FACILITY ANALYSIS

VILLA PARK PUBLIC LIBRARY

305 S. Ardmore

Villa Park, Illinois 60181

Final Report

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VILLA PARK PUBLIC LIBRARY
Facility Analysis & Capital Needs Assessment

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VILLA PARK PUBLIC LIBRARY
Facility Assessment

Villa Park, Illinois

BACKGROUND AND PROJECT SCOPE

The Villa Park Public Library, located at 305 S. Ardmore, was designed by Wendt Cedarholm Tippens Architects & Planners in 1968 and further remodeled by WCT Architects, Inc. in 1997. In 2014, the Library asked Nagle Hartray Architecture to assemble a Facility Analysis and Capital Need Assessment for the existing library building and grounds including the adjacent surface parking lot.

The purpose of the Facility Analysis and Capital Need Assessment is to develop a comprehensive report for the building and grounds, develop recommendations for facility renovations and maintenance, and develop estimated costs for recommended repairs over the next twenty years. In accordance with our agreement dated September 14, 2014, Nagle Hartray Architecture, Ltd. (NHA) and our subconsultants have reviewed relevant documents provided to us, performed an on-site visual inspection of select building components, and reviewed public spaces for compliance with the American with Disabilities Act (ADA). Our observations are included in the report.

The following narratives are organized by discipline which separately addresses the site construction and exterior improvements, the building envelope, the mechanical and electrical systems, the interior environment, and the conveying equipment.

The recommendations included in each section of this report are based on a best practice approach by using standard and customary metrics of evaluation. The opinion of probable costs were calculated by and based on the visual inspections of the building systems and the review of the historical documents provided to us for review. This evaluation is not meant to predict the point in time when system failure would require system replacement but serves as a tool for the planning of reserve funds. The systems nearing the end of their useful life may continue to function longer than predicted, however the risks of higher system replacement or associated maintenance cost will likely rise each year the recommended work is deferred.

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VILLA PARK PUBLIC LIBRARY
Site Survey

References to the following shall be defined as below:

- "Library" means the Villa Park Public Library
- "Staff" means the members of the Villa Park Public Library team in attendance and available to respond to questions during site visit
- "Church" means the Saint Alexanders Church located directly east of the Library
- "NHA" means Nagle Hartray Architecture, prime consultant on the assessment
- "EEA" means Eriksson Engineering Associates, Ltd., the civil engineering consultant on the assessment
- "Village" means the Village of Villa Park

A meeting was held at the Library on November 10, 2014 with Staff, NHA, and EEA to complete a full assessment of the library and the surrounding site. After the meeting, EEA toured the site to observe the existing conditions. A summary of the information received from Staff and uncovered on the site visit is listed below.

Background Information

1. The Library completed pavement patching and seal coating on the parking lot directly south of the building two months prior to the visit.
2. Seal coating and pavement patching operations occur about every three years. Staff would prefer to have the operations occur every 2 years.
3. The parking circulation along the eastern property line extends into the Church property to the east. The Church allows the circulation to continue.
4. Staff alerted team to:
    A. Discharge freezing in downspout at NW corner of the building. Ice build-up occurs at the 90▫ bend.
    B. Water leakage occurs along the north windows.
    C. Adjustable rings installed on the storm manhole located about 60' to the north of Library, in the second parking aisle, and west of the north-south midpoint of the parking lot have settled in the past. Emergency work was completed on the manhole due to the settlement.
5. No concerns have been expressed to Staff about ADA access through the main entrance door.
6. Property immediately to the north is owned by the Church immediately east of the property.
7. The property to the north of the Church property mentioned in 6. Is owned by the Library. The existing house on the site is leased out to the current inhabitants.
8. Based on Staff recollection, no underground utilities have been replaced in the last +/- 30 years. This includes water main/service, sanitary sewer, and storm sewer.
9. The Library provided the design team with survey documentation outside of our meeting under separate cover.
10. The utility service connections are located:
    A. Sanitary sewer service exits the mid-south point of the Library and is directed towards the main line in Ardmore Ave. The size is 4" leaving the building and flows into a 6" vitrified clay pipe prior to discharging into the main.
    B. Water main service exits near the southwest corner of the building, out the west side of the Library. The size of the water service is 1 ½" copper pipe.
    C. There is no storm service discharging from the building. The Library does not have a basement and does not have a sump pump leaving the building.
11. The Library district does not own a bookmobile.
12. All deliveries (Fed-Ex, UPS, etc.) are taken through the front door.

General Site Observations

1. The weather for the site visit was 55 degrees and sunny.
2. The Library building is located at the high point elevation-wise on the property.
3. Generally, drainage appears to be directed away from the building in all directions.
4. There did not appear to be any evidence of water ponding on the parking lot. The expectation would be that the property drains adequately.
5. Within the property that the Library sits on, there is a very limited amount of pervious area. The majority of the property is made up of the building, sidewalks, parking lot, and drives, as well as aggregate maintenance strips on the east, west, and north sides of the building.
6. A French drain was installed just east of the eastern property line to capture any flow coming from the Library property to the Church property.
7. Cracking in the sidewalk south of the Library is evident in multiple places. This cracking would appear to be due to settlement.

Example of sidewalk cracking

8. The ADA route at the entrance door appears to meet the code at the time it was installed. Additional work (topographic survey and elevation checks) would need to be completed to confirm that slope meets code. Cracking is apparent throughout the parking lot. The cracking appears to be due to wear.
9. The storm inlets on site appear to be generally clear of impediments.
10. The bike racks located in the parking lot appear to be in need of maintenance.
11. There is not a drive-up/drive thru book drop adjacent to the parking lot or driveways.
12. The parking lot has cracking throughout the asphalt pavement. The cracking appears to be due to wear. There does not appear to be a large amount of settlement in the cracking.
13. A chain-link fence is installed along the north and east property lines. It does not appear that maintenance has been completed recently on the poles or the chain mail.
14. The sidewalk adjacent to the west property line appears to be in fair condition with some cracking. This was observed due to its proximity to the property and access to site. The exception to this comment would be at the entrance and exit drive. It appears that tar from the recent sealcoating operation was tracked onto the sidewalk.

15. There is noticeable cracking in the stairway outside the southeast corner of the building. This cracking would appear to be due to settlement.

Cracking in stair; refer to left wing wall

16. There is a significant grade difference in the pavement area reserved for trash collection located near the southeast corner of the building. The pavement generally slopes from west to east with a significant drop of about 18" in the last 10' before the property line.

Slope of pavement

17. Along the south edge of the property there is a grade difference as one would move west towards the southeast property corner. The existing slope appears to be stable and there was no evidence of soil erosion on the pavement.

18. The patch around the storm manhole discussed in Background Information 4.C. does not appear to have settled significantly since the patch was applied.

Patch around storm manhole

19. On the west and east sides of the building, there are maintenance strips in the building alcoves. Two roof drains on each side (east and west) discharge directly to these maintenance strips. A drainage collection pipe or structures did not seem to be located in the areas collecting runoff. EEA is unsure if these areas drain out.
20. If the runoff collects below ground in the maintenance strip areas specified in 16. without infiltration, a concern would be that runoff is ponding up against the building foundation typically.

Site Assessment Recommendations

Cracking in Pavement

Currently, the existing site exhibits cracking throughout the pavement areas. The concrete pavement sections appear to be in good condition, although cracking is a cause for concern. The asphalt pavement section appears to be in good condition based on the recent seal coating and crack filling operations.
Existing cracking shall be monitored regarding whether there is growth in size, length, width, and amount. Cracks in pavement present multiple risks including tripping hazards, areas where water could infiltrate and cause issues with the subgrade, and early indications of settlement issues amongst other issues.
There are two typical options to fix cracking. The first option would be to fill cracks with a crack filling material and top dress/finish with a sealant over the material. The second option would be to replace sections of pavement with cracking. For the second option to be most effective, EEA would recommend removing the entire pavement material (concrete slab or asphalt surface & binder) and reconditioning the aggregate base. The reconditioning of the aggregate base would involve removing any foreign items, replacing void spaces with additional stone, and re-compacting the aggregate section.
For concrete pavements, individual areas can be removed between existing joints to fix selected repair areas. For asphalt pavement sections, it is more effective to do much larger sections or the entire area in one re-paving project. EEA would recommend to continue with the current sealcoating and crack filling program instituted by the Library while continuing to monitor the cracking for any significant changes. EEA would advocate completing the program every other year, but the 3-year rotation program is a practice employed throughout the area.

ADA Access

Based on the site observations it appears that the entrance access was renovated in the past to make it ADA accessible. Those renovations appear to have met the code requirements in effect at the time of the installation. If any entrance modifications or renovations area scheduled, EEA would recommend re-design of the entrance area to meet the latest ADA codes, including providing a maximum of a 2% along the dedicated access route from the ADA parking spots to the front door.

Garbage Collection Area/Drive

There is a significant elevation change in the garbage collection area. The existing slope/grade may be a safety issue in terms of the public traversing via foot or it may be an traffic issue should a vehicle utilize the area for some type of vehicular movement. It would be EEA's recommendation to renovate the area for better utilization and safety precautions. This would involve performing a topographic survey, analyzing the data, and having a civil engineer design a solution. The solution most likely would involve installation of retaining wall, re-grading/sloping the area, and re-paving the area.

Storm Water

Overall Site Drainage
Generally, there does not appear to be any apparent storm water drainage issues. There does not appear to be significant soil erosion from the pervious areas or aggregate erosion from the maintenance strips. EEA recommends cleaning out the storm sewer system yearly, including jetting/vacuuming the storm sewers and structures to maintain the proposed capacity. It is especially critical to remove any foreign objects or leaves from the structures to make sure runoff is able to drain through the system. If a structure were to become blocked, surface flooding would occur. Based on the site grading, flooding from a sewer back up may not be a primary concern to the library building, but it may affect the adjacent properties.

Maintenance Strip Drainage
No drainage issues were observed in the maintenance areas around the building. There does not appear to be evidence of flooding issues in the maintenance strips areas. Currently, the areas are subject to discharge from roof drains and direct rainfall into the areas. If the surrounding soils do not promote water infiltration, these areas could hold water. The concern when considering the proximity to the building would be that there does not appear to be an outlet for the runoff to discharge away from the building (EEA could not determine from information provided if there is foundation drain piping in the subject areas). EEA would recommend retrofitting these areas with sub-drains and piping to discharge runoff away from the building.

Past Drainage Repair
Due to the past settlement issue around the existing storm structure discussed above, EEA would recommend monitoring the area closely. Based on the previous issue, the subject area would be considered to be more likely for a potential settlement issue. The reconstruction completed previously appears to have worked and does not appear to require additional maintenance at this point.

Security

Based on the observed condition of the chain-link fence, EEA would recommend replacing the sections that are not in good condition with a similar fencing solution. The maintenance needs of existing fence appear to be due to general wear and tear. One option would be to replace the chain-link fence in its entirety. The second option would be considered more a value engineered solution involving removal of the chain mail in certain areas, re-installation of non-vertical poles, replacement of damaged poles, and replacement of the chain mail.

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VILLA PARK PUBLIC LIBRARY
Exterior Building Survey

Klein and Hoffman, Inc. (K&H) has completed the Building Envelope Condition Assessment for Villa Park Public Library (VPPL) in Villa Park, Illinois. The purposes of the assessment was to inspect existing building envelope systems and identify deficiencies and recommended repair scope items and provide an opinion of probable cost.

On November 10 & 17, 2014, K&H performed a limited visual assessment of the exterior walls and roof to document observed defects and deterioration. The inspection was conducted from the ground and roof level. No invasive observation openings were made within the exterior walls or roof as part of this review.

The VPPL building, built in approximately 1968, is two stories tall and is rectangular in plan with projecting masonry-clad bay/piers spaced regularly along the north and south facades. The cladding of the exterior walls is primarily comprised of a hard-fired face brick on the walls and piers separated by window areas of aluminum and glass curtain walls. The top several feet of the main building has a projecting cantilevered fascia clad with vertical precast concrete panels with an exposed aggregate finish, and a suspended stucco/plaster soffit. There is a one-story projecting canopy at the south façade entry clad with the same precast concrete fascia panels and supported by exposed steel tube columns. A one-story penthouse exists at the roof level and is clad with painted steel panels. The roof is covered with a single-ply EPDM system ballasted with gravel stone. Overall views of the building are shown in Photos 1-4.

I. Observed Findings and Recommended Work Scope Repair Items

The information gathered during the inspection was used to prepare an itemized list of deficiencies and recommended work scope for future repair items, as well as an Engineer's Opinion of Cost. The findings and work scope repair items are categorized by enclosure element and are outlined in detail below.

A. Brick Masonry

Brick Masonry (General) - The existing brick material is generally in good condition. No structural cracks or visible displacement was observed.

Brick Mortar Joints – The mortar joints are generally in fair condition with deterioration and erosion typically occurring at the top portions of the projecting bay/piers, along the corners of the bay/piers, adjacent to embedded downspout drains, and at localized areas in the wall. There were also isolated locations of cracked mortar joints throughout the walls. Refer to Photos 5 – 8.

Recommendation: We recommend repointing 100% of the top portion of the piers and down the corners several feet, as well as localized repointing of other isolated areas as necessary.

Brick Parapet Walls – There are short parapet walls atop the bay/piers that are capped with limestone coping stones. The joints between coping stones are sealed, but the sealant is deteriorated and open, allowing water into the masonry below. The top courses of masonry at the parapet walls are in poor conditions with numerous cracked and open mortar joints, allowing water to freely enter the walls. There also does not appear to be an effective through-wall flashing below the coping stones. Refer to Photos 9 & 10.

Recommendation: Rebuild 100% of the parapet walls at the bay/piers. Install through-wall flashing below the coping stones and seal the coping stone joints

B. Windows / Sealant

Windows/Curtain Walls – The curtain wall windows appear in generally good condition with some deterioration of glazing seals.

Recommendation: Replace isolated areas of glazing seals.

Window Perimeter Sealant – At the majority of the windows, the perimeter sealant was found in fair to poor condition, with numerous areas of failed and open joints. Replacement of perimeter sealant at isolated locations has occurred; however, this sealant was installed leaving upper portions of the joints open. This allows water to freely enter the top portions of the joint, thereby trapping the water behind the newer sealant below. Refer to Photos 11 & 12.

Recommendation: Replace 100% of the window perimeter sealant.

Brick/Concrete Sidewalk Joint Sealant – The joint between the concrete sidewalk and brick masonry is typically deteriorated and open. See Photo 13.

Recommendation: Replace 100% of the concrete sidewalk to brick sealant.

Sealant Joints at Precast Concrete Fascia Panels – The majority of these joints are deteriorated and many have failed. See Photo 15

Recommendation: Replace 100% of the sealant joints at the fascia panels; however, see further information regarding the fascia panel repair recommendations below.

C. Precast Concrete Fascia Panels

Panel Configuration – According to the original architectural drawings, the precast concrete fascia panels are very thin (about ¾ inch thick) and attached to both the top and bottom surfaces of the precast concrete roof slabs with steel clip angles at 3 ft. – 4 in. on center.

Previous Panel Repairs – Reportedly, in 2009 a portion of a concrete fascia panels at the west façade was severely dislocated and required emergency stabilization repairs to reattach the panel. No report was available for review to identify the extent or methodology of repairs. K&H contacted the repair contractor, Bulley & Andrews (B&A), for additional information, but at this time no repair files have been located or received. Our inspection revealed that through-face anchors are visible at the end of one panel in the general area where the dislocated panel was reported. Refer to Photo 17.

Staining – There is extensive brown staining of the fascia panels, which varies from random spots on many of the panels to regular vertical striping on the panels at the west façade. See Photo 14. The cause of the staining is unknown, but may be related to corrosion of internal reinforcing steel.

Bowing and displacement – Many of the fascia panels have visible bowing and displacement, particularly visible at the ends of the panels where they abut the brick piers or another fascia panel. See Photos 15 – 17. Limited "sounding" with a hammer was performed from the roof level on a couple of panels at visibly bowed ends. The panels vibrated significantly, although they were not noticeably loose.

Recommendations: Due to the previous reported failure of one panel and the visible bowing and displacement of other panels, K&H recommends that investigation and possible repairs of these fascia panels be considered a high priority. We have developed the following recommendations:

> ***Short Term:*** Perform close-up inspection of the fascia panels, particularly above pedestrian areas, to verify that the panels are secure. This will require invasive inspection to observe existing anchors through both the suspended soffits and through the roofing. Depending on the findings, temporary stabilization may be required.
>
> ***Long Term:*** Replace the precast concrete fascia panels with new panels. Depending on the desired aesthetic look, the panel materials and finishes that may be considered are numerous, including metal panel systems, glass-fiber reinforced concrete, and many others.

D. Soffits

The suspended soffits, including the small vertical portion that extends down to the brick cladding, are generally in fair to good condition. There is localized cracking and previous sealant repairs throughout the soffits, primarily related to corners, ends and masonry return walls. See Photo 18.

Recommendation: Replace localized areas of cracked soffit stucco/plaster and repaint the soffit areas 100%.

E. Roof

The existing roof system is over 25 years old and is beyond its useful life. The following deficiencies were observed (Refer to Photos 19 - 30):

1. Significant pulling, stretching and stress at the perimeter of the roofs due to shrinking of the EPDM membrane, which is common for this roofing material.

2. Failed seals, tears, and openings at the perimeter of the roofs.

3. Debonded and open seams at locations throughout the roofs. Many of the seams have been repaired in the past with large quantities of surface-applied sealant.

4. Failed seams and termination seals at penetration flashings (pipes, vents, stacks, etc.)

5. Inadequate height of roof flashing at several locations.

6. Lack of mechanical termination at top of flashings at several penetrating elements.

7. Build-up of dirt and debris, and resulting organic growth, at concrete pavers around the rooftop HVAC units

8. *A single skylight along the south side of the roof is in poor condition with loose framing elements and failed glazing seals. The height of the roof flashing around the skylight is inadequate.*

Recommendation: Replace the entire roof system, including sloped insulating fill, with new 2-ply modified bitumen roofing system and tapered insulation system. Until this is performed maintenance repairs should continue to be performed on a regular basis to reduce water penetration. The skylight should be replaced with a new skylight and curb system high enough to provide proper flashing.

F. Penthouse

The one-story penthouse is in fair condition with typical loss of paint coating and corrosion of the sheet metal cladding, as well as deterioration of sealant joints. Door penetrations are also in poor condition with low thresholds that prevent proper height of roof flashings. Refer to Photos 31 – 33.

Recommendation: Replace 100% of sealant joints; repaint the metal cladding; replace the doors and raise the threshold to provide for proper roof flashing height.

G. Miscellaneous

The steel tube columns that support the front entry canopy have typical deterioration of paint coatings and localized corrosion. In addition, where the steel columns are embedded in the concrete sidewalk corrosion of the steel has caused cracking of the concrete. See Photo 34.

Recommendation: Remove the concrete sidewalk around the columns, clean and paint the exposed steel framing, and replace the sidewalk slab.

II. Engineering Opinion of Cost

The following opinion of cost is based on current average unit prices are based on our experience with similar repairs and/or from several contractors who specialize in this type of work. The quantities presented in the Opinion of Cost are an estimate of construction quantities based on the information obtained during our limited visual investigation. The Owner should consider escalation costs for work performed in future years.

Timeframe for Repairs	Description of Repair Scope	Estimated Cost of Repairs*
Brick Masonry		
Within 2 years	Repointing of localized masonry joints (approx. 3,000 sf)	$45,000
Within 1 year	Rebuild brick parapets at bay/piers (10 piers)	$80,000
Windows/Sealant Joints		
Within 2 years	Recaulk localized glazing seals (approx. 1,000 lf)	$8,000
Within 1 year	Recaulk 100% window perimeter joints (1,200 lf)	$14,400
Within 1 year	Recaulk sidewalk/brick joints (approx. 200 lf)	$3,000
Within 1 year	Recaulk fascia joints (approx. 140 lf)	$1,680
Precast Concrete Fascia Panels and Soffits		
Immediately	Further investigation of fascia panel anchorage (allowance)	$20,000
Dependent on Investigation	Short term stabilization/repairs of designated panels (allowance)	$30,000 +
Within 4 years	Replace panels with new lightweight panel system (1,400 sf)	$112,000

Within 4 years	Repair isolate areas of cracked soffit (40 sf)	$1,200
Within 4 years	Repaint soffit 100% (1,900 sf)	$9,500
Roof		
Within 1 year	Perform short term maintenance repairs until long-term replacement can be performed (allowance)	$30,000
Within 2 years	Replace roofing at main roof, penthouse roof, and entry canopy (12,500 sf)	312,500
Within 2 years	Replace skylight.	$3,000
Penthouse		
Within 4 years	Replace sealant joints (900 lf)	$9,000
Within 4 years	Replace 3 doors	$4,500
Within 4 years	Repaint penthouse (1,900 sf)	$9,500
Miscellaneous		
Within 2 years	Remove and replace concrete sidewalk at entry and clean and paint exposed steel canopy support (allowance)	$7,500
	Total Estimate Cost	**$700,780**

*** -** Estimated repair costs are in today's dollars and do not account for inflation related to work completed in future years. Estimated repairs also do not include General Conditions and Mobilization, which would likely be an additional 20% - 25% of repair costs. K&H also recommends a minimum 15% contingency to address concealed and unforeseen conditions.

III. Conditions and Limitations

The conclusions, recommendations and opinions presented in this report are based upon an on-site visual observation of the existing conditions. Defects and deficiencies may exist, which were not readily visible, inaccessible or otherwise hidden from our view. The information in this report is intended to provide an engineering opinion of the cause of deterioration, recommendation for repair work, and an estimated opinion of cost.

VILLA PARK PUBLIC LIBRARY
Mechanical, Plumbing and Electrical Systems Survey

A. Fire Protection

1. Existing Conditions

a. The Library is not currently sprinkled. The incoming water service appears to be 1-1/2" and would not have sufficient capacity to provide fire protection for the facility.

B. Plumbing

1. Existing Conditions

a. The storm system is original to the 1969 construction of the building and consists of roof drains that are piped to two downspouts on the east end of the facility and two downspouts on the west end of the facility. All piping appears to be cast iron with lead and oakum joints. In general, the piping appears to be in good shape, and there are no specific issues with the condition of the drains on the roof. The downspouts are located in unconditioned chases and have occasionally frozen during the winter, with water backing up throughout the piping all the way to the roof. All downspouts discharge at grade, with storm water permeating into the ground. There is no secondary storm system for the building.

b. The sanitary and vent system is generally original to the 1969 construction of the building; however, a portion of the system was reconfigured during the 1996 renovation. Drawings of the original construction indicate the piping was cast iron and likely has lead and oakum joints. There are no known issues with the condition of the sanitary and vent system.

c. The domestic water system is generally original to the 1969 construction of the building; however, a portion of the system was reconfigured during the 1996 renovation. The incoming water service is a 1-1/2" pipe located in a closet on the First Floor and appears to be undersized for the load in the building. There is no backflow preventer on the incoming service, which is typically a requirement of the water utility company serving the facility. The original domestic water piping appears to be galvanized steel and is likely sufficiently corroded that it needs to be replaced. Where piping was replaced or added in the 1996 renovation work, domestic water piping was installed in copper.

d. Domestic water heating is accomplished by a 4.5 KW electric water heater with an integral 40-gallon storage tank located in the Mechanical Penthouse. The water heater was replaced in 2008 and appears to be in good condition. There is not a thermostat on the water heater and there is not a master mixing valve on the system, so the temperature of water being stored and distributed throughout the building is unknown. There does not appear to be ASSE-rated mixing valves anywhere in the facility in compliance with the Illinois Plumbing Code. The domestic hot water system does not have a circulation loop, so it takes a long time for hot water to get to fixtures early in the morning after the loop has cooled down overnight.

e. Plumbing fixtures throughout the facility consist of sensor-operated lavatories and manual flush valves on urinals and water closets. All fixtures within the facility do appear to be compliant with ADA requirements.

f. Water samples were obtained from two separate plumbing fixtures within the facility and sent to a laboratory for testing. Copies of those tests are enclosed with this report; however, in general, the water quality in the facility was acceptable. In summary, water hardness, copper, and manganese were all slightly elevated, but below any thresholds associated with negative effects. There was a discoloration of the water that is likely due to galvanic corrosion that occurs in old piping with dissimilar metal connections.

g. Water pressure in the street was obtained from the Village of Villa Park Fire Department. They indicated that a flow test had not been done immediately in front of the Library at any point, but that pressure in that area of town was very consistent in the 50 psi to 55 psi range. Water pressure tests were also conducted inside the building by a testing and balancing firm.
   1) Static pressure on the upper floor was approximately 42 psi.
   2) The Second Floor mop basin had a residual pressure of 14.2 psi at a water flow rate of 0.62 gallons per minute when tested on the hot water system.
   3) The Second Floor mop basin had a residual pressure of 17.2 psi at a water flow rate of 0.71 gallons per minute when tested on the cold water system.
   4) These results indicate there is significant pressure drop within the piping in the building that is being caused by a combination of undersized pipes and corroded and blocked pipes.

2. Recommendations

a. To prevent the storm system from experiencing freezing conditions, heat trace can be applied to the bottom 5’ to 10’ of each storm riser to prevent the buildup of ice. The heat trace can be of a self-regulating style so control of the system is automated.

b. Provide a secondary storm system by adding overflow drains to the roof and connecting the outlet of them to the existing primary storm system. With this configuration the primary storm system will need to continue to discharge at grade.

c. Any existing galvanized domestic water piping within the facility should be replaced with copper piping so the pipes are appropriately sized and corrosion can be eliminated from the system. A water softener should be added to the system to reduce the levels of copper and manganese in the system and also to reduce the water hardness. Any dissimilar metal connections should be joined with a dielectric fitting to eliminate galvanic corrosion.

d. A centralized mixing valve rated in accordance with ASSE 1017 should be added in the Mechanical Penthouse so domestic hot water can be stored at 140°F to prevent the growth of Legionella, and then distributed to fixtures at 110°F to comply with the requirements of the Illinois Plumbing Code. An alternative option would be to distribute 140°F hot water throughout the facility and add point-of-use mixing valves rated in accordance with ASSE 1017 at all public fixtures using hot water.

e. Add a domestic hot water circulation loop so hot water is circulated to fixtures needing hot water within the facility. A hot water circulation pump and an aqua-stat would also be required.

f. Add a backflow preventer to the incoming domestic water service.

g. The incoming water main is undersized based on the current requirements of the Illinois Plumbing Code. The main should be increased and a booster pump installed to provide sufficient pressure throughout the facility.

C. Heating, Ventilating and Air Conditioning (HVAC)

1. Existing Conditions

a. The air distribution system consists of six single zone, constant volume air handling units located in the Mechanical Penthouse. Each unit contains a supply fan, steam heating coil, DX cooling coil, direct injection steam humidifier (not currently operating), and a duct-mounted filter bank. The units are original to the 1969 construction of the building and are past their life expectancy. The single zone configuration of the air handling unit only allows each air handler to control a single thermal zone (i.e., one thermostat), which is causing comfort issues within the facility because varying exposures and occupancy types are zoned onto the same air handler in various locations. At some point electric, duct mounted reheat coils were added to the system to provide additional thermal controls, however, the air handling unit controls are set up for this type of configuration and the system does not comply with current Energy Code. Additionally, because of the constant volume configuration of the air handlers, it is not possible for the air handling units to dehumidify the building during all ambient conditions.

b. The heating system consists of two gas-fired steam boilers located in the Mechanical Penthouse. A condensate return station is also located in the Mechanical Penthouse adjacent to one of the boilers. Steam and condensate piping is routed throughout the Penthouse to steam heating coils located in each air handler. Steam is also routed to each air handler to serve as a source of humidification. All of the heating system is original to the 1969 construction of the building and is past its life expectancy. There are no terminal heating elements located throughout the building in the form of perimeter radiation so, during low ambient conditions; occupant comfort adjacent to windows likely suffers.

c. The cooling system consists of six condensing units located on the roof of the building adjacent to the Mechanical Penthouse. Each condensing unit is dedicated to a single air handler and provides cooling for that unit via the DX cooling coil internal to each air handler. The condensing units were replaced in 2010 and are operating sufficiently well. The cooling coil in each air handling unit is original to the 1969 construction of the building and would only need to be replaced if the air handler was replaced.

d. The temperature control system is an early generation building automation system by Johnson Controls Inc. The user interface to the system is not very intuitive and has limited functionality. Additionally, components for the system are increasingly difficult to find when replacement is needed.

e. Air quality testing was conducted to identify any problems within the facility. A copy of the results is enclosed with this report, but, in general, the air quality within the facility was adequate. There were no visible signs of mold growth, and air particulate levels were generally within published guidelines. The particulate matter (airborne dust) levels were higher than targeted recommendations, but this is likely due to dust on books, which can be difficult to remove.

2. Recommendations

a. Replace the HVAC system in its entirety including the air handlers, electric reheat coils, central heating system and building automation system. The condensing units may be able to be reused if new building zoning and loads closely match the sizes of the existing condensing units. All new equipment and controls will need to comply with current Ventilation and Energy Code. There are numerous replacement HVAC system options that are possible;

however, a VAV reheat system with centralized air handlers and heating water boilers could be considered. Depending on the type of HVAC system selected the size of the Penthouse may need to be increased to accommodate new equipment.

b. The new HVAC system should be provided with a minimum filtration level of MERV 11. The system should be designed for year round humidity control and with proper thermal zoning. Housecleaning procedures should also be reviewed to minimize the amount of dust that is built up on books and furniture.

D. Electrical

1. Existing Conditions

a. The Library is served by a 1,600A, 120/208 volt, 3 phase, 4 wire switchboard. This switchboard is served by four overhead secondary feeders routed from the pole-mounted ComEd utility transformers located at the northeast corner of the building. Based on the markings, the "Emergency" panel is installed and wired ahead of the main switch which is a violation of National Electric Code (NEC). Various branch panels are installed throughout the facility. The main switchboard and most of the branch panels are original to the 1969 construction of the building.

b. Interior light fixtures throughout the building have been retrofitted with T8 lamps and ballasts. A majority of the lights are controlled by manual switches via contactors, although lights in some offices and conference rooms are controlled by occupancy sensors. Lamp color temperatures are not consistent throughout the facility. Some fixture lenses are cracked or yellow. Lighting levels seem to be low in some areas and high in others and the quality of light is less than desirable. Exit signs are a mix of incandescent and compact fluorescent lamps. Some emergency lights have been observed.

c. Exterior light fixtures use a mix of high pressure sodium and metal halide lamps. Pole-mounted fixtures located on the south side of the parking lot and some in-ground lighting fixtures are not working. Exterior lights are controlled by a photocell.

d. The fire alarm system is a Simplex 4005 model. Smoke detection, pull stations, and horn/strobe devices are provided throughout the facility via conventional (hard-wired) devices. Based on the age of the fire alarm system, the strobes are likely not synchronized per ADA requirements.

e. Thermal panel testing was conducted on the electrical equipment throughout the facility. A copy of the test results is enclosed with this report, but, in general, the panels were not indicating immediate failure despite their advanced age. There were several deficiencies with a couple of the panels that should be addressed in the near future, as they pose safety concerns.

1) Panel LP 2B has a 20A circuit breaker that is overloaded.
2) The Elevator Equipment Room has two separate type of fuses installed.
3) Panel LP-2-A has ground wires connected to the neutral terminal in lieu of the ground bus.
4) The Penthouse has two separate type of fuses installed, including one with fuse extenders.

2. Recommendations

a. The electrical power distribution system, except for a few branch panels, is at or near the end of its service life and should be considered for replacement. The "Emergency" panel should be removed and branch circuits rewired so the emergency lights are wired with a local lighting circuit to meet current NEC requirements.

b. Surge protection devices should be added at the main service and at branch panels to protect sensitive electronic equipment from voltage surges.

c. Additional circuits and convenience receptacles should be added throughout the facility.

d. The current lighting scheme does meet Energy Code requirements for lighting power density (watts/square foot) due to the type and quantity of luminaires. We recommend replacing lighting fixtures throughout the building with a higher efficacy (light output/watt) to provide adequate light levels while still complying with energy requirements. LED luminaires or high efficiency fluorescent with higher performance lens/reflector systems should be considered.

e. Renovated areas will need to comply with the control requirements of the Energy Code. These include the use of manual "on" control and occupancy sensors or time-based scheduling for automatic "off" control, manual controls to adjust the light output through dimmers or multi-level switching schemes, and daylight sensors in areas with windows.

f. Exit signs should be replaced with LED type fixtures.

g. Emergency lights should be replaced to provide 1 foot-candle on any path of egress, including on the outside of the building.

h. Exterior lights should be replaced with LED type fixtures. New controls should be provided to meet the Energy Code.

i. Replace the fire alarm system with addressable devices and provide a voice (speaker/strobe) annunciating system. This type of system would have synchronized strobes.

j. All deficiencies noted in the Electrical Panel Test Report should be addressed:
   1) Install transient voltage surge suppressors on the main electrical switchboard and on all distribution panels serving critical loads.
   2) Remove load from the overloaded circuit breaker on Panel LP2B.
   3) Replace the fuses in the Elevator Equipment Room and the Penthouse.
   4) Relocate ground wires on Panel LP-2-A from the neutral terminal to the ground bus.

VILLA PARK PUBLIC LIBRARY
Data and Communication System Survey

Technology

3. Existing Conditions

   a. With the exception of the walker duct on the First Floor, pathways for technology cable consist of surface-mount wiremold.

   b. The existing grounding infrastructure is not best practice and is missing at key locations.

   c. The surveillance system includes a 16-channel DVR recording six exterior analog cameras and nine interior analog cameras. The user interface on the DVR is hard to use, and the resolution of the analog cameras does not provide a quality image.

   d. There is currently no book or multi-media loss prevention equipment system.

   e. There is currently no electronic access control system.

   f. The alarm system consists of three panic buttons at key staff locations connected to a Radionics Burglar Alarm panel. This panel is monitored by a local central station.

   g. Telephone (voice) services are supported by an analog PBX that is obsolete and no longer supported by the manufacturer. This wall-mounted unit is located in the First Floor maintenance room next to the telephone service provider demarcation wall field/service entrance. The PBX is at capacity and cannot support any additional extensions.

   h. There is an add-on voice mail server that runs on a desktop PC located in the rack in the Second Floor Automation Work Room. Parts and service for either of these components are not available.

   i. Incoming service from AT&T consists of a 50-pair POTS cable and two T1 circuits. Many of the POTS lines are damaged, and the quantity of telephone numbers available to the Library is greatly reduced.

   j. Broadband services are provided by Comcast over a cable modem. The incoming coax cable runs through the First Floor service entrance and terminates in the Second Floor Automation Work Room.

   k. Horizontal phone cable (station cable) consists of an old 25-pair trunk cable that has been spliced and extended to telephone sets.

   l. Cable from workstations for telephone is terminated at a different location than that of cable for data, making support and relocation difficult.

   m. The network services are supported from electronics and servers in racks in the Second Floor Automation Work Room.

   n. Data cable is a mix of non-plenum Cat 5, Cat 5E and Cat 6 terminated on a mix of modular patch panels.

o. The available power at the Second Floor racks is not dedicated and is inadequate.

p. The Annex is supported by a wireless bridge using consumer electronics. The antenna at the Library is inside, and connection speed is slow and unreliable.

q. The Main Program room on the Second Floor (Ohrman) includes a standalone presentation system. This equipment is dated and does not support digital signals. A separate cart with a PC is used for PowerPoint and other PC-based presentations.

r. The First Floor conference room uses a portable tabletop projector and a ceiling-mounted electric projection screen. The projection screen is broken and no longer does up and down.

s. The TV signal is a provided by Comcast and is available through a few taps at a couple of locations in the library.

t. The Library has a zoned paging system with 70V ceiling speakers connected to a single channel amplifier. The amplifier is integrated with the telephone system for initiation of pages. The single channel does not permit zone pages.

u. A standalone digital signage station is set up with a local PC at the main entrance.

v. The Annex has a single dedicated telephone circuit.

w. Fourteen PCs are supported off the wireless bridge from the Library.

x. Within the Annex, data cable is routed from a small rack in the rear hallway to a few multi-port faceplates. Cable management at the PCs when set up for the computer lab is problematic, as cables run across the floor.

y. A portable projector is used for AV.

4. Recommendations

a. A TIA/EIA grounding system is required at all telecom locations.

b. The existing structured cable system should be replaced with a new Cat 6 universal cabling design to support both data and voice services. This would include all cable and patch panels.

c. The existing telephone equipment should be replaced with a Voice Over Internet Protocol (VOIP) system.

d. The existing CCTV system should be replaced with an IP-type system and leverage the new structured cable design to provide high resolution digital images.

e. An access control system should be added to the Library to provide a record of staff access. This system should also be configured to monitor doors and forced entry as to generate notice if the building is accessed after regular working hours.

f. Conditioned dedicated power should be provided at the telecom racks and equipment.

g. Data connectivity to the Annex should be upgraded with external antennas and commercial electronics.

VILLA PARK PUBLIC LIBRARY
Energy Operating Costs Evaluation

This portion of the facility analysis is performed by others and is to be provided under separate cover.

VILLA PARK PUBLIC LIBRARY
Interior Building Survey

The Villa Park Public Library has approximately 24,000 square feet divided among two floors and mechanical penthouse; the building is approximately 33 feet high from grade to the top of the penthouse.

The interior of the library includes public and private spaces as well as equipment, service, and storage areas. The first level houses collections; circulation; reference; office and meeting rooms; technology and media activity areas; maintenance and storage spaces; and public restrooms. The second level includes collections areas; youth services areas; office and meeting rooms; technology workroom; storage spaces; and public restrooms. The third level penthouse is dedicated to mechanical space and is largely unfinished. For the purposed of the interior assessment, the mechanical penthouse, associated mechanical spaces, and unfinished storage rooms and closets have been excluded from this report.

I. Description of Existing Conditions:

Flooring
Typical interior floor finishes on the first and second levels include carpet (approximately 11,700 square feet), vinyl composition tile (approximately 6,000 square feet), slate tiling (approximately 850 square feet), and ceramic floor tiling at the second level restrooms (approximately 90 square feet).

A. Carpet Tile Flooring:
The carpet tile flooring is showing sign of wear in high traffic areas; discoloration from exposure to light; and staining. The carpets throughout are nearing the end of their serviceable life.


Figure 1. Wear pattern visible adjacent to door from stair @ 1st floor


Figure 2. Discoloration visible adjacent to Circulation Desk @ 1st floor

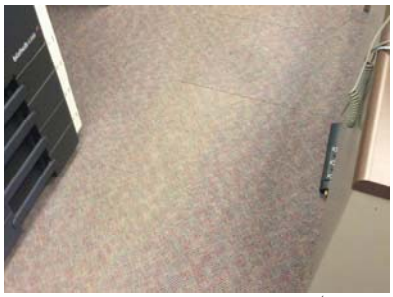


Figure 3. Wear pattern visible @ 1st floor office area


Figure 4. Straining visible at 2nd floor Lobby


Figure 5. Seaming and wearing issues @ transition strip @ stacks area


Figure 6. Fading and staining visible at 2nd floor Story Room.

B. Vinyl Tile Flooring:
The condition of the vinyl tile flooring is in fair condition; however, based on the 1968 drawing set, the original vinyl was made with asbestos or vinyl asbestos tile (VAT). If modifications are made to the flooring in these areas the tiles will either need to be encapsulated or abated and replaced.


Figure 7. Discoloration/dirt @ 2nd floor staff restroom


Figure 8. Marking/ residue visible @ 2nd floor stacks area


Figure 9. Staining visible @ 1st floor stacks area

C. Slate Tiling:
The slate tiling adjacent to the first level lobbies is in excellent condition and exhibits the typical indication of wear for a product its age.

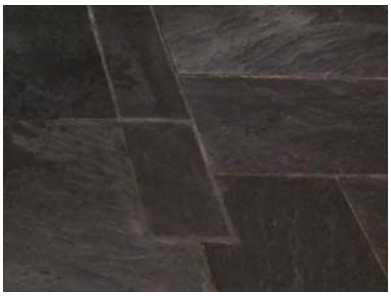


Figure 10. Lobby tile detail


Figure 11. Lobby tile


Figure 12. Bathroom tile

D. Ceramic Tile Flooring:
The condition of the ceramic floor tile inside the public restrooms at the second floor is in poor condition. The mesh-backed mosaic 2x2 tiles appear to be delaminating from the substrate within the Girls's Toilet Room and is likely caused by water leaking from the adjacent plumbing fixtures. Additional concerns include darkened grout, wearing, and cracking at select locations due to traffic, use, and abuse.


Figure 13. Tiling at Men's Toilet Room


Figure 14. Tiling at Women's Toilet Room


Figure 15. Delaminated and cracked tiling at Women's Toilet Room

Wall Finishes

The wall surfaces include interior face brick (approximately 7,800 square feet), painted CMU, plaster, or gypsum board walls and associated vinyl cove base (approximately 5,250 square feet), decorative wood paneling & trim (approximately 1,800 square feet), carpet and vinyl wall coverings (approximately 1,350 square feet), and ceramic wall tiling at the restrooms (approximately 1,250 square feet).

A. Interior Face Brick:
The condition of the interior face brick is in excellent condition throughout the facility. There were isolated signs of efflorescence likely a result of plumbing leaks.

Figure 16. Interior face brick - detail

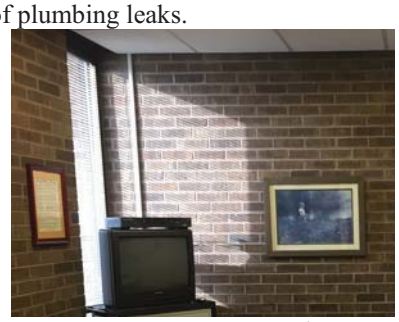


Figure 17. Interior face brick – 2nd floor

Figure 18. Interior face brick –1st floor

B. Painted Surfaces (CMU, Gypsum Board Partitions, Plaster Surfaces):
Painted surfaces throughout are in fair condition showing the typical signs of wear for the age of the application.

C. Decorative Wood Paneling and Trim
The condition of decorative wood paneling and trim is in excellent condition throughout the facility.

D. Wall Coverings (Vinyl and Carpet):
The condition of the wall coverings throughout the facility is in poor condition. The vinyl coverings are damaged, torn, or marked beyond repair throughout. The sheet carpet wall coverings also have damaged and stained surfaces. Both types of wall coverings throughout are nearing the end of their serviceable life.

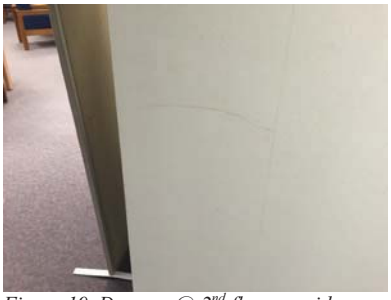


Figure 19. Damage @ 2nd floor corridor

Figure 20. Damage @ Study Rooms

Figure 21. Damage @ Study Rooms

Figure 22. Staining @ Story Time Rm

Figure 23. Discoloration @ Story Time Rm

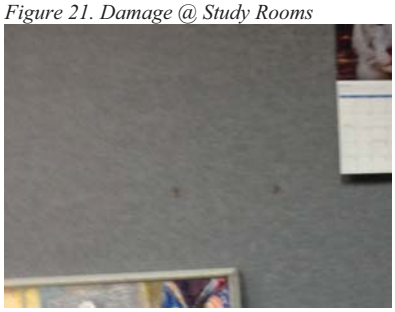


Figure 24. Staining @ Conf. Rm

E. Ceramic Wall Tile:
The condition of the ceramic wall tile inside the public restrooms throughout is in poor condition. The 4x4 tiles appear to be damaged, chipped, and cracked at select locations. Also visible are abandoned gypsum board anchors left behind after the removal or relocation of wall hung devices.


Figure 25. Abandoned anchors @ tile


Figure 26. Voids @ tile


Figure 27. Chipping @ tile


Figure 28. Cracking @ tile


Figure 29. Chipping @ tile


Figure 30. Grout voids @ tile

Openings
The predominant type of doors in the facility is solid core wood doors with hollow metal frames, most of which are original to the building. There also exist a select number of custom built wood frames and associated doors as well as some aluminum framed doors and lites, also original to the building. During the remodeling project in 1997, additional wood doors and hollow metal frames as well as aluminum framed doors and lites were added.

A. Hollow Metal Frames:
The condition of hollow metal frames is good but will require repainting every 10 years or as required.

B. Solid Core Wood Door Panels:
The solid core wood doors are in fair condition showing the expected signs of wear and tear for a product their age.


Figure 31. Typical Door & Frame


Figure 32. Wear on door frame


Figure 33. Wear on door panel

C. Custom-built Wood Frames:
The wood door frames are in fair condition and are showing the expected signs of wear and tear for a product their age.

D. Aluminum Framed Doors and Lites:
The aluminum framed doors and lites are in good condition. The automatic sliding doors are no longer operational and remain in the open position permanently.

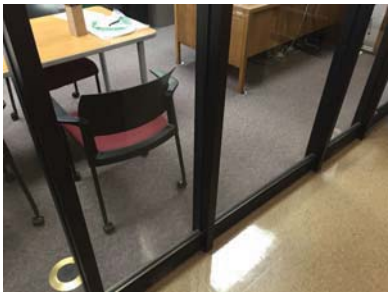


Figure 34. Typical aluminum frame

Figure 35. Non-functional Automatic Sliding doors

Figure 36. Typical aluminum framed doors

Ceiling Finishes

The ceilings are largely a lay-in type acoustical panel ceiling system (approximately 17,450 square feet) with a small portion of the ceilings comprised of gypsum board soffits (approximately 1,500 square feet). The balance of the ceilings is exposed to structure and is excluded from this assessment.

A. Acoustical Panel Ceiling System:
The condition of acoustical panel ceiling and grid is in good condition throughout the facility. Only select areas had any discoloration resulting from mechanical leaks and or condensation and should be replaced on an as needed basis. The ceiling system appears to be at the midpoint of their lifecycle; however, it has been noted elsewhere in this assessment that the inefficient lighting system above with the stack areas will need to be replaced due to the associated high costs to power them. These areas are on both the first and second levels and comprise approximately half the total ceiling area for the building. Testing should be performed on the existing ceiling panels to verify there are no asbestos containing materials which would require special remediation.

Figure 37. Typical APC system

Figure 38. Stack area lighting and associated ceiling panels and grid

Figure 39. Typical gypsum board soffit

B. The gypsum board ceiling and soffit areas are in good condition and are showing the expected signs of wear and tear for a product their age.

Furniture, Fixtures and Equipment

The facility's FF&E scope includes the following: base cabinetry and associated counters (approximately 250 lineal feet); wall cabinetry (approximately 115 lineal feet); library furniture / stacks (approximately 850 lineal feet); furniture including lounge seating and tables and task chairs (approximately 25 groupings); bathroom fixtures and accessories (5 total rooms); and residential appliances associated with the staff break room.

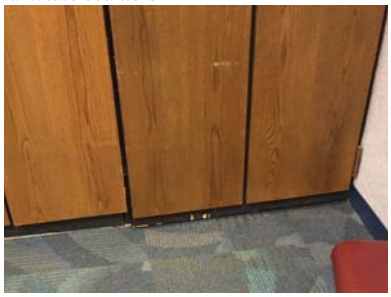
A. The various types of base cabinetry and associated counters have all shown evidence of considerable wear and associated damage. The most common evident sign of deterioration is the delamination of the plastic laminate or veneer. The following additional concerns were observed with the base cabinetry and counters: chipping and splitting of the woodwork edges and associated finishes, and exposed sub-top for solid surface counters

B. The wall cabinetry is better protected than the base cabinetry since they either are located within private offices or are above the plane of high traffic / impact compared to the base cabinetry where a large quantity is comprised the service desks actively use; therefore, the condition of the wall cabinets are considerably less degraded.

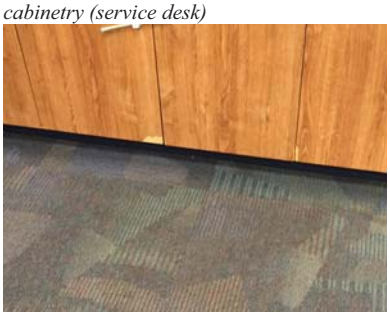
Figure 40. Delamination of the plastic laminate counters

Figure 41. Chipping of the wood base cabinetry (service desk)

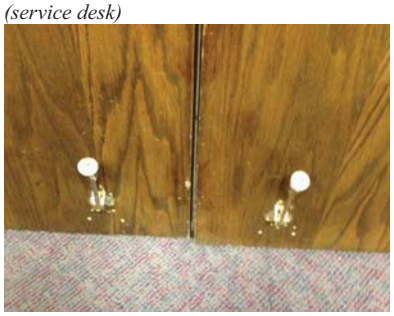
42. Chipping of the wood base cabinetry (service desk)



43. Chipping of the wood base cabinetry (service desk)



44. Delamination of the wood veneer on the base cabinetry (Story Time Room)



4 5 . Chipping of the wood door panels

46. Counter sub-top exposed to view at side overhang

47. Chipping of the wood base cabinetry (service desk)

48. Typical wall cabinet over base cabinetry and counter

C. The library stacks appear to be a more recent purchase than the associated library shelving (both free standing and wall mounted alike). In both cases, there does not appear to be considerable wear beyond that which is to be expected for the age of the furniture.

D. The library lounge seating, task seating and tables appear to be in fair condition and are showing the expected signs of wear and tear for a product their age.

E. The bathroom fixtures and accessories appear to be in fair condition; however, they are showing signs of aging and corrosion. When renovating the bathroom tiling, newer fixtures and accessories should be considered. The grab bars do not appear to comply with the most current version of the accessibility codes. There appears to be no vertical bar parallel to toilet centerline and the bar perpendicular to toilet centerline does not appear to be a minimum 36" wide.

Figure 49. No 36" wide grab bar perpendicular to toilet centerline

Figure 49. No vertical grab bar parallel to toilet centerline

50. Aged bathroom accessories

F. The appliances throughout are nearing the end of their serviceable life.

Vertical Circulation

The facility in total has two unfinished exit stairs at the northeast and northwest corners of the building. Additionally, there is one convenience stair adjacent to the building entry and a service elevator at the south east corner of the building. Also provided adjacent to the building entry is a double height space with a balcony overlooking the main entry doors which are protected with a metal and wood guard rail.

A. Both exit stairs predate the current accessibility codes. If the facility undergoes substantial renovation or expansion, additional investment in costs may be required to bring the existing stairs into compliance with the current accessibility codes.

B. The monumental stair adjacent to the building entry appears to be in good condition; however, the carpet wrapped treads is showing signs of wear.

C. The elevator cab interiors appear to be in fair condition and are showing the expected signs of wear and tear for a product their age.

D. The balcony guard railing appears to be in fair condition and is showing the expected signs of wear and tear for a product their age.

Accessibility

A. The minimum clear width between library stacks of 36" is not met at the majority of the conditions. Any rearrangement of the library stacks should provide the required 36" wide clearance.
B. The T-shape or 60" diameter turn-a-round is not met at the majority of the conditions from the access corridor to the library stack aisle.
C. Approximately 15% of the door openings have maneuvering clearance issues at both the first and second levels of the facility.

D. The grab bars do not appear to comply with the minimum 36" wide requirements for the back wall nor the vertical grab bar for the side wall in the bathrooms.
E. The base cabinets with sinks do not appear to comply with the 34" height and 30"x48" clearance requirements for perpendicular approach to the fixture.
F. The convenience stair adjacent to the main entrance has open treads and not permitted per the ADA requirements.
G. There are presently no Areas of Rescue Assistance at the second level stair landings.
H. The guard rails at the second level exit stair landings do not meet the 42" height requirement of the current codes.
I. The rail spacing at the guard rails at the second level exit stair landings does not comply with the minimum spacing requirements.
J. At the level of discharge, both of the enclosed stairs at the northwest and northeast corners of the building would be better served by eliminating any stepped conditions thereby improving the egress condition to the "public way" in the event of an emergency.
K. The open stair risers at the convenience stair adjacent to the main entrance are not permitted by the current accessibility requirements.

II. Recommendations:

- Replace the carpet tile flooring within the next five year period and budget bi-annual carpet cleaning for the following ten years. Replace carpet tile flooring every ten years at the highest traffic areas.
- Repair the plumbing leaks within the concealed chases and replace the ceramic tile at both second level bathrooms where there is evidence of delamination. At that time, replace the cove base and ceramic wall tile at both locations as well. When renovating the bathrooms, provide the accessible grab bars and new bathroom fixtures and accessories.
- Reserve some funds to address partial incidental repair to the slate tile flooring within the twenty year time period.
- Replace or encapsulate all VAT tile flooring within the next five year period due to age and condition of the material. At that time redistribute the library stacks to conform with the aisle width requirements for accessibility.
- Reserve some funds to address partial incidental repair to the wood paneling within the twenty year time period.
- Repaint the facility within the next five year period and budget repainting every 10 years.
- Replace all wall surfaces with wall coverings within the next five year period and budget new wall coverings every 8-10 years.
- Reserve some funds to address partial incidental repair to the interior face brick within the twenty year time period.
- Reserve some funds to address door replacement on an as needed basis within the twenty year time period.
- Replace the existing inoperable automatic sliding doors with new storefront system with double doors and automatic operators within the next five year period.
- Replace all aluminum framed lites and doors within the next twenty years.
- Reserve some funds to address partial incidental repair and or replacement of the gypsum board ceiling and soffits within the next twenty year time period.
- Replace the ceilings above the stacks areas when addressing the lighting system for that area. Replace the balance of the APC ceiling over the next twenty year period.
- Replace all of the base cabinetry and counters on a case by case basis in the order of need over the next 15 years period.
- Reserve some funds to address partial incidental repair to the wall cabinetry within the next twenty year time period.
- Reserve some funds to address partial incidental repair and or replacement of the library shelves and stacks

within the next twenty year time period.

- Reserve some funds to address partial incidental repair and or replacement of the lounge seating, tables and task chairs on an as need basis. Assume one quarter replacement every five years.
- Replace the kitchen appliances within the next five year period and budget replacement costs every 10 years.
- Reserve some funds to address partial incidental repair to the wood and metal guard railings within the next twenty year time period.
- Reserve some funds to replace the elevator cab finishes within the next twenty year time period.
- If the facility undergoes substantial renovation or expansion, additional investment in costs may be required to address both the accessibility of the exit stairs and pluming fixture quantities mentioned above.

nagle hartray architecture

VILLA PARK PUBLIC LIBRARY
Conveying Equipment Survey

CHECKLIST FOR INSPECTION OF HYDRAULIC ELEVATORS

GENERAL NOTES:

(a) See ASME A17.2.2 for detailed code requirements.

(b) OK = meets requirements; NG = insert number to identify comment on back; NA = not applicable

Address: VILLA PARK LIBRARY
305 S. ARDMORE
VILLA PARK, IL

ID No: 1

[X] Passenger — Rated Load: 2000 LBS

[ ] Freight Class ____ — Speed: 80 FPM

[ ] Routine inspection
[ ] Periodic inspection
[X] Acceptance inspection

Code Edition: ANSI A17.1 - 2010

Inspected by: Raymond E. Volk — QEI# C-3893

Signature: Raymond E Volk — Date: 11/10/14

		OK	NG	NA
1	**INSIDE OF CAR**			
1.1	Door reopening device	X		
1.2	Stop switch	X		
1.3	Operating control device, communications	X		
1.4	Car floor and landing sill	X		
1.5	Car lighting	X		
1.6	Car emergency signal	X		
1.7	Car door or gate	X		
1.8	Car closing force 28 Lbs	X		
1.9	Power closing of doors 4.1 Sec.	X		
1.10	Power opening of doors 1.7 Sec.	X		
1.11	Car vision panels and glass car doors			X
1.12	Car enclosure	X		
1.13	Emergency exit	X		
1.14	Ventilation	X		
1.15	Operating device symbols	X		
1.16	Rated load, platform area, and data plate	X		
1.17	Emergency lighting 0.6 Foot Candles	X		
1.18	Restricted opening of car door	X		
1.19	Car ride 20.3 Sec Up 18.9 Sec Dn		1	
2	**MACHINE ROOM**			
2.1	Access to machine space		2	
2.2	Headroom	X		
2.3	Lighting and receptacles 38 FtC	X		
2.4	Enclosure of machinery space	X		
2.5	Housekeeping	X		
2.6	Ventilation	X		
2.7	Fire extinguisher	X		
2.8	Pipes, wiring and ducts	X		
2.9	Noise level 44 Amb 79 run	X		
2.10	Guarding of exposed equipment	X		
2.11	Numbering of controllers, machines and disconnect switches	X		
2.12	Disconnecting means and control			
2.13	Hydraulic Power Unit			
2.14	Relief Valves	X		
2.15	Control Valve	X		
2.16	Tanks	X		
2.17	Flexible hydraulic hose and fitting assemblies			X
2.18	Supply line and shut off valve	X		
2.19	Hydraulic cylinder			X
3	**TOP OF CAR**			
3.1	Stop Switch	X		
3.2	Car top light and outlet	X		
3.3	Top of car operating device	X		
3.4	Top of car clearance and refuge space	X		
3.5	Normal terminal stopping device	X		
3.6	Emergency terminal speed limiting devices	X		
3.7	Anti-creep leveling device	X		
3.8	Crosshead data plate		3	
3.9	Top emergency exit	X		
3.10	Floor and emergency identification numbering	X		
3.11	Hoistway construction	X		
3.12	Hoistway smoke control	X		
3.13	Pipes, wiring and ducts	X		
3.14	Windows, projections, setbacks	X		
3.15	Hoistway clearances	X		
3.16	Multiple hoistway			X
3.17	Traveling cables, junction boxes	X		
3.18	Hoistway door and elevator gate equipment	X		
3.19	Car frame and stiles	X		
3.20	Guide rails, fastening and equipment	X		
3.21	Car floor and landing sill	X		
	ROPED HYDRAULIC ONLY			
3.22	Suspension Rope			X
3.23	Traveling Sheave			X
3.24	Wire rope fastening and hitch plate			X
3.25	Governor			X
3.26	Governor access			X

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CHECKLIST FOR INSPECTION OF HYDRAULIC ELEVATORS (back)

		OK	NG	NA
3.27	Governor rope			X
3.28	Governor releasing carrier			X
4	**OUTSIDE HOISTWAY**			
4.1	Car platform guard			X
4.2	Hoistway doors	X		
4.3	Vision panels			X
4.4	Hoistway door unlocking device	X		
4.5	Access to hoistway	X		
4.6	Power closing of hoistway doors			X
4.7	Sequence operation			X
4.8	Hoistway enclosure	X		
4.9	Elevator parking device			X
4.10	Emergency doors in blind hoistways			X
4.11	Emergency power operation and switching			X
4.12	Operating devices, direction lanterns	X		

		OK	NG	NA
5	**PIT**			
5.1	Pit access, lighting, stop switch, condition	X		
5.2	Bottom clearance and runby	X		
5.3	Plunger and cylinder	X		
5.4	Car buffer	X		
5.5	Normal terminal stopping device	X		
5.6	Traveling cables	X		
5.7	Governor rope tension sheave (Roped)			X
5.8	Car safety (Roped or LifeJacket)			X
5.9	Car frame and platform	X		
5.10	Guiding members	X		
5.11	Supply piping	X		
6	**FIREFIGHTER'S SERVICE**			
6.1	Sequence of operation	X		
6.2	Hallway signage and switches	X		
6.3	In car signage and switches	X		

COMMENTS: 1. Note that the speed is actually 125 FPM UP and 141 FPM down. We are hitting something on the way up and on the way down, so perhaps Colley can look at this when they are changing out the data tag on the car top. Extra vertical vibration could be due to the extra speed - they should check that out as well. 2. As mentioned during the walk through and in the photo sheets that follow, there needs to be a sign by the door stating what the room is.

3. As mentioned, the crosshead data tag should match the controller data tag in terms of speed. Reducing speed to the rated speed may clear up the vertical vibration.

Otherwise, a very good and complete elevator modernization by Colley that should last 30 years before additional work is required.

Perhaps future expenditures might include changing the sliding guides to roller type guides.

Elevator 1

The machine room door is self-closing and self-locking, but needs a sign indicating that it is the elevator equipment room.

Everything is up to date from a code standpoint for light switch and fire extinguisher.

There is also a phone line and GFCI protected outlet as required by current code.

Electrical disconnect switches were all upgraded as part of the elevator modernization process.

Here is the code data plate, required by code. Note the speed listed at 80 FPM. The actual speed measured was 125 FPM Up and 141 FPM down.

The is the data tag installed on the car top. It lists the car speed at 85 FPM. I called Craig at Colley and he is going to change the crosshead data tag to match the controller data tag, which is what the elevator is engineered for.

Controller installation information tag for future reference sake.

Specifications called for an electronic soft start system. This help reduce energy usage.

The new controller is a generic type, manufactured by MCE. Should last 30 years.

Parts cabinet contained all the necessary wiring diagrams and maintenance manuals. Spare parts would be nice. Perhaps a few interlock parts and some fixture parts and a couple of rollers for the cab door and hoistway door.

The specifications said the pump unit could be reused. Colley replaced the pump unit with a new unit.

Pump data.

Drain pipes in the machine room. No leaks - generally, local code authorities require these be enclosed, but this is an existing condition.

New lighting, including emergency lighting as well as ventilation duct near the top. Again, roof drain pipe is in the machine room.

Machine room was updated with smoke and heat sensors.

The elevator now has automatic and alternate floor fire recall to meet all current code requirements.

New fan, new lighting, new leveling system. Notice the "Danger - Low Overhead" sign

New smoke sensor in hoistway. There is a little moisture forming at the top of the hoistway along that back wall - could just be condensate.

New limit switches on the side wall and note the new hoistway door hardware. A very complete modernization by Colley.

The existing sliding guides were reused. These require the rails to be lubricated. Also, there is a "bump" in the middle of travel (see ride comfort readouts) which is most likely due to this guide hitting an out of alignment rail joint.

Looking down at the pit drain. The pit area appears damp, but could be from a variety of sources, as there was no standing water. Might even be from when the old cylinder was removed.

New lighting and pit ladder to meet code.

Oil recovery device pumps oil from cylinder head ring back to pump unit on the send floor. Not much oil to pump back from this new cylinder. There will always be a small amount of oil for the piston to move smoothly through the packing.

New GFCI protected outlet. Oil recover device is plugged into it.

Hoistway doors have emergency evacuation key holes.

New push button station at the 1st floor contains all current (2010) code required items, including signal in event of elevator telephone system failure.

A new car operating panel was installed. The PVC ring around the emergency phone call system is a good idea to minimize accidental contact. We tested the phone - it works as discussed.

New car fixtures are all code complaint. I didn't notice an audible floor passing signal, but most likely not turned on due to sound as well as there are only two stops.

Cab interior turned out nice. ADAAG compliant handrail on the rear wall.

Man-D-Tec LED lighting system throws 15 ft-c of lighting at the cab sill. The emergency lighting system in the car operating panel was also tested. It throws 3 times the code required minimum lighting.

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Filename: U34ZAG1E.VE2
Trigger Time: 11:32:52
Trigger Date: 11/10/14
EVA Serial Number: E00083675
EVA Vibration Analysis Tools Test Version 8.75.2004

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z
Max Pk to Pk	2.4	3.7	34.7
A95	2.0	2.4	24.9

*ISO Whole Body X,Y,Z 1999 Horizontal Channels (1/4), Vertical Channel (2/3)

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	65.6	69.8	64.3	69.8
L Aleq	61.7	54.7	58.4	58.0

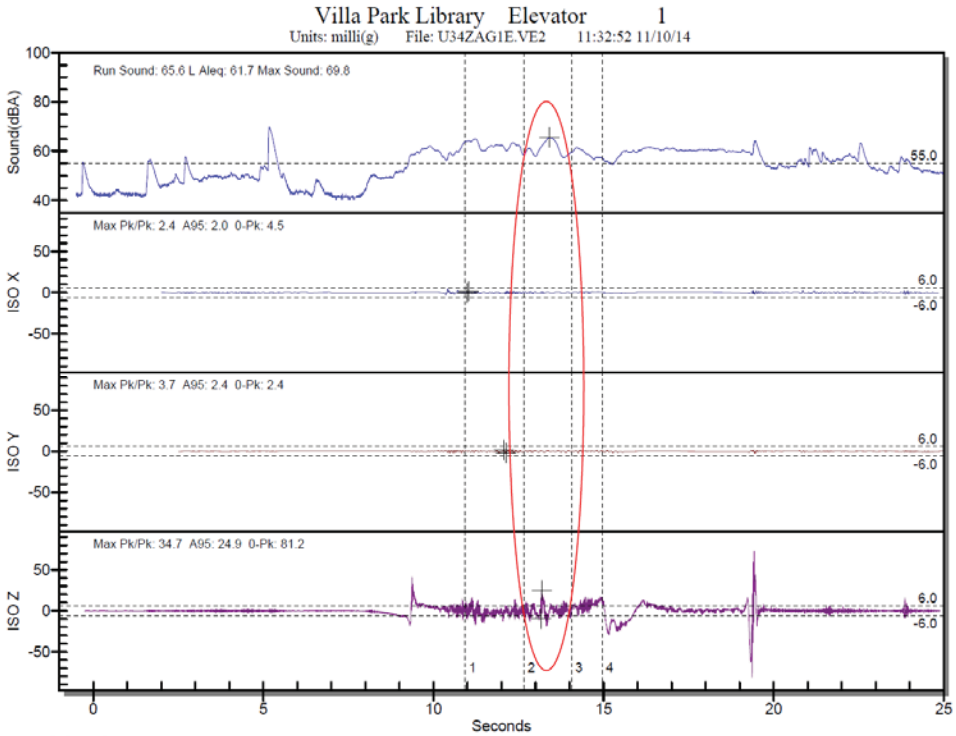
Raw Data (milli(g))	X	Y	Z
Max Pk to Pk	43.3	29.0	110.6
A95	29.0	19.6	62.9
Max 0 to Pk	31.8	22.4	176.7

Performance	Max	95	Average
Velocity (ft/min)	124.6	123.3	
Jerk (ft/s^3)	6.201		
Acceleration (ft/s^2)	1.787	1.511	1.063
Deceleration (ft/s^2)	2.471	2.274	0.441
Distance Travelled (ft)	11.5		

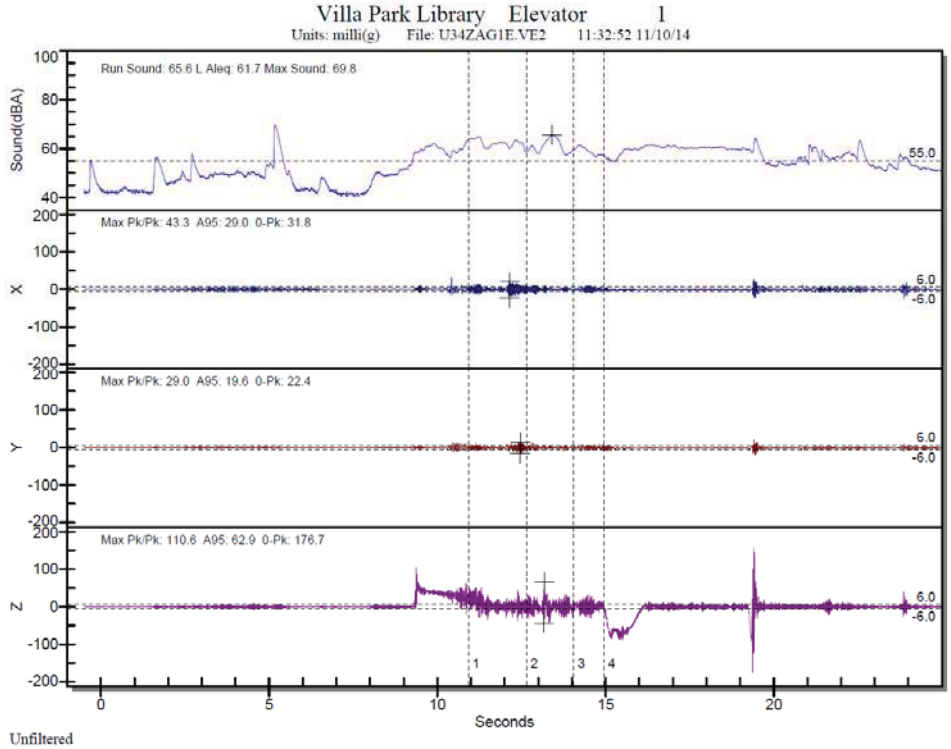
Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	3.7	12.0	30.61
Max Vertical Vib. ISO (milli(g))	34.7	12.0	289.12
Max Jerk (ft/s^3)	6.201	9.000	68.904
Max Velocity (ft/min)	124.6	80.0	155.8
Max Acceleration (ft/s^2)	2.471	4.000	61.771
Max Sound Level dB(A)	65.6	55.0	+10.6 dB

Report

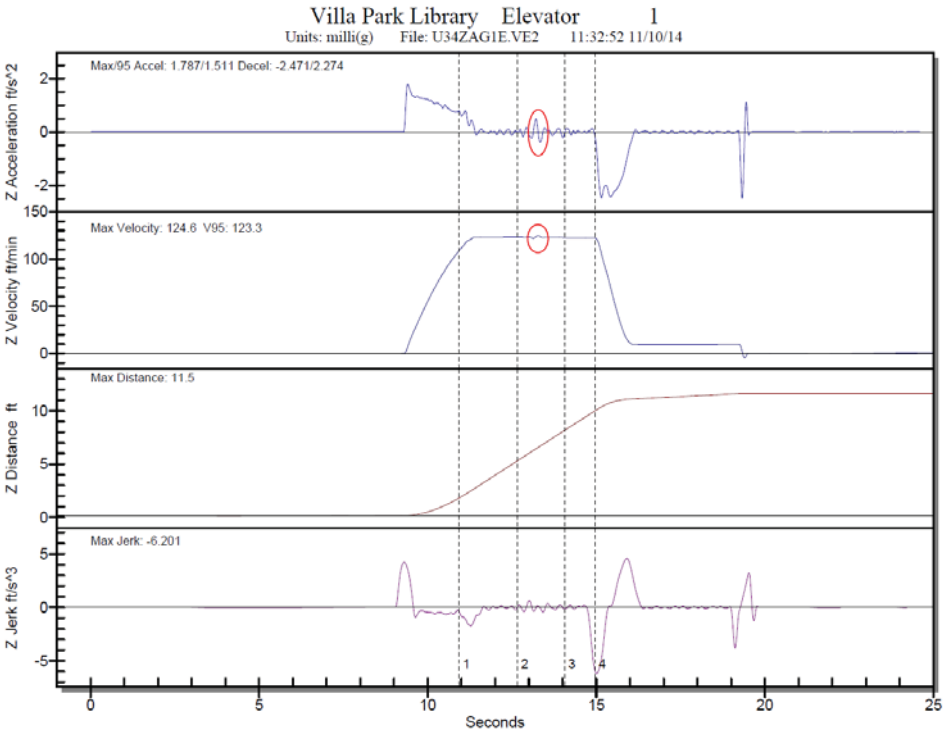
Project	Villa Park Library
Client	Nagle Hartray
Operator	Ray Volk
Company	Jenkins & Huntington
Location	Willowbrook, IL
Elevator	1
Start/Stop	1 / 2
Comments	UP Fan OFF



ISO Whole Body X,Y,Z 1999



Unfiltered


Villa Park Library Elevator 1
Units: milli(g) File: U34ZAG1E.VE2 11:32:52 11/10/14
Max/95 Accel: 1.787/1.511 Decel: -2.471/2.274
Z Acceleration ft/s^2
Max Velocity: 124.6 V95: 123.3
Z Velocity ft/min
Max Distance: 11.5
Z Distance ft
Max Jerk: -6.201
Z Jerk ft/s^3
1
2
3
4
Seconds

nagle hartray architecture

Filename: U34ZAG0S.VE2
Trigger Time: 11:32:08
Trigger Date: 11/10/14
EVA Serial Number: E00083675
EVA Vibration Analysis Tools Test Version 8.75.2004

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z
Max Pk to Pk	4.1	4.9	32.7
A95	2.0	4.5	26.9

*ISO Whole Body X,Y,Z 1999 Horizontal Channels (1/4), Vertical Channel (2/3)

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	64.2	70.1	64.4	70.1
L Aleq	62.1	62.7	61.9	62.2

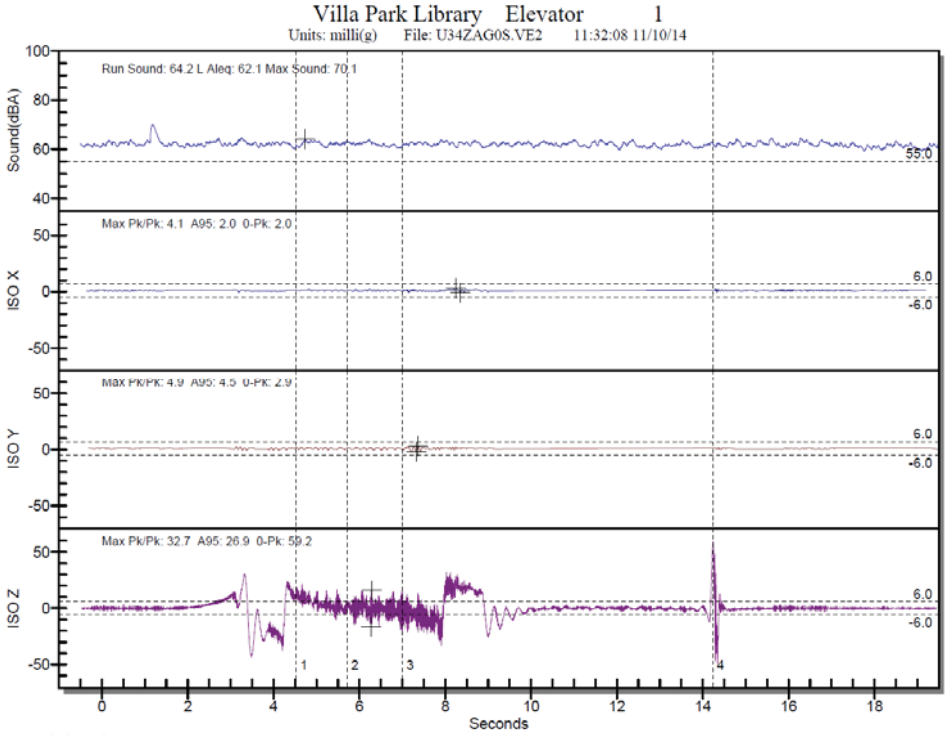
Raw Data (milli(g))	X	Y	Z
Max Pk to Pk	39.2	30.2	102.9
A95	15.9	13.9	93.5
Max 0 to Pk	29.4	15.9	141.2

Performance	Max	95	Average
Velocity (ft/min)	141.0	141.0	
Jerk (ft/s^3)	7.950		
Acceleration (ft/s^2)	3.325	3.220	2.713
Deceleration (ft/s^2)	2.602	2.445	0.343
Distance Travelled (ft)	11.6		

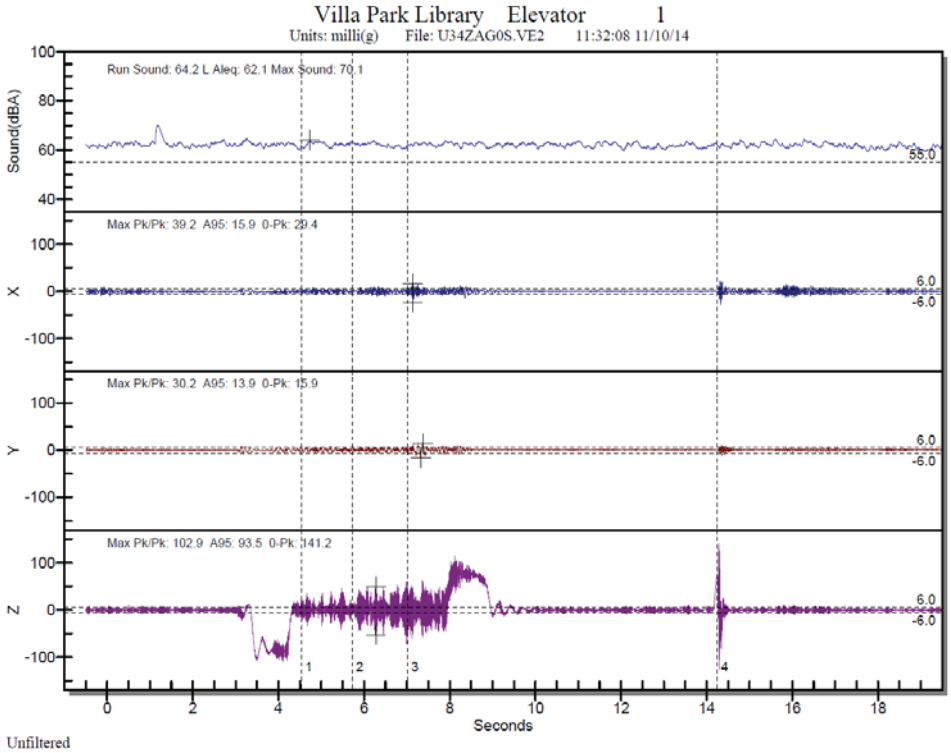
Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	4.9	12.0	40.82
Max Vertical Vib. ISO (milli(g))	32.7	12.0	272.11
Max Jerk (ft/s^3)	7.950	9.000	88.329
Max Velocity (ft/min)	141.0	80.0	176.3
Max Acceleration (ft/s^2)	3.325	4.000	83.129
Max Sound Level dB(A)	64.2	55.0	+9.2 dB

Report

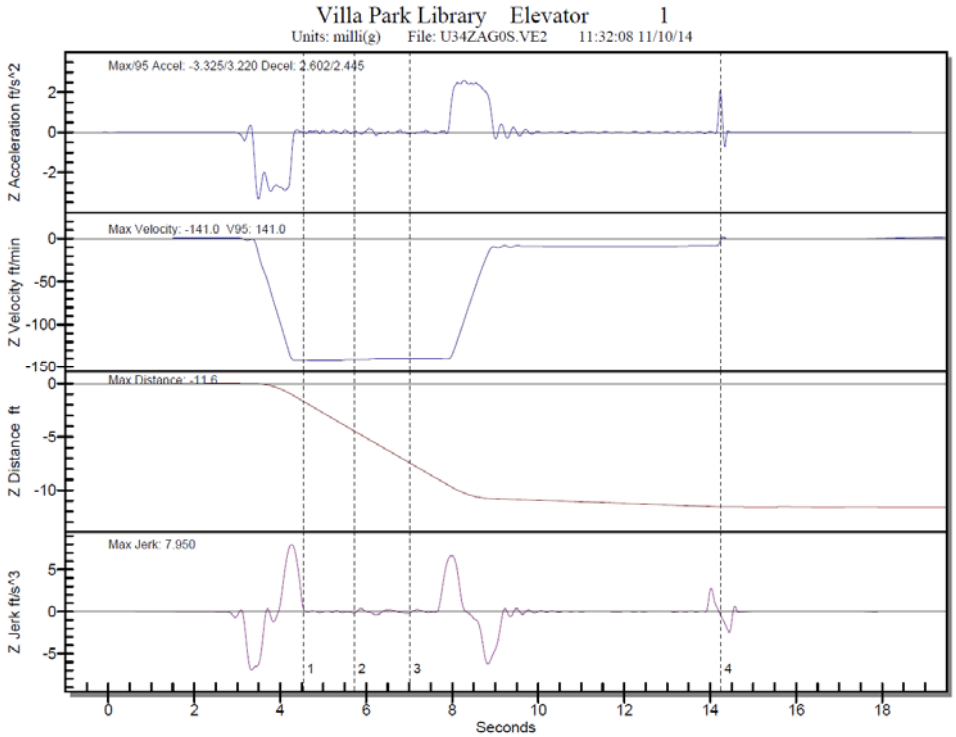
Project	Villa Park Library
Client	Nagle Hartray
Operator	Ray Volk
Company	Jenkins & Huntington
Location	Willowbrook, IL
Elevator	1
Start/Stop	1 / 2
Comments	DOWN Fan ON



ISO Whole Body X,Y,Z 1999



Unfiltered


Villa Park Library Elevator 1
Units: milli(g) File: U34ZAG0S.VE2 11:32:08 11/10/14
Max/95 Accel: -3.325/3.220 Decel: 2.602/2.445
Z Acceleration ft/s^2
Max Velocity: -141.0 V95: 141.0
Z Velocity ft/min
Max Distance: -11.6
Z Distance ft
Max Jerk: 7.950
Z Jerk ft/s^3
1
2
3
4
Seconds

VILLA PARK PUBLIC LIBRARY
Additions and Alterations

I. Building Alterations

The facility assessment report is intended to review the condition of the existing building systems relative to their performance and function compared to the estimated lifespans and to assign a replacement cost for budgeting purposes over the next twenty years. The estimate of probable costs is associated with maintenance and repair of the existing facility and its components versus an alteration of the facility which may alter the facility appearance, use or function. The maintenance or repair of the facility includes the restoration to good or sound condition of any part of the facility for the purposes of maintenance. An alteration is any construction or renovation to an existing structure other than a repair or addition as defined by the International Existing Building Code.

The costs associated with a large scale alteration may be subject to the conditions of the Illinois Accessibility Code. If the costs of the alterations are less than 15% of the building replacement cost, the scope of compliance are limited to elements or spaces being altered. In the event that the alternation costs exceed 15% of the building replacement costs, additional scope will be required to meet the current accessibility requirements including the building entrances, exits, and restrooms. For the purposes of this review, considerations for alterations have been excluded.

II. Building Additions

The distinction between a building alteration and a building addition is that the building addition is considered "new construction" and thereby required to meet the requirements of the current building and accessibility codes. The report and associated estimate of probable costs does not specifically address these additional requirements if a building addition is considered. After review of the building systems and the applicable codes concerning accessibility and existing structures, it is likely that the following systems will be impacted if a building addition is considered:

A. Accessibility of Existing Exit Stairs:
The existing exit stairs are not presently constructed with an accessible means of egress by providing the required areas of refuge at each of the exits from the second floor stair enclosures. Additionally, the current exit stairs have non-compliant guard rails which have minor costs associated with their replacement. If a building addition is considered, costs should be assigned to providing a rated enclosure for areas of refuge, their associated two-way communication systems, and guard rail replacement.

B. Accessibility of the Existing Elevator:
The existing elevator is not presently constructed with the required minimum clear floor dimensions. Consequently, if a building addition is considered, costs should be assigned to providing a new 4000 lbs. hospital shaped elevator that will meet wheelchair movement requirements and fit a hospital stretcher in the case of an emergency.

C. Plumbing fixture Counts:
There does not appear to be the minimum required number of plumbing fixtures required by the occupant load per the current Illinois Plumbing Code. If the facility undergoes substantial expansion, additional investment in costs may be required to add the required number of plumbing fixtures for the entire facility complying with current plumbing codes.

	Required	Current	Status
Water Closets	3 male; 5 female	2 male; 2 female; 1 unisex	**Does not comply** 1 male; 2 female fixtures short
Urinals	3 required	0 provided	**Does not comply** 3 fixtures short
Lavatories	2 male; 2 female	2 male; 2 female, 1 unisex	Complies
Drinking Fountains	1 per each set of public restrooms	1 per each set of public restrooms	Complies – No standing height drinking fountains provided
Service Sinks	1 per floor	1 per floor	Complies

D. Fire Suppression System:
The existing facility does currently not include a fire sprinkler system and the associated water service is presently inadequate for adding such a system at present time. In the event a building addition is considered in excess of 1,500 square feet (per the Villa Park amendments to the IBC 2009), additional costs should be assigned for providing a fully sprinklered system including the associated costs for increasing the building's water service described within the "Mechanical, Plumbing and Electrical Systems Survey" section.

VILLA PARK PUBLIC LIBRARY

Appendix A: Opinion of Probable Costs (Total Building and Site Development)

		System / Assembly	Lifespan in years*		Approximate Age		Replacement Unit Costs in Today $'s	/Unit	Quantity		5 YEAR	10 YEAR	15 YEAR	20 YEAR
SITE & EXTERIOR IMPROVEMENTS	Site Improvements	Asphalt Pavement Replacement	10 to 15	years	10+	years	$ 42.00	SY	1,990	SY	$ 83,580.00			$ 83,580.00
		Asphalt Crackfilling & Sealcoating (every 2 years)	2 to 3	years	n/a	years	$ 5.00	SY	1,990	SY	$ 9,950.00	$ 19,900.00	$ 19,900.00	$ 9,950.00
		Concrete Pavement Replacement	40	years	25	years	$ 65.00	SY	260	SY		$ 8,450.00		$ 8,450.00
		Retaining Wall Maintenance	n/a	years	n/a	years	$ 27.00	SF	100	SF	$ 2,700.00			
		Chain Link Fencing Replacement	20	years	47	years	$ 18.00	LF	290	LF	$ 5,220.00			
		ADA Entrance Modifications[3]	n/a		20	years	$ 16,000.00	LS	1	LS	$ 16,000.00			
		Concrete Curb Replacement	40	years	25	years	$ 25.00	LF	240	LF		$ 3,000.00		$ 3,000.00
	Utility Replacements	Water Service Replacement	50	years	47	years	$ 140.00	LF	85	LF		$ 11,900.00		
		Sanitary Sewer Replacement	75+	years	47	years	$ 65.00	LF	130	LF				$ 8,450.00
		Storm Sewer Maintenance	75+	years	25	years	$ 80.00	LF	200	LF				$ 16,000.00
		Utility Televising (Storm Sewer Only)	n/a	years	n/a	years	$ 5.00	LF	200	LF	$ 1,000.00		$ 1,000.00	
		Storm Sewer Flush	n/a	years	n/a	years	$ 18.00	LF	200	LF	$ 3,600.00	$ 3,600.00	$ 3,600.00	$ 3,600.00
		Underdrain Installation (foundation)	50+	years	n/a	years	$ 30.00	LF	460	LF			$ 13,800.00	
											5 YEARS	10 YEARS	15 YEARS	20 YEARS
		SubTotal : Site & Exterior Improvements									$ 122,050.00	$ 46,850.00	$ 38,300.00	$ 133,030.00
EXTERIOR BUILDING SYSTEMS	Brick Masonry	Brick Replacement - Isolated	80+	years	47	years	$ 90.00	SF	9500	SF	$ 17,100.00			$ 25,650.00
		Mortar Joints/Repointing (Localized)	30-50	years	47	years	$ 15.00	SF	9500	SF	$ 42,750.00			$ 28,500.00
		Brick Parapets and Limestone Copings/Rebuild	50+	years	47	years	$ 150.00	SF	540	SF	$ 81,000.00			
	Windows/ Sealant	Windows/Curtain Walls Maint. or Replacement	20 to 50	years	47	years	$ 50.00	SF	2250	SF				$ 28,125.00
		Glazing Seals - Replacement (Partial)	10 to 15	years	15	years	$ 8.00	LF	2500	LF	$ 8,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00
		Window Perimeter Sealant - Replacement 100%	10 to 20	years	15	years	$ 12.00	LF	1330	LF	$ 15,960.00			$ 4,788.00
		Brick/Sidewalk Sealant Replacement 100%	5 to 10	years	15	years	$ 15.00	LF	200	LF	$ 3,000.00			$ 3,000.00
		Fascia Panel Sealant - Replacement 100%	10 to 20	years	20	years	$ 12.00	LF	140	LF	$ 1,680.00			$ 1,680.00
	Precast Concrete Fascia Panels	Panel Investigation[2]	40 to 60	years	47	years	$ 20,000.00	each	1	total	$ 20,000.00			
		Panel Repairs - Short Term[2]	40 to 60	years	47	years	$ 25.00	SF	1500	SF	$ 37,500.00			
		Panel Repairs - Long Term Replacement[2]	40 to 60	years	47	years	$ 75.00	SF	1500	SF	$ 112,500.00			
	Soffits	Crack Repair/Localized Rebuild	40 to 60	years	47	years	$ 30.00	each	1900	SF	$ 1,710.00			$ 2,850.00
		Soffit Repaint 100%	40 to 60	years	15	years	$ 5.00	SF	1900	SF	$ 9,500.00			$ 9,500.00
	Roofing	Total Roof - Maintenance Repairs	20 to 25	years	??	years	$ 2.40	SF	12500	SF	$ 30,000.00	$ 15,000.00		$ 30,000.00
		Main Roof - Replacement	20 to 25	years	??	years	$ 25.00	SF	10700	SF	$ 267,500.00			
		Penthouse Roof - Replacement	20 to 25	years	??	years	$ 25.00	SF	1800	SF	$ 45,000.00			
		Skylight - Replacement	20 to 40	years	47	years	$ 3,000.00	each	1	total	$ 3,000.00			
	P'house	Wall Panels - Repainting	50+	years	47	years	$ 5.00	SF	1900	SF	$ 9,500.00			$ 9,500.00
		Expansion for new Mech. Equipment Allowance	N/A	N/A	N/A	N/A	$ 150.00	SF	500	SF	$ 75,000.00			
		Penthouse Doors - Replace and Raise Thresholds	50+	years	47	years	$ 2,000.00	each	3	total	$ 6,000.00			
		Sealant - Replace 100%	10 to 20	years	20	years	$ 10.00	LF	900	LF	$ 9,000.00			$ 9,000.00
	Misc.	Entry Canopy Columns - Repair/Paint	40 to 60	years	47	years	$ 2,000.00	each	1	total	$ 2,000.00			
		Concrete Sidewalk Under Entry Canopy - Replace	20 to 30	years	50	years	$ 20.00	SF	280	SF	$ 5,600.00			
											5 YEARS	10 YEARS	15 YEARS	20 YEARS
		SubTotal : SITE & EXTERIOR IMPROVEMENTS									$ 803,300.00	$ 19,000.00	$ 4,000.00	$ 156,593.00
MECHANICAL, ELECTRICAL, PLUMBING & TECHNOLOGY	Mechanical, Plumbing, Fire Protection	Fire Protection[3]	N/A	years	N/A	years	$ 3.00	SF	22000					
		Domestic Water and Fixtures	30-40	years	45	years	$ 4.00	SF	22000		$ 88,000.00			
		Heat Tracing Storm Leaders[2]	N/A	years	N/A	years	$ 2,500.00	each	4	total	$ 10,000.00			
		Sanitary, Storm and Vent	75	years	45	years	$ 1.00	SF	22000		$ 12,000.00			
		Heating, Ventilating and Air Conditioning	20 to 30	years	45	years	$ 35.00	SF	22000		$ 770,000.00			
	Electrical	Light fixtures & controls (T8 lamps retroffitted- '97)	30+	years	45	years	$ 12.00	SF	22000	SF	$ 264,000.00			
		Electrical Distribution Gear	35+	years	45	years	$ 14.00	SF	22000	SF	$ 308,000.00			
		Fire Alarm[2]	30	years	17	years	$ 3.00	-	22000	-	$ 66,000.00			
	Technology	Telecom Cable Infrasturcture	20+	years	20	years	$ 2.75	SF	22000	SF	$ 60,500.00			
		Security Systems (CCTV, Access/Alarms, Loss Prev.)	10+	years	10	years	$ 1.60	SF	22000	SF	$ 35,200.00		$ 15,000.00	
		Audio Visual System	10+	years	10	years	$ 10,000.00	room	2	total	$ 20,000.00		$ 20,000.00	
											5 YEARS	10 YEARS	15 YEARS	20 YEARS
		SubTotal: MECHANICAL, ELECTRICAL, PLUMBING & TECHNOLOGY									$ 1,633,700.00	$ -	$ 35,000.00	$ -
INTERIOR BUILDING SYSTEMS*	Flooring	Carpet Flooring	8 to 10	years	50	years	$ 5.00	SF	11710	SF	$ 58,550.00		$ 58,550.00	
		Ceramic Tile Flooring	70	years	15	years	$ 13.00	SF	90	SF	$ 1,170.00			
		Slate Tile Flooring	100	years	50	years	$ 15.00	SF	850	SF				$ 12,750.00
		Vinyl Asbestos Tile Flooring & Remediation	25	years	50	years	$ 10.00	SF	6000	SF	$ 60,000.00			
	Wall Surfaces	Wood Paneling and Trim	20 to 50	years	50	years	$ 25.00	SF	1820	SF				$ 11,375.00
		Paint Finishes (GB & CMU) + VCT base	10 to 15	years	15	years	$ 2.50	SF	5250	SF	$ 13,125.00		$ 13,125.00	
		Wall Coverings + VCT base	8 to 10	years	15	years	$ 10.00	SF	1330	SF	$ 13,300.00		$ 13,300.00	
		Ceramic Wall Tile & Base	70	years	15	years	$ 13.00	SF	1250	SF	$ 16,250.00			
		Interior Face Brick	100	years	50	years	$ 25.00	SF	7810	SF				$ 19,525.00
	Open-ings	Wood Doors / Metal Frames	30+	years	50	years	$ 1,300.00	each	53	total				$ 17,225.00
		Interior Glazed Frames	100+	years	15	years	$ 360.00	LF	120	LF	$ 12,240.00			$ 10,800.00
	Ceilings	Gypsum Board Ceilings	25+	years	15	years	$ 10.00	SF	1520	SF			$ 15,200.00	
		Acoustical Panel Ceiling	40	years	15	years	$ 4.00	SF	17450	SF	$ 34,900.00			$ 34,900.00
		Exposed Ceilings	Lifetime				$ -	-		-				
	Furniture , Fixtures & Equipment	Base Cabinetry & Counters	20 to 30	years	15	years	$ 360.00	LF	253	LF	$ 45,540.00	$ 22,770.00	$ 22,770.00	
		Wall Cabinetry	50	years	15	years	$ 160.00	LF	116	LF				$ 18,560.00
		Library Furniture - stacks / shelves	50	years	50	years	$ 85.00	LF	846	LF				$ 17,977.50
		Tables & Chairs / Lounge - Grouping	25	years	15	years	$ 2,500.00	group	23	groups	$ 14,375.00	$ 14,375.00	$ 14,375.00	$ 14,375.00
		Bathroom Fixtures & Accessories	25	years	15	years	$ 1,500.00	room	5	total	$ 7,500.00			$ 30,000.00
		Appliances	10	years	15	years	$ 5,000.00	LS	1	total	$ 5,000.00		$ 5,000.00	
	Stairs	Exit Stairs[3]	Lifetime				$ -		2	total				
		Railings	50	years	50	years	$ 200.00	LF	75	LF				$ 15,000.000
		* Lifespan based on IACHI Standards									5 YEARS	10 YEARS	15 YEARS	20 YEARS
		SubTotal: INTERIOR BUILDING SYSTEMS									$ 281,950.00	$ 37,145.00	$ 142,320.00	$ 202,487.50
CONVEY'G SYSTEM	Elevator	Rail Guide System (Change to Roller)	25	years	50	years	$ 4,000.00	set	1	set		$ 4,000.00		
		Elevator Cab Finishes	20	years	1	years	$ 10,000.00	cab	1	cab				$ 10,000.00
		Elevator Door Operator System	20	years	1	years	$ 10,000.00	system	1	SY				$ 10,000.00
		SubTotal: INTERIOR BUILDING SYSTEMS									$ -	$ 4,000.00	$ -	$ 20,000.00

		5 YEARS	10 YEARS	15 YEARS	20 YEARS
	SubTotal	$ 2,841,000.00	$ 106,995.00	$ 219,620.00	$ 512,110.50
GENERAL CONDITIONS OH&P	15%	$ 426,150.00	$ 16,049.25	$ 32,943.00	$ 76,816.58
CONTINGENCY	15%	$ 490,072.50	$ 18,456.64	$ 37,884.45	$ 88,339.06
ESCALATION	4.25% /yr	$ 869,220.68	$ 73,044.81	$ 251,813.74	$ 879,705.26
PROFESSIONAL FEES ALLOWANCE	15%	$ 693,966.48	$ 32,181.85	$ 81,339.18	$ 233,545.71
	Total	$ 5,320,409.66	$ 246,727.55	$ 623,600.37	$ 1,790,517.11

Cumulative Total $ 7,981,254.68 [1]

Legend of Abbreviations:

SY	System
LF	Lineal Foot
LS	Lump Sum
SF	Square Foot
OH&P	Overhead and Profit

[1] *The Estimate of Probable Cost reflects maintenance associated with the assessment of the facility. Major additions and alternation are excluded.*

[2] *Items identified in RED represent potential life safety issues and considered highest priority.*

[3] *Items identified in BLUE represent scope that may be required if a large scale renovation or addition is considered*

nagle hartray architecture
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KJWW
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Naperville, IL 60563

Certificate of Laboratory Analysis

linois Department of Public Health Certified # 17134

Report Number: W9208

Project: VILLA PARK LIBR
Purchase Order:

Report Date 12/5 /2014
Date Received: 11/20/2014
Time Received 13:46:00
Relinquished By CLIENT
Received By: EO

Sample No. W9208001 Matrix: A Sample Type DW Sampled: 11/20/2014 @ 13:12:00
Description: KITCHEN SINK Grab Collected By: SM

Analyte	Result	Units	MCL	Detection Limi	Analyzed	Analys	Method Reference
Alkalinity, pH 4.5 as CaCO3	96	mg/l	NA	2.0	12/04/2014	FE	SM 2320B
Calcium	32.8	mg/l	NA	1.0	11/25/2014	FE	SM 3111B
Chloride	15	mg/l	250	2.5	11/26/2014	FE	SM 4500ClD
Conductivity, mmhos/cm	279	mmhos	NA	0.1	11/24/2014	BT	SM 2510B
Copper	0.006	mg/l		0.001	11/25/2014	FE	SM 3113B
Fluoride	0.98	mg/l	0.9-	.01	11/25/2014	FE	SM 4500FC
Hardness, Total (Calc) as	134	mg/l		3	12/03/2014	FE	
Iron	0.11	mg/l		0.01	11/25/2014	FE	SM 3111B
Lead In Drinking Water	<0.005	mg/l	15.0	0.002	11/25/2014	FE	SM 3113B
Magnesium	12.7	mg/l	NA	0.1	11/25/2014	FE	SM 3111B
Manganese	0.007	mg/l	150.	.005	11/25/2014	FE	SM 3111B
Nitrogen (nitrate & nitri	<0.10	mg/l	10	0.10	12/02/2014	FE	SM 4500No3E
pH	8.5	units		1-12	11/24/2014	BT	SM 4500-H-B
Potassium	1.4	mg/l		.5	11/25/2014	FE	SM3111B
Sodium	8.0	mg/l	NA	1	11/25/2014	FE	SM 3111B
Solids (total dissolved)	166				11/25/2014	BT	
Sulfate	28				12/01/2014	FE	
Zinc	0.130	mg/l	5000	.005	11/25/2014	FE	SM 3111B

M. Lenos, Project Manager

I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete and accurate

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linois Department of Public Health Certified # 17134

Report Number: W9241

Project: VILLA PARK PUBL
Purchase Order:

Report Date	1 /13/2015
Date Received:	12/18/2014
Time Received	12:07:00
Relinquished By	CLIENT
Received By:	EO

Sample No. W9241001 Matrix: A Sample Type DW Sampled: 12/18/2014 @ 10:06:00
Description: REST ROOM Grab Collected By: SM

Analyte	Result	Units	MCL	Detection Limi	Analyzed	Analys	Method Reference
Alkalinity, pH 4.5 as CaCO3	96	mg/l	NA	2.0	12/23/2014	FE	SM 2320B
Calcium	36.1	mg/l	NA	1.0	12/22/2014	FE	SM 3111B
Chloride	15	mg/l	250	2.5	12/22/2014	FE	SM 4500ClD
Conductivity, mmhos/cm	279	mmhos	NA	0.1	12/18/2014	BT	SM 2510B
Copper	0.008	mg/l		0.001	12/22/2014	FE	SM 3113B
Fluoride	0.88	mg/l	0.9-	.01	12/23/2014	FE	SM 4500FC
Hardness, Total (Calc) as	142	mg/l		3	12/22/2014	FE	
Iron	0.36	mg/l	300.	0.01	12/22/2014	FE	SM 3111B
Lead In Drinking Water	<0.005	mg/l	15.0	0.002	12/22/2014	FE	SM 3113B
Magnesium	13.1	mg/l	NA	0.1	12/22/2014	FE	SM 3111B
Manganese	0.014	mg/l	150.	.005	12/22/2014	FE	SM 3111B
Nitrogen (nitrate & nitri	0.23	mg/l	10	0.10	12/22/2014	FE	SM 4500No3E
pH	7.4	units		1-12	12/18/2014	BT	SM 4500-H-B
Potassium	1.4	mg/l		.5	12/22/2014	FE	SM3111B
Sodium	7.2	mg/l	NA	1	12/22/2014	FE	SM 3111B
Solids (total dissolved)	146	mg/l	500.	1.0	12/19/2014	BT	SM 2540C
Sulfate	34				12/23/2014	FE	
Zinc	0.430	mg/l	5000	.005	12/22/2014	FE	SM 3111B

M. Lenos, Project Manager

I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete and accurate

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Certificate of Laboratory Analysis

linois Department of Public Health Certified # 17134

Report Number: W9256

Project:
Purchase Order:

Report Date	1 /15/2015
Date Received:	01/08/2015
Time Received	09:30:00
Relinquished By	CLIENT
Received By:	EO

Sample No. W9256001 Matrix: A Sample Type DW Sampled: 12/29/2014 @
Description: WATER SAMPLE Grab Collected By: SM

Analyte	Result	Units	MCL	Detection Limi	Analyzed	Analys	Method Reference
Iron	5.01	mg/l	300.	0.01	01/13/2015	FE	SM 3111B

M. Lenos, Project Manager

I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete and accurate

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ENVIROTEST/PERRY
LABORATORIES, INC.

E.T.P Labs

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Alkalinity - Alkalinity of a water is its acid-neutralizing capacity. The major constituents of alkalinity are carbonates, bicarbonates and hydroxide in the water. Water with low alkalinity may not react with coagulants such as iron or aluminum salts. Low alkalinity may lead to excessive corrosion of metallic parts. High alkalinity may produce a distinctly unpleasant taste.

Calcium - Contributes to water hardness.

Chloride - Chlorides, in reasonable amounts, are not harmful to health. When levels become excessive, a salty taste is detected. EPA SMCLs 250 mg/l.

Conductivity - Is the measure of the ability of an aqueous solution to carry an electric current. The conductivity of potable water in the United States ranges generally from 50 to 1500 umhos/cm.

Copper - Copper is an essential and beneficial element in human metabolism. Excess amounts are excreted in the urine and the feces. Large doses, however, can produce liver damage. Copper does produce a taste. Individuals vary in their taste perception with detectable range varying from 1 to 5 ppm (mg/l). EPA SMCLs 1.3 mg/l.

Fluoride - Fluorides are essential constituents of all diets. When fluoride levels become excessive, dental fluorosis occurs. EPA MCL 4.0 mg/l. EPA SMCLs 2.0 mg/l.

Hardness - Acceptable levels for water hardness are based on consumer acceptance. Hardness is caused by the quanity of calcium and magnesium in the water and contributes significantly to the total dissolved solids. High concentrations are detrimental to boilers and hot water heaters resulting in scale formations when the water is heated.

Iron - Iron is an abundant element in the earth's crust and is frequently found in well water supplies. As little as 0.3 mg/l can cause staining of laundry and bathroom fixtures. Taste from iron in the water becomes noticeable at 2 mg/l. EPA SMCLs 0.3 mg/l

Langleir Index - A measure of a solution's ability to dissolve or deposit calcium carbonate, often used as an indicator of the corrosivity of water.

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Magnesium - Contributes to water hardness

Manganese - Maganese causes a brown to black stain on laundry and impairs the taste of beverages including coffee and tea. EPA SMCLs 0.05 mg/l.

Nitrogen (Nitrate) as N - Serious and occasionally fatal poisonings of infants have occured following ingestion of water containing concentrations of nitrate which are greater than 10 mg/l. Nitrate is converted to nitrite in the stomach of an infant. In turn, the nitrite converts the hemoglobin of the blood to methemoglobin. The methemoglobin can not transport oxygen and the infant, in effect, suffocates. EPA MCL 10 mg/l.

pH - At a given temperature the intensity of the acidic or basic character of a solution is indicated by pH or hydrogen ion activity. EPA SMCLs 6.5 - 8.5 pH units.

Potassium - Potassium is a common element and is found in small amounts in almost all water supplies. In excessive amounts (1000 - 2000 mg) it has a laxative effect. Levels of 340 mg/l (Potassium Chloride) to 680 mg/l (Potassium Acetate) produce a taste in water that can be detected by some consumers.

Sodium - Sodium occurs in water by leaching from both surface and underground deposits of sodium bearing minerals. Various types of water treatment such as softening (ion exchange) and adjustment of pH with compounds containing sodium (soda ash) increase the amount of sodium in the treated water. Sodium levels up to 20 mg/l are recommended for highly restricted diets. Sodium levels up to 270 mg/l are recommended for moderately restricted diets.

Solids (Total Dissolved) - Drinking water which contains high TDS is likely to contain excessive amounts of substances which are esthetically objectionable to the consumer. High TDS frequently result in water with a generaly poor taste. EPA SMCLs 500 mg/l.

Sulfate - The presence of sulfate in the water can result in a laxative effect. Both sodium and magnesium in the water influences the laxative effect of the sulfate. EPA SMCLs 250 mg/l.

Zinc - Zinc is an essential and beneficial element in human metabolism. Water which contains 4 to 5 mg/l of zinc is described as having a bitter or astringent taste. EPA SMCLs 5.0 mg/l.

If you have any further questions, please contact us at your convenience.

IndoorScience
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December 10, 2014

KJWW (on behalf of Villa Park Library)
Attn: Brandon Fortier
305 S. Ardmore Avenue
Villa Park, IL 60181

Air Quality Report

Executive Summary

- The air quality parameters were generally within the accepted guidelines.
- No visible mold was identified and air samples did not uncover elevated counts.
- Visible water stains were observed in several locations, however, the stains were dry during the time of the assessment.
    - We recommend replacing all stained ceiling tiles.
- The particulate matter (airborne dust) levels were higher than the target we recommend for commercial and public buildings. This is likely due to dust on books, which can be cumbersome to remove.
    - If improvements will be made to the HVAC system, we recommend sizing the equipment to allow for a minimum filtration level of MERV 11.
    - We also recommend evaluating procedures for vacuuming and dusting. The library may want to consider a central vacuuming system set up to exhaust outdoors any particles not trapped by the vacuum.

Background

On December 3, 2014, Ian Cull, P.E. and Scott Wieringa of Indoor Science performed an indoor air quality assessment at the Villa Park Public Library at 305 S. Ardmore Avenue in Villa Park, IL.

It is our understanding that the library is evaluating the current status of the facility and planning for future capital improvements. The library was interested in evaluating the current indoor air quality.

Observations

A visual observation was performed of the property. There were several ceiling tiles that showed water stains. However, none of the stains were wet during the assessment.

An infrared camera and moisture meter were used throughout the property to identify any areas on dampness, which can lead to mold and bacteria growth. No dampness was identified during the assessment.

The HVAC system was providing outdoor air, but there did not appear to be advanced controls to optimize ventilation during ideal weather via an economizer. The filtration appeared to meet minimum standards.

Measurements

During the site visit, measurements of important contaminants were collected to assess the air quality. The locations of all the measurements are indicated in the attached floorplan found in Appendix A.

Total Volatile Organic Compounds (TVOCs)

Volatile organic compounds (VOCs) are a broad classification of organic gases with no strict definition. There are over 10,000 chemical compounds that fall under this classification. Many are associated with cleaners, personal care products, paints, furniture, pressed wood products, and a host of other sources.

The health effects of VOCs are greatly dependent on the individual VOC. The VOC's concentration, the duration of exposure, and the occupant's unique sensitivities will determine the precise health effects. Acute symptoms often reported are: eye, nose and throat irritation, headache, difficulty breathing, nausea and fatigue.

The levels of VOCs can be approximated using handheld digital equipment, such as a photoionization detector (PID). Although this can provide near instantaneous results, it is only able to approximate a total amount of VOCs (TVOCs) without being able to identify the individual VOCs present in the air (e.g. toluene, acetone, etc.).

In North America and Europe, TVOCs are not generally regulated as a combination of compounds; rather some specific volatile organic compounds are regulated.

Although no regulatory numbers exist for TVOCs, there are some recommended levels. The most often quoted recommended levels come from Lars Mölhave[1]:

- Less than 200µg/m^3: no irritation or discomfort
- 200-3,000 µg/m^3: irritation and discomfort possible if other exposures interact
- 3,000 - 25,000 µg/m^3: exposure effect and probably headache possible if other

[1] Lars Mølhave, *Volatile Organic Compounds,Indoor Air Quality and Health*, Indoor Air, 4,357-376 (1991)

exposures interact

- Greater than 25,000 μg/m^3: headache. Additional neurotoxic effects other than headache may occur

Also the US Green Building Council's building rating system, Leadership in Energy and Environmental Design (LEED®) has a target TVOC value for green buildings. Their rating system references a target value of 500 micrograms per cubic meter.

The table below summarizes the results of TVOC measurements taken with a GrayWolf Advanced Sense IAQ Probe with PID sensor:

Location	**TVOC (micrograms/cubic meter)**
Fails Guideline	*Above 3,000 μg/m^3*
Meets Guideline	*Below 3,000 μg/m^3*
Surpasses Guideline	*Below 500 μg/m^3*
1. Head of Circulation	30
2. NW Corner of the stacks	23
3. Stacks	30
4. Stacks	16
5. Stacks	16
6. Stacks	10
7. Stacks	3
8. Rear of Building	3
9. Maintenance Room	30
10. Multi Media	10
11. Tech Center	3
12. East of check out	10
13. West of check out	16
14. Magazines	10
15. Open Area	10
16. Conference Room	10

17. Lobby	16
18. Office	30
19. Office	29
20. Open area (rear)	23
21. Open area (front)	10
22. Ohrman Room	3
23. Gallery	9
24. East of Info Desk	9
25. Young Adults	9
26. Stacks	9
27. Stacks	3
28. Open Area	3
29. Rear Stacks	9
30. Middle Stacks	9
31. Office	9
32. Youth Services	3
33. Automation Workroom	3
34. Staff Room	3
35. Reading Room	3
36. Graphics Room	3
37. Outdoors	10

Formaldehyde

Many products and processes generate formaldehyde. It is used in the production of paper, particle board, plywood, and oriented strand board (OSB). It can also be found in paints, coatings, insulation products and emissions from combustion including cigarette smoke. Generally the formaldehyde concentration will be highest when a building is brand new.

Formaldehyde is a carcinogen and has no level that is known to be risk free. Therefore, it is

recommended to reduce indoor formaldehyde concentrations as much as possible. Formaldehyde also can cause short-term irritant effects, including temporary burning or itching of the eyes or nose, stuffy nose, and sore throat. At higher concentrations, formaldehyde exposure can also cause irritation of the lung's passageways. At very high formaldehyde concentrations, chest tightness, coughing, and wheezing can occur. Some people have reported headache, nausea, and fatigue after exposure to formaldehyde.[2]

The California Office of Environmental Health Hazard Assessment (OEHHA) has established an Acute Reference Exposure Level (acute REL) of 76 ppb for a one-hour exposure. The California Air Resources Board recommends formaldehyde levels below 27 parts per billion in residential settings.

A 30-minute measurement of formaldehyde was collected using a GrayWolf Formaldehyde Multimode Monitor (Model #FM-801).

Location	**Formaldehyde (parts per billion)**
Fails Guideline	*Above 76 ppb*
Meets Guideline	*Below 76 ppb*
Surpasses Guideline	*Below 27 ppb*
Head of Circulation Services	Below limit of detection (<10 ppb)
Ohrman	Below limit of detection (<10 ppb)

Particulate Matter

All air contains particles that can be seen with the naked eye. However, the small particles that cannot be seen have a greater impact on health. Smaller particles travel past the nose and upper respiratory tract, and reach the lungs. Particulate matter, regardless of its makeup, can have an affect on health including increased respiratory symptoms, irritation of the airways, coughing, difficulty breathing, decreased lung function, aggravated asthma and premature death in people with heart or lung disease.

Particulate matter consists of small particles and liquid droplets. Particle levels can indicate general air quality. There are no governmental regulations related to indoor particle levels.

Particle counts can be compared to ISO 14644-1 cleanroom standards[3]. Based on our experience, commercial buildings with good filters and vacuum cleaners can meet ISO class 8

[2] California Environmental Protection Agency: Air Resources Board. *Indoor Air Quality Guideline: Formaldehyde in the Home*; No. 1; California Air Resources Board: Sacramento, CA, August 2004.
[3] International Organization for Standardization. *Classification of Air Cleanliness*; ISO 14644-1; IEST: Arlington Heights, IL, 1999.

standards. At a minimum they should meet ISO class 9 standards and strive to achieve ISO class 8 standards.[4]

Measurements were collected using a TSI 3-channel particle counter (Model: AeroTrak APC 9303-01). The table below summarizes the ISO class reached for each location. Note that 3 particle sizes were tested for each location: 0.3 µm, 1.0 µm and 5.0 µm.

Location	**0.3 µm particles**	**1.0 µm particles**	**5.0 µm particles**
Fails Guideline	*>9*	*>9*	*>9*
Meets Guideline	*9*	*9*	*9*
Surpasses Guideline	*8*	*8*	*8*
1. Head of Circulation	9	8	9
2. NW Corner of the stacks	9	8	8
3. Stacks	9	8	8
4. Stacks	9	8	8
5. Stacks	9	8	8
6. Stacks	9	8	8
7. Stacks	9	8	8
Rear of Building	9	8	8
Maintenance Room	9	8	8
10. Multi Media	9	8	8/9
11. Tech Center	9	8	8
12. East of check out	9	8	9
13. West of check out	9	8	9
14. Magazines	9	8	8
15. Open Area	9	8	8

[4] The lower the ISO class number, the better. ISO class 7 and below require advanced filtration and engineering controls and is not achievable in most commercial buildings.

16. Conference Room	9	8	8
17. Lobby	9	8	9
18. Office	9	8	8/9
19. Office	9	8	9
20. Open area (rear)	9	8	9
21. Open area (front)	9	8	8
22. Ohrman Room	9	8	8
23. Gallery	9	8	8
24. East of Info Desk	9	8	8
25. Young Adults	9	8	9
26. Stacks	9	8	8
27. Stacks	9	8	8
28. Open Area	9	8	8
29. Rear Stacks	9	8	8
30. Middle Stacks	9	8	8
31. Office	9	8	8
32. Youth Services	9	8	8
33. Automation Workroom	9	8	8
34. Staff Room	9	8	8
35. Reading Room	9	8	8
36. Graphics	8/9	8	9
37. Outdoors	9	8	9

Carbon Dioxide and Air Exchange

The more air-tight a building, the greater the energy saving. However, a tight building means that there are a reduced number of air exchanges. Air exchanges benefit the indoor air quality by diluting many airborne contaminants.

Carbon dioxide (CO_2) can be measured in the building to approximate air exchange. People breathe out CO_2 and are the main indoor source. High CO_2 levels demonstrate that there is a lack of air exchange inside the building. Although it would be ideal to take these measurements when the building was fully occupied, the CO_2 measurements were collected during the course of the air quality assessment regardless of the occupancy.

A rule of thumb is to keep CO_2 levels below 1,000 ppm. Levels above 1,000 ppm have been shown to have an effect on decision making[5]. A less stringent guideline is to not exceed 700 ppm above background levels, which in Chicago can be up to 500 ppm (700 + 500 = 1,200 ppm).

Measurement were collected using a GrayWolf Advanced Sense IAQ Probe with CO_2 sensor.

Location	**Carbon dioxide (ppm)**
Fails Guideline	*Above 1,200 ppm*
Meets Guideline	*Below 1,200 ppm*
Surpasses Guideline	*Below 1,000 ppm*
1. Head of Circulation	751
2. NW Corner of the stacks	481
3. Stacks	470
4. Stacks	563
5. Stacks	503
6. Stacks	438
7. Stacks	488
8. Rear of Building	448
9. Maintenance Room	459

[5]Satish, U., Mendell. M.J., Shekhar, K., Hotchi, T., Sullivan, D., Streufert, S., Fisk, W.J. Is CO2 an indoor pollutant? Direct effects of low-to-moderate CO2 concentrations on human decision-making performance. *Environ Health Perspect*. **2012,** *120(12)*, 1671-1677.

10. Multi Media	461
11. Tech Center	419
12. East of check out	452
13. West of check out	514
14. Magazines	486
15. Open area	503
16. Conference Room	445
17. Lobby	485
18. Office	476
19. Office	492
20. Open Area	509
21. Open area	500
22. Ohrman Room	477
23. Gallery	502
24. East of Info Desk	490
25. Young Adults	495
26. Stacks	526
27. Stacks	485
28. Open Area	476
29. Rear Stacks	500
30. Middle Stacks	494
31. Office	541
32. Youth Services	521
33. Automation Workroom	505
34. Staff Room	462
35. Reading Room	494
36. Graphics Room	521

37. Outdoors	366

Carbon Monoxide

Carbon monoxide is a by-product of combustion. Its presence in indoor air can indicate that combustion gases are not being properly vented to the outdoors. Indoor combustion appliances include gas-powered furnaces, hot water heaters, clothes dryers, stoves and range tops. Other indoor sources include fireplaces and idling vehicles in attached garages.

Carbon monoxide is a colorless and odorless gas that can be deadly at high concentrations. At relatively low concentrations, carbon monoxide can lead to a decreased work time to exhaustion and a reduction in visual perception and manual dexterity. Higher concentrations can lead to headache, fatigue, impaired judgment with even higher levels leading to confusion, loss of consciousness and death. ASHRAE considers an 8-hour average of 9 ppm to be a concentration of interest[6]. Other professional organizations consider any indoor levels 2 ppm above outdoor levels to be worth further investigation.

Measurement were collected using a GrayWolf Advanced Sense IAQ Probe with a CO sensor.

Location	**Carbon monoxide (ppm)**
Fails Guideline	*>9 ppm*
Meets Guideline	*9 ppm*
Surpasses Guideline	*5 ppm*
1. Head of Circulation	0.2
2. NW Corner of the stacks	0.3
3. Stacks	0.3
4. Stacks	0.3
5. Stacks	0.3
6. Stacks	0.3
7. Stacks	0.4
8. Rear of Building	0.2

[6] ASHRAE Standard 62.1

9. Maintenance Room	0.3
10. Multi Media	0.3
11. Tech Center	0.3
12. East of Checkout	0.2
13. West of Checkout	0.3
14. Magazines	0.3
15. Open Area	0.3
16. Conference Room	0.3
17. Lobby	0.2
18. Office	0.2
19. Office	0.2
20. Open Area toward rear	0.2
21. Open Area	0.2
22. Ohrman Room	0.2
23. Gallery	0.3
24. East of Info Desk	0.3
25. Young Adults	0.3
26. Stacks	0.3
27. Stacks	0.3
28. Open Area	0.3
29. Rear Stacks	0.4
30. Middle Stacks	0.4
31. Office	0.3
32. Youth Services	0.4
33. Automation Workroom	0.3
34. Staff Room	0.3
35. Reading Room	0.2

36. Graphics	0.3
37. Outdoors	0.0

Comfort Parameters

The temperature and relative humidity of a building will have an effect on comfort. There are no strict temperature standards, because thermal comfort is relative. Generally a building should be maintained between 68-78°F.

Relative humidity can cause both comfort and air quality issues. When the air is too dry, several parts of the body also dry out including the skin, nasal passages and eyes. Dry air can also cause problems with static electricity and splitting or cracking of woodwork. If the air is too humid, microorganisms can grow. High humidity also leads to condensation on cold surfaces, which can further lead to microbial growth.

Humidity should be maintained between 20-65%, with an ideal humidity being 35-50%.

Measurement were collected using a GrayWolf Advanced Sense IAQ Probe with a temperature and humidity sensor.

Location	**Temperature (°F)**	**Relative humidity (%)**
Fails Guideline	*Less than 68°F, Greater than 80°F*	*Less than 20%, Greater than 65%*
Meets Guideline	*68-80°F*	*20-65%*
Surpasses Guideline	*72-76°F*	*35-50%*
1. Head of Circulation	66.7	24.1
2. NW corner of the stacks	67.1	22.7
3. Stacks	67.3	23.1
4. Stacks	68.0	22.6
5. Stacks	68.1	22.0
6. Stacks	68.2	20.6
7. Stacks	68.5	20.2
8. Rear of building	68.8	20.2
9. Maintenance Room	68.6	18.9

10. Multi Media	69.1	19.4
11. Tech Center	69.3	19.1
12. East of Checkout	69.4	20.1
13. West of Checkout	69.7	20.6
14. Magazines	69.6	20.1
15. Open Area	69.7	20.3
16. Conference Room	69.3	18.7
17. Lobby	69.5	19.6
18. Office	69.8	19.7
19. Office	70.0	19.8
20. Open Area toward rear	70.2	19.8
21. Open Area front	70.5	19.4
22. Ohrman Room	70.5	19.1
23. Gallery	71.7	19.4
24. East of Info Desk	71.7	18.8
25. Young Adults	71.9	18.6
26. Stacks	71.7	18.4
27. Stacks	71.6	18.2
28. Open Area	71.6	18.3
29. Rear Stacks	71.3	18.8
30. Middle Stacks	71.3	19.1
31. Office	71.8	19.1
32. Youth Services	72.1	18.9
33. Automation	72.2	18.1
34. Staff Room	72.0	17.9
35. Reading Room	72.1	17.9
36. Graphics	70.3	19.2

37. Outdoors	46.9	31.1

Mold

Mold is a branching fungus that forms distinct colonies. It grows where there is ample moisture and nutrients. Dampness and mold have consistent positive associations with multiple allergic and respiratory effects.[7]

No visible mold growth was observed during the inspection. However, air samples for mold were collected in order to help identify any hidden mold.

The government has not established safe or acceptable levels of mold in the air. In fact, there is always a background amount of mold in the air indoors and outdoors. Multiple samples are taken to compare values. It is presumed that when mold is growing in one area of a building, the airborne levels will be elevated above the outdoor sample and other indoor samples.

The types and concentrations of airborne mold in the library was reflective of the types and concentrations found in the outdoor reference sample. There were no water damage indicating genera such as *Stachybotrys*, *Chaetomium* or *Ulocladium*.

The full laboratory report is attached as an appendix.

Conclusions and Recommendations

- The air quality parameters were generally within the accepted guidelines.
- No visible mold was identified and air samples did not uncover elevated counts.
- Visible water stains were observed in several locations, however, the stains were dry during the time of the assessment.
    - We recommend replacing all stained ceiling tiles.
- The particulate matter (airborne dust) levels were higher than the target we recommend for commercial and public buildings. This is likely due to dust on books, which can be cumbersome to remove.
    - If improvements will be made to the HVAC system, we recommend sizing the equipment to allow for a minimum filtration level of MERV 11.
    - We also recommend evaluating procedures for vacuuming and dusting. The library may want to consider a central vacuuming system set up to exhaust outdoors any particles not trapped by the vacuum.

If you have any questions, please do not hesitate to contact us.

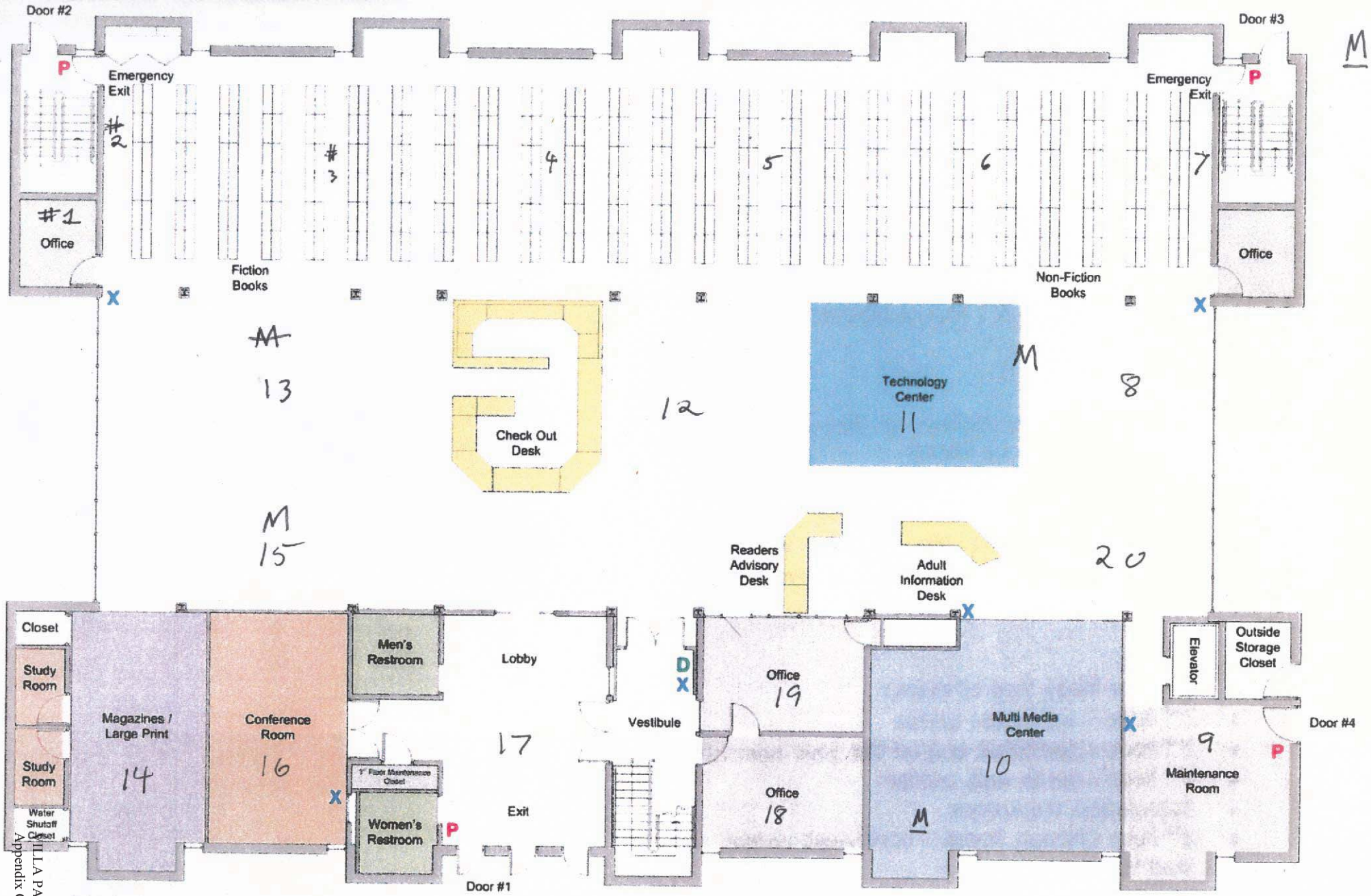
Regards,

[7] *Respiratory and Allergic Health Effects of Dampness, Mold, and Dampness-Related Agents: A Review of the Epidemiologic Evidence*, Mark J. Mendell, Anna G. Mirer, Kerry Cheung, My Tong, and Jeroen Douwes, Environmental Health Perspectives Volume 119, no. 6, June 2011.

Ian Cull
President
Indoor Science

Enclosed:
Appendix A- Floor Plan with Measurement Locations
Appendix B- Laboratory Results for Mold

Appendix A- Floor Plan with Measurement Locations

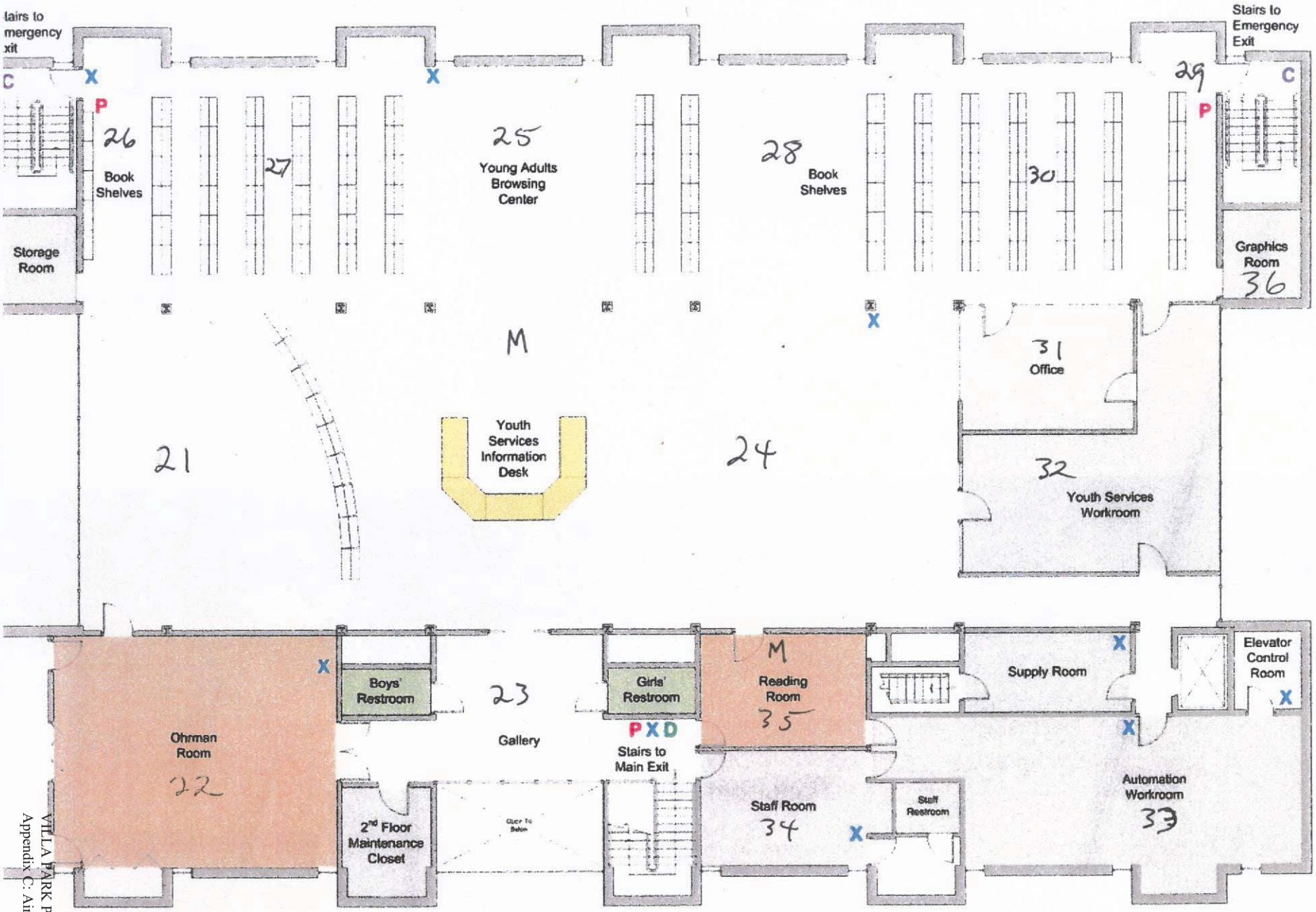


VILLA PARK PUBLIC LIBRARY

First Floor Layout

P – Fire Pull
X – Extinguisher
D – Defibrilator

N
W E
S



VILLA PARK PUBLIC LIBRARY

Second Floor Layout

P – Fire Pull
X – Extinguisher
D – Defibrilator
C – Rescue Call Button

N
W E
S

Appendix B- Laboratory Results for Mold

EMSL Analytical, Inc.

2225 W. Hubbard Street Chicago, IL 60612
Phone/Fax: (773) 313-0099 / (773) 313-0139
http://www.EMSL.com / chicagolab@emsl.com

Order ID:	261409183
Customer ID:	INDS78
Customer PO:	
Project ID:	

Attn:	Ian Cull	Phone:	(312) 920-9393
	Indoor Sciences, Inc.	Fax:	(312) 637-9393
	223 West Jackson Blvd.	Collected:	12/03/2014
	Suite 725	Received:	12/04/2014
	Chicago, IL 60606	Analyzed:	12/05/2014
Proj:	Villa Park Library		

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number:	261409183-0001			261409183-0002			261409183-0003		
Client Sample ID:	20872334			20872258			20845651		
Volume (L):	150			75			75		
Sample Location:	Outdoors			Media			Checkout		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria	1	20	1.8	1*	10*	11.1	-	-	-
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	11	230	20.4	-	-	-	-	-	-
Basidiospores	1	20	1.8	-	-	-	-	-	-
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	40	830	73.5	2	80	88.9	7	300	83.3
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	2*	10*	0.9	-	-	-	1*	10*	2.8
Pithomyces	-	-	-	-	-	-	1*	10*	2.8
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	1	20	1.8	-	-	-	1	40	11.1
Zygomycetes	-	-	-	-	-	-	-	-	-
Total Fungi	**56**	**1130**	**100**	**3**	**90**	**100**	**10**	**360**	**100**
Hyphal Fragment	1*	7*	0.6	-	-	-	1*	10*	2.8
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	21	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	7*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	2	-	-	2	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum
Myxomycetes++ = Myxomycetes/Periconia/Smut

No discernable field blank was submitted with this group of samples.

Andrei Poluchowicz, Microbiology Technical Manager

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Chicago, IL AIHA-LAP, LLC--EMLAP Lab 102992

Initial report from: 12/05/2014 16:06:01

For Information on the fungi listed in this report please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.
2225 W. Hubbard Street Chicago, IL 60612
Phone/Fax: (773) 313-0099 / (773) 313-0139
http://www.EMSL.com / chicagolab@emsl.com

Order ID: 261409183
Customer ID: INDS78
Customer PO:
Project ID:

Attn: Ian Cull
Indoor Sciences, Inc.
223 West Jackson Blvd.
Suite 725
Chicago, IL 60606

Phone: (312) 920-9393
Fax: (312) 637-9393
Collected: 12/03/2014
Received: 12/04/2014
Analyzed: 12/05/2014

Proj: Villa Park Library

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number:	261409183-0004			261409183-0005			261409183-0006		
Client Sample ID:	20845629			20872270			20872261		
Volume (L):	75			75			75		
Sample Location:	Technology			Youth Services			Reading Room		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	2	80	36.4	2	80	50	-	-	-
Basidiospores	1	40	18.2	-	-	-	-	-	-
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	3	100	45.5	2	80	50	1	40	50
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces	-	-	-	-	-	-	1	40	50
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Total Fungi	**6**	**220**	**100**	**4**	**160**	**100**	**2**	**80**	**100**
Hyphal Fragment	-	-	-	-	-	-	1*	10*	12.5
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	2	-
Fibrous Particulate (1-4)	-	1	-	-	2	-	-	2	-
Background (1-5)	-	1	-	-	1	-	-	1	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum
Myxomycetes++ = Myxomycetes/Periconia/Smut

No discernable field blank was submitted with this group of samples.

Andrei Poluchowicz, Microbiology Technical Manager

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Chicago, IL AIHA-LAP, LLC--EMLAP Lab 102992

Initial report from: 12/05/2014 16:06:01

For Information on the fungi listed in this report please visit the Resources section at www.emsl.com

ENGINEERING REPORT

KJWW ENGINEERING / VILLA PARK LIBRARY
305 S. Ardmore Avenue
Villa Park, IL 60181

PERFORMED BY:
ENERGY MANAGEMENT AND TESTING
PO BOX 59572
SCHAMBURG, IL 60159
(630) 973-7172

emtcorp@comcast.net

2014 INFRARED/THERMOGRAPHIC SCANNING & INSPECTION OF FACILITY ELECTRICAL DISTRIBUTION

KJWW ENGINEERING
Villa Park Library
305 S. Ardmore Avenue
Villa Park, Illinois 60181

December 29, 2014

Attention: Mr. Brandon Fortier PE,

Subject: Engineering report for 2014 infrared/thermographic scanning and inspection of electrical distribution equipment

Enclosed is the engineering report detailing the project that Energy management and Testing (EMT) recently completed at the facility listed above. EMT is a full service independent testing company and appreciates the opportunity to provide your system review and testing services.

Our mission is to provide an independent technical service to enhance the safety, reliability and efficiency of electrical systems and provide a one-stop solution for quality electrical testing services.

Thank you for the opportunity to provide this service. Please contact us if you have any questions, comments about this report or wish to know more about our services.

Respectfully Submitted,

Mike Bracher
Project Manager
Email: mike.bracher@comcast.net

ENGINEERING REPORT

Villa Park Library
305 S. Ardmore Avenue
Villa Park, IL 60181

2014 Infrared Scanning & Inspection of Electrical Distribution Equipment

SECTION 1 **SCOPE; PURPOSE; PROCEDURE; APPRAISAL AND RECOMMENDATIONS**

SECTION 2 **THERMOGRAPHIC INSPECTION EQUIPMENT LOG & DEFICIENCIES**

ENGINEERING REPORT

Villa Park Library
305 S. Ardmore Avenue
Villa Park, IL 60181

2014 Infrared Scanning & Inspection of Electrical Distribution Equipment

SECTION I

SCOPE:
During the week of December 29th, 2014 EMT performed an infrared inspection of the Villa Park Library Facility located at 305 S. Ardmore Avenue, Villa Park, Illinois 60181 building electrical distribution equipment.

Detailed inspection notes and observations documented during the execution of this project are contained in the Thermographic Inspection Equipment Log section (separate attached file) of this engineering report. This log contains a listing of all equipment inspected and deficiencies (4) found during this project.

PURPOSE:
The purpose of this Thermographic inspection is to provide information relative to the physical condition of the electrical distribution system. Loose and poor connections, unbalanced loads and loose bus joints can be located. These conditions are characterized by increased resistance and accompanied by a temperature rise detected by thermographic scanning. This report is intended to assist you in reducing loss to property by bringing your attention to hazards and problems. It is not intended to imply that other hazards or problems may or may not exist at the time of the inspection.

PROCEDURE:
All testing is performed in accordance with EMT's standard procedures including, but not limited to, selected specifications from the following: International Electrical Testing Association (NETA), National Electrical Code (NEC), National Fire Protection Association 70B-Electrical Equipment Maintenance (NFPA 70B), Institute of Electrical and Electronic Engineers (IEEE), American Society for Testing and Materials (ASTM), National Electrical Manufacturer's Association (NEMA), manufacturer's instruction manuals and/or project specifications, unless otherwise noted.

APPRAISAL AND RECOMMENDATIONS:
EMT recommends annual infrared inspections of electrical equipment to assist in identifying deteriorated connections and abnormal operating temperatures prior to equipment failure.

ENGINEERING REPORT

Villa Park Library
305 S. Ardmore Avenue
Villa Park, IL 60181

2014 Infrared Scanning & Inspection of Electrical Distribution Equipment

The enclosed Thermographic Inspection Equipment Log (separate attached file) contains thermal and digital pictures and recommendations for equipment that was identified as having deficiencies (4) or elevated temperatures and requires corrective actions. The enclosed Thermographic Inspection Equipment Log also contains a listing of all equipment inspected during this project. Some equipment may be noted as not operating at the time of the inspection or not accessible because of interlocks. This equipment should be inspected during a scheduled outage. EMT tightened loose connections found as practical.

EMT has assigned "Repair Priority" ratings to each deficiency identified in the Thermographic Inspection Report. These ratings are based on two primary factors: (1) The International Electrical Testing Association (NETA) table 10.18 identifying the various temperature differentials between similar equipment and/or ambient temperature; and (2) The type and critical nature of the equipment and the effect the elevated temperature may have on continued reliable service.

Following all repairs, a thermographic inspection should be scheduled to assure the deficiencies have been adequately repaired. Please contact our office to schedule a follow-up infrared scanning and inspection.

ENGINEERING REPORT

Villa Park Library
305 S. Ardmore Avenue
Villa Park, IL 60181

2014 Infrared Scanning & Inspection of Electrical Distribution Equipment

Each Thermographic photograph is adjusted for clarity; therefore, the temperature scales of the various pictures are not consistent. Photographs with very slight elevated temperatures may appear to be serious deficiencies based upon the color gradient (isotherm) of the photograph. EMT has provided isometric charts and temperature differential listings to assist in the evaluation of each photograph.

DEFICIENCY TEMPERATURE REFERENCE

Temperature difference based upon comparison between similar components under similar load	Temperature difference based upon comparison between component and ambient temperatures	Recommended action	Repair Priority
1 – 3 °C	1 – 10 °C	Possible deficiency, warrants investigation	1
4 – 15 °C	11 – 20 °C	Indicates probable deficiency, repair as time permits	2
N/A	21 - 40°C	Monitor continuously until corrections are completed	3
> 15 °C	> 40 °C	Critical variance Repair Immediately	4

The above table is taken from the International Electrical Testing Association Maintenance Testing Specification NETA MTS-2001, Table 10.18. This table is provided as a reference providing suggested actions based solely on temperature differences. Actual recommendations may vary from those above based on specific equipment inspected, components showing signs of elevated temperature, criticality of equipment, and likely cause of elevated temperature.

ENGINEERING REPORT

Villa Park Library
305 S. Ardmore Avenue
Villa Park, IL 60181

2014 Infrared Scanning & Inspection of Electrical Distribution Equipment

DEFICIENCIES: See the separate attached Thermographic Inspection Equipment Log file containing infrared data for recommendations regarding panels/equipment deficiencies (4) and the repairs.

APPRAISAL AND RECOMMENDATIONS: General

1) **EMT recommends REGULAR ELECTRICAL INSPECTIONS, CLEANING AND TESTING of electrical equipment to assist in identifying deteriorated insulation, abnormal operating temperatures and malfunctioning protective devices prior to equipment failure.**

2) **All electrical protective equipment including ground fault relays, circuit breakers and fused disconnects should be tested, exercised and lubricated on a regular basis. Mechanical equipment may not operate properly when called upon if regular maintenance is neglected.**

3) **New OSHA requirements have been issued regarding Arc Flash requirements and personnel safety. New Arc Flash requirements will require all facilities (industrial, commercial, institutional) to display information about the arc flash availability at each panel, switch or breaker where the equipment is accessible by maintenance/site personnel. The arc flash information on the panel fronts will indicate the level of clothing and level of training required to open and maintain the equipment within the panel or switchboard.**

4) **EMT recommends the installation of a primary transient voltage surge suppressor (tvss) unit on the main electrical switchboard. The primary tvss unit will clamp/remove all incoming transient/surge disturbances created by lightning, utility switching, downed power lines, ice/snow on utility lines/insulators, high winds, etc. We also recommend secondary tvss units be installed on ALL electrical distribution panels especially critical or individual loads (computer, patient care, security/fire, building energy management, etc.) as final point of protection from internal switching disturbances created by the turning off and on or duty cycling of ALL electrical/electronic equipment or loads. The secondary level of protection will also act as back up should the primary tvss unit become damaged or sacrificial. We noticed a marked absence of any tvss units within the building.**

EMT **Infrared Inspection Equipment Survey**

Customer: VILLA PARK LIBRARY
Address: 305 South Ardmore Avenue, Villa Park, IL

Date: December 29, 2014
Sheet No: 1

MAIN BUILDING

Equipment Identification or Location	Inspection Notes	IR	Photo
FRONT ENTERANCE STAFFF ONLY CLOSET			
PANEL NO LABEL LEFT WITH 23 CIRCUIT BREAKERS			
PANEL NO LABEL RIGHT WITH 21 CIRCUIT BREAKERS			
2ND FLOOR			
PANEL LP2-B WITH 35 CIRCUIT BREAKERS		53	
ELEVATOR EQUIPMENT ROOM			
ELEVATOR MAIN CRK DISCONNECT			
EM PANEL CRK #2			
ELEVATOR CONTROLLER			
2ND FLOOR SUPPLY ROOM			
PANEL LP-2-C WITH 39 CIRCUIT BREAKERS			
PANEL LP-2-A WITH 39 CIRCUIT BREAKERS			
PENTHOUSE			
MCC WITH 4 STARTERS AND 14 DISCONNECTS			
PANEL LPP WITH 13 CIRCUIT BREAKERS			
DISCONNECT #5			
DISCONNECT #4			
DISCONNECT #3			
DISCONNECT #2			
DISCONNECT #1			
MAIN SWITCHGEAR			
PANEL LP-1A WITH 24 CIRCUIT BREAKERS			
PANEL LP-1A SUB WITH 20 CIRCUIT BREAKERS			
PANEL EM WITH 14 CIRCUIT BREAKERS			
11 FUSED DISCONNECTS AND 1 BOLTED PRESSURE SWITCH			

Test Set Used: ILIR01

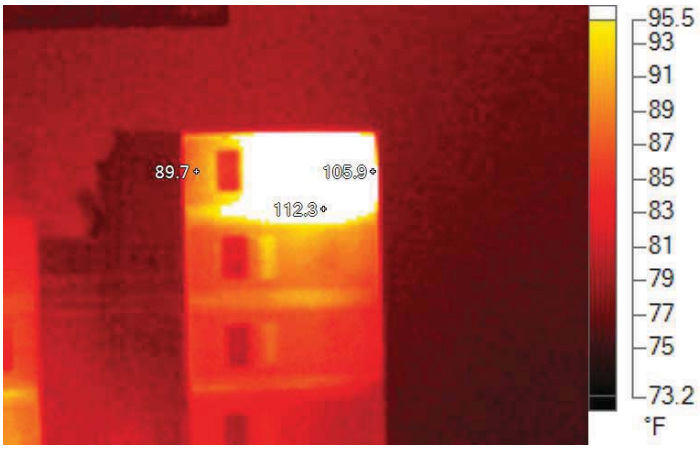
Test Personnel: ,MB

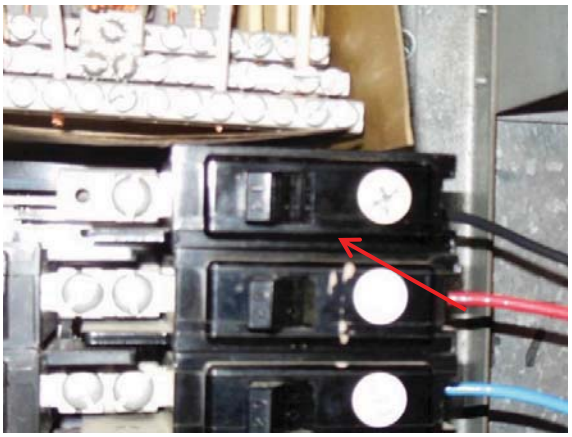
EMT

ENERGY MANAGEMENT AND TESTING

THERMOGRAPHIC INSPECTION REPORT

Customer:	VILLA PARK LIBRARY	**Date:**	12/29/14
Address:	305 South Ardmore Avenue, Villa Park, IL	**Project:**	B122914
Equipment Location:	2ND FLOOR	**Air Temp:**	70ºF
Equipment ID:	PANEL LP 2B	**Humidity:**	45%





Problem Description: 20AF CIRCUIT BREAKER POSITION #2 MEASURED CURRENT:(18.0A)

	ACTION REQUIRED		Probable Cause		Recommended Action
	Deficiency, Investigate		Loose Connection		Secure Power
	Schedule Repair at next outage		Oxidation of Conn	X	Clean/Tighten Connection
	None: Problem Corrected during inspection	X	Overloaded Circuit		Determine Cause of Imbalance
X	Repair and verify with infrared inspection		Unbalanced Circuit		Distribute Load evenly
			Failing (Bad) Fuse		Determine cause of overload
			Failing Breaker	X	Reduce load below 80% FLA
			Code Violation		Replace Conductors
			Failing Contacter		Replace Fuses
					Replace Bus
					Replace Breaker

(P) Point Temperature

(P1) Temp	(P2) Temp
89ºF	106ºF
Hot Temp	112ºF

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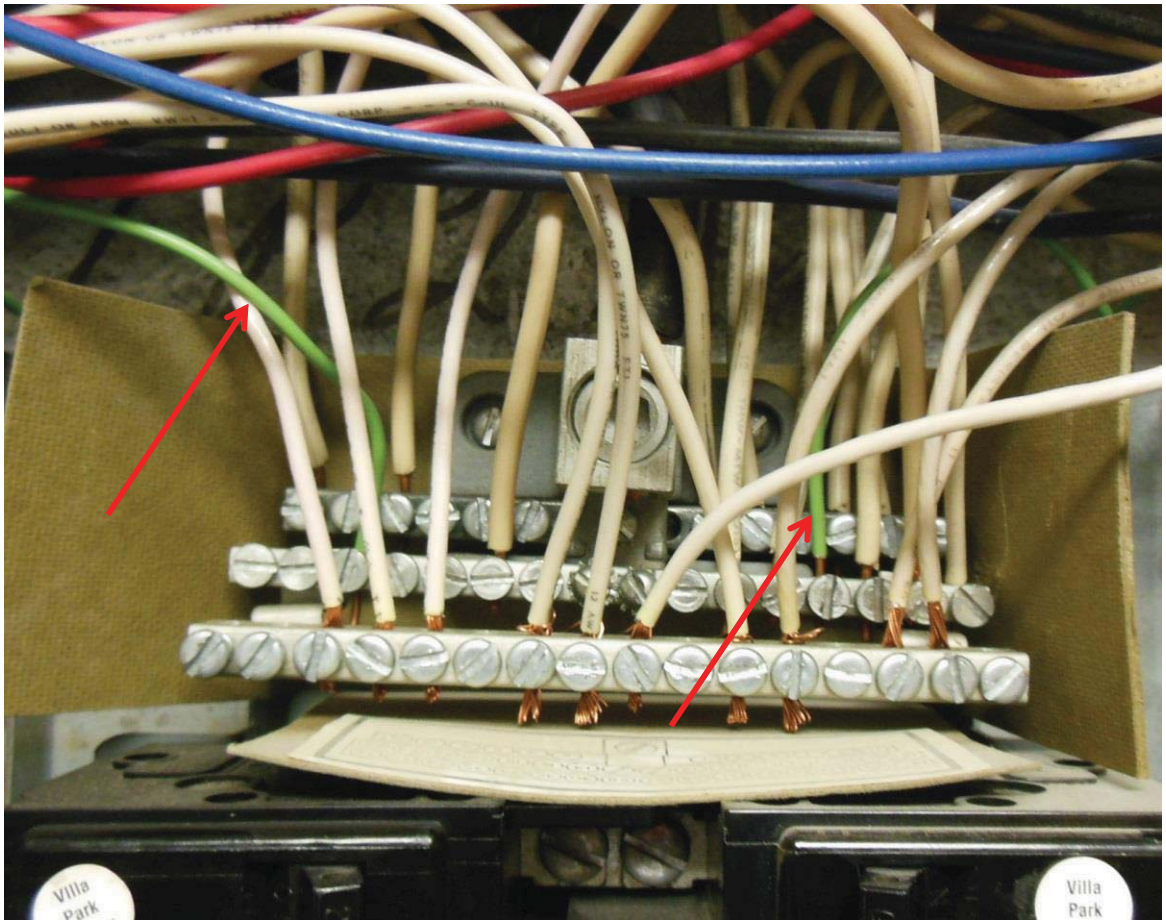
ELEVATOR EQUIPMENT ROOM

ELEVATOR MAIN CRK DISCONNECT

2 DIFFERENT FUSE TYPES ECNR AND TR. WE RECOMMEND REPLACING WITH IDENTIAL FUSES.

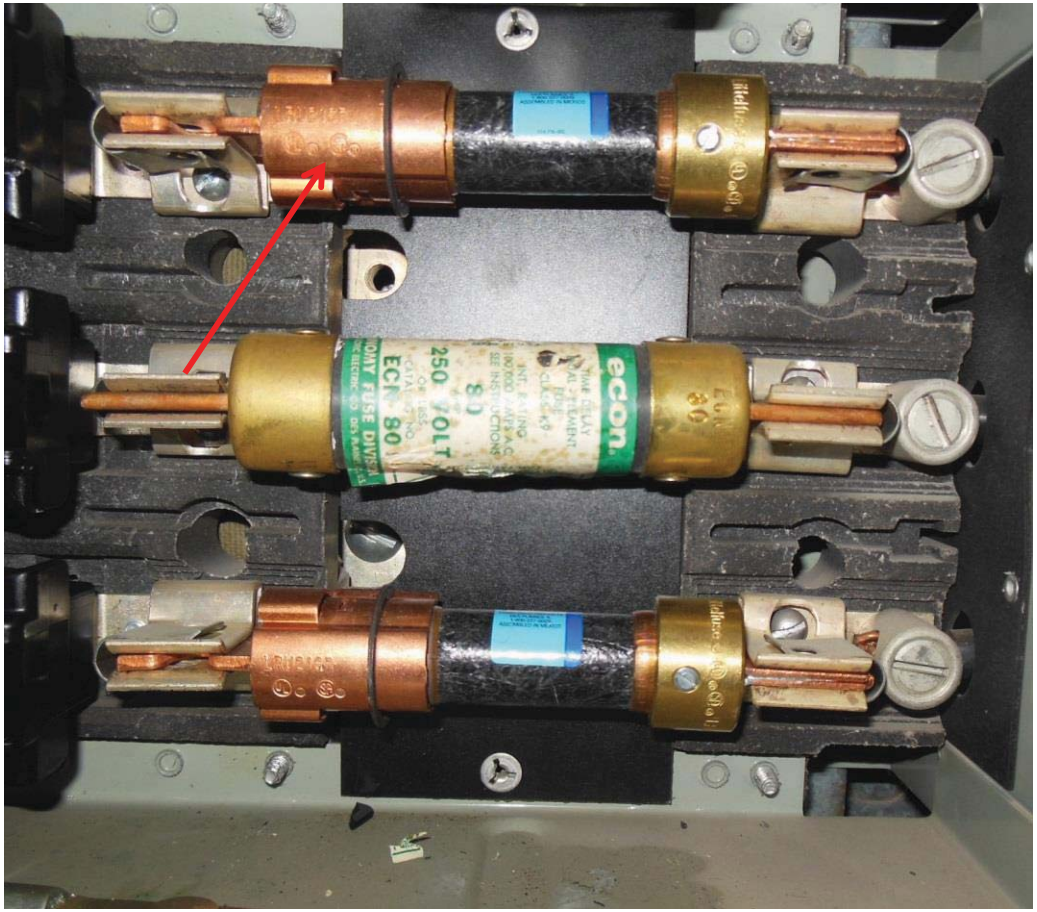
2ND FLOOR SUPPLY ROOM PANEL LP-2-A



GROUND WIRES FOUND ON NEUTRAL TERMINAL.
REMOVE AND CONNECT TO GROUND BUS.

PENTHOUSE

MCC COND UNIT #6 FUSED DISCONNECT



2 DIFFERENT FUSE TYPES FUSE EXTENDERS BEING USED.
RECOMMEND REPLACING WITH SAME TYPE AND SIZE FUSES
WITHOUT THE FUSE EXTENDERS.

Photo No. 1. Overall view of west façade.

Photo No. 2. Overall view of portion of the south façade

Photo No. 3. Overall view of east façade.

Photo No. 4. Overall view of north façade.

Photo No. 5. Typical mortar erosion at top of brick piers.

Photo No. 6. Typical mortar cracks and deterioration.

Photo No. 7. Mortar erosion.

Photo No. 8. Mortar deterioration adjacent to roof gutter and directly outside of interior efflorescence.

Photo No. 9. Brick deterioration directly below pier copings at return walls.

Photo No. 10. Deteriorated coping sealant joint.

Photo No. 11. Failed window perimeter sealant.

Photo No. 12. Window perimeter sealant at lower portion, but no sealant above allowing water to enter behind sealant.

Photo No. 13. Failed sealant joint at sidewalk-to-building joint.

Photo No. 14. Staining pattern on concrete fascia panels at west façade.

Photo No. 15. Example of bowed concrete fascia panel and failed sealant joint.

Photo No. 16. Visible displacement of concrete fascia panels at joint.

Photo No. 17. Concrete fascia panels at east façade at location of previous stabilization repairs. Note the panel displacement and failed sealant joint.

Photo No. 18. Example of localized cracking and sealant repair of stucco/plaster soffit.

Photo No. 19. Caption (3 lines maximum)

Photo No. 20. Overall view of roof.

Photo No. 21. Severe stretching of roof at perimeter condition. Note that the edge of the roof is sealed to the thin top edge of the concrete fascia panels.

Photo No. 22. Example of failed seal at the perimeter of the penthouse roof.

Photo No. 23. Torn and open roof flashing at perimeter of penthouse roof.

Photo No. 24. Example of open seam.

Photo No. 25. Open seam at roof flashing. Note the corroded vent metal.

Photo No. 26. Roofing flashing at vent penetration with inadequate height. No mechanical termination or seal exists at the top edge of the roofing.

Photo No. 27. Failed termination seal and no mechanical termination at a roof system vent.

Photo No. 28. Example of numerous sealant repairs at roof seams.

Photo No. 29. Collection of dirt and debris between pavers, and resulting organic growth atop roofing membrane.

Photo No. 30. Skylight along south side of roof with dislocated framing members and deteriorated glazing seals.

Photo No. 31. View of rooftop penthouse with metal cladding.

Photo No. 32. Loss of protective paint coating and corrosion of metal at penthouse.

Photo No. 33. Poor roof flashing (with inadequate height) below penthouse door threshold.

Photo No. 34. Corrosion of embedded steel post at entry canopy.