

*Note: This assessment was performed from a lift. I did not walk the roof or examine every area in detail.*

### Description

The historic \*\*\*\*\* House includes the main house with a hip roof, and the carriage house with multiple hipped roofs. All of the sloped roofs have matte green Ludowici Classic Interlocking tiles with V-Hip and Ridge.

Flat roofs have soldered hammered seam copper pans.

The entire eave assembly of the house is clad in copper, including a coffered soffit, copper bed molding, and cupreous woven caned soffit vent grills. The gutters of the main house are part of the eave assembly, and are sloped toward the four corners of the house to 3"x4" copper downspouts.

The gutters on the carriage house are two-piece, with an outer formed copper fascia with an inner copper liner. Copper straps hold the gutter assembly back to the roof, and the gutter drains to 3"x4" copper downspouts.

All of the roofing and gutters appear to be original to the 1910 remodel.

### General Condition

The general condition of the roof tiles is excellent for it's age, or good overall. The roof appears to have been carefully installed and detailed well, including the installation of the underlayment and flashing details. The roof attic of the main house is well ventilated and insulated so ice damage has been minimal. I expect that some of the tile interlocks are cracked, and water is leaking in places, but that the underlayment is keeping that water out.

The gutters are wearing out with age, and show the effects of some design flaws. The gutters on the main house are too shallow at the uphill ends and runoff "over-tops" these gutters, found at the center of each facet where there is the most run-off. The slip-joints and expansion joints on the main house may not be adequate, as there have been some signs of stress cracking in the gutter joints. The gutters on the carriage house have too-few outlets, so there is over-topping there as the gutters cannot drain quickly enough. There is also evidence of ice damage on these gutters as they are bent away from the roof.

The copper flat roofs are in good condition overall, with some problem areas outlined below. The flashings are also original (except for the two house chimneys and one vent stack), and may need some work.

## Specific Conditions

Below are listed areas of concern. These are not in any particular order.

### **Roof tile**

While the roof is in as good of a condition as I have seen for a roof of this age, I suspect that some of the interlocking areas of the tiles have cracked, and that some water is getting on to the underlayment. When we remove interlocking tiles on similar roofs, we often find this. It is not urgent, but it should be kept in mind that at some point, the underlayment will fail and that water will begin to leak on to the deck boards and drip into the attic. This could be years from now, or it could start next year.

The hip and ridge tiles were set in colored mortar when they were installed, to seal them down to the field tile and to seal off the nailer board they are attached to. Most of this mortar is missing, so wind-driven rain and snow is getting under these hip and ridge tile, and are rotting out the nailer, as was discovered recently during some repairs. I expect that the underlayment is sealed well against the nailer, but it is only a matter of time before the weather weakens that seal and the roof begins leaking there.

While there is a significant supply of tiles in the carriage house attic, these tiles are also readily available new from Ludowici.

### **Gutters**

These gutters were very well designed and carefully installed from what I can tell without taking them apart. However, the liners are simply wearing through, and some of the joints are failing. None of the leaks will cause immediate damage, but the water will eventually get back to the overhang and start rotting the wood. A section of liner on the south side of the main house has been replaced. The carriage house gutters probably do not perform very well and permit much of the roof run-off to not get carried away to the downspout. Some of the straps on the carriage house gutter have been replaced, probably a result of ice damage. There are only a few downspouts on the carriage house, so the gutters have to convey run-off a long distance.

### **Flashing**

The copper flashing seems to be functional, and the chimney flashing on the main house was replaced within the last few years with new copper, as has an adjacent vent stack. I expect that some of the other penetration flashings may leak or will soon, especially the lead flashings on the two plumbing vents on the main house. These tend to wear through. Another area of concern is the flashing on the carriage house against the side wall. These flashings are continuous, not stepped, and it has been our experience that they tend to accumulate leaf and debris, which clogs the flow of water. The water then is able to flow or wick sideways across the heads of the tiles, and create leaks. These need to be

cleaned in the same schedule as the gutters. I expect that the chimney on the carriage house has leaked or is leaking as roofing tar has been applied to the original counterflashing and cricket.

### **Flat roofs**

There are three flat copper roofs on the main house. The roof over the entryway has lifted from the decking, and should be replaced. The other two are fine, although the low flat roof next to the wheelchair ramp has small impact holes from perhaps someone chipping ice.

### **Counterflashing and Valleys**

All of the original counterflashing I saw needed to be recaulked. Most of the time, these areas will not leak, except in a driving rain. The valleys on the carriage house looked to be in good shape; I did not see any pin holes or thin areas.

Where the entryway roof meets the sill of the second story window, the counterflashing is at least flat, and perhaps may be sloping back under the roof tiles.

### **Other**

There are two metal bands between tile courses above the carriage house chimney cricket. These may have been a repair to a leak, maybe at the same time the roofing tar was applied. It is not clear what these were intended to do as this is not a conventional repair method.

On the south flat roof on the main house, I found that the replaced step flashing was improperly installed and directs water on to the underlayment. There may be other conditions like this on new work.

Some of the soffit vents were closed off in the attic with a sliding cover. All of these vents should be opened and left opened. This will minimize or eliminate ice from forming on the main roof.

On the carriage house above the round-top door, there are matching tears in both the gutter liner and the copper soffit. Both tears appear to be from a force between these two pieces going outward; both bulge sharply outward, and the tears are aligned. I have never seen this pattern and I don't know the cause.

### **Recommendations**

These are in order of priority. I did not see any active leaks and was not made aware of any. There were some suspicious areas, and the gutters leak, but there were no known areas leaking into the building. My recommendations below are all preventive repairs. New leaking or other conditions would change this order.

Within the next year

1. Open all attic vents
2. Replace copper roof and make other repairs over entryway, including flashing, gutter and tile reset
3. Review new flashing details

Within three years

4. Replace carriage house gutters and add outlets if possible
5. Recaulk all counterflashing
6. Replace main house gutters and downspouts

Within five years

7. Replace carriage house chimney flashing
8. Install synthetic mortar under hip and ridge tiles
9. Reset tile roof sections and install new underlayment

### Conclusion

None of the repairs needed are critical, which means that there's time to develop a long-term plan. Please let me know which of these recommended items you would like firm pricing on.