

# RIS2 Drainage Resilience Metric

## Definition

Commencing in RIS2, the performance of the National Highways’ drainage asset will be measured by the Drainage Resilience metric, defined as: *“The percentage length of carriageway that does not have an observed significant susceptibility to flooding, based on the number of flood events over the previous five years and their severity of impact (both to road users and third parties), measured for each highway drainage catchment across the SRN.”*

The percentage length of carriageway impacted by flooding is assessed in terms of drainage highway catchments, which are defined in the standard CD 535 *Drainage asset data and risk management*, as: *“A group of all the drainage systems and the adjacent land they drain, between two geographical high points of the highway network”*.

A drainage catchment therefore extends from a high point on the network, through a low point, to the next high point. All rain falling within the catchment drains to the same low point on the network. These catchments have been modelled for the whole SRN using a topographical model. An example catchment is shown below.



## Calculation

The Drainage Resilience metric is calculated in a GIS by spatially linking the catchments with the flood events recorded in National Highways’ Drainage Data Management System (DDMS) over the previous 5 years to define a risk status from A1 (Highest risk) to D (Low risk) for each catchment in accordance with the matrix below. The flood risk status considers both flooding within the National Highways boundary fence (the upper part of the matrix), and the impact on third-parties of flooding outside the boundary fence but within 200m of the network (the lower part of the matrix). The matrix considers both the number of floods in the last 5 years and the most severe impact. For carriageway flooding the severity index quantifies the impact on network traffic through a combination of road classification, traffic flows, duration and extent of lane closure, and ranges from 0 (low) to 10 (high). For third party flooding the impact is determined on the basis of the type of land, property or infrastructure impacted. The overall catchment risk status is defined by the most severe of either the impact of carriageway flooding or the third-party impact.

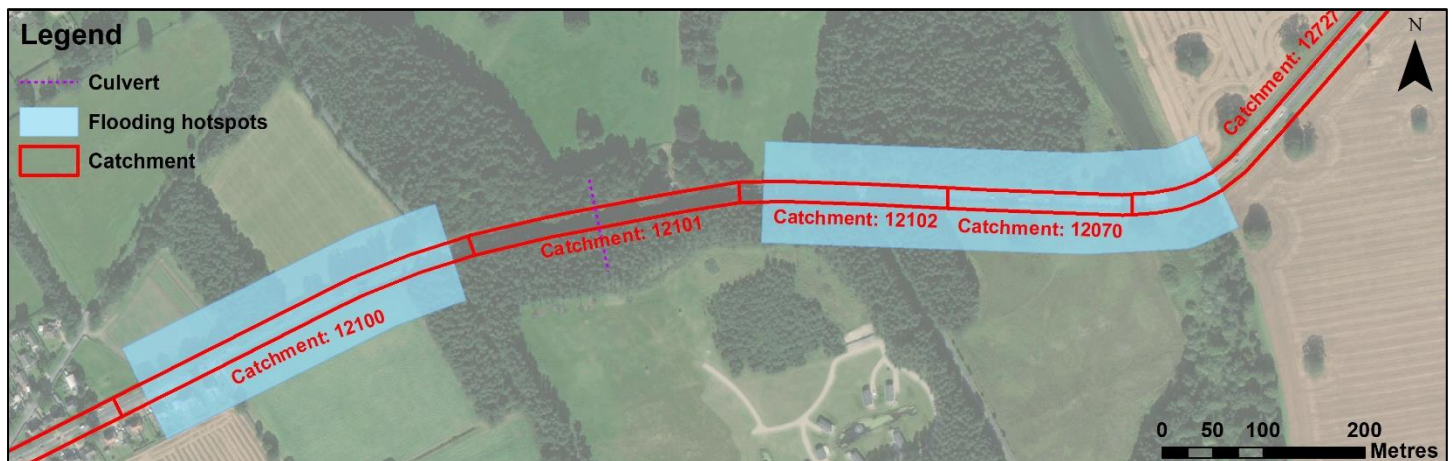
Metric includes:

- C (Moderate)
- D (Low)

Overall Catchment Flood Risk Status (Defined by the most severe of that determined by the severity index or the third party impacts)			
Number of flood events within the catchment in the last 5 years			
> 5	2 to 5	1	0

Severity index of most severe flood				
7 to 10	A1 (Highest)	A (Very High)	B (High)	N/A
5 to 6	A (Very High)	B (High)	C (Moderate)	N/A
0 to 4	B (High)	C (Moderate)	D (Low)	N/A
No history of flooding	N/A	N/A	N/A	D (Low)
Most severe third party impact				
Residential or critical infrastructure	A (Very High)	A (Very High)	A (Very High)	N/A
Commercial	B (High)	B (High)	B (High)	N/A
Agricultural	C (Moderate)	C (Moderate)	C (Moderate)	N/A
None	D (Low)	D (Low)	D (Low)	D (Low)

The Area teams manually define flooding hotspots on DDMS by identifying concentrations of floods on or adjacent to the network. Because the hotspots are manually defined, an individual hotspot may cover more than one catchment. Culverts, that may be a source of flooding issues, are also recorded on DDMS. An example of the relationship between hotspots, catchments and culverts is shown below.



When a flooding issue has been addressed by remedial or maintenance works the hotspot and/or culvert mitigation is recorded and evidenced on DDMS. However, mitigations are only counted in the assessment of the Drainage Resilience metric once they have been assured by SES. The calculation of the metric determines which catchments are mitigated when the associated hotspots or culverts are mitigated, provided that further flooding has not occurred since the mitigation. If a catchment has a risk status of A1, A or B and is associated with an assured hotspot or culvert mitigation, it's risk status is reduced to C.

Once the current risk status of each catchment has been assessed, the lengths of all the Moderate and Low risk (C and D) catchments are totalled to give a percentage length of network that has a low observed significant susceptibility to flooding:

$$\text{Drainage resilience metric} = \sum \frac{\text{length of category C and D catchments}}{\text{total length of SRN}} \times 100$$

### **Weather normalisation**

From April 2024, the metric is “weather normalised”. This enhancement uses Met Office rainfall data to identify flood events that occurred during extreme weather events, where the rainfall levels exceeded the design criteria of the drainage in that location. Any floods identified as exceeding the design criteria are not included in the metric calculation defined above.

### **Reporting**

The National Drainage Resilience metric reports performance of all National Highways Areas plus the M25 DBFO, but excludes all other DBFOs.

The metric is reported internally in the DDMS monthly report, one month in arrears, for each Area, Region and Nationally. External reporting is annual at National level covering the fiscal year 1 April to 31 March.

Reporting prior to April 2024 is of the non-weather normalised metric, reporting after that date is of the weather normalised metric.