My name is Chris Stone, I was a previous member of the Subcommittee, and I am a licensed Professional Engineer. For over four decades, I have been involved in the design of infrastructure projects across the Commonwealth. I am here today because I believe our state's flood design standards are dangerously out of date.

Nationally, FEMA aims to update Flood Insurance Rate Maps around every five years, to reflect changes in landscape, development and hydrology. Recently, new FEMA maps placed about 180 Richmond homes and businesses in a high-risk flood zone. FEMA's current flood maps in Virginia are still largely based on the old assumption of stationarity. That means they assume the past rainfall and streamflow records are a reliable guide to the future. The 100-year flood, for example, is calculated from long-term USGS stream gages and historical rainfall records. So: the maps mostly do not yet account for climate-driven increases in rainfall intensity, frequency, or sea-level rise.

Right now in Virginia, all official flood maps and stormwater designs are based on NOAA Atlas 14, which is nearly 20 years old and assumes climate isn't changing. Atlas 15, Volume 2 will bring climate-adjusted rainfall into the mainstream, but until then, many engineers are applying their own climate factors to avoid under-designing storm drainage projects. The official system hasn't caught up yet — but engineers on the ground increasingly know they can't just "trust the old curves."

I am also a member of the Committee on a Changing Climate with the American Society of Civil Engineers, or ASCE, which is actively working with NOAA on rainfall frequency updates through the Atlas 14 and upcoming Atlas 15 projects. NOAA provides the precipitation data engineers rely on, while ASCE incorporates it into design standards, used across the country. NOAA is currently working to complete Atlas 15 Volume 1 by the end of 2026, but that only updates historical rainfall trends, or non-stationary. However, Atlas 15 Volume 2 which will add full U.S. coverage and climate-adjusted future rainfall projections, may lag by several years.

The Virginia Transportation Research Council found that rainfall intensities are projected to rise 10 to 30 percent by mid-century, and up to 40 percent by the end of this century. This means a bridge or culvert designed today may fail decades earlier than expected, putting lives and property at risk. Interim use of climate adjustment factors (+20% to +30%) will better protect infrastructure investments, public safety, and statewide resilience until Atlas 15, Volume 2 can be formally adopted.

We know the next dataset, Atlas 15, will account for climate change. But it's still years away. Waiting for it would be like waiting to fix a leaky roof until the next storm passes.

Meanwhile, some Virginia communities aren't waiting:

- Virginia Beach now requires engineers to add 20% to Atlas 14 rainfall values.
- Arlington County has adopted updated rainfall tables through its Risk Assessment and Management Plan.
- Alexandria has already increased design storm intensities for critical projects.

Some states, like New Jersey, New York, Vermont, New Hampshire, and North Carolina are starting to apply "climate factors" or multipliers to Atlas 14 while waiting for Atlas 15. North Carolina uses the RaInDROP Tool, provided by North Carolina's State Climate Office, to enhance Atlas 14 by applying scale factors for both mid-century and end-of-century projections under moderate/high emission scenarios.

I respectfully recommend the General Assembly take three actions:

1. Amend the Code of Virginia to require the use of *climate-adjusted rainfall data* in all state and local stormwater, culvert, and bridge design.
2. Direct DEQ and VDOT to issue interim guidance now — for example, a 20% increase to Atlas 14 rainfall depths statewide — until Atlas 15 is adopted.
3. Allow localities to go further if their risks demand it, while ensuring a strong, consistent statewide baseline.

Engineers in Virginia are waiting for Atlas 15 like it's the next iPhone release — because it will directly influence how drainage and floodplain standards are written for decades. This is not about overbuilding. It is about protecting public safety, preserving infrastructure investments, and saving taxpayer dollars by reducing future flood damage.

Virginians expect us to prepare, not to react. The storms are already here. Please don't wait for Atlas 15. Let's design today for the Virginia of tomorrow.

A BILL to amend the Code of Virginia by adding a section relating to rainfall design standards for flood resilience.

Be it enacted by the General Assembly of Virginia:

1. That the Code of Virginia is amended by adding the following section to Title 62.1, Chapter 3.1 (State Water Control Law):

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§ 62.1-44.15:85. Rainfall design standards; non-stationary precipitation.

A. Notwithstanding any other provision of law, all state agencies and political subdivisions of the Commonwealth shall incorporate climate-adjusted precipitation values when establishing design standards for stormwater management facilities, floodplain management, culverts, and bridges.

B. Until such time as NOAA Atlas 15 precipitation frequency estimates are published and adopted by the Commonwealth, the Department of Environmental Quality, in consultation with the Virginia Department of Transportation, shall establish interim guidance requiring that precipitation values derived from NOAA Atlas 14 be increased by not less than twenty percent (20%) when used for design purposes.

C. Nothing in this section shall prohibit a locality from adopting more stringent rainfall design standards to address local or regional flood risk.

D. The Department of Environmental Quality and the Virginia Department of Transportation shall update all relevant manuals and design standards to reflect this requirement within 12 months of the effective date of this section.

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2. That this act shall become effective on July 1, 2026.

A BILL to amend the Code of Virginia by adding a section relating to rainfall design standards for flood resilience.

Be it enacted by the General Assembly of Virginia:

1. That the Code of Virginia is amended by adding the following section to Chapter 2 of Title 33.2:

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§ 33.2-XXX. Rainfall design standards for state transportation projects.

A. The Department of Transportation shall incorporate climate-adjusted precipitation values when establishing design standards for stormwater management facilities, culverts, bridges, and other transportation infrastructure.

B. Until NOAA Atlas 15 precipitation frequency estimates are published and formally adopted by the Commonwealth, the Department shall apply an interim adjustment factor of not less than 20 percent (20%) above NOAA Atlas 14 values for all rainfall intensities used in design.

C. The Commissioner of Highways shall update all relevant VDOT design manuals, including the Drainage Manual and the Structure and Bridge Manual, within 12 months of the effective date of this section to reflect these requirements.

D. Nothing in this section shall prohibit a locality or regional transportation authority from applying more conservative rainfall design standards.

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2. That this act shall become effective on July 1, 2026.

Why Title 33.2 matters

- It puts the requirement directly in VDOT's lane, which covers bridges, culverts, and drainage tied to transportation projects.
- It makes compliance automatic for Structure & Bridge and Location & Design Divisions, since their manuals flow from statutory mandates.
- It still allows DEQ (Title 62.1) to oversee local stormwater systems, but ensures transportation infrastructure — often the most expensive and most at risk — is upgraded first.