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Window design/install Deficiencies and Age Related Issues – Harbour Cove.

The window assemblies at Harbour Cove were installed with different design and construction detailing in each Phase. Workmanship also varied. The way these assemblies have performed to date and remediation done has varied to suit the individual locations.

The water ingress problems are a combination of:

1. Poor original design/construction of window assemblies. All Phases
2. Improperly designed sill assemblies Phase 1&2
3. Improperly installed window sills All Phases
4. Improperly sized and cast window openings Phase 3
5. Lack of / or improper installation of building wrap All Phases
6. Failure of perimeter sealants All Phases
7. Post Construction - Improper installation of weep/drain holes All Phases
8. Corrosion of aluminum frames at joints. All Phases on high exposure faces.

The remediation work to date has focused on cost effective repairs to address these deficiencies. For the most part extensive sealant replacements and additions in critical areas has eliminated the water ingress in individual suites.

In a few areas brickwork has been replaced at window perimeters. Water was entering where the windows meet the void behind the brick rainscreen due to lack of original building wrap [5 above]

In other areas where extensive sealant replacement was not effective it was necessary to remove lower glass panels to examine frame joints and welds and reseal same. [8 above]

In areas of high weather exposure the corrosion of the aluminum window frame joints is significant. This corrosion is typically at bottom connections and corners where lack of sealants during manufacture puts water in contact with the uncoated extrusion ends and welds. Polluted rain water is acidic and slowly corrodes uncoated aluminum. These frames were assembled with steel fasteners at many connections and galvanic action has added to the corrosion of the aluminum. Windows recently replaced at 508- 1470 were a typical example where corrosion had enlarged lower frame joints to allow continuous leakage into the lower wall where the lack of effective sill or building wrap meant water damage in suite.

The current problematic windows at 903-1470, 1001-1470, 1002-1470, and 501-1490 have had full sealant replacements and additions to minimal effect. They are in high weather exposure locations and we would expect to find significant frame corrosion is contributing to leakage. It would not be cost effective to remove and replace all the glass to allow for inspection and short term repairs to the frames. We have done a few smaller panes and some resealing already. Additionally there are severe condensation issues in these high exposure areas due to the non-thermally broken frames.

Windows assemblies like these and likely many others in the high exposure areas will need to be replaced to ensure long term reliability. We don't feel the joint corrosion, in the areas we have seen, has significantly reduced the functional strength of the overall assembly yet but it eventually will. The windows are reaching the end of their serviceable life especially in the high exposure areas. Any replacement program should initially focus on these exposures.

Lee Hanson