Planning Decisions, Adaptive Capacity & Insurability

A case study in Somerset 2021-2 addressing nationally relevant themes

Funded by PCAN

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PLACE-BASED CLIMATE ACTION NETWORK

Project Overview

This project aims to understand the capacity of Local Authority Planning Departments to manage the long term impacts from climate change on flooding. The threshold for effective outcomes was considered in terms of the insurability of new properties against flood risk over the next 100 years.

Planning decisions are required to protect properties from flooding for 100 years.

The threshold for insurability was considered a 1 in 75 annual probability of flooding i.e. that properties that are subject to a greater than 1.3% annual probability of flooding could face problems in acquiring insurance. The project therefore tested the ability of planning decisions to retain at least a 1.3% annual probability of flooding, in 100 years, taking into account climate change.

Two case studies in Somerset considered:

- **fluvial flood risk and**
- **surface water flooding**

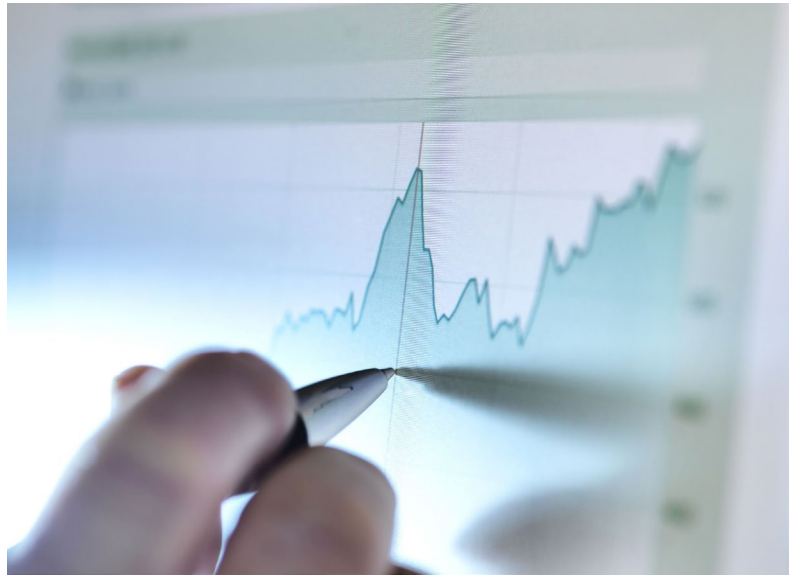
Fluvial (*River*) Flooding

Surface Water Flooding

Thanks are given for the support of Somerset Rivers Authority, Somerset County Council, Somerset Lead Local Flood Authority, Sedgemoor District Council, Mendip District Council, The Environment Agency, Calm Consulting, JBA Consulting, and Rheos Consulting.

Project Overview

Headlines:



- **Fluvial Flood:** **Compliance by Local Authority planners with existing regulation generally offers a significant level of protection. Properties in some developments could, however, face a challenge in insurability. On the one occasion where a developer provided additional flood protection, beyond that required by the Local Authority, this significantly reduced the risk of un-insurability.**
- **Surface Water Flood:** **A Local Authority invested in advice beyond that required for regulatory compliance. Despite this, a developer ignored advice, and the Local Authority did not feel it had the resources to mount a legal challenge. This exposed properties to a potential challenge in un-insurability today, with problems likely to increase further with future climate change**

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Key Points – Fluvial Flood Risk

- **Fluvial flood risk is more strongly regulated than surface water flood risk. This means that simple compliance provides more protection against fluvial risk compared with surface water flooding.**
- **Greater protection can be provided if developers provide flood protection beyond the requirements of compliance (higher adaptive capacity). This is rare.**
- **In line with planning guidance, planners in the case study used the Environment Agency Flood Zone 3* maps to define flood risk within which development cannot happen.**
- **However, the use of these Flood Zone 3 does not consider DEFRA guidance to assess climate change risk by considering an up to 85% increase in peak river flow.**

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*** Flood Zone 3:** Land having a 1 in 100 or greater annual probability of river flooding;, or, land having a 1 in 200 or greater annual probability of sea flooding or, this zone comprises land where water has to flow, or be stored, in times of flood. Return periods are under current climate conditions

Key Points – Fluvial Flood Risk

- In 2020, the Environment Agency in Somerset stress tested its flood defence infrastructure by modelling the impact of an 85% increase in peak river flow, in line with DEFRA guidance.
- The project compared these two assessments of flood risk to see if there was a difference in the identification of long term insurability.
- Most areas at risk of flooding in the stress test overlapped with the Flood Zone 3 Map, meaning that most areas considered at risk under DEFRA guidance would not be developed when using the longer standing risk assessment process using Flood Zone 3.
    - It would take investigation of other areas where the Environment Agency has stress tested its flood protection infrastructure to know whether the Flood Zone 3 map is as reliable as was the case in Somerset.

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Key Points – Fluvial Flood Risk

There were a relatively small number of recently approved developments that had not been identified using the Flood Zone 3 map but which seem to be at risk of flooding using the stress test. Of these developments:

- **One had put in place an effective flood defence system which was designed to be easily upgraded as flood risk increases, so that 1 in 100 year protection level can be maintained to high case climate change scenarios. The risk of un-insurability here was low.**
- **The other developers had not provided anything beyond compliant flood protection. The associated developments were exposed to potential problems with un-insurability due to fluvial flood risk not anticipated by the planning process.**

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Key Points – Surface Water Flood Risk

- **Surface water flood risk is weakly regulated. This makes it difficult to enforce good practice without co-operation from the developer**
- **A recently approved development was modelled by planners for un-insurability due to surface water flood risk in line with DEFRA guidance. This considers risk at:**
  - ***current climate levels***
  - ***20% increase in peak flow and***
  - ***40% increase in peak flow***
- **Planners required the developer to make changes to its proposed flood mitigation measures, in line with the risks identified in this flood risk assessment**

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Key Points – Surface Water Flood Risk

- **However, the developer built without incorporating the required changes.**
  - ***In fact, it reduced the capacity of the measures it had originally proposed at planning***
- **Under current climate, this exposed 5% of properties to un-insurability. This increases to 9% in a mid-case climate change scenario (20% increase in peak flow) and 11% in a high-case climate change scenario (40% increase in peak flow)**
- **The Planning Department could take the developer to court but weak regulation and the high cost of the legal process made the risk of losing too high**

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Key Points – Surface Water Flood Risk

- **The Planning Department invested in far more technical flood risk management advice than is required for compliance, indicating it higher than normal adaptive capacity to identify and respond to flood risk.**
- **Nonetheless, weak regulation, and enforcement capability led to an increasing future risk of un-insurability due to flooding.**
- **These weaknesses in the planning process are well understood by those in the flood protection field. They also know the details of properties at risk.**
- **While understanding the consequences, they do not publicise the detail because of concern for the property owners and the value of their property.**

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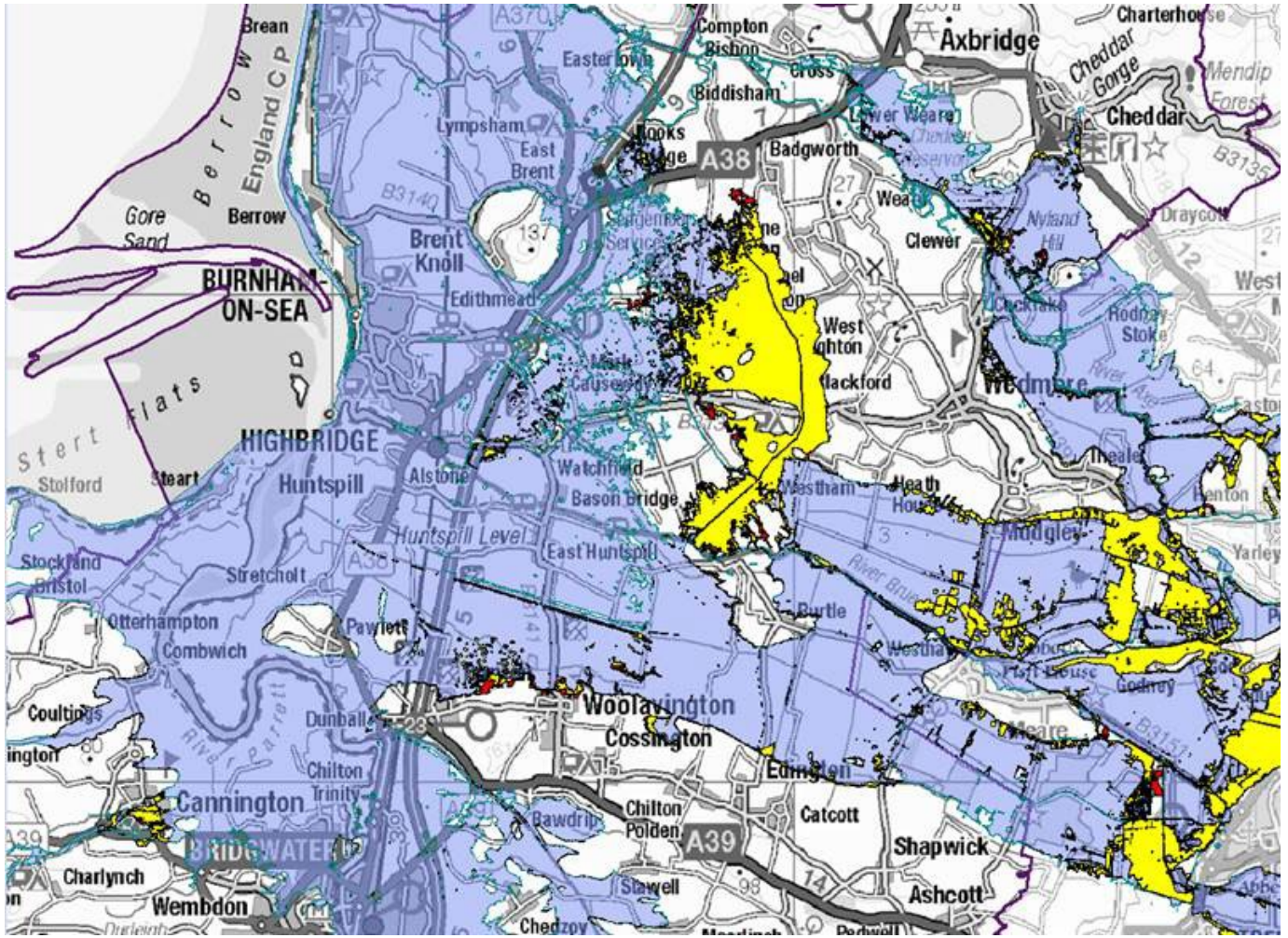
Fluvial Flooding

- **Yellow and Red areas are outside Flood Zone 3 but inside the EA stress test area**
- **The local planning authority found that their use of Flood Zone 3 maps to exclude development had prevented development in most of these areas**
- **There were some developments outside the Flood Zone 3 area but within the flood risk area identified in the EA stress test**



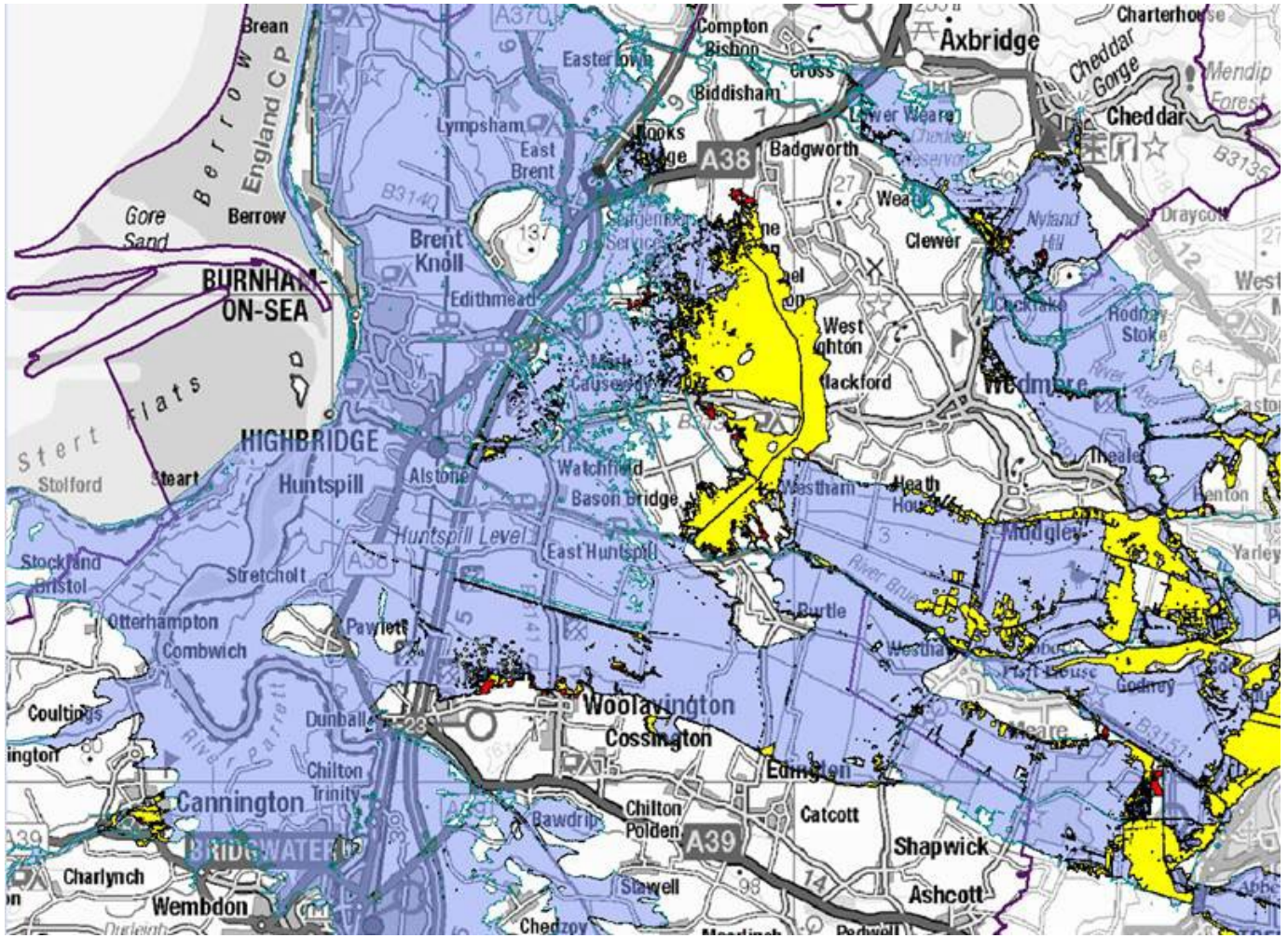
March 2022

Map Key
Blue – Flood Zone 3 ,
Yellow – 1 in 75 85% Climate Change extent that is outside of Flood Zone 3 ,
Red – between 1 in 75 and 1 in 100 85% Climate Change extent that is outside Flood Zone 3

Fluvial Flooding

There were 9 developments outside flood zone 3 areas but within the EA stress tested risk areas

Development number	No Properties
1	73
2	1
3	1
4	1
5	16
6	1
7	1
8	1
9	5



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"The design of the scheme allows for future interventions to maintain a 1% AEP (1 in 100 year) standard through appropriate sizing and design to allow for future re-sizing of key structures such as the culvert under the A39. It is more optimal to address the deterioration in Standard of Protection through future interventions than at the time of scheme construction. Future operational response will monitor the effectiveness of the scheme and if necessary, further channel enlargement could be undertaken to offset against changing flood flow response."

The largest development has acceptable climate risk measures in place:

- **The consultant advisors to this development are internationally reputed advisors on climate risk.**
- **None of the other developments had flood risk measures**

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Surface Water Flooding

Case Study Attributes:

- **The case study is a real site in Mendip District that has been recently approved for development for 203 dwellings**
- **Two attenuation ponds were included in the developers proposal in response to its flood risk assessment**
- **The development's flood protection measures were modelled and tested against a 20% and 40% increase in peak surface water flow compared to current climate levels, in line with DEFRA surface water flood protection guidance**
- **Readers are asked to consider the principles that this case study reveals, rather than details. The principles apply widely throughout Somerset and England, if not more widely across the UK**

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Surface Water Flooding

Case Study Attributes:

- **The planning department's review of the proposal found that the proposed flood mitigation measures did not manage the water flows identified in the Flood Risk Assessment (FRA)**
- **Additions to flood protection were proposed:**
  - **improvements to the developers proposed attenuation ponds; and**
  - **an additional bund**
- **But the developer did not make the changes proposed, and indeed reduced the level of flood protection it had shown in its plans**
- **The developer was not challenged by planners because weak regulation made the risk of losing a costly court case too high in the view of the District Authority.**

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Surface Water Flooding

Summary of scenario and rainfall events, and corresponding number of properties flooded

Interventions beyond developer's plan	Number of 203 properties flooded (% total)		
	Base rainfall	"Central" uplift +20%	"Upper end" uplift +40%
No interventions	11 (5%)	18 (9%)	22 (11%)
Bund interventions	12 (6%)	18 (9%)	21 (10%)
Swale interventions	9 (4%)	12 (6%)	18 (9%)

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Adaptive Capacity & Flood Risk

Flood protection through the planning process is a systemic issue. In the following slides, the system is divided into 4 levels: regulation, planning, enforcement and development. Decisions at one level affect the ability to provide flood protection at the level below

Regulatory obligations have a direct impact on what is delivered at a local level. Fluvial flooding is currently regulated more effectively than surface water flooding. Outcomes for surface water flooding are therefore less likely to be effective than for fluvial flooding. The following diagrams illustrate how this dynamic results in that outcome.

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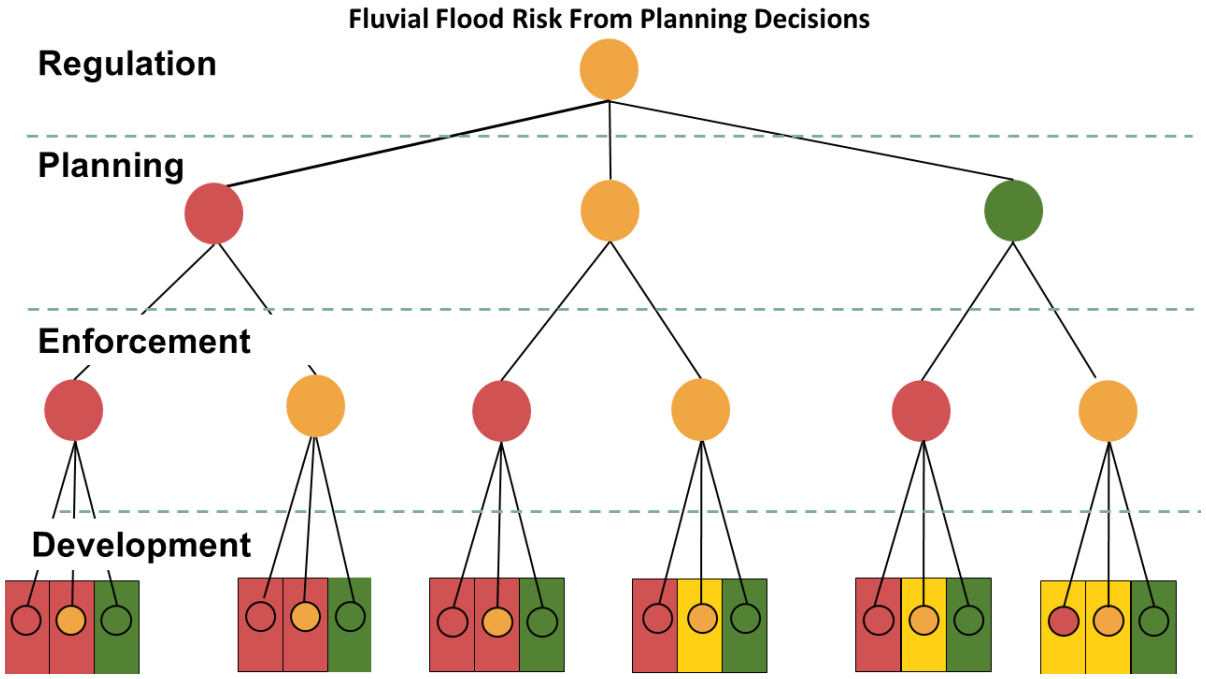
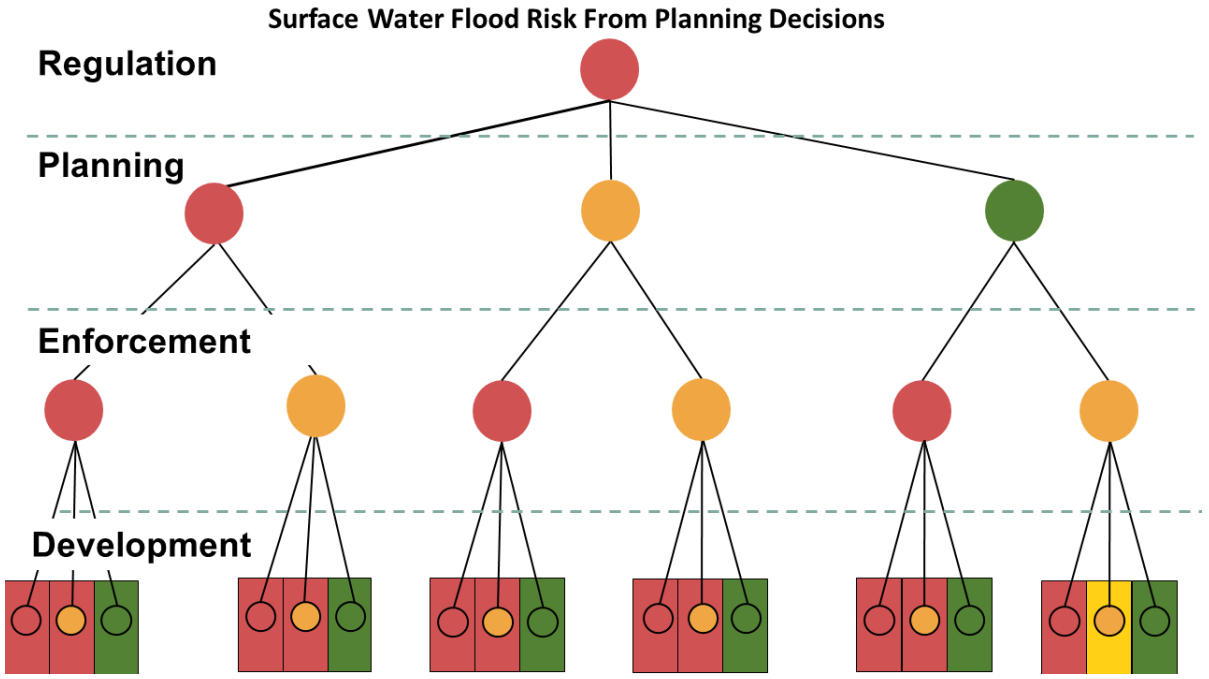
Adaptive Capacity & Flood Risk

Regulatory obligations have a direct impact on what is delivered at a local level. Fluvial flooding is currently regulated more effectively than surface water flooding. Outcomes for surface water flooding are therefore less likely to be effective than for fluvial flooding (rectangular blocks along the “Development” line show the level of risk at development level) .





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Key			
●	Decisions contribute to a **high** probability of effective flood protection	▮	Developments with high probability of flood protection
●	Decisions contribute to an **intermediate** probability of effective flood protection	▮	Developments with intermediate probability of flood protection
●	Decisions contribute to a **low** probability of effective flood protection	▮	Developments with low probability of flood protection

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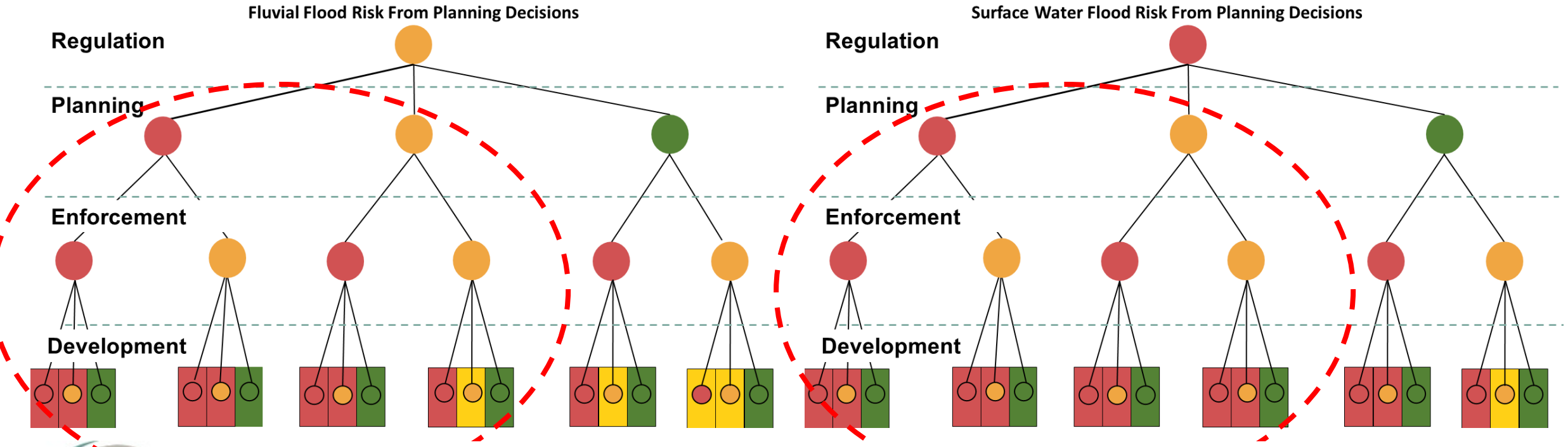
Adaptive Capacity & Flood Risk

At the planning level, current resource limitations, access to appropriate skills and sometimes politics mean we can expect planning authorities to be restricted to somewhere between the red and amber range (circled in red). Any green activity would be deemed “exceptional”



Key	
Decisions contribute to a **high** probability of effective flood protection	Developments with high probability of flood protection
Decisions contribute to an **intermediate** probability of effective flood protection	Developments with intermediate probability of flood protection
Decisions contribute to a **low** probability of effective flood protection	Developments with low probability of flood protection

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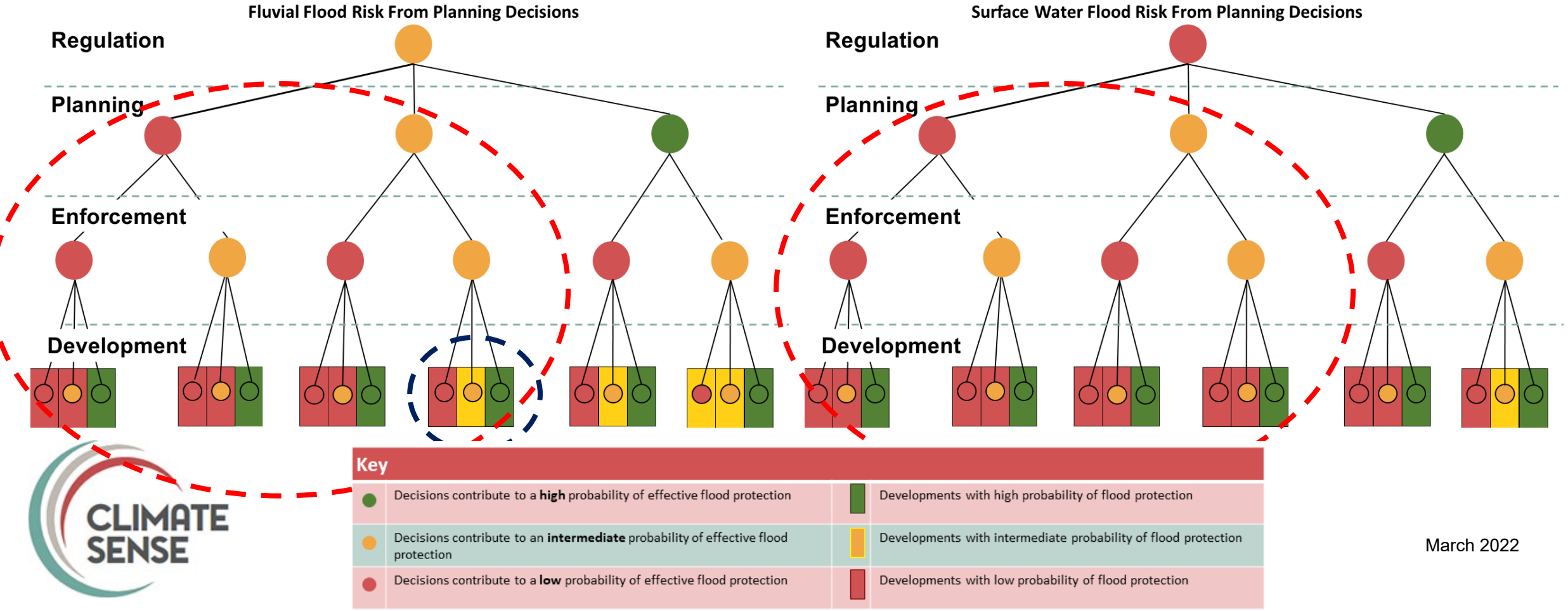
Adaptive Capacity & Flood Risk

Within the range of likely planning capacity scenarios, only one of the possible outcomes reduces flood risk to "intermediate" level (circled in blue) which requires compliance by all parties without the exceptional case of a developer operating beyond the requirements of compliance. This is a common outcome but not inevitable.



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