

Arrowhead Point Entrance Monuments

2022 Repairs and design modifications

Early in the spring of 2022, the brick monuments at the two entrances of Arrowhead Point were reviewed by members of the Arrowhead BoD because of structural failure of key portions of the brick work. Bricks were cracked, broken apart, and covered with a white residue in some areas. Some missing bricks had been replaced with standard red building brick. The monuments were falling apart, and the damage was increasing each year.

A small committee of architects, engineers and other Board members met with various brick masons and amongst themselves to come up with a plan of action. It was also determined that individual, yet much smaller, brickwork in homeowner lamp posts and monuments were failing as well.

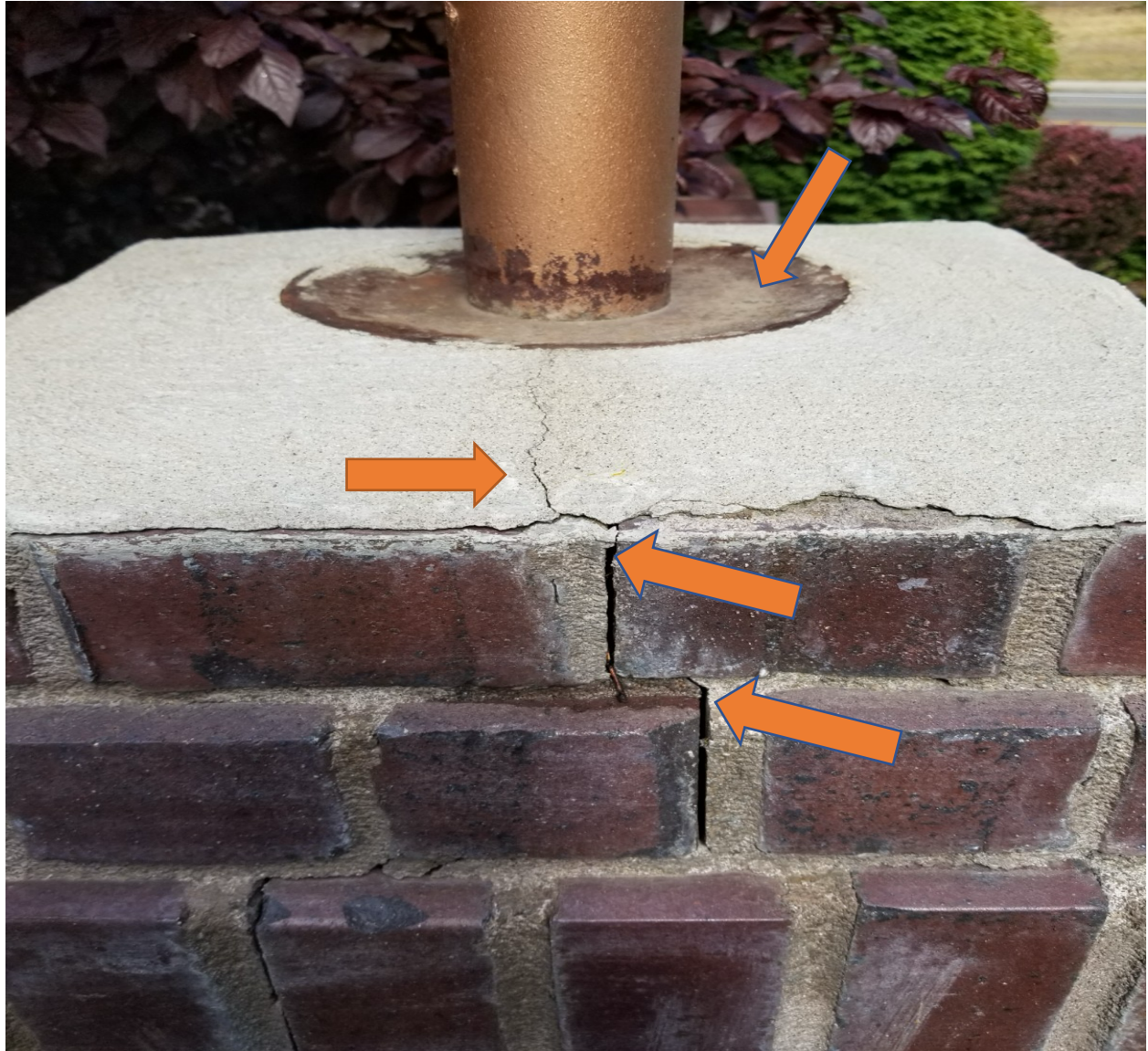
After some considerable thought, discussion and analysis, the problems with the brickwork at the entrance monuments and the individual neighborhood lamp posts and brickwork can be traced to water, water, and water, plus poor design, and poor maintenance. Water in its frozen form is the biggest culprit.

Water, when it freezes, expands about 10%. When that water is trapped in the tiny pores and crevices in the brickwork from rain and sprinklers in the fall and then freezes during winter, it expands 10% and splits open the bricks and the brickwork. It's a bit more complicated than that, but not much more.

The pictures below show what happened to our entrance monuments.



Orange arrows show areas of mostly poor brickwork design. Red arrows show areas of mostly poor sprinkler design. But please remember, everything works together as a whole and water in its frozen form is the main problem.



This is an example of very poor design. Rain water and melting snow collect on top of the column (in the “cup” and through the crack in the mortar cap) and drain into the brick column. Gradually the column splits open when the ice trapped inside freezes and expands making cracks in the mortar joints. After that even more water can then enter. The brick “ledges” or “steps” contribute to the collection of snow/rainwater and further increase the amount of water that can seep into the column. You can see water draining from the top mortar joint and collecting on the middle “ledge”.



The top row of brickwork has fractured and spalled due to multiple cycles of freezing and thawing. Eventually pieces of brick simply fall off (called spalling).

So far, only the top row of brick has been damaged. Left alone, the next row down will fail in the same way



This image illustrates many of the problems associated with the Arrowhead Point brick monuments.

1. Much of the brickwork is flat. It has no slope to drain water away from the surface.

2. Sprinklers spray water for the plants (day lilies in this case) right up till winter.

3. Originally, the water sprayed

everywhere, and hard water salts built up on the brick surfaces (the whitish scum) making it harder for water to migrate to the surface and evaporate.

4. Note also that the sprinkler head (red arrow) has now been changed from a “spray everywhere” style to a plastic tube that waters the plant much more directly and efficiently. There are still several sprinkler heads that need to be modified to match this technique in the coming spring.

THE ARROWHEAD BoD DEVELOPED A PLAN FOR THE DAMAGED MONUMENTS

The first step was to find out if we could repair the monuments or would we have to tear the monuments down and rebuild something with a better design. It didn't take long to realize that a complete rebuild would be expensive and take a lot of time and much discussion. The manufacturer of the original brick was from Canada and had gone out of business about ten years ago. Getting even a similar brick was expensive and would have required the development of a custom brick. However, everyone we spoke to still likes the original design and look of the current monuments. So, we decided to try and repair the monuments. Only time will tell if we have succeeded.

The final plan centered around the principles of reducing the amount of water attacking the monuments, as much as possible, from all sources, fixing some of glaring design and maintenance flaws and salvaging as much brick as possible during the repairs to replace totally failed brick. Sprinklers are one of the most common sources of excess water. You can tell if sprinklers are spraying all over the bricks by the whiteish scum/residue left behind after the water evaporates. These are the signs of hard water deposits. Spokane water is filled with dissolved minerals of calcium and magnesium, and it is easy to see if excess water is coming from the sprinklers by the location of the mineral salts.

Homeowners are encouraged to drive around North Spokane and look at other brick monuments. In addition to redirecting sprinklers away from the brickwork, it will be clear that the use of concrete caps on freestanding brickwork and lamp posts is one of the other primary methods of reducing water entry into these structures. Sloped surfaces on the concrete and a concrete overhang of the brickwork are now standard practice and drain away rain, melting ice and snow and sprinkler head water. Sealers are also used on top of the caps to reduce water penetration.



This is how our Center Street entrance looks after the repairs and with snow on top. Note that the caps all hang over the edge of the bricks. They do not drain onto other bricks.

While it is hard to see in this picture, each cap has a slope away from the bricks of $\frac{1}{4}$ inch per foot.

Note also that one row of the original flat brick around the planters have been removed and replaced with sloped caps about $1\frac{1}{2}$ - 2 ft long by 13 inches wide. Thus, minimizing water entry through the grout joints.

The total cost so far for both the Center and Wilson entrances is about \$9200. That includes caps, masonry, mortar, and delivery. There is still work to do on the sprinkler layout next spring.



This is a current close up of the arrowhead pictured previously.

Note that the “cup” is now gone, mortar joints have been refilled with mortar and the slope of the caps drains water and snow away. Note also that the sealer has kept water from soaking into the cap. You can see how the water now beads up and can drain away.

Sealers should be used on the top of brickwork not the sides. A sealer that coats the sides of the vertical surfaces will tend to lock moisture into the brick instead of letting the water in the brick slowly move to the surface and evaporate away during sunny days.



Unfortunately, this was not one of our ideal repairs. We wanted to replace the entire top row of vertical bricks but there just weren't enough good bricks left over. So, we simply capped the flat surface and re-pointed the mortar joints as best we could.

This will be an area to watch closely. If this holds up over the next several winters, then we will know that stopping water entry from the top and rearranging the sprinkler heads are the best practice to follow.

Removing the white residue is a future goal, but very difficult at this point because the build up is so thick. We will be doing some experiments this spring and summer.

There are quite a few homes in Arrowhead Point that have similar problems with lamp posts and brick monuments. Some of them are going to be more difficult to solve than others. However, for the price of a cappuccino at Starbucks, I will be happy to share the board's experience on this issue and help you find a reasonable solution if your home has failing brickwork.

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