non-designated heritage assets as a result of local flood risk management measures.</p>	<p>Number of designated and non-designated heritage sites at risk from local flooding.</p> <p>Number of heritage assets adversely impacted upon by local flood risk management measures.</p>
Population and Human Health	6	Protect and enhance human health and wellbeing.	Conserve and enhance open (including urban amenity areas) and natural green spaces including PRow and recreation opportunities.	<p>Number of open and natural green spaces.</p> <p>Number and value of PRow routes.</p>

Receptor	Objective	Sub-objective	Indicator
			<p>Protect key social infrastructure assets and services from flooding and increase resilience to climate change.</p> <p>Number of residential properties at risk from flooding.</p> <p>Number of key services at risk from local flooding.</p> <p>Health and wellbeing statistics.</p>
Material assets	7	<p>Minimise the impacts of flooding to the transport network and key critical infrastructure.</p> <p>No increase in length of road and rail infrastructure at risk from local flooding.</p> <p>No increase in number of infrastructure assets at risk from local flooding.</p> <p>No increase in number of Green Infrastructure assets at risk of local flooding and/or an enhancement of current Green Infrastructure Assets in the area.</p>	<p>Length of road and rail infrastructure at risk from local flooding.</p> <p>Number of key infrastructure assets at risk from local flooding.</p> <p>Number of green infrastructure assets at risk from flooding/created or enhanced through implementation of the LFRMS.</p>
	8	<p>Minimise local and national contribution to climate change.</p> <p>Minimise short-term carbon and reduce long-term emissions by preferencing low carbon solutions.</p>	<p>Number of flood management measures implemented that will also sequester carbon. Carbon dioxide equivalent emissions (CO₂e)</p>

STAGE B: DEVELOPING AND REFINING OPTIONS AND ASSESSING EFFECTS

DEVELOPING ALTERNATIVES

The SEA Regulations require an assessment of the plan and its 'reasonable alternatives'. In order to assess reasonable alternatives, different strategy options for delivering the LFRMS have been considered and assessed at a strategic level against the SEA objectives (see Table 7-1) and environmental baseline. The results of this assessment will be used to inform the decision-making process in choosing a preferred way of delivering the LFRMS.

APPRAISAL OF REASONABLE ALTERNATIVES

The LFRMS has the purpose of managing and reducing local flood risk in the study area. A high-level review of the options against the SEA Objectives was undertaken in the form of a simple matrix for each of the following options:

Do Nothing - where no action is taken, and existing assets and ordinary watercourses are abandoned.

- Do minimum: maintain current Kirklees Council Local Flood Risk Management Strategy (2012)- where existing assets and watercourses are maintained as present in line with the existing local flood risk management plan as an alternative to preparing a new one. Existing infrastructure is not improved over time and the effects of climate change are not taken into account.
- Manage and reduce local flood risk - take action to reduce the social, economic and environmental impact due to flooding through the preparation of a new LFRMS.

Table 7-1 compares all three strategy options against each of the SEA objectives.

Table 7-1 Assessment of the Strategy and Alternative Options Against the SEA Objectives

SEA Objectives		Options and Effects		
		Do Nothing	Do minimum: maintain current local flood risk strategy	Manage and reduce local flood risk
1	Protect the integrity of local urban and rural landscapes in the area.	Potential negative effect resulting from no management that could adversely impact sensitive landscape character. Locally important landscape features, including those identified within the LCAs, would likely be exposed to damage and deterioration through increased exposure to flood risk.	Little change to baseline in the short to medium term. However, in the future, as a result of climate change and increasing flood risk, adverse impacts on local landscapes may arise.	Potential for managing and promoting this objective through sensitively designed flood risk management schemes which enhance local landscape character, such as natural flood management.
2	Maintain and enhance biodiversity, wildlife, and habitat connectivity.	Potential for both adverse and beneficial impacts. For example, abandonment of assets may allow for the development of more natural watercourses and wetland habitat creation/ enhancement through increased inundation. However, there could be an increased risk of spreading of non-native invasive species	Little/no change to baseline levels in the short to medium term. However, as a result of increased flooding in the future due to climate change, new habitats may be created, or existing wetland habitats enhanced. Although, habitats intolerant of increased inundation or changes in water quality may be adversely affected.	Potential for both adverse and beneficial impacts as a result of active management. Opportunities may arise to enhance biodiversity and notable habitats the Council through the implementation of measures to reduce local flood risk, for example: natural flood management measures, improvements

SEA Objectives		Options and Effects		
		Do Nothing	Do minimum: maintain current local flood risk strategy	Manage and reduce local flood risk
		through flooding; deterioration of existing wildlife corridors; and detrimental impacts on habitats intolerant of increased inundation.		to fish passage; encouraging appropriate management of watercourses by riparian landowners; and undertaking watercourse maintenance.
3	Protect and enhance the quality of water features and resources.	Potential for both adverse and beneficial impacts.	Little/no change to baseline levels. However, potential deterioration of water quality during flooding incidents.	Potential for both adverse and beneficial impacts.
4	Maintain soil quality and conserve geological designations.	Potential negative effect resulting from increased erosion of soils as a result of increased flooding and no management of land contamination risks and subsequent effects.	Little/no change to baseline in the short to medium term. However, in the future, as a result of climate change, adverse impacts may arise through erosion and land contamination from increased flooding.	Potential for managing and promoting this objective through reduced flood risk, which will help to protect the Council area's soil resource from erosion and its quality.
5	Preserve and where possible enhance important historic and cultural sites.	Heritage assets will likely be exposed to damage and deterioration through increased exposure to flood risk.	Little/no change to baseline in the short to medium term. However, in the future, important heritage assets may be exposed to increased flooding and damage due to climate change.	Potential for both adverse and beneficial impacts as a result of active management, for example through increased protection of vulnerable heritage assets or reduced inundation resulting in the desiccation of buried archaeology.
6	Protect and enhance human health and wellbeing.	Increased exposure to flood risk from a combination of no management and climate change. This could lead to a greater number of people and their properties at risk of flooding, causing greater damage and disruption, increases in social exclusion, deprivation and health risks.	No improvements to health and well-being as existing flood risk is maintained and the risk may increase in the future as a result of climate change.	Active management to reduce local flood risk should help to protect residential properties and key social infrastructure services from flooding. This has the potential to create a range of social benefits including reducing associated health impacts and social deprivation.
7	Minimise the impacts of flooding to the transport network and key critical infrastructure.	This option is likely to result in increased flood risk to key infrastructure, which would cause significant disturbance	Maintains the current flood risk levels, although this risk may increase in the future due to climate change.	Managing and reducing local flood risk will minimise the impact of flooding on roads, railways and other infrastructure assets. This

SEA Objectives		Options and Effects		
		Do Nothing	Do minimum: maintain current local flood risk strategy	Manage and reduce local flood risk
		ruption to the county, impacting on human and economic activity and the environment.		will reduce disruption during flood events and enable a more effective response.
8	Minimise local and national contribution to climate change.	Increased exposure to flood risk may result in increased emissions locally. For example, from emissions associated with the recovery effort following flood events.	Little/no change to baseline levels in the short to medium term. However, as a result of future climate change and associated increased flood risk, there may be an increase in emissions following flood events.	Potential for negative impacts if management is carried out using hard engineering approaches which contribute embodied carbon. Potential for management through low carbon measures such as natural flood management.

Impact Significance	Impact Symbol	Description
Significant positive impact	++	Significantly beneficial to the SEA objective -multiple opportunities for environmental improvement or resolves existing environmental issue.
Minor positive impact	+	Partially beneficial (not significant) to the SEA objectives – contributes to resolving an existing environmental issue or offers some opportunities for improvement.
Neutral impact	0	Neutral effect on the SEA objective and environment.
Minor negative impact	-	Partially undermines (not significantly) the SEA objective – would contribute to an environmental issue or reduce opportunities for improvement.
Significant negative impact	--	Significantly undermines the SEA objective – will significantly contribute to an environmental problem or undermine opportunity for improvement.

Uncertain impact	?	Insufficient detail on the option or baseline – cannot effectively assess the significance of the strategy objective on the SEA objective.
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ASSESSMENT APPROACH

The LFRMS objectives and actions have been evaluated in light of their potential cumulative, synergistic, direct and indirect environmental effects on the different SEA receptors selected for further assessment. The assessment of these environmental effects has been informed by the baseline data collected at the scoping stage, professional judgement and experience with other water level management and flood risk related SEAs, as well as an assessment of national, regional, and local trends. In some cases, the assessment has drawn upon mapping data and GIS to identify areas of potential pressure, for example due to presence of environmental designations. Throughout the assessment the following will apply:

- Positive, neutral and negative impacts will be assessed, with uncertain impacts highlighted;
- The duration of the impact will be considered over the short, medium and long term;
- Consideration of whether the impact would be directly on a receptor or indirectly;
- The reversibility and permanence of the impact will be assessed. For example: temporary construction impacts, such as during decommissioning pumping stations; impacts which can be mitigated against/restored over time such as altered drainage pressures; or completely irreversible changes to the environment; and
- In-combination effects will also be considered.

The significance of effects upon each of the SEA objectives will then be evaluated and used to inform option selection.

LIMITATIONS AND ASSUMPTIONS

The LRFMS actions are high-level and generic and do not include specific details such as location, scale and/or implementation methods. As such, any assessment is based upon a high-level understanding of the individual actions.

It is assumed that actions will be undertaken in accordance with local and national policies, and to best practice guidance.

ASSESSMENT

The assessment of the LFRMS objectives and actions against the SEA objectives is shown below in Table 8-3. Cumulative effects of the actions against the SEA objectives are shown in Table 8-4. These are qualitative assessments that identify the range of potential effects that the LFRMS may have on delivering the SEA objectives.

Strategic Theme	LFRMS Action	SEA Objectives								Comments
		1	2	3	4	5	6	7	8	
Place	Engage early with spatial planners and growth strategies to ensure new development and plans make best use of land in making space for surface water, fluvial water, sustainable drainage systems and promote the use of adaptive pathways to adapt to climate hazards. Share our understanding of flooding in the area to avoid inappropriate development.	+	+	+	+	+	+	+	+	Ensuring best use of land and incorporating adaptive pathways and sustainable drainage systems (SuDS) will help contribute to reduced flood risk while being considerate of ecological, heritage and visual receptors, water resources and carbon. This action has the potential to positively benefit all SEA objectives.
Place	Work with the Local Planning Authority, Highway Authority, Environment Agency, and water companies to ensure the planning process and development design account fully for land drainage and surface water managements issues. Ensure our practices secure sound management and maintenance regimes that are proportionate and appropriate to the flood risk in the area.	+	+	+	+	+	+	+	+	Ensuring ongoing involvement with consultees on land drainage and surface water management will have indirect positive benefits to material assets as a result of minimising surface water flooding impacts on infrastructure. As statutory consultee, the LLFA could promote the use of sustainable flood risk management measures, such as SuDS, which would indirectly positively impact several SEA objectives.
Place	As a Lead Local Flood Authority engage with others to advise on climate change allowances for sources of flooding from surface water, groundwater, and ordinary watercourses. To share and inform others of current guidance, research and best practice on sustainability and water management to inform decision making.	+	+	+	+	+	+	+	○	Incorporating climate change allowances will improve the accuracy of flood modelling and will allow for targeted flood alleviation options to be achieved. This action should improve flood management in the area and have multiple benefits to SEA objectives, such as enhancing the resilience of ecosystems, communities and infrastructure.

Strategic Theme	LFRMS Action	SEA Objectives								Comments
		1	2	3	4	5	6	7	8	
Place	Enhance our early engagement with developments and commit to targeted periodic inspections of new development to ensure compliance with drainage planning conditions and Land Drainage Act legislation. Seek 106 contributions where appropriate and promote environmental net gain.	+	+	+	+	○	+	+	+	Early consideration of flood risk in development proposals would result in benefits to human and material receptors by ensuring that developments appropriately consider flood risk management measures. Undertaking inspections will ensure these measures are met. Promoting environmental net gain will have positive impacts on a range of SEA objectives through the enhancement of habitats.
Place	Improve our asset data on drainage assets within the district including highway gullies, culverts, carrier drains, debris screens and others to build our evidence base. Where considered significant make this publicly available.	○	○	○	○	○	+	+	○	Collecting and maintaining asset data will not have any identified direct effect on SEA receptors, however this action should promote better flood management in the area, particularly if there is a focus on assets which have a significant effect upon local flood risk.
Protect	Identify and develop flood risk improvement schemes for Kirklees to reduce the risk of surface water flooding and flooding from ordinary watercourses to better protect properties and the highway network in high-risk areas. Be open to new financing models. Promote a range of resilience actions and climate change scenarios.	9	9	9	9	9	+	+	9	Delivery of flood alleviation schemes will result in reduced risk to the local community for the benefit of population, human health and material assets. However, the project location, physical works to install, manage and maintain flood assets are unknown and may have adverse impacts on designated sites (both ecological and cultural), watercourses and soils in the proximity of the works. There is the potential that works will promote positive impacts for these receptors through managing water within the locality for their benefit.
Protect	Improve the awareness, understanding and delivery of Property Flood Resilience measures to manage local flood risk within our communities. Encourage homeowners and business owners to undertake Property Flood Surveys and seek grant funding to support resilience measure installations to support a build back better approach.	○	○	○	○	○	+	+	○	Improved resilience will reduce the impact of flood events on population and human health and material assets and will allow for faster recovery from floods.

Strategic Theme	LFRMS Action	SEA Objectives								Comments
		1	2	3	4	5	6	7	8	
Protect	Work with our partners, universities, and communities to develop integrated solutions and maintenance programmes to deliver multiple benefits to reduce flood risk and look to improve economic, social and environmental benefits. Be innovative in our approach.	+	+	+	+	+	+	+	+	Developing and implementing integrated approaches to flood management, incorporating input from multiple stakeholders will lead to benefits for all SEA objectives.
Protect	Engage with catchment partnerships and landowners to embrace land management techniques and natural flood management to help to manage surface water runoff. Seek out opportunities to use Working with Natural Processes in managing flood risk to promote multiple benefits such as environmental net gain.	+	++	+	+	+	+	+	+	Maximising opportunities for natural flood management will have direct, long-term benefits to ecological receptors and will also likely lead to improvements in water quality, along with sequestering carbon. Implementation of natural flood management may also have indirect positive effects on landscape, cultural assets, amenity, population, human health, and material assets.
Protect	Support the severe weather incident management function the Council undertakes through technological advancements to ensure it is an intelligence led approach.	○	○	○	○	○	+	+	○	Improvements to the severe weather management function will have long-term positive benefits to population and human health and material assets through improved flood resilience.
Protect	Maintain assets based on a risk-based approach to ensure high flood risk assets are prioritised and allowances made for climate change projections are considered. Try new technological approaches. Assess which Council assets require capacity improvements as a last resort.	○	○	○	○	○	+	+	○	This action will ensure that funding will be provided to protect the most at-risk receptors. This should help reduce the magnitude and likelihood of flooding and will have positive benefits to population and human health and material assets.
Response	Provide intelligence to ensure policy frameworks and emergency plans are robust. Work with other services to establish the basis of the Council's response to severe rainfall events in supporting communities.	○	○	○	○	○	+	+	○	Improving flood event response through development of emergency plans and frameworks will help communities better recover from flood events respond more effectively to future flood events, leaving them less vulnerable to further events in the future.

Strategic Theme	LFRMS Action	SEA Objectives								Comments
		1	2	3	4	5	6	7	8	
Response	Work with the local communities to increase their awareness and preparedness for flooding in Kirklees to improve flood resilience in homes, businesses and communities through education campaigns with our partners. Enhance our online content to deliver a one-stop shop.	○	○	○	○	○	+	+	○	Enhancing community preparedness and resilience to flooding will reduce the impact of flooding on communities and allow them to respond more effectively to flood events. This will lead to increased community health and wellbeing, and enable measures to be taken to protect infrastructure.
Response	Encourage flood community action groups to be set up in key areas of flood risk and through this work, in conjunction with partners, provide a higher standard of community led resilience by developing a network of community resilience leads.	○	○	○	○	○	+	+	○	Community flood action groups will promote awareness of flood risk and understanding of response plans. This will not have any identified direct effect on the majority of SEA receptors. However, this action should promote better understanding of flood risk and management plans in the area, and should promote direct engagement of the community in flooding issues.
Response	Ensure flood risk management actions reach out and remain inclusive in our approach within our diverse communities and areas of deprivation.	○	○	○	○	○	+	○	○	Ensuring inclusivity will ensure all communities are involved in discussions around flood risk and will improve understanding and trust in flood risk management actions for all members of the population.
Response	Establish and maintain a Communication Plan in line with national and other Council services to provide coordinated and timely information to communities at flood risk.	○	○	○	○	○	+	+	○	Establishing a communication plan will indirectly benefit local communities and infrastructure through provision of alerts of likely flood risk, which will allow time for preparation for flood events, reducing flooding impacts.
Recovery	Provide follow up recovery support and advice to residents, business owners and communities that have been affected by flooding on funding, wellbeing support and signpost to affordable flood insurance to help them recover quicker.	○	○	○	○	○	+	+	○	Providing flood recovery support will help communities recover after flooding and respond more effectively to future flood events, leaving them less vulnerable to further events in the future.

Strategic Theme	LFRMS Action	SEA Objectives								Comments
		1	2	3	4	5	6	7	8	
Recovery	Investigate flood incidents of all sources and establish flood outlines with our partners to validate existing flood models to help inform future grant fundings and flood risk management projects.	+	+	+	+	+	+	+	+	Validating existing modelling will not have any identified direct effects on the SEA objectives; however, the action should increase understanding of flood risk in the area (including flood risk to sensitive receptors). The results will inform better flood management which may lead to indirect benefits to multiple SEA objectives.
Recovery	Work with Partners and health bodies to ensure mental health impacts from flooding are factored into long term recovery planning.	○	○	○	○	○	+	+	○	Ensuring mental health impacts are factored into planning will have major long-term positive impacts to communities.
Recovery	Support Review Briefings and feedback learning from communities to inform our plans and policies to ensure a more efficient and effective response in the future.	○	○	○	○	○	+	+	○	Understanding learnings from flood events to improve future response will have positive impacts to population and human health and material assets through reduced future flooding impacts.

Receptor	SEA Objective	Assessment Score	Justification
Landscape and Visual Amenity	Protect the integrity of local urban and rural landscapes in the area.	0	<p>The majority of LFRMS action will not have any direct impacts upon this objective, although objectives will have broad positive impacts upon landscape and visual receptors through reduced flood risk and associated reduction in the scale of visual impacts from flood events.</p> <p>There is potential through the LFRMS to provide opportunities for landscape and visual enhancements through the implementation of natural flood management and SuDS, which may enable the protection and enhancement of green spaces, river corridors and woodland to enhance visitor experience and provide recreational amenity.</p> <p>However, there are uncertainties around the actions relating to the delivery of flood alleviation schemes. Without specific details of these projects adverse impacts to visual receptors cannot be ruled out. There is the potential for impacts to arise through the construction of new defence schemes. Schemes should be designed to avoid the potential for significant landscape impacts; including minimising hard engineering and encouraging nature-based solutions. Where impacts are identified, they should be mitigated appropriately.</p>

Receptor	SEA Objective	Assessment Score	Justification
Biodiversity, Flora and Fauna	Maintain and enhance biodiversity, wildlife and habitat connectivity.	0	<p>In general, many of the LFRMS actions will not have any identified direct effects on this SEA objective, however, by promoting better flood management and reducing flood risk to key ecological receptors, including designated sites, the LFRMS may help enhance biodiversity whilst safeguarding habitat connectivity corridors.</p> <p>The LFRMS provides direct opportunities for ecological enhancements through the implementation of natural flood management schemes, which would help deliver policy objectives for the natural environment including habitat enhancements, improved ecological connectivity and increased biodiversity resilience to flood risk and climate change.</p> <p>However, there are uncertainties around the actions relating to the delivery of flood alleviation schemes. Without specific details of these projects adverse impacts to ecological receptors cannot be ruled out.</p> <p>Impacts may arise due to disruption of species and habitats from construction activities. New schemes should be designed to avoid the potential for significant ecological impacts, and where impacts are identified, they should be mitigated appropriately.</p>

Receptor	SEA Objective	Assessment Score	Justification
Water Environment	Protect and enhance the quality of water features and resources.	0	<p>The majority of actions will have a neutral impact upon this objective due to their nature, however, by promoting better flood management and reducing flood risk, the LFRMS may help to improve water quality and WFD status across the Council area. A reduction in the frequency and magnitude of flood events will help prevent sewage spillage incidents and entry of litter into watercourses.</p> <p>The LFRMS provides opportunities for enhancement to the water environment through the implementation of natural flood management, SuDS and drainage management schemes. Such schemes would help reduce flood risk whilst providing water quality benefits by improvements such as: restoring natural sediment processes; reducing surface runoff and increasing infiltration rates; and reconnection of floodplains.</p> <p>However, there are uncertainties around the actions relating to the delivery of flood alleviation schemes. Without specific details of these projects, adverse impacts to the water environment cannot be ruled out. Impacts may arise from spillages and dust pollution during construction activities. New schemes should be constructed in line with industry best practice guidance in order to avoid the potential for significant impacts, and where impacts are identified, they should be mitigated appropriately.</p>

Receptor	SEA Objective	Assessment Score	Justification
Geology and Soils	Maintain soil quality and conserve geological designations.	0	<p>The LFRMS will contribute to objectives relating to geology and soils by reducing flood risk and promoting better flood management. Reduction in the frequency and magnitude of flooding events will help prevent soil contamination incidents, soil erosion, and help conserve the condition of geological designated sites.</p> <p>There are opportunities for enhancement of soil quality through natural flood management and SuDS schemes which may improve the quality of infiltrating water and hence provide improvements to the soil.</p> <p>However, there are uncertainties around the actions relating to the delivery of flood alleviation schemes. Without specific details of these projects, adverse impacts to geology and soils cannot be ruled out. Impacts may arise from contamination and disturbance of soils during construction activities.</p>

Receptor	SEA Objective	Assessment Score	Justification
Historic Environment	Preserve and where possible enhance important historic and cultural sites.	○	<p>The majority of actions will have a neutral impact upon this objective due to their nature, however, there is the potential for the LFRMS to benefit historic environment assets due to better flood management and reduced flood risk. Reduction in flood frequency and magnitude will help prevent damage to cultural heritage receptors, including listed buildings and Scheduled Monuments, which are prone to loss of stability, collapse, biodegradation and moisture-induced damage following flooding. LFRMS actions will also help to improve the setting of heritage assets.</p> <p>There is the potential for adverse impacts to the water environment through the construction of flood defence schemes. Impacts may arise from damage to heritage assets and their setting during construction activities. New schemes should be constructed in line with industry best practice guidance in order to avoid the potential for significant impacts.</p>
Population and Human Health	Protect and enhance human health and wellbeing.	++	<p>The LFRMS actions will directly benefit population and human health receptors through reduced flood risk. A reduction in the frequency and magnitude of flood events will reduce flooding impacts to residential and commercial properties, and key infrastructure such as educational and healthcare facilities.</p> <p>Flood risk reduction and community involvement in planning and recovery will also help to decrease the cost and stress of living in high flood risk areas and dealing with flooding consequences.</p> <p>The construction of new flood defence schemes will improve infrastructure resilience to climate change.</p>

Receptor	SEA Objective	Assessment Score	Justification
Material assets	Minimise the impacts of flooding to the transport network and key critical infrastructure.	+	Overall, the LFRMS objectives are likely to have a significant positive impact in relation to this SEA objective as the LFRMS includes several actions that seek to improve the resilience of material assets in the borough. Reduction in flood risk will reduce impacts to key such as road, rail and power grid.
	Minimise local and national contribution to climate change.	○	The majority of LFRMS actions do not directly contribute to climate change objectives as they do not reduce local carbon emissions. However, reduction in flood risk may indirectly reduce emissions by reducing the requirement for rebuilding/redevelopment after large flood events. In addition, SuDS natural flood management and associated green space enhancement may improve local carbon sequestration.

MITIGATION

There were no negative effects identified in the assessment and therefore on this basis no specific mitigation measures are required. However, potential areas of improvement and consideration for refining the LFRMS objectives and actions are included below.

This is in accordance with the Schedule 2 of the SEA Regulations (7) which states that the Environmental Report should include 'the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme'.

It should be ensured that any flood risk improvement schemes be designed to avoid impacts to SEA receptors and take steps to actively enhance them. This may be completed through an Environmental Impact Assessment (EIA) methodology. Natural flood management and SuDS approaches should be implemented where possible to best work with the natural and built environment and reduce impacts of flood alleviation schemes on the environment.

Where possible, options to reduce flood risk whilst contributing to local carbon reduction targets should be considered, such as through natural flood management.

CONCLUSIONS AND RECOMMENDATIONS

The key aim of the LFRMS is to manage local flood risk by technically, economically, socially and environmentally appropriate options. The intention of the strategy is to set out the roles and responsibilities and to improve local flood risk management so as to minimise the impact of flooding on infrastructure, businesses and properties.

The SEA has been undertaken to identify the likely significant environmental effects of the implementation of the LFRMS. A proportionate approach was adopted towards establishing the scope of the SEA, reflecting the high-level nature of the LFRMS.

A range of different strategy options for delivering the LFRMS have been assessed at a strategic level against the SEA objectives. These alternatives include the 'do nothing' scenario, where no action is taken and existing assets and ordinary watercourses are abandoned, and the 'maintain current Local Flood Risk Management Strategy (2012)' scenario, where existing assets and watercourses are maintained as present in line with current levels of flood risk.

The 'Do Nothing' approach would promote an overall negative effect on the SEA objectives as a result of abandoning current management practices, increasing the risk of local flooding. This impact would be likely to increase over time as responsible bodies will be unable to incorporate precautionary measures in existing or new developments in a response to climate change pressures. The mid-way option of 'Maintain Current Flood Risk Strategy' is unlikely to worsen the current impacts on SEA receptors or have significant change on baseline levels. However, by not fully considering the adaptation to climate change pressures, the current level of flood risk management may be insufficient to prevent detrimental impacts on the environment, socially and ecologically, in the future. The only realistic approach to be employed by Kirklees Council is the 'Manage and Reduce Flood Risk' option, which offers more beneficial environmental outcomes and a pro-active approach to flooding pressures.

The LFRMS will have broad positive impacts to many SEA objectives by encouraging better water management and reducing flood risk. By reducing the magnitude and likelihood of flooding, impacts to key ecological, visual, heritage, water and geological receptors in the council will be reduced, and the quality of these receptors may be preserved. The majority of LFRMS actions relate to enhanced understanding, awareness and response to flood events and will not have impacts on many of the SEA objectives, but will positively impact SEA objectives 6 and 7. By actively managing the flood risk, there will be obvious benefits to the population, human health and material assets. Through promoting a greater understanding of flood risk, encouraging community involvement and promoting self-resilience as well as a coordinated borough-wide flood risk management approach, communities and responsible parties will be better placed to effectively minimise the risk of flooding in the Kirklees area.

The LRFMS provides opportunities for environmental enhancements through the implementation of natural flood management and SuDS schemes. Such schemes reduce flood risk whilst also allowing for sensitive consideration of ecological, visual, water, heritage and geological assets.

At present the LFRMS actions relating to local flood risk improvements schemes has an unknown effect on the SEA objectives as the exact location, nature and scale is currently uncertain. Without a specific methodology for the implementation of these actions, potential beneficial/adverse effects cannot be determined for certain.

The LFRMS actions do not directly contribute to climate change objectives. It is important that climate change be factored into decision making around flood alleviation.

RECOMMENDATIONS

The assessment of the objectives and actions has identified a couple of areas where the LFRMS could be strengthened to promote a more sustainable approach:

- Fully consider climatic factors in the development of both existing and new infrastructure, to ensure appropriate and adaptable flood risk management in the future.
- Ensure that low-carbon approaches to flood alleviation are prioritised to limit local contribution to climate change.
- Take steps to ensure that all relevant stakeholders, including both statutory and non-statutory entities, are involved in sustainability discussions during new development. This collaborative approach will help to promote effective communication and engagement among stakeholders.

To prevent adverse effects from the LFRMS, it is essential to integrate all strategy actions and ensure that the delivery of individual actions aligns with the wider strategy objectives. This includes flood risk improvement schemes in specific areas. Effective management of the development and implementation of these actions is crucial, including the assessment of proposals for their potential positive and negative environmental effects before implementation. If necessary, appropriate mitigation measures should be incorporated into their delivery.

The LFRMS should aim to maximize the potential environmental benefits of its objectives and measures. This can be best achieved through the integration of LFRMS objectives and close partnership working, ensuring that appropriate resources and funding are effectively allocated.

MONITORING

As per the SEA Regulations, Kirklees Council is required to monitor the significant environmental effects of implementing the LFRMS. Monitoring should include key indicators and targets based on those used in the SEA framework.

The indicators and targets will facilitate the monitoring of the LFRMS, enabling early identification and remediation of any problems or shortfalls. If any failings are identified, it will be necessary to revise the LFRMS to ensure that the SEA objectives are not compromised. It is important to note that the effects, whether negative or positive, are unlikely to be immediately visible, and the relative timescale for monitoring will vary for each indicator/target.

Possible Monitoring partners are indicated against the SEA objectives in Table 9-1. These will be refined subject to the outcomes of the consultation process.

Table 9-1 Possible Monitoring Partners for SEA objectives

Receptor	SEA Objective		Monitoring Indicator	Target as a result of local flood risk management measures	Possible Monitoring Partners
Landscape and Visual Amenity	1	Protect the integrity of local urban and rural landscapes in the area.	<p>Changes in the condition and extent of existing characteristic elements of the landscape.</p> <p>The condition and quality of new landscape features introduced to the environment (i.e., new flood defences).</p>	No adverse impacts on landscape character of the NCAs, LCAs or other locally important landscapes/features as a result of implementation of the LFRMS.	<p>Environment Agency</p> <p>Natural England</p>
Biodiversity, Flora and Fauna	2	Maintain and enhance biodiversity, wildlife, and habitat connectivity.	<p>Recorded numbers of protected habitats and species.</p> <p>Percentage change in area of priority habitats.</p> <p>'Condition' of designated wildlife, geological sites, and habitats.</p>	<p>No adverse impact on designated nature conservation sites as a result of changes to the current local flooding regime.</p> <p>No deterioration in the conservation status of designated</p>	<p>Environment Agency</p> <p>Natural England</p>

Receptor	SEA Objective		Monitoring Indicator	Target as a result of local flood risk management measures	Possible Monitoring Partners
			<p>Deliver measures which also improve the ecological status of WFD waterbodies.</p> <p>Biodiversity net gain and other enhancements achieved in projects delivered through the LFRMS.</p>	<p>sites as a result of implementation of the LFRMS.</p> <p>No adverse impact on designated nature conservation sites as a result of local flood risk management measures.</p> <p>Increase in the area of good wildlife habitat as a result of implementation of the LFRMS.</p> <p>No new impediments to fish and eel passage.</p>	

Receptor	SEA Objective		Monitoring Indicator	Target as a result of local flood risk management measures	Possible Monitoring Partners
Water Environment	3	Protect and enhance the quality of water features and resources.	WFD chemical or ecological status of water bodies within catchment.	No deterioration to the WFD status of water bodies within the catchment as a result of implementation of the LFRMS.	Environment Agency Natural England Severn Trent Water
Geology and Soils	4	Maintain soil quality and conserve geological designations.	Number of contamination incidents. Risk levels of contamination. Soil quality. 'Condition' of geological designated sites.	No reduction in the condition of geological designated sites as a result of implementation of the LFRMS. No reduction in condition of soils in designated sites within the Council area as a result of implementation of the LFRMS.	Environment Agency Natural England Internal Drainage Boards

Receptor	SEA Objective		Monitoring Indicator	Target as a result of local flood risk management measures	Possible Monitoring Partners
Historic Environment	5	Preserve and where possible enhance important historic and cultural sites.	<p>Number of designated heritage sites at risk from local flooding.</p> <p>Number of heritage assets adversely impacted upon by local flood risk management measures.</p>	<p>No adverse impact on designated heritage sites as a result of flooding.</p> <p>No adverse impact on the integrity/setting of designated heritage sites as a result of flood risk management measures.</p>	<p>Environment Agency</p> <p>Natural England</p> <p>Historic England</p>

Receptor	SEA Objective		Monitoring Indicator	Target as a result of local flood risk management measures	Possible Monitoring Partners
Population and Human Health	6	Protect and enhance human health and wellbeing.	<p>Number of open and natural green spaces.</p> <p>Number and value of PRow routes.</p> <p>Number of residential properties at risk from flooding.</p> <p>Number of key services at risk from local flooding.</p> <p>Health and wellbeing statistics.</p>	No increase in number of residential properties at risk from flooding.	<p>Environment Agency</p> <p>National Health Service</p>

Receptor	SEA Objective		Monitoring Indicator	Target as a result of local flood risk management measures	Possible Monitoring Partners
Material assets and Climate Change	7	Minimise the impacts of flooding to the transport network and key critical infrastructure.	<p>Length of road and rail infrastructure at risk from local flooding.</p> <p>Number of key infrastructure assets at risk from local flooding.</p> <p>Number of green infrastructure assets at risk from flooding/created or enhanced through implementation of the LFRMS.</p>	<p>No increase in length of road and rail infrastructure at risk from flooding.</p> <p>No increase in number of infrastructure assets at risk from flooding.</p> <p>An enhancement of current Green Infrastructure Assets in the Council area.</p>	<p>Environment Agency</p> <p>Network Rail</p> <p>National Highways</p>

Receptor	SEA Objective		Monitoring Indicator	Target as a result of local flood risk management measures	Possible Monitoring Partners
	8	Minimise local and national contribution to climate change.	Number of flood management measures implemented that will also sequester carbon.	Carbon dioxide equivalent emissions (CO2e) Number of flood management measures implemented that will also sequester carbon.	Environment Agency Natural England

NEXT STEPS

CONSULTATION

The next stage of the SEA process (Stage D) will involve consultation on the draft SEA Environmental Report and the draft LFRMS with statutory consultees, stakeholders, and the public. This consultation aims to identify any necessary amendments and updates to the documents.

All consultation responses received will be reviewed and considered for the next stage of the SEA process, which involves preparing a Post-Adoption Statement. The statement will outline how the Environmental Report's findings and the views expressed during the consultation have been taken into account while finalizing and formally approving the LFRMS. The Post-Adoption Statement will also identify any additional monitoring requirements necessary to track the significant environmental effects of the strategy.

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APPENDICES

A PLANNING POLICY CONTEXT

A.1 International Objectives

International Objectives		
Policy/Plan/ Programme/ Strategy	Key Objectives or Requirements relevant to SEA	Implications for LFRMS and SEA
EU Groundwater Directive – Directive 2006/118/EC on the protection of groundwater against pollution and deterioration, 2006	Protection of groundwater sources from pollution and deterioration.	The plan will need to ensure that and locally occurring groundwater storages will not be impacted by pollution or deterioration from proposed works.
EU Water Framework Directive - Directive 2000/60/EC, 2000	An EU directive which commits European Union member states to achieve good qualitative and quantitative status of all water bodies (including marine waters up to one nautical mile from shore).	The plan will need to ensure that the qualitative and quantitative status of local water bodies are not negatively impacted by any proposed works.
European Commission, Nitrates Directive 91/676/EEC, 1991	An EU directive which commits European Union members states to protect water bodies from agricultural nitrates.	The plan will need to ensure that the local water bodies are not negatively impacted by any proposed works involving agricultural nitrates

International Objectives

<p>European Landscape Convention: guidelines for managing landscape (2010)</p>	<p>The Convention highlights the need to develop policies dedicated to the protection, management and planning of landscape. Raising awareness of the landscape is an important thread running through all these areas. It also encourages the integration of landscape into all relevant areas of policies, including cultural, economic and social policies.</p>	<p>The plan should consider specific measures promoted by the Convention including improved consideration of and integration of landscape in future spatial policy and regulation.</p>
<p>Convention for the Protection of the Architectural Heritage of Europe (1985)</p>	<p>The main purpose of the Convention is to reinforce and promote policies for the conservation and enhancement of Europe's heritage.</p>	<p>The plan should consider the articles set out in the convention.</p>
<p>European Convention on the Protection of Archaeological Heritage (1995)</p>	<p>The aim of this Convention is to protect archaeological heritage all remains and objects and any other traces of mankind from the past epochs.</p>	<p>The plan should consider the articles set out in the convention.</p>

A.2 NATIONAL POLICY

National Policy		
Policy/Plan/ Programme/ Strategy	Key Objectives or Requirements relevant to SEA	Implications for LFRMS and SEA
<p>A Green Future: Our 25 Year Plan to Improve the Environment</p>	<p>A government plan to improve air and water quality in both rural areas and cities. The adoption of this plan commits to the following: Clean air Clean and plentiful water Thriving plants and wildlife</p>	<p>The plan will need to ensure that managed land is used sustainably, the beauty of landscapes is</p>

National Policy

	<p>A reduced risk of harm from environmental hazards such as flooding and drought. Using resources from nature more sustainably and efficiently Enhanced beauty, heritage, and engagement with the natural environment.</p>	<p>enhanced, people are more connected to the environment, resources are used efficiently, and pollution and waste is reduced, the seas and oceans remain clean and biologically diverse, the global environment is protected. The plan also commits to the restoration of 75% of terrestrial and freshwater protected sites to favourable condition, creating or restoring 500,000 hectares of wildlife rich habitat, and recover threatened species.</p>
<p>Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations, 2019</p>	<p>A government policy which protects ambient air quality from the volatile organic compounds in paints, varnishes, and vehicle re-finishings.</p>	<p>The plan will need to ensure that ambient air quality will be protected from volatile organic compounds.</p>
<p>Ancient Monuments and Archaeological Areas Act, 1979 (as amended)</p>	<p>A government policy which protects monuments and archaeological areas from disturbances.</p>	<p>The plan will need to ensure that the local monuments are archaeological</p>

National Policy

		al areas are protected from any disturbances that proposed works could cause.
Biodiversity 2020: A Strategy for England's Wildlife and Ecosystems, 2011	A government policy which protects England's wildlife and ecosystems.	The plan will need to ensure that the local wildlife and ecosystems are not negatively impacted by any proposed works.
Cabinet Office, National Strategy Action Plan for Neighbourhood Renewal, 2001	A government policy which aimed to remove disadvantages people experienced because of where they lived	The plan will need to consider the impact it may have on areas already experiencing disadvantages.
Clean Air Strategy, 2019	A government policy aimed at reducing all sources of air pollution making our air healthier to breath, protecting nature, and boosting the economy.	The plan will need to consider the impact it may have on air pollution.
Climate Change Act, 2008	A government policy aimed at reducing all sources of carbon and waste to minimise the impacts on climate change.	The plan will need to consider how it will minimise its carbon emissions and levels of waste.
Climate Change Adaption Strategy, 2020	A government policy aimed at reducing all sources of carbon emissions and eventually becoming net zero by 2050.	The plan will need to consider how it will minimise its carbon emissions and options

National Policy		
		for operating at net zero.
Conservation of Habitats and Species Regulations (amendment - EU Exit), 2019	A government policy aimed at both preserving and restoring species and habitats to a favourable conservation status in a specified area of distribution.	The plan will need to consider how it will prevent any negative impacts on flora and fauna
Contaminated Land (England) Regulations, 2006 (as amended)	A government policy aimed at preserving natural landscapes and waterbodies by protecting them from pollution.	The plan will need to consider how it will prevent any land or water from being polluted.
Water Act, 2014	A government policy aimed at improving water resilience and the supply of water resources.	The plan will need to consider how it will avoid negatively impacting the supply of water resources.
England Biodiversity Framework, 2008	A government policy aimed at protecting the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.	The plan will need to consider how it will protect biodiversity during any proposed works.
Environment Act, 1995 (as amended)	A government act which gives power and rights to the government body The Environment Agency.	The plan must consider how it will abide by the Environment Agencies policies.
Fisheries Act 2020	A government act which regulates the management of fisheries to ensure the practice is sustainable.	The plan must consider how it will ensure the management of fisheries is not

National Policy		
		negatively impacted by any proposed works.
Floods and Water (Amendment - EU Exit) Regulations, 2019	A EU policy aimed at protecting inland surface waters (rivers and lakes), transitional waters, coastal waters and groundwater, in order to prevent and reduce pollution, promote sustainable water use, protect the aquatic environment, improve the status of aquatic ecosystems and mitigate the effects of floods and droughts.	The plan must consider how it will ensure inland surface, transitional, coastal and groundwaters will be protected from pollution unsustainable water usage as well as ensuring the protection of aquatic ecosystems and mitigate the effects of floods and droughts.
Flood Risk Regulations, 2009	Governmental regulations that provide a framework for managing flood risk over a 6- year cycle, and require: Production of a Preliminary Flood Risk Assessment (PFRA); Identification of potential significant risk, referred to as flood risk areas (FRAs); Mapping of flood hazard and risk; and Flood Risk Management Plans, setting out measures and actions to reduce the risk.	The plant should include a PFRA, FRA, flood risk mapping and flood risk management .
Future Water: The Government's water strategy for England, 2008	A governmental strategy aimed at achieving sustainable delivery of secure water supplies and an improved and protected water environment.	The plan should consider how it will aid in achieving sustainable delivery of water supplies and protecting the water environment .

National Policy		
Heritage Protection for the 21st Century, White Paper, 2007	A government policy aimed at developing a unified approach to the historic environment; Maximising opportunities for inclusion and involvement; and supporting sustainable communities by putting the historic environment at the heart of an effective planning system.	The plan should consider how it will aid in supporting the policy aims, especially through the careful management of any proposed works to prevent disturbance of heritage assets.
Land Drainage Act 1991 (as amended)	An Act to consolidate the enactments relating to internal drainage boards, and to the functions of such boards and of local authorities in relation to land drainage, with amendments to give effect to recommendations of the Law Commission.	The plan should consider how it will prevent obstruction to water courses, as well as maintaining the water course to allow the natural flow of water.
Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network, 2010	An independent report on wildlife sites in England and recommendations on how to achieve a healthy natural environment. It makes the following key points: Designated wildlife sites should be protected. New ecological restoration zones should be established. Non-designated wildlife sites should be protected.	The plan should consider how it will protect both designated and non-designated wildlife sites. It should also be aware of the potential for new ecological restoration zones.
Making Space for Water – taking	A governmental Act that places a statutory duty on the Environment Agency to develop a National Flood and Coastal Erosion Risk Management Strategy for England.	The plan should consider how it will

National Policy

<p>forward a new Government strategy for flood and coastal erosion risk management in England, 2005</p>		<p>develop national flood and coastal erosion risk management . Any proposed works should be assessed for their potential to increase flood and coastal erosion risk.</p>
<p>National Planning Policy Framework, 2021</p>	<p>A government framework which sets out the government’s planning policies for England and how these are expected to be applied. Taking into consideration relevant international obligations and statutory requirements.</p>	<p>The plan should consider that any proposed works require prior planning permission</p>
<p>Natural Environment and Rural Communities (NERC) Act, 2006</p>	<p>A government act which created Natural England and the Commission for Rural Communities and, amongst other measures, it extended the biodiversity duty set out in the Countryside and Rights of Way (CROW) Act to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity.</p>	<p>The plan should consider what measure it will put in place in order to protect the conservation of biodiversity.</p>
<p>Planning (Listed Buildings and Conservation Areas) Act 1990</p>	<p>a UK Act of Parliament introduced in 1990 that changed laws relating to the granting of planning permission for building works, with a particular focus on listed buildings and conservation areas. It created special controls for the demolition, alteration or extension of buildings, objects or structures of particular architectural or historic interest, as well as conservation areas.</p>	<p>The plan should consider how it will avoid disturbing listed buildings and conservation areas where appropriate.</p>
<p>Safeguarding our Soils – A strategy for England, 2009</p>	<p>A government policy which aims to protect the integrity of soils for both agricultural and natural requirements</p>	<p>The policy should consider appropriate mitigation strategies for</p>

National Policy		
		soil protection where appropriate.
Salmon and Freshwater Fisher Fisheries Act 1975	A law passed by the government, in an attempt to protect salmon and trout from commercial poaching, to protect migration routes, to prevent wilful vandalism and neglect of fisheries, ensure correct licensing and water authority approval.	The policy should consider its potential impact on salmon trout fisheries and include mitigation measures where necessary.
Securing the Future – the UK Government Sustainable Development Strategy, 2005	A government strategy for sustainable development, which aims to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations.	The plan should consider how it will use resources sustainably, especially the limitation of excessive use of limited resources and consumption of energy where not necessary.
The Carbon Plan, 2011	First published in December 2011, the Carbon Plan sets out the government's plans for achieving the emissions reductions it committed to in the first 4 carbon budgets. Emissions in the UK must, by law, be cut by at least 80% of 1990 levels by 2050.	The plan should consider how it will limit the production of carbon emissions where appropriate and applicable.
The Eels (England and Wales) Regulations 2009	On 15th January 2010, the Eels (England and Wales) Regulations 2009 came into force. These regulations afford new powers to the Environment Agency to implement measures for the recovery of European eel stocks and have important implications for operators of abstractions and discharges.	The plan should consider how it will mitigate any impacts it may have on European eel stocks.

National Policy		
The Environment Act, 2021	The Environment Act allows the UK to enshrine some environmental protection into law. It offers new powers to set new binding targets, including for air quality, water, biodiversity, and waste reduction.	The plan must consider mitigation strategies for reducing impacts on the environment , in particular, reducing negative impacts on air quality, water quality, biodiversity and waste reduction. The plan must also consider how to enhance the environment to ensure no net loss and overall biodiversity net gain in associated projects.
The National Flood and Coastal Erosion Risk Management Strategy for England, 2020	This strategy's long-term vision is for: a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100. It has 3 long-term ambitions, underpinned by evidence about future risk and investment needs.	The plan must consider mitigation strategies for reducing impacts of flooding and coastal erosion.
The National Flood Emergency Framework for England, 2011 (as amended)	Its purpose is to provide a forward-looking policy framework for flood emergency planning and response. It brings together information, guidance and key policies and is a resource for all involved in flood emergency planning at national, regional and local levels.	The plan must consider any emergency flooding strategies and responses where appropriate.
Water for	An Environment Agency report highlighting	The plan

National Policy		
Life, Water White Paper, 2011	the need for the sustainable provision of clean drinking water.	must consider potential mitigation strategies to minimise any possible negative impacts on clean drinking water that works may have, taking into consideration pollution and contamination of groundwater and freshwater sources.
Water for People and the Environment , Water Resources Strategy for England and Wales, 2009	A government strategy aimed at ensuring there is 'enough water for people and the environment'. The management and use of water and land must be shown to be sustainable - environmentally, socially and economically. We require the right amount of good quality water for people, agriculture, commerce and industry, and the environment.	The plan must consider potential mitigation strategies to minimise any possible negative impacts on local water resources.
Wildlife and Countryside Act 1981 (as amended)	Under the Wildlife and Countryside Act 1981 (as amended), the country nature conservation bodies have a duty to notify any area of land which in their opinion is 'of special interest by reason of any of its flora, fauna, or geological or physiographical features' – these areas are known as Sites of Special Scientific Interest (SSSI).	The plan must consider the extent of SSSIs, avoiding disturbing the area or if appropriate any relevant mitigation strategies required to minimise negative impacts on the area.

A.3 REGIONAL AND LOCAL PLANS AND PROGRAMMES

REGIONAL AND LOCAL PLANS AND PROGRAMMES		
POLICY/PLAN/ PROGRAMME/ STRATEGY	KEY OBJECTIVES OR REQUIREMENTS RELEVANT TO SEA	IMPLICATIONS FOR LFRMS AND SEA
REGIONAL		
<p>WEST YORKSHIRE CLIMATE ENVIRONMENT PLAN 2021-2024</p>	<p>A PLAN PUT IN PLACE BY WEST YORKSHIRE COMBINED AUTHORITY WHEREBY THE MAYOR OF WEST YORKSHIRE AND WEST YORKSHIRE LEADERS HAVE DECLARED A CLIMATE EMERGENCY AND SET AN AMBITIOUS SCIENCE-BASED TARGET FOR THE REGION TO BE NET ZERO CARBON BY 2038, WITH SIGNIFICANT PROGRESS BY 2030. REDUCING HARMFUL CARBON AND AIR QUALITY EMISSIONS, HELPING NATURE TO RECOVER AND IMPROVE LONG-TERM CLIMATE RESILIENCE IS CRITICAL AND ACTION ACROSS ALL PARTS OF THE ECONOMY AND SOCIETY IS REQUIRED.</p>	<p>THE PLAN MUST CONSIDER MITIGATION STRATEGIES FOR REDUCING IMPACTS ON THE ENVIRONMENT, IN PARTICULAR; REDUCING NEGATIVE IMPACTS ON AIR QUALITY, WATER QUALITY, BIODIVERSITY AND WASTE REDUCTION.</p>
<p>WEST YORKSHIRE COMBINED AUTHORITY (2017)</p>	<p>THE WEST YORKSHIRE COMBINED AUTHORITY IS A DEMOCRATICALLY-LED AUTHORITY AND IS GOVERNED BY A CROSS-PARTY, POLITICALLY BALANCED GROUP OF ELECTED COUNCILLORS NOMINATED BY EACH PARTNER COUNCILS: BRADFORD, CALDERDALE, KIRKLEES, LEEDS, WAKEFIELD, AND YORK.</p>	<p>THE PLAN WILL NEED TO CONSIDER POLICIES PUT IN PLACE BY THE WEST YORKSHIRE COMBINED AUTHORITY, AND ANY MITIGATIONS STRATEGIES THAT MAY BE REQUIRED.</p>

REGIONAL AND LOCAL PLANS AND PROGRAMMES

<p>WHITE ROSE FOREST ACTION PLAN 2021-2025</p>	<p>AN ENVIRONMENTAL BODIES' PLAN TO REGENERATE THE NATURAL ENVIRONMENT, IT IS SUPPORTED BY A PARTNERSHIP OF LOCAL AUTHORITIES, NATIONAL PARKS, NATIONAL AND LOCAL CHARITIES, DEFRA ORGANISATIONS AND COMMUNITY ENTERPRISES</p>	<p>THE PLAN MUST CONSIDER MITIGATION STRATEGIES FOR REDUCING IMPACTS ON FORESTED AREAS AND POTENTIAL FOR INCREASING THE FORESTED COVERAGE.</p>
<p>LOCAL</p>		
<p>CALDER CATCHMENT FLOOD MANAGEMENT PLAN (2010)</p>	<p>MANAGEMENT PLAN TO HELP UNDERSTAND THE SCALE AND EXTENT OF FLOODING NOW IN THE FUTURE. INCLUDES SET POLICIES FOR MANAGEMENT FLOOD RISK WITHIN THE CATCHMENT.</p>	<p>THE PLAN WILL NEED TO CONSIDER THE MEASURES AND POLICIES INCLUDED IN THE PLAN.</p>
<p>PEAK DISTRICT BIODIVERSITY ACTION PLAN (2011-2020)</p>	<p>ACTION PLAN TO CONSIDER THE ENHANCEMENT OF HABITATS, LANDSCAPES AND CONCENTRATE EFFORTS ON THE BUFFERING AREAS OF HIGH-QUALITY SITES.</p>	<p>THE PLAN SHOULD CONSIDER THE LOCATION OF HIGH-QUALITY ENVIRONMENTAL SITES, AND CONSIDER POTENTIAL ENHANCEMENT OPPORTUNITIES.</p>
<p>KIRKLEES METROPOLITAN BOROUGH COUNCIL RESOURCES AND WASTE STRATEGY 2021-2030</p>	<p>ACHIEVE A RECYCLING RATE OF AT LEAST 70% AT OUR HOUSEHOLD WASTE AND RECYCLING CENTRES BY 2025. RECYCLE AT LEAST 55% OF MUNICIPAL WASTE BY 2025. REUSE OR RECYCLE AS MUCH OF THE RESOURCES COLLECTED VIA OUR BULKY WASTE COLLECTIONS AS POSSIBLE</p>	<p>THE PLAN WILL NEED TO CONSIDER METHODS FOR THE APPROPRIATE RECYCLING AND DISPOSAL OF WASTE.</p>
<p>KIRKLEES METROPOLITAN BOROUGH COUNCIL BIODIVERSITY STRATEGY</p>	<p>A LOCAL GOVERNMENT STRATEGY TO HALT THE DECLINE OF BIODIVERSITY.</p>	<p>THE PLAN WILL NEED TO CONSIDER HOW IT WILL PREVENT THE LOSS BIODIVERSITY AS A RESULT OF DIRECT OR INDIRECT IMPACTS FROM ANY PROPOSED WORKS.</p>

REGIONAL AND LOCAL PLANS AND PROGRAMMES

<p>KIRKLEES METROPOLITAN BOROUGH COUNCIL LOCAL PLAN 2019</p>	<p>A LOCAL GOVERNMENT PLAN AIMED AT SETTING POLICIES FOR THE DEVELOPMENT OF THE METROPOLITAN BOROUGH FOR THE MEDIUM TERM. A PART OF THE PLAN INVOLVES SETTING DESIGNATIONS WHICH WILL RESTRICT DEVELOPMENTS.</p>	<p>THE PLAN WILL NEED TO CONSIDER THE EXTENT OF THESE DESIGNATIONS AND PREVENT ANY DEVELOPMENT IN THESE AREAS.</p>
<p>KIRKLEES METROPOLITAN BOROUGH COUNCIL NET-ZERO ASSESSMENT FOR KIRKLEES (2021)</p>	<p>A LOCAL GOVERNMENT PLAN WHICH SETS NET ZERO TARGETS FOR THE BOROUGH.</p>	<p>THE PLAN SHOULD CONSIDER CARBON MANAGEMENT SOLUTIONS AND AIM TO REDUCE EMISSIONS AS MUCH AS POSSIBLE BEFORE THE NET ZERO DEADLINE IN 2038.</p>
<p>KIRKLEES DRAFT HERITAGE STRATEGY</p>	<p>THE STRATEGY SETS OUT THE OBJECTIVES AND KEY PRINCIPLES TO HELP DELIVER THE COUNCIL'S VISION FOR HERITAGE IN KIRKLEES FORM 2022-2032.</p>	<p>THE STRATEGY SHOULD CONSIDER THE COUNCIL'S DRAFT ACTION PLAN AND PRINCIPLES.</p>

B LOCAL NATURE RESERVES IN KIRKLEES METROPOLITAN BOROUGH – ADDITIONAL DETAIL

LOCAL WILDLIFE SITE	ADDRESS
LWS1	ARKENLEY LANE, ALMONDBURY
LWS2	CASTLE HILL, HUDDERSFIELD
LWS3	GAWTHORPE LOWER WOOD, LEPTON
LWS4	LEPTON GREAT WOOD, LEPTON
LWS5	GRIM ESCAR WOOD, BIRKBY
LWS6	HUDDERSFIELD BROAD CANAL (SIR JOHN RAMSDEN CANAL), HUDDERSFIELD
LWS7	BRADLEY WOOD, BRADLEY
LWS8	PARK HILL, BRADLEY
LWS9	DEAN WOOD, NETHERTON
LWS10	DELVES WOOD & BUTTER NAB SPRING, HUDDERSFIELD
LWS11	DALTON BANK LOCAL NATURE RESERVE, DALTON
LWS12	LANESIDE QUARRY, KIRKHEATON
LWS13	ROUND WOOD, WATERLOO
LWS14	GLEDHOLT WOODS LOCAL NATURE RESERVE, HUDDERSFIELD
LWS15	LONG HILL PLANTATION, LOWERHOUSES
LWS16	PARK WOOD, BERRY BROW
LWS17	UPPER PARK WOOD LOCAL NATURE RESERVE, HONLEY
LWS18	HOWROYD BECK FIELDS, WHITLEY LOWER
LWS19	SPARROW WOOD, DEWSBURY
LWS20	LOWER SPEN LOCAL NATURE RESERVE, RAVENSTHORPE
LWS21	BRIERY BANK WOOD, LOWER HOPTON
LWS22	COVEY CLOUGH WOOD, MIRFIELD
LWS23	GREGORY SPRING WOOD, MIRFIELD
LWS24	JORDAN WOOD & OLIVER WOOD, MIRFIELD
LWS25	LILEY WOOD, LOWER HOPTON
LWS26	SUNNY BANK PONDS LOCAL NATURE RESERVE, MIRFIELD
LWS27	WHITLEY WOOD, LOWER HOPTON (INCLUDES HAGG WOOD)
LWS28	DOGLOITCH WOOD, SHAW CROSS
LWS29	DUNN WOOD, DEWSBURY
LWS30	SCARGILL WOOD, DEWSBURY
LWS31	SOOTHILL WOOD, BATLEY
LWS32	OAKWELL HALL COUNTRY PARK, BIRSTALL
LWS33	TONG MOOR LOCAL NATURE RESERVE, EAST BIERLEY
LWS34	COCKLESHAW WOOD, EAST BIERLEY
LWS35	HANGING WOOD, CLECKHEATON
LWS36	HUNSWORTH LITTLE WOOD, HUNSWORTH
LWS37	DROP CLOUGH, MARSDEN
LWS38	HUDDERSFIELD NARROW CANAL

LWS39	LOW WESTWOOD POND, LINTHWAITE
LWS40	SHAW WOOD, OUTLANE
LWS41	GREEN HILL CLOUGH, MARSDEN
LWS42	BLACKER WOOD, SCISSETT
LWS43	DEFFER WOODS, DENBY DALE
LWS44	DENBY DELPH, UPPER DENBY
LWS45	HIGH BRIDGE WOOD, SCISSETT
LWS46	KIRKBY WOOD, FLOCKTON
LWS47	LOWER JANE WELL, UPPER CUMBERWORTH
LWS48	PARK GATE DYKE, SKELMANTHORPE
LWS49	RIDING WOOD, CLAYTON WEST
LWS50	TURPIN HILL, UPPER CUMBERWORTH
LWS51	HOB ROYD & MIRY GREAVES SHROGG
LWS52	BANK WOOD, MELTHAM
LWS53	CLIFF WOOD, BROCKHOLES
LWS54	HALL HAYES WOOD, MELTHAM
LWS55	HEY WOOD & WEST WOOD, FARNLEY TYAS
LWS56	HONLEY WOOD, HONLEY
LWS57	ROUND WOOD, BROCKHOLES
LWS58	SPRING WOOD, HONLEY
LWS59	HAGG WOOD, HONLEY
LWS60	CARR GREEN MEADOWS, HOLMBRIDGE
LWS61	DIGLEY RESERVOIR & MARSDEN CLOUGH, HOLMBRIDGE
LWS62	HOLME HOUSE GRASSLANDS, NEW MILL
LWS63	HOLME HOUSE WOOD, NEW MILL
LWS64	HOLMROYD WOOD, NETHERTHONG
LWS65	MALKIN HOUSE WOOD, HOLMFIRTH
LWS66	MORTON WOOD, HEPWORTH
LWS67	NEW LAITH FIELDS, HOLMBRIDGE
LWS68	RAKES WOOD, HEPWORTH
LWS69	WILD BOAR CLOUGH, HADE EDGE
LWS70	YATEHOLME RESERVOIRS & PLANTATIONS, HOLME
LWS71	ALLEN WOOD, SHELLEY
LWS72	ALMONDBURY COMMON WOODS, HUDDERSFIELD
LWS73	ARTHUR WOOD, HUDDERSFIELD
LWS74	BIRKS WOOD, STOCKSMOOR
LWS75	BROWN'S KNOLL MEADOWS, STOCKSMOOR
LWS76	CARR WOOD, HUDDERSFIELD
LWS77	CLOUGH WOOD, STOCKSMOOR
LWS78	GELDER WOOD, KIRKBURTON
LWS79	HUTCHIN WOOD, HOUSES HILL, HUDDERSFIELD
LWS80	LUMB HOUSE, STOCKSMOOR
LWS81	MOLLY CARR WOOD, KIRKBURTON
LWS82	ROAF WOODS, KIRKBURTON
LWS83	SHELLEY WOOD, SHELLEY
LWS84	SHEPLEY MILL WOOD, SHELLEY
LWS85	THUNDERBRIDGE MEADOWS, THUNDERBRIDGE
LWS86	UPPER & LOWER STONE WOODS, SHEPLEY
LWS87	WOODVIEW MEADOWS (RANGE DIKE), FARNLEY TYAS
LWS88	YEW TREE WOOD, SHEPLEY

Kirklees Council Local Flood Risk Management Strategy

Habitats Regulations As- sessment

Screening Assessment

Final Report

2024

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NON-TECHNICAL SUMMARY

This report contributes to Kirklees Metropolitan District Council's legal obligation to The Conservation of Habitats and Species Regulations 2017 (as amended by the Conservation of Habitats and Species (amendment) (EU Exit) Regulations 2019) to carry out a Habitat Regulations Assessment (HRA) of its plans for effects on European Sites.

Kirklees Metropolitan District Council (KMDC) has developed a Local Flood Risk Management Strategy (LFRMS) for the District. As Lead Local Flood Authority (LLFA) under the Floods and Water Management Act 2010 they are responsible for the management of local flood risk, including from surface runoff, groundwater and flooding from ordinary watercourses (smaller rivers and streams). Several European Sites are located within or adjacent to the KMDC boundary and it is a requirement that LFRMS is assessed under these regulations.

Before a plan can be adopted, the 'competent authority' (KMDC) needs to demonstrate that the plan would have no significant effects on European Sites' integrity to the satisfaction of Natural England.

The first section of this report consists of the first step of the HRA process, which is to screen the LFRMS to determine whether the objectives and associated action identified in the Strategy could lead to a significant effect on European sites, either directly or indirectly, alone, or in combination with other relevant plans and projects.

European Sites consist of Special Areas of Conservation (SAC) designated for habitats and animal species, and Special Protection Areas (SPA) designated for bird species. Ramsar sites designated under the Ramsar Convention on Wetlands 1971 are also included following Government policy.

The LFRMS contains six high level objectives linked to measures to manage flood risk in the District, followed by area specific measures. The screening process identified measures with potential to threaten European Sites. Within the action plan, Natural Flood Management measures and maintenance/construction related actions within close proximity to European Sites (particularly upland sites), had the greatest potential to have likely significant effects on these designated sites at Scheme Level.

The Screening Assessment concluded that the LFRMS is not likely **at this stage** to have significant effects, either alone or in-combination with other plans and projects on any of the European Sites located within Kirklees Metropolitan District or with 15km of the District boundary. This conclusion is based on the very high level and undefined nature of the LFRMS and the potential environmental benefits of the measures included.

It is therefore recommended that the LFRMS can be adopted with no adverse impact on the integrity of European Sites with the advisory that re-screening takes place under the HRA once detailed design is known, with appropriate mitigation detailed as necessary. Partnership (a key objective of the LFRMS), is actively encouraged going forward.

1. INTRODUCTION

This report details the Screening and Appropriate Assessment Stages of the Habitats Regulations Assessment of the Local Flood Risk Management Strategy (LFRMS) that has been developed by Kirklees Metropolitan District Council (KMDC), as part of their responsibility as a Lead Local Flood Authority (LLFA). It is intended to identify, describe and assess the likely significant effects of implementing the strategy on European designated sites (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) and also Ramsar sites within and around Kirklees Metropolitan District.

1.1 THE LOCAL FLOOD RISK MANAGEMENT STRATEGY

The Flood and Water Management Act 2010 determined the need for flood risk to be managed within the framework of National Strategies for England and Wales and within Local Strategies for each Local Flood Authority Area. The national strategy for England sets out the principles for flood risk management and which organisations are responsible for implementation.

In accordance with the national strategy for England, LLFAs have been allocated responsibility for developing independent LFRMSs to address sources of local flooding. Each LFRMS identifies which local organisation is accountable for managing flood risk and establishes partnership agreements, as well as undertaking an assessment of flood risk and developing plans / actions, for tackling these risks.

KMDC, as a LLFA, has a responsibility to produce a LFRMS to manage water within the District to address local flooding issues. The KMDC LFRMS sets out the overall objectives to manage flooding within KMDC. KMDC present the purpose of the strategy as follows: "The Local Strategy will take into consideration current thinking and understanding to tackling flood risk in our district. Our Local Strategy will encourage more effective risk management by enabling local communities and business owners to work together to:

- Balance the needs of the community, environment, and economy,
- Enhance and extend our partnership working between us and other key stakeholders (e.g., charities, community groups, Parish Councils, and health bodies),
- Improve community awareness of flood risk, respond to their expectations and their priorities,
- Ensure a clear understanding of local flood risks and prioritise high risk catchments and communities,
- Encourage innovative flood risk management techniques,
- Support the development of emergency plans and responses to flood incidents are effective and that communities are better prepared,
- Support communities to recover more quickly and effectively after major flood incidents. Research carried out by the University of York and the Centre for Mental Health reported that the risk of long-term mental health problems was up to nine times more likely for flood victims compared to those who had never experienced flooding,
- Enable continued learning to ensure we remain progressive." (KMDC, 2022)

Kirklees LFRMS identifies six objectives that outline the KMDC strategy to manage local flood risk and puts forward associated measures that will promote the successful delivery of the strategy.

1.2. HABITATS REGULATIONS ASSESSMENT

1.2.1 Legislative Context

The Conservation of Habitats and Species Regulations 2017 (as amended by the Conservation of Habitats and Species (amendment) (EU Exit) Regulations 2019), also known as the 'Habitats Regulations', provide legal protection to habitats and species of national importance. The regulations also secure an ecological network of protected sites, consisting of SACs and SPAs. Government guidance also requires that Ramsar sites (which support internationally important wetland habitats and are listed under the Convention on Wetlands of International Importance [Ramsar Convention]) are given the same level of protection as SACs and SPAs.

Prior to the UK's withdrawal from the EU, SACs were designated and protected under domestic legislation transposed from European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (Habitats Directive), and SPAs under European Directive 2009/147/EC on the Conservation of Wild Birds (Birds Directive). Together these sites formed a European-wide Natura 2000 network of protected sites. Since 31 December 2020, SACs and SPAs within the UK no longer fall within the Natura 2000 network, and instead form a National Site Network. SPAs and SACs continue to be referred to collectively as 'European sites' within the context of the Habitats Regulations, reflecting their international importance for the conservation of biodiversity.

SACs and SPAs within the National Site Network are also still designated for habitats listed on Annex I and for species listed on Annex II of the Habitats Directive, and criteria listed under the Birds Directive, and it is these Annex I habitats, Annex II species and Birds Directive Criteria against which assessments under the Habitats Regulations are still made.

It is a requirement of Regulation 105 of the Habitats Regulations that where a plan is likely to have a significant effect on a European site, either alone or in-combination with other plans or projects, and where it is not directly connected with or necessary to the management of the site "the plan-making authority for that plan must, before the plan is given effect, make an appropriate assessment of the implications for the site in view of that site's conservation objectives".

Therefore, for all plans that are not wholly directly connected with, or necessary to, the conservation management of the site's qualifying features, a formal Screening for any Likely Significant Effects (either alone or in-combination with other plans or projects) on a European site is required. This Screening Assessment is based on available ecological information on the designated site(s), other plans, projects, and policies relevant to the area and details of the proposed development/policy.

If the Screening Assessment concludes that the plan is likely to have a significant effect on the conservation objectives of the site(s), or that such an effect cannot be ruled out (adopting a precautionary approach) an Appropriate Assessment must be carried out. An Appropriate Assessment involves an assessment of the potential effects of the plan on the conservation objectives of the site(s). If significant effects are identified, avoidance measures or mitigation to reduce impacts can be applied.

If it cannot be concluded that the plan will not adversely impact upon the integrity of the site(s), the development will not be able to proceed without further conditions and/or assessment. The plan will need to prove that all alternatives have been considered and that there are imperative reasons of overriding public interest (IROPI) that outweigh the potentially damaging impacts that the plan may have before it can proceed. In this case compensatory measures will be required.

Planning documents, such as the KMDC LFRMS, are required to undergo HRA if there is the potential for significant impacts and they are not directly connected with or necessary to the management of a European site. As the Plan is not connected with or necessary to the management of SACs, SPAs or Ramsar sites, it is necessary to undertake a HRA of the Plan.

2. HRA METHODOLOGY

2.1 Introduction

It is accepted best-practice for the HRA of strategic planning documents to be run as an iterative process alongside the plan development, with the emerging policies, sites or options continually assessed for their possible effects on European sites and modified or abandoned (as necessary) to ensure that the subsequently adopted plan is not likely to result in significant effects on any European sites, either alone or 'in-combination' with other plans. This is undertaken in consultation with Natural England and other appropriate consultees.

2.2 HRA Process

The HRA will follow a four-stage process, based on that detailed in the Department for Communities and Local Government (DCLG) guidance Planning for the Protection of European sites: Appropriate Assessment (2006) and subsequent Government Guidance on the Use of Habitats Regulations Assessment (2019). These stages are described in Table 1.

Table 1: The HRA Process

Stage/Task	Description
HRA Stage 1: Screening	<p>This process identifies the likely impacts upon a European site of a project or plan, either alone or in-combination with other projects or plans, and determines whether these impacts are likely to be significant.</p> <p>If no likely significant effect is determined, the project or plan can proceed. If a likely significant effect is identified, Stage 2 is commenced.</p> <p>Following the People over Wind & Sweetman v Coillte Teoranta Case C-323/17, the assessment does not consider protective, avoidance or mitigation measures for Stage 1 Screening. These measures are carried forward and considered as part of Stage 2.</p> <p>However, any changes to early drafts of a plan, for example the removal of a policy with likely significant effects, are considered as pre-screening decisions. The HRA formal Screening is undertaken prior to the adoption of the Plan. Therefore, any changes on earlier iterations of the draft plan are in effect changes to the essential features or characteristics of the plan itself and are therefore (usually) not considered to be avoidance measures requiring consideration at Stage 2.</p>
HRA Stage 2: Appropriate Assessment	<p>This assessment determines whether a project or plan would have an adverse impact on the integrity of a European site, either alone or in-combination with other projects or plans. This assessment is confined to the effects on the important habitats and species for which the site is designated (i.e. the qualifying interests of the site).</p> <p>Appropriate Assessments, in line with CJEU: Case C-461/17 Holohan v An Bord Pleanála, must also consider impacts upon habitats and species within or outside of a site boundary if they support a qualifying feature and could impact upon the conservation objectives of the site.</p> <p>If no adverse impact is determined, the project or plan can proceed.</p> <p>If an adverse impact is identified, Stage 3 is commenced.</p>
HRA Stage 3: Assessment where no alternatives and adverse impacts remain (Mitigation and Alternatives)	<p>Where a plan or project has been found to have adverse impacts on the integrity of a European site, potential avoidance/mitigation measures or alternative options should be identified.</p> <p>If suitable avoidance/mitigation or alternative options are identified, that result in there being no adverse effects from the project or plan on European sites, the project or plan can proceed.</p> <p>If no suitable avoidance/mitigation or alternative options are identified, as a rule the project or plan should not proceed. However, in exceptional circumstances, if there is an 'imperative reason of overriding public interest' for the implementation of the project or plan, consideration can be given to proceeding in the absence of alternative solutions. In this case, compensatory measures must have to be put in place to offset negative impacts (Stage 4).</p>
HRA Stage 4: Compensatory measures	<p>Stage 4 comprises an assessment of the compensatory measures where, in light of an assessment of imperative reasons of overriding public interest, it is deemed that the project should proceed.</p>

Other guidance documents have been used to help inform the methodology of this assessment, including:

- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission 2002)
- The Habitats Regulations Assessment Handbook (DTA Publications, 2023).
- Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (European Communities, 2018)
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC (European Communities, 2007)

- The National Planning Policy Framework (NPPF) and National Planning Practice Guidance (NPPG)
- The Planning Inspectorate PINS Note 05/ 2018: Consideration of avoidance and reduction measures in Habitats Regulations Assessment: *People over Wind*, Peter Sweetman, v Coillte Te-oranta (The Planning Inspectorate, 2018)
- UK Government Guidance on the use of Habitats Regulations Assessment (July 2019) [<https://www.gov.uk/guidance/appropriate-assessment>]

2.1. HRA Stage 1: Screening Methodology

The principles of 'screening' are applied to a plan or its components (i.e., policies and site allocations) to allow the assessment stage to focus on those aspects that are most likely to have potentially significant or adverse effects on European sites, as well as shape the emerging strategy. Screening aims to determine whether the plan will have any 'likely significant effects' on any European site as a result of its implementation. It is intended to be a coarse filter for identifying effects (positive and negative) that may occur, to allow the assessment stage to focus on the most important aspects. A plan should be considered 'likely' to have an effect if it is not possible (on the basis of objective information) to exclude the likelihood that the plan could have significant effects on any European site, either alone or in-combination with other plans or projects; an effect will be 'significant' if it could undermine the site's conservation objectives.

Screening can be used to 'screen-out' European sites and plan components from further assessment, if it is possible to determine that significant effects are unlikely (e.g., if sites or interest features are clearly not vulnerable (exposed and/or sensitive) to the outcomes of a plan due to the absence of any reasonable impact pathways).

In order to undertake screening of the LFRMS, it is necessary to:

- Identify the European sites within and outside the plan area likely to be affected, reasons for their designation and their conservation objectives.
- Describe the plan/strategy and their aims and objectives and also those of other plans or projects that in-combination have the potential to impact upon the European sites.
- Identify the potential effects on the European sites.
- Assess the significance of these potential effects on the European sites.

2.3.1. The Precautionary Principle

If there is uncertainty, and it is not possible, based on the information available, to confidently determine no significant effects on a site then the precautionary principle will be applied, and the plan will be subject to an appropriate assessment (HRA Stage 2).

2.3.2. Consultation

It is a requirement of the Habitat Regulations to consult the appropriate nature conservation statutory body (i.e. Natural England). No formal consultation with NE has been undertaken at this stage.

2.3.3. Mitigation, Avoidance and Protective Measures

Following the *People over Wind & Sweetman v Coillte Teoranta* Case C-323/17, the assessment does not consider protective, avoidance or mitigation measures for stage 1 Screening. These measures are carried forward and considered as part of the stage 2 Appropriate Assessment.

3. HRA STAGE 2: APPROPRIATE ASSESSMENT METHODOLOGY

3.1 Appropriate Assessment and Mitigation – HRA Stages 2 and 3

For those European sites screened into the HRA, it is necessary to undertake an Appropriate Assessment to explore the potential adverse effects on their integrity and develop measures to avoid these effects entirely, or if not possible, to mitigate the impacts sufficiently that effects on the European sites are rendered effectively insignificant.

The stages involved in the Appropriate Assessment are to:

- Explore the reasons for the European designation of the "screened in" European sites.
- Explore the environmental conditions required to maintain the integrity of the "scoped in" European sites and become familiar with the current trends in these environmental processes.
- Gain a full understanding of the LFRMS and consider each within the context of the environmental processes – would the policies lead to an impact on any identified process?
- Decide whether the identified impact will lead to an adverse effect on the integrity of the European site.
- In reference to ECJ case C-462/17 (Nov 18) *Holohan v An Bord Pleanala*, the Appropriate Assessment needs to include all typical habitats and species present within and outside of the boundaries of the European site if they are necessary for the conservation of the habitats and species listed for the protected area.
- Identify other plans that might affect these European sites in combination with the LFRMS and decide whether there are any adverse effects that might not result from the strategy in isolation but will do so in-combination.
- Develop measures to avoid the effect entirely, or if not possible, to mitigate the impact sufficiently such that its effect on the European site is rendered effectively insignificant.

In evaluating significance, JBA Consulting has relied on its professional judgement, which will be further reinforced through consultation with Natural England, through the development of the LFRMS and its associated appraisal processes.

4. EUROPEAN SITES

4.1 INTRODUCTION

As discussed in section 1.2, European sites collectively form the National Site Network. The objectives of the National Site Network are to:

- a) maintain at, or where appropriate restore habitats and species listed in Annexes I and II of the Habitats Directive to a favourable conservation status in their natural range (so far as it lies in the United Kingdom's territory, and so far, as is proportionate).
- b) contribute to ensuring, in their area of distribution, the survival and reproduction of wild birds listed in Annex I to the new Wild Birds Directive which naturally occur in the United Kingdom's territory and regularly occurring migratory species of birds not listed in that Annex which naturally occur in the United Kingdom's territory, and so securing compliance with the overarching aims of the Wild Birds Directive.

The National Site Network consists of:

- SACs - these are designated to protect those habitat types and species that are most in need of conservation (excluding birds).

- SPAs) - these are designated to protect rare and vulnerable birds, and also regularly occurring migratory species.

Although not included in the legislation, as a matter of policy, Ramsar sites in England and Wales are protected in the same way as European sites, and therefore considered in the HRA process. The vast majority are also classified as SPAs and Sites of Special Scientific Interest (SSSIs). All SPAs and terrestrial SACs in England and Wales are also designated as SSSIs under the Wildlife and Countryside Act (1981) as amended.

For simplicity in this report, SACs, SPAs and Ramsar sites are collectively referred to as European sites.

4.2 EUROPEAN SITES IN AND AROUND KIRKLEES DISTRICT

Best practice guidance suggests that sites occurring within a wider area of approximately 10km to 15km from the boundary of the area directly affected by a plan should be identified and assessed, in addition to those sites located within the plan area (Therivel, 2009). However, it is important to consider the possibility of impacts for any European site that might be affected, whatever its location, given the activities included in the plan and their range of influence. This may extend some distance from the area within the immediate influence of a plan.

There is one SAC and two SPA sites located within Kirklees. A further two SAC sites located adjacent to Kirklees which have been deemed to be within the influence of KMDC LFRMS. These sites are listed in Table 2 and shown in Appendix A.

Table 2: European Sites Within and Adjacent to Kirklees District

Designation	Within Kirklees District	Adjacent to Kirklees District and deemed to be within the influence of the LFRMS
SAC	- South Pennine Moors	- Denby Grange Colliery Ponds - Rochdale Canal
SPA	- Peak District Moors (South Pennine Moors Phase 1) - South Pennine Moors Phase 2	

Data on the European site interest features, their distribution, and their sensitivity to potential effects associated with the LFRMS were obtained from various sources and reports, including the Joint Nature Conservation Committee (JNCC) and Natural England websites (citations, boundaries, management plans, site improvement plans etc).

Detailed information on these sites, including their qualifying features and conservation objectives are provided in Appendix B within Table 8.

4.3 POTENTIAL HAZARDS TO EUROPEAN SITES

4.3.1 Introduction

Any strategy to manage flooding and the associated infrastructure upon which this strategy relies, can potentially have adverse impacts on the habitats and species for which European sites are designated. These impacts can be direct, such as habitat loss, fragmentation, or degradation, or indirect such as disturbance or pollution from construction, transportation etc.

This section identifies the potential hazards to European sites within and adjacent to Kirklees District and then goes on to identify the types of hazards to which the qualifying features that are present within the sites are particularly sensitive.

4.3.2 Hazards to Sites

The European sites within and adjacent to KMDC comprise of moorland, canal and pond sites, and the moorland sites in particular have considerable bird interest. Potential hazards to the interest features are identified in Table 3 below.

Table 3: Potential Hazards to the European Sites within and adjacent to the District

Potential Hazard		Description
1	Change in water levels	Flooding, or altered water levels, may have adverse impacts on water dependant habitats and species. Additionally, changes to ground-water may adversely impact on these habitats.
2	Changes in hydrological regime	These are changes to existing hydrological processes (e.g. changes to flow rates) that may alter the present characteristics of the European site.
3	Changes in water quality	Activities which may impact upon water quality, such as accidental pollution spills as a result of defence construction or pumping station operation, may adversely affect wetland habitats and species.
4	Changes to surface water flooding	Activities which may result in a reduction or increase in the frequency and extent of surface water flooding which may affect riverine, floodplain and other habitats.
5	Competition from invasive non-native species	Flooding may cause introduction or spread of invasive non-native species, particularly plants, which could result in changes to community composition and even to the complete loss of native communities.
6	Disturbance	Human activity (construction or other) can adversely impact on the qualifying features of the site directly (physical disturbance) or indirectly (visual or noise).
7	Habitat fragmentation	This is where flood events, or flood risk management measures such as defence construc-

Potential Hazard		Description
		tion, result in the separation of available habitats or split extensive areas of suitable habitat. Most likely to affect species.
8	Habitat loss	This is a loss of habitat within the designated boundaries of a European site, for example as a result of defence construction.
9	Habitat/community simplification	Changes to environmental conditions that result in a reduction and fragmentation of habitats that will reduce biodiversity.
10	Turbidity and siltation	Increases in turbidity within water environments can impact upon aquatic plants, fish and wildfowl due to sedimentation and reduction in penetrable light. This may rise from construction activities or changed flood-ing/hydrological regimes.

4.3.3 Qualifying Features and Sensitivity to Hazards

Table 4 below, shows the qualifying features of the European sites within and adjacent to KMDC and identifies the hazards to which they are sensitive (see Table 3).

It must be noted that during the assessment of the potential impacts of the LFRMS on a European site, all of the potential hazards will be considered.

Table 4: Sensitivity of European Sites to Potential Hazards

Feature	Potential Hazards										Sites at Risk of Hazard
	1 Change in water levels	2 Changes in hydrological regime	3 Changes in water quality	4 Changes to surface water flooding	5 Competition from invasive non-native species	6 Disturbance	7 Habitat fragmentation	8 Habitat loss	9 Habitat/community simplification	10 Turbidity and siltation	
Dry heathland habitats	X	X		X	X	X	X	X	X		South Pennine Moors SAC
Bogs and wet habitats	X	X	X	X	X	X	X	X	X	X	South Pennine Moors SAC
Dry woodland	X	X		X	X	X	X	X	X		South Pennine Moors SAC
Wet heathland habitats	X	X	X	X	X	X	X	X	X	X	South Pennine Moors SAC
Breeding Bird Assemblage						X	X	X	X		Peak District Moors (South Pennine Moors Phase 1) SPA South Pennine Moors Phase 2 SPA
Breeding Amphibians	X	X	X	X	X	X	X	X	X	X	Denby Grange Colliery Ponds SAC
Aquatic Macrophytes	X	X	X	X	X	X	X	X	X	X	Rochdale Canal SAC

5. SCREENING ASSESSMENT

5.1 INTRODUCTION

This section gives a summary of the KMDC LFRMS strategic themes and objectives (which are defined in Appendix F of the LFRMS entitled ‘The Flood Risk Action Plan’). The LFRMS contains four strategic themes and six high level objectives to manage flood risk in the District. Table 5 summarises the four strategic themes, six objectives and the specific measures that apply to both, as identified in the KMDC LFRMS and whether they have the potential to impact on European Sites.

The Habitat Regulations also require the cumulative effects with other plans or projects to be considered at the screening stage. This section, therefore, also identifies the other plans and projects that it is considered could potentially act “in combination” with the LFRMS to have “significant effects” on European sites. These are identified in the following section (Section 6).

Table 5: LFRMS Strategic Measures

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
PLACE	Engage early with spatial planners and growth strategies to ensure new development and plans make best use of land in making space for surface water, fluvial	Engagement	Surface water run-off, and fluvial.	Partnership	District wide	All proposed development will be subject to a separate Habitats Regulations Assessment (HRA) and will not be permitted should a significant effect be predicted on a given European Site within the	No in-combination effect; zero effect alone. No effect

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	water, sustainable drainage systems and promote the use of adaptive pathways to adapt to climate hazards. Share our understanding of flooding in the area to avoid inappropriate development.					District. This assessment will include any recommendation given by Kirklees Metropolitan Borough Council as to preventative flood actions. In addition, this is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023). No effect at all	
	Work with the Local Planning Authority, Highway Authority, Environment Agency and water companies to ensure the planning process and	Collaboration/Policy and Implementation	Surface water run-off	Partnership	District wide	All proposed development, management and maintenance regimes will be subject to a separate HRA and will not be permitted should a significant effect be predicted on a given European	No in-combination effect; zero effect alone. No effect

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	development design account fully for land drainage and surface water managements issues. Ensure our practices secure sound management and maintenance regimes that are proportionate and appropriate to the flood risk in the					Site. This assessment will include any recommendation given by Kirklees Metropolitan Borough Council as to preventative flood actions. In addition, this is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023). No effect at all	
	As a Lead Local Flood Authority engage with others to advise on climate change allowances for sources of flooding from surface water, groundwater	Engagement/Training	Surface water run-off, groundwater and fluvial.	Partnership/Adapt/Sustainable	District wide	This training and sharing of best practice will allow others to make decisions in line with the latest research and developments in flood risk management. At this stage this knowledge sharing is purely	No in-combination effect; zero effect alone. No effect

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	and ordinary water-courses. To share and inform others of current guidance, research and best practice on sustainability and water management to inform decision making.					theoretical and geographically undefined. Empowering decision makers in this way will not lead to any direct effects on European Sites. No effect at all	

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	Enhance our early engagement with developments and commit to targeted periodic inspections of new development to ensure compliance with drainage planning conditions and Land Drainage Act legislation. Seek 106 contributions where appropriate and promote environmental net gain.	Engagement	Surface water run-off	Partnership/Sustainable	District wide	This measure relates to development already secured and ensures compliance of drainage planning conditions. As part of the planning process, such development would be subject to an HRA and as such would not be permitted were there adverse impacts predicted on neighbouring European Sites. No effect at all.	No in-combination effect; zero effect alone. No effect
	Improve our asset data on drainage assets within the district including highway gullies, culverts, carrier	Investigation	All forms of flooding	Evidence	District wide	By enhancing and expanding the current understanding of drainage assets, resilience to flood risk can be improved. This will ensure that management is based on the	No in-combination effect; zero effect alone. No effect

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	drains, debris screens and others to build our evidence base. Where considered significant make this publicly available.					latest information. Adopting this guidance should ensure that asset condition and other particulars are readily available but will not directly lead to development to impact on European Sites. No effect at all.	
PROTECT	Identify and develop flood risk improvement schemes for Kirklees to reduce the risk of surface water flooding and flooding from ordinary watercourses to better protect properties and the highway network in high risk areas. Be open to	Scheme	Surface water run-off, fluvial.	Innovation/Adapt	High risk catchments	High risk areas are most likely to focus on settlements and major roads. Should the focus of such Schemes be restricted to these areas, European Sites are likely to be protected, as the majority of European Sites within proximity to the catchment are in the uplands, away from hubs of development.	Potential for effects alone or in-combination effects; in-combination assessment completed in Section 6.

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	new financing models. Promote a range of resilience actions and climate change					In addition, this is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023). No likely significant effect	
	Improve the awareness, understanding and delivery of Property Flood Resilience measures to manage local flood risk within our communities. Encourage homeowners and business owners to undertake Property Flood Surveys and	Engagement/Training and Scheme	All forms of flooding	Communities	District wide	This measure is most likely to focus on settlements. Should the focus of such Schemes be restricted to these areas, European Sites are likely to be protected, as the majority of European Sites within proximity to the catchment are in the uplands, away from hubs of development. In addition, this is a general statement of	Potential for effects alone or in-combination effects; in-combination assessment completed in Section 6.

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	seek grant funding to support resilience measure installations to support a build back better approach.					policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023). No likely significant effect	
	Work with our partners, universities and communities to develop integrated solutions and maintenance programmes to deliver multiple benefits to reduce flood risk and look to improve economic, social and environmental benefits. Be innovative in our approach.	Collaboration/Innovation/Scheme	All forms of flooding	Partnership/Sustainable/Innovation	District wide	This measure focuses on partnership working and there is no direct driver for development. In addition, the measure looks to improve environmental benefits, so the policy should steer away from impacts to European sites. No effect at all.	No in-combination effect; zero effect alone. No effect
	Engage with catchment	Engagement and NFM	Surface water run-off	Partnership/Sustainable	District wide	Natural flood management	Potential for effects alone or

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	<p>partnerships and land-owners to embrace land management techniques and natural flood management to help to manage surface water runoff. Seek out opportunities to use Working with Natural Processes in managing flood risk to promote multiple benefits such as environmental net gain.</p>		<p>and all forms of flooding</p>			<p>techniques are likely to target upland areas to protect downstream development. The moorland European Sites referenced in Figure 1 may be at risk from NFM measures. This is however a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023). In addition, the measure seeks to promote environmental net gain and hence should steer change in such a way as to protect European Sites from adverse impacts.</p>	<p>in-combination effects; in-combination assessment completed in Section 6.</p>

Strategic Theme	LF RMS Strategic Measure	Category of Work	Source of Flooding	LF RMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
						No likely significant effect	
	Support the severe weather incident management function the Council undertakes through technological advancements to ensure it is an intelligence led approach.	Innovation/ Collaboration	All forms of flooding	Innovation	District wide	This measure will ensure severe weather incidents are managed intelligently but supplying intelligence is in a sense theoretical and will have no direct effects on European Sites. No effect at all	No in-combination effect; zero effect alone. No effect
	Maintain assets based on a risk based approach to ensure high flood risk assets are prioritised and allowances made for climate change projections are considered. Try new technological approaches.	Scheme/Innovation	All forms of flooding	Adapt	District wide	This will ensure that management within these communities is current and considers variables (such as changing climate). This measure focuses on the approach to maintenance as opposed to maintenance itself and hence is unlikely to have any direct	No in-combination effect; zero effect alone. No effect

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	Assess which Council assets require capacity improvements as a last resort.					effects on European Sites. In addition, this is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023)). No effect at all.	
RESPONSE	Provide intelligence to ensure policy frameworks and emergency plans are robust. Work with other services to establish the basis of the Council's response to severe rainfall events in supporting communities.	Policy and Implementation/Collaboration	All forms of flooding	Evidence	District wide	This is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023)). No effect at all.	No in-combination effect; zero effect alone. No effect
	Work with the local	Engagement/Training	All forms of flooding	Communities/Partnership	District wide	Empowering communities in	No in-combination

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	<p>communities to increase their awareness and preparedness for flooding in Kirklees to improve flood resilience in homes, businesses and communities through education campaigns with our partners. Enhance our online content to deliver a one-stop shop.</p>					<p>this way will not lead to any direct effects on European Sites. No effect at all</p>	<p>effect; zero effect alone. No effect</p>

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	Encourage flood community action groups to be set up in key areas of flood risk and through this work, in conjunction with partners, provide a higher standard of community led resilience by developing a network of community resilience leads.	Collaboration and engagement	All forms of flooding	Communities	Known flooded places	Empowering communities in this way will not lead to any direct effects on European Sites. No effect at all	No in-combination effect; zero effect alone. No effect
	Ensure flood risk management actions reach out and remain inclusive in our approach within our diverse communities and areas of deprivation.	Engagement	All forms of flooding	Communities	District Wide	Empowering and including diverse communities in this way will not lead to any direct effects on European Sites. No effect at all	No in-combination effect; zero effect alone. No effect

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	Establish and maintain a Communication Plan in line with national and other Council services to provide coordinated and timely information to communities at flood risk.	Engagement/Education	All forms of flooding	Communities/Partnership	District wide	Good communication and education within communities at risk is likely to lead to small scale, benefits to flood risk management at the individual level. It is will not lead to any direct effects on European Sites. No effect at all.	No in-combination effect; zero effect alone. No effect
RECOVERY	Provide follow up recovery support and advice to residents, business owners and communities that have been affected by flooding on funding, wellbeing support and signpost to affordable flood insurance to help	Support and Advice	All forms of flooding	Communities	District wide	Support and advice within communities affected by flooding is likely to lead to small scale, benefits to flood risk management at the individual level. It is will not lead to any direct effects on European Sites. No effect at all.	No in-combination effect; zero effect alone. No effect

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
	them recover quicker.						
	Investigate flood incidents of all sources and establish flood outlines with our partners to validate existing flood models to help inform future grant fundings and flood risk management projects.	Investigation	All forms of flooding	Evidence/Partnership/Innovation	District wide	Collecting data to validate flood models and inform future projects is very much theoretical and will have no direct effects on European Sites.	No in-combination effect; zero effect alone. No effect
	Work with Partners and health bodies to ensure mental health impacts from flooding are factored into long term recovery planning.	Collaboration and support	All forms of flooding	Communities	N/A	Better supporting the wellbeing of communities affected by flooding is likely to lead to mental health benefits and personal resilience at the individual level. It is will not lead to any direct effects on European Sites.	No in-combination effect; zero effect alone. No effect

Strategic Theme	LFRMS Strategic Measure	Category of Work	Source of Flooding	LFRMS Objective	Geographical Area	Potential Effect on European Sites	Potential for In-Combination Effect?
						No effect at all.	
	Support Review Briefings and feedback learning from communities to inform our plans and policies to ensure a more efficient and effective response in the future.	Investigation/Policy	All forms of flooding	Communities/Innovation/Evidence	N/A	Gathering data to streamline plans and policy will not lead to any direct effects on European Sites. No effect at all	No in-combination effect; zero effect alone. No effect

6. Other Relevant Plans and Projects that might act In-combination.

A series of individually modest effects may in-combination produce effects that are likely to adversely affect the integrity of one or more European sites. Article 6(3) of the Habitats Directive tries to address this by taking into account the combination of effects from other plans or projects. The Directive does not explicitly define which other plans and projects are within the scope of the combination provision. Guidance in section 4.4.3 of *'Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC'*, published by the European Commission, states:

'When determining likely significant effects, the combination of other plans or projects should also be considered to take account of cumulative impacts. It would seem appropriate to restrict the combination provision to other plans or projects which have been actually proposed.'

Table 6 lists the relevant plans and projects that have been identified as having the potential to result in adverse effects on European sites in-combination with the LFRMS. A search was made of the local planning authority and National Infrastructure Planning websites, in addition to a search of Natural England's website for Nature Improvement Areas.

Table 6: Other Plans and Projects

Plan/Project	Potential In-combination Effects
<p>The Kirklees Development Plan (Kirklees Council, 2022)</p>	<p>The Kirklees Development Plan consists of the Kirklees Local Plan and, in applicable areas, the Holme Valley Neighbourhood Development Plan. This Plan sets out how the District will develop and change over the next nine years. The Plan comprises separate parts, including the Core Strategy which other documents under the Plan fall under, which address different aspects of development within the District and surrounding area. No adverse in-combination effects with the LFRMS are expected as proposed development, schemes and plans which are stated within the Development Plan Documents (DPD) under the Framework will require assessment under the Habitat Regulations if they pose any risk to European Sites within or adjacent to the boundary. Therefore, any development facilitated by or that becomes feasible because of measures within the LFRMS will also be subject to the HRA process to ensure no adverse impacts arise.</p> <p>No likely significant effect in combination with relevant LFRMS Strategic Measures identified</p>
<p>A57 Link Roads (previously known as Trans Pennine Upgrade Programme) (National Infrastructure Planning, 2022)</p>	<p>The A57 Link Roads project will include the creation of two new link roads: (1) Mottram Moor Link Road - a new dual carriageway from the M67 junction 4 roundabout to a new junction on the A57(T) at Mottram Moor; and (2) A57 Link Road - a new single carriageway link from the A57(T) at Mottram Moor to a new junction on the A57 in Woolley Bridge. This project is situated within 10km of the southern boundary of Kirklees District. No adverse in-combination effects with the LFRMS are expected as the proposed development will require assessment under the Habitat Regulations if they pose any risk to European Sites within or adjacent to the boundary. Therefore, any development facilitated by or that becomes feasible because of measures within the LFRMS will also be subject to the HRA process to ensure no adverse impacts arise.</p>

Plan/Project	Potential In-combination Effects
	No likely significant effect in combination with relevant LFRMS Strategic Measures identified
Dark Peak Nature Improvement Area (NIA) Programme (2015) (The National Archives, 2014)	<p>This programme may result in positive in-combination effects in relation to the Peak District National Park as key projects in the programme relate to the enhancement of these sites, through habitat and water quality management. Working with the Dark Peak Partnership and NIA programme may identify opportunities to achieve some of the objectives of the LFRMS (e.g. Objective 5), whilst helping to protect these European Sites. Subsequent land management initiatives continuing after completion of the project suggests positive effects likely to be ongoing.</p> <p>No likely significant effect in combination with relevant LFRMS Strategic Measures identified</p>

7. Screening Assessment Results

7.1 Introduction

This section considers the actions and measures identified in the LFRMS that are considered to have a potential impact on European Sites (as shown in Table 5) and identifies whether or not they are likely to have significant effects on site integrity, either alone or in-combination with other plans and/or projects, as detailed in Table 6. Many of the actions and measures identified in the KMDC LFRMS have been screened out in Table 5 as they are high level actions and are not determined to directly threaten the integrity of European Sites.

7.2 Screening Assessment

Considering the location of the European sites and the interest features carried forward from Table 4 in relation to KMDC and the identified potential hazards associated with the actions and measures of the LFRMS, an assessment was made as to whether the LFRMS, alone and in-combination with other plans and/or projects, would have likely significant effects on any European sites.

Table 7: Summary of screened in LFRMS actions and measures and their likely impacts on European Sites.

LFRMS Measures	Potential Hazard	Interest Feature Affected	Designated Sites which include Interest Feature Affected	Likelihood of Significant Effect on Sites
<p>Identify and develop flood risk improvement schemes for Kirklees to reduce the risk of surface water flooding and flooding from ordinary watercourses to better protect properties and the highway network in high risk areas. Be open to new financing models. Promote a range of resilience actions and climate change scenarios.</p>	<p>The scope for potential hazards under this action is very broad and due to the high level, undefined nature of this action, impacts are uncertain.</p>	<ul style="list-style-type: none"> -Dry heathland habitats -Bogs and wet habitats -Dry woodland -Wet heathland habitats -Breeding Bird Assemblage -Aquatic Macrophytes -Breeding Amphibians 	<p>South Pennine Moors SAC</p>	<p>This is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023)).</p> <p><i>No likely significant effect alone or in combination.</i></p>
			<p>Peak District Moors (South Pennine Moors Phase 1) SPA</p>	<p>This is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023)).</p> <p><i>No likely significant effect alone or in combination.</i></p>
			<p>South Pennine Moors Phase 2 SPA</p>	<p>This is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023)).</p> <p><i>No likely significant effect alone or in combination.</i></p>

LFRMS Measures	Potential Hazard	Interest Feature Affected	Designated Sites which include Interest Feature Affected	Likelihood of Significant Effect on Sites
			Denby Grange Colliery Ponds SAC	<p>This is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023)).</p> <p><i>No likely significant effect alone or in combination.</i></p>
			Rochdale Canal SAC	<p>No in-combination effect; zero effect alone due to the distance (approximately 7km) of the European Site to the District and lack of hydrological connectivity.</p> <p><i>No effect at all</i></p>
<p>Improve the awareness, understanding and delivery of Property Flood Resilience measures to manage local flood risk</p>	<p>The scope for potential hazards under this action is very broad and due to the high level, undefined nature of this action, impacts are uncertain. However, impacts are</p>	<ul style="list-style-type: none"> -Dry heathland habitats -Bogs and wet habitats -Dry woodland -Wet heathland habitats 	<p>South Pennine Moors SAC</p>	<p>This is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023)).</p> <p><i>No likely significant effect alone or in combination.</i></p>

LFRMS Measures	Potential Hazard	Interest Feature Affected	Designated Sites which include Interest Feature Affected	Likelihood of Significant Effect on Sites
<p>within our communities. Encourage homeowners and business owners to undertake Property Flood Surveys and seek grant funding to support resilience measure installations to support a build back better approach.</p>	<p>likely to be small scale and focused on the individual property level e.g., installing flood gates etc. The combined effect of this measure may be to force more flood water elsewhere on the floodplain. This could change patterns of sedimentation and hydrology.</p> <p>The focus of this measure is on settlements. Should the focus of such Schemes be restricted to these areas, European Sites are likely to be protected, as the majority of European Sites within proximity to the catchment are in the uplands, away from hubs of development. This</p>	<p>-Breeding Bird Assemblage</p> <p>-Aquatic Macrophytes</p> <p>-Breeding Amphibians</p>	<p>Peak District Moors (South Pennine Moors Phase 1) SPA</p>	<p>Peak District Moor SPA is largely located upstream of the District and unlikely to be significantly affected by changes in hydrology and sedimentation patterns.</p> <p>In addition, the majority of property within the District is located downstream of the SPA and the interest features of the SPA (Breeding Bird Assemblage) includes moorland species:</p> <p>-A098 <i>Falco columbarius</i>; Merlin (Breeding)</p> <p>-A140 <i>Pluvialis apricaria</i>; European golden plover (Breeding)</p> <p>-A222 <i>Asio flammeus</i>; Short-eared owl (Breeding)</p> <p>These species are less likely to be affected by changes to the river corridor.</p> <p>Furthermore, this is a general statement of policy, so in itself cannot</p>

LFRMS Measures	Potential Hazard	Interest Feature Affected	Designated Sites which include Interest Feature Affected	Likelihood of Significant Effect on Sites
	<p>is not to say that property within such sites would not qualify for support.</p>			<p>lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023)).</p> <p><i>No likely significant effect alone or in combination.</i></p>
			<p>South Pennine Moors Phase 2 SPA</p>	<p>South Pennine Moors SPA is largely located upstream of the District and unlikely to be significantly affected by changes in hydrology and sedimentation patterns.</p> <p>In addition, the majority of property within the District is located downstream of the SPA and the interest features of the SPA (Breeding Bird Assemblage) includes moorland species:</p> <p><i>A098 Falco columbarius; Merlin (Breeding)</i></p> <p><i>A140 Pluvialis apricaria; European golden plover (Breeding)</i></p> <p>These species are less likely to be affected by</p>

LFRMS Measures	Potential Hazard	Interest Feature Affected	Designated Sites which include Interest Feature Affected	Likelihood of Significant Effect on Sites
				<p>changes to the river corridor.</p> <p>Furthermore, this is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023)).</p> <p><i>No likely significant effect alone or in combination.</i></p>
			Denby Grange Colliery Ponds SAC	<p>This is a general statement of policy, so in itself cannot lead to any impacts on any European Sites (see Section F.6.3.1 in the DTA Handbook (DTA, 2023)).</p> <p><i>No likely significant effect alone or in combination.</i></p>
			Rochdale Canal SAC	<p>No in-combination effect; zero effect alone due to the distance (approximately 7km) of the European Site to the District and lack of hydrological connectivity.</p> <p><i>No effect at all</i></p>

LFRMS Measures	Potential Hazard	Interest Feature Affected	Designated Sites which include Interest Feature Affected	Likelihood of Significant Effect on Sites
<p>Engage with catchment partnerships and landowners to embrace land management techniques and natural flood management to help to manage surface water runoff. Seek out opportunities to use Working with Natural Processes in managing flood risk to promote multiple benefits such as environmental net gain.</p>	<p>Delivery of this objective will result in reduced flood risk to local and downstream communities for the benefit of population, human health, and material assets. Whilst environmental gains are likely (via improved water quality and habitat creation), there is the potential for impacts on European Site Interest Features from specific measures under this action and until detailed designs are known, impacts remain uncertain.</p>	<ul style="list-style-type: none"> -Dry heathland habitats -Bogs and wet habitats -Dry woodland -Wet heathland habitats -Breeding Bird Assemblage -Aquatic Macrophytes -Breeding Amphibians 	<p>South Pennine Moors SAC</p>	<p>Section F.6.3.5 of the DTA handbook (DTA, 2023), refers to the ability to screen out policies and proposals which will have the indirect or unintentional effect of steering change away from European Sites. Any measure which promotes environmental benefits is likely to do so.</p> <p><i>No likely significant effect alone or in combination.</i></p>
			<p>Peak District Moors (South Pennine Moors Phase 1) SPA</p>	<p>Section F.6.3.5 of the DTA handbook (DTA, 2023), refers to the ability to screen out policies and proposals which will have the indirect or unintentional effect of steering change away from European Sites. Any measure which promotes environmental benefits is likely to do so.</p> <p><i>No likely significant effect alone or in combination.</i></p>

LFRMS Measures	Potential Hazard	Interest Feature Affected	Designated Sites which include Interest Feature Affected	Likelihood of Significant Effect on Sites
			South Pennine Moors Phase 2 SPA	<p>Section F.6.3.5 of the DTA handbook (DTA, 2023), refers to the ability to screen out policies and proposals which will have the indirect or unintentional effect of steering change away from European Sites. Any measure which promotes environmental benefits is likely to do so.</p> <p><i>No likely significant effect alone or in combination.</i></p>
			Denby Grange Colliery Ponds SAC	<p>Section F.6.3.5 of the DTA handbook (DTA, 2023), refers to the ability to screen out policies and proposals which will have the indirect or unintentional effect of steering change away from European Sites. Any measure which promotes environmental benefits is likely to do so.</p> <p><i>No likely significant effect alone or in combination.</i></p>

LFRMS Measures	Potential Hazard	Interest Feature Affected	Designated Sites which include Interest Feature Affected	Likelihood of Significant Effect on Sites
			Rochdale Canal SAC	<p>No in-combination effect; zero effect alone due to the distance (approximately 7km) of the European Site to the District and lack of hydrological connectivity.</p> <p><i>No effect at all</i></p>

8. Screening Statement and Conclusions

8.1 Summary

The LFRMS sets out the overall objectives to manage flooding within KMDC. The purpose of the Strategy is to " In combination with the National Strategy, our Local Strategy will encourage more effective risk management by enabling people, communities, businesses and the public to work together " (KMDC, 2022). The six objectives of the Strategy set out a vision as to how local flood risk will be delivered and managed by DMDC as LLFA, and all other Risk Management Authorities as well.

The Screening Assessment identified the potential for hydrological changes, water quality effects and impacts to habitats and species that may occur as a direct or indirect result of the implementation of the LFRMS. These effects could arise from measures directed at waterway maintenance and management of flood risk in specific locations, potentially using flood defences and separately via NFM initiatives.

The Screening Assessment process did not identify any likely significant effects arising from the KMDC LFRMS's proposed objectives that might significantly affect the European Sites located within Kirklees Metropolitan District or with 15km of the District boundary. This was largely due to the high-level nature and general aspirations of the LFRMS as well as the dual purpose of achieving environmental gain. It is therefore not necessary for an Appropriate Assessment (HRA Task 2 and 3) to be carried out.

9. Appendix A

9.1 Location of European Sites within and adjacent to KMDC

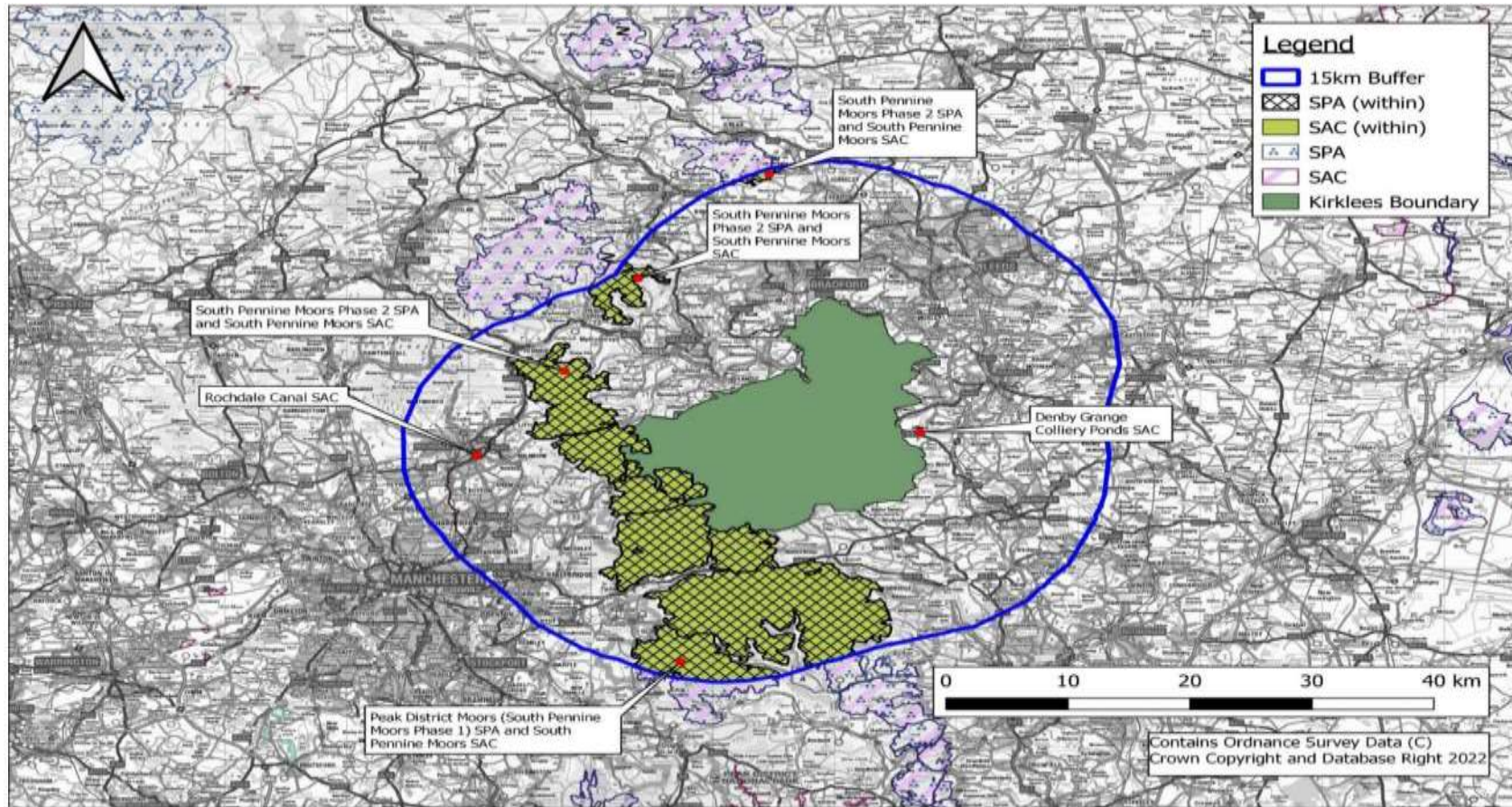


Figure 1: European Site Map

10. Appendix B

10.1 Details of European sites within and adjacent to Kirklees District

Table 8: Details of European Sites within and adjacent to KMDC. Information from JNCC and Natural England

European Site	Qualifying Feature (Broad Habitat/Species Groupings)	Qualifying Feature	Conservation Objectives	Site Vulnerability
<p>South Pennine Moors SAC</p> <p>Site area 65024.32 ha</p>	<ul style="list-style-type: none"> -Dry heathland habitats -Bogs and wet habitats -Dry woodland -Wet heathland habitats 	<p>Annex I habitats:</p> <p><i>4030 European dry heaths</i></p> <p><i>7130 Blanket bogs (* if active bog)</i></p> <p><i>* Priority feature</i></p> <p><i>91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles</i></p> <p><i>4010 Northern Atlantic wet heaths with Erica tetralix</i></p> <p><i>7140 Transition mires and quaking bogs</i></p>	<p>Subject to natural change, to maintain or restore:</p> <ul style="list-style-type: none"> -The extent and distribution of the qualifying natural habitats -The structure and function (including typical species) of the qualifying natural habitats, <p>and,</p> <ul style="list-style-type: none"> -The supporting processes on which the qualifying natural habitats rely 	<p>The site is vulnerable to:</p> <ul style="list-style-type: none"> -Air pollution, air-borne pollutants (B)* -Agriculture activities not referred to above (B) -Human induced changes in hydraulic conditions (B) -Fire and fire suppression (I)* -Outdoor sports and leisure activities, recreational activities (I)

European Site	Qualifying Feature (Broad Habitat/Species Groupings)	Qualifying Feature	Conservation Objectives	Site Vulnerability
<p>Peak District Moors (South Pennine Moors Phase 1) SPA</p> <p>Site area 45,270.52 ha</p>	<p>-Breeding Bird Assemblage</p>	<p>Annex I species:</p> <p>-A098 <i>Falco columbarius</i>; Merlin (Breeding)</p> <p>-A140 <i>Pluvialis apricaria</i>; European golden plover (Breeding)</p> <p>-A222 <i>Asio flammeus</i>; Short-eared owl (Breeding)</p>	<p>Subject to natural change, to maintain or restore:</p> <p>-The extent and distribution of the habitats of the qualifying features</p> <p>-The structure and function of the habitats of the qualifying features</p> <p>-The supporting processes on which the habitats of the qualifying features rely</p> <p>-The population of each of the qualifying features, and,</p> <p>-The distribution of the qualifying features within the site.</p>	<p>The site is vulnerable to:</p> <ul style="list-style-type: none"> - Outdoor sports and leisure activities, recreational activities (I) - Human induced changes in hydraulic conditions (B) - Fire and fire suppression (I) - Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g., due to fishing gear), etc.) (I) - Reduced fecundity/ genetic depression (I)
<p>South Pennine Moors Phase 2 SPA</p> <p>Site area 20944.46 ha</p>	<p>-Breeding Bird Assemblage</p>	<p>Annex I species:</p> <p>A098 <i>Falco columbarius</i>; Merlin (Breeding)</p> <p>A140 <i>Pluvialis apricaria</i>; European</p>	<p>Subject to natural change, to maintain or restore:</p> <p>-The extent and distribution of the habitats of the qualifying features</p>	<p>The site is vulnerable to:</p> <ul style="list-style-type: none"> - Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching,

European Site	Qualifying Feature (Broad Habitat/Species Groupings)	Qualifying Feature	Conservation Objectives	Site Vulnerability
		golden plover (Breeding)	<ul style="list-style-type: none"> -The structure and function of the habitats of the qualifying features -The supporting processes on which the habitats of the qualifying features rely -The population of each of the qualifying features, and, -The distribution of the qualifying features within the site. 	<p>predator control, accidental capture (e.g., due to fishing gear), etc.) (I)</p> <ul style="list-style-type: none"> - Reduced fecundity/ genetic depression (I) - Fire and fire suppression (I) - Human induced changes in hydraulic conditions (B) - Outdoor sports and leisure activities, recreational activities (I)

European Site	Qualifying Feature (Broad Habitat/Species Groupings)	Qualifying Feature	Conservation Objectives	Site Vulnerability
<p>Denby Grange Colliery Ponds SAC</p> <p><i>Site area 18.34 ha</i></p>	<p>- Breeding Amphibians</p>	<p>Annex II species:</p> <p>1166 Great crested newt <i>Triturus cristatus</i></p>	<p>Subject to natural change, to maintain or restore:</p> <ul style="list-style-type: none"> -The extent and distribution of the habitats of qualifying species -The structure and function of the habitats of qualifying species -The supporting processes on which the habitats of qualifying species rely -The populations of qualifying species, and, -The distribution of qualifying species within the site. 	<p>The site is vulnerable to:</p> <ul style="list-style-type: none"> - Pollution to groundwater (point sources and diffuse sources) (B) - Other ecosystem modifications (B) - Forest and Plantation management & use (I) - Human induced changes in hydraulic conditions (B) - Invasive non-native species (B)

European Site	Qualifying Feature (Broad Habitat/Species Groupings)	Qualifying Feature	Conservation Objectives	Site Vulnerability
<p>Rochdale Canal SAC</p> <p><i>Site area</i> 24.86 ha</p>	<p>- Aquatic Macrophytes</p>	<p>Annex II species:</p> <p>1831 Floating waterplantain <i>Luronium natans</i></p>	<p>Subject to natural change, to maintain or restore:</p> <ul style="list-style-type: none"> -The extent and distribution of the habitats of qualifying species -The structure and function of the habitats of qualifying species -The supporting processes on which the habitats of qualifying species rely -The populations of the qualifying species, and, -The distribution of the qualifying species within the site. 	<p>The site is vulnerable to:</p> <ul style="list-style-type: none"> - Air pollution, air-borne pollutants (B) - Human induced changes in hydraulic conditions (B)

*I = Inside, O = Outside, B = Both

11. References

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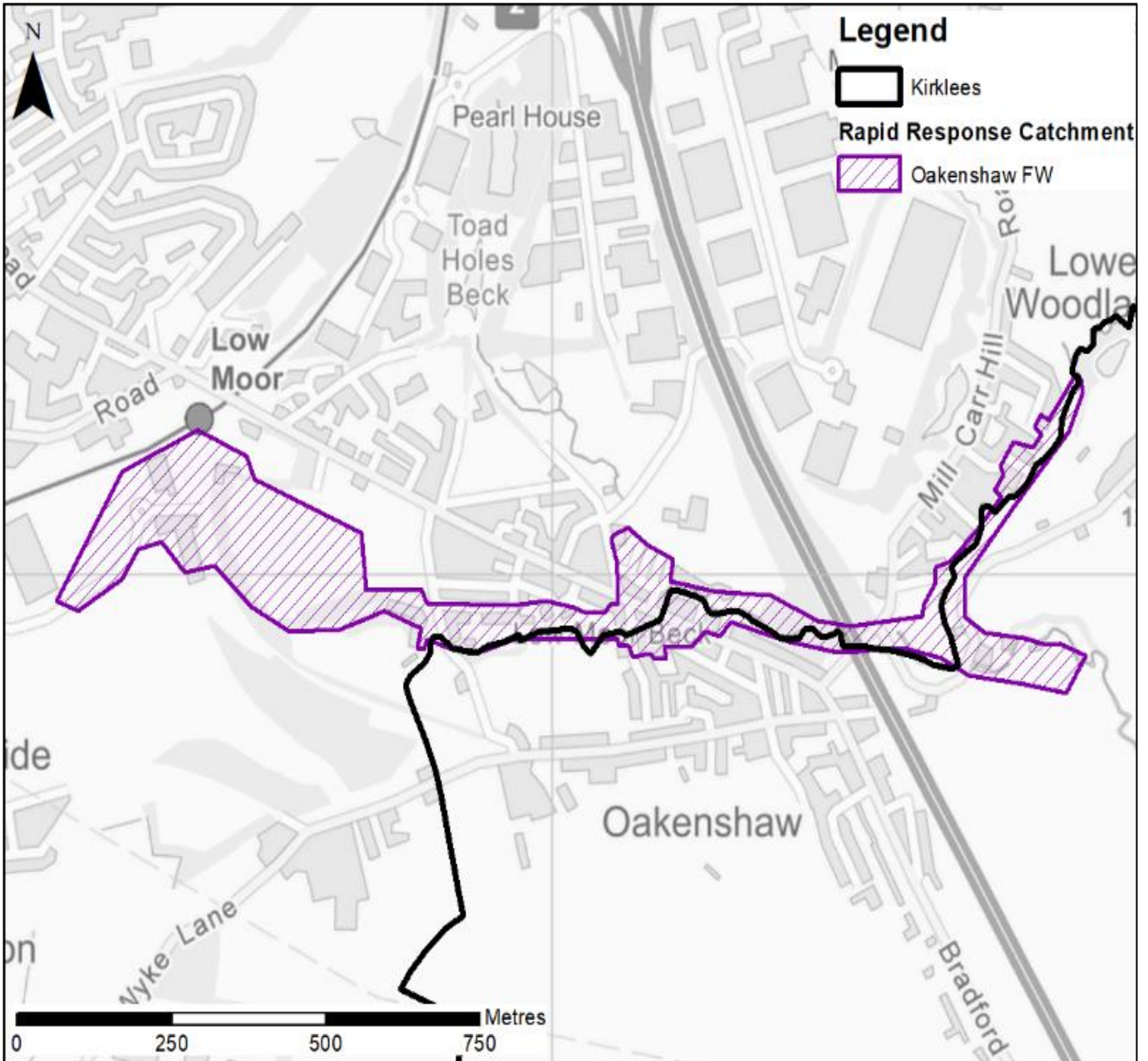
Appendix C – Environment Agency Rapid Response Catchments

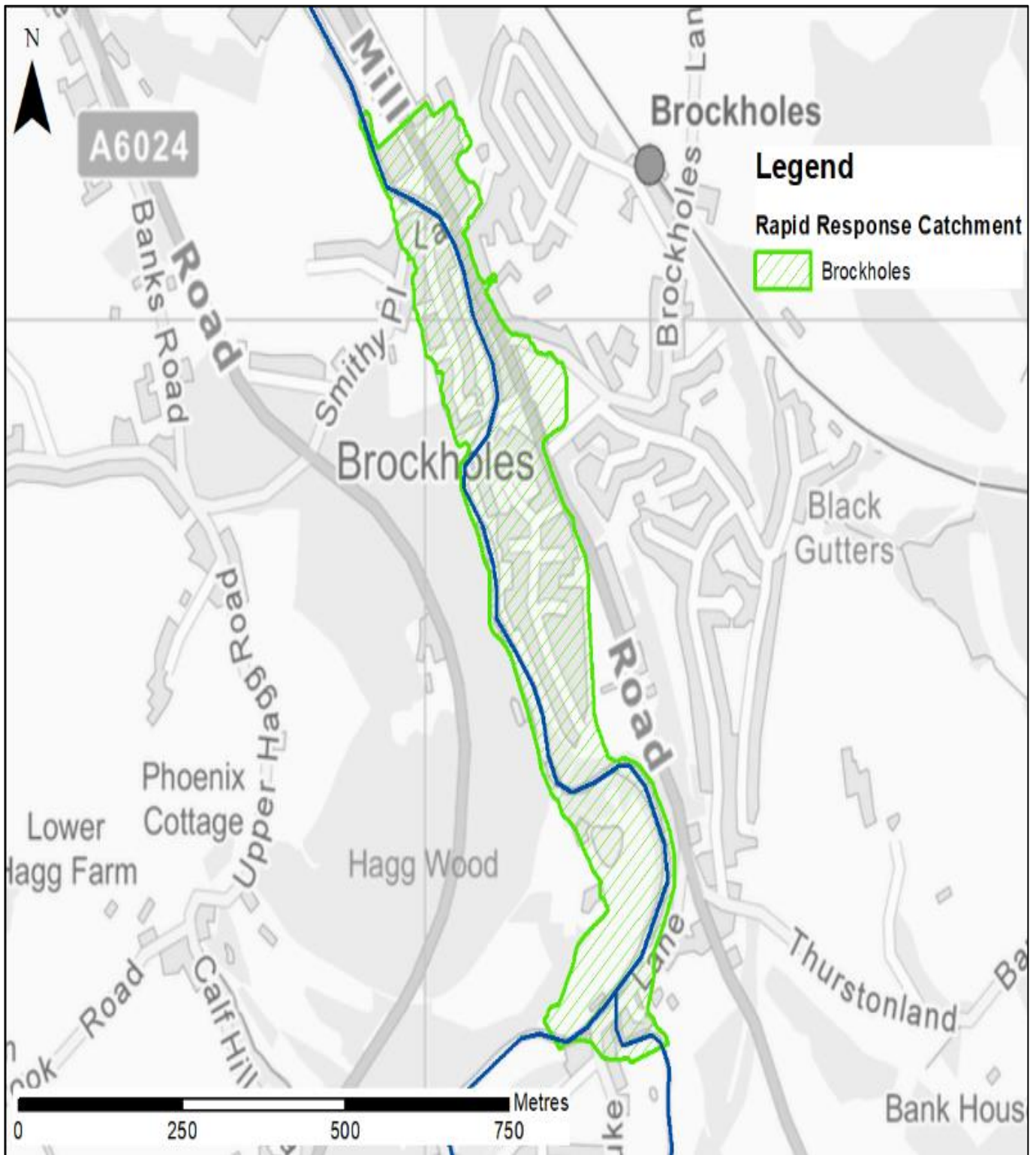
ENVIRONMENT AGENCY RAPID RESPONSE CATCHMENTS

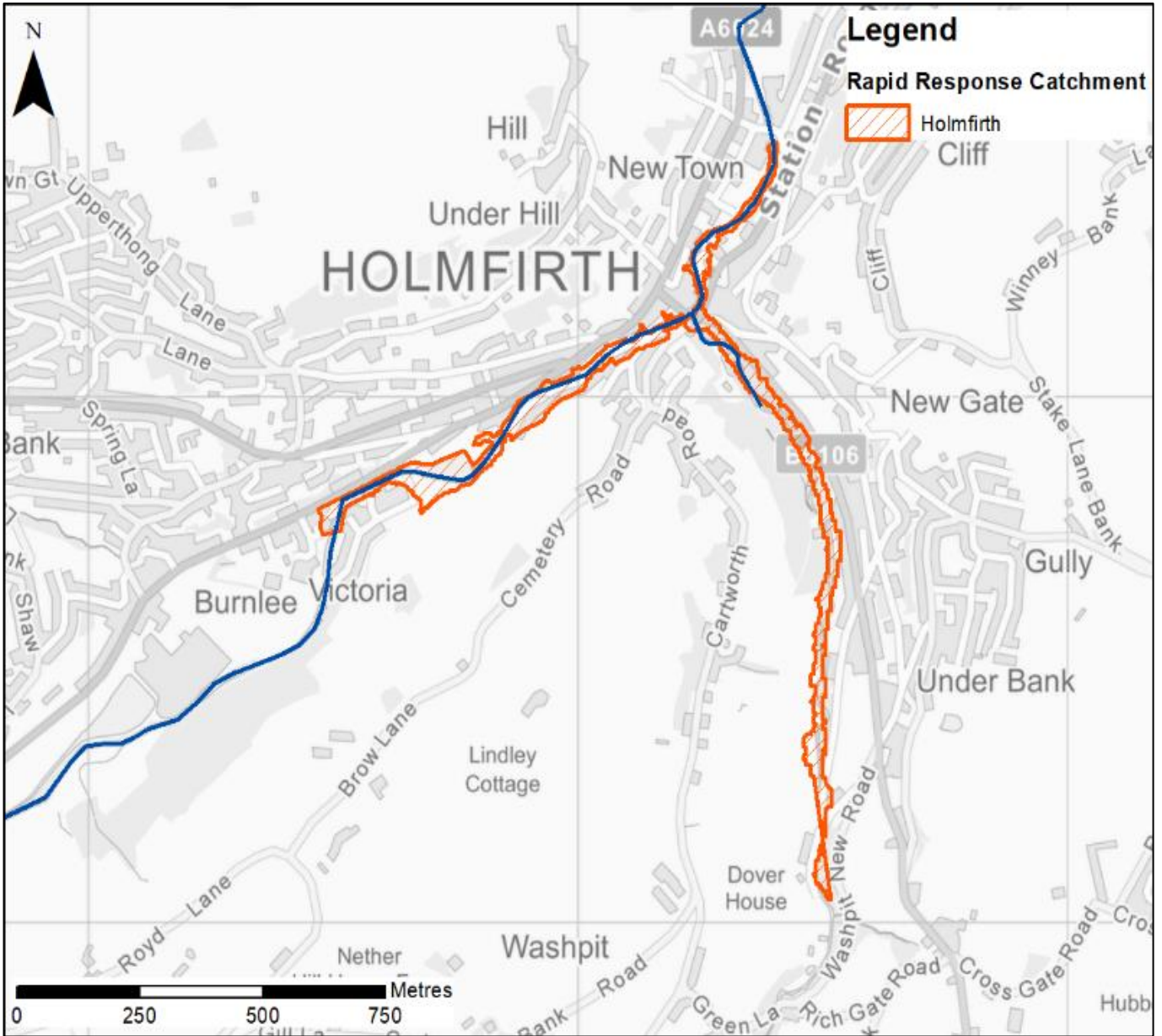
1. Appendix C – Environment Agency Rapid Response Catchments	3
1.1 Oakenshaw FW Rapid Response Catchment	3
1.2 Brockholes Rapid Response Catchment	4
1.3 Holmfirth Rapid Response Catchment	5
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1.6 Ravensthorpe Rapid Response Catchment	8

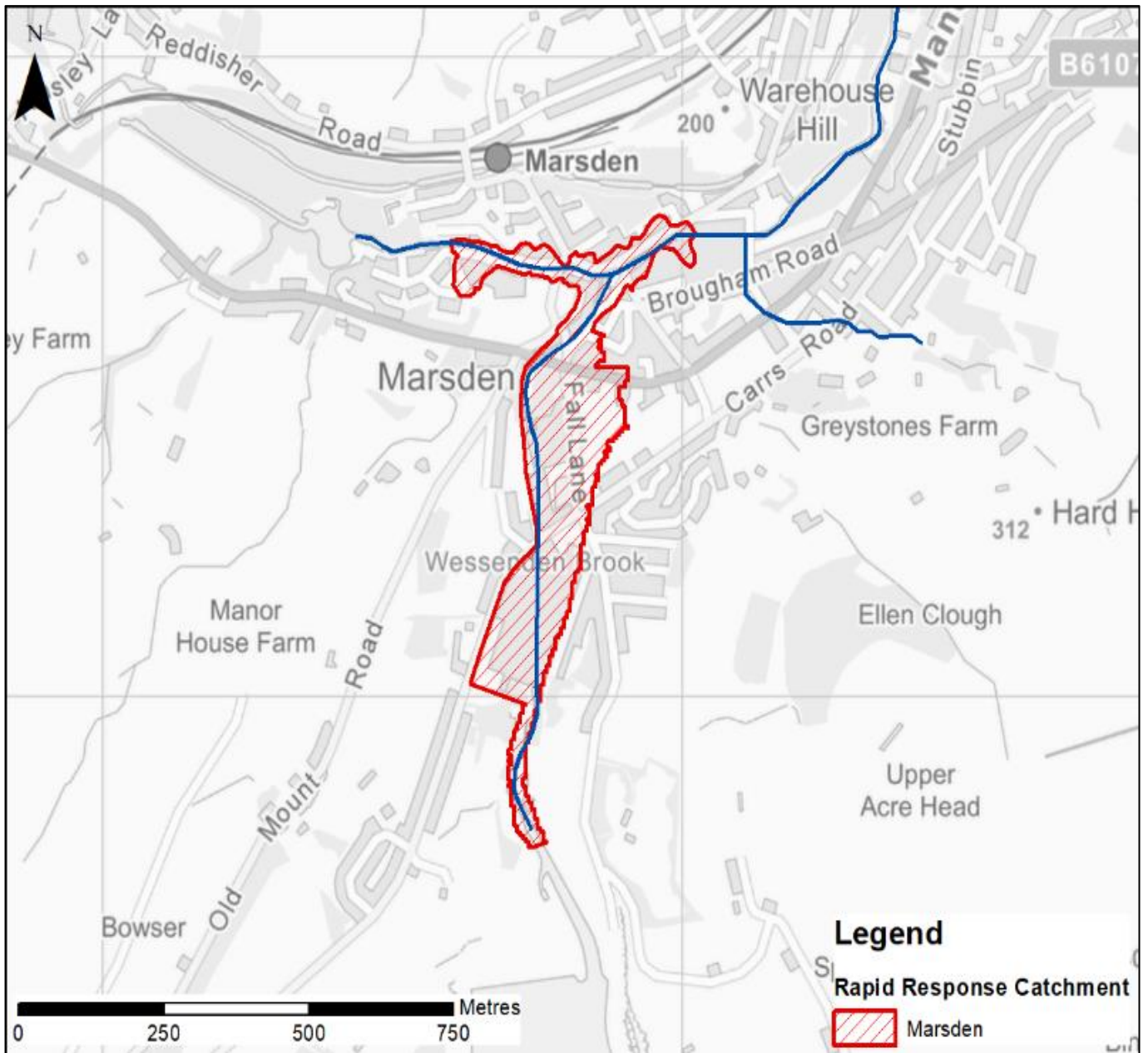
ENVIRONMENT AGENCY RAPID RESPONSE CATCHMENTS

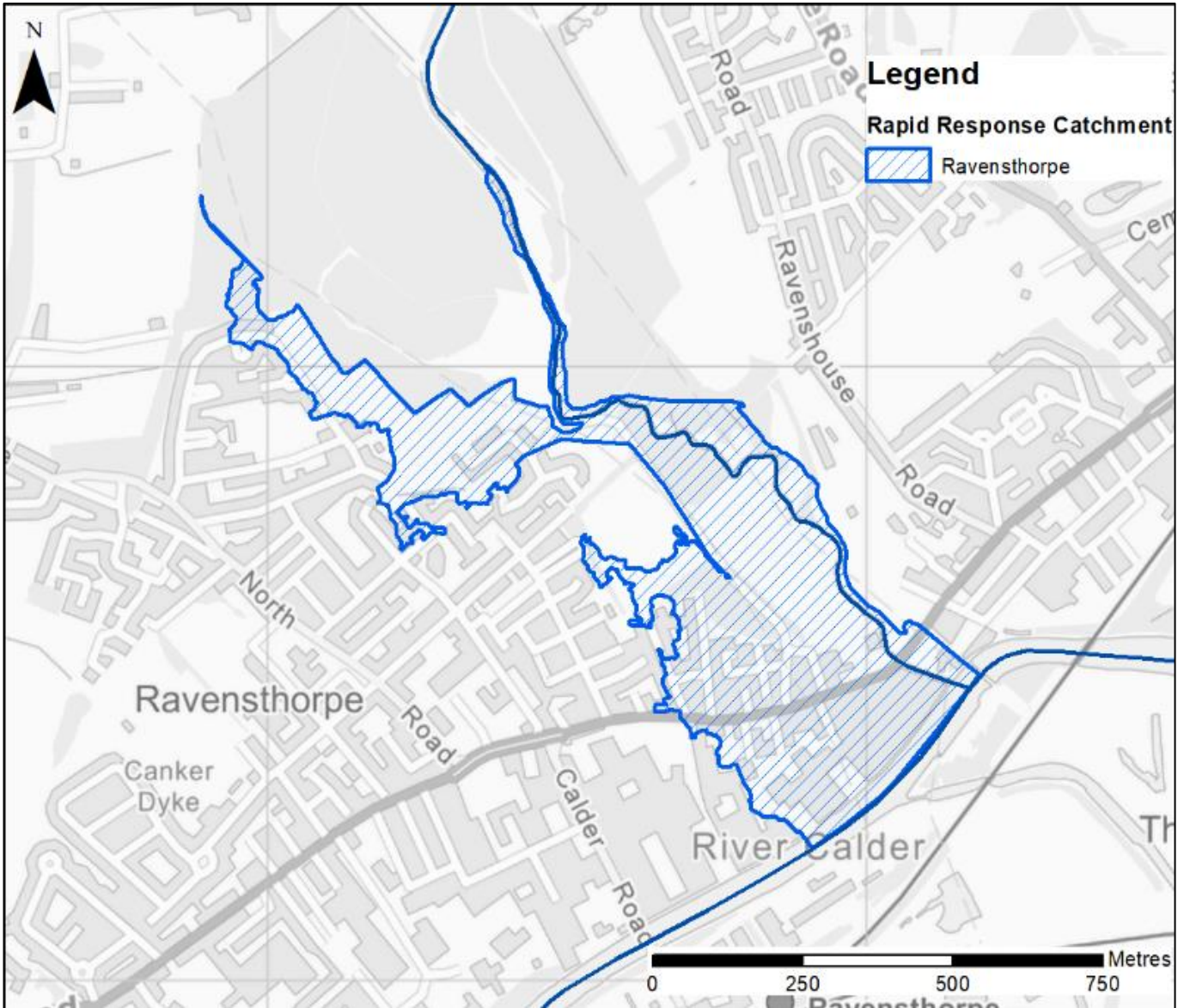
The Environment Agency has a Rapid Response Catchment (RRC) register which was prepared using a combination of flood event factors, such as time to maximum flood depths and velocities, and the amount of debris carried in the floodwater. Potential property numbers affected, and vulnerable sites such as care homes and campsites, were also considered.











Appendix D Flood risk management roles and responsibilities

APPENDIX D FLOOD RISK MANAGEMENT ROLES AND RESPONSIBILITIES

1. Flood risk Management roles and responsibilities	3
2. Schedule 3 Sustainable Drainage (FWMA 2020)	3
3. Kirklees Council LLFA	4
4. Environment Agency	5
5. Yorkshire Water	5
6. Highways Authority (Kirklees Council and National Highways)	6

FLOOD RISK MANAGEMENT ROLES AND RESPONSIBILITIES

In relation to Kirklees, the Risk Management Authorities include:

- The Lead Local Flood Authority – Kirklees Council,
- Environment Agency,
- Water and sewerage companies – Yorkshire Water,
- Highways Authority – Kirklees Council and National Highways

Under the provisions of the Flood and Water Management Act the following duties and powers are common to all risk management authorities:

- Duty to cooperate with other risk management authorities,
- Duty to act consistently with the national and local strategies,
- Powers to take on flood risk functions from another RMA,
- Duty to contribute towards the achievement of sustainable development,
- Duty to be subject to scrutiny from the LLFA's democratic process.

SCHEDULE 3 SUSTAINABLE DRAINAGE (FWMA 2020)

The enactment of Schedule 31 of the FWMA means there is a requirement for the inclusion of SuDS in all new development which must be approved by the Council as the 'approving body'. The Council would also be expected to adopt and maintain SuDS for new developments once the development is complete. It is expected that legal, statutory guidance will be produced which will provide a more consistent approach to SuDS design and approval. It is expected that this would replace the non-statutory guidance and the Council's local guidance.

¹ [Schedule 3 Flood and Water Management Act 2010](#)

Some of the main roles and responsibilities in relation to flood risk management activities



Some of the main roles and responsibilities in relation to flood risk management activities for each RMA are as follows:

KIRKLEES COUNCIL LLFA

- Provides strategic leadership of local flood risk management authorities,
- Develops, maintains, applies and monitors a strategy for local flood risk (this Local Strategy) (FWMA 2010),
- Prepares Preliminary Flood Risk Assessments and Flood Risk Management Plans concerning flood risk attributable to surface water runoff, ordinary watercourses and groundwater (Flood Risk Regulations 2009),
- Has powers to carry out works to manage flood risk from surface water runoff, ordinary watercourses and groundwater (Land Drainage Act 1991),
- Is a statutory consultee to determine the acceptability of proposed SuDS (as per the enacted Schedule 3 of the FWMA 2010). Approvals must be given before the developer can commence construction, and sometime before the occupation of dwellings. Working with the local planning authority, planning conditions or obligations should be in place to ensure arrangements are in place for ongoing maintenance of any SuDS over the lifetime of development,



- Acts as a statutory consultee for planning authorities and responds to drainage designs for major planning applications (Town and Country Planning (Development Management Procedure) (England) Order 2015),
- Has powers to request information from any person in connection with the authority's flood risk management functions,
- Has a duty to investigate and publish reports on significant flood incidents in Kirklees (where appropriate and necessary) to identify which authorities have relevant flood risk management functions, and what they have done or intend to do (FWMA 2010)

The Council will endeavour to investigate flood incidents which meet the following criteria:

- Where one or more residential or business property suffers internal flooding
- Where there is a risk to life as a result of the depth and / or velocity of floodwater
- Where critical infrastructure (e.g. emergency services buildings, utility company infrastructure, schools, day centres, hospitals and main transport routes) suffer flooding or obstruction, or were in imminent danger of flooding
- Where five or more properties were in imminent danger of flooding, or
- Where local democratic pressures from elected members, committees, or other elected bodies, might be considered as a factor in determining whether a formal investigation should be carried out

- Has a duty to maintain a register of structures or assets that have a significant effect on flood risk (FWMA 2010). The LLFA has discretion to set a local indication of "significance" to determine which assets it records on the register, which is available for inspection

The Council's register of drainage assets aims to include the following structures or features:

Pipes and culverts:

- Where the diameter is greater than 600mm or cross-sectional area is greater than 0.3m² or
- Where the pipe/culvert has a recorded history of flooding or
- Where the pipe/culvert is within 20m of a cluster of 5 or more recorded flood incidents (non-cellar) – excluding pipes of 225mm diameter or less

Debris screen:

- Where a debris screen is blocked

Others:

- Reservoirs
- Mill ponds
- EA assets

SuDS:

- All new SuDS adopted by the LLFA

- Powers to designate structures and features with flood risk significance other than on main rivers (Land Drainage Act 1991). The Council will use these powers in a proportionate manner, determining an appropriate measure of significance for the flood risk. Any proposal to designate a structure or feature will be fully evidenced and justified,
- Has a duty to ensure local flood risk management functions are consistent with the national strategy,
- Has a duty to contribute towards the achievement of sustainable development in the exercise of flood risk management functions and to have regard to any ministerial guidance on this topic.

ENVIRONMENT AGENCY

- Carries out works to manage flood risk from main rivers (Water Resources Act 1991),
- Regulates the operation of large, raised reservoirs (Reservoirs Act 1975),
- Sets the direction for managing flood risk through the National Flood and Coastal Erosion Risk Management Strategy for England (FWMA, 2010),
- Prepares Preliminary Flood Risk Assessments and Flood Risk Management Plans for flooding from main rivers, reservoirs and the sea (Flood Risk Regulations 2009),
- Operates flood warning systems for the public (Ministerial Direction to the National Rivers Authority, 1996),
- Regulates the activities that may affect the risk of flooding from main rivers (Environmental Permitting Regulations (England and Wales) Regulations 2016),
- Carries out surveys and mapping (Flood Risk Regulations 2009, Water Resources Act 1991),
- Reports to the minister on flood and coastal erosion risk and how the national and local strategies are being applied by all the authorities involved (FWMA, 2010),
- Acts as a statutory consultee for planning authorities providing advice on planning applications, local plans and environmental assessments regarding flood risk from main rivers and the sea (Town and Country Planning (Development Management Procedure) (England) Order 2015).

YORKSHIRE WATER

- Is responsible for public water supply and sewerage systems,
- Must manage the risk of flooding from its water supply networks and sewerage networks,
- Must produce Drainage and Wastewater Management Plans (DWMPs) to assess current and future capacity, pressures, and risks to the networks such as climate change and population growth. DWMPs must cover a minimum of 25 years,
- Must prepare and review water resource management plans and provide drought plans,
- Where appropriate, assists the LLFA in meeting its duties in line with the national strategy,
- Where appropriate, shares information and data with other RMAs, relevant to their flood risk management functions,



- Has a duty to effectually drain its area (includes sewage and surface water), in accordance with section 94 of the Water Industry Act 1991,
- Advises on the appropriate management of surface water and encouraging the use of SuDS,
- Creating a detailed understanding of flood risk from the public sewer system,
- A duty to ensure local flood risk management and drainage works are consistent with environmental regulations (including the Water Framework Directive).

. Highways Authority (Kirklees Council and National Highways)

- Are responsible for providing and managing highway drainage and some roadside ditches / gullies,
- Must ensure that new road projects do not increase flood risks,
- Are permitted to carry out drainage works on highways or adjoining land (Highways Act 1980),
- Has a duty to act in a manner which is consistent with the local and national strategies,
- Has a duty to share information with other RMAs relevant to their flood risk management functions.



APPENDIX E - High risk catchments

HIGH RISK CATCHMENTS

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APPROACH TO DEFINING HIGH RISK CATCHMENTS

As part of the development of Kirklees Local Flood Risk Management Strategy (LFRMS), a flood risk appraisal was undertaken in order to identify and prioritise the areas of Kirklees most at risk of surface water flooding and flooding from main rivers to help inform where actions should be focused. A catchment-based approach has been taken using the Water Framework Directive (WFD) watercourse catchments.

DATA

Data used within the analysis has been divided into two groups, primary and secondary, depending on the perceived level of significance within the catchment prioritisation process.

PRIMARY DATASETS

This data was used in the initial cluster analysis and formed the basis of the catchment prioritisation.

- Water Framework Directive (WFD) watercourse catchments (19 catchments in study area)
- National Receptor Dataset 2021 (NRD)
- Ordnance Survey (OS) MasterMap buildings
- Risk of Flooding from Surface Water (RoFSW) dataset
- RoFSW 1% AEP event + climate change

CLUSTER ANALYSIS

The Risk of Flooding from Surface Water (RoFSW) was used as the primary dataset to assess flood risk. It shows the flooding that takes place from the 'surface runoff' generated by rainwater (including snow and other precipitation) for the 1 in 30-year (3.3% AEP), 1 in 100-year (1% AEP) and 1 in 1000-year (0.1% AEP) rainfall events. This dataset has been chosen because, unlike the Environment Agency Flood Zones, it includes watercourses with catchments smaller than (3km²), and as surface water flooding is the responsibility of the Lead Local Flood Authority, as opposed to Main River fluvial flooding, the responsibility for which predominantly lies with the Environment Agency. Additionally, climate change uplifts have been applied to the 1% AEP event, based on the allowances set out in the main report.

These datasets were used to identify clusters of properties at risk of surface water flooding. The approach used to identify these clusters is set out below:

1. National Receptor Dataset 2021 (NRD) was used to identify all properties. The Multi-Coloured Manual (MCM) codes within the NRD were used to identify residential and non-residential properties. Non-residential properties were further classified into types of property (emergency services, education, utility services, transport, offices, commercial and retail). A sensibility check of the NRD data was done compared to OS mapping.
2. Building footprints were extracted from OS MasterMap data for each NRD point identified within step 1.
3. Building footprints were screened against the RoFSW datasets and all NRD points where the flood risk intersects the building footprint were extracted. This was undertaken for each of the three RoFSW return periods (3.3%, 1% and 0.1%) plus two climate change uplifts (1% AEP +30% and 1% AEP + 45%) individually, creating five sets of data.
4. The NRD point for each property at risk of flooding within each dataset were buffered by 50m (to create a 100m diameter circle around each point).

5. The NRD buffers within each dataset were merged together where they intersected to generate clusters of properties at risk. Clusters with fewer than three properties were then discounted to avoid skewing the prioritisation towards individual properties in rural catchments, where there will be less opportunity schemes to be undertaken due to lower cost-benefit ratios.
6. To generate an individual 'risk score' for each WFD catchment and return period, the total number of properties within all the clusters (containing three or more properties) in a catchment was divided by the total number of clusters in each catchment (the average number of properties per cluster within a catchment).
7. To give greater weighting to locations susceptible to more frequent flooding, the individual 'risk scores' for each Annual Exceedance Probability (AEP) was combined to produce an overall prioritisation. This was achieved by multiplying the individual "risk scores" for each AEP by their AEP and then adding them together. i.e. the 3.3% AEP averages were multiplied by 3.3, the 1% AEP averages (an average of the 1% AEP, 1% AEP + 30% CC and 1% AEP + 45% CC) multiplied by 1 and the 0.1% AEP averages multiplied by 0.1.
8. Finally, the primary prioritisation scores were normalised by dividing the score for each WFD catchment by the maximum score – giving a score between one and zero for each WFD catchment.

WEIGHTING

Once the initial prioritisation of catchments was generated, the secondary datasets were used to adjust the weightings of the catchments to consider the impact other sources of flooding and historic flood records may have on the prioritisation of catchments. This allows catchment priorities to be influenced by existing (verified) flood risk information and potential for partnership working as a result of flood risk from multiple sources.

A weighting was applied to normalised flood risk score for each of these datasets within each WFD catchment based on the following information:

- Historic Flooding: derived from information provided by Kirklees Council as part of this study and the number of properties in the Environment Agency Historic Flood outlines **[0.5]**
- Number of properties in Flood Zone 2 (normalised) **[0.2]**
- Number of properties in Flood Zone 3 (normalised) **[0.2]**
- Number of properties in the highest risk (Zone 3 and 4) of the JBA groundwater map (normalised) **[0.1]**

For each secondary dataset, the score was normalised by dividing each WFD score by the maximum score – giving a score between one and zero for each WFD catchment. A weighting (shown in bold square brackets) was applied to each secondary dataset and then was added to the primary prioritisation score.

Strategic Theme	Ref	LFRMS Strategic Measure	Geographical Area	Key External Partner(s)
PLACE	1	Engage early with spatial planners and growth strategies to ensure new development and plans make best use of land in making space for surface water, fluvial water, sustainable drainage systems and promote the use of adaptive pathways to adapt to climate hazards. Share our understanding of flooding in the area to avoid inappropriate development.	District wide	Developers, Consultants
PLACE	2	Work with the Local Planning Authority, Highway Authority, Environment Agency and water companies to ensure the planning process and development design account fully for land drainage and surface water managements issues. Ensure our practices secure sound management and maintenance regimes that are proportionate and appropriate to the flood risk in the area.	District wide	EA, YW
PLACE	3	As a Lead Local Flood Authority engage with others to advise on climate change allowances for sources of flooding from surface water, groundwater and ordinary watercourses. To share and inform others of current guidance, research and best practice on sustainability and water management to inform decision making.	District wide	Developers, Consultants
PLACE	4	Enhance our early engagement with developments and commit to targeted periodic inspections of new development to ensure compliance/enforcement with drainage planning conditions and Land Drainage Act legislation. Seek 106 contributions where appropriate and promote environmental net gain.	District wide	Developers, Consultants, Riparian Owners
PLACE	5	Improve our asset data on drainage assets within the district including highway gullies, culverts, carrier drains, debris screens and others to build our evidence base. Where considered significant make this publicly available.	District wide	Asset Owners
PROTECT	6	Identify and develop flood risk improvement schemes for Kirklees to reduce the risk of surface water flooding and flooding from ordinary watercourses to better protect properties and the highway network in high-risk areas. Be open to new financing models. Promote a range of resilience actions and climate change scenarios.	High risk catchments	YW, EA, Landowners
PROTECT	7	Improve the awareness, understanding and delivery of Property Flood Resilience measures to manage local flood risk within our communities. Encourage homeowners and business owners to undertake Property Flood Surveys and seek grant funding to support resilience measure installations to support a build back better approach.	District wide	EA, Suppliers
PROTECT	8	Work with our partners, learned institutions, communities to develop integrated solutions and maintenance programmes to deliver multiple benefits to reduce flood risk and look to improve economic, social and environmental benefits. Be innovative in our approach.	District wide	EA, YW, Universities
PROTECT	9	Engage with catchment partnerships and landowners to embrace land management techniques and natural flood management to help to manage surface water runoff. Seek out opportunities to use Working with Natural Processes in managing flood risk to promote multiple benefits such as environmental net gain.	District wide	Local Partnerships, River Trusts, Landowners
PROTECT	10	Support the severe weather incident management function the Council undertakes through technological advancements to ensure it is an intelligence led approach.	District wide	Suppliers
PROTECT	11	Maintain assets based on a risk-based approach to ensure high flood risk assets are prioritised and allowances made for climate change projections are considered. Try new technological approaches. Assess which Council assets require capacity improvements as a last resort.	District wide	Suppliers
RESPONSE	12	Provide intelligence to ensure policy frameworks and emergency plans are robust. Work with other services to establish the basis of the Council's response to severe rainfall events in supporting communities.	District wide	Local Resilience Forums, Met Office, EA
RESPONSE	13	Work with the local communities and landowners to increase their awareness and preparedness for flooding in Kirklees to improve flood resilience in homes, businesses and communities through education campaigns with our partners. Enhance our online content to deliver a one-stop shop.	District wide	Local flood groups
RESPONSE	14	Encourage flood community action groups to be set up in key areas of flood risk and through this work, in conjunction with partners, provide a higher standard of community led resilience by developing a network of community resilience leads.	Known flooded places	Parish Councils, Local Flood Groups
RESPONSE	15	Ensure flood risk management actions reach out and remain inclusive in our approach within our diverse communities and areas of deprivation.	District Wide	Communities
RESPONSE	16	Establish and maintain a Communication Plan in line with national and other Council services to provide coordinated and timely information to communities at flood risk.	District wide	Various
RECOVERY	17	Provide follow up recovery support and advice to residents, business owners and communities that have been affected by flooding on funding, wellbeing support and signpost to affordable flood insurance to help them recover quicker.	District wide	EA, Flood Re

RECOVERY	18	Investigate flood incidents of all sources and establish flood outlines with our partners to validate existing flood models to help inform future grant fundings and flood risk management projects.	District wide	EA, YW
RECOVERY	19	Work with Partners and health bodies to ensure mental health impacts from flooding are factored into long term recovery planning.	N/A	Local health services, charities
RECOVERY	20	Support Review Briefings and feedback learning from communities to inform our plans and policies to ensure a more efficient and effective response in the future.	N/A	Local Resilience Forums, Local Flood Groups