

Preliminary Damage Survey Report:
Wind Damage Event
1 mile North of Ellicott – 5 miles North of Ellicott
May 22, 2006

1. Summary

On the afternoon of Monday, May 22, 2006, severe thunderstorms impacted a narrow area along Ellicott Highway just north of Ellicott, in El Paso County, Colorado. Sporadic damage caused by wind was found along and west of Ellicott Highway along a 4 mile path.

On Tuesday, May 23, 2006, William Fortune, MIC for NOAA/National Weather Service (NWS) Weather Forecast Office in Pueblo conducted a survey of the damage resulting from a storm that moved from south to north over central El Paso County. The purposes of the survey were to determine, as closely as possible, the magnitude and areal extent of the damage, and to evaluate whether any of the wind damage resulted from tornadic winds, straight line winds, or possibly both.

Mr. Fortune determined there was sporadic wind damage along and just west of Ellicott Highway from about 1 mile north of Highway 94 to about 5 miles north of Highway 94 (a 4 mile damage path). The damage area was roughly 100 yards wide at the maximum. All of the structural damage was to individual large span structures which had a south exposure (pole barns, large sheds, etc), or that were oriented from east to west making them vulnerable to a strong south wind. Damage also occurred to other more substantial structures, but this damage was caused by the debris from the large span structures. The debris was found to be aligned in a divergent pattern extending from south to north. This type of damage pattern indicated that the damage was likely caused by straight line winds, with speeds ranging between 70 and 80 mph.

There were no human casualties or injuries.

2. Summary of damage

Damage occurred to structures along and just west of Ellicott Highway between ~3:40 pm and ~4:00 pm. Four structures were damaged directly by the impact of the thunderstorm winds. Other structures received damage from the debris blown from the four structures.

Most of the structures that were damaged by the wind directly were “out buildings” with openings on the south side. There was one mobile home which was not tied down that was pushed over by the wind and received substantial damage.

The first structure damaged (Figure 1) was a large span storage barn facility approximately 30 ft by 40 feet. This structure had an opening on the south side. It was apparent that the strong wind impacted on the south side and blew the roof off. The east,

west and north sides of the structure remained intact, although damaged. The structure was of 2x4 construction with metal siding. A 5th wheel camper trailer, as seen in Figure 1, was positioned on the south side of the structure and was moved by the wind, but was not damaged. Debris from the structure in Figure 1, mostly wood framing and metal siding, was blown northward and impacted a home approximately 200 feet to the north (Figure 2). Some of the debris actually punctured the south wall of the building shown in Figure 2. Debris was deposited in a divergent pattern over open fields north-northeast to northwest. A 3-sided shelter located about 100 yards west of the home shown in Figure 2 was also destroyed. A few pieces of metal siding or roof material from this shelter were deposited in an open field northwest of the damaged home. There were two small camper trailers sitting near another residence 150 yards northwest of the residence in Figure 2. One camper trailer was fully deployed while the other was retracted. The deployed camper was flipped over and moved about 3 feet. The other trailer was not moved nor damaged.



Figure 1. Damaged Storage Barn



Figure 2. Home north of damaged storage barn. Roof debris from the barn is seen laying up on the side of the home.

The next structure found to be damaged was a 60 year old barn made of sod or adobe style material with wood framing (Figure 3). The structure was an open pole barn that faced to the south. This structure was completely destroyed. The roof of a taller barn structure, attached to the 60 year old barn was blown off. Much of the debris from the pole barn was deposited just north of its original position. The sod walls were blown down. Debris from the taller barn structure was blown to the north and northeast impacting a small SUV and the west side of a stucco home. (Figures 3 and 4) Wood from the barn structure penetrated the stucco home on the west side leaving insulation material exposed. There was also damage to the roof. Several other structures north of the barn that appeared to be more substantially built were not damaged other than by debris impact. Some of the debris was collected along a row of trees about 180 feet north of the barn, on the other side of the more substantial structures. Smaller sections of the roof were found northwest of the structure on the other side of a small building that was not damaged.



Figure 3. 60 year old pole barn



Figure 4. Car and wall with damage from debris



Figure 5. Debris penetrating stucco wall



Figure 6. Storage warehouse.

A third structure (Figure 6) had damage on the south facing side. This structure was an unoccupied storage structure. It appeared that the outer walls were in the process of receiving some form of stucco covering. The south wall was pushed inward causing damage to the roof and west wall.

A fourth structure received substantial damage. (Figure 7) This structure was an older mobile home that was sitting on blocks. The structure did not appear to be secured to the ground by tie downs. The mobile home was positioned in an east-west direction and appeared to be perpendicular to the thunderstorm wind. The mobile home was pushed off the blocks. Some of the debris from the mobile home was deposited about 20 yards to the northeast. A more substantial mobile home was positioned in the same way about 10 yards north of the



Figure 7. Mobile home pushed and rolled

damaged mobile home. This structure received only minor damage caused by debris from the damaged mobile home.

Several substantial structures exist along the four mile path between the damaged structures discussed above. None of these structures received significant damage.

3. Eyewitnesses and Radar Analysis

There were several reports of funnel clouds from untrained spotters. One resident along Ellicott Highway reported the following:

About 3:30 PM large hail began falling along with heavy rain. The hail reached 1.5 inches in diameter and covered the ground for a brief time. The hail lasted about 3 to 5 minutes then it became calm and quiet with light rain. Suddenly there was a loud wind noise and debris went flying by the house. The residents took cover on the floor of the home and could hear debris hitting the south side. The event lasted only a few minutes.

At the next residence a similar event unfolded a short time later. Large hail woke the resident and then the wind noise began as the pole barn and attached barn were hit by the destructive winds. A relative of the resident reported seeing a funnel cloud and reportedly captured some of the event on a cellular phone just prior to the damage occurrence.

Radar analysis indicated 2 storms which caused the severe weather in Ellicott. The first was an isolated cell which produced the initial large hail. About 10 minutes later, a cluster of strong storms with damaging straight line outflow winds hit the Ellicott area, causing the wind damage.

None of the witnesses received the severe thunderstorm or tornado warnings issued by the National Weather Service office in Pueblo, Colorado. While a signal from the NOAA Weather Radio – All Hazards transmitter is available in the area, none of the residences have access to a receiver.

4. Warnings

The NOAA/NWS Weather Forecasting office in Pueblo issued a Severe Thunderstorm Warning at 3:29 P.M. approximately 1 minute later a report of 1" hail was received from a weather spotter in Ellicott. Damaging winds and large hail were mentioned in the Severe Thunderstorm Warning. At around 350 pm, a report relayed via NAWAS from the El Paso county sheriff indicated a "tornado was in progress in Ellicott", and that "a home was destroyed and ambulances were being dispatched". Shortly after this time (3:51 pm) a tornado warning was issued by NWS Pueblo. NOAA Weather Radio All Hazards was activated with tone alert for both the severe thunderstorm warning and tornado warning. According to media reports, the El Paso county sheriff first received reports due to wind damage around 3:40 P.M.

5. Conclusions

The damage that occurred during this event was caused by straight-line wind produced by thunderstorms that moved across the area on a south to north trajectory at a speed of 40 to 50 mph. The sporadic wind damage was confined to “large span” buildings that had openings or exposures facing south and to structures that were oriented in such a way as to make them vulnerable to a south wind. Damage to other structures was caused by debris from the damaged structures. Straight-line thunderstorm winds impacted the structures at speeds possibly as high as 70-80 mph taking advantage of weak points on the south side or broad siding structures that were oriented east-west.

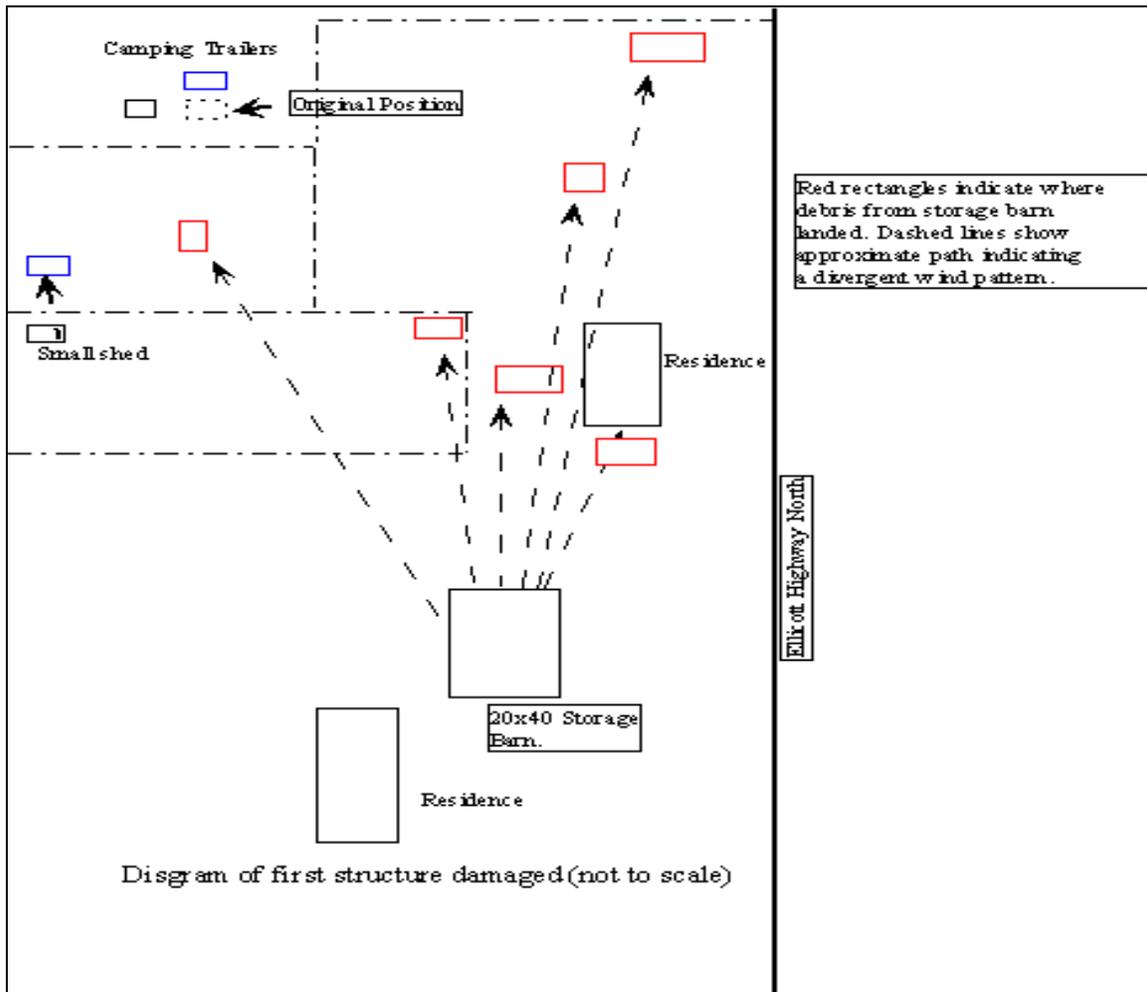


Figure 8. Diagram of debris pattern

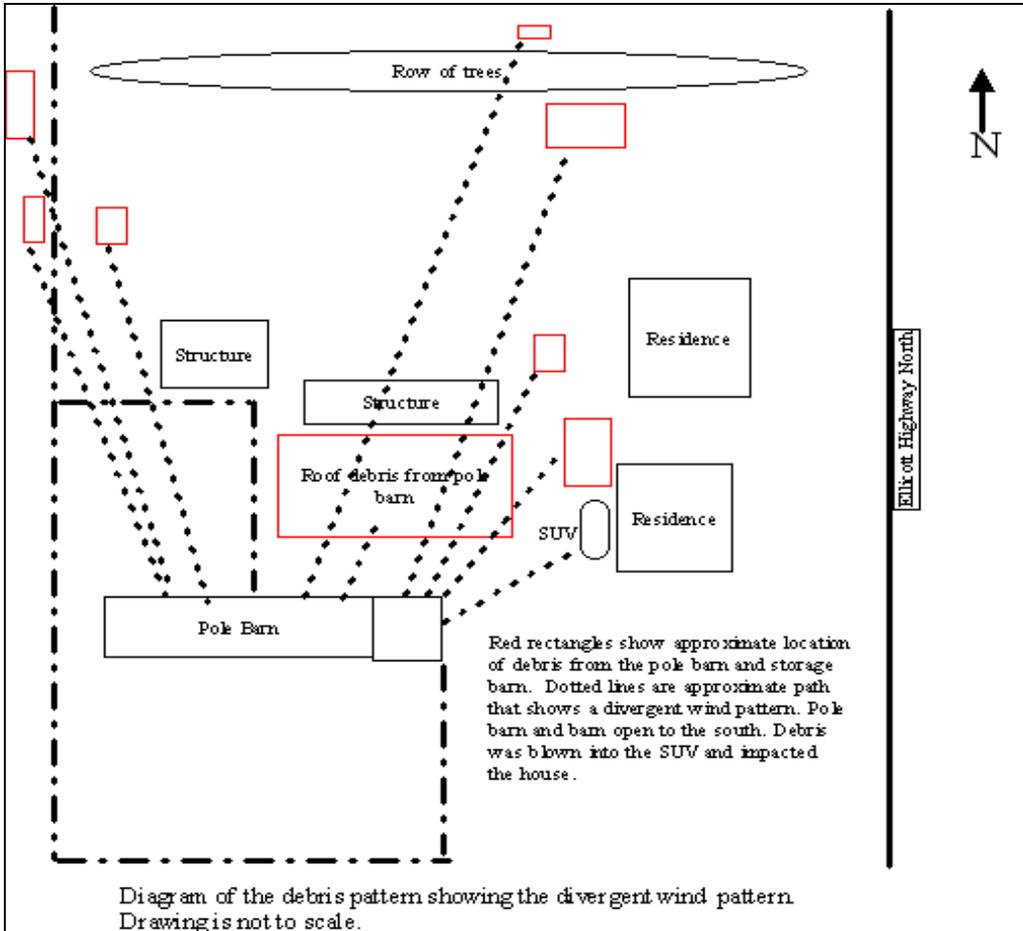


Figure 9. Diagram of Debris Pattern

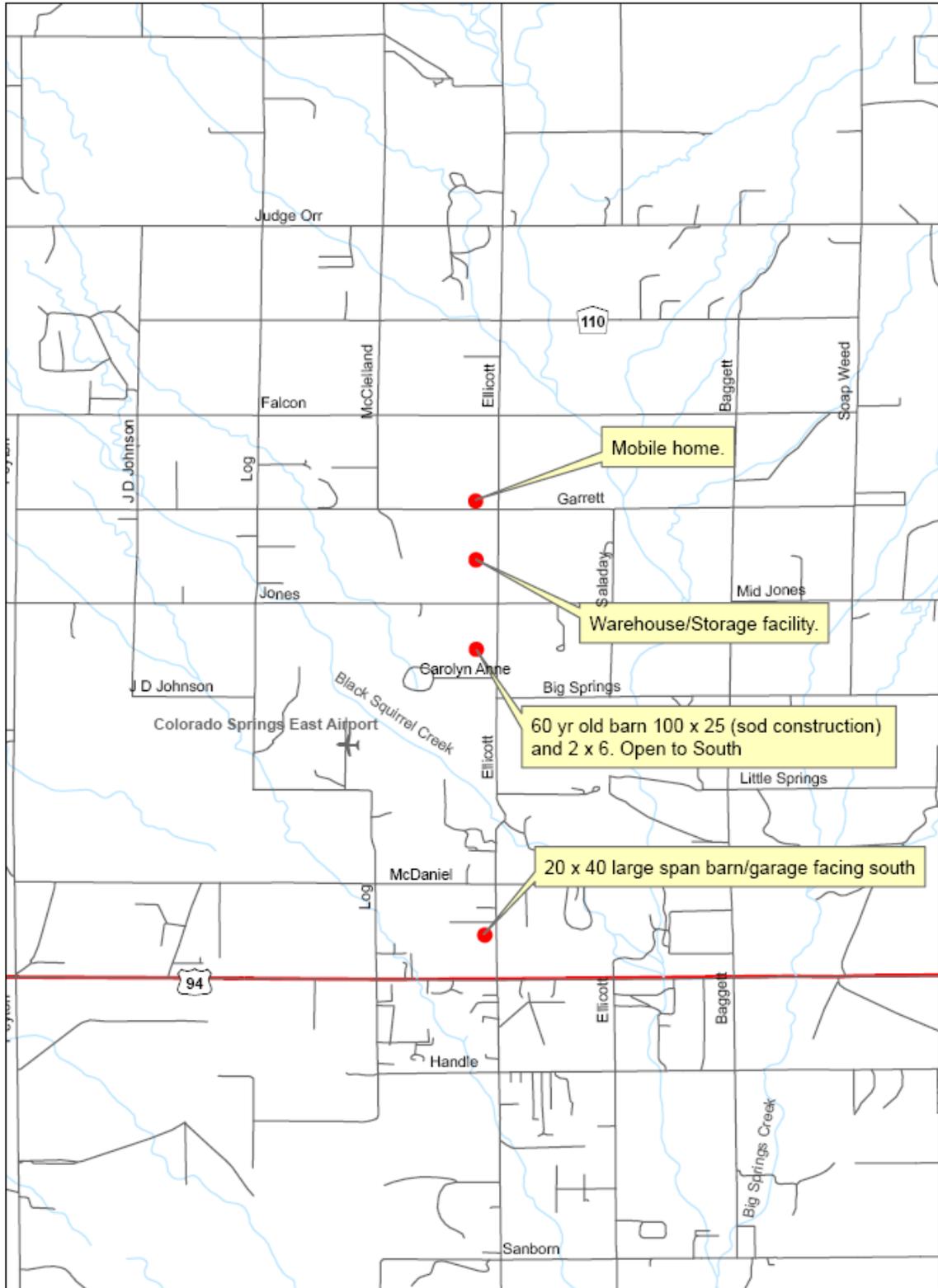


Figure 10. Map of approximate damage locations