Appendix F – Cumulative Impact Assessment

This section provides a summary of the catchments with the highest flood risk and development pressures and then makes recommendations for local planning policy based on these for the Yorkshire Dales National Park.

1 Background

1.1 Introduction

The cumulative impact of development should be considered at both the Local Plan making and the planning application and development design stages. Appropriate mitigation measures should be undertaken to ensure flood risk is not exacerbated, and where possible the development should be used to reduce existing flood risk issues.

To understand the impact of future development on flood risk in the Yorkshire Dales National Park, catchments were identified where development may have the greatest potential effect on flood risk, and where further assessment would be required within a Level 2 Strategic Flood Risk Assessment (SFRA) or site-specific Flood Risk Assessment (FRA). The potential change in developed area within each catchment and communities sensitive to increased risk of surface water flooding, alongside evidence of historic flooding incidents were considered to identify catchments at the highest risk. Where catchments have been identified as sensitive to the cumulative impact of development, the assessment concludes with recommended strategic planning policy suggestions to manage the risk.

1.2 Strategic flood risk solutions

The Yorkshire Dales National Park Authority (YDNPA) have a vision set forth in their Local Plan for the future management of flood risk and drainage in the region. This concerns flood risk management, alongside wider environmental and water quality enhancements. Strategic solutions may include upstream flood storage, integrated major infrastructure/ Flood Risk Management (FRM) schemes, new defences, and watercourse improvements as part of regeneration and enhancing green infrastructure, with opportunities for natural flood management and retrofitting sustainable drainage systems. The North Yorkshire Local Flood Risk Strategy Action Plan, North-West Flood Risk Management Plan, Solway Tweed Flood Risk Management Plan, Humber Flood Risk Management Plan and Northumbria Flood Risk Management Plan set out specific actions for the authority region.

Section 2 sets out the strategic plans that exist for the authority region. The list below summarises the key outcomes these are seeking to achieve. This vision needs to be delivered by new development alongside retrofitting and enhancing green infrastructure and flood defence schemes in the existing developed area.

The strategic policy vision from the Catchment Flood Management Plans (CFMPs) and the River Basin Management Plans (RBMPs) focus on re-naturalising watercourses, safeguarding the floodplains and encouraging collaboration and creating new partnerships to reduce the risk of flooding and to enhance the natural environment. Within the Yorkshire Dales National Park, strategic solutions encourage development to:

- Prevent deterioration of the status of surface water and groundwater,
- Aim to achieve good status for all water bodies or, for heavily modified water bodies and artificial water bodies, good ecological status and good surface water chemical status,
- Reverse any significant and sustained upward trends in pollutant concentrations in groundwater,
- Cessation of discharges, emissions and losses of priority hazardous substances into surface waters,
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants,
- Reduce risk to people, economic damage and community disruption,
- Use sustainable flood storage and mitigation schemes to store water and manage surface water runoff in locations that provide overall flood risk reduction as well as environmental benefits,
- Restore peat bogs, meres and moss land to help reduce peak time runoff and overall peak water levels,
- Engage with a variety of stakeholders across the region to develop plans and seize opportunities for collaborative partnership working,
- Providing a greater role for communities in managing flood risk,
- Improving knowledge and understanding of flood risk and management responsibilities, and of watercourse networks and drainage infrastructure,
- Sustainable and appropriate development,
- Delivering flood risk management measures that have social, economic and environmental benefits,
- Identify opportunities to use areas of the floodplain to store water during high flows, to reduce long term dependence on engineered flood defences located both within the National Park and outside the National Park,
- Use SFRAs to inform future development and minimise flood risk from all sources,
- Implement upstream catchment management e.g. slow the flow and flood storage schemes could be implemented in upper catchments to reduce flooding downstream and across neighbouring authority boundaries, and
- Promote and consider Sustainable Drainage Systems (SuDS) at the earliest stage of site development.

In some locations, the Environment Agency (EA) have committed to assist Local Planning Authorities (LPAs) in identifying areas which may be most affected by increased flood risk due to development and/or climate change. However, this work is stated to likely fall short of extensive hydraulic modelling and detailed mapping of theoretical flood extents. The headline message is therefore:

Flood risk is increasing, perhaps substantially, so Planners, Emergency Planners, Asset Managers and others will need to mitigate this through a mix of collaborative working, planning policies, use of 'worst case' scenarios, development of contingency plans and some detailed analysis.

1.2.1 Opportunities and projects in/ affecting the Yorkshire Dales National Park

The Yorkshire Dales National Park is already included within the Northern Upland Chain Local Nature Partnership Area (LNPA). The following are other stakeholders and project delivery schemes affecting the National Park.

Dales to Vale River Network:

The **Dales to Vale River Network (DVRN)** (https://www.dvrn.org.uk/) is the associated Catchment Based Approach (CaBA) catchment partnership for the 'Swale, Ure, Nidd and Ouse', and 'Wharfe and Lower Ouse' catchments. It is a collaboration between relevant partners to deliver projects that will improve the health of the area's rivers and wetland environments.

Their key principles are:

- Using an ecosystem based, whole catchment approach.
- Engaging at catchment level, with active involvement of all interested parties, including the local community.
- Drawing on the high-quality data, knowledge, experience, and aspirations of all interested parties so as to drive a much fuller range of measures (hitherto, narrow reliance on EA monitoring data had produced insufficient evidence to justify action).
- Developing high quality citizen science to improve the knowledge base and drive more actions.
- Linking up with other partnerships and groupings (e.g. Local Nature Partnerships, Local Enterprise Partnerships, Nature Recovery Networks, Championing the Farmed Environment) and organisations (National Parks, Areas of Outstanding Natural Beauty (AONBs), water companies, local authorities in relation to both planning and flood risk management).
- Identifying and pursuing possible benefits (e.g. for wildlife and habitats, natural flood management, access and recreation, etc.) that will flow from any intended intervention, to maximise economic benefits, possible funding sources and the number of interventions realisable.

- Prioritising projects that provide the biggest range of benefits and therefore maximise possible funding sources.
- Generally, delivering outcomes over and above what the EA can deliver alone.
- Setting out all relevant measures and proposed measures in a collectively owned catchment.

The partnership has created **interactive map** (https://www.dvrn.org.uk/our-catchments/) that details of a range of project data that is being collated and opportunities for improvements across the catchment, including water supply, flood defences and fisheries.

Ribble Life Together/Ribble Rivers Trust:

The **Ribble Life Catchment Partnership** (https://ribblelifetogether.org/ribble-life-together-partnership/) is hosted by the **Ribble Rivers Trust** (https://ribbletrust.org.uk/). It is a collaboration between relevant partners to deliver projects that will improve the health of the Ribble catchment.

Their key objectives are:

- Improve the rivers, estuary and other water bodies in the Ribble Catchment – supporting a vibrant and resilient economy and creating a great place to live.
- Deliver greater impact through collaborative projects that result in improvements to our water environment with multiple benefits.
- To share information and communicate effectively across the Ribble catchment.
- Work collaboratively to combat the causes of climate change and ensure that the natural capital (benefits and assets) of the catchment is valued and protected.
- Enhance the amenity value of the water environment within the Ribble catchment.

Living Lune Partnership/Lune Rivers Trust

The **Living Lune Partnership** (https://www.arcgis.com/apps/MapSeries/index.html?appid=280d106e9c7747f18db4135422c7589e) is co-hosted by the **Lune Rivers Trust** (https://luneriverstrust.org.uk/about-us/). It is a collaboration between relevant partners to deliver projects that will improve the health of the Lune catchment. Although focussing on the River Lune, the catchment also includes the River Keer, River Conder, River Cocker, Pilling Water and Ridgy Pool.

Saving Eden Partnership:

The **Saving Eden Coalition** (https://www.edenriverstrust.org.uk/projects/habitat-improvement/saving-eden/#:~:text=Hosted%20by%20Eden%20

Rivers%20Trust,and%20its%20rivers%20and%20lakes.) is the organisational partnership for the Eden catchment co-hosted by the Eden Rivers Trust, alongside the Cumbria Wildlife Trust and the EA. It is a collaboration between relevant partners to deliver projects that will improve water quality and availability, reduce agricultural pollution, community engagement, biodiversity and land use.

Their key objectives are:

- A water-friendly planning system
- A resilient network of habitats
- A dynamic and more natural river system
- A river for people: accessible, fun and culturally vibrant
- A water-friendly farming catchment
- A knowledgeable and water-friendly end-user community
- Joined up thinking at a catchment (and end-user) scale

Yorkshire Wildlife Trust Nature Reserves

Yorkshire Wildlife Trust manage 11 Nature Reserves within the Yorkshire Dales National Park. These are:

- Yellands Meadow
- Semer Water
- Grass Wood
- Globeflower Wood
- Southerscales
- South House Pavement
- Brae Pasture
- Ashes Pasture
- Salt Lake Quarry
- Seata Quarry
- Newbiggin Pasture

These sites are home to various important and protected habitats and species, including:

- Northern Hay Meadow
- Lowland meadow and pasture, Wetlands
- Grassland
- Woodland
- Limestone Pavement
- Upland acid grassland and rush pasture
- Blanket Bog
- Hay Meadow
- Calcareous Grassland
- Wet Woodland
- Waders
- Curlew
- Oystercatcher
- Snipe
- Globeflower
- Yellow Rock-rose
- Alpine bistort
- Blue moor grass
- Bird’s-eye primrose

- Frog orchid
- Cowslips

Natural Flood Management techniques could be encouraged at some of the reserves to aid flood storage and improve natural habitats.

1.3 Assessment of Cross-Boundary Issues

The Yorkshire Dales National Park partially contains areas within the following Local Authorities (see Figure 1.2 in the main report for the Local Authority boundaries):

- Craven District
- Eden District
- Lancaster District (B)
- Richmondshire District
- South Lakeland District

The topographic characteristics of the Yorkshire Dales National Park are dictated by limestone, sandstone and mudstone highland hills and wide U-shaped, post-glacial valleys. The high ground creates the watershed for a number of catchments. The River Eden flows north into Eden District, and the River Swale and River Ure flow east into Richmondshire District. The River Wharfe flows south and is located entirely within the Craven District, where the Rivers Aire and Ribble begin and flow southeast and southwest out of the region respectively. The River Lune begins in the west of the Eden District, turning south to flank the study area through South Lakeland District into Lancaster District where it drains into the Irish Sea. See Section 1.5 of the main report for further details on the study area.

As such, future development, both within and outside the National Park can have the potential to affect flood risk to existing development and surrounding areas, depending on the effectiveness of SuDS and drainage implementation.

Development control should ensure that the impact on receiving watercourses from development in the National Park has been sufficiently considered during the planning stage and appropriate development management decisions put in place to ensure there is no adverse impact on flood risk or water quality. All developments are required to comply with the NPPF and demonstrate they will not increase flood risk elsewhere. Therefore, providing developments near watercourses in neighbouring authorities comply with the latest guidance and legislation relating to flood risk and sustainable drainage, they should result in no increase in flood risk within the National Park. The neighbouring authorities were contacted for information on their site allocations, to determine where development in neighbouring authorities may have an impact on.

The Yorkshire Dales' new Local Plan (2023 – 2040) is currently being prepared alongside the evidence base and the flood risk and sustainable drainage policies in the adopted plan (2015 - 2030) have therefore not yet been updated to ensure compliance with the NPPF.

The following Local Plans have been adopted by neighbouring local authorities and include policies relevant to flood risk and drainage:

- **Craven District's Local Plan** (https://www.cravendc.gov.uk/media/8733/z-local-plans-ldf-314-local-plan-adoption-2019-lp-adoption-docs-final-adoption-local-plan-pdfs-craven-local-plan-appendices-and-policies-map.pdf) 2012 - 2032
- **Eden District's Local Plan** (https://www.eden.gov.uk/media/5032/edenlocalplan2014-2032finalwithoutforeword.pdf) 2014 - 2032
- **Lancaster District's Local Plan** (https://www.yorkshiredales.org.uk/wp-content/uploads/sites/13/2019/06/Lancaster-City-Development-Management-DPD-2014.pdf) 2011 – 2031
- **Richmondshire District's Local Plan** (https://www.richmondshire.gov.uk/planning-and-climate-change/current-planning-policy/local-plan-2012-2028/) 2012 – 2028
- **South Lakeland District's Local Plan** (https://www.southlakeland.gov.uk/planning-and-building/south-lakeland-local-plan/local-plan-review/local-plan-review-overview/) (currently under review, due to end 2040)

For the CIA the Yorkshire Dales National Park was split into smaller catchment areas (see Figure F-1 and Table F-1).

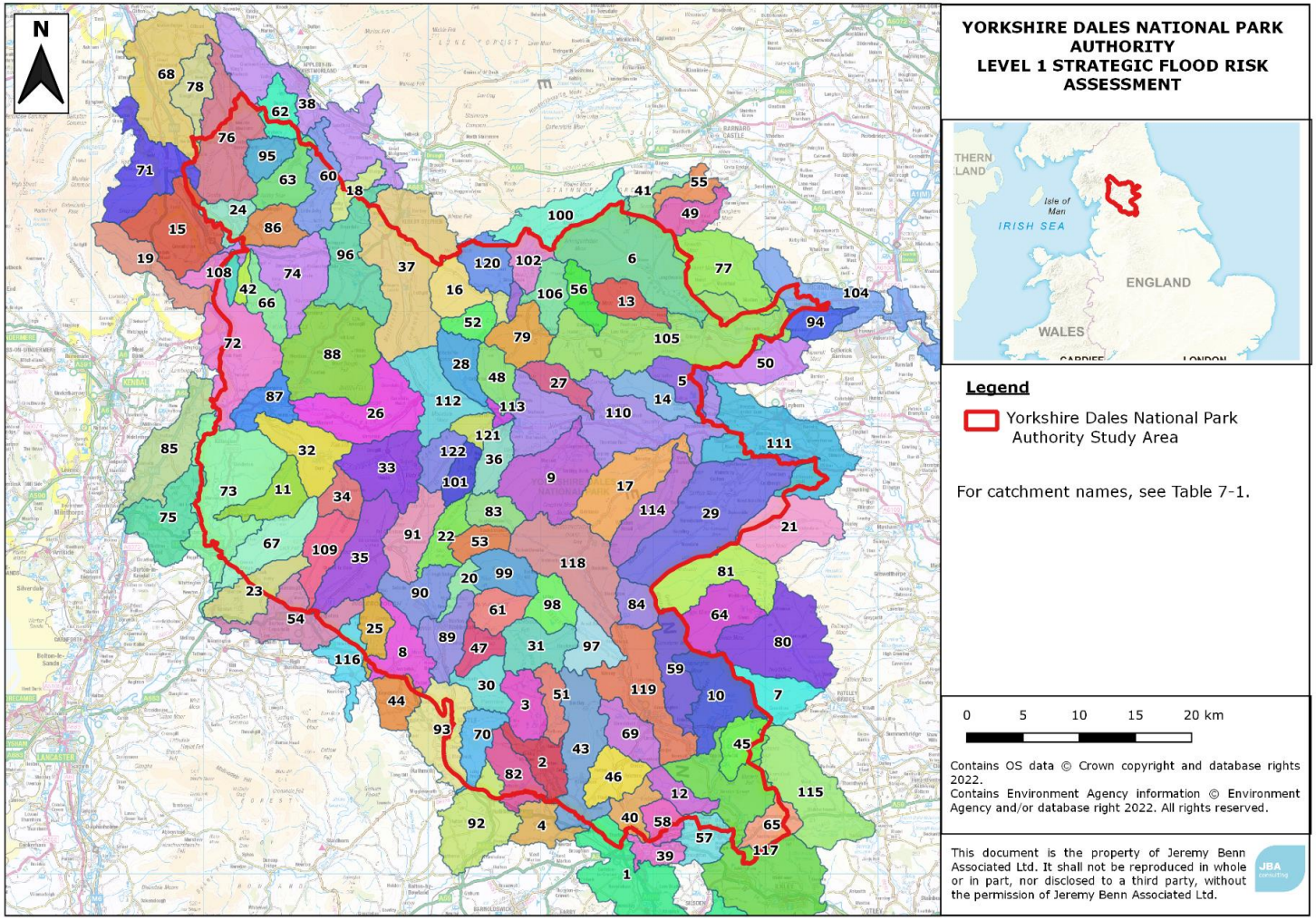


Figure F-1: Catchments within the Yorkshire Dales National Park. (For catchment names, see Table F-1)

Table F-1: Catchment Names associated to Figure F-1.

Map No.	Waterbody ID	Waterbody Name
1	GB104027063033	Aire (Eshton Beck to R Worth)
2	GB104027063100	Aire from Malham Beck to Otterburn Beck
3	GB104027063110	Aire from Malham Tarn to Malham Beck
4	GB104027063050	Aire from Otterburn Beck to Eshton Beck
5	GB104027069490	Apedale Beck Catch (trib of River Ure)
6	GB104027069170	Arkle Beck from Source to River Swale
7	GB104027063890	Ashfoldside Beck to River Nidd
8	GB112072066100	Austwick beck
9	GB104027069400	Bain/Raydale Beck Catch (trib of Ure)
10	GB104027064120	Barben Beck/River Dibb Catchment (trib of Wharfe)
11	GB112072071700	Barbon Beck (Barkin Beck)
12	GB104027064060	Barden Beck Catchment (trib of Wharfe)
13	GB104027069080	Barney Bk/Hard Level Gill from Source to R Swale
14	GB104027069470	Beldon Beck catch (trib of Apedale Beck)
15	GB112072071810	Birk Beck
16	GB104027069110	Birkdale Beck from Source to River Swale
17	GB104027069360	Bishopdale Bk from Source to R Ure
18	GB102076070790	Blind Beck
19	GB112072071770	Borrow Beck
20	GB112071071600	Brantsghyll Beck
21	GB104027069300	Burn from Source to Leighton Beck
22	GB112071071580	Cam Beck (Ribble)
23	GB112072071620	Cant Beck
24	GB112072071800	Chapel Beck
25	GB112072071840	Clapham Beck
26	GB112072071820	Clough
27	GB104027069480	Coghill Beck Catch (trib of Ure)
28	GB104027069520	Cotterdale Beck from Source to River Ure
29	GB104027069330	Coverdale Catch (Trib of Ure)
30	GB112071065690	Cowside and Stainforth Beck
31	GB104027064150	Cowside Beck from Source to River Skirfare
32	GB112072071680	Dee - conf Deepdale Bk to conf Rawthey
33	GB112072071670	Dee - headwaters to conf Deepdale Bk
34	GB112072071660	Deepdale Beck
35	GB112072071650	Doe
36	GB104027069390	Duerley Beck from Source to River Ure
37	GB102076070590	Eden - headwaters to Scandal Beck

Map No.	Waterbody ID	Waterbody Name
38	GB102076070880	Eden - Scandal Beck to Lyvennet
39	GB104027063020	Eller Beck from Haw Beck to River Aire
40	GB104027063070	Eller Beck from Source to Haw Beck
41	GB103025072070	Eller Beck from Source to River Greta
42	GB112072071740	Ellergill Beck (Lune)
43	GB104027063120	Eshton Beck - source to River Aire
44	GB112072066090	Fen Beck
45	GB104027064080	Fir Beck/Blands Beck Catchment (trib of Wharfe)
46	GB104027063080	Flasby Beck from Source to Eshton Beck
47	GB112071065630	Fornah Gill
48	GB104027069510	Fossdale Gill from Source to River Ure
49	GB103025072560	Gill Beck from Source to Greta
50	GB104027068980	Gill Beck/Black Beck from Source to River Swale
51	GB104027063130	Gordale Beck from Source to Malham Beck
52	GB104027069040	Great Sleddale Beck from Source to River Swale
53	GB104027069280	Green Field Beck from Source to River Wharfe
54	GB112072071610	Greta
55	GB103025072110	Greta from Eller Beck to Gill Beck
56	GB104027069090	Gunnerside Gill from Source to River Swale
57	GB104027064030	Hambleton Beck/Ings Bk Catch (trib of Wharfe)
58	GB104027063060	Haw Beck from Source to Eller beck
59	GB104027064190	Hebden Beck Catchment (trib of Wharfe)
60	GB102076070710	Helm Beck
61	GB104027069240	Hesleden Bk from Source to River Skirfare
62	GB102076070820	Hoff Beck (lower)
63	GB102076070630	Hoff Beck (upper)
64	GB104027068300	Howstean Beck from Source to River Nidd
65	GB104027064050	Kex Beck Catchment (trib of Wharfe)
66	GB112072071730	Langdale Beck
67	GB112072071640	Leck Beck (Ease Gill)
68	GB102076070900	Leith
69	GB104027064090	Linton Beck Catchment (Trib of Wharfe)
70	GB112071065600	Long Preston Beck
71	GB102076070690	Lowther (Upper)
72	GB112072071720	Lune - conf Birk Beck to conf Rawthey
73	GB112072071690	Lune - conf Rawthey to conf Greta
74	GB112072071760	Lune - headwaters to conf Birk Beck
75	GB112073071080	Lupton (Farleton) Beck

Map No.	Waterbody ID	Waterbody Name
76	GB102076070840	Lyvennet
77	GB104027069140	Marske Beck from Source to River Swale
78	GB102076070830	Morland Beck
79	GB104027069030	Muker Beck Catchment from Source to River Swale
80	GB104027068294	Nidd from Howstean Beck to Ashfoldside Beck
81	GB104027068380	Nidd from Source to Howstean Beck
82	GB104027063090	Otterburn Beck from Source to River Aire
83	GB104027069320	Oughtershaw Beck from Source to River Wharfe
84	GB104027069220	Park Gill Beck from Source to River Wharfe
85	GB112073071090	Peasey Beck
86	GB112072071790	Rais Beck
87	GB112072071710	Rawthey - Lower
88	GB112072071830	Rawthey - Upper
89	GB112071065640	Ribble - Brants Ghyll to conf Stainforth Beck
90	GB112071071570	Ribble - conf Cam Beck to Brants Ghyll
91	GB112071071590	Ribble - headwaters to conf Cam Beck
92	GB112071065613	Ribble (Long Preston to Stock Beck)
93	GB112071065614	Ribble (Stainforth to Long Preston Beck)
94	GB104027069020	Sand Beck from Source to River Swale
95	GB102076070640	Scale Beck
96	GB102076070600	Scandal Beck
97	GB104027064180	Skirfare from Cowside Beck to River Wharfe
98	GB104027069230	Skirfare from Heselden Beck to Cowside Beck
99	GB104027069250	Skirfare from Source to Heselden Beck
100	GB103025072090	Sleightholme Beck from Source to Greta
101	GB104027069350	Snaizeholme Beck from Source to Widdale Beck
102	GB104027069150	Stonesdale Bk from Source to River Swale
103	GB104027069050	Swale Birkdale/Gt Sleddale Bks to Whitsundale Bk
104	GB104027069122	Swale from Clapgate Beck to Bedale Beck
105	GB104027069121	Swale from Muker Beck to Clapgate Beck
106	GB104027069100	Swale from Stonesdale Bk to Muker Bk
107	GB104027069070	Swale from Whitsundale Bk to Stonesdale Bk
108	GB112072071780	Tebay Gill
109	GB112072071630	Twiss
110	GB104027069463	Ure from Duerley Beck to Mill Beck
111	GB104027069464	Ure from Mill Beck to Thornton Steward Beck
112	GB104027069500	Ure from Source to Widdale Beck
113	GB104027069430	Ure from Widdale Beck to Duerley Beck

Map No.	Waterbody ID	Waterbody Name
114	GB104027069340	Walden Beck from Source to Bishopdale Beck
115	GB104027064070	Washburn Source to Spinksburn Bk (Swinsty Res)
116	GB112072066060	Wenning - Upper
117	GB104027064257	Wharfe from Barben Beck/River Dibb to Hundwith Beck
118	GB104027069290	Wharfe from Oughtershaw Beck to Park Gill Beck
119	GB104027064253	Wharfe from Park Gill Bk to Barben Beck/River Dibb
120	GB104027069130	Whitsundale Beck from Source to River Swale
121	GB104027069410	Widdale Beck from Source to River Ure
122	GB104027069380	Widdale Beck from Source to Snaizeholme Beck

1.4 Cumulative Impact Assessment Methodology

This broadscale assessment determines where the potential cumulative impact of developments may have the greatest effect on flood risk across the study area. Catchments at the highest risk are taken forward to a catchment-level analysis. Potential change in developed areas within each catchment from neighbouring authorities was also considered. In this instance, historic records of flooding events were not available, however some baseline records were derived from recent Section 19 reports and a supplied asset register. The recorded incidents from these provide a general overview but were included in the assessment. Analysis of this data facilitated the identification of catchments at the greatest risk of cumulative impacts of an increase in impermeable area within the catchment.

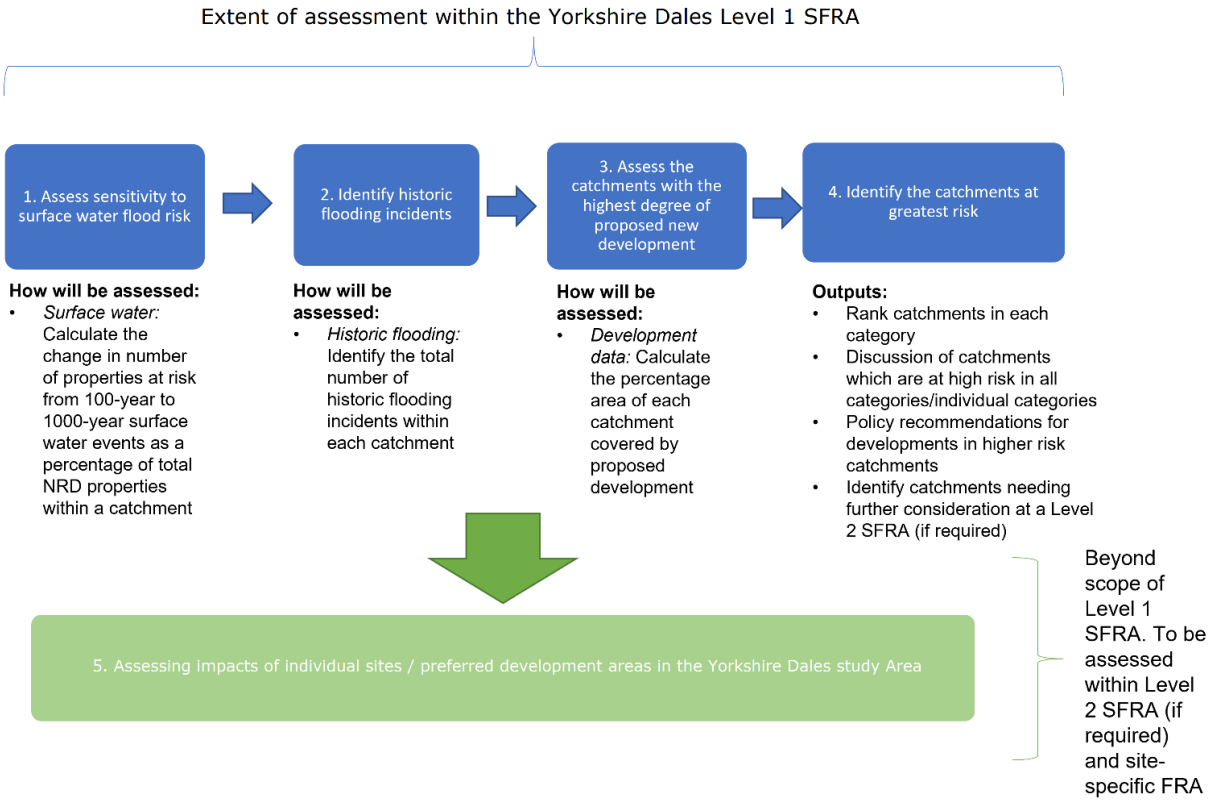


Figure F-2: Overview of the method used within the Cumulative Impact Assessment

Figure F-2 shows the methodology used and Table F-2 summarises the datasets used within the Yorkshire Dales National Park cumulative development scenario.

Future development sites within the study area were provided by the YDNPA and neighbouring authorities. Catchments within the study area were ranked on five metrics: sensitivity to increased fluvial flood risk, prevalence of recorded historic flood incidents (limited by the data available), sensitivity to increased risk of surface water flooding, prevalence of

recorded flooding incidences and area of new development proposed within the catchment.

The final results of this assessment gave a rating of low, medium, or high risk for each metric, for each catchment within the study area, the boundaries of which were derived from WFD. The rating of each catchment in each of these assessments was combined to give an overall ranking.

1.4.1 Sensitivity to increases in flood flows

This is the measure of the increase in the number of properties at risk of surface water flooding in a 1 in 100-year event to a 1 in 1,000-year event. It is an indicator of where local topography makes an area more sensitive to increases in flood risk that may be due to any number of reasons, including climate change, new development etc. It is not an absolute figure or prediction of the impact that new development will have on flood risk.

The National Receptor Database (NRD) dataset 2014 was used to identify all properties within the National Park study area.

This data was intersected with the 1,000-year and 100-year surface water flood extents separately to determine the number of properties in each catchment, in each surface water flood extent. The difference between the two values was then taken as a percentage of the total number of properties within the catchment to allow comparison between catchments of different sizes.

1.4.2 Growth in the area

Development within the Yorkshire Dales National Park has the potential to affect flood risk in neighbouring authorities, especially if there are existing flood risk issues. The River Ure drains out of the National Park into Richmondshire District.

Areas for future proposed development were received from the YDNPA and neighbouring authorities and were assessed as part of this CIA. The area of new development within each catchment was expressed as a percentage of the total catchment area to determine the potential for increase in flood risk as a result of new development.

1.4.3 Historic flood risk

Recorded flooding events data for fluvial or surface water flooding within some, but not all Local Authorities was made available for this assessment. Historic flood risk was also determined from limited recorded data from one local authority, limited Section 19 reports and asset register data. Historic flooding incidents data for sewer flooding were provided for this assessment. Details of historic flood events can be found in Section 5.1 of the main report. Each point represents a location where it is known there has been at least one flood event (however, the nature and scale of these flood events varies significantly).

A count of each historical flood incident was conducted for each catchment to determine the historic flood risk of the catchments.

A summary of the datasets used to calculate the historic flood risk and the sensitivity to increases in flood flows for each catchment is shown in Table F-2.

Table F-2 Summary of datasets used within the Broadscale Cumulative Impact Assessment

Dataset	Coverage	Source of Data	Use of Data
Catchment Boundaries	Yorkshire Dales National Park Study Area	Water Framework Directive Catchments	Assessment of susceptibility to cumulative impacts of development by catchment.
National Receptor Dataset (2014)	Yorkshire Dales National Park Study Area	Environment Agency	Assessing the number of properties at risk of surface water flooding within each catchment.
Risk of Flooding from Surface Water	Yorkshire Dales National Park Study Area	Environment Agency	Assessing the number of properties at risk of surface water flooding within each catchment.
Fluvial Flood Zones 2 and 3	Yorkshire Dales National Park Study Area	Environment Agency	Assessing the number of properties at risk of fluvial flooding within each catchment
Future development areas (recently built out sites/sites under construction/sites with planning permission/previously allocated sites/currently allocated sites)	Yorkshire Dales National Park Study Area & neighbouring authorities	Yorkshire Dales National Park Authority; Craven District Council, Eden District Council; Lancaster City Council; Richmondshire County Council; South Lakeland District Council.	Assessing the impact of proposed future development on risk of flooding.
Historic Flooding Incidents	Yorkshire Dales National Park Study Area	JBA: Various Section 19 reports, Asset register; United Utilities; Lancashire County Council, Cumbria County Council	Assessing incidences of historic flooding within the study area.

1.4.4 Ranking the results

The results for each assessment were ranked into High, Medium and Low risk as shown in Table F-3. The ranking results were combined from all four assessments to give an overall High, Medium and Low ranking for all catchments within the district. Each ranking was then totalled to give a final combined ranking, this was done twice, once without the inclusion of the YDNPA's proposed development site data (to gain a current baseline), and once including the site data, to provide the development impact ranking. Ranking delineations were given at natural breaks in the results.

Table F-3: Ranking assessment criteria

Flood risk ranking	% of properties at increased risk of Fluvial flooding	% of properties at increased risk of SW flooding	Total number of data points in the YDNPA Historic Flooding Incidents Register	% Area of Catchment Covered by new development
Low risk	<4%	<5%	<4	<0.1%
Medium risk	4 to 7 %	<5% to 9%	4-6	0.1 to 1%
High risk	>7%	>9%	>6	>1

1.4.5 Assumptions

The assumptions made when conducting the cumulative impact assessment are shown in Table F-4.

Policy recommendations with regards to managing the cumulative impact of development have been made in Section 2.2 below. This will help to ensure there is no incremental increase in flood risk both within and downstream of the National Park.

Table F-4: Assumptions of the cumulative impact assessment

Assessment aspect	Assumption made	Details of limitation in method	Justification of method used
Surface water flood risk; Flood Zone 2 and 3	Total number of properties flooded	Assumption that all properties have been included in the 2014 NRD dataset. It may not include all new build properties.	This was the most up to date and accurate data available.
Historic Flooding incidents (sourced from Section 19 reports and asset registers only)	Total number of historic events and severity of flooding	Only flooding incidents recorded that could be georeferenced with XY coordinates to produce GIS files. Each point represents a location where it is known there has been at least one flood incident. The severity of the historic flooding event relating to the point has not been considered, just the total number of points within each catchment where there has been a flood incident.	GIS data sourced provided the most accurate results possible for the location of historic flooding incidents in the Yorkshire Dales National Park and neighbouring authorities.

1.5 Cumulative Impact Assessment

1.5.1 Sensitivity to fluvial flooding

The number of properties within Flood Zone 2 not presently within Flood Zone 3 was taken, as a percentage of the total properties in the catchment. These properties are considered sensitive to increased flood risk as a result of climate change.

Catchments with greater than 7% properties at increased risk were considered high risk.

Table F-5 Catchments considered highly sensitive to increased fluvial flood risk in future

Catchment	% properties sensitive to increased fluvial flood risk	Rank
Widdale Beck from Source to River Ure	17.77	1
Wharfe from Oughtershaw Beck to Park Gill Beck	11.96	2
Ure from Widdale Beck to Duerley Beck	10.17	3
Langdale Beck	9.81	4
Aire from Otterburn Beck to Eshton Beck	7.95	5
Cowside and Stainforth Beck	7.04	6

1.5.2 Sensitivity to surface water flooding

The number of properties within the 1000-year surface water extent not presently within the 100-year extent was taken, as a percentage of the total properties in the catchment. These properties are considered sensitive to increased flood risk as a result of climate change.

Catchments with greater than 9% properties at increased risk were considered high risk.

Table F-6 Catchments considered highly sensitive to increased surface water flood risk in future

Catchment	% properties sensitive to increased surface water flood risk	Rank
Cowside and Stainforth Beck	29.63	1
Park Gill Beck from Source to River Wharfe	14.49	2
Otterburn Beck from Source to River Aire	12.64	3
Cam Beck (Ribble)	11.91	4
Eller Beck from Source to River Greta	11.11	5
Widdale Beck from Source to Snaizeholme Beck	10.61	6
Duerley Beck from Source to River Ure	10.33	7
Green Field Beck from Source to River Wharfe	10	8
Ribble – conf Cam Beck to Brants Ghyll	9.84	9
Cowside Beck from Source to River Skirfare	9.71	10
Fir Beck/Blands Beck Catchment (trib of Wharfe)	9.68	11

Catchment	% properties sensitive to increased surface water flood risk	Rank
Skirfare from Source to Heselden Beck	9.43	12
Gordale Beck from Source to Malham Beck	9.3	13
Heselden Beck from Source to River Skirfare	9.1	14

1.5.3 Prevalence of historic flooding incidents

Historic flood incidents data for fluvial or surface water was available for this assessment, although at the time of the assessment records were only available from Lancashire County Council and Cumbria County Council, with others derived from recent Section 19 reports and an asset register. While this will not provide a detailed scope of historic flooding incidents across the region, the number of flood incidents in each catchment from the data available were identified to provide a broadscale understanding of flood risk. Historic Sewer flooding incidents data were provided by United Utilities and included in this assessment. Catchments with more than six recorded incidents were considered high risk.

For a more detailed assessment of historic flood risk or Level 2 SFRA, acquiring historic flooding incidents records from all neighbouring authorities is recommended.

Table F-7 Catchments with the highest number of recorded historic flood incidents

Catchment	Number of recorded incidents	Rank
Rawthey - Lower	13	1
Leck Beck (Ease Gill)	12	2
Cant Beck	7	3

1.5.4 Area of proposed development

YDNPA and neighbouring authorities provided a list of likely new development sites and the total area of new development in each catchment was measured, as a percentage of catchment area. Catchments with more than 1% of their area earmarked for development were considered high risk.

Table F-8 Catchments with the highest percentage cover of proposed development

Catchment	Area of proposed development (ha)	Area of proposed development (%)	Rank
Hambleton Beck/Ings Bk Catch (trib of Wharfe)	77.34	4.62	1
Eller Beck from Haw Beck to River Aire	38.95	4.15	2
Haw Beck from Source to Eller Beck	25.15	2.22	3
Ribble (Long Preston to Stock Beck)	58.83	1.44	4
Swale from Clapgate Beck to Bedale Beck)	22.36	1.36	5
Ribble (Stainforth to Long Preston Beck)	38.32	1.06	6

1.6 Overall rankings

As can be seen from the above tables and Figure F-2, there are catchments that are at high risk in multiple categories. Rankings from each assessment have been combined to give an overall ranking. A Red-Amber-Green (RAG) rating was then applied to the catchments, with red being high risk, amber being medium risk and green being low risk (Figure F-3). The catchments with a combined ranking score between 50 and 100 were deemed high risk.

The catchments rated as high-risk in the broadscale assessment are shown in Table F-9. Catchment numbers are the same as those shown in Figure F-1 and detailed in Table F-1.

Table F-9: High Risk catchments as shown in Figure F-3

Catchment No.	Waterbody Name	Rank
92	Ribble (Long Preston to Stock Beck)	1
36	Duerley Beck from Source to River Ure	2
30	Cowside and Stainforth Beck	3
82	Otterburn Beck from Source to River Aire	4

Catchment No.	Waterbody Name	Rank
93	Ribble (Stainforth to Long Preston Beck)	5
39	Eller Beck from Haw Beck to River Aire	6
2	Aire from Malham Beck to Otterburn Beck	7

Some catchments that border the Yorkshire Dales National Park or are within neighbouring catchments were discounted from the final RAG Assessment outputs as their results were not applicable due to their being no countable data for one or more assessment criteria, as well as them being located outside of the study area.

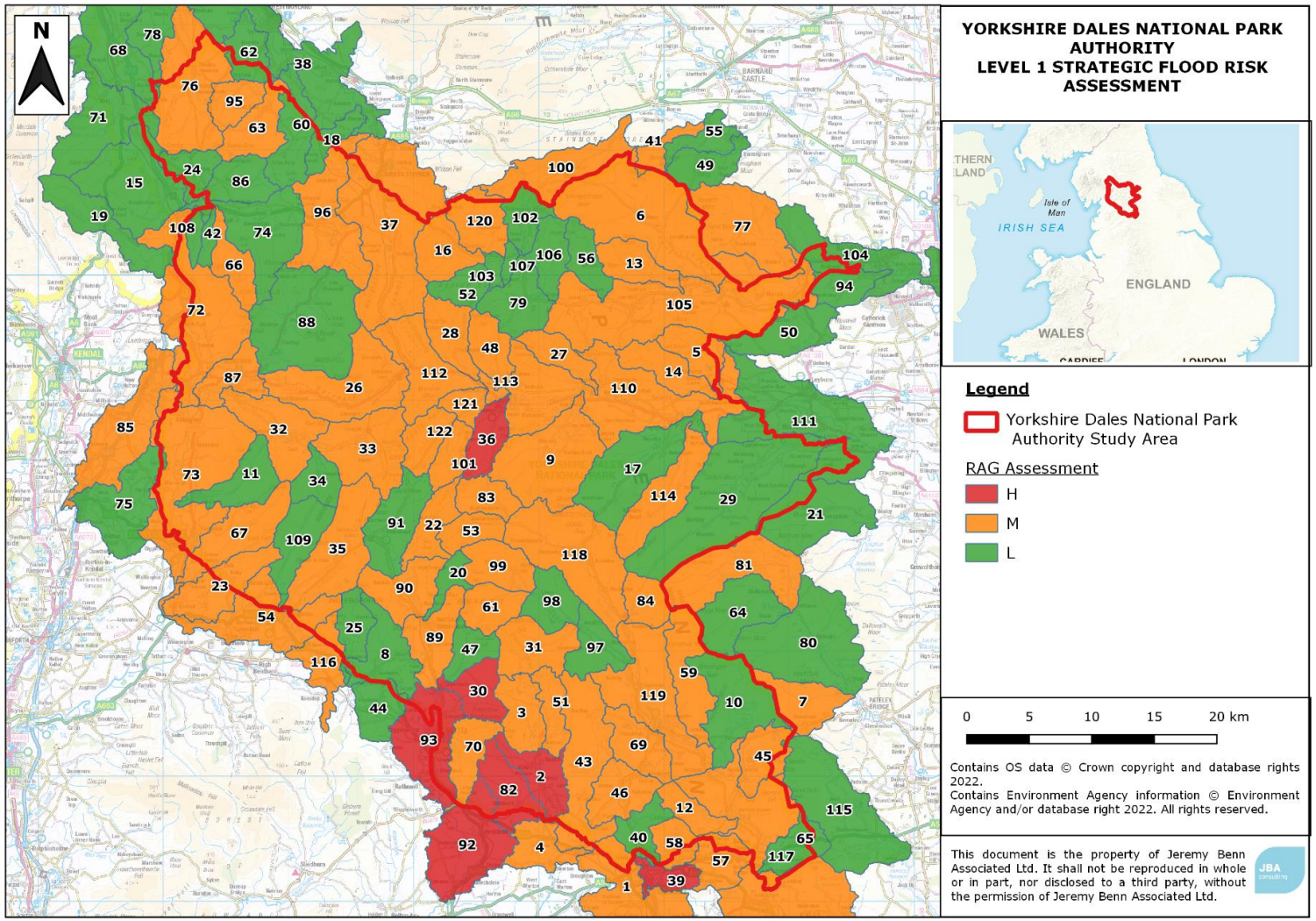


Figure F-3: Final catchment rankings of susceptibility to the impacts of cumulative impacts within the Yorkshire Dales National Park

2 Policy Recommendations

2.1 Broadscale Recommendations

The broadscale cumulative impact assessment for the Yorkshire Dales National Park has highlighted that the potential for development to have a cumulative impact on flood risk is moderately low across the area. Catchments have been identified as high, medium or low risk.

Flood risk will still be impacted upon in any circumstance and thus the need for incremental action and betterment in flood risk terms across all of the National Park is supported.

The following policy recommendations therefore apply to all catchments within the study area:

- The YDNPA should work closely with neighbouring local authorities to develop complementary Local Planning Policies for catchments that drain into and out of the National Park to other local authorities in order to minimise cross boundary issues of cumulative impacts of development.
- Developers should incorporate SuDS and provide details of adoption, ongoing maintenance and management on all development sites. Proposals will be required to provide reasoned justification for not using SuDS techniques, where ground conditions and other key factors show them to be technically feasible. Preference will be given to systems that contribute to the conservation and enhancement of biodiversity and green infrastructure in the districts where practicable. Developers should refer to the relevant LLFA guidance (North Yorkshire County Council, Cumbria County Council or Lancashire County Council) for the requirements for SuDS in the Yorkshire Dales National Park, including Technical and Development Type-specific Guidance for Developers.
    - **North Yorkshire County Council Information for Developers** (https://www.northyorks.gov.uk/flood-and-water-management)
    - **Cumbria County Council Information for Developers** (https://cumbria.gov.uk/planning-environment/flooding/default.asp)
    - **Lancashire County Council Information for Developers** (https://www.lancashire.gov.uk/council/planning/sustainable-drainage-systems/)

  Further guidance on SuDS can be found in Section 9 of the main report.
- North Yorkshire County Council, Cumbria County Council or Lancashire County Council as LLFA will review Surface Water Drainage Strategies in accordance with their local requirements for major and non-major developments. These should take into account all sources of flooding to ensure that future development is resilient to flood risk and does not increase flood risk elsewhere.
- Where appropriate, that the opportunity for Natural Flood Management in rural areas, SuDS retrofit in urban areas and river restoration should be

maximised. Culverting should be opposed, and day-lighting existing culverts promoted through new developments.

- Runoff rates from all development sites must be limited to greenfield rates (including brownfield sites) for all sites unless it can be demonstrated that this is not practicable. If it is demonstrated that greenfield rates are not practicable then the runoff rates should be restricted to the closest rate that is practicable. Developers should refer to the relevant LLFA guidance for the requirements for SuDS in the Yorkshire Dales National Park.
- All development proposals should undertake a site-specific Flood Risk Assessment. Site-specific FRAs should explore opportunities to provide wider community flood risk benefit through new developments. Measures that can be put in place to contribute to a reduction in flood risk downstream should be considered. This may be either be by provision of additional storage on site e.g. through oversized SuDS, natural flood management techniques, green infrastructure and green-blue corridors, and/ or by providing a Partnership Funding contribution towards any flood alleviation schemes.
- YDNPA should consider requiring developers to contribute to community flood defences outside of their red line boundary to provide wider benefit and help offset the cumulative impact of development. There are proposed and ongoing Flood Alleviation Schemes which may help to reduce fluvial risk in the town centre, and there may be opportunities for development to support the funding/delivery of these schemes.

Section 8.3 of the main report details the local requirements for mitigation measures. Catchment-specific recommendations are made for high-risk catchments below.

2.2 Recommendations for high-risk catchments

From analysing the results produced above, high-level recommendations for flood storage and betterment have been proposed for sites in each of the high-risk catchments. These recommendations should be considered by developers as part of a site-specific assessment, but more detailed modelling must be undertaken by the developer to ascertain the true storage needs and potential at each site at the planning application stage. Within the FRA consideration should be given to the potential cumulative effects of all proposed development and how this affects sensitive receptors.

Developers should also include a construction surface water management plan to support the Construction Drainage Phasing Plan. This should provide information to the EA, the LLFA and the LPA regarding the proposed management approach during the construction phase to address surface water management during storm events.

For developments in High Risk catchments, the LLFA and LPA should consult with Local Non-For-Profit organisations such as wildlife trusts, rivers trusts and catchment partnerships to understand ongoing and upcoming projects where NFM, flood storage and attenuation, and environmental betterment may be possible alongside developments and aid in reducing flood risk.

2.2.1 Ribble (Long Preston to Stock Beck)

There are no YDNPA development sites proposed within this catchment, however development sites within Craven District are present on the district boundary with the National Park.

- LPAs should work closely with the EA and the LLFA to identify any areas of land that should be safeguarded for any future flood alleviation schemes and natural flood management features.
- There is the potential for development in this catchment to contribute towards works to reduce flood risk and enable regeneration as well as contributing to the wider provision of green infrastructure.

2.2.2 Duerley Beck from Source to River Ure

There are no YDNPA development sites proposed within this catchment, however surface water flooding risk ranked high and fluvial flood risk the highest medium.

- The LLFA should work closely with the EA to identify any areas of land that should be safeguarded for any future flood alleviation and natural flood management features in the upper catchment.

2.2.3 Cowside and Stainforth Beck

There are no YDNPA development sites proposed within this catchment, however surface water flooding risk and fluvial flood risk both ranked high.

- The LLFA should work closely with the EA to identify any areas of land that should be safeguarded for any future flood alleviation and natural flood management features in the upper catchment.

2.2.4 Otterburn Beck from Source to River Aire

There are no YDNPA development sites proposed within this catchment, however surface water flooding risk ranked high and fluvial flood risk medium.

- The LLFA should work closely with the EA to identify any areas of land that should be safeguarded for any future flood alleviation and natural flood management features in the upper catchment.

2.2.5 Ribble (Stainforth to Long Preston Beck)

The district boundary with Craven District passes through this catchment, and there are 11 proposed development sites in and around Settle town. The combination of YDNPA and Craven District development sites places this catchment as the highest rank for development.

YDNPA sites proposed for development within, or partially within this catchment:

- LAN1, SET1, LON2, LON4, LON5
- As the catchment drains through Langcliffe and Settle, LPAs should work closely with the EA and LLFA to identify any areas of land that should be safeguarded for any future flood alleviation schemes and natural flood management features.

- The LLFA should work closely with the EA to identify any areas of land that should be safeguarded for any future flood alleviation and natural flood management features in the upper catchment.
- There is the potential for development in this catchment to contribute towards works to reduce flood risk and enable regeneration as well as contributing to the wider provision of green infrastructure.

2.2.6 Eller Beck from Haw Beck to River Aire

There are no YDNPA development sites proposed within this catchment, however development sites within Craven District are present near the district boundary with the National Park.

- LPAs should work closely with the EA and LLFA to identify any areas of land that should be safeguarded for any future flood alleviation schemes and natural flood management features.
- There is the potential for development in this catchment to contribute towards works to reduce flood risk and enable regeneration as well as contributing to the wider provision of green infrastructure.

2.2.7 Aire from Malham Beck to Otterburn Beck

Sites proposed for development within, or partially within this catchment:

- KIR1, AIR1, AIR2
- As the catchment drains through Kirkby Malham and Airton, LPAs should work closely with the EA and the LLFA to identify any areas of land that should be safeguarded for any future flood alleviation schemes and natural flood management features.
- The LLFA should work closely with the EA to identify any areas of land that should be safeguarded for any future flood alleviation and natural flood management features in the upper catchment.
- There is the potential for development in this catchment to contribute towards works to reduce flood risk and enable regeneration as well as contributing to the wider provision of green infrastructure.

2.2.8 Development within Medium risk catchments

Catchments that have been scored an overall ranking of medium, but where development proposals are present (Table F-10), should also consider the following recommendations:

- LPAs should work closely with the EA and the LLFA to identify any areas of land that should be safeguarded for any future flood alleviation schemes and natural flood management features.
- There is the potential for development in these catchments to contribute towards works to reduce flood risk and enable regeneration as well as contributing to the wider provision of green infrastructure.

Table F-10: Catchments ranked Medium risk where development is proposed.

Catchment No.	Waterbody Name
46	Flasby Beck from Source to Eshton Beck
119	Wharfe from Park Gill Bk to Barben Beck/River Dibb
69	Linton Beck Catchment (Trib of Wharfe)
87	Rawthey - Lower
110	Ure from Duerley Beck to Mill Beck
105	Swale from Muker Beck to Clapgate Beck
73	Lune - conf Rawthey to conf Greta