

FACILITY AUDIT REPORT

HITCHCOCK HALL

#274

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HITCHCOCK HALL

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HITCHCOCK HALL

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EXECUTIVE SUMMARY FOR HITCHCOCK HALL

Hitchcock Hall houses offices, classrooms, laboratories, computer rooms and auditoriums for the College of Engineering. The four-story building with basement was constructed in 1965/66 and occupied in February of 1967 by the College of Engineering with a gross area of 119,498 GSF. The building was designed to add several additional floors above the fourth floor at a future date. A equipment replacement project in 1984 included a new chiller and cooling tower to replace one of the absorption chillers. The roof was replaced in 1986. In 1995 a project to upgrade the controls for DDC remote readout to meet the present day HVAC needs was completed. The latest project in 2000 to connected the building to the central chilled water loop with a plate and frame chilled water heat exchanger and two chilled water pumps and the removal of the last absorption chiller. Over the years several renovations to the labs have taken place to meet the changing needs of the research and classroom requirements. However, more than normal maintenance problems are beginning to show up in plumbing, steam and condensate piping, temperature controls, and door and door hardware.

PROPOSED MAINTENANCE PROJECTS

HITCHCOCK HALL #274

A. Corrective Maintenance Projects:	Control No	
1. <i>Clean the limestone/concrete app.10,935 SF and seal. \$</i>	<i>28,000</i>	<i>6554</i>
2. <i>Clean the brick app. 25,000 SF and seal the walls. \$</i>	<i>52,000</i>	<i>1944</i>
3. <i>Replace the entrance steps. \$</i>	<i>9,000</i>	<i>1943</i>
4. <i>Replace the blacktop drive. \$</i>	<i>12,000</i>	<i>6555</i>
5. <i>Epoxy seal and repair concrete columns and soffits. \$</i>	<i>5,000</i>	<i>6556</i>
6. <i>Repair and/or replace concrete walks. \$</i>	<i>13,000</i>	<i>6557</i>
Sub Total	<i>119,000</i>	
B. Building Improvement/Addition Projects:		
1. <i>Install a new passenger elevator in the building..... \$</i>	<i>150,000</i>	<i>2307</i>
2. <i>Replace 158 window glass with double pane units. \$</i>	<i>125,000</i>	<i>6558</i>
3. <i>Install a concrete patio and walk at the north door. \$</i>	<i>32,000</i>	<i>6559</i>
4. <i>Replace the hall ceiling tiles. \$</i>	<i>32,000</i>	<i>6560</i>
Sub Total	<i>339,000</i>	
C. Building Component Replacements expected within the next 5-10 years:		
1. <i>Replace the 1967 DDHV air handling unit and boxes.. \$</i>	<i>915,000</i>	<i>6561</i>
2. <i>Replace six double aluminum and two steel doors. \$</i>	<i>26,000</i>	<i>6562</i>
3. <i>Replace the original heating distribution equipment in room 029M. \$</i>	<i>82,000</i>	<i>6563</i>
4. <i>Replace the MZ AHU unit in room 039M with new air handling unit. \$</i>	<i>185,000</i>	<i>6564</i>

5. <i>Replace the AHU unit in room 051M with new air handling unit.</i>	\$ 50,000	6565
6. <i>Replace four Liebert AH units in rooms 316, with new air conditioned units.</i>	\$ 60,000	6566
7. <i>Replace the fire alarm panel in room 003M with a new unit and install annunciator in hall.</i>	\$ 110,000	6567
Sub Total	\$ 1,428,000	
Total Cost for all Projects	\$ 1,886,000	

**RENOVATION PROJECTS IN PROGRESS OR COMPLETED
SINCE LAST AUDIT**

HITCHCOCK HALL #274

Projects:	Project No
<i>Remove the absorption chiller in room 328M and install central chilled water</i>	5061-002395
<i>Repair west front steps</i>	9986-5699
<i>Repair the steam station and heat exchanger in room 029M</i>	9986-6656
<i>Replace auditorium seating</i>	5070-R991605
<i>Sound proof wall between room 475 and 475A</i>	50700-R011659
<i>Renovate rooms 206, 208, 214, 216, 222 and 224</i>	5061-PF5571
<i>Renovate rooms 011, and 025B, D, E, F</i>	5359
<i>Renovate room 025</i>	5061-PF5359
<i>Renovate room 346</i>	5061-PF6294
<i>Renovate third floor for IWSE</i>	315-1996-920
<i>Renovate room 142 and 173t</i>	5070-R981594
<i>Renovate rooms 018, 022 and 026</i>	5061-PF980501
<i>Upgrade duct, chilled water and HVAC upgrades</i>	315-1994-917

GENERAL BUILDING INFORMATION

HITCHCOCK HALL #274

BUILDING ADDRESS: *2070 Neil Avenue*

GROSS SQ. FT.: *119,493*

NET ASSIGNABLE SQ. FT.: *110,661*

MECHANICAL/CUSTODIAL AREA SQ. FT.: *7,339*

YEAR OF CONSTRUCTION: *1965/67*

YEAR OF LAST RENOVATION: *none*

NUMBER OF STORIES/BASEMENT: *Four stories with basement*

AIR CONDITIONING (Percentage): *100%*

CURRENT USE: *The College of Engineering*

TYPE OF CONSTRUCTION: *Reinforced Concrete with Masonry Skin*

ESTIMATED REPLACEMENT COST: *\$ 18,191,000 **

COST PER GROSS SQUARE FEET: *\$ 252.69*

WHEELCHAIR ACCESSIBILITY: *From Bolz Hall to the corridor and the elevators.*

OVERALL BUILDING CONDITION: *Satisfactory ***

NUMBER OF EXIT STAIRWAYS: *Three (3)*

NUMBER OF OTHER EXITS: *Three (3)*

AREA SHOP RESPONSIBILITY: *North Shop*

* *Replacement Cost assigned June 2001 by The Office of University Resource Planning & Institutional Analysis.*

** *The Office of University Resource Planning & Institutional Analysis C-1 Report Condition Code.*

BUILDING SYSTEMS INFORMATION

HITCHCOCK HALL #274

HEATING:

Source – *Power plant*

Type Heating System – *Hot water*

Main Steam Feed (Line size, valve location) – *4” HPS to room 002M*

Building Htg. Water (line size, valve location) – *6” in room 029M*

VENTILATION SYSTEM: *Powered exhaust and DDVAV systems*

COOLING:

BLDG. 100%, Central Chilled Water: *6” 330 Ton to room 328M*

One McQuay 225 Ton Centrifugal chiller, R-12, 1984 in room 328M back-up

One Marley 240 Ton open type cooling tower, 1984 in room 329M back-up

Window Units: *none*, Thru-the-wall: *none*, Direct expansion units: *seven*

HVAC CONTROL SYSTEM: *Electric and pneumatic controls and DDC upgrade*

ELECTRIC:

Source	Size (KVA)	Primary/Secondary Switchgear & Main Disc. (Rm.)
<i>107/037</i>	<i>1000</i>	<i>13,200/ 480/277 029M</i>

PLUMBING SERVICES:

Water (size, valve location) – *6” room 026A, 6” to fire, 3” to domestic*

Gas (size, valve location) – *2” room 002M*

Domestic Hot Water (size, valve location) – *2” DHWS, 3/4” DHWR room 002M*

Compressed Air (size, location) – *1-1/4” in room 002M*

SEWERS:

Storm - *1@12”*, Sanitary -*2@6”*, Combined Storm/San-*none*

METERS:

Gas (size, location) – *040M*

Water (size, location) – *6” in room 026A*

Electric (location) - *room 029M*

ALARM SYSTEMS:

Fire Alarm room *029M*, Remote Panel Location at entrance *x101c*

Fire Pump @ GPM, Pump Location-

Sprinkler, Valve Location Room *003M*,

100%, Partial, Limited

Strobes, Bells Horns in Halls, Rooms

Other Alarms – *equipment*

ELEVATORS:

Number- *Two*, Type (passenger/freight)- *Passenger/Freight*

Manufacturer – *Otis*, Size- *2,500# and 4,000#, 66”x 78” and 67”x 96”*

EMERGENCY GENERATOR:

Size- *85 KVA @ 480/277 Volts in room 039M*

ASBESTOS SURVEY (1986): *Asbestos containing materials were identified in rooms 002M, 029M, 039M and 231M in pipe, equipment and duct insulation.*

HITCHCOCK HALL NARRATIVE

HISTORY

Hitchcock Hall houses offices, classrooms, laboratories, computer rooms and auditoriums for the College of Engineering. The four-story building with basement was constructed in 1965/66 and occupied in February of 1967 by the College of Engineering with a gross area of 119,498 GSF. The building was designed to add several additional floors above the fourth floor at a future date. A equipment replacement project in 1984 included a new chiller and cooling tower to replace one of the absorption chillers. The roof was replaced in 1986. In 1995 a project to upgrade the controls for DDC remote readout to meet the present day HVAC needs was completed. The latest project in 2000 to connected the building to the central chilled water loop with a plate and frame chilled water heat exchanger and two chilled water pumps and the removal of the last absorption chiller. Over the years several renovations to the labs have taken place to meet the changing needs of the research and classroom requirements. However, more than normal maintenance problems are beginning to show up in plumbing, steam and condensate piping, temperature controls, and door and door hardware.

In an interview with the building coordinator, it was learned that the occupants are satisfied with the overall condition of the building systems, however, items noted above and herein are of concern. These items when completed will protect the structural and exterior components from the elements and enhance the building's performance and create a satisfying visual environment for students, faculty, staff and visitors.

Room occupancy of the building as reported by The Office of University Resource Planning & Institutional Analysis in the C-1 Building Space Assignment Report dated June 2000 with a Net Assignable Area of 110,136 SF, is as follows. Laboratories 15.0%, Classrooms 13.6%, Faculty and Graduate Offices 15.0%, Research Laboratories 9.8%, Administrative and Staff Offices 8.9%, Student Services Offices 6.2%, Circulation 23.2%, Mechanical 6.7% and Custodial/Toilet 1.6%.

PRIMARY SYSTEMS

The structural components of this building consist of reinforced concrete caissons to bedrock, reinforced concrete grade beams, spread footers, walls, columns and floors. Reinforced concrete walls to the first floor rest on perimeter grade beams set on caissons to bedrock or on footers on caissons with reinforced concrete columns up to the first floor level. The concrete walls and reinforced concrete columns support the reinforced concrete beams and one way joists that support the reinforced concrete floors from the first floor up to the roof level of the main building. The perimeter reinforced columns and beams are exposed and flush with the exterior brick walls and form a portion of the exterior façade. The roof

structural components of the auditorium consist of steel beams and joists that support the metal deck and insulation or the roof structure. These form the basic skeletal components of this four-story building with basement.

There are no major signs of settlement or movement in the building foundation or structural columns and supports. There were some signs of differential settlement and/or movement between the expansion joints in the interior structure. Some exterior structural columns and beams have exposed rebar at corners and at the bottom of beams where the rebar was installed too close to the exposed surface. Moisture absorbed into the concrete is causing the rebar to oxidize and expand, crack and spall the concrete. These areas need to be coated with an epoxy sealant to prevent further deterioration until the areas can be properly repaired.

Exposed reinforced concrete columns and beams frame the perimeter on several facades while three to four feet deep reinforced concrete beams frame the rooflines and sections of the first floor. A brick masonry veneer with rowlock construction to the concrete block backing and interior insulation was installed between the concrete columns and beams to form the exterior walls. Limestone veneer panels were installed in lieu of concrete panels in some areas on reinforced concrete or concrete block to form these exterior walls. Reinforced concrete beams are raised at the perimeter roof level to form 6"-12" parapets with copper coping on the parapet. These combinations of materials complete the architectural elements that accent this building. Openings in the brick for windows and entrance doors are accented with concrete or brick that form the head, sill and jambs. Varied styles of concrete shapes and metal shapes are used for wall, entrance and roof trim. Soffits at entrances and the west side overhang have drivel board with a stucco finish. Storefront windows at entrance doors at the first floor entrances are located on the north, east and west side.

The exterior masonry brick is in good condition. Control and expansion joints were originally installed and appear to be in good condition. The brick does not appear to have weep holes at the first course to drain condensate or entrapped water, these need to be installed when the brick is cleaned and sealed. The limestone and brick needs to be cleaned and sealed to prevent staining and moisture intrusion.

The basic window design of this building consists of aluminum frames that are attached to the building structure. The frames consist of rails or jambs, a header and a sill. Windows have fixed panes of single-glazed glass or an operable window panel that can be opened. The fixed glass is set in the aluminum opening with rubber gaskets and an aluminum retaining strip. The operable windows are pivoted in at the top with weather stripping around the edges and have a locking key at the sides. The windows have been reported to leak air and water and repairs are needed. As noted above, some rooms of the building are drafty and cold during the winter months due to the single pane windows.

The store front windows consist of fixed single-glazed glass windows that are installed in aluminum frames that consist of rails or jambs, a header, sill and mullions fixed to the building structure.

Two double doors at the west and east entries are aluminum with glass inserts and glass panels forming a store front type vestibule to the brick walls and are in good condition. The inner double doors are aluminum with glass inserts. One double door at the west and north entries are aluminum with glass inserts and glass store front panels to the brick walls and are in good condition. A double door at the east dock is steel and is in fair condition and needs to be painted. There is one single steel door to the east from the auditorium and east stairwell from the basement auditoriums that also needs to be painted.

The main roofs consist of concrete beams and one way joists with a concrete deck, lightweight concrete fill to form drainage slopes, rigid insulation, and an asphalt four ply roof with gravel. The sloped roof over the auditorium consists of steel rafters and joists with a steel deck, rigid insulation and a sloping asphalt four ply roof with an aluminum roof coating. The canopy roof over the west entrance consists of concrete beams and a concrete deck with an asphalt four ply roof. The flat roof over the west bump out consist of concrete beams and joists with a concrete deck, lightweight concrete fill, insulation board, and an asphalt four ply roof with gravel. The flat roof over the west and northeast stairwells consist of steel beams and purlins with a steel deck, insulation board, and modified roll roofing installed with asphalt four ply roof with gravel. These sections can be removed if upper floors are added at a later date. The 22 roof drains on the roofs drain to interior storm drains. The entrance roof drains to interior storm drains. The roofs are 14 years old and are in good to fair condition. The concrete parapet walls with copper coping caps are in good condition. Expansion joints on the main roof and auditorium are in good to fair condition.

The roofs are showing premature aging with fish mouths, expansion wrinkles and blisters. The lower northwest roof over the first floor appears to be aging prematurely and is in fair condition. Sections are showing signs of blistering and fish mouths. Some leaks were noted in the work orders from the third floor bump-out roof at the counterflashing at the fourth floor brick wall above. These were repaired and appear to have solved the problem. Many of the lightning rod bases, wire and retainer clips are loose on the coping and need to be reinstalled. The roof flashing and counterflashing at the northwest corner of the fourth floor has pulled loose and needs to be repaired.

INTERIOR SYSTEMS

The one way reinforced concrete floors and concrete columns of this building are enclosed with concrete block with interior brick at stairwells while the perimeter has some insulation and concrete block that forms the perimeter walls. The interior walls, halls and many rooms are enclosed with concrete block while newer walls

have metal studs with drywall. The first floor lobby walls have brick with a marble base. Hall walls have concrete block walls with a marble base. Restroom walls have 4x4 inch ceramic tile from the floor up to the drywall ceilings. The partitions and walls are in good condition.

The majority of the doors in this building have wood doors in metal frames that are in good to fair condition depending on the location. Metal fire doors in steel frames are used at mechanical rooms and stairwells off hallways. The fire doors in this building are in good to fair condition but need to be adjusted to close properly and need to be painted. Some door and/or door hardware problems are showing up in maintenance calls.

The entrance vestibules and lobby floors in this building have granite terrazzo flooring to the south offices, auditorium lobby and elevators. There is carpet in some offices, conference and computer rooms on all floors. The balance of the offices, hallways, some classrooms and stairwell floors have 9x9 asbestos vinyl tile or vinyl tile. The stairs and landings are metal framed with concrete fill with rubber stair treads and asbestos vinyl tile on landings. The stairs have steel handrails and steel railings and are in good condition. Restroom floors have 1x1 inch ceramic tile. The main auditorium has exposed concrete floors that have been sealed with a clear sealant under the seating, carpet in the aisles and wood floors and steps on the stage floor. The basement equipment rooms have exposed concrete floors that have been sealed with a clear sealant and third floor equipment rooms have an epoxy floor sealant. The floors throughout the building are in good condition and have been well maintained.

The ceilings in this building consists of a suspended aluminum 2x4 grid with 2x4 or 2x2 mineral fiber ceiling tiles, 1x1 mineral fiber concealed spline ceiling tiles or drywall. The ceilings in halls consisted of a suspended aluminum 2x4 grid with 2x4 mineral fiber ceiling tiles. The ceilings in the auditorium lobby consisted of a suspended steel grid with 1x1 mineral fiber concealed spline ceiling tiles in the field and painted drywall mansard type ceilings on the perimeter. The ceilings in the auditorium consisted of a suspended steel grid with 1x1 mineral fiber concealed spline ceiling tiles on the perimeter and painted drywall ceilings in the field. Some ceiling tiles are accented with wood trim. The ceilings on the first floor entrances consisted of 1x1 mineral fiber concealed spline ceiling tiles. Remodeled rooms consist of suspended aluminum grid with 2x4 or 2x2 mineral fiber ceiling tiles. The mineral fiber tile ceilings are in good condition. Some ceiling tiles need to be replaced or repaired where leaks have occurred and hall ceilings that are over thirty years old should be replaced.

SERVICE SYSTEMS

There is one passenger elevator and one freight elevator in this building. The passenger elevator consists of a cab that is moved from floor to floor by a cable driven system driven by a DC motor and reduction gearbox. The elevator controls

consist of electric relay controls that operate the motor, brake, floor levelers, doors and position lights. The elevator has a speakerphone for emergency communication. The passenger elevator has had an upgrade to meet present ADA accessibility guidelines. The passenger elevator is thirty-four years old and will need to be replaced in the next ten years.

The hydraulic freight elevator is 34 years old and is in good to fair condition. The controls consist of push buttons, relays and solenoids that operate the hydraulic motor and solenoids, floor levelers, doors and position lights. The elevator does not meet present ADA accessibility guidelines since it is used for freight only between the first floor dock area and the basement. The elevators were operating and maintenance records did not indicate any problems with the elevators over the past year.

The major service systems consist of domestic cold and hot water, standpipe and limited sprinkler system, natural gas, compressed air, sanitary waste and storm drainage and all appeared to be in good condition and functioning at this time. The building sanitary waste and vent piping appears to have cast iron pipe with waste and vent fittings and appears to be in good condition and should hold up well. The plumbing drainage system has a duplex sewage ejector in a buried sump located on the northeast corner of room 039M that discharges to the sanitary waste above. The separate basement lab sanitary waste and vent piping appears to have cast iron pipe with waste and vent fittings and appears to be in good condition. The interior storm water piping also appears to have cast iron pipe and appears to be in good condition. The plumbing drainage system did not appear to have any problems.

The 2" natural gas piping from the power plant located to room 002M for the labs consists of steel pipe with malleable iron fittings. The 1-1/2" compressed air piping from the power plant located to room 002M for the labs consists of steel pipe with malleable iron fittings.

City water enters the building in room 026A on the west side of the building through a 6" ductile cast iron pipe to a 6" backflow preventer that feeds the fire protection system. A 3" service tap feeds the building domestic water service through a 3" meter and backflow preventer. The domestic cold and hot water piping has copper pipe and is in good condition.

The domestic hot water pipe from the power plant enters the building in room 002M and consists of a 2" hot water supply and a 3/4" hot water return line with a circulating pump that appeared to be operating properly. There was adequate water pressure at the faucets and fixtures on all of the floors.

The restroom fixtures consist of original wall mounted water closets and urinals with flush valves and original counter mounted lavatories and faucets. The restroom fixtures were functioning properly and no replacements are needed at this time,

however, maintenance records did indicate that sanitary waste pipe stoppage and domestic water faucet leaks are occurring more frequently.

The 6" ductile cast iron pipe in room 026A feeds the fire protection system that consists of steel pipe with cast iron fittings, standpipes and limited sprinklers. The fire protection standpipe systems consist of stairwell 2.5" fire department valves on the standpipes and hall hose cabinets with the hoses removed. The wet standpipes and wet pipe sprinkler systems are fed from the alarm valve in room 029A and appear to be in good condition. There are portable fire extinguishers located throughout the building.

The 5" HPS line that feeds the building is tapped into the central high pressure steam line located on Neil Avenue. When the absorption chillers were taken out of service the 12,000 #/hr PRV was removed from the steam station piping and a new desuperheater was installed to better control the decreased steam consumption. The high pressure steam line feeds a 12110 #/hr steam station located in room 002M through double 1/3x2/3 200/70 PSI pressure reducing valves. There is a desuperheater in the line after the 200/70 PSI pressure reducing station.

The desuperheater cools superheated steam delivered from the power plant at 600 °F to 325 °F with condensate water. Condensate is collected in a receiver tank where a desuperheater pump raises the pressure of the liquid to 10 PSI above the pressure of the steam to be cooled. The condensate liquid is metered through a control valve before it enters the desuperheater. The desuperheater in Hitchcock Hall appears to be sized properly.

After the desuperheater the MPS steam feeds a 9,100 lb/hr double 1/3x2/3 70/15 PSI pressure reducing station in room 029M and humidifiers in room 018. The 9,100 lb/hr (LPS) Low Pressure Steam heats the heating hot water in the heat exchanger in room 029M. The hot water is then pumped through one of two heating hot water pumps in room 029M to the DDHV air handling units, MZ hot water reheat coils, fan coil units at entrances, convectors under some windows and in stairwells and unit heaters. A condensate return system was installed in room 029M at the heat exchanger to move the condensate through duplex pumps back to the receiver in room 002M. The duplex pumps on the south wall return the condensate to the power plant or the desuperheater. This system was in operation and appears to be operating properly. There are reheat coils on some DDHV boxes.

The 6" chilled water line to Hitchcock Hall is tapped off the campus chilled water loop on Neil Avenue. Two variable speed chilled water pumps located in room 328M supply chilled water from the plate and frame heat exchanger to the DDHV, MZ and CAV air handling units cooling coils. About 330 tons of cooling is provided to the building.

The back up chiller in the cooling system consists of a McQuay 225 Ton centrifugal chiller with R-12 refrigerant that was installed in 1984 and located in room 328M.

The back up mechanical cooling chilled water system consists of a motor that turns a centrifugal compressor that compresses refrigerant gases to a higher pressure where the hot gases are condensed in the condenser with cooling tower water. The high pressure liquid is metered from the condenser to the evaporator where the chilled water is cooled.

Two condenser water pumps moves water from a Marley 240 Ton open type cooling tower to the backup chiller condensing heat exchanger. The condensing water flows over baffles in the tower while air flowing through the baffles into tower core cools the condensing water before it is collected in the sump pan under the tower to be moved back to the pumps. Cycling the constant speed fan controls the amount of air flowing through the cooling tower that cools the condensing water.

The two major air handling units in this building are dual duct high velocity (DDHV) constant volume air handling units. The DDHV air handling units have hot water heating and chilled water coils, a supply air fan, prefilters and 65% bag filters and a return air fan. A DDHV constant air volume unit typically has a hot and cold deck that discharges air into separate hot and cold high velocity ducts that supply air to dual duct constant volume boxes located in rooms throughout the building. The dual duct air boxes are controlled with a pneumatic thermostat located in the room and supply low velocity air to diffusers and grills located throughout the room. A ducted system returns air from the rooms and halls through slots in the light fixtures to ceiling spaces to ducts where air is moved back to the air handling unit through a return air fan.

The original DDHV heating, ventilation, and air conditioning system was a constant volume, dual duct system. Each room terminal box would discharge the same air volume, whether in full heating or full cooling, thus modulating the temperature. The energy conservation program in 1978/1979 modified the fan system and the terminal boxes. The fans were re-sheaved down to 85% of the original volumes. The majority of the terminal boxes were modified (from constant volume dual-duct) to a semi-variable air volume. For all interior spaces with low heating requirements, the hot ducts were completely blanked-off. For most of the perimeter spaces, the hot air duct volumes were reduced using fixed orifice plates. All cold ducts remained the original size. The fan system air volumes were then determined by following the pressure-dependent fan performance curves, using fixed speed motors and fixed pulley diameters, without speed modulation. Individual rooms were not surveyed for air volumes in both the full-heating and full-cooling modes creating uneven air distribution in many areas. Possible corrective measures could be retrofit of local variable air volume regulators at each terminal box, fan volume tracking controls on the fan systems, and re-balance of air volumes could reduce air distribution problems. The DDHV air handling units are well past the end of their useful life and will require replacement in the next five to ten years.

The heating, ventilation, and air conditioning system for the auditorium and the two classrooms below use a multi-zone constant volume air handling unit located in room 039M. This multi-zone constant volume air handling unit has a cooling cold deck and hot water reheat coils in each of the ducts to each zone. A pneumatic thermostat located in the zone controls the discharge temperature to the zone using the hot water reheat coil. The MZ air handling unit has hot water reheat and chilled water coils, a supply air fan, 65% filters and prefilters and a return air fan. The MZ air handling unit supplies air to diffusers and grills located throughout the auditorium and the two classrooms. A ducted system returns air to the air handling unit through a return air fan. Controls for the heating and cooling system are pneumatic and electric and have experienced some failures. The cooling and ventilation system appeared to be operating at the time of the site visits, however, some heating problems, leaks in coils and loose duct insulation were noted. The MZ air handling unit is well past the end of its useful life and will require replacement in the next five years.

Several basement labs have a Trane constant volume air handling unit located in room 0051M that supplies conditioned air to diffusers and grills located throughout the basement rooms. A ducted system returns air from the rooms through ceiling ducts back to the air handling unit.

Some rooms on the third floor, requiring separate control and/or operating parameters, utilize split system A/C units. Three Liebert DX air conditioning units were installed in 1984 to cool computer labs and repair areas. Liebert 10, 7.5 and 5 Ton R-22 DX condensers are located on the roof of the main building that supply condensed refrigerant to the air handling units located in rooms 316, 302 and 342. These units have been modified or moved several times over the years and are approaching the end of their expected life cycle and will need to be replaced in the next five years. A newer Liebert 5 Ton, R-22, DX condenser also located on the roof supplies the air handling unit located in room 302 and 314. A York 5 Ton R-22 DX condenser located on the east side of the auditorium supplies the air handling unit located in the northwest corner of room 0039M. One Liebert water cooled evaporator was installed to remove waste heat from a packaged ceiling unit used to cool a computer area on the third floor.

The cooling and ventilation systems appeared to be operating at the time of the site visits. In 1976 the units were modified with night setback as part of the energy conservation program. All of the heating and cooling equipment is 33 years old, unreliable and is well past its expected life and will need to be replaced at this time.

Low-pressure steam feeds humidifiers that supply steam to three labs. These humidifiers need to be cleaned at the beginning of each heating season to remove mold, mildew and bacterial growth from the units.

Controls for the heating and cooling system are pneumatic and electric and have been tied into the modified DDC central campus system. Some temperature control problems have been detected with the pneumatic system.

Specific fans for removing lab hood exhaust are located in the basement and the fourth floor roof.

One exhaust fan removes air from a lab hood and has the controller located on the roof, it needs to be located in the lab near the hood. All these units appear to be in fairly good condition, operating properly and well maintained.

There are six general exhaust fans located throughout the building. Each unit removes air from restrooms, equipment rooms, meeting rooms, common areas and conference rooms.

ELECTRIC

The Building is supplied with a dual electrical power supply from the McCracken substation circuits number 107/307 that feeds the 13.2 KVA switches and the 1000 KVA 480/277 volt transformer located on the southeast side of the building. The transformer supplies the electrical service to the 480/277-volt switchgear located in room 029M. The switchgear feeds the MCC panels in room 029M and 231M and the lighting and power distribution panels in these rooms. Subpanels are located throughout the building in electrical closets or in walls. Panel sizes vary throughout the building depending on the load. At about 9.1 watts per square foot the building appears to have an adequate power supply in all circuits. Some areas have electrical and electronic equipment that is fed with an isolated ground power circuits. The 208/120-volt transformers located in the basement and the third floor steps down the 480 volt power to feed a power distribution panel located on each floor that is used for wall outlet power requirements. New panels have been installed to meet the changing demands of upgrading the computer labs. A 480/277 200 amp emergency circuit is tied to the emergency generator distribution panel in room 039M.

Computer classrooms have an isolated ground 120V electrical service and modem outlets for computer tie-ins.

The MCC panels located in equipment rooms contain fused switches that distribute 480 volt 3 phase power to mechanical equipment in or near the mechanical room.

Fused switches from the transformer feed 480/277 lighting circuit breaker panels and 480/208 transformers located in electrical closets. The 480/208 transformers feed the 208/120 power distribution panels throughout the building.

Some of the building lighting uses 150 watt 120 volt recessed and surfaced mounted incandescent fixtures in the auditorium. HID 120 volt bulbs should be

considered to replace incandescent lighting, since the average bulb life is longer, the light output is greater with lower wattage, thus saving energy and maintenance costs.

The building has been retrofitted with 32-watt fluorescent surface and recessed fluorescent tube light fixtures throughout of the building. Entrance areas are illuminated with fluorescent recessed can fixtures and ceiling and wall mounted fixtures. Some areas are illuminated with HID fixtures. There are an adequate number of convenience and isolated ground power outlets throughout the building.

SAFETY STANDARDS

Hitchcock Hall is equipped with a manual fire alarm system consisting of pull stations at exits and stairwells that provide local fire annunciation from the panel in room 029M to bells in the halls on all floors and are remotely alarmed to the central computer.

The wet standpipes and limited sprinkler system (two heads) to the building are fed from the valve in room 027A and appear to be in good condition. The 2.5" fire department hose valve connections are located in the stairwells. There are portable fire extinguishers located throughout the building.

There are some exit signs at exits that have an emergency backup battery in each unit that have replaced the older units. The original system had exit signs and emergency lights located in the corridors and in stairwells that were powered from a battery backup system. The emergency power source from the battery backup is located in room. An emergency lighting panel supplies power to new lighted exit signs and emergency lights in the hallways and stairwells. There is an 85 KVA at 480/277 Volt emergency generator located in room 039M that supplies power to the back-up batteries and the emergency power panel in room 029.

ASBESTOS

The Ohio Board of Regents Facilities Asbestos Inspection and Risk Assessment Program's report titled "Inventory of Friable Asbestos Containing Material in Buildings of the Ohio State University (Main and Branch Campuses) and Recommendations for Corrective Action", was prepared by PEI Associates dated Sept. 1986. Asbestos containing materials are identified in pipe, fitting and duct insulation in equipment room 029M, 039M and 231M. All asbestos piping and asbestos containing materials including floor tiles and mastic, caulking and materials within the limits of the building need to be removed before any renovation or repairs.

PERIMETER

About 95 percent of the sidewalks around the building are in good condition. Some sidewalks on the west side have sections of cracked, settled or raised concrete. Sections of the sidewalks that have settled areas, cracked sections or tripping hazards need to be relevelled or replaced. There are low areas on the north side of the building that need to be backfilled to slope away from the building.

The lawn area on the north side has bare spots in the grass. All of the shrubbery and trees need to be trimmed and mulched.

The north patio door is used frequently and a concrete patio and sidewalk should be installed.

Concrete planting walls need to be repaired in some places.

Blacktop areas to the southeast need to have the cracks filled and the spalled blacktop repaired.

Entrances to the building are well lighted and area, flood and street lighting appear to be distributed properly. The building signs are in good condition.

All of the sidewalks around the building are in good condition. Some sidewalks at the front stairs at the street are sloped to the steps and need to be sloped to the street to prevent frozen treads and a potential fall hazard.

Entrances to the building are well lighted and area, flood and street lighting appear to be distributed properly. The building signs are in good condition. The lighting in the south walkway needs to be checked for proper operation.

Minor Maintenance Projects (Less Than \$5000) EXTERIOR

HITCHCOCK HALL #274

- 1 Some of the window lintels or head flashing on the east side of the building are leaking and need to be repaired, (building coordinator has locations).
Customer Request #114467
- 2 The counter flashing and flashing on the northwest fourth floor needs to be repaired.
Customer Request #114468
- 3 The lights under the west soffit need to be checked for proper operation.
Customer Request #114469
- 4 Three steel exterior doors need to be painted.
Customer Request #114470
- 5 The asphalt in front of the loading dock needs to be patched.
Customer Request #114472
- 6 The concrete ramp on the northwest corner needs to be patched.
Customer Request #114472
- 7 The trees and shrubs need to be trimmed.
Customer Request #114474
- 8 The concrete walk on the southeast corner at the dock needs to be patched.
Customer Request #114472
- 9 Dirt needs to be added around shrubs at the west sidewalk where erosion has occurred and the possibility of injury could occur.
Customer Request #114474

Control #6739

1. Repair the lightning arresting system on the building including cable brackets, lightning rods and grounds.
2. The exposed rebar in the concrete columns and beams needs to be patched with epoxy to protect it until they can be properly repaired.

Minor Maintenance Projects (Less Than \$5000) INTERIOR

HITCHCOCK HALL #274

1. Stained 2x4 ceiling tiles need to be replaced.
Customer Request # 114477
2. The trash and left over materials in room 029M and 238M need to be removed.
Customer Request # 114478
3. Repair the stairwell firedoors to operate properly.
Customer Request # 114479
4. Paint the stairwell firedoors.
Customer Request # Completed
5. Repair the heating coil leaks on the MZ unit in room039M.
Customer Request # 114480

BUILDING EVALUATION SUMMARY

BUILDING INFORMATION

Fac #274, Facility Name: **HITCHCOCK HALL**

Date: 10/30/00, Inspector: JAO, Year Constructed: 1967, Gross Sq. Ft: 119,498

Net Sq. Ft: 110,661, Replacement Cost: \$ 18,191,000 *

COMPONENT RATING

COMPONENT	BUILDING COMPONENT PERCENTAGE OF TOTAL COST **	BUILDING COMPONENT REPLACEMENT COST	BUILDING COMPONENT CONDITION VALUE MULTIPLIER	BUILDING COMPONENT CURRENT VALUE
Foundation	12.47	2,269,306	88	1,989,600
Columns and Beams	14.82	2,695,753	86	2,309,567
Exterior Walls	6.60	1,200,143	79	944,193
Ext. Windows & Doors	3.35	609,210	71	434,602
Roofing & Flashing	2.09	380,756	86	327,480
Partitions & Doors	6.48	1,178,821	71	840,954
Wall Finishes	2.44	444,723	86	380,519
Floor Finishes	4.62	840,709	72	605,356
Ceilings & Finishes	5.68	1,032,610	68	702,228
Conveying	2.60	472,137	77	362,000
Plumbing	8.37	1,523,024	75	1,137,274
Heating	8.04	1,462,103	75	1,091,783
Cooling and Vent.	9.23	1,678,373	57	951,125
Elect. Serv. & Dist.	1.22	222,362	80	177,904
Lighting and Power	9.21	1,675,327	90	1,507,945
Safety Standards	2.78	505,644	57	286,546
TOTALS	100.00	18,191,000	77	14,049,076

BUILDING RATING SUMMARY

Overall Building Rating = **77%**

* Replacement Cost assigned June 2001 by The Office of University Resource Planning & Institutional Analysis without the furnishings and fixed equipment allocation.

** Percent allocation of each building component is calculated from The Means Standard Construction Cost data for College Classroom Buildings.

FOUNDATIONS

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>2,269,306</u>) x (<u>88%</u>) = \$ <u>1,989,600</u>						
<table style="margin: auto; border: none;"> <tr> <td style="padding: 0 10px;">Possible</td> <td style="padding: 0 10px;">Condition</td> <td style="padding: 0 10px;">Component</td> </tr> <tr> <td style="padding: 0 10px;">Value</td> <td style="padding: 0 10px;">Value Multiplier</td> <td style="padding: 0 10px;">Value</td> </tr> </table>	Possible	Condition	Component	Value	Value Multiplier	Value
Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat Att

a. Footings:

- Interior Footings/Piers *on caissons*
- Interior Footings/Bearing Walls.....
- Perimeter Footings*for sidewalks and walls*
- Grade Beams*between caissons on perimeter*
- Piles
- Caissons

b. Foundation Wall Materials:

- Concrete Cast-in-place.....*from ground to the first floor*
- Concrete Block.....
- Stone
- Brick.....
- Other

c. Waterproofing and Underdrain:

- Coating.....
- Membrane
- Board.....
- Drain Pipe*shown on drawings*

d. Slab on Grade:

- Plain
- Reinforced.....

e. Ground/Basement Floor Slab:

- Plain
- Reinforced.....

f. Special Substructures:

-

COMMENTS:

None

COLUMNS AND BEAMS

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>2,695,753</u>) x (<u>86%</u>) = \$ <u>2,309,567</u> <div style="display: flex; justify-content: space-around; font-size: small;"> Possible Value Condition Value Multiplier Component Value </div>

SYSTEM DESCRIPTION

Sat Att

- a. Columns and Beams:**
- Reinforced Concrete..... *columns and beams*
- Precast Concrete
- Steel
- Fireproofing
- Wood
- Other
- b. Floor Joists:**
- Concrete..... *one way joists*
- Steel
- Wood
- Other
- d. Floor Decks:**
- Concrete Slab.....*reinforced concrete*
- Precast Slab
- Metal Deck
- Wood
- e. Roof Joists:**
- Concrete..... *one way joists over main building*
- Steel
- Wood
- f. Pitched Roof System:**
- Pitch 1.5/12, 7/12, 10/12
- Dormers
- Steel Purlins.....
- Wood Rafters.....
- Fireproofing
- Underlayment
- Insulation
- Ventilation
- Other
- g. Flat Roof System:**
- Slope.....*0.25" per foot on perimeter*
- Concrete Deck
- Precast Slab
- Metal Deck w/concrete fill

- Metal Deck w/insulation
- Wood Deck
- Insulation..... *1.5" insulation*
- Other

COMMENTS:

The columns and beams are spalling where the rebar was installed to close to the surface and need to be epoxy sealed to prevent rebar deterioration.

EXTERIOR WALLS

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ 1,200,143) x (79%) = \$ 944,193

Possible	Condition	Component
Value	Value Multiplier	Value

SYSTEM DESCRIPTION

Sat Att

a. Walls:

- [] Concrete CIP PRECAST.....7,260 SF
- [] Concrete Block/brick.....rowlock 24,635 SF
- [] Brick MASONRY VENEER
- [] Veneer..... limestone 3,575 SF
- [] Window/Curtainwall
- [] Metal Siding
- [] Other.....louvers on two levels

b. Wall Lintels Over Openings:

- [] Concrete PRECAST CIP.....
- [] Limestone
- [] Brick Masonry
- [] Steel
- [] Wood
- [] Other.....

c. Wall Trim:

- [] Limestonepanels
- [] Brick
- [] Marble.....
- [] Wood
- [] Other.....concrete columns, beams and parapets

d. Finishes:

- [] Plain.....
- [] Stuccoentrance and soffits
- [] Paint.....
- [] Parging..... concrete on columns and beams
- [] Exposed Aggregate
- [] Drivit
- [] Other.....

e. Exterior Wall Backing System:

- [] Concrete.....
- [] Concrete Block on perimeter and stairwells
- [] Brick Masonry
- [] Ceramic Glazed Clay Tiles.....

[]	[]	Metal Studs
[]	[]	Wood Studs

COMMENTS:

There are no weeps in the brick veneer and need to be installed when cleaned.

All of the limestone, concrete and brick needs to be cleaned and should be sealed.

The walls behind the brick are constructed of concrete block and rigid insulation.

EXTERIOR WINDOWS AND DOORS

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>609,210</u>) x (<u>71%</u>) = \$ <u>434,602</u> <div style="display: flex; justify-content: space-around; font-size: small;"> Possible Value Condition Value Multiplier Component Value </div>
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SYSTEM DESCRIPTION

Sat Att

- a. Window materials:**
- [] [] Wood
- [] [] Steel
- [X] [] Alum..... *window frames*
- [] [] PVC
- [] [] Other.....
- b. Windows type & number:**
- [] [] Double Hung
- [] [] Awning
- [] [] Casement
- [X] [] Pivoted..... *59 top pivot swing in, 9 in stairwells*
- [] [] Sliding
- [X] [] Fixed..... *95 window units with fixed glass*
- c. Window glazing:**
- [X] [] Single pane *on all windows 1,950 SF*
- [] [] Double pane.....
- d. Window Wall and/or Store Front:**
- [X] [] Store Front..... *at entrances*
- [X] [] Vestibule..... *at east and west entrances*
- [X] [] Single pane *340 SF on 26 units*
- [] [] Double pane.....
- [] [] Other
- e. Door Materials:**
- [] [] Wood
- [X] [] Steel..... *exit doors*
- [] [] Stainless Steel.....
- [X] [] Alum..... *four sets of entrance doors*
- f. Doors type & number:**
- [X] [] Vestibule Double *two at east and west entrances*
- [X] [] Double *one at north and southwest entrances*
- [X] [] Exit Single *northeast auditorium exit*
- [X] [] Exit Double..... *at southeast dock exit*
- [X] [] Stair Exits *to north lobby and south stair exits*
- [] [] Garage.....
- [] [] Special

g. Hardware:

- Automatic opener..... *on east entrance*
- Push Bar Openers wt Closures.....
- Key Cards.....

COMMENTS:

The steel exit doors need to be painted.

The aluminum windows are 32 years old and are beginning to leak air and water and will need to be replaced within the next five to ten years.

The six aluminum entrance double doors are 32 years old and will need to be replaced within the next five to ten years.

ROOFING

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ 380,756) x (86%) = \$ 327,480

Possible Value	Condition Value Multiplier	Component Value
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SYSTEM DESCRIPTION

Sat Att

a. Roof Covering:

- [X] [] Built-up [] asphalt [] Coal Tar [X] Bitumen6,893 SF
- [X] [] Built-up w/gravel [] asphalt [X] Coal Tar21,140 SF
- [X] [] Modified asphalt Roll *used as counterflashing*
- [] [] Asphalt Shingle
- [] [] Copper
- [] [] EPDM.....
- [X] [] Other *aluminum paint over modified ply roof*

b. Flashing:

- [X] [] Materials: [X]Cu []Galv [X]Al []EPDM []SS []PVC..
- [X] [] Base1945 LF
- [] [X] Counter1345 LF
- [X] [] Cap.....827 LF
- [X] [] Reglet..... *in walls* 516 LF
- [] [] Valley & Ridge.....
- [X] [] Other *expansion joint* 150 LF

c. Gravel Stop & Edge Strips:

- [X] [] Type []SS []Galv []Al [X]Cu []PVC 600 LF

d. Drainage:

- [] [] Gutters w/ Exterior Downspouts
- [] [] Scuppers w/o Exterior Downspouts
- [X] [] Drains w/ Interior Storm Drains 22 EA.
- [X] [] Emergency Overflow.....*over the edge*

e. Parapets:

- [X] [] Concrete..... *6" to 12" above roof*
- [X] [] Brick*to roof level*
- [] [] Precast
- [] [] Other.....

f. Parapet Caps:

- [] [] Metal []SS []Galv []Al [X]Cu []PVC827 LF
- [] [] Tile
- [] [] Limestone
- [] [] Precast
- [] [] Other

h. Roof accessories:

- [] [X] Lightning Protection
- [X] [] Roof Curbs
- [X] [] Equipment Frames
- [X] [] Pitch Pockets
- [X] [] Other *access door*

COMMENTS:

The roof is 14 years old and is in good to fair condition. Sections are showing signs of blistering, wrinkles and fish mouths.

The lower northwest roof over the first floor appears to be 14 years old and is in good to fair condition. Sections are showing signs of blistering and fish mouths.

Some leaks were noted in the work orders from the third floor roof at the counterflashing above room 342, 346 and x440s that was repaired.

Many of the lightning rod bases, wire and retainer clips are loose on the coping and need to be reinstalled, the cement holding them to the metal has come loose.

The roof flashing and counterflashing at the northwest corner of the fourth floor has pulled loose and needs to be repaired.

PARTITIONS AND DOORS

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ 1,178,821) x (71%) = \$ 840,954

Possible Value	Condition Value Multiplier	Component Value
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SYSTEM DESCRIPTION

Sat Att

a. Partition Framing:

- [] [] Concrete Block *predominate throughout*
- [] [] Clay Tile Block.....
- [] [] Glazed Clay Tile Block
- [] [] Masonry
- [] [] Wood Stud.....
- [] [] Metal Stud *in remodeled areas*
- [] [] Other.....

b. Special partitions and Walls:

- [] [] Demountable.....
- [] [] Toilet *Steel*
- [] [] Screen Walls..... *Steel*
- [] [] Glass
- [] [] Gate.....
- [] [] Other.....

c. Wall Material:

- [] [] Concrete Block *predominate throughout*
- [] [] Plaster *some soffits*
- [] [] Drywall *on metal studs in remodeled areas*
- [] [] Glass
- [] [] Wood Paneling
- [] [] Composite Paneling.....*some offices*
- [] [] Steel Panels.....
- [] [] Tile/Glazed
- [] [] Other.....

d. Interior Doors & Frames:

- [] [] [X] Met Door/Met Frame.....*fire doors to stairwells*
- [] [] Wood Door/Wood Frame
- [] [] Wood Door/Metal Frame *predominate throughout*
- [] [] Glazing
- [] [] Roll-up.....
- [] [] Sliding
- [] [] Other.....

e. Hardware:

- [] Door Knobs []Levers.....
- [] Door Closures
- [] Kick/Push Plates
- [] Security & Detection..... *some door key card locks*
- [] Automatic Openers *on east and west exit doors*
- [] [] Fire Door Magnets
- [] [] Other

COMMENTS:

All of the stairwell fire doors need to be checked for proper operation and repaired.

Maintenance records indicate that door and/or door hardware are being adjusted and/or repaired on a continual basis.

WALL FINISHES

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ 444,723) x (86%) = \$ 380,519

Possible	Condition	Component
Value	Value Multiplier	Value

SYSTEM DESCRIPTION

Sat Att

a. Wall Finishes:

- [X] [] Paint
- [X] [] Vinyl Wall Coverings
- [X] [] Prefinished Paneling *in auditoriums*
- [] [] Cork
- [] [] Wallpaper.....
- [] [] Ceramic Glazed Tile
- [] [] Marble.....
- [] [] Stone
- [X] [] Trim & Wainscot
- [X] [] Decoration.....*brick lobbies and stairwells*
- [] [] Glass.....
- [] [] Other

COMMENTS:

The brick in the auditorium lobby (west wall x1011) needs to have the roof tar removed.

FLOOR FINISHES

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ 840,709) x (72%) = \$ 605,356

Possible Value	Condition Value Multiplier	Component Value
-------------------	-------------------------------	--------------------

SYSTEM DESCRIPTION

Sat Att

- a. Carpet:**
- [X] [] Rolled.....*predominate throughout*
- [] [] Tile
- b. Concrete Topping:**
- [X] [] Clear Sealant *in equipment rooms*
- [] [] Antislip.....
- [X] [] Epoxy *room 328M*
- c. Resilient:**
- [X] [] Vinyl Composition Tile *in hallways*
- [] [] Vinyl/Plastic Tile
- [X] [] Asphalt Asbestos Tile
- [] [] Linoleum Roll *in stairwells*
- [] [] Vinyl Roll.....
- [] [] Rubber.....
- [X] [] **d. Ceramic Tile** [X]Mosaic []Quarry []Pavers.....
- [] [] **e. Masonry** []Marble []Granite []Slate []Brick.....
- [X] [] **f. Terrazzo** []Marble [X]Granite
- [] [] **g. Wood** []Tiles []T&G Hardwood []Planking
- [] [] **h. Pedestal** []Vinyl Tiles []Grills []Supply Air []Vent. ..
- i. Base Molding:**
- [X] [] Vinyl
- [] [] Wood.....*predominate throughout*
- [X] [] Terrazzo *marble first floor*
- [] [] Ceramic Tile *restrooms*
- [X] [] Masonry *in restrooms*

COMMENTS:

Floor finishes are in good condition.

CEILINGS AND FINISHES

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>1,032,610</u>) x (<u>68%</u>) = \$ <u>702,228</u>						
<table style="margin: auto; border: none;"> <tr> <td style="text-align: center; padding: 0 10px;">Possible</td> <td style="text-align: center; padding: 0 10px;">Condition</td> <td style="text-align: center; padding: 0 10px;">Component</td> </tr> <tr> <td style="text-align: center; padding: 0 10px;">Value</td> <td style="text-align: center; padding: 0 10px;">Value Multiplier</td> <td style="text-align: center; padding: 0 10px;">Value</td> </tr> </table>	Possible	Condition	Component	Value	Value Multiplier	Value
Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat Att

a. System Type:

- [] Exposed *in equipment rooms*
- [] [] Applied to Structure
- [] [] Suspended Stud
- [] Suspended Steel Grid
- [] Suspended Aluminum Grid
- [] [] Suspended Sealed Grid.....
- [] Suspended Concealed Spline.....

b. Materials:

- [] Drywall *in some remodeled areas*
- [] Plaster
- [] Mineral Fiber Board *predominate throughout*
- [] [] Fiberglas Board.....
- [] Cementitious Fiber Board..... *auditorium*
- [] [] Metal Pan Tile
- [] Other *wood trim at soffits and cornice*

c. Finishes:

- [] Paint.....
- [] [X] Prefinished [X]Paint []vinyl []Fabric
- [] [] Other

d. Openings & Inserts:

- [] Air Distribution
- [] Lighting Fixtures
- [] Access Panels
- [] [] Sprinklers.....
- [] [] Smoke Detectors.....
- [] [] Speakers.....
- [] [] Skylights
- [] [] Other

COMMENTS:

Several tiles are stained from water leaks and need to be replaced.

CONVEYING

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>472,137</u>) x (<u>77%</u>) = \$ <u>362,000</u>		
Possible Value	Condition Value Multiplier	Component Value

SYSTEM DESCRIPTION

Sat Att

a. Elevators:

- Number *One Otis*
- Type *Passenger*
- Speed..... *125 FPM*
- Capacity (lbs.) *2,500 Lbs.*
- Dimensions *72"x72"*
- Door Operation: Center To Side.....
- Accessible Codes
- Fire Codes

b. Elevators:

- Number *One Otis*
- Type *Freight Only*
- Speed..... *125 FPM*
- Capacity (lbs.) *4,000 Lbs.*
- Dimensions *72"x120"*
- Door Operation:
- Door Operation: Center To Side.....
- Accessible Codes
- Fire Codes

c. Lifts and Hoists:

- Number
- Type

d. Moving Stairs and Walks:

- Number
- Type

e. Conveyors:

- Number
- Type

COMMENTS:

One elevator is ADA compliant and has voice communication but will need to be replaced within the next ten years.

MECHANICAL/PLUMBING

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ 1,523,024) x (75%) = \$ 1,137,274 <div style="display: flex; justify-content: space-around; font-size: small;"> Possible Value Condition Value Multiplier Component Value </div>

SYSTEM DESCRIPTION

Sat Att

a. Services Available:

- [] Cold Water 6" fire in room 026A
- [] Backflow Valve 3" in room 002M
- [] Hot Water 2.5" in room 002M
- [] Natural Gas 2" in room 002M
- [] Compressed Air 1.5" in room 002M
- [] Other

b. Piping & Fittings:

- [] Cast Iron sanitary and storm
- [] Duroiron
- [] Copper Pipe water piping
- [] Copper Tubing on control air
- [] Steel on standpipe and sprinklers, gas and air
- [] Galv. Steel
- [] Other cast iron water service

c. Water Heaters:

- [] Gas
- [] Steam Converter/Tank
- [] Steam Instantaneous
- [] Central Hot Water 2.5" DHWS & 3/4" DHWR

d. Drainage:

- [] Storm Drains 1@12" to the west
- [] Sanitary Drainage 2@6" San to the west
- [] Floor Drains
- [] Sewage Pumps . 100 GPM duplex north side room 039M
- [] Sump Pumps

e. Fixtures: Number

- [] Water Closets 26
- [] Urinals 23
- [] Lavatory Sinks 24
- [] Kitchen Sinks 2
- [] Service Sinks 5
- [] Showers 2
- [] Electric Water Coolers 8

- f. Sprinkler Systems:**
- Wet *in room 003 and 011*
- Dry
- Carbon Dioxide.....
- Halon.....
- g. Standpipe Systems:**
- []Wet []Dry
- Fire Hose Valves []2.5" []1.25" *in hallways*
- Valve Cabinets..... *2.5" in stairwells and halls*

COMMENTS:

The main water valve for the domestic water piping is in room 026A.

The main water valve for the standpipe piping is in room 026A.

MECHANICAL/HEATING

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ 1,426,103) x (75%) = \$ 1,091,783 <div style="display: flex; justify-content: space-around; font-size: small;"> Possible Value Condition Value Multiplier Component Value </div>

SYSTEM DESCRIPTION

Sat Att

- a. Heat Source:**
- [] Central Plant Steam5” HPS from Power Plant
- [] Central Plant Hot Water
- b. System Type:**
- [] Steam
- [] Hot Water 8” heating hot water room 029M
- [] Warm Air.....
- c. Air Handling Units:**
- [] Multizone Preheat Heating Reheat.....
- [] Dual Duct Preheat Heating Reheat.....
- [] Make-up Air Preheat Heating Reheat.....
- [] Variable Volume Air Preheat Heating Reheat
- [] Constant Volume Air Preheat Heating Reheat....
- [] Other.....
- d. Air Filters:**
- [] Prefilter Multi DDAHU MUAHU VAVAHU CAV
- [] Bagfilter Multi DDAHU MUAHU VAVAHU CAV
- [] Other.....
- e. Space Equipment:**
- [] Radiators.....
- [] Convectors.....stairwells
- [] Unit Heaters..... in equipment rooms
- [] Reheat Coils on some DDVAV boxes
- [] VAV Boxes two VAV in remodeled areas
- [] DDVAV Boxes..... throughout building
- [] 2-Pipe Fan Coil.....at entrances
- [] Other..... DDVAV fan coil boxes
- f. Control Type:**
- [] Pneu Electric DDC DDC upgrade
- [] Compressed Air in room 029M

COMMENTS:

The air handling units are 33 years old and past their life cycle replacement age and will need to be replaced.

COOLING/VENTILATING

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ 1,678,373) x (57%) = \$ 951,125

Possible Value	Condition Value Multiplier	Component Value
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SYSTEM DESCRIPTION

Sat Att

a. System/Capacity:

- [] Central Chilled Water System6" from Power Plant
- [] Water.....330 ton
- [] Glycol.....

b. Chillers Capacity/Year/Refrigerant/Manufacturer:

- [] Centrifugal McQuay 225 ton, R-12, 1984 back up
- [] Reciprocating
- [] Absorption
- [] Screw

c. Condenser Side:

- [] Type/Capacity CW DX . Marley 240 ton open type
- [] Other

d. Air Handling Units:

- [] Multizone CW DX HUMD
- [] Dual Duct CW DX HUMD
- [] Make-up Air CW DX HUMD
- [] Variable Volume CW DX HUMID
- [] Constant Volume CW DX HUMD.....
- [] Other

e. Additional Air Filters:

- [] Postfilter Multi DDAHU MUAHU VAVAHU CAV
- [] Other HEPA BAG CARTRIDGE CHARCOAL

f. Direct Expansion: Number

- [] Window units.....
- [] Thru-the-wall
- [] Single zone..... seven units
- [] Other

g. Distribution Boxes:

- [] VAV FC REHEAT.....
- [] CAV FC REHEAT.....
- [] DUAL DUCT FC REHEAT.....

h. Special Systems:

- [] Type
- [] Capacity

i. Control Systems:

- [] Pneu Electric []DDC DDC Upgrade.....
- [] Compressed Air..... *in room 029M*

j. Fans:

- [] Exhaust equipment *14 general and lab exhaust fans*
- [] Recirculating..... *three RA fans*

COMMENTS:

The air handling units are 33 years old and past their life cycle replacement age and will need to be replaced.

There are problems with the controls in several areas that need to be resolved.

ELECTRICAL SERVICE AND DISTRIBUTION

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ 222,362) x (80%) = \$ 177,904

Possible Value	Condition Value Multiplier	Component Value
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SYSTEM DESCRIPTION

a. Service:

Substation: Buckeye, McCracken Power Plant AEP

Primary Voltage: 13,200 Volts, Volts

Switch Gear Circuit No.: 107/307

Transformer:

Manufacture Type	KVA	Secondary/Voltages	Location
GE Oil	1000	480/277	southeast corner

b. Distribution System:

1. Motor Control Center (MCC) Room 029M

Panelboard Fused, Circuit Breakers

Voltage 480/3, 277/3, 208/3, 240/1

Amperage 1600A, 800A, 600A, 400A, 200A

2. Lighting Room 029M and 330M

Panelboard Fused, Circuit Breakers

Voltage 480/3, 277/3, 208/3, 240/1

Amperage 800A, 400A, 250A, 200A, 150A, 100A

3. Building Power Room 029M and 330M

Panelboard Fused, Circuit Breakers

Voltage 480/3, 277/3, 208/3, 240/1

Amperage 800A, 400A, 250A, 200A, 150A, 100A

4. Isolated Ground Power Room 029M and 231M

Panelboard Fused, Circuit Breakers

Voltage 480/3, 277/3, 208/3, 240/1

Amperage 400A, 250A, 200A, 150A, 100A

c. Conduit and wire:

Conduit Steel, Aluminum, PVC, Flexible

Conductor Copper, Aluminum, MIT

Wire: PVC Cover, Romex, Armored Cable(BX)

d. Emergency System:

Battery backup Room x10c

Emergency Panel Room 039M

UPS Room

e. Emergency Generator: 85 KVA in room 039M

COMMENTS:

A 200 amp 480/277 back-up circuit ties the emergency panel.

ELECTRICAL LIGHTING AND POWER

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>1,675,327</u>) x (<u>90%</u>) = \$ <u>1,507,945</u> <div style="display: flex; justify-content: space-around; font-size: small;"> Possible Value Condition Value Multiplier Component Value </div>
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SYSTEM DESCRIPTION

Sat Att

- a. Lighting (lamp type):**
- [] [] Fluor 40 watt.....
- [X] [] Fluor 32 watt..... *upgraded*
- [X] [] Fluor Can.....*in some areas of the building*
- [X] [] Incandescent *in entrances, lobbies and auditorium*
- [X] [] HID []Mercury []HPS [X]Metal Halide*exterior*
- [X] [] Low Voltage (12V).....*display cases and track*
- [] [] Other.....
- b. Lighting Levels**
- [X] [] Halls.....
- [X] [] Rooms.....
- [X] [] Mechanical Rooms.....
- c. Fixture Condition**
- [X] [] Fixtures.....
- [X] [] Bulbs.....
- [X] [] Fixture Lens.....
- d. Receptacles & Switches:**
- [X] [] Wall Outlet 20A.....
- [] [] GFIC Breakers.....
- [X] [] Switches.....
- [X] [] Cover Plates.....
- e. Special:**
- [X] [] Lightning Protection.....
- [X] [] Communication [X]Clock []Public Address [X]Bells
- [X] [] Alarm [X]Fire [X]Security.....
- [X] [] Telecommunication [X] Phones [X]Data []Cable TV
- [X] [] Data Systems.....
- [X] [] Fiber Optics.....
- [X] [] Security..... *locks on some doors*
- [X] [] UPS circuit backup..... *local to some computers*

COMMENTS:

Incandescent light bulbs should be replaced with HID replacement bulbs to conserve energy and extend bulb replacement periods.

SAFETY STANDARDS

FAC #: 274

DATE: 10/30/00

INSPECTOR: JAO

COMPONENT RATING: (\$ 505,644) x (57%) = \$ 2865462

Possible Value	Condition Value Multiplier	Component Value
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SYSTEM DESCRIPTION

Sat Att

a. Exits:

Stair Construction:

- concrete.....
- steel..... *with concrete fill*
- Number of Exit Stairs*three*
- Number of Other Exits.....*three*

b. Fire Rating:

- Construction Type: I__ II X III__ IV__ V__ VI__
- Building Height: 48ft, 4 stories *and basement*

c. Extinguishing Systems:

- Portable
- Standpipe *in stairwells and halls*
- Hose Valve Cabinets..... *in stairwells*
- Sprinklers *limited coverage*
- Gas Suppression.....

d. Detection & Alarm Systems:

- Pull Stations
- Bells
- Horns.....
- Strobes
- Annunciator Panel..... *029M*
- Smoke Detectors
- Halls.....
- Elevators
- Rooms.....
- Equip Rooms
- Ducts.....

e. Lighting Systems:

- Exit Signs [X]BATTERY [X]EMC.....
- Exit Lighting [X]BATTERY [X]EMC.....
- Emergency Lighting []BATTERY [X]EMC
- Emergency Generator..... *85 KVA 480/277 volt*

f. Lightning Protection

COMMENTS: none

The Ohio State University
Department of Physical Facilities
BUILDING AUDIT METHODOLOGY

1. BUILDING AUDIT PROGRAM OBJECTIVE

To provide a building-by-building inventory, including maintenance deficiencies that currently exist, for the 172 OSU buildings that the Department of Physical Facilities is budgetary responsible. These audits will be used to establish repair and renovation projects, budget cost estimates for these projects, and overall levels of required maintenance funding.

2. BUILDING AUDIT APPROACH

A five step procedure is used to meet the program objectives:

1. Collect Historical and Inventory Data on each building.
2. Interview Building Occupants.
3. Perform a Building Inspection.
4. Complete Building Evaluation Forms.
5. Issue Written Report.

3. DATA ORGANIZATION

The data collected is stored by hard copy with field notes in a building file established for each building. The report data is being stored in a database program that allows retrieval of specific data as it is needed. The "Building Evaluation" forms contain ratings for the condition of each building component and a description of any deficiencies for those components. The "Building Information" sheets provide data on the utilities to the buildings and the type of systems in each building.

4. COST ESTIMATES

Costs are for budgeting purposes only and are based on The Means Standard Construction Cost data, auditor experience, industry sources and OSU project cost data. Costs are reported current to the year of the audit. The building component values assigned in the "Building Evaluation" forms are not cost estimates. These values are calculated from the replacement cost provided by The Office of Campus Planning and space Utilization for each OSU building. This building replacement cost is allocated to each building component to provide an estimated value for each component. Project cost estimates will exceed the building component values in most situations because of tear-out, handling and site limitations that occur in building component replacement projects.

5. DATA USAGE

Repair and Renovation Projects: provided to assist in the budgeting process for the Department of Physical Facilities. Building Evaluation: provided to give a numerical rating for each building on campus quantifying its percentage of deficiency.

6. LIMITATIONS

(1) All inspections are visual and do not include physical tests, instrumentation or metering measurements, sampling, or monitoring.

(2) Only random typical offices or laboratories are entered. Typical spaces are deemed to be representative of average conditions throughout each building.

(3) The scope of the analysis does not include complete OSHA, energy, or physical impaired access study. Buildings and components are inspected for condition and general safety requirements rather than specialized code conformance.

(4) It is assumed that the State of Ohio Division of Factory and Building Inspection at the time of construction approved the buildings inspected. The recommendations listed in the reports are not an attempt to bring these existing buildings up to present day code standards. Rather, the intent is to eliminate obvious problems and to upgrade the buildings in a reasonable manner in regard to occupant safety.

(5) Cost estimates are in current year dollars and include contractor mark-ups, construction administration costs, and architectural/engineering costs where applicable. Escalation factors must be applied for future work. Combining of projects should serve to decrease costs. These estimates are strictly for purposes of budgeting, and final pricing will be required when the specific scope of work for the project is defined.

(6) The building inspections are defined to include the following:

(a) Includes general repainting and redecorating, wholesale replacement of building and system components on-going maintenance, replacement and renovation projects are not included.

(b) Includes exterior building walls and attached items.

(c) Includes the first step up at all entries. Ramps outside the buildings are included; the steps and walks up to the ramps are not included.

(d) Blinds, drapes, light bulbs, and movable furniture are not included.

(e) Fixed equipment inside the buildings that is installed and maintained by a specific academic department or using agency is not included.

(f) Utility lines supplying the buildings are not included.

(g) The program needs of the using department are assumed to be satisfied. No consideration has been given to anticipate any changes in current occupant space needs.

ABBREVIATIONS

A/C	AIR CONDITIONING
AW	ACID WASTE
AHU	AIR HANDLING UNIT
ATT	ATTENTION
BLDG	BUILDING
BUR.....	BUILT UP ROOF
COND.....	CONDENSATE WATER
CAV	CONSTANT AIR VOLUME
CW	CONDENSER WATER OR CHILLED WATER
DCW	DOMESTIC COLD WATER
DDAHU	DUAL DUCT AIR HANDLING UNIT
DDHV	DUAL DUCT HIGH VELOCITY
DHWH	DOMESTIC HOT WATER HEATER
DHWR.....	DOMESTIC HOT WATER RETURN
DHWS	DOMESTIC HOT WATER SUPPLY
DHWT.....	DOMESTIC HOT WATER TANK
DX	DIRECT EXPANSION AIR CONDITIONER
EWC	ELECTRIC WATER COOLER
EMC	EMERGENCY CIRCUIT
FPM.....	FEET PER MINUTE
GPM	GALLONS PER MINUTE
HID.....	HIGH INTENSITY DISCHARGE LIGHT
HHW	HEATING HOT WATER
HPS	HIGH PRESSURE STEAM (125 PSI)
HVAC.....	HEATING, VENTILATING AND AIR CONDITIONING
KV	KILOVOLTS
KVA	KILOVOLTS AMPS
KW	KILOWATTS
LF	LINEAL FEET
LPS	LOW PRESSURE STEAM (15 PSI)
MCC.....	MOTOR CONTROL CENTER
MPS.....	MEDIUM PRESSURE STEAM (50 PSI)
MZCV	MULTIZONE CONSTANT VOLUME AIR HANDLING
N/A.....	NOT APPLICABLE
PSI.....	POUNDS PER SQUARE INCH
RM.....	ROOM
RTU.....	ROOF TOP UNIT (HEATING OR A/C)
SF	SQUARE FEET
S/P	STAND PIPE
SY.....	SQUARE YARDS
TR.....	TERMINAL REHEAT
V	VOLTS
VAV	VARIABLE AIR VOLUME

APPENDIX

Reduced Scale Building Floor Plans

C-1 Building Space Assignments