2. Experimental Apparatus and Procedure

The experiments investigated 6 large (approximately 3 m to 6 m tall) Douglas-fir trees in the open under quasi-quiescent conditions (without an applied wind field). The experiments were conducted under the 20 MW exhaust hood calorimeter at NIST's National Fire Research Laboratory (NFRL). A schematic of the hood and laboratory space is shown in Fig. 1. The subsections below elaborate further on the hood and describe the setup, instrumentation, and details of the experimental series.

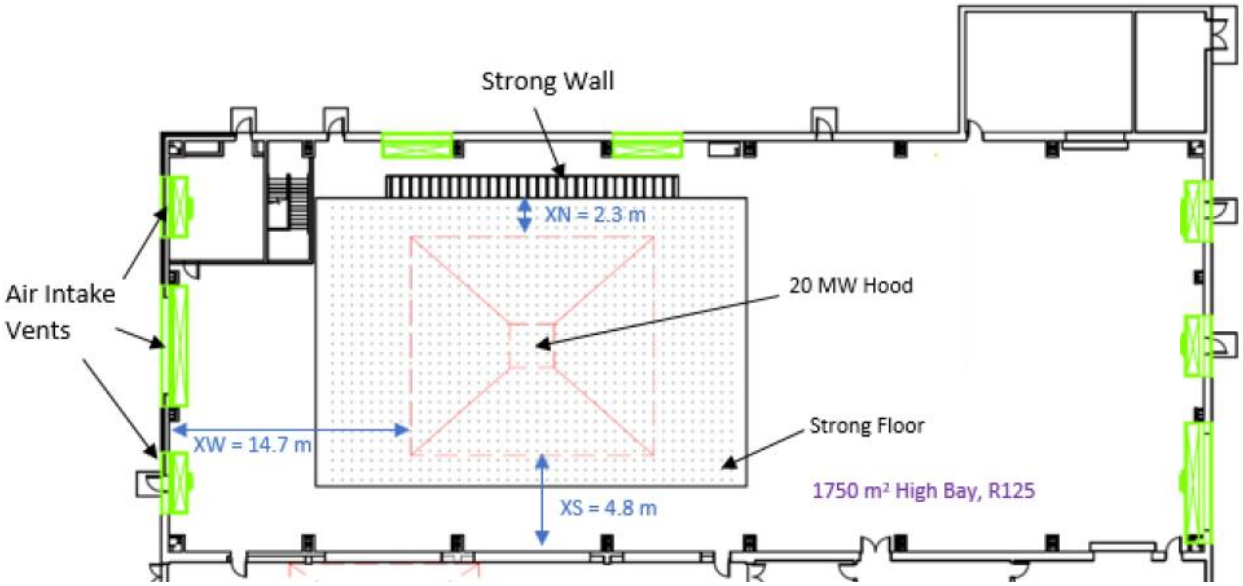

Figure 1. Floor plan of the National Fire Research Laboratory's Room 125, housing the 20 MW exhaust hood.

2.1. Experimental Setup

The 6 large trees were burned one at a time under a 20 MW capacity calorimeter with a 13.8 m × 15.4 m canopy hood. The 20 MW exhaust hood captured the fire effluent for quantification of the heat release as a function of time. A large round exhaust duct (2.4 m diameter) was located 15.3 m above the floor.

Figure 2 shows a plan view of the experimental setup under the 13.8 m × 15.4 m canopy hood. The instrumentation and attachment I-beam columns are shown in their relative positions. The test specimen was placed directly below the center of the exhaust duct. The exhaust flow used during the experiments was approximately 70 kg/s and is listed in the FCD. Side skirts located 6.1 m above the floor were suspended from and surrounded the exhaust hood. Multiple heat flux gauges and plate thermometers were arranged vertically at designated locations as described in detail in Section 2.3.4.