

# University of Virginia

0260 Ruffner Hall

## MAINTENANCE SURVEY

**February 2007**

Inspector

Martin B. Sheedy

## **Vital Statistics:**

**FY 2007 VALUE:** \$11,635,178.00

**YEAR BUILT:** 1973

**GROSS SF:** 86,455

**FLOORS:** 4

**ARCHITECT:** Caudill, Rowlett, Scott, Rawlings, Wilson and Fraher

**ARCHITECTURE:** Brick Building With A Flat Single - Ply Roof, Metal Windows, Metal Doors. The Main Entrance Is On The North End Of The First Floor.

**OCCUPANTS:** Department of Education

# Executive Summary:

## INTRODUCTION:

A maintenance inspection was conducted at Ruffner Hall during February 2007. The purpose of the inspection was to assess the overall condition of the building and to identify current maintenance needs.

The survey was visual and was supplemented with information provided by University of Virginia faculty and staff familiar with the condition of the building. A substantial amount of information was taken from two reports completed by independent companies in 2004. Both reports are available from the Resource Center here at Facilities Management. The first report dated 30 May 2004 is a 66 page Space Needs Report completed by Train and Partners Architects. The second report is a 288 page Facility Condition Assessment dated September 15, 2004 completed by VFA. Very little has changed at Ruffner Hall since either of these reports was issued. Both reports provide insight into the mechanicals and structural components of the building. Both reports also rely heavily on the life expectancy of various components of the building.

Facilities Management goal is to conduct maintenance inspections on selected buildings every three to four years. Ruffner Hall has an estimated replacement cost of \$11,635,178.00. The total estimated cost of the identified maintenance needs in this report is \$7,793,690.

A priority system has been instituted to coincide with the maintenance repairs listed in the project section of this report. Priorities listed as #1 should receive the highest consideration. These repairs may include everything from cosmetics to serious structural problems. #2 priorities are deemed less urgent but should be considered if budgets allow and #3 projects are generally problems they may be deferred for a longer period of time. A substantial amount of the identified maintenance needs fall into the priority #3 category.

Most inspections completed by this department have not included projects or requirements strictly because of the age of the system. However with Ruffner Hall, and the two reports noted above, to ignore the findings of those who contributed to those reports would be wasteful.

## ARCHITECTURAL

Ruffner Hall is a four story building constructed in 1973. The 86,455 square foot building supports office and classroom uses for the Curry School of Education.

Ruffner is a concrete and steel building with a pedestrian bridge at the northeast corner that crosses Emmett St. The exterior is brick; windows are non operating single pane.

Floors are mainly VAT, with smaller amounts of carpeting. Ceilings are a combination of 2 x 2 acoustical tiles and painted gypsum wallboard. The walls are mainly painted gypsum drywall, with random areas of concrete masonry units, vinyl wall coverings and vertical wood baffled walls. The restrooms have 1-inch square ceramic tile floors, painted CMU walls, and floor mounted laminate stall partitions. Door assemblies consist of a combination of painted solid-core wood doors and doors with a natural stained oak veneer, painted metal frames and non-handicapped accessible knob hardware except for the stair tower doors, which have panic and thumb latch type. The majority of the hardware is either brushed chrome or aluminum.

## ELEVATOR

The building has a single 2500 pound capacity hydraulic elevator located at the northwest corner of the building. The 30 horsepower hydraulic pump and reservoir unit are located in room T011B.

Recommendations from the elevator maintenance supervisor are listed in the project section.

## MECHANICAL

The building is provided with a central chilled water system for cooling using a 357-Ton Carrier centrifugal water-cooled chiller. Both the chiller and rooftop cooling tower are original. As a part of the Bavarro Hall addition the chiller and cooling tower will be removed and the system will be connected to a nearby chiller loop.

The heating water source is from the medium temperature hot water loop through a water to water heat exchanger in room M012.

Eight dual deck multi zone air handlers ranging in size from 8,000 to 20,000 cfm provide conditioned air to the building. All air handlers utilize the space above the ceilings as a return air plenum. Any disturbance above the ceilings requires extra effort due to the abundance of asbestos insulation used in those spaces. The EHS dept. reports air quality tests conducted semi annually for air borne asbestos particles have been negative.

Air handlers are past their rated life expectancies. VFA recommends replacement of the units with rooftop units and the Train & Partners report suggests major component replacement will extend the life of the units from five to ten years. A project to replace pneumatic actuators (damper modules) to electronic is almost complete.

## PLUMBING

The restroom fixtures are vitreous china and appear to be principally original to the building with the exception of minor faucet or

fixture replacement. Although dated the restrooms appear to be in good overall condition. Bathrooms at the lower level have just reopened after redirecting sewer lines to a new location on the west side of the building.

Domestic piping is copper and DWV is mainly bell and spigot cast iron. There is a backflow preventer on the water service main.

Hot water is generated with a heat exchanger served by the building heating system and stored in a large vertical tank. Although functioning well both are past their life expectancies.

#### FIRE AND LIFE SAFETY

This building is not furnished with a standpipe or automatic sprinkler system. Dry chemical extinguishers, smoke detectors, audio visual alarms, and battery pack lighting were found throughout the building. The fire alarm control panel is an EST LSS4/36 conventional system, which when triggered, sends an alarm to the Facility Management Systems Control Center.

#### ELECTRICAL

Ruffner Halls' electrical service originates from the Alderman Street substation. Two separate primary feeders at 12.47 kV terminate to an exterior, pad mounted high voltage switchgear equipped with manual transfer. Thereafter, a single high voltage feeder terminates to an adjacent exterior oil-filled transformer rated for 1000 kVA with secondary conductors rated for 3000 A routed underground terminating to the buildings main switchboard located in room M012. The switchboard is equipped with a 3000 A bolted pressure switch and fused distribution switches.

Downstream from the main switchboard, panel boards and transformers are provided in electrical closets and mechanical spaces with branch circuitry extending to lighting, receptacles, and miscellaneous loads throughout the facility.

Interior office and classroom lighting is either recessed or surface mounted, fluorescent luminaries primarily with prismatic lenses and T8 lamps. Corridors and stairs generally are illuminated with 2x2 surface mounted fluorescent fixtures or surface mounted 4-foot linear fluorescent fixtures. Mechanical spaces and other utilitarian spaces utilize surface mounted, fluorescent commercial strip luminaries or in a few locations porcelain sockets with incandescent lamps.

If after reviewing this report there are questions regarding the content or the omission of information pertaining to this building please do not hesitate to contact me, Martin Sheedy at 434 243 5338 or email at [mbs2e@virginia.edu](mailto:mbs2e@virginia.edu).

Location	Deficiency	Priority	Cost	Inspector Comments	Action Taken
14333	Air Handler Replacement	3	\$635,524	<p>Air Handling Equipment and Distribution</p> <p>There are eight separate, multi-zone, air-handling dual deck units ranging in size from 8,000 cfm to 20,000 cfm. Each is a Carrier packaged unit with belt-driven supply fan, heating and cooling coils and a filter section. The mechanical rooms are configured as return plenums. Outside air make-up is drawn from roof vents and in the case of room M100, a louvered inlet on the exterior wall. Supply and return ducts are not equipped with smoke detectors. Air distribution ducts are primarily rectangular formed galvanized sheet metal and preformed round ducting. Connection from hard ducts to diffusers and registers is a wire-reinforced insulated flexible duct product.</p> <p>Controls and Instrumentation</p> <p>Actuation valves in the chilled water and heating hot water system are primarily pneumatic. Louvers and dampers are primarily electronically actuated but are backed up by the original pneumatic system. Apparently this building was 100 percent pneumatic but was retrofitted with an electronic control and monitoring package by Andover Controls. It was then replaced by an Automated Logic, Inc. Inter-Op 8500 electronic system. Thermostats are wall mounted Honeywell units. W.O. # 585335 is currently in progress to replace 42 HVAC transducers.</p> <p>Both reports recommend renovation of the HVAC equipment. Train &amp; Partners states the systems are showing signs of age and may not be heating and cooling effectively.</p>	This is a backlogged deferred maintenance project. Because addressing this defect can be delayed for several years, it was given a 3.

Location	Deficiency	Priority	Cost	Inspector Comments	Action Taken
				<p>They further state that ventilation quantities are less than required by current codes and humidity control is difficult with this type of system. VFA's report states that all units are aged and showing signs of deterioration including corroded piping, minor leaks, air leakage and rust. VFA's recommendations include relocating air handlers to the rooftop and reducing the number of air handlers from eight to three.</p> <p>The estimated cost used in this project was VFA's estimate from 2004 with a 10% annual increase for inflation.</p>	
Corridors	14367 Repair ceiling cracks	2	\$3,300	<p>Numerous cracks transverse the corridor's gypsum board ceilings on levels 1 and 2. VFA's report indicates cracks are not from structural problems but most likely a result of thermal expansion and contraction. Repair cracks in gypsum board ceilings and walls as needed and paint ceilings.</p>	Not funded.
Exterior	7413 Repairs to the bridge	1	\$0	<p>Although not considered a part of Ruffner Hall a quick review of a May 2004 bridge inspection report by MMM Design Group was made. Most of the recommendations cited in this report were not completed. A comparison of photos from the 2004 report and present conditions indicate the steel at both ends of the bridge and at the base of the steel columns are continuing to deteriorate. There is a large amount of scaling and delaminating of the steel in question. The report recommended cleaning and painting to prevent further deterioration.</p> <p>There are other recommendations in the report that should be considered but</p>	<p>For backlog calculation purposes the bridge is considered "infrastructure" not part of the Ruffner building. The estimated \$85,000 cost of the repairs, and the actual costs when they occur, will be assigned to infrastructure, and so were removed here. A service call was made to get the beam ends painted.</p>

Location	Deficiency	Priority	Cost	Inspector Comments	Action Taken
				the deteriorating steel should take precedence and should most likely be inspected by a structural engineer. The estimated cost used is a WAG, but assumes the rusted railing supports can be fixed in some manner that does not involve complete replacement.	
Exterior	7416 Investigate rusted support channels	2	\$1,500	The steel channels at the edge of the stucco under the terrace at the north east corner of building is rusted and some of the stucco is cracked. Both Bill Blodgett and Ernie Barber have looked at this in March 2007 and determined the problem to be cosmetic and not structural.	Backlogged.
Exterior	7319 Repoint Steps & Cheekwalls On The North Steps	2	\$10,000	Exterior stairwells have numerous areas of settlement cracks that are allowing water infiltration and compounding the damage. Stairs and cheekwalls on the north side of the building should be repointed as needed. Brickwork at the eastside exterior stairwells is in need of repair also but these stairs are scheduled for removal as part of the Bavarro Hall addition.	Backlogged.
Exterior	14331 Window replacement	3	\$423,787	Most windows are original, non operable, single glazed set in aluminum frames. Few problems exist with the current windows other than their age, 13 years older than the life expectancy of twenty years and the inefficiency of single glazing. Both the VFA report and the LCA tool recommend replacement. The estimated cost used was \$302,705 construction cost generated by the LCA tool, plus 40% for a total project cost..	This is a backlogged deferred maintenance project. Because addressing this defect can be delayed for several years, it was given a 3.
Exterior	14330 Exterior masonry repairs	3	\$3,000,000	The Train and Partners report, dated May 2004, states the exterior masonry of the building exhibits evidence of insufficient brick support and cavity wall drainage causing numerous areas to shift, crack,	This is a backlogged deferred maintenance project. Because addressing this defect can be delayed for several years, it was given a 3. project.

Location	Deficiency	Priority	Cost	Inspector Comments	Action Taken
				<p>and mortar to pop out. The report goes on to explain that the possible source of the damage to be from the non-galvanized ferrous material in the exterior walls, including wall ties and shelf angles, coupled with the thin back up masonry, and the lack of weep holes to help in the elimination of water from the cavity wall.</p> <p>VFA performed a visual observation of the facility on September 8, 2004, which did not include any destructive testing to determine the existing construction of the cavity walls. During the visual observation VFA observed numerous areas of surface stress cracking, mortar popping, and masonry separation. The following areas of concern, which have also been identified in the Train and Partners report, are as follows: veneer shifting along near the southwest corner of the roof level; mortar slippage (popping) near the southeast corner of the roof; masonry cracking along the west elevation near the second floor near Column Grid A-10; masonry sill cracking along Column Grid 18 in the library; masonry step cracking in the northwest stairwell near the third floor masonry opening; shelf angle slippage on the second and third floors near along Column Grid 17; shelf angle slippage along Column Grid F between 17 and 18; shelf angle slippage along north diagonal between Column Grids N and Q; shelf angle slippage on the west face of the wall between Column Grid F between 17 and 18; brick veneer separation at the first floor of the exterior north terrace stair; delaminating of brick from the concrete stairs along the</p>	

Location	Deficiency	Priority	Cost	Inspector Comments	Action Taken
				<p>north terrace stair; masonry cracking on the corner of the east side of the exterior terrace; shelf angle slippage on the northwest walls at the second and third floor levels near Column Grid D to F.</p> <p>Based on the visual observation and the information identified in the report, VFA states removal of the existing brick veneer, supporting lintels, and anchors, and the installation of new veneer with new galvanized lintels and galvanized wall ties is warranted. New veneer will need to meet current day industry construction standards for support of dead loads.</p> <p>Repair estimates range from VFA's \$869,000.00 to \$3,000,000 in the Maintenance Reserve Budget. The \$3,000,000 estimate was used in this project.</p> <p>Comparisons of recent photos indicate little change in the 2 1/2 years since the Train and Partners report.</p>	
Interior	14363 Ceiling Tile Replacement	3	\$660	<p>Ceiling tile repairs noted by Sue Wharam.</p> <p>Replace cracked or broken ceiling tiles in rooms 121, 102, 150, 204, 287.</p>	Service call issued to replace ceiling tiles noted above.
Interior	14361 HVAC repairs	2	\$1,680	<p>HVAC problems noted by building coordinator Sue Wharam.</p> <p>1. Vents throughout building are in need of cleaning. Offices, bathrooms, corridors and stairwells.</p> <p>2. Uneven temperature control and little air flow. Too warm in 169 F, 227A, 227B, 275, 273. Too cool in 234.</p>	<p>Vent cleaning would be a normal housekeeping task. We have asked housekeeping supervisor to take a look. Service call issued to adjust temperatures, although Ruffner is famous for unsolvable heat/cool distribution problems.</p>
Interior	14358 Lockset Replacement	2	\$51,471	<p>Locksets on most interior doors are original to the building. Gene Bellamy reports that problems with the locksets are becoming more common because of their age. Tenants have been unable</p>	This is a deferred maintenance project on our backlog list.

Location	Deficiency	Priority	Cost	Inspector Comments	Action Taken
				to gain entry and in some instances leave their offices because of the worn and failed locksets. VFA's report noted the knob type handles were not ADA compliant and recommended lever type handles be installed to all corridor doors to public spaces such as offices, classrooms, and restrooms. Gene quotes a price of \$225.00 per lockset and approximately \$76.00 for labor for each door. Approximately 171 doors @ \$301.00.	
Interior	14326 Elevator repairs/upgrades	2	\$400,000	"Ruffner Hall elevator was installed in 1972. Its 35 years old, the controller is a Virginia Controller with relay logic. Relays are mechanical, and require constant maintenance of cleaning and dressing contacts. The selector that tells the controller where the car is positioned is a torpedo type selector, which is obsolete, and the wire used to make the selector work, is no longer manufactured. The door tracks on the elevator car and hoist way doors are worn out. The hoist way doors and elevator car doors need replacement, as well as all door locks, rollers, and hardware. The door operator is original and requires routine adjustment. The elevator cab is old looking and could use modernization. The hydraulic valve, motor, pump, and tank are all original, and could fail at any time. The safety edges could be upgraded to the new type electronic edges that see movement. It would also be nice to have a new Hatch Latch door restrictor that would keep any elevator passengers safe if the elevator was to stop between floors. Marty, I hate to paint a picture of gloom and doom, but	This is a project on our backlog list.

Location	Deficiency	Priority	Cost	Inspector Comments	Action Taken
				<p>Ruffner elevator is that old. It's running fine now, but in the future, who knows? If you have any questions, let me know." Information from Eddie Morris, elevator maintenance supervisor.</p> <p>The Sept. 2004 report from VFA states "The elevator lacks firefighters emergency recall operation as required and elevator lobbies and the machine room lacks smoke detection to facilitate recall operation." The estimate cost used by VFA was \$80,000. Our experience in 06-07 has been that complete overhauls, which we expect would be needed here, are running in the \$350,000 to \$400,000 range.</p>	
Interior	14376 Undocumented deferred maintenance repairs	2	\$410,000	<p>In a building as old and complex as Ruffner there are sure to be deficiencies we did not record. For those that we did, our estimates are done without benefit of any engineering or design guidance. We added .05% of the estimated cost of the documented deficiencies to account for these unknowns.</p>	
Interior	14357 Electrical upgrades	3	\$641,200	<p>The VFA report from 2004 states that the main switchboard has exceeded it's useful life and that extended outages could result because replacement parts are no longer being manufactured. Additionally the switchboard is not equipped with ground fault protection as required, lacks power logic metering and surge suppression protection. VFA's report further states that Ruffner has not had an electrical upgrade since its construction in 1973 and panelboards are at capacity with few spares available. There is an abundance of computers with multiple CPUs in certain spaces. VFA's report suggests that the present day usage of the existing</p>	<p>This is a project on our deferred maintenance backlog list. Because addressing this defect can be delayed for several years, it was given a 3.</p>

Location	Deficiency	Priority	Cost	Inspector Comments	Action Taken
				<p>electrical system is far from the intended use of 1973.</p> <p>Recommendations include:</p> <ol style="list-style-type: none"> <li>1. Replacing existing transformers</li> <li>2. Replacing aged panels</li> <li>3. Provide additional panels to serve dense computer locations.</li> <li>4. Replace aged main switchboard.</li> <li>5. Replace aged canopy and walkway lights</li> <li>6. Replace aged dimmers</li> <li>7. Replace aged emergency lighting battery packs and implement a study of the emergency lighting system which appears to be non compliant.</li> </ol> <p>Other smaller projects are listed in the VFA report.</p> <p>The LCA tool generated an estimated construction cost of \$485,660.00. The total replacements and upgrades from VFA's 2004 report were priced at \$365,087.00. We used the LCA figures, upped by 40% to arrive at a total project cost.</p>	
Interior	14345 Asbestos Abatement	3	\$1,720,000	<p>Asbestos fireproofing above ceilings in return air plenums makes any type of renovation or disturbance in those areas prohibitive because of the abatement costs involved. Air sampling is conducted by EHS on a semi-annual basis and results for airborne asbestos particles have been negative. EHS personnel estimate abatement costs at \$20.00 to \$25.00 a foot although prices for a large scale abatement like Ruffner Hall could be significantly lower. \$20.00 per square foot was used for the estimated cost in this project.</p>	This is a project on our deferred maintenance backlog list. Because addressing this defect can be delayed for several years, it was given a 3.
North end	14355 Beam replacement.	1	\$600,000	This project includes replacing the steel beam supporting the area at the north entrance on the 1st level, demolition and	Repairs in progress.

Location	Deficiency	Priority	Cost	Inspector Comments	Action Taken
				replacement of concrete decking with improved waterproofing. Project is in design stage although temporary supports are in place, asbestos has been abated and the area surrounding the beam has been walled off as of Feb. 2007.	
Rm 223	14365 Carpet Replacement	1	\$3,640	Carpet replacement requested by Sue Wharam. Room 223 seams are separating, carpet in poor condition. 106 yards @ \$30.00 plus incidentals.	W.O. issued for this.
Roof	14354 Roof Replacement	2	\$712,000	The existing stone ballasted EPDM roof was installed over the original built up roofing in 1982. Despite being five years past the life expectancy of 20 years there are at present no major problems with the main field of the roof. At the north section of roof over the Library, new EPDM flashings were installed at the parapet walls and metal caps were added to the coping of the parapet walls in hopes of reducing water infiltration. The estimated cost used to replace the entire roof with fully adhered EPDM over tapered insulation was estimated at \$20.00 per square foot. The area to be covered is approximately 34,600 sq. ft.. Reroofing should include capping the balance of the parapet walls with metal and resetting roof drains for storm water runoff.	This is a backlogged deferred maintenance project. Although the roof is still sound and addressing this defect can be delayed for several years, because it will need to be replaced as soon as it does fail it was given a 2.
Room 214	14366 Repair roof leak	1	\$0	Investigate and repair roof leak over room 214. Leak originally reported by Sue Wharam. Room 214 appears to be directly below cooling tower unit.	Service call issued.
<b>Grand Total:</b>			<b>\$8,614,762</b>		