

Performance Reborn.

August 10, 2007

VIA E-MAIL

Eagles Nest at Mt. Crested Butte c/o Mr. Grantly Benton 701 Gothic Road Mt Crested Butte, CO 81775 Email: <u>Morsre@aol.com</u> <u>Grant@crestedbuttelodging.com</u> john.r.warner2@boeing.com RonWarner@aol.com

Re: Property Condition Assessment for Eagles Nest at Mt. Crested Butte Project No.: 07057

Dear Mr. Benton and Members of the Board:

We have completed our property condition assessment for the Eagles Nest at Mt. Crested Butte condominiums located in Mt. Crested Butte, Colorado. The following is a summary of our observations, comments and recommendations.

The recommendations provided within this report are not intended to be a complete set of construction documents but will give the Eagles Nest at Mt. Crested Butte Homeowners Association a general idea of the repair recommendations.

## General Information

Eagles Nest is a covenant controlled community located in Mount Crested Butte, Colorado. The community consists of 40 townhouse style units housed in 4 multi-story buildings.

The site consists of full depth asphalt roadways, concrete drive pans, concrete curb and gutters and garage aprons. The buildings façade consists of newly installed composite siding and trim, board plank balcony decks over a waterproof membrane over a sleeper system, metal panel and low sloped roof systems. The community was constructed approximately 27 years ago.

We were informed that there are concerns with many of the site and building components at the development, which include the following:

- Composite Siding and Trim
- Metal Deck Roofing System
- Balcony Decks and Balcony Deck Waterproofing
- Concrete Flatwork Abutting Asphalt Drive Lanes

1130 West 124th Avenue Suite 100 Westminster, Colorado 80234 TEL 303/426 1731 FAX 303/426 1732

- Asphalt Roadways Grading and Drainage
- Lateral Sewer Lines

We performed our investigations June 13<sup>th</sup> through June 15, 2007.

## Scope of Work Performed

Bornengineering provided visual observations to determine general as-built conditions of the components mentioned above. In addition, maintenance personnel removed sections of siding, trim and decks to determine the as built conditions of those systems. We also looked at several other components that may be affected by the components included in the initial scope of work. These are also discussed below.

We worked with a plumbing company that specializes in video graphic technology to analyze the lateral sewer lines. Video graphic "scope" of the lateral sewage lines was performed and the results are included.

The following sections detail the apparent cause and origin of the alleged deficiencies, describes the conditions and provides general recommendations. We also include photographic documentation.

## Disclaimer

All comments made are based on conditions seen at the time of this visual observation. We do not accept any responsibility for unknown or unknowable conditions within the existing site or structures. In addition, if the professional services of the engineer do not extend to the design documents phase and construction observations, then, by the acceptance of this report, it is agreed that the client will defend, indemnify and hold harmless the engineer from any claim or suit whatsoever. The engineer agrees to be responsible for his/her own or his/her employee(s) negligent acts, errors or omissions.

If you have any questions regarding this report, please do not hesitate to contact our office.

Sincerely,

Bornengineering

m Justin Foy, R.S.

Director of Site and Building

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Terry Foulke Exterior Building Consultant

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# **Executive Summary**

This summary will state our general opinion of condition and recommendations for the components we feel need attention in the relatively near future (within 5 years) and require significant expense. Many of the systems discussed are interrelated and should be addressed in a particular order as to prevent premature deterioration.

- The metal sloped roof systems are the primary cause of damage and deterioration to the siding, stucco and concrete aprons. We feel that the roofing should be replaced prior to replacement of those components. A cold roof conversion with an eave extension would be the most appropriate solution given the climatic conditions and the buildings architectural features. The roof project should be performed in 2 to 4 years.
- 2. Upon completion of the roof renovations the concrete aprons should be replaced with aprons with proper slope. The concrete apron project should be performed in 2 to 4 years.
- 3. In order to accommodate the garage aprons (elevation constraints); we recommend removing and replacing the settled garage slabs.
- 4. In order to replace the aprons properly, the adjacent asphalt roadways, which are nearly the end of their useful life, should be completely removed. The subsoil's re-graded and the asphalt properly installed to match the aprons and curb/gutter. 2 to 4 years.
- 5. During the asphalt replacement, the lateral sanitary sewer lines servicing the individual units (groups of 2) should be removed and replaced at all locations. Replacement should include pipe replacement at the proper depth and to current code. 2 to 4 years.
- 6. During the asphalt replacement a vehicle barrier system should be installed at impact prone areas. The system could consist of a pipe bollard or railing system. 2 to 4 years.
- 7. After addressing the roof, we feel a stucco rehabilitation or replacement could be performed. This could entail renovating the current stucco or installing a completely different system such as a stone veneer or other façade options.
- 8. The balcony waterproof membranes are nearly the end of their useful life. We recommend removing the decking and the waterproof membranes. A plywood substrate with a heavy duty pedestrian grade urethane coating system with a skid resistant texture would work well in the Crested Butte area.
- During the balcony renovation, we recommend removing and replacing the balcony railings. The balcony railings should be brought up to current code at that time. The railings could be architecturally designed to match the vehicular barrier system, etc. 3 to 5 years.
- 10. The installation deficiencies and coatings defects involving the James Hardie siding and trim are leading to premature deterioration of the system. At this rate we estimate that a siding and trim replacement, in those areas, in 2 to 3 years.

# Observations, Conclusions and Recommendations

#### A1. Low Slope Roofs

**Description:** The low sloped roof sections of the residential buildings have a single ply ethylene propylene diene membrane (EPDM) roof system

**Comments:** The membranes are mechanically adhered and utilize edge scuppers for drainage. These roofs were installed in 2003.



**Recommendations:** The membranes were in good condition for their age. We did note that the adjacent parapet walls did not have a parapet caps and were just wrapped with the EPDM membrane. These metal parapet wall caps are required by the manufacturer. We recommend installing the flashing if the membrane starts to prematurely deteriorate. The roofs should last another 12 to 14 more years.

#### A2. Steep Slope Roofs

**Description:** The original standing seam metal roof systems over asphaltic felt membranes.

**Comments:** The condition of the metal panels is typical on these types of roof of this age. The metal panels are faded and in aesthetically displeasing condition. Typically, the underlayment will fail first.



We observed damage to stucco and siding from ice/snow fall from the roofs. The eaves on the buildings have no overhang relative to the vertical façade. We received report of ice damming problems during the winter months.

Three things are required for an ice dam to form: snow, heat to melt the snow and cold to refreeze the melted snow into solid ice. Ice dams can form when as little as 1 or 2 inches of snow accumulates on a roof - if the snowfall is followed by several days of sub-freezing temperatures. Ice dams develop as snow on the upper part of the roof melts. Water runs down the roof slope under the blanket of snow and refreezes into a band of ice at the roof's edge creating a "dam".

The reason ice-dams form along the roof's lower edge, usually above the overhang, is straight-forward. The upper roof surface (toward the ridgeline) is at a temperature that is above freezing. And the lower part of the roof surface (along the eaves) is below freezing. The upper roof surface is located directly above the living space. Heat lost from the building

warms this section of the roof, melting snow in this area. During periods of sub-freezing temperature the lower regions of the roof deck remain at sub-freezing ambient temperatures. Roof overhangs are not warmed by indoor heat-loss.

**Recommendations:** These types of roof systems typically have a useful life of 25 to 30 years before a replacement is necessary. We recommend replacing the roofs and underlayment in the next 2 to 5 years.

A cold roof conversion with an asphalt type shingle system would be our recommendation. In climates where snow accumulations can be excessive, a cold roof conversion may assist in the prevention or reduction in ice dams and



roof leaks. The metal roof panels and underlayment would need to be removed and damaged sheathing replaced.

A cold roof is basically a roof on top of a roof. The upper roof is separated from the lower roof by a ventilating space. Outside air can flow freely between the two roofs. This keeps the upper roof, the one with the snow and ice on it, cold. Believe it or not, this is exactly what you want. You want the melt water to freeze as quickly as possible in ice dam situations. This keeps the water from backing up underneath the roofing materials or refreezing down lower on the building facade.

We recommend a continuous ventilation system be incorporated to maximize the cold roof intent. This consists of full soffit or eave ventilation used in conjunction with continuous ventilation at the top of your roof. This type of ventilation permits a constant supply of cold air to flow beneath the surface of your roof. Once again, this is a favorable condition, as it keeps the roof surface cold and can actually cause the entire surface of the roof to freeze.

We also recommend extending you eaves away from the vertical façade of the building during the conversion. This should assist in minimizing impact damage from ice/snow that may fall.

The proper flashings, diverters, etc. will also need to be incorporated into the design and construction.

We have designed and managed several cold roof conversions in the resort communities of Colorado. We performed 3 conversions in the Keystone Valley 10 years ago and one in Breckenridge 8 years ago. The roofs were a great improvement and ice damming was virtually eliminated.

## A3. Stucco Facade

**Description:** A cementitious stucco system located on the exterior façade of chimney chases and at vertical transitions at sloped to low sloped roof building sections.

**Comments:** There are many areas with impact damage from what appears to be ice/snow fall and from vehicles. Some of these areas appear to have been repaired with an Exterior Insulation and Finishing System.

**Recommendations:** This type of stucco system can have useful lives in excess of 50 years with maintenance. The damaged areas can be patched and the stucco recoated to match. This type and color of stucco is prone to staining and impact damage, so cyclical maintenance should be anticipated.



Replacing the stucco with an alternative cladding system is also an option. A stone, or a faux stone, may work well. If choosing a stone façade we recommend full depth mortar joints. Open joints at higher elevations are prone to damage from the dramatic freeze thaw cycles.

We recommend addressing the ice/snow impact problems with a roof renovation prior to addressing the stucco damage.

We also recommend installing a vehicle barrier system at the lower stucco areas adjacent to the parking garages. There are many vehicle barrier options available, including single posts, double posts with rails, fixed, removable, collapsible, etc. It may be possible to integrate a design scheme to match the vehicle barriers and the balcony railings.

#### A4. Balconies

**Description:** Located on the second and third levels on the residential units. The upper level balconies are ledger board and leading edge beam supported open deck board structures. The balcony railings are tubular steel rails supported by direct face attachments. A thin baluster is used towards the middle of the rails



for support.

The lower balconies are stringer and deck boards over a membrane covered sub-sheathing that is supported in a similar fashion as the upper balconies. The membranes and deck boards on the balconies are the original.

**Comments:** The deck boards are in low satisfactory condition and shows signs of moisture deterioration. The boards are weak and deflect when applying loads. The boards are approaching the end of their useful life.

On site maintenance personnel removed deteriorated deck boards on one balcony in order for us to observe the condition of the membrane. The membrane is brittle and deteriorated at seams along the edges. These types of membranes have a useful life of around 25 years before replacement is necessary. The membrane is approaching the end of its useful life.

The railings are in fair condition with some deterioration noted. The railings are out of current building code and should be updated during a balcony renovation.

**Recommendations:** We recommend removing the decking and the waterproof membranes. A plywood substrate with a heavy duty pedestrian grade urethane coating system with a skid resistant texture would work well in the Crested Butte area.

## A5. Lap Siding

**Description:** James Hardie, Hardie Plank Lap Siding.

General requirements for the installation of James Hardie siding products include but are not limited to the following:

- A weather-resistive barrier is required in accordance with local building code requirements. The weather resistive barrier must be appropriately installed with penetration and junction flashings in accordance with local building code requirements.
- Install James Hardie® products with a minimum 6" clearance to the finished grade on the exterior of the building or in appardence with least h





building or in accordance with local building codes.

- Maintain a minimum 2" clearance between James Hardie products and roofs, decks, paths, steps and driveways. Maintain a 1/4" clearance between James Hardie products and horizontal flashing.
- Install kickout flashing at roof-wall junctions. Ensure gutters have end caps and do not terminate against siding and trim.



- Adjacent finished grade must slope away from the building in accordance with local building codes - typically a minimum of 6" in the first 10'.
- Do not install James Hardie products, such that they may remain in contact with standing water.

**Comments:** The local building code applicable during the time of installation was the 1997 Universal Building Code (UBC).

- Section 1402.2, Flashing and Counter Flashing: "Exterior openings exposed to the weather shall be flashed in such a manner as to make them weatherproof. All flashing, counterflashing and coping, when of metal, shall have a minimum thickness of 0.019- inch (0.48 mm) (no. 26 galvanized sheet metal gage) corrosion resistant metal."
- We observed metal flashings to have been installed at roof level windows however; no metal flashings have been installed at first or second level windows or doors.
- There are no membrane flashings around window and door heads, jambs or sills.
- There are no kickout flashings at roof to wall intersections. We observed several areas at roof to wall intersections that have been damaged as a result of water intrusion due to the lack of kick out flashings.
- There are no flashings around utilities mounted to the buildings.
- There are several 1/4" to 3/8" holes throughout the lap siding. These holes are presumed to have been made as a result of attaching scaffolding during the installation of the lap siding. The holes have not been repaired and are a potential source for water intrusion.
- Several siding butt joints are greater than 1/4" in width. James Hardie recommends butt joints have moderate contact, typically somewhere between 1/16" to 1/8".
- We observed the coating on several areas of siding to be pealing and flaking from the surface. Where the coating is not pealing or flaking, several surface cracks can be seen. The coating is rapidly deteriorating and failing throughout the entire property site.

**Recommendations:** Membrane flashing should be installed on the jamb, sill and head of all windows and doors per AMAA Window Membrane Flashing Standard B.

Kick out flashings should be installed at all roof to wall intersections. Damaged siding should be removed and replaced prior to the installation of the kick out flashings.

Flashings and counterflashings should be installed at all window and door locations as required by the local building code and James Hardie.

As a result of the wide spread failure of the coating, we recommend that the siding be removed and replaced. We recommend that the finish coat to be applied to the newly installed siding product be painted with a 100% solid, acrylic topcoat.

As a result of not having specifications, details and drawings prepared, improper placement or lack of the proper metal flashings, kick out flashings, size and spacing of butt joints, improper termination and flashing at utilities and the wide spread coating failure; the Eagles Nest at Mt Crested Butte Homeowners Association has the daunting task of rectifying the siding deficiencies.

We highly recommend that a full set of specifications, details and drawings be drafted prior to implementing the recommended repairs to the siding. We also strongly recommend that periodic construction observations be performed throughout the project to ensure the siding, coatings and all auxiliary materials and systems are implemented per the construction documents.

Having the proper set of construction documents and performing routine construction observations throughout the installation of the siding systems will help minimize any construction deficiencies and provide the Eagles Nest at Mt. Crested Butte Homeowners Association with the best possible siding system.

#### A6. Garage Aprons

**Description:** The concrete aprons were recently removed and replaced. The concrete is on grade of unknown depth or reinforcement.

**Comments**: During our previous visit in 2004 we noted that the garage aprons did not have adequate slope and were in poor condition with



extensive spalling and impact damage noted. Much of this damage appeared to be the result of ice/snow fall from the above roof fields.

We also received report that during periods of precipitation, several of the garage aprons drain moisture into the garages.

It appears that the aprons were simply removed and replaced, matching the elevations at the garage slabs and the asphalt drive. Many of the garage slabs have settled and the leading edges, at the asphalt, have remained at the original elevation. This has resulted in slope deficiencies at many of the aprons. We performed an elevation survey of the garage aprons and the adjacent roadway. The following is the results of that survey.

- Please note that the elevations shown within the building footprint (at the garage entries) were taken where the garage aprons meet the garage slab.
- The numbers that are circled are the percent slope of the garage aprons taken at the lowest sloped area at that unit.
- The 2<sup>nd</sup> set of numbers, located just outside of the garage aprons, are elevation shots taken where the aprons meet the asphalt.
- The other elevations are shots taken in the middle of the asphalt drive and where the asphalt drive meets the curb and gutter.

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**Recommendations:** Remove and replace the garage aprons in 2 to 4 years. We also recommend replacing the garage slabs simultaneously in order to properly match elevations.

## A7. Asphalt

**Description:** Bituminous asphalt mats placed on grade.

**Comments:** From the moment asphalt pavements are mixed, they begin to deteriorate. Unfortunately they do not deteriorate by the same amount each year. If they did you could predict precisely when to perform maintenance. For this reason a continual preventive maintenance routine is required to get the most out of your asphalt.

Once placed on the roadway, the asphalt is subjected to the natural aging process, such as ultraviolet rays and the continual stripping action of rain, as well as human factors such as traffic, salt, and loads. Eventually pavements reach a critical point in which they begin a rapid



deterioration that will end up with complete replacement. The key to prolonging the life of your pavements is to begin a preventive maintenance.

It appears the asphalt areas at the complex have had some maintenance in the past. We noted an abundance of past patches in the asphalt systems. We could determine if the asphalt has been sealcoated.

The asphalt is in low satisfactory condition with vertical deflections noted in several areas. These deflections are signs of moisture disruption of the supporting base soils. Many areas have failed resulting in "alligatoring". We also noted full depth longitudinal cracking in many areas. There is aggregate exposure on the surface. The asphalt is nearing the end of its useful life.

We noted a sizeable pothole areas on the roadway leading to the upper buildings. This is a sign of complete asphalt failure in those areas.

**Recommendations:** The current asphalt is showing signs of base problems. The asphalt should be removed, the sub-grade soils will need to be reconditioned, re-graded and a new asphalt system installed.

We recommend removing and replacing the damaged concrete drain pans, curbing and garage apron sections during the asphalt replacement.

### A8. Lateral Sewer Lines

**Description:** The trunk line reportedly runs north to south along the front of the units approximately 15 feet from the garage door openings. The trunk line reportedly is PVC and the individual units lateral lines are cast iron.



Comments: We reviewed the video inspection

of the drain lines performed by Roto Rooter Sewer and Drain Service.

Inspections of lateral lines were performed through cleanouts located in the garage floor slabs. Transition, as referenced below, refers to where the 3" cast iron main drain pipe connects to the 4" PVC pipe leading to the trunk line.

- Unit #1 cleanout; There is a 3" to 4" offset in the transition between the PVC and cast iron pipe sections. Standing water in the lateral line is observed.
- Unit #3 cleanout; Minor crushing of the cast iron pipe section. The lateral line is buried approximately 3'-3" below grade.
- Unit #5 cleanout; Lateral line appears normal.
- Unit #7 cleanout; Minor dent in the cast iron pipe section. The lateral line is buried approximately 3'-3" below grade.
- Unit #9 cleanout; Lateral line appears normal.
- Unit #11 cleanout; Minor dent in the cast iron pipe section. There is a minor offset in the transition between the PVC and cast iron pipe sections.
- Unit #13 cleanout; There is a significant offset in the transition between the PVC and cast iron pipe sections. The lateral line is buried approximately 3'-10" below grade.
- Unit #15 cleanout; Lateral line appears normal.
- Unit #20 cleanout; There is a significant offset in the transition between the PVC and cast iron pipe sections.
- Unit #22 cleanout; There is a minor offset in the transition between the PVC and cast iron pipe sections. The lateral line is buried approximately 4'-4" below grade.
- Unit #24 cleanout; Lateral line appears normal.
- Unit #26 cleanout; Lateral line appears normal.
- Unit #28 cleanout; There is a minor offset in the transition between the PVC and cast iron pipe sections. The lateral line is buried approximately 4'-11" below grade.
- Unit #30 cleanout; There is a significant offset in the transition between the PVC and cast iron pipe sections. Roto Rooter was unable to inspect the lateral sewer line.
- Unit #32 cleanout; Lateral line appears normal.
- Unit #34 cleanout; Lateral line appears normal.
- Unit #36 cleanout; There is a minor offset in the transition between the PVC and cast iron pipe sections. The lateral line is buried approximately 4'-3" below grade.
- Unit #38 cleanout; Lateral line appears normal.

The evaluations determined that there are breeches, low spots (bellies), some pipe damage and settlement in several locations.

We were informed that the community experiences many frozen lateral sewer lines during the winter months.

**Recommendations:** During the asphalt replacement, the lateral sanitary sewer lines servicing the individual units (groups of 2) should be removed and replaced at all locations. Replacement should include pipe replacement at the proper depth and to current code.

The lateral sewer line located in unit #30 is in the worst condition however still functional. If this line continues to collapse it may need to be replaced prior to the above mentioned recommendation.

A copy of the lateral sewer line inspection has been included with this report.

#### A9. Crawl Spaces

**Description:** Approximately 4 foot crawl space areas located in the back wall of the units garages.

**Comments:** In general the crawlspaces were observed to be dry. We observed a water leak from a domestic line in unit #35. The leak was reported immediately to the property management personnel.

**Recommendations:** The geotechnical strata configuration is such that moisture can travel through the horizontal strata layers at multiple levels rendering perimeter drain systems and composite drainage mats minimally functional.

The installation of a through wall ventilation system connected to a humistat will help dry any moisture that may accumulate while keeping the relative humidity in check.