

Carmel Clay Public Library

Building Condition Study

January 2013



**Carmel Clay Public Library
55 4th Avenue SE, Carmel, Indiana
Facility Study**

Scope

The new landmark facility for Carmel Public Library was constructed in 1998/99 and celebrated its opening in May of 1999. The building was constructed of high quality materials selected by the Architectural design team of Meyer, Scherer & Rockcastle in association with Browning Day Mullins Dierdorf. The structure, finishes and systems were designed to institutional standard which has led to a building that should have a productive life well in excess of 50 years. Individual systems and components within the building may have a considerably shorter useful life and will require periodic maintenance and at some point, replacement. Failure to properly maintain building systems can lead to accelerated building deterioration, an uncomfortable environment and reduced satisfaction for patrons and staff. The building will have been occupied 14 years in May 2013.

Stair Associates, in meeting with the Library staff to review some specific issues, volunteered to review the current state of the building from an Architectural and Engineering standpoint. The goal of the review being to identify any systems that are deficient or require immediate maintenance and to help predict short term and long term projects that will be necessary.

Martin Truesdell a Registered Architect and Woody Holm a Registered Engineer, visited the site on December 10 and surveyed the building and systems

Specific Condition and Deficiencies

Structure

The Carmel Clay Public Library has a steel frame structure typical of this type of building. The structure will require no maintenance or monitoring. The most common source of challenges is relative to the foundation or soil bearing, and issues will express themselves in cracks in the floors, especially terrazzo, and in the brick masonry. No such problems were observed, and after 14 years of occupancy, it would be very unlikely that any structural issues will occur in the near future.

Building Envelope

Standing seam metal roofs are used as an architectural feature for roofs which are visible from the ground. These roofs should have a long life and require little maintenance, as the amount of slope will keep debris from accumulating. The design of the roofs consists of simple single slope and hip forms, which will seldom accumulate ice and do not have the potential for leaks that valley or complex roof forms have. The most common complaint for this type of roof is fading of the color, which is purely cosmetic. The Carmel Clay Public Library may wish to monitor these roofs to watch for corrosion; however no corrosion was observed at this time and is unlikely for many more years.

The soffits below the standing seam roofs at the clerestories appear to be redwood. These soffits are in good condition, however there is dimensional lumber detailing which is beginning to show some sign of

drying and checking. No attention is required at this time, however this should be monitored to make sure that more degradation does not occur.

The building skin consists of a combination of metal panels and clay brick masonry. The clerestories are sheathed in metal panels, which are in good condition. As with the standing seam roof, the primary complaint with the metal panels is typically fading. The soft blue and particularly the earth tone colors used on this facility are some of the least likely to fade, and it is not obvious when they do start to fade. No attention is likely to be required for these panels for many years.

The majority of the roof is an elastomeric membrane. These membranes typically carry a 20 year warranty in this type of construction, so there should be (6) years left on the warranty. If the roof is maintained and debris is removed, it may be possible to re-strip the seams and address any pulling at parapets to extend the roof life well beyond the warranty period. There is no evidence that these procedures are required at this time.

It should be noted that the detailing of the metal panels relative to the roof membrane may cause challenges at the time the roof does need to be repaired or replaced. Refer to the detail from the original contract documents included in the graphic portion this report. The detailer left little room between the top of the roof membrane and bottom of the panel and does not appear to have taken into account the slope of the roof. There are many locations where the metal wall panels are either nearly touching the roof membrane, or have even had to be modified to hold them above the roof. It may be necessary to remove the metal panels to allow the roof membrane to be turned up behind them when the roof membrane is replaced.

The junction between the membrane roofs and the wall parapets was detailed with a gap between the roof counter flashing and the top of the parapet as shown in the original contract detail included in the graphic portion of this report. Fortunately it appears that in each case this condition was not constructed as detailed, and the membrane was wrapped up under the coping which is a much better solution. The detail at the building walls was, however, constructed with the membrane turned up only a short distance from the deck. This can allow water to enter the building skin either through brick weeps or directly through the masonry particularly when snow is banked up against these walls. Water infiltration has occurred in one location, and has been repaired by extending the membrane up the wall with a termination bar. This solution works in this location because there are windows above and no brick weeps in the walls. Caution should be used if this solution is used in any other locations to assure that no brick weeps are covered, as this will channel water directly below the roof membrane and into the building. Please see the photographs included for further illustration of this condition.

Coping are generally in serviceable condition. IF the membrane has been turned up and under the copings they are primarily cosmetic. As long as there is no sign of water infiltration, maintenance can be done as convenient.

The balance of the exterior skin consists primarily of clay brick masonry. There is no evidence of cracks, degraded mortar joints, or other concerns which would require attention at this time. The brick masonry should last the life of the building, with some attention the mortar joints which will not be required for many years.

Interior and finishes

The exterior window frames and the door frames in the public areas are aluminum, and should require no maintenance or painting. The only comment we would make is that the caulking of the exterior windows was done on the surface as opposed to in a caulk space between the window and adjacent finish. This will inherently peel off. If possible the caulk should be removed whenever these walls are painted and properly be tucked into the space between the window and finish, IF such a space exists.

Several locations were noted where the wood base was installed with the wood putty smeared onto the surface of the wood. While this is purely cosmetic, the wood could be sanded down and refinished.

Wall paint is typically addressed on an as needed basis, or as required to update the image of the facility. Consider developing a schedule for painting, addressing high use areas with greater frequency. Note that in the public areas the door frames will not require painting, however in the secure areas the door frames are hollow metal, and may be painted on schedule with the walls or perhaps even more frequently. Some doors have door guards which will take more abuse, and will require more attention. Corner guards have been provided at gypsum board corner conditions which will greatly reduce the potential for damage and requirement for maintenance.

The carpet we observed was replaced in the summer of 2012, and is in good condition. Consider carpet replacement on a rotating schedule, again addressing high use areas more frequently. The carpet is cleaned on a monthly schedule. Note that carpet life can be greatly increased with regular cleaning, particularly using extraction.

Ceramic floors and access floors will require little maintenance other than regular cleaning. Monitor the ceramic floors in the toilet rooms, especially around urinals, for signs of grout degradation. Vinyl Composition Tile is primarily used in the secure areas and should have a long life with regular cleaning and waxing. The terrazzo floors appear to have been vitrified, and should require virtually no maintenance. No cracks or other challenges were observed in the terrazzo.

Accessibility

The facility was constructed under accessibility guidelines which are very similar to those in force today. The only difference observed is that there is a new requirement for a vertical grab bar at the water closets. Installation of this grab bar may require opening up the wall to provide new blocking.

Site

Site conditions were not reviewed at this time. Additional review will be done when plant materials are active in the spring.

Plumbing

The building is fully sprinklered with exposed heads. The system appears to be in very good condition. This system should be inspected no less than annually by a qualified fire protection contractor.

Primary plumbing supply and waste systems are in very good condition with cast iron no-hub waste/vent and copper supply. Systems are properly insulated with a closed cell rubber product. Plumbing fixtures, faucets and flush valves also appear to be in good condition.

There are approximately 10 electric domestic water heaters installed at sink locations throughout the building. Distributing these tanks throughout the building reduces the amount of piping necessary and reduces the energy loss of a central circulated system. However each of these tanks will have a service life of about 10-15 years before pinhole leaks develop. The long term budget should plan on replacing one of these systems each year. The alternative to the installed system would be a central gas fired heater and tank with a new circulation loop throughout the building. The cost of the new piping may negate the maintenance savings of a centralized plant.

All building domestic water is softened including water coolers. Soft water delivery to water coolers is frequently avoided due to the ongoing debate of the suitability of softened drinking water. The Marlo softener appears to be in good condition.

Heating, Ventilating and Air Conditioning

Building heating originates at two 3 million btu/hr Ajax gas fired, water tube, hot water boilers. These boilers appear to be in good condition and with good water treatment, proper control and maintenance should last many more years. During our visit the boilers seemed to be cycling excessively with one boiler operating, shutting down, and then the second boiler starting soon after. We may want to review the current control sequence to minimize this. Heating hot water is pumped to coils and terminal units throughout the building. These pumps have variable flow to help in energy use, but they were running fairly constant at the time of the visit. A review of their control sequence may also be helpful.

The McQuay air-cooled chiller located in an exterior enclosure has a problematic history. Objectionable noise levels led to acoustic additions at the enclosure which may have affected performance and compressor life. Compressors have been replaced over the years at a higher than average rate. The median life for this class of equipment is about 20 years and the longevity may have been compromised by the acoustic modifications. Replacement should be anticipated in the next 4 to 8 years.

Chilled water is pumped to the two main air handling units on the mezzanine. These pumps do not have variable speed drives which could be added to save energy. Distribution piping for both hot water and chilled water is very good quality copper, properly insulated.

The two main Racan air handling units on the mezzanine are in good condition and should require only preventative maintenance over the next 10 years. These air handlers deliver fresh air, typically between 55-65°F to Variable Air Volume terminal boxes located above ceilings. The controls on these boxes determines the volume of cool air delivered to each space and if necessary opens a valve to heat the air. These boxes are in good condition and should require only minimal maintenance.

A third air handling unit is located on the northwest mezzanine and serves only the Program Room. This air handler is also in good condition. It is not served by the building chiller but has its own air cooled condensing unit on the roof. This equipment appears to be in fair condition but is near the end of a predicted 15-20 year median life.

The computer room is served by its own Liebert system with a rooftop condensing unit which is in good condition but may become a maintenance problem in 5-8 years.

The only significant temperature complaints were in the coffee shop area where outside air blows in through the vestibule. Physical changes to the vestibule and a new dedicated fan coil unit could improve this situation.

Rooftop exhaust fans are in good condition. Rooftop relief hoods are showing rust where water pools but are otherwise in good condition.

The recent temperature control upgrade appears to be well done with state of the art equipment. Consideration should be given to adding indoor carbon dioxide sensors to reduce outside air flow to minimal levels.

Electrical

The 480 volt, 3 phase 2000 amp service and distribution appears to be adequately sized and in good condition. Distribution panelboard space is adequate for future additions of equipment.

The recent upgrades to current lamp technology have been a good investment. Consideration may be given to adding day Lighting or occupancy sensor controls to lighting to further reduce usage. The emergency lighting fixtures are served by on-board battery packs which are near the end of their median life. These should be inspected no less than annually. Exterior lighting is adequate with 400 watt metal halide in the parking lots. Conversion of these lights to LED may be appropriate in the future. The exterior lights are controlled by mechanical time clocks and contactors. Control of these lights by the temperature control system would have some advantages.

Building fire alarm system is in good condition with appropriate coverage.

<u>Potential Short Term Projects</u>	<u>Time Frame</u>	<u>Budget Cost</u>
Membrane Roof Replacement	6-10 Years	\$200,000
Ongoing Carpet and Painting	As Needed	Varies
Domestic Water Heater Replacement (1 of 10)	Annual	\$1,200
Boiler/Hot Water control adjustment	As Desired	\$2,500
Chiller Replacement	4-8 Years	\$300,000
Chilled Water Variable Speed Drives	As Desired	\$20,000
Replace McQuay Air Cooled Condenser	2-6 years	\$25,000
Add CO2 Sensors	As Desired	\$15,000
Vestibule Improvements	As Desired	\$30,000
Occupancy Sensors/ Daylighting	As Desired	\$25,000
Exterior Lighting Control	As Desired	\$4,000

All costs are 2013 dollars.

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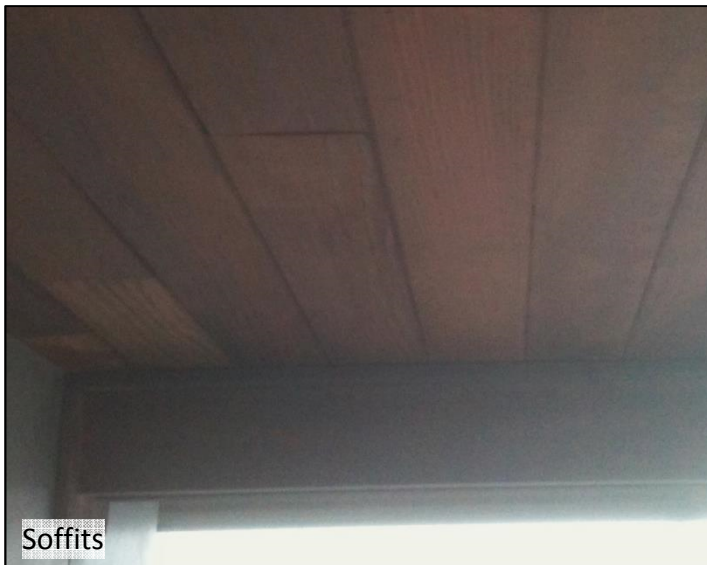
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Standing seam metal roof

Redwood soffit and trim

Clerestory with standing seam metal roof, redwood soffits, and metal panel exterior cladding



Redwood soffits at upper clerestories are generally in good condition.



Dimensional redwood details at soffits are starting to show some checking and drying out. No attention is required at this time but condition should be monitored

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Soffits

Redwood detailing



Metal panels

Roof slope to drain creates a condition where roof tapers up to metal panels.

Metal Panels are set close to the roof membrane.



Metal panels

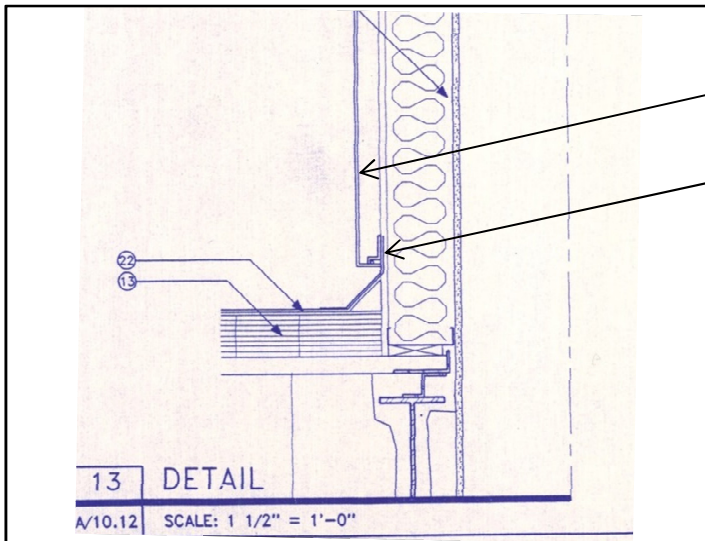
Corner detail at metal panels

Building Envelope

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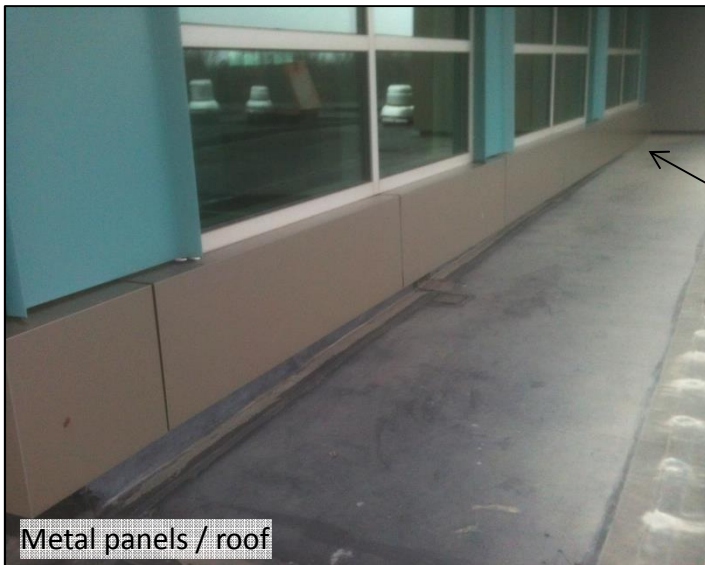


Metal panel system.

Roof membrane turns up a short distance behind the metal panel system as shown in contract documents. Minimal space is available for any type of termination when a new roof membrane is installed.

Detail from original Contract Documents

Metal panels



Roof slopes to base of metal panel

Metal Panels are set close to the roof membrane.



When the time comes to replace the roof membrane, it may be necessary to remove the metal panels in order to turn the new roof membrane up and behind the panels. There is not adequate room below the panels to provide a termination bar to seal the top of a new membrane. The roof will not require replacement for several years.

Building Envelope

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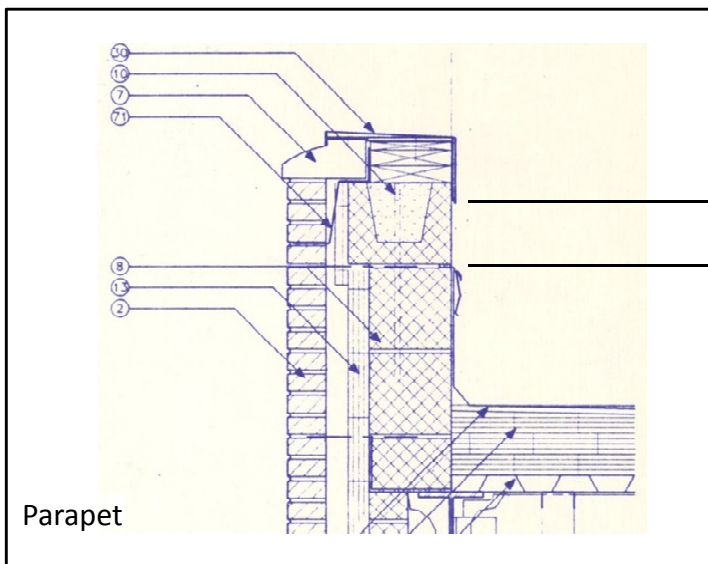
Close up of metal panel at roof.



Mechanically fastened EPDM.

Standing seam metal roof.

The roof consists of standing seam metal and EPDM membrane systems.



The way the roof and flashings are detailed leave an opportunity for water infiltration at both the parapets and building walls. If this detail is addressed, care must be taken at building walls to make sure that wall weeps are not covered.

Detail from original Contract Documents

Building Envelope

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The membrane roof is in good condition and will not require replacement for several years. This is another location where replacement of the roof will be challenging.



The masonry wall in this location, over the main entry, was allowing water infiltration. The repair consisted of turning additional roof membrane up and over the masonry with a termination bar to keep water from entering through the brick.

Termination bar.

Turned up EPDM membrane.

Roof detail.



See detail above.

The brick in this location has not shown sign of leaking, however the detail is identical to the area which did leak. This condition should be monitored for potential issues. See Construction Document detail previous page.

Existing flashing and counter flashing.

Corner detail at metal panels

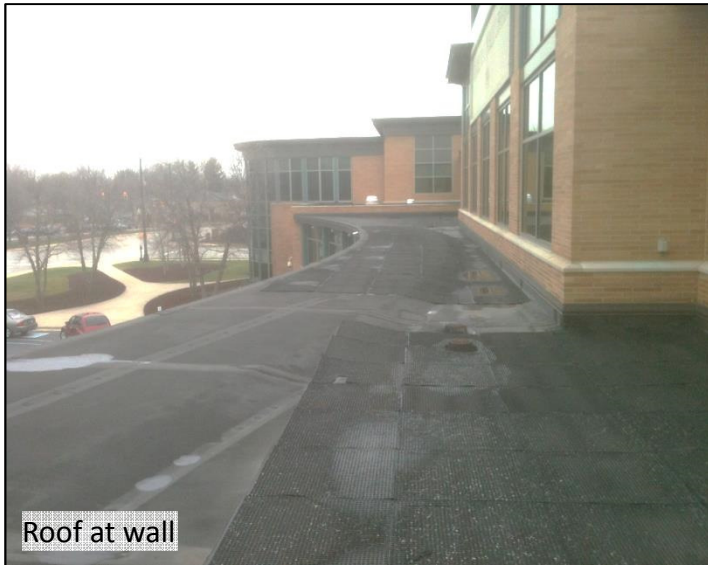
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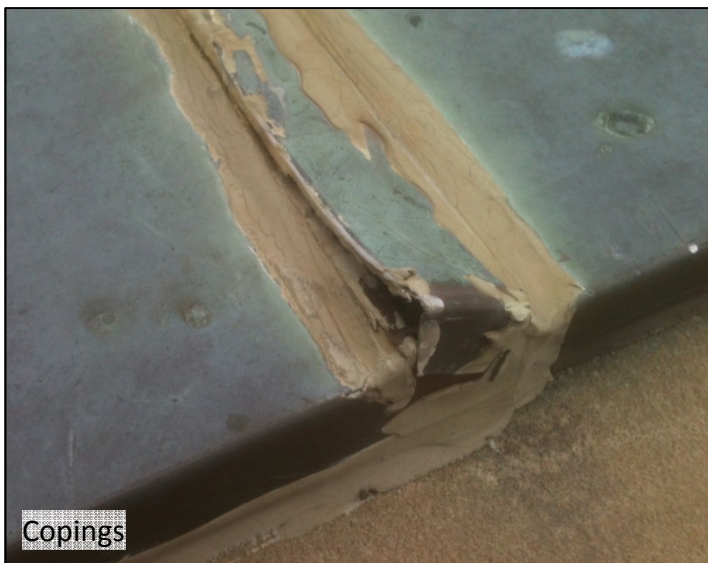


The reason the wall has not leaked at this location is likely because the flashing and counter flashing is higher than the exterior edge condition.



Debris and plant growth.

Roof maintenance should be done where water or debris become trapped.



Maintenance should be done at roof copings. This is primarily cosmetic IF the flashing has been done per the original documents.

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Ponding Water.

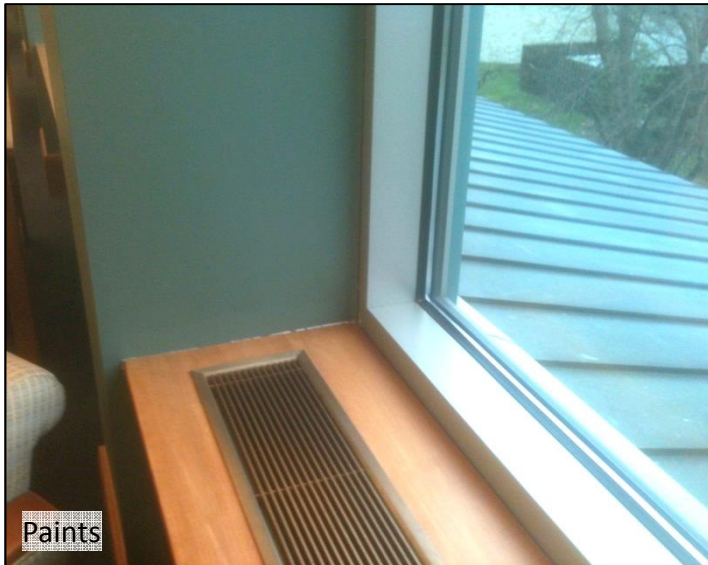
Ponding water to this extent should not be a problem as long as the EPDM is sound, however these conditions should be corrected when the membrane is replaced.

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Exterior windows are aluminum and do not need to be set up on a schedule for refinishing.

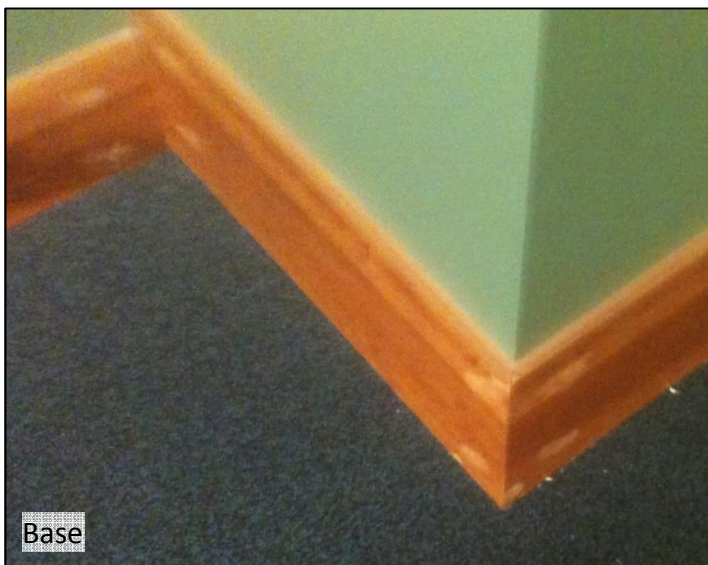
Detail at exterior window.



Sealant has pulled away from window frame.

When the walls are painted at the exterior windows, the sealant between the walls and frames should be addressed. If possible the sealant should be installed in the space between the frame and wall rather than over the top.

Sealant at exterior windows.



The public spaces have wood base which typically would not need attention for a long time. There are several locations where the nail putty was smeared on the surface of the wood. Consider sanding out and re-finishing when the walls are due for new paint.

Wood base.

Interior and finishes

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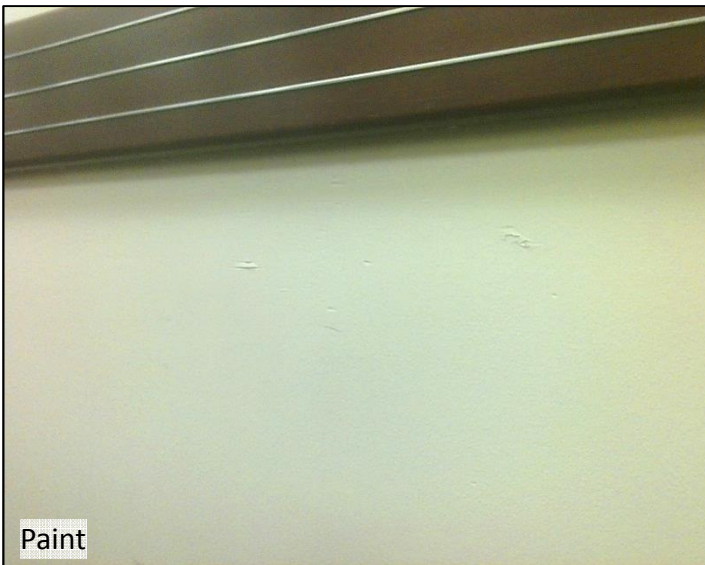
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Consider putting walls on schedule for painting to allow a yearly budget to be set.

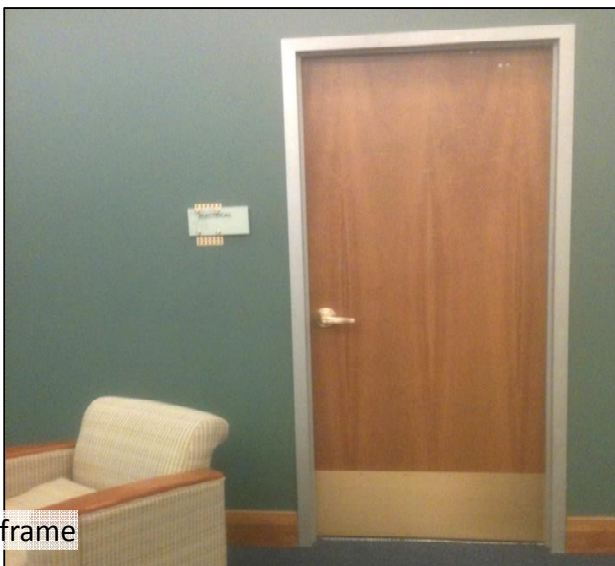
Walls are in good condition, few need repair of the gypsum board.

Wall at study room



Chair rails reduce the amount of wall damage, however be aware that some repair will be needed on occasion.

Wall below chair rail.



Aluminum door frames in public areas should not require any scheduled maintenance.

Door frames at public areas

Interior and finishes

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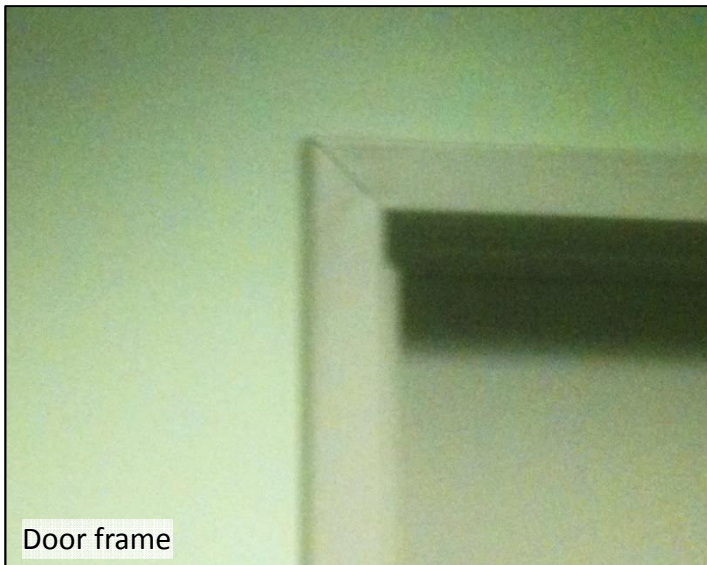
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Interior window frame

Aluminum interior window frames should not need to be set on a regular maintenance schedule.

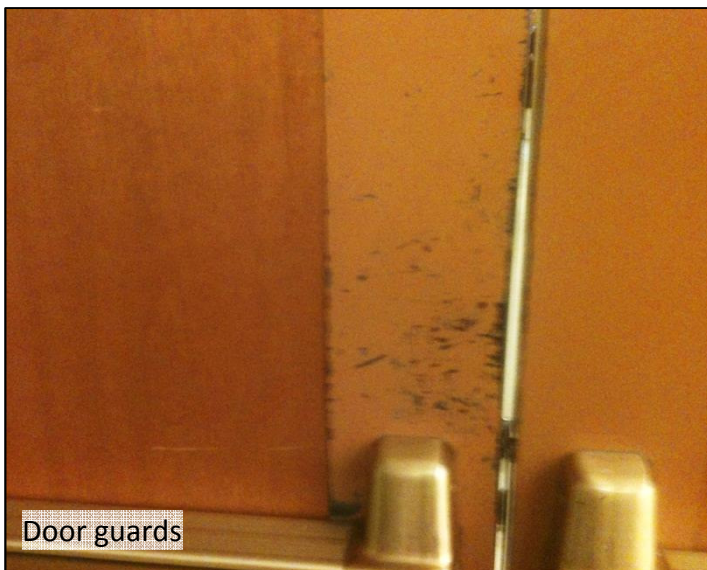
Window frame



Door frame

The door frames at the non-public areas are painted hollow metal. Consider scheduling refinishing of these frames on the same schedule as wall paint.

Door frame at staff areas.



Door guards

The metal edges of the doors between public and non-public areas take a lot of abuse. Regular re-finishing will be required to keep them looking good.

Interior and finishes

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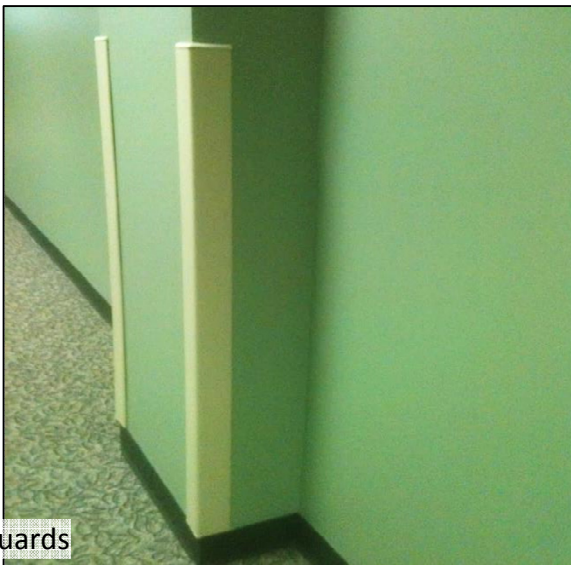
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Corner guards

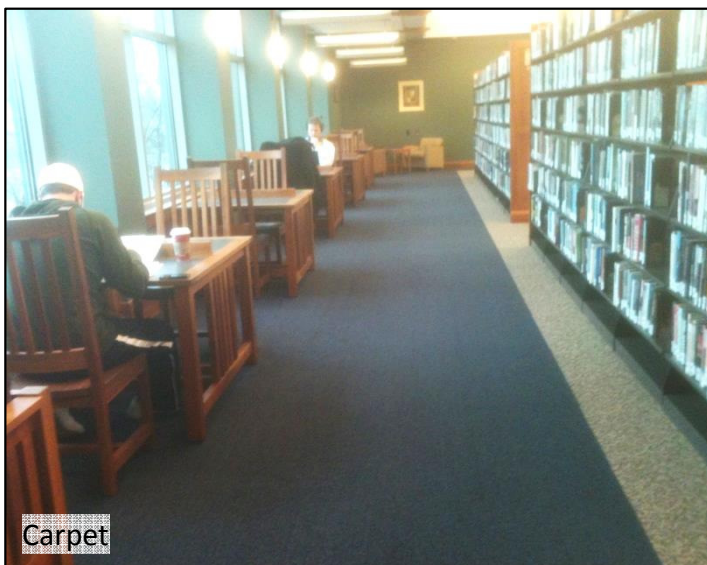
Corner guards are appropriately placed to reduce wall damage, no scheduled maintenance should be required. Guards in public areas are small, solid material.

Corner guard in public area.



Corner guards

Corner guards in non-public areas are (2) piece resilient.



Carpet

Carpet is in reasonably good condition. Carpet squares allow replacement of individual sections of carpet. Consider developing a regular schedule for carpet replacement.

Regular cleaning, including extraction, can greatly extend the life of carpet.

Carpet at stacks.

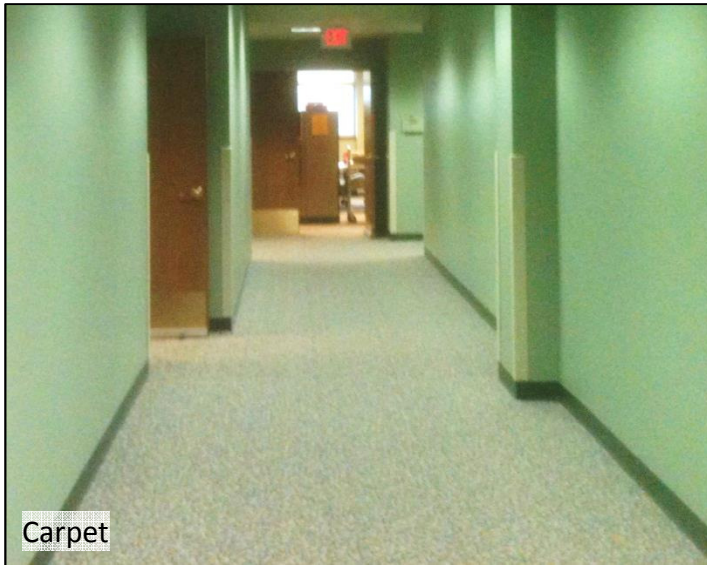
Interior and finishes

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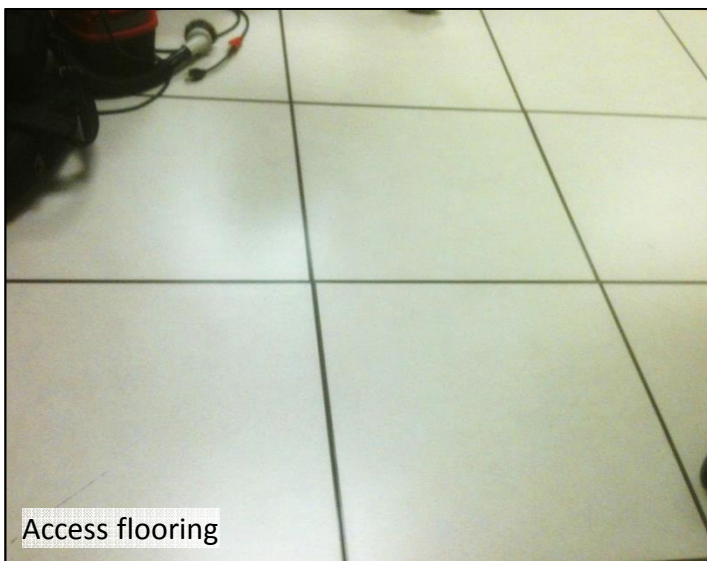
Consider putting carpet on replacement schedule.

Carpet at non-public corridors.



Ceramic tile floors do not need to be on any kind of replacement schedule. Consider resealing grout as maintenance.

Finish at toilet rooms.



Access flooring will not need to be on replacement schedule..

Floor at server room

Interior and finishes

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V.C.T.

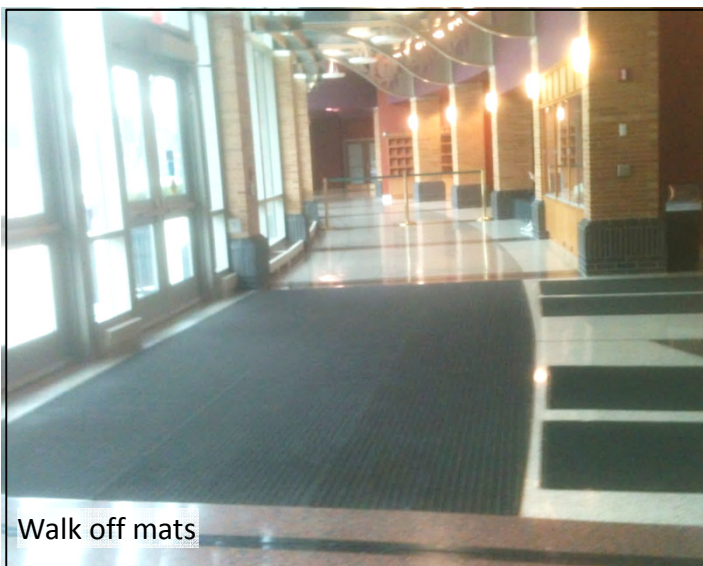
Vinyl Composition Tile (V.C.T.) does not need to be on a replacement schedule. Regular cleaning and waxing should be done to assure maximum performance and to extend the life of the floor.

Redwood detailing



Terrazzo

Terrazzo floors do not need to be placed on any type of replacement schedule. Waxing is NOT required to extend the material life.



Walk off mats

ARE MATS LEASED, OR ???

Main entry

Interior and finishes

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The revised accessibility code requires an additional vertical grab bar. Consider adding this at all water closets.

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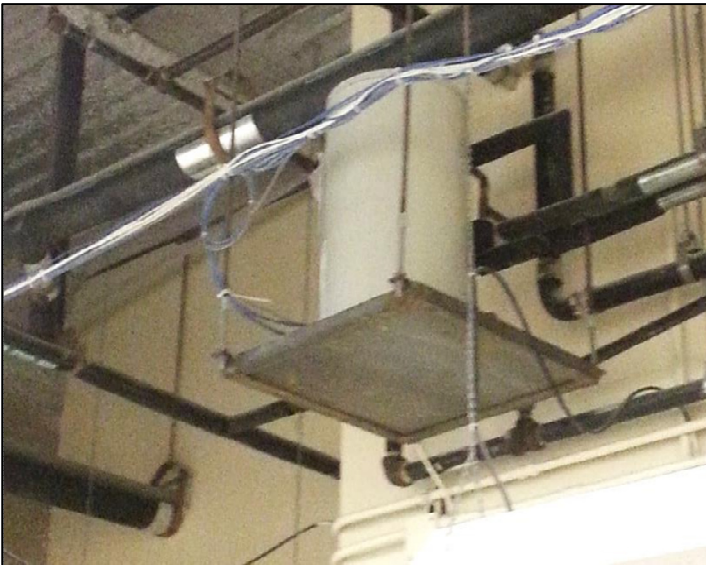
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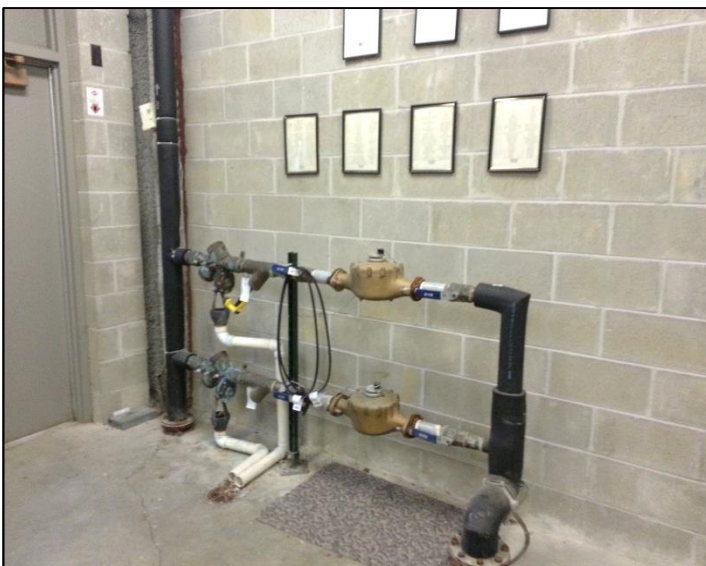
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Point –of-use electric water heater with 3-way mixing valve. One of ten systems.



Point –of-use electric water heater with 3-way mixing valve. One of ten systems.



Water meters and backflow preventers.

Mechanical and Electrical

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Boilers



Heating hot water pumps and expansion tanks



Chilled water pumps and glycol fill system.

Mechanical and Electrical

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Air Cooled chiller with plenum on top.



Two main air handling units.



Program Room air handling unit.

Mechanical and Electrical

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Program Room Air Cooled Condensing Unit



Roof mounted exhaust fans.



Roof mounted relief hood, showing some rust.

Mechanical and Electrical

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New direct digital temperature control panels.



Data Room Air Cooled Condensing Unit.



Variable Air Volume terminal box

Mechanical and Electrical

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Pendant light fixture with compact fluorescent lamps.



Electrical branch circuit panels, exterior lighting contactors and time clock.