Building Restoration Corporation

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Phone: 612-789-2800

November 13, 2023

Karen Swanson
Business Administrator
Our Lady of the Lake Catholic Church
201 Lake Shore Drive East
Ashland, WI 54806

Dear Ms Swanson,

Thank you for the opportunity to provide this budget estimate for masonry repairs and maintenance at the Our Lady of the Lake church and school buildings. I especially appreciate the time you and your staff spent with me during my visit to the site.

As we discussed during our tour of the site, there are a lot of opportunities to make improvements in the condition of the exterior masonry around the entire campus, but for the purposes of this budget estimate, I am addressing only the front of the church, all four sides of the bell tower, the east elevation of the church, and the school building. The conditions on the north and west church elevations, and the Pastoral Center building are similar, and when time permits, we can supplement this estimate with more specific information on those areas.

Our budget estimate includes identification of specific conditions like damaged stones, and unit pricing for repair work, such as replacing individual stones that are too badly damaged to repair by patching. We also provide an estimate of the quantity of the various work items that is needed. The estimated quantities are based on direct observation of the building exterior, usually from ground level. The nature of restoration work is that during the course of most projects, hidden conditions are exposed, and with this building, I want to emphasize the potential for the actual quantities of work to be higher than the budget estimates.

During our site visit, you mentioned that your priorities are the front and east elevations of the church building. I felt that the tower elevations are also a high priority as access to them is challenging and the ability to assess their conditions is limited. I also decided to include the school building because the conditions in need of attention are currently allowing water infiltration that is causing further damage to the building that will be expensive to repair. Making the appropriate repairs to the exterior envelop now is likely to reduce the amount of additional damage.

Work items included in our recommended repair scope include cutting and tuckpointing of mortar joints, repair and replacement of damaged stone and brick, removal and replacement of caulking sealant, and related work items.

Cutting and Tuckpointing of Mortar Joints

A widespread problem throughout the campus buildings is the cracking and deterioration of mortar joints. Deterioration of mortar is a natural process in response to the building being exposed to the elements over a number of years, and cutting back the joints and installing new mortar is a normal maintenance activity that will restore the ability of a masonry wall to resist moisture infiltration. A review of the mortar in the campus buildings reveals that a number of projects over the years have included replacing mortar. Unfortunately, most of the work has been of a poor quality using inappropriate materials. This has resulted in a patchwork of different colors, joint widths, and surface profiles around the building, with many of these “repairs” already failing.

We recommend that any future tuckpointing be done using a mortar that is specifically formulated to match the mortar used during the construction of the church. The mortar would have the appropriate color, texture, and compressive strength to result in an attractive and durable repair. We also recommend that the joints be finished with raised beaded joints so the joint profile is consistent with the original design of the building. Rather than continuing with the practice of spot replacement of only the most seriously damaged joints, we are recommending that 100% of the existing mortar joints on the church building be cut and replaced. On the school building, there are large sections of the original mortar that appear to be in fine condition. Our budget estimate is that up to 20% of the existing mortar joints are cracked or deteriorated. These joints should be cut back and replaced using a mortar that matches the original mortar.

Repair of Deteriorated, Damaged, or Loose Stone and Brick

Since the type and degree of damage to the existing stone of the church varies quite a lot, the type of repair that is most appropriate also varies. Some of the stones are so badly deteriorated that they will have to be replaced. Replacing this stone with matching stone is a difficult challenge since there is no supply of matching stone currently available. Options for replacement include stones salvaged from the demolition of other buildings, use of stone that has a similar appearance, and custom fabrication of replacement using color matched concrete. The pricing for the options vary as well, so the budget estimate was prepared using a medium price point so that it is possible to have a general idea of the cost of this work item in advance of analyzing each stone that might be included in a repair.

Other than replacing damaged stones, in some cases it will be appropriate to install patches, or in the case of cracked stone, an epoxy injection process can be a reasonable repair. Loose and damaged brick would be replaced with brick that match the existing as closely as possible. One of the key elements of stone or brick replacement is to gain an understanding of what caused the original material to fail. Often conditions inside a wall will be exposed as the exterior masonry is removed. When possible, those conditions should be corrected to prevent the replacement masonry from suffering the same type of damage.

Removal and Replacement of Caulking Sealant

Caulking sealant has a limited life expectancy of about 10 years depending on what it is made of and how it is installed. As sealant ages it is less able to remain both flexible and adhered to the joint surfaces, so it eventually allows moisture to penetrate past the joint it was installed to protect. Regular maintenance of caulking sealant includes monitoring its condition over time and making spot repairs as small problems are detected. Eventually the sealant should be removed and replaced. The work areas included for replacement in this budget are mostly window and door opening perimeters.

Related Work Items

One of the conditions observed on the school building is running cracks in the brick. As noted in the attached photos, some of this cracking is related to the expansion of the rusting window lintels. As the steel rusts a build up of rust flakes develops and eventually reaches the point where there is so much pressure from the rust that it is able to crack the surrounding masonry. The repair for this condition is to remove and replace cracked brick, and tuckpoint the cracked mortar joints. Work should also be performed to remove or reduce the rust build up on the steel lintel that caused the problem. The appropriate repair will depend on the severity of the rust condition, but could include sawing the surface of the steel to remove rust, all the way to removing the lintel and replacing it with a new galvanized, or epoxy coated lintel.

Another brick damage condition is cracking caused by the expansion of the brick itself. When brick come out of the kiln, they are a dry and small as they will ever be. Over time, clay based brick that are exposed to the elements will begin to get bigger. The amount of expansion in any single brick may be difficult to measure, but when there is a wall of brick several hundred feet long, the cumulative expansion can add up to the point where there is enough pressure to crack the brick. In modern brick veneer buildings this type of expansion is planned for and expansion joints are included at regular intervals. Caulking sealant is used to fill these joints because it can keep moisture and insects out of the wall cavity. As the brick on either side of the joint expand, the caulking can be compressed without damaging the bricks. When the caulking sealant is replaced as part of normal maintenance, joints that have become narrow due to brick expansion can be sawn to widen them before the new sealant is installed.

In order to relieve brick expansion pressure in the exterior brick walls of the school, we are proposing to saw cut full height expansion joints in the brick. Caulking sealant would be installed in these joints to make them weathertight, and as brick expansion takes place going forward, the sealant will absorb that movement protecting the brick from being damaged.

The capstones on the gable front wall of the church have horizontal joints at the ends of each stone that are especially vulnerable to water infiltration because of the tendency for ice and snow to collect on them. As the winter season runs it's course, this ice and snow go through many cycles of freezing and thawing. Each cycle of thawing saturates the stone and the joints between the stones, and each freezing stresses the stones with the formation of ice. Joints like these end joints eventually fail and moisture gets down into the body of the wall and under the large capstones. The eventual result is the type of damage we were called to repair during our 2015 project.

Installing caulking sealant in these end joints is a reasonable way to prevent water getting into them, but sealant has a limited life expectancy and when it fails, it is unlikely anyone will notice, especially on top of those gable capstones. The primary reason the sealant fails is the exposure to UV radiation from the sun. We have included a work item in the budget for the installation of lead "T" joint covers for some of the vulnerable joints on the front of the church. In preparation for the joint covers, the end joints are cut back and sealant is installed as usual,.Instead of the final step being the smoothing of the sealant surface, the lead "T" is installed into the joint while the sealant is still soft. This leaves the joint cavity full of sealant that prevents any water entry, and the horizontal portion of the "T" protects the sealant from having any sun exposure. This creates a very effective and durable joint at these difficult locations.

We have included pricing for chemical cleaning of the church elevations included in this budget estimate. Performing the cleaning would make a dramatic difference in the overall appearance of the building, and doing it in conjunction with the other recommended repair work would give the overall project a great impact. If you have any interest in seeing what the cleaning could accomplish, we would be able to do a sample area in an unobtrusive section of the north side above the roof rather than create a clean spot on the side of the church building.

We have provided a lot of information as part of the budget, and I hope that it helps with discussions within the church as you consider how to proceed. Please call me with questions as they come up. I can be reached at 612-309-4054. My email address is john@buildingrestoration.com.

Sincerely,

John Felton
BUILDING RESTORATION CORPORATION

Our Lady of the Lake Catholic Church
2023 Masonry Repairs and Maintenance Budget

11/7/23

Front Elevation (below tower)	*Qty*	*Unit*	*Unit Cost*	*Total*
Mobilization, insurance, and General Expenses	1	lump sum	4,840	4,840
Dumpster expense	2	Each	585	1,170
Equipment expense	1	lump sum	2,500	2,500
Aerial lift or scaffolding	1	lump sum	17,600	17,600
Solid 100% cutting and tuckpointing of mortar joints Joints in stone to be raised beaded profile	1	lump sum	104,616	104,616
Replacement of selected stones judged too badly damaged to patch. Estimated Quantity	36	Each	468	16,848
Patching of stones with surface damage Estimated Quantity	40	Each Patch	284	11,360
Remove and replace caulking sealant at window and door opening perimeters	0	LF	14	0
Final acid wash and rinse down of wall	1	lump sum	4,684	4,684
Front Elevation Subtotal				**163,618**

Tower Elevations (4 sides)	*Qty*	*Unit*	*Unit Cost*	*Total*
Roofing protection by others				
Dumpster expense	2	Each	585	1,170
Equipment expense	1	lump sum	1,500	1,500
Aerial lift or scaffolding	1	lump sum	9,900	9,900
Solid 100% cutting and tuckpointing of mortar joints Joints in stone to be raised beaded profile	1	lump sum	50,472	50,472
Replacement of selected stones judged too badly damaged to patch. Estimated Quantity	12	Each	468	5,616
Patching of stones with surface damage Estimated Quantity	18	Each Patch	284	5,112
Remove and replace caulking sealant at window and door opening perimeters	0	LF	14	0
Final acid wash and rinse down of wall	1	lump sum	3,468	3,468
Tower Elevations Subtotal				**77,238**

East Elevation	*Qty*	*Unit*	*Unit Cost*	*Total*
Styrofoam and plywood roof protection on low roof	1	lump sum	884	884
Dumpster expense	2	Each	585	1,170
Equipment expense	1	lump sum	1,500	1,500
Aerial lift or scaffolding	1	lump sum	14,400	14,400
Solid 100% cutting and tuckpointing of mortar joints Joints in stone to be raised beaded profile	1	lump sum	114,768	114,768
Replacement of selected stones judged too badly damaged to patch. Estimated Quantity	28	Each	468	13,104
Patching of stones with surface damage Estimated Quantity	20	Each Patch	284	5,680
Remove and replace caulking sealant at window and door opening perimeters	0	LF	14	0
Final acid wash and rinse down of wall	1	lump sum	3,468	3,468
East Elevation Subtotal				**154,974**
Total for 3 sections listed above				**395,830**

North and West Elevations Not Included

Alternate Work

Installation of lead T joint covering at end joints of Brownstone gable capstones, ledge over main entrance, and vertical water table caps.	130	LF	52	6,760

Exclusions:

Painting, window repair, roof repair, landscape restoration, any other work not listed above

Our Lady of the Lake Catholic Church
2023 Masonry Repairs and Maintenance Budget
School

11/9/23

	Qty	Unit	Unit Cost	Total
Mobilization, insurance, and General Expenses	1	lump sum	4,840	4,840
Dumpster expense	3	Each	585	1,755
Equipment expense	1	lump sum	2,500	2,500
Aerial lift or scaffolding	1	lump sum	6,650	6,650
Spot cutting and tuckpointing of cracked mortar joints Estimate 20% of joints to be included	1	lump sum	49,280	49,280
Replacement of loose and damaged bricks Estimated Quantity	240	Each	28	6,720
Refacing of and loose and damaged block Estimated Quantity	25	Each	78	1,950
Patching of block with surface damage Estimated Quantity	6	Each Patch	68	408
Remove and replace caulking sealant at window and door opening perimeters	1,626	LF	14	22,764
Final acid wash and rinse down of wall	1	lump sum	4,684	4,684
School Subtotal				**101,551**
Alternate Work				
Saw cut to create full height expansion joints	5	Each	414	2,070

Exclusions:

Painting, window repair, roof repair, landscape restoration, any other work not listed above

Masonry repair and maintenance is needed on all of the Our Lady of the Lake campus buildings. Cutting and tuckpointing of deteriorated mortar joints, patching and replacement of damaged stone and bricks, removal and replacement of caulking sealant, and other related work is outlined in this report and the attached budget estimate.

In addition to the age of the church building, the proximity to the busy highway with constant vibration from heavy trucks and seasonal exposure to de-icing chemicals has contributed to an accelerated rate of deterioration.

It appears that some of the de-icing chemical deterioration may have come from chemicals applied to the steps and sidewalks to make them safe to use during the winter conditions.

Examples of different types and degrees of stone damage are shown in these photos. Conditions run from weathering away of the stone surfaces to deep cracking and loss of portions of the stones. Recommended repairs depend on the individual stone conditions. In some cases, cutting back and replacing the surrounding mortar is a reasonable response. In other cases, entire stones may need to be replaced because the existing ones are too badly damaged to be repaired.

Unfortunately, Bayfield Brownstone like that used in the construction of the church is no longer being quarried, so finding repair stone that will match well with the building is difficult. There are a number of high quality stone patching materials available for repair of smaller cracks and spalls.

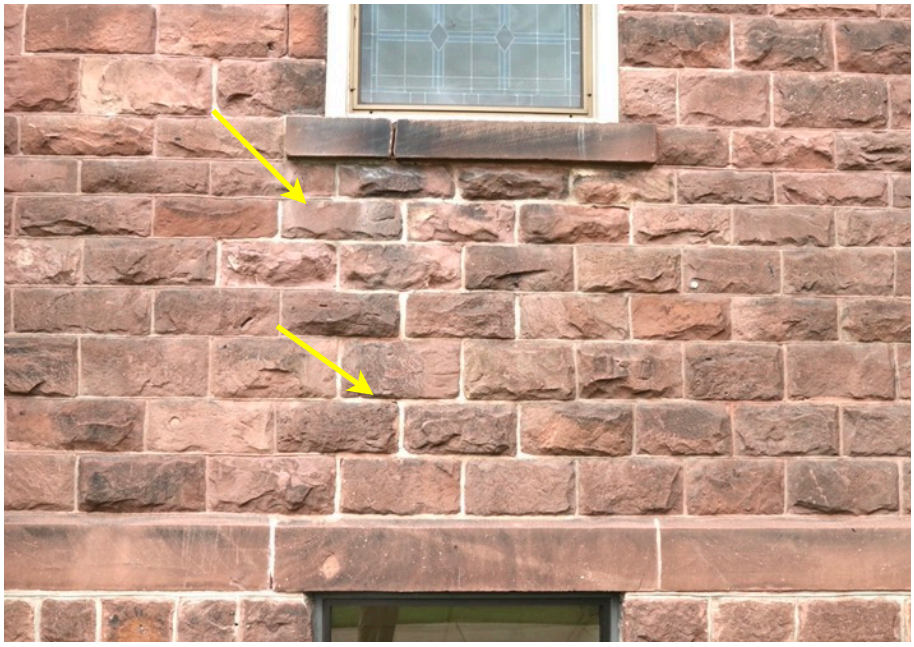
In 2015, loose stones were reset and anchored on both ends of the main gable wall. The stones appear to be stable as there are no signs of shifting or cracking of the masonry on either corner.

The intent of the 2015 project was a temporary stabilization with more comprehensive repairs to follow once finances allowed. In order to save money at the time, some damaged stone was left in place, and the mortar joints were not finished with the raised, beaded profile.

A noticeable feature of the church is that the stone exterior is badly soiled. Costs for chemical cleaning of the building are included in the attached budget estimate.

The east side of the church is also included in the attached budget estimate. We are recommending that 100% of the mortar joints be cut and tuckpointed as part of the work, but it is not possible to accurately predict the quantity of stone repair and replacement that will be needed until the work is under way. The estimate includes unit prices for this type of work item where the actual quantity can vary.

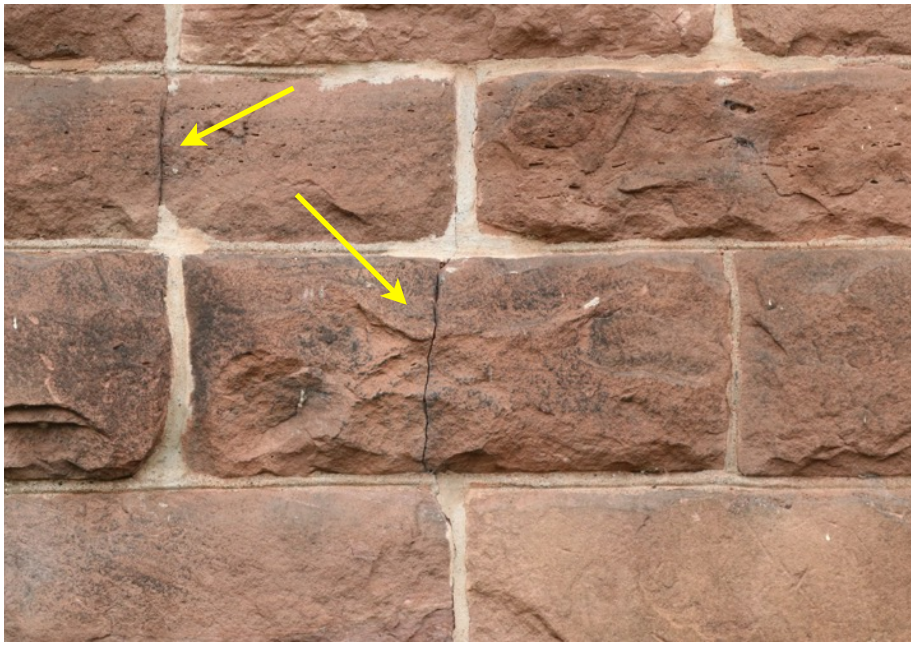
Movement in the building structure over time can lead to cracks in the mortar joints, and eventually in some of the individual stones. In this area it appears that a weakness in the structure between the upper and lower windows allowed a running crack to develop. The crack extended up into the sill of the upper window, and has created a path for water to continue to leak into the wall.



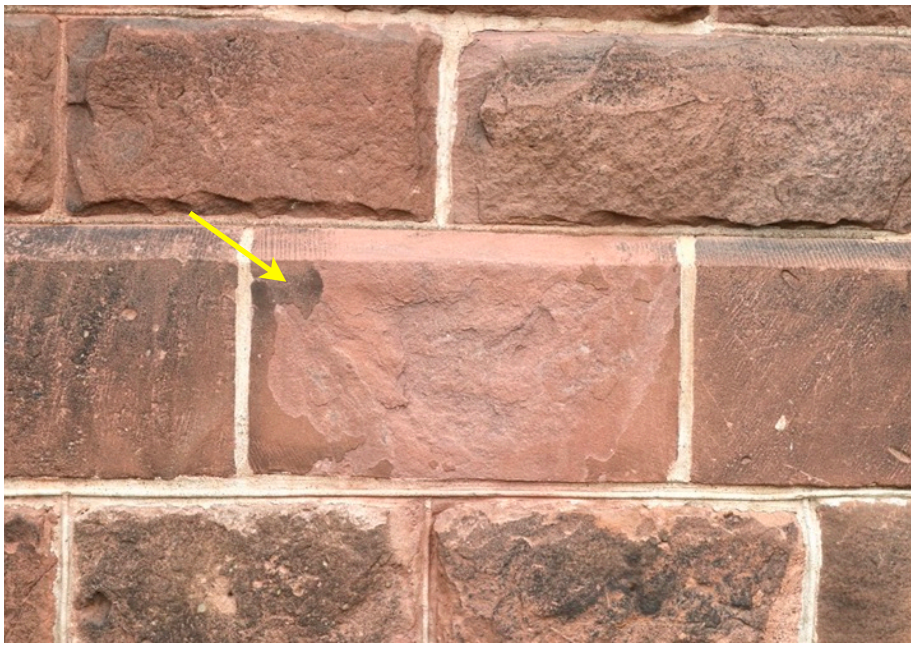
This close-up shows the opening in the sill stone. When the original mortar cracking was noticed, if the repair had been done properly it is unlikely that the crack would have spread to the point where the sill was cracked.

There are many examples of poor quality work on the building. Not only does the mixture of mortar colors and joint profiles look bad, it is obvious that this type of work is bad because the “repairs” have failed so quickly.

A more detailed examination of this cracked window sill will be needed to determine the most appropriate repair. Regardless of the repair chosen for this individual stone, unless the wall below is also properly repaired, the sill repair will not be durable.



Narrow stone cracks like those pictured here can often be repaired using a combination of epoxy injection and surface patching.



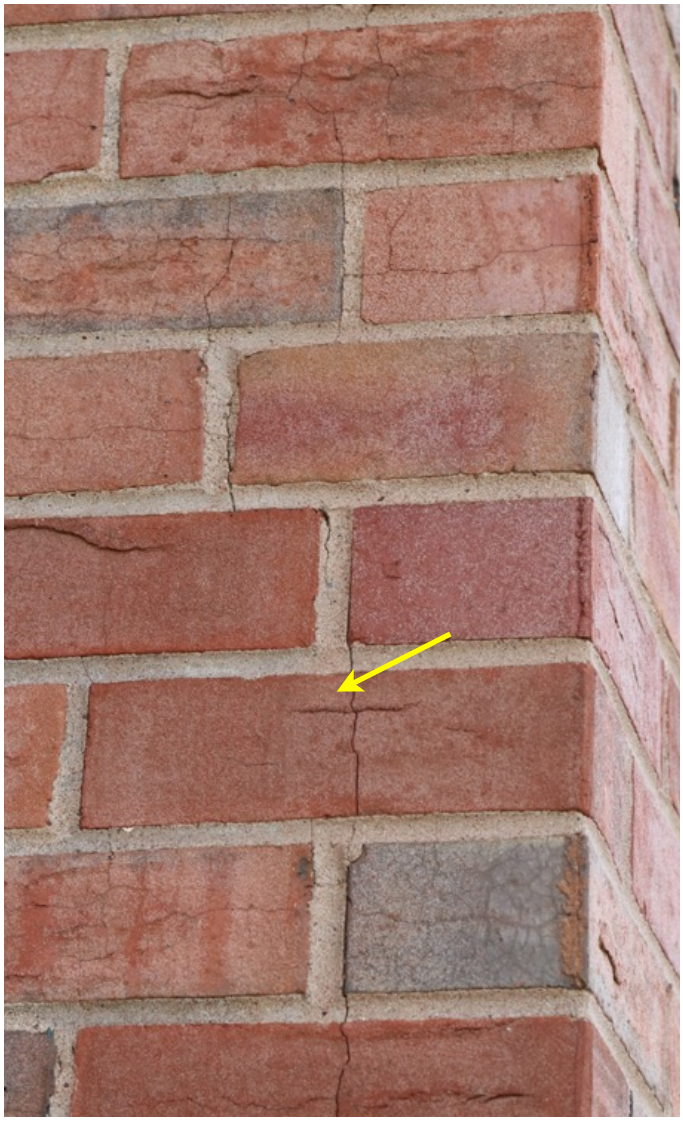
The condition where outer layers of a stone flake off is known as “spalling”. When the depth of the spalling is not too severe, it is sometimes possible to remove the stone and recarve the surface profile before reinstalling it. This is an especially useful option when working with historic stone that is no longer available from any quarries.

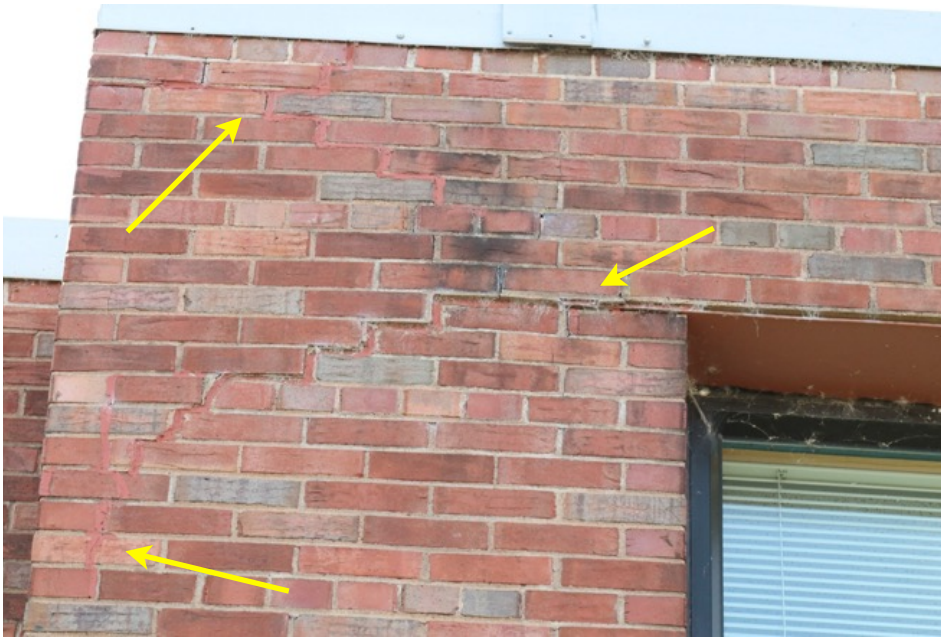
This is an example of a stone that may not be a good candidate for a patch based repair because so much of the surface area has been lost. Further examination will be needed to determine how deeply the “softness” extends into the body of the stone as part of the decision on the best repair option.

The conditions on the west side of the church are similar to those on other elevations of the building. The current repair budget is limited to the front, the tower, and the east sides of the building.

Masonry repairs including cutting and tuckpointing of cracked mortar joints, replacement of damaged brick and block, removal and replacement of caulking sealant, and related work is needed on the Our Lady of the Lake Catholic School building.

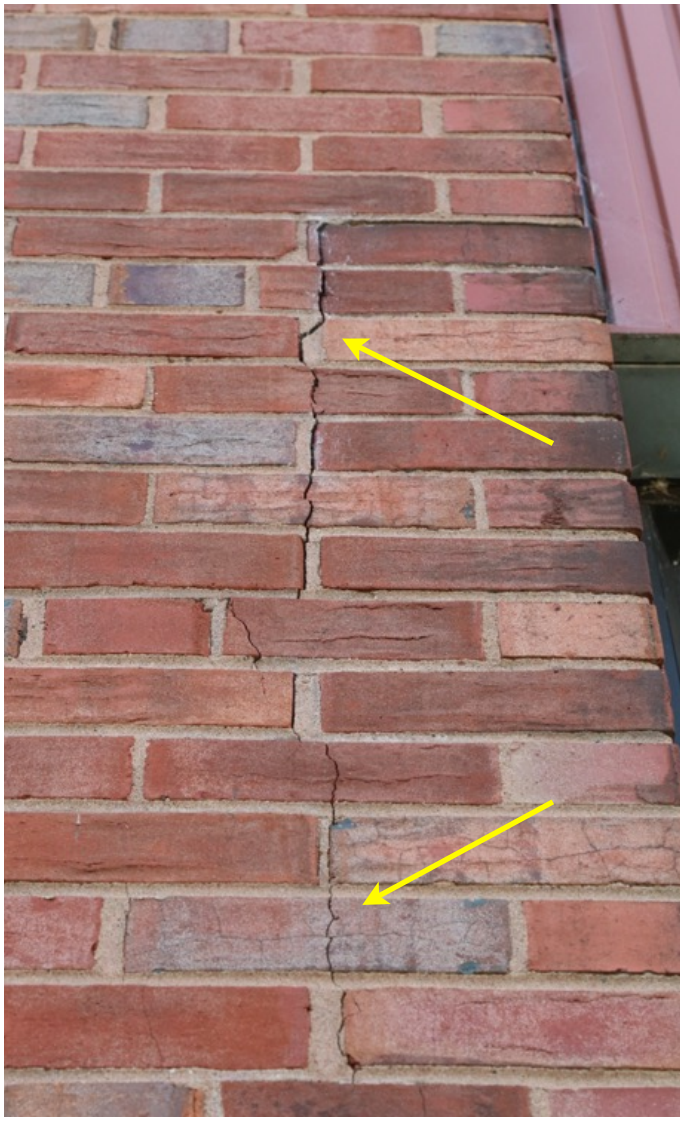
A large number of cracked brick are visible on the school. The close up photos below are from the area highlighted in the top photo. The running vertical crack is consistent with a brick expansion pressure build up. In this case, the expanding brick on the east elevation are causing this crack around the corner.





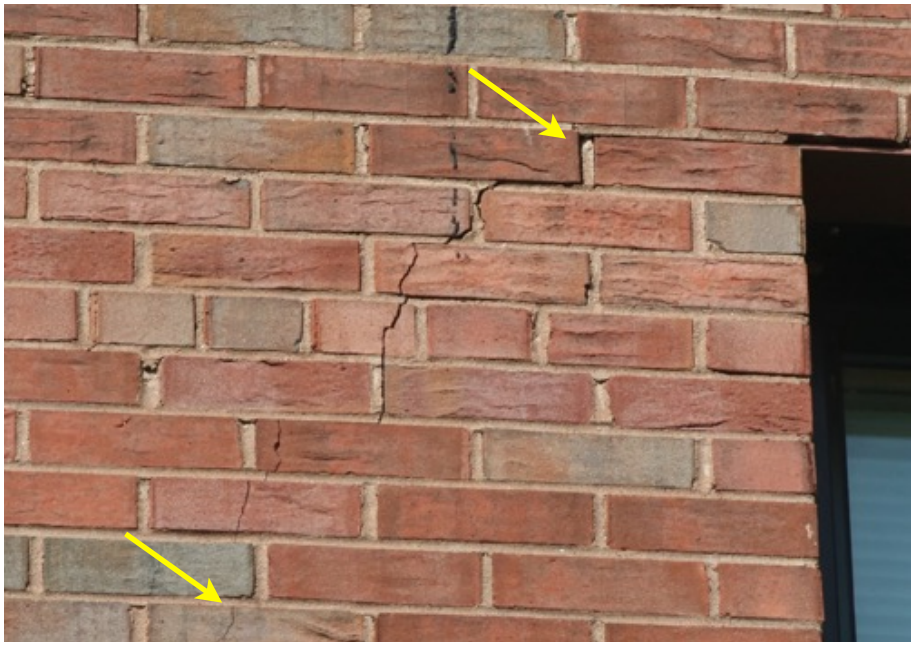
The cracking highlighted here is likely caused by the pressure from the build up of flaking pack rust on the window lintel. Close observation of this lintel showed that it has bowed down in the center. As a result, the ends of the lintel are lifting the brick to the left of the opening. The pressure is severe enough to break the bond of the mortar joints creating a typical “stair step” cracking pattern.

Further investigation will be required to determine the cause of the vertical cracking highlighted in the photos below. That investigation should include an examination of the roof cap that is immediately in line with the cracking. Finding and correcting underlying causes of damage during the course of a repair will result in a more durable repair.



In addition to the stair step cracking pattern seen at several other windows on the building, there are displaced bricks at the top of the highlighted corner.

Based on the mortar being pushed out of the joint cavity at this location, the pack rust build up on the steel lintel must have gotten pretty thick at this location.



During the course of repairing this crack, a number of brick will be removed from the wall. This will provide on opportunity to see the construction detail and some of the interior wall conditions.

Several conditions observed in the roof perimeter cap system are likely having an impact on the masonry wall below. One of the most obvious conditions is that several of the cover plates between cap sections are coming loose.

There is a large gap between the roof perimeter cap and the face of the brick masonry. If wind driven rain is able to get into this gap, it is likely that some of the moisture will infiltrate into the top of the masonry wall. Any loose cover plates only create a bigger gap for potential water entry.

Sealant joints in the roofing system are weathered to the point where they may no longer be providing protection against water infiltration to the building components below. The condition of the roof should be verified as part of any masonry repairs to the walls below.

The window perimeter caulking sealant shown here is cracking and no longer providing protection against water infiltration. Also, the staining on the grey aluminum sill suggests that the sill is pitched back towards the building allowing water to pool at the joint with the window frame.

The construction detail of the joint where the sills meet the masonry wall below is such that water can easily get under and behind the sill. Consideration should be given to installing a water tight gasket or sealant joint at all of the similar sills on the building.

The north elevation of the school is shown here. The conditions are generally similar to the other school building elevations with the exception of the two concrete block walls.

Vertical cracking in the block wall sections of the building appears to be related to the lack of flexible control joints. The severe deterioration visible at the upper corner is typical of the damage caused by repeated cycles of freezing and thawing when the masonry is saturated. The full repair of this condition will likely require some work at the connection between the roofing and the masonry.

The horizontal crack highlighted in the photo to the left will need further investigation to determine the cause and appropriate repair, but it is consistent with rust expansion of block reinforcing “ladder” ties.

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