Secondary Risk Characteristics Supported by the AIR Inland Flood Model for the United States in Touchstone

The vulnerability component of the AIR Inland Flood Model for the United States uses damage functions that rely on the input of several primary building characteristics, including construction, occupancy, building height, and year built. These damage functions are also both region- and season-specific; regional variations account for differences in building practices that arise from building code and environmental conditions, while seasonality captures differences in drying time.

In addition to these primary determinants of vulnerability, the AIR model also supports several secondary building characteristics as described below. If this information is input into Touchstone®, modifications are made to the base damage functions that capture the impact of these characteristics.

> The inclusion of secondary building characteristics in an analysis can have a major impact on model losses and yield more accurate results. AIR therefore strongly recommends that companies begin collecting the relevant data now.

FOUNDATION TYPE

The type of building foundation has a significant impact on its flood vulnerability. Basements can greatly increase the susceptibility to flood damage, while cripple wall crawl spaces can easily buckle or be damaged by water. The type of material can also make a difference, with concrete generally more flood-resistant than masonry.

Choice of foundation type is available for all residential (except mobile homes) and commercial buildings. Foundation types supported are:

Unknown	Crawl space – masonry	Mat/Slab
Masonry basement	Crawl space – raised (wood)	Pile
Concrete basement	Post and pier	No basement
Crawl space – cripple wall	Footing	Engineered foundation

NUMBER OF BASEMENT LEVELS

While basements increase flood vulnerability, multiple basement levels are usually found in high-rise and other large commercial buildings or apartment complexes. These buildings also have a higher level of engineering and are therefore equipped with better flood protection systems.

Used in conjunction with masonry or concrete basement foundation types, this feature indicates the number of basement levels. For general residential, single family homes, or multi-family homes, only one level is supported. For all other residential (except mobile homes) and commercial buildings, multiple levels of basement can be entered, indicated by a number.

AIR

BASEMENT FINISH

Used in conjunction with masonry or concrete basement foundation types, this feature uses a numerical designator to indicate if the basement is unfinished or finished. Finished basements are equipped with interior features such as drywall, plaster, insulation, and flooring, and also contain more valuable contents than unfinished basements.

CUSTOM ELEVATION

The elevation of the local ground surface (in feet) can be entered for this feature, which will override the underlying modeled digital terrain elevation. A higher surface elevation can significantly reduce flood damage and loss.

BASE FLOOD ELEVATION (BFE)

FEMA defines the base flood elevation as the "water surface elevation corresponding to a flood having a 1% probability of being equaled or exceeded in a given year." This is essentially the water elevation (in feet) expected for a 100-year flood. When this information is provided, the model will assume that the building has its lowest floor (including the basement, if any) at the base flood elevation. It is supported for all residential, commercial, and small industrial buildings. Note that any input for First Floor Height (described below) will override BFE values.

FIRST FLOOR HEIGHT

The height of the first floor (in feet), above the ground surface can be entered for all residential, commercial, and small industrial buildings. This overrides the BFE entry. A raised first floor significantly reduces a building's vulnerability to flood damage.

CUSTOM FLOOD PROTECTION

For buildings that are protected by a custom flood protection system, such as a levee or flood wall, this feature provides the height of the custom flood protection system (in feet), above the ground surface.

SERVICE EQUIPMENT PROTECTION

Mechanical, electrical, or plumbing service equipment can be designated as being protected or unprotected using a numerical designator. Protection can be provided by elevating the equipment, or having some type of flood-proofing. This is supported for all residential, commercial, and small industrial buildings.

FLOOR OF INTEREST

In cases where the entire building is not covered under the insurance policy, the floor of interest (including a basement) can be entered with a numerical input. Replacement values (building, contents, and business interruption) and policy terms will be applied for the floor of interest only. This is supported for all residential (except mobile homes) and commercial buildings.

CONTENTS VULNERABILITY

If some of a building's contents are resistant to water damage, or have flood protection, then an indication of the portion of contents that have a low vulnerability can be entered for all residential, commercial, and small industrial buildings. The entries are as follows:

- **LOW:** An unusually large percentage of the contents are water-resistant or protected to resist flood damage
- **MODERATE:** A typical percentage of the contents are water-resistant or protected to resist flood damage
- **HIGH:** A low percentage of the contents are water-resistant or protected to resist flood damage
- **VERY HIGH:** Almost none of the contents are water-resistant or protected to resist flood damage