Executive Summary:

Pursuant to Section 32 of HB 1021 – 2024, the Florida Building Commission has been tasked with performing a study on standards related to the prevention of water intrusion through the tracks of sliding glass doors (SGDs), including the consideration of devices designed to further prevent such water intrusion. By December 1, 2024, the Florida Building Commission is required to provide a written report of its recommendations to the Governor, the President of the Senate, the Speaker of the House of Representatives, and the chairs of the legislative appropriations committees and appropriate substantive committees with jurisdiction over chapter 718, Florida Statutes.

Past hurricanes have shown that water intrusion can cause minor to severe interior content damage and property loss which led to this request. This report provides a literature review study on standards pertaining to the prevention of water intrusion through the tracks of SGDs, including the consideration of mitigation devices designed to further prevent such water intrusion. This report examines current water testing standards as referenced by the 8th Edition (2023) Florida Building Code, Residential and Building and the High-Velocity Hurricane Zone (HVHZ), as well as a review of Federal Emergency Management Agency (FEMA) reports from the observations from past hurricanes.

A Research Technical Advisory Group (TAC) was formed to help in the review of current water testing standards referenced in the current Florida building code. The meetings spanned 1.5 months, with the group meeting five times scheduled for one hour each. The TAC also considered mitigation devices that can be installed on SGDs to further reduce water intrusion.

The literature review includes recent SGDs wind-rainfall intrusion testing standards, academic reports and papers based on experimental testing, and impact reports from previous hurricanes, such as the FEMA Mitigation Assessment Team (MAT) reports on Hurricane Michael (P-2077 2020) and Hurricane Ian (FEMA P-2342 2023). The literature review was supported by recommendations from the Technical Advisory Committee (TAC). The FEMA MAT reports reflect high-level visual observations made after storms for which damage reports of structures are not backed by actual forensics data leading to detailed root causes.

There were not any forensic studies available for WDR through the track of SGDs. Therefore, FEMA MAT reports from Hurricane Michael and Hurricane Ian were used for the literature review. The FEMA MAT reports are based on surveys and visual observation that might lack detailed forensic analysis, however, they explicitly stated that testing standards for door and window assemblies do not appear to adequately help prevent water infiltration and that current testing standards will need adjustment. Experimental testing for a number of SGD samples was conducted at Florida International University (FIU) and the University of Florida (UF). The analysis results from these tests suggested that further research into wind and WDR conditions and how those conditions may impact the building envelope may be warranted. The main findings of this literature review are that mixed-phase flow dynamics (i.e., fluctuating winds with entrained rain precipitation) through SGDs are not properly simulated in existing standardized tests and may not capture how effectively water infiltrates and drains. Together with wind directionality, these intrusion effects may not be adequately simulated in traditional static-type WDR laboratory tests but could be incorporated to improve future standards. Also, the typical 15% design pressure (DP) protocols listed in TAS 202, and the AAMA standards did not adequately assess building envelope

rain intrusion, which was much lower than what a SGD might face during actual hurricanes, making it insufficient for real-world conditions.

A set of recommendations were proposed based on these findings:

1. Based on the review of experimental testing at different facilities and FEMA MAT reports from different hurricanes, it can be observed that the typical 15% DP protocols listed in TAS 202 do not adequately assess the building envelope rain intrusion. Therefore, more field data should be collected to understand the nature of WDR.
2. Climate-adjusted WDR maps are critical to identifying the requirements for conditions in Florida. This may help to accurately specify the performance requirements for individual locations and buildings rather than having constant WDR intensity parameters across the entire state.
3. It is important to perform a full-scale holistic rain simulation and testing in strong winds to physically model realistic conditions experienced by the building envelope components during windstorms. This holistic full-scale rain simulation can inform a new testing approach based on the University of Florida study on SGDs (hurricane wind pressure trace simulations based on water injection) after calibrating the rain and wind parameters to mimic the full-scale simulation environment such as the one developed at the WOW EF.
4. Aftermarket mitigation devices need to go through the Florida Product Approval System to be considered. Although the standards did not provide an approach to test aftermarket devices, the FBC provides a process to test these devices through the Florida product approval system. Approved agencies (e.g., registered design professionals) can come up with compliance criteria to test aftermarket devices and the building official can approve the test as deemed complied with respect to quality and manner for new assemblies as provided in FBC section 104.11.