



Appendix F – Cumulative Impact methodology

1.1 Methodology

1.1.1 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 Scarborough Borough and Ryedale District 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.

1.1.2 Growth in the area

Development in neighbouring authorities can affect flood risk in Scarborough Borough and Ryedale District, especially if the catchment is draining towards the study area. Development sites in neighbouring authorities were assessed to determine if any neighbouring development would affect flood risk in Scarborough Borough and Ryedale District.

Likewise, development within the Borough and District has the potential to affect flood risk in neighbouring authorities, especially if there are existing flood risk issues. The River Derwent drains out of Ryedale District towards north East Riding of Yorkshire whilst the River Foss drains out of Ryedale District towards York city centre.

Areas for future proposed development were received from Scarborough Borough, Ryedale District Councils and York City Council. 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.

1.1.3 Historic flood risk

Historic flood risk information was provided by North Yorkshire County Council for the area of Scarborough Borough. Points were plotted as accurately as possible to the historic flooding descriptions based on the data available. Each point represents a location where it is known there has been at least one flood event since 2012 (however, the nature and scale of these flood events varies significantly).

Attribute data for each Incident Recording System data point includes the:

- Date
- Location (postcode)
- Description of incident

Due to potential data gaps, historic flood risk was compared to the rankings of catchments following an initial assessment of the first two risk categories (surface water and growth).



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-1.

Table F-1: Summary of datasets used in the cumulative impact assessment

Dataset	Coverage	Source of data	Use of data
Catchment Boundaries	Scarborough Borough and Ryedale District study area (any other local authority areas that intersect these catchments)	Water Framework Directive Catchments	Surface Water and Development Flood Risk
National Receptor Database (2014)	Scarborough Borough and Ryedale District study area	Environment Agency	Assessing the number of properties at risk of surface water flooding within each catchment
Risk of Surface Water Flooding Mapping	Scarborough Borough and Ryedale District study area	Environment Agency	Assessing the number of properties at risk of surface water flooding within each catchment
Future development areas	Scarborough Borough, Ryedale District study area and neighbouring local authorities	Scarborough Borough, Ryedale District and City of York	Assessing the impact of proposed future development on risk of flooding.
Historic Flooding Incidents	Scarborough Borough study area	North Yorkshire County Council	Assessing incidences of historic flooding within the Scarborough Borough study area.
Catchment Boundaries	Scarborough Borough and Ryedale District study area (any other local authority areas that intersect these catchments)	Water Framework Directive Catchments	Surface Water and Development Flood Risk

1.1.4 Ranking the results

The results for each assessment were ranked into high, medium and low risk as shown in Table F-2 for Scarborough Borough and Table F-3 for Ryedale below.

Table F-2 Risk banding for Scarborough Borough

Flood risk ranking	% of properties at increased risk of SW flooding	% Area of Catchment Covered by new development
Low risk	<0.5%	<0.5%
Medium risk	>0.5%, <2.5%	>0.75%, <3%
High risk	>2.5%	>3%



Table F-3 Risk banding for Ryedale District

Flood risk ranking	% of properties at increased risk of SW flooding	% Area of Catchment Covered by new development
Low risk	<2%	<1%
Medium risk	>2%, <4%	>1%, <2%
High risk	>4%	>2%

The ranking results were combined from the two assessments to give an overall high, medium and low ranking for all catchments within the district. Each catchment received a score for its ranking in each category, which were totalled to give a total risk score as shown in Table F-4.

Table F-4: Final combined rankings

Individual Rank	Score	Total Score (out of 9)	Final Rank
High risk	3	7-9	High risk
Medium risk	2	5-6	Medium risk
Low risk	1	3-4	Low risk

1.1.5 Assumptions

The assumptions made when conducting the cumulative impact assessment are shown in Table F-5.

Table F-5: Assumptions of the cumulative impact assessment

Assessment aspect	Assumption made	Details of limitation in method	Justification of method used
Surface water flood risk	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.

The results of the assessment and policy recommendations can be found in Chapter 7 and Chapter 10 of the main SFRA report.