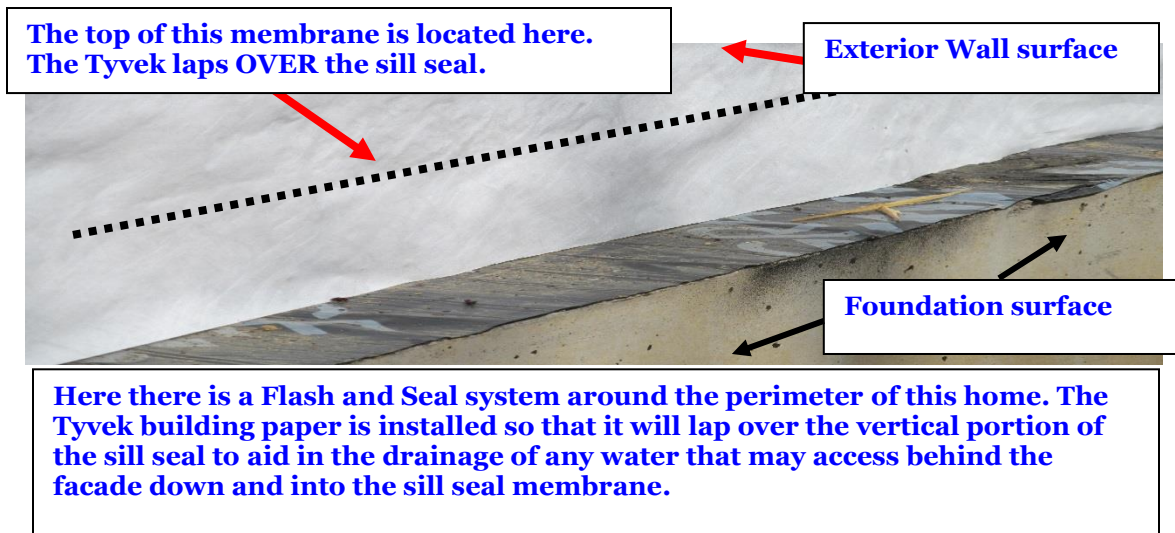


January 2019

## Exterior Walls & Exterior Trim Stone and Brick

If there are **brick and/or stone façade surfaces** on the exterior walls of the home, the installation of these components must include the following things:

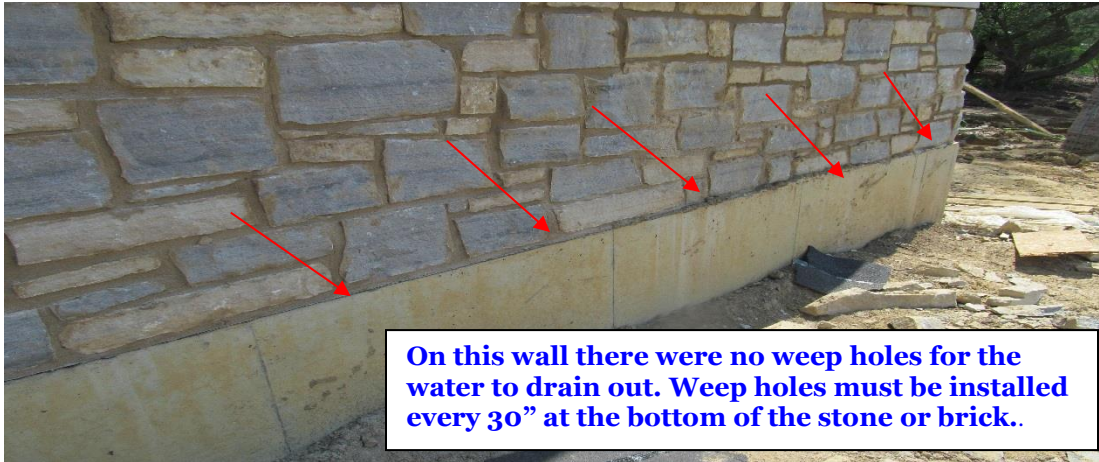
**1). Sill membrane:** There should first be a **sill membrane**, also known as a **sill seal**, that is installed prior to the stone installation. Some means of drainage must be installed, such as building paper or tar paper or other drainage methods, that are terminated into the sill membrane. The sill membrane is installed by adhering it to the top of the concrete foundation and which is wide enough to travel in a continuous piece up the wall surface by “6 to 12”.



**2).** A “**sill flashing**” foundation seal must be installed around of the walls/foundation wherever there is to be stone or brick. The wall must be held back from the outside lip of the foundation, typically 4”, in order to provide a ledge. This allows room for the bearing of the stone or brick facade.

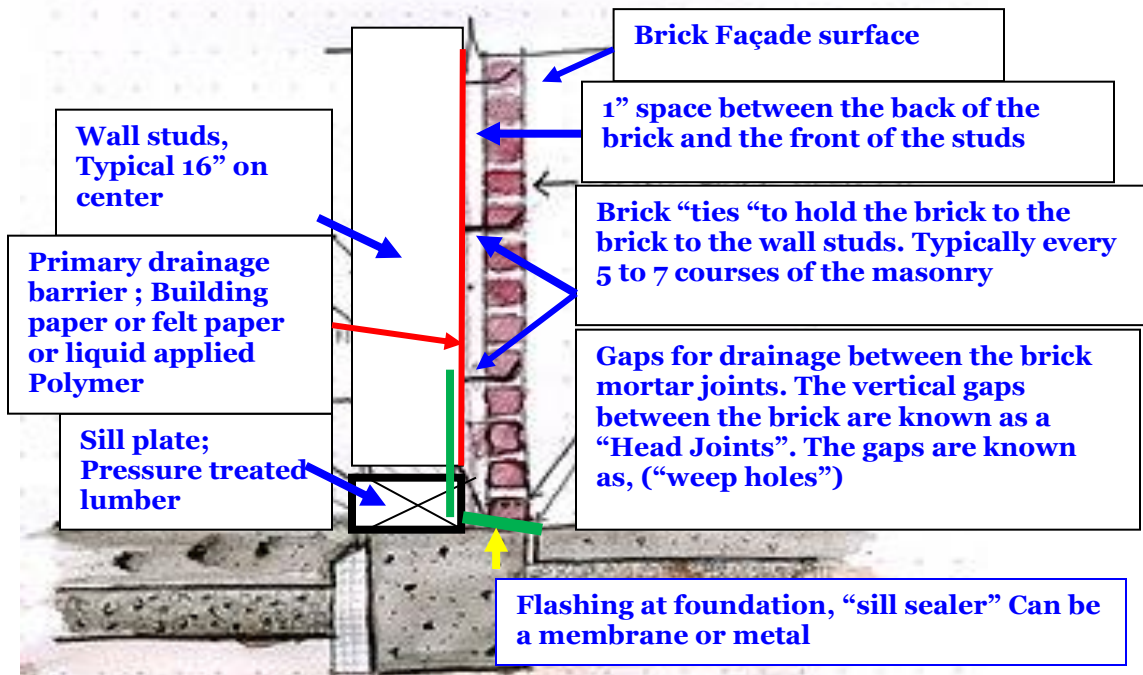
With proper bearing and proper flashing and proper drainage behind the future stone or brick, the wall facade is ready to be constructed. There must be created an air space between the back of the stone or brick and the wall substrate for any water that may access through the façade so that the water will escape out the bottom weep holes. This “drainage system” will allow for the collection of any moisture and channel it to drain or evaporate from the plastic or polymer or tar-based primary barrier that is impervious to water penetration.

**3). Weep Holes** - There need to be **weep holes** along the base of the stone/brick. The weep holes should be installed prior to the stone setting and should be designed to allow any moisture that may develop behind the stone to drain out.



The weep holes can take the form of plastic tubes, head joint gaps or other means. The weep holes provide a pathway for any water that may access behind the wall facade to drain out. Without weep holes at the bottom course of brick or stone, water can find an access into the wall or into the floor of the house that is behind the façade.

## ANATOMY OF A BRICK FAÇADE WALL



Today all windows and doors that have a brick façade must have weep holes installed above and below the openings at these locations. The installation of weep hole locations is shown in the photos below.

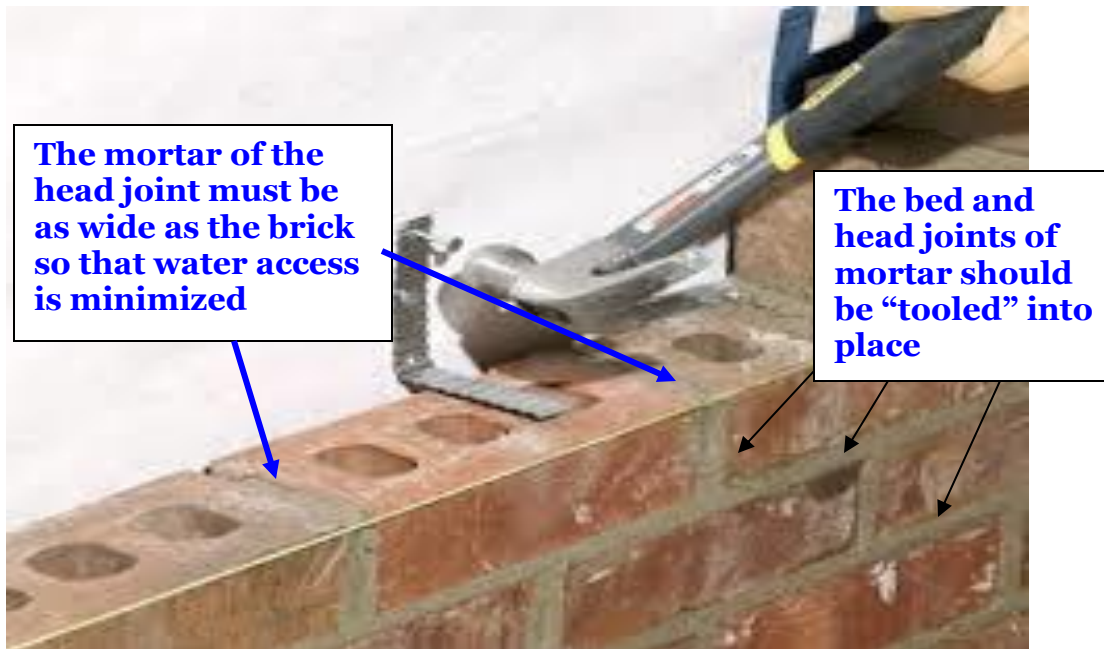


**Where there are arrows, there must be weep holes at every window and door**

In 2018, the requirement for weep holes had increased from simply installed at the bottom of the stone or brick at the first course of the brick or stone to several other locations. Now, at the top of every door and window, there must be a weep hole for drainage. They also must be installed at gable walls where the bottom of the gable touches the top of the wall plate. There may be other locations as well; local building codes vary in what is adopted from the national building code requirements.

Together with the flashing that is required above and below windows and doors, the water is directed outward from the air space behind the façade to the exterior of the wall.

**4). Brick mortar installation** - There are head joints and there are bed joints in brick and stone installations. The head joints are the vertical mortar-filled spaces between the brick or stone. The bed joints are the horizontal mortar locations that provide a place for the brick or stone to lie. One of the biggest problems with brick façade installation is at the mortar in the head joints on the brick façade. The head joints are often not as thick as the width of the brick. This causes the water on the exterior wall to be drawn through the mortar and into the air space between the brick and the wall. This occurs via capillary action of the surface water and is a source of water leaks in brick and stone façade homes.

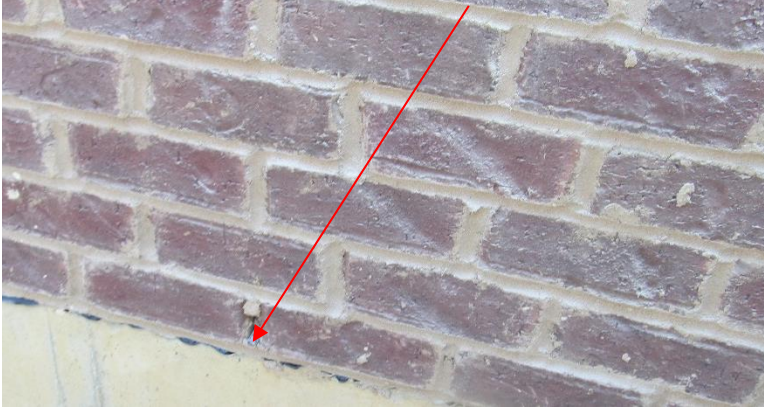


The mortar should contain acceptable levels of Sand and Portland cement mixture and it should be tooled properly into place. A smooth surface with a slight “glaze” on the mortar surfaces is indicative of proper tooling with a “tooling trowel”. With the mortar tooled properly, the mortar is compacted on the exterior surface and is not prone to water access via capillary water movement.

**5). Brick or stone air space** –Between the brick and the substrate, there should be an approximate 1” air space between the back of the brick or stone and the exterior facing surface of the substrate. This air space should be relatively free of mortar “bridging” and other types of obstructions. If there is less than 1” of space between the substrate and the back of the brick, the wall drainage system will still function but if a great deal of mortar should fall down between the back of the brick and the outside surface of the substrate inside the air space, the accumulated mortar can block the air space and cause problems with water access. This is called mortar occlusion.

**6). Mortar, brick and weep holes** – The brick façade as well as the mortar in the stone façade will allow some moisture to pass through the surface in some situations. Water movement will always be toward the cooler surfaces and away from any heated surfaces. Water often moves in vapor form and then condenses on the building paper or vapor barrier inside the wall assembly. How much water movement occurs through the brick and mortar is dependent on a variety of factors including the porosity of the individual brick and mortar. Once liquid water from vapor condenses on the back side of the brick or stone it must be able to run down the back side of the bricks and then exit out of the weep holes. The volume of water that will drain out of any weep hole is normally minor.

The weep holes that are at the base of the walls and above or below windows and doors must be clear of mortar and debris. In the below picture, there are no weep holes below the various windows or the rear door. There should be enough brick weep holes to provide sufficient pressure equalization in the air space as well as drainage terminations around the perimeter of the home.



**7). Brick/Window installation** - Expansion gaps between the stone mortar and the window frames are needed. If the brick is too tight against the window frame, there will be excess stress placed on the window frame by the expansion and contraction of the brick and mortar, and also then from distortion of the window frame joints where the top and bottom of the window side jambs intersect the head and sills.



**8). Weep Holes at Window Sills** - This window sill was installed with stone. This is an excellent material because it is one continuous piece and there are no gaps that can take on water. A 15-degree slope is the best slope to have for the stone sills so that water can drain away from the window frame surfaces.



Lastly, when the final grade is accomplished, the **finish soil grade** of all planting beds should always be kept lower than 3” from the bottom of the brick surfaces in the future. All mulch and planting beds should be kept lower than that level in all locations so as to allow proper “fall” of the soil grade away from the foundation and thus prevent any termite or carpenter ant access.

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