

STAFF REPORT

TO: Planning Commission

FROM: Kyle Parag, Building Official

RE: Modification to Town adopted Ground Snow Load

DATE: January 14, 2024

BACKGROUND/ANALYSIS:

Every jurisdiction is required to determine a snow load as part of the local climatic conditions specific to the location of the jurisdiction. This snow load is used in calculations by engineers for structural loads imposed on all portions of a structure and used by inspectors to determine structural stability of structures within the Town Limits of Blue River. Historically, Blue River's snow load has been determined to be 100 lbs/sqft, roof snow load. As a roof snow load, the IRC does not permit any reduction for the loads actually imposed on the structure other than pitch reductions.

Heavy snow fall weighs about 1.5 lbs/sqft*inch, which means the current 100 lbs/sqft design criteria equates to a snow accumulation of about 66". In addition to the weight of the compounding snow accumulation, freeze-thaw cycles can create ice, exponentially increasing the total weight. Ice/snow mixtures weigh about 5lbs/sqft*inch. With the analysis of the ice and snow combination, the 100 lb/sqft can be exceeded with only about 20" of late season snow and ice combination accumulation.

Most of the building safety industry uses ground load rather than roof load, which is typically converted by reducing the ground load by 30%. With that conversion, and for comparisons in this document, Blue River would have a current design ground snow load of 142 lb/sqft.

Newer recent data that uses this ideology has indicated the 2% snow load with the addition of the loading for ice for some of the Blue River properties goes up to 227lbs/sqft. 2% snow load is derived from similar methods of the rainfall statistics, such as 100-year rain. A 2% snow load would mean that the load is expected to be obtained with a chance of 2% in any given year, and/or expected every 50 years.

When using the tool below, residential structures are Risk Category II.

<https://asce7hazardtool.online>

For additional information:

<https://assets.ccaps.umn.edu/documents/CPE-Conferences/structural/2022Structural722ASCE.pdf>

The current snow load design criteria the Town uses (142 lb/sqft) is currently on par with the highest snow loads required by jurisdictions throughout Colorado. This snow load poses challenges for the design of structures and promotes steeper roof designs. A significant increase in snow load will create additional costs for the construction of new homes. However, with recent data indicating the relative probability of significantly exceeding the current design loads is likely, I recommend an increase in design snow loads.

As the building official, I am recommending increasing the roof snow load to 140 lbs/sqft (200 lbs/sqft ground snow load).

The above snow load has been determined based on the latest data available and to the best of the staff's knowledge, provides the safest and most reasonable design conditions for the Town of Blue River, without creating undue costs and burdens on the community.

This change will be written in the Town code as part of the climatic conditions table of the IRC, and the value will be used for the local determination in accordance with 1608.2 of the IBC.

STAFF RECOMMENDATION

Staff recommends the commission provide a recommendation to the Board of Trustees to approve an ordinance to increase the design snow load for the Town of Blue River.