The Commonwealth of Massachusetts
Executive Office of Health and Human Services
Department of Public Health
Bureau of Environmental Health
250 Washington Street, Boston, MA 02108-4619
Phone: 617-624-5757 Fax: 617-624-5777
TTY: 617-624-5286

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lieutenant Governor

MARYLOU SUDDERS
Secretary

MONICA BHAREL, MD, MPH
Commissioner

Tel: 617-624-6000
www.mass.gov/dph

January 22, 2020

Kalene Gendron
Pepperell Board of Health
1 Main St
Pepperell, MA 01463

Dear Ms. Gendron:

Enclosed is a copy of the report by our Indoor Air Quality Program on their visit to the Pepperell Public Safety Building. Please refer to the recommendations section for advice on how to correct any issues identified by this assessment.

If you have any questions regarding the report or if we can be of further assistance in this matter, please feel free to call us at (617) 624-5757.

Sincerely,

Michael A. Feeney, B.Pharm, R.Ph., J.D., C.H.O.
Director, Indoor Air Quality Program

cc: Jana Ferguson, Director, Bureau of Environmental Health
David Scott, Chief of Police, Pepperell

Enclosure(s)

INDOOR AIR QUALITY ASSESSMENT

Pepperell Police Department
59 Main Street
Pepperell, MA

Prepared by:
Massachusetts Department of Public Health
Bureau of Environmental Health
Indoor Air Quality Program
January 2020

Background

Building:	Pepperell Police Department (PPD)
Address:	59 Main Street, Pepperell, MA
Reason for Request:	General Indoor Air Quality (IAQ) assessment
Date of Assessment:	December 12, 2019
Massachusetts Department of Public Health/Bureau of Environmental Health (MDPH/BEH) Staff Conducting Assessment:	Ruth Alfasso, Environmental Engineer/Inspector, IAQ Program
Building Population:	Approximately 8 employees
Windows:	Openable

This building was visited previously in 2013. Recommendations were made in a letter issued in December of 2013 and a report issued in early 2014. Appendix A shows recommendations from both the letter and report.

Methods

Please refer to the IAQ Manual for methods, sampling procedures, and interpretation of results (MDPH, 2015).

IAQ Testing Results

The following is a summary of indoor air testing results (Table 1).

- ***Carbon dioxide levels*** were below the MDPH guideline of 800 parts per million (ppm) in all areas assessed.
- ***Temperature*** was within or below the recommended range of 70°F to 78°F in areas assessed.
- ***Relative humidity*** was below the recommended range of 40% to 60% in all areas assessed which is typical of the heating season.
- ***Carbon monoxide*** levels were non-detectable in all areas assessed.
- ***Fine particulate matter (PM2.5)*** concentrations measured were below the National Ambient Air Quality Standard (NAAQS) level of 35 $\mu g/m^3$ in all areas assessed.

Ventilation

A heating, ventilating, and air conditioning (HVAC) system has several functions. First it provides heating and, if equipped, cooling. Second, it is a source of fresh air. Finally, an HVAC system will dilute and remove normally-occurring indoor environmental pollutants by not only introducing fresh air, but by filtering the airstream and ejecting stale air to the outdoors via exhaust ventilation. Even if an HVAC system is operating as designed, point sources of respiratory irritation may exist and cause symptoms in sensitive individuals. The following analysis examines and identifies components of the HVAC system and likely sources of respiratory irritant/allergen exposure due to water damage, aerosolized dust, and/or chemicals found in the indoor environment.

The assessment results indicate that the building is receiving adequate fresh air for the occupancy in the building. Note that many areas had low occupancy, which can reduce the creation of carbon dioxide. To maximize air exchange, the BEH recommends that a mechanical ventilation system operate continuously during periods of occupancy. Without the system operating as designed, normally occurring pollutants cannot be diluted or removed, allowing them to build up and lead to IAQ/comfort complaints.

It is important to note, however, that the building does not have a mechanical ventilation system to provide fresh air to the first or second floor. These areas rely on openable windows and incidental air leakage for air exchange. There is a mechanical ventilation system for the basement lock-up area. An air handling unit (AHU) located in the basement area supplies fresh air through ceiling or wall-mounted vents (Picture 1). Return air is ducted back to the AHU.

First floor offices are equipped with fan coil units (FCUs). FCUs do not introduce outside air and are limited to recirculating air. FCUs are designed to draw from a return air intake vent located at the base of each unit (Figure 1), to provide heat or cooling. Since the previous visit in 2013, the FCUs for the first floor have been replaced with new units (Picture 2), which appeared to be functional and in good condition.

First floor offices have mechanical exhaust vents connected to fans in the attic (Picture 3). These vents were drawing air during the assessment. Note that without a source of mechanical fresh air, offices on the first floor are likely to become *depressurized.* Buildings with offices are usually designed to be *pressurized* to prevent the draw of odors from wall cavities or

other locations that can contain environmental pollutants. In addition, these vents would remove heated air from offices, making thermal comfort control difficult.

Areas on the upper floor had window-mounted air conditioners which can be used to provide some fresh air even without cooling using a "fan only" setting (Picture 4). Wall-mounted ductless air conditioners are also present in a few areas for supplemental cooling (Picture 5).

Additional heat for some basement/utility areas is supplied by unit heaters (Picture 6). These units appeared to be hydronic (using hot water or steam). However, if any use combustion (e.g., natural gas), they need to operate in a well-ventilated area and carbon monoxide detectors should be used in each location to prevent exposure to hazardous conditions.

The garage area has space for two vehicles. It is equipped with a switch-activated exhaust system which appeared to be functional (Picture 7). This exhaust system should be used whenever vehicles enter the space. Vehicles should not be idled inside the building.

Microbial/Moisture Concerns

Water infiltration and water damage was noted in several areas of the building. Roof leaks have been reported, although some areas of the roof have been repaired recently. In one area of the attic, a plastic tarp and bucket had been constructed to capture water leaks from the roof (Picture 8). Until the roof can be repaired to address the leak, the bucket needs to be emptied out and cleaned regularly to avoid becoming a source of spills and odors.

Occupants reported that work was conducted to remove water-damaged and moldy materials after the previous assessment. Picture 9 shows an area of wall that had been cleaned/stripped to remove mold. Another wall was found with water stains, reportedly from a historic leak (Picture 10). Water-damaged walls should be cleaned and be refinished following remediation. Other leaks, such as from a urinal, were reported to have occurred in the past.

Several areas of water damage were observed on the lower level. Moldy items, including pipe wrap and papers, were found in the garage (Pictures 11 through 13). Musty odors were noted in other parts of the lower level. Several factors contribute to water damage, mold, and odors in the garage and other parts of the basement:

- Open garage doors and cars in the garage bring in rainwater/snowmelt, leading to puddles and increased humidity (Picture 14);

- Cars are also reportedly washed in the garage, which would provide a significant source of moisture when it occurs;
- Condensation is likely to occur on surfaces that are in contact with the ground, and therefore at a lower temperature than surrounding air, particularly during warm humid weather;
- Drainage from the heating system moistens the floor and can increase indoor humidity (Picture 15);
- Leaks from plumbing equipment on the first floor to the basement have reportedly occurred;
- Relatively high groundwater, as demonstrated by the presence of running water (Varnum Brook) to the rear of the property, can contribute to water infiltration through gaps in the foundation and prevent drying through increased local humidity;
- Shrubs and plants against the building hold water against the brick and foundation (Picture 16). This can lead to deterioration of the building envelope and increased water penetration.

Note that the pipe wrap seen in Pictures 11 and 12 replaced other mold-colonized pipe wrap reported in the previous assessment (Appendix A). The construction of this pipe wrap appears to include an outer paper layer which is highly susceptible to mold colonization. Replacement pipe wrap in a damp environment such as this garage should be composed of non-porous, non-carbon-containing materials that are resistant to mold growth.

Dehumidifiers were placed in the basement (Picture 17), but it was reported that these units cause too much stress on the electrical system of the building to be used. Dehumidifiers can be helpful in reducing humidity-related issues in basement areas. If used, they need to be emptied and cleaned regularly to avoid becoming a source of odors.

Other moisture/odor-related issues were found in the PPD. Window air conditioners were found installed with porous items around them (e.g., Picture 4). This material can become moistened and become a source of mold and odors. Also note that the exposed fiberglass insulation shown in Picture 4 can become a source of irritating fibers.

The US Environmental Protection Agency (US EPA) and the American Conference of Governmental Industrial Hygienists (ACGIH) recommends that porous materials (e.g.,

wallboard, carpeting, ceiling tiles) be dried with fans and heating within 24 to 48 hours of becoming wet (US EPA, 2008; ACGIH, 1989). If porous materials are not dried within this time frame, mold growth may occur. Once mold has colonized porous materials, they are difficult to clean and should be removed.

Other concerns

Other issues were identified that may contribute to IAQ issues. Dust and debris was found in many areas of the building (Pictures 18-22). One source of this dust and debris is deterioration and wear of building materials such as brick and wood. This material can be irritating if aerosolized and should be cleaned regularly. The attic floor was insulated using a spray foam material (Pictures 19 and 20). This material is exposed between the floorboards and is flaking off creating another source of dust/debris. The condition of this insulation material may indicate the foam was not properly installed and has become prematurely brittle, or it may be due to mechanical wear from it being exposed to foot traffic. The ceiling in the upper level has flaking paint (Picture 23), which also contributes to debris. Based on the age of the building, this paint may contain lead, so appropriate measure should be taken to contain dust and debris from paint scraping work to prevent exposure.

Gaps were observed between occupied and unoccupied areas such as the attic and wall interstices. These gaps should be sealed to prevent the migration of odors and dust. Doors between the upper and lower levels should be closed and weather-stripped to be airtight.

FCUs have filters which are reportedly changed twice a year. A filter was removed and examined, and it appeared to be a good quality pleated filter that fit well into the unit. Pleated filters with a minimum efficiency rating (MERV) of 8 of better should be used when possible in equipment as these are effective to remove particles such as pollen and mold spores (ASHRAE, 2012). Filters on the AHU serving the basement should also be changed in accordance with manufacturer's instructions, at least twice a year. Window air conditioners, dehumidifiers, air filters, ceiling fans, and personal fans in use in the building should also be cleaned regularly in accordance with manufacturer's instructions.

There are a large number of items stored in the PPD, including the upper level and basement (Pictures 24-26). Items should be stored in an organized manner and away from areas with the potential for water damage (e.g., the basement floor) and excessive dust. Items that are

not needed or broken should be removed from the building for proper disposal. Special care should be taken with items that are potentially hazardous, including oils, paints, and fluorescent light bulbs (Pictures 24 and 26). If broken, fluorescent bulbs may release mercury. Also note in Picture 25 is a box of the same type of pleated filters used in the FCUs on the first floor. Filters in particular need to be stored in a clean, dry area to avoid contamination with dust, mold and odors which may later be distributed to occupied areas when the filters are used.

Many areas in the PPD are carpeted. Most of the carpet has been replaced since the previous assessment and appeared to be in good condition. In general, however, it is not recommended for police departments and other emergency response agencies to have carpeted floors due to the possible cross-contamination that may occur from footwear contact with automotive products, chemicals, or biological contamination. In addition the Institute of Inspection, Cleaning and Restoration Certification (IICRC) discusses floor covering in its guideline, "Standard for Professional Cleaning of Textile Floor Coverings" (IICRC, 2015). Based on this standard, the IICRC recommends twice-daily vacuuming and/or pile-lifting cleaning for commercial carpeting in heavy traffic areas. Carpeting should be cleaned annually or semi-annually in soiled high traffic areas as per the recommendations of the Institute of Inspection, Cleaning and Restoration Certification (IICRC, 2012).

Conclusions/Recommendations

The conditions related to IAQ problems at the PPD raise a number of issues. The general building conditions/design, maintenance, and the condition of HVAC equipment, if considered individually, present conditions that could degrade IAQ. When combined, these conditions can serve to further degrade IAQ. Some of these conditions can be remedied by actions of building occupants. Other remediation efforts will require alteration to the building structure and equipment. For these reasons, a two-phase approach is recommended. The first consists of short-term measures to improve air quality and the second consists of long-term measures that will require capital planning and resources to adequately address overall conditions:

Short-term measures

1. Use openable windows to supply fresh air to occupied areas when possible.

2. Close windows when air conditioning is in use to prevent the introduction of hot humid air into the building that may lead to condensation.
3. When vehicles are brought into the garage, use the exhaust system consistently to remove products of combustion from the building.
4. Maintain FCUs including changing filters regularly. Store unused filters in a clean dry area until needed.
5. Ensure condensation drainage from FCUs and ductless ACs drain properly without leaks or clogs.
6. Maintain the HVAC system for the basement including cleaning and filer changes.
7. Consider using window ACs in the fan-only mode during temperate weather for additional fresh air.
8. Ensure carbon monoxide detectors are installed in areas where combustion is taking place, such as the boiler room and where any gas-fired heaters are operating. Ensure they are tested and maintained/replaced in accordance with manufacturer's recommendations.
9. Until roof leaks can be repaired, continue to monitor and empty leak collecting vessels in the attic. Periodically inspect the attic for water infiltration in areas of flashing.
10. Maintain plumbing to prevent leaks.
11. Remove water-damaged and mold-colonized porous materials from the garage and basement (e.g., pipe wrap, paper, boxes). Replace pipe wrap with a non-porous mold-resistant material.
12. Consider washing cars outside the building or use the services of a commercial car wash.
13. Ensure floor drains in the garage and basement are free-flowing to remove rain, snow melt and drainage from the heating system.
14. Remove shrubs from against the building and trim plants at least five feet away from the foundation.
15. Use dehumidifiers in the basement, if possible with current electrical systems. Clean and maintain them regularly to prevent odors.
16. Seal around window ACs using non-porous materials. Remove any uncontained fiberglass to prevent irritating dusts.
17. Ensure water-damaged materials are cleaned, replaced, and/or repaired in a manner consistent with the U.S. Environmental Protection Agency's guidelines (US EPA, 2008).

18. Repaint/refinish areas of historic or previously-remediated water damage.
19. Scrape and repaint/refinish ceilings to prevent dust and debris. Ensure that lead-safe procedures are used.
20. Store items in the building neatly and away from any areas with known leaks or water issues. Use totes, shelves, or cabinets to store items neatly and prevent moistening, dust buildup, and pest harborage.
21. Store and discard potentially hazardous materials in an appropriate manner to prevent exposure. This includes proper storage and disposal of used fluorescent light bulbs, paint and oils.
22. Regularly clean dust and debris from surfaces in the building. Flag areas with significant accumulations of dust/debris to check for potential pests (e.g., carpenter ants or termites), and for future repairs/replacement of wood and masonry.
23. Consider covering areas of the attic with walkways to minimize abrasion/deterioration of insulation foam.
24. For buildings in New England, periods of low relative humidity during the winter are often unavoidable. Therefore, scrupulous cleaning practices should be adopted to minimize common indoor air contaminants whose irritant effects can be enhanced when the relative humidity is low. To control for dusts, a high efficiency particulate arrestance (HEPA) filter equipped vacuum cleaner in conjunction with wet wiping of all surfaces is recommended. Avoid the use of feather dusters. Drinking water during the day can help ease some symptoms associated with a dry environment (throat and sinus irritations).
25. Vacuum carpeting regularly and professionally clean once or twice a year. Consider replacing carpeting with non-porous flooring in areas subject to heavy foot traffic.
26. Review recommendations from the previous letter and report to address remaining issues.
27. Refer to resource manual and other related IAQ documents located on the MDPH's website for further building-wide evaluations and advice on maintaining public buildings. These documents are available at: http://mass.gov/dph/iaq.

Long-term recommendations

1. Consult with a building/ventilation engineer regarding the provision of mechanical air exchange to the first floor of the building. This may include unit ventilators, ducted systems or other means of fresh air and exhaust.
2. Consult with a roofing contractor regarding repairing any remaining roof leaks.
3. Consult with a building envelope specialist regarding repair/replacement of windows to increase thermal comfort and energy efficiency of the building.
4. Consult with a building envelope specialist regarding drainage around the foundation, and refinishing/repointing brickwork.
5. Consult with an electrician regarding upgrades to the electrical system of the building to support current and future needs.
6. Overall plans should also be developed regarding use of the building, including current and potential future uses.

References

ACGIH. 1989. Guidelines for the Assessment of Bioaerosols in the Indoor Environment. American Conference of Governmental Industrial Hygienists, Cincinnati, OH.

ASHRAE. 2012. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 52.2-2012 -- Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size (ANSI Approved).

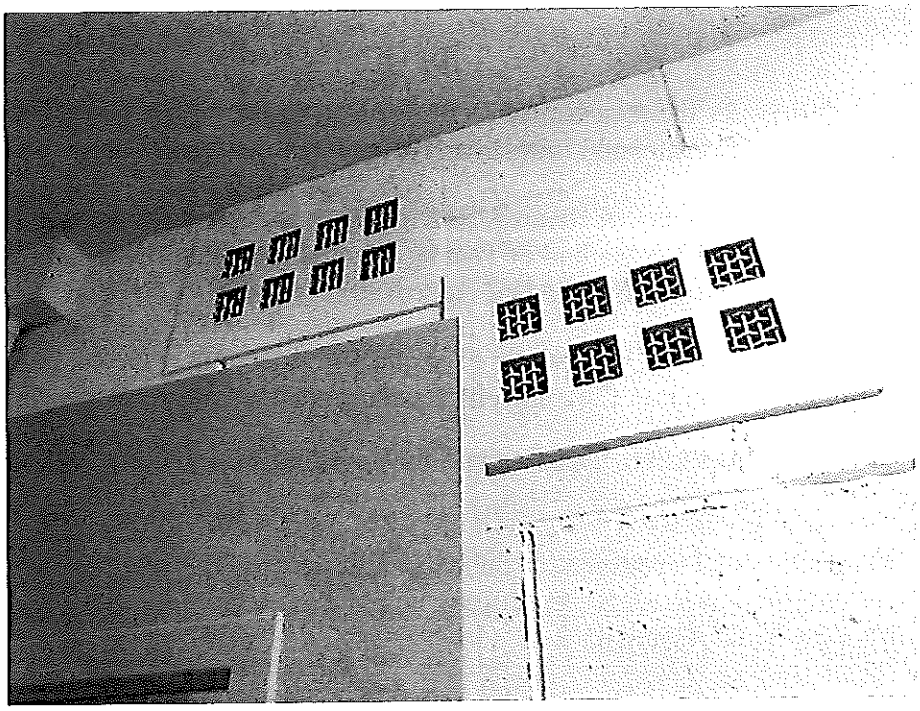
IICRC. 2012. Carpet Cleaning FAQ 4 Institute of Inspection, Cleaning and Restoration Certification. Institute of Inspection Cleaning and Restoration, Vancouver, WA.

IICRC. 2015. Institute of Inspection, Cleaning and Restoration Certification. Commercial Carpet Cleaning: FAQ.

MDPH. 2015. Massachusetts Department of Public Health. Indoor Air Quality Manual: Chapters I-III. Available at: http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/exposure-topics/iaq/iaq-manual/.

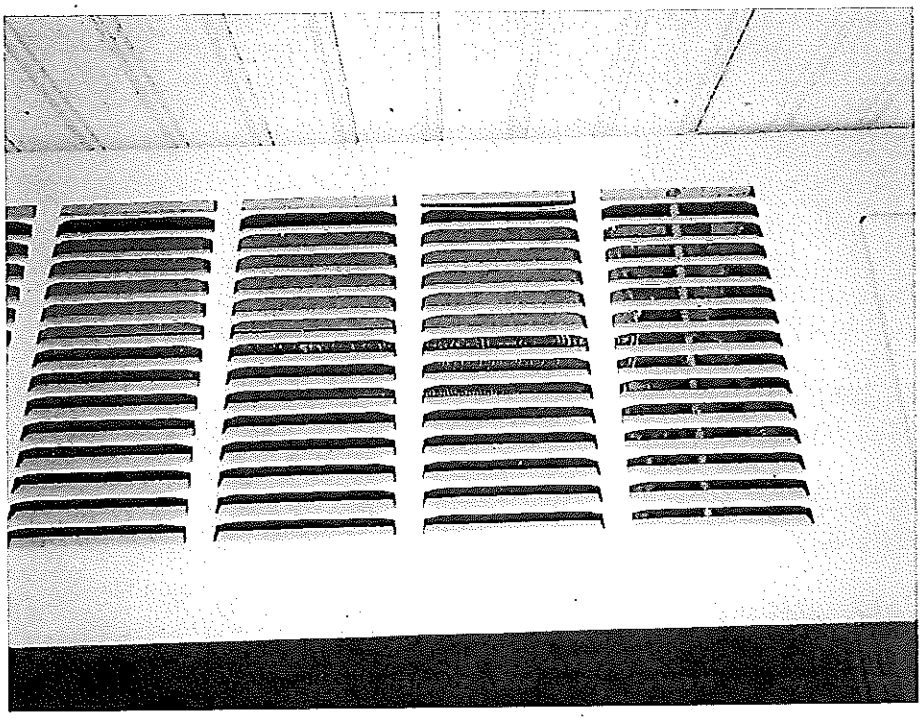
US EPA. 2008. "Mold Remediation in Schools and Commercial Buildings". Office of Air and Radiation, Indoor Environments Division, Washington, DC. EPA 402-K-01-001. September 2008. Available at: http://www.epa.gov/mold/mold-remediation-schools-and-commercial-buildings-guide.

Picture 1



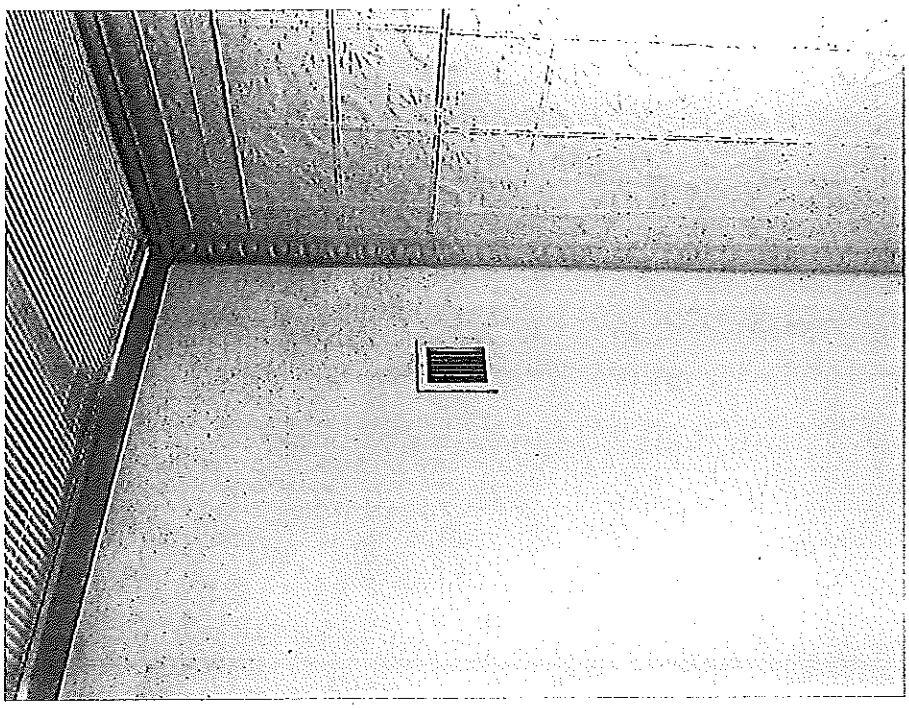
Supply and return vents in the lockup/lab area

Picture 2



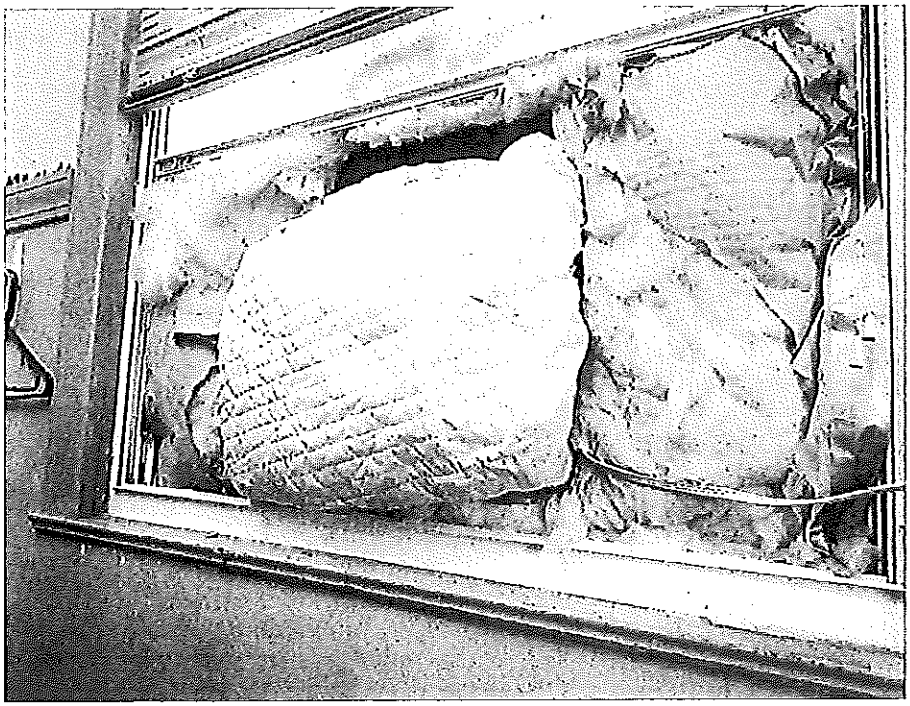
Top of new fan coil unit

Picture 3



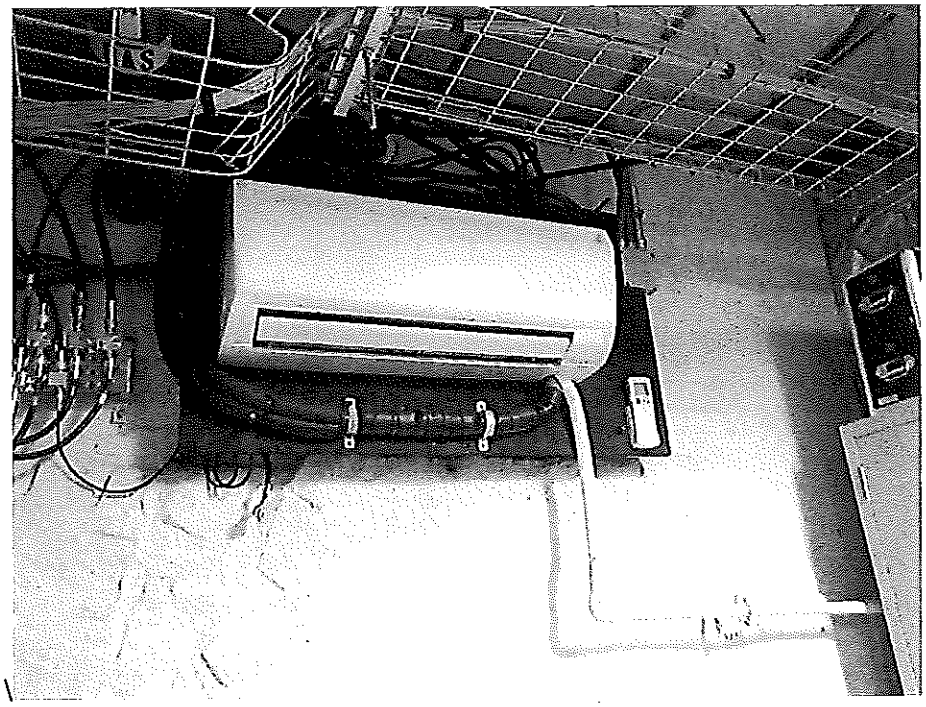
Wall-mounted exhaust vent in one of the first-floor offices

Picture 4



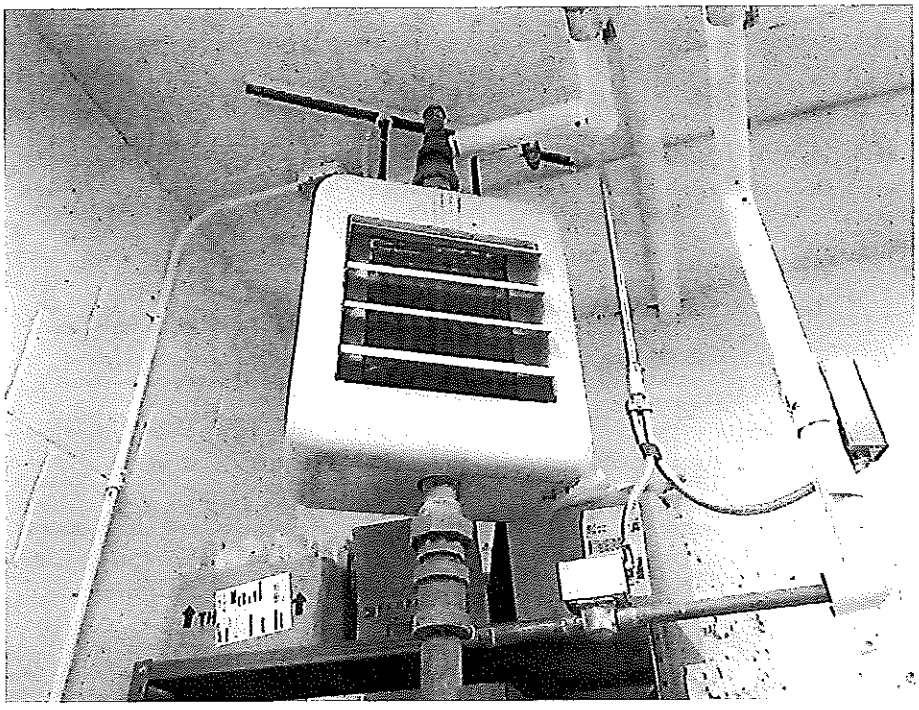
Window air conditioner with cover for winter, note condition of surrounding insulation

Picture 5



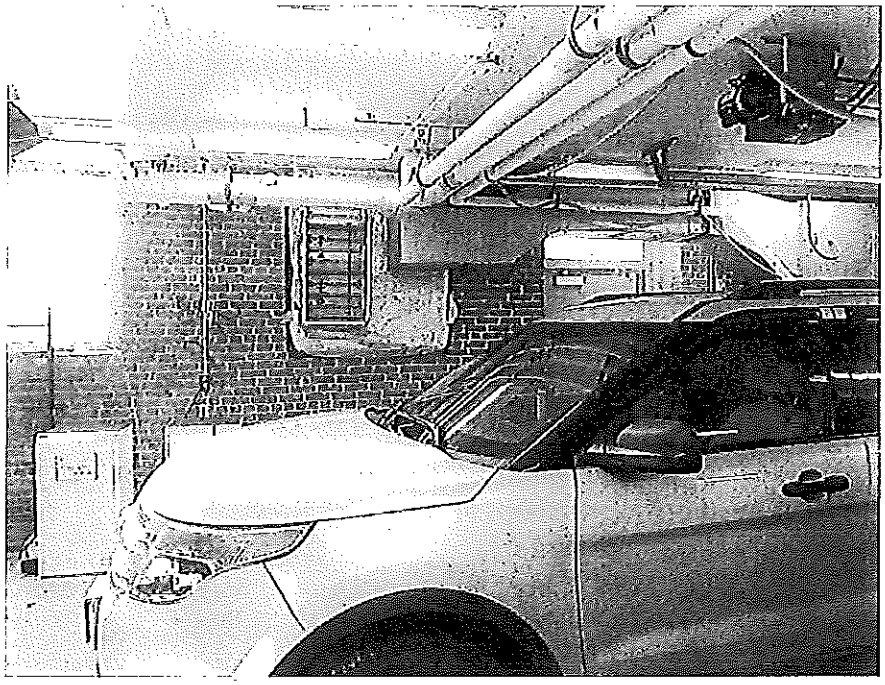
Ductless air conditioner with condensation drain

Picture 6



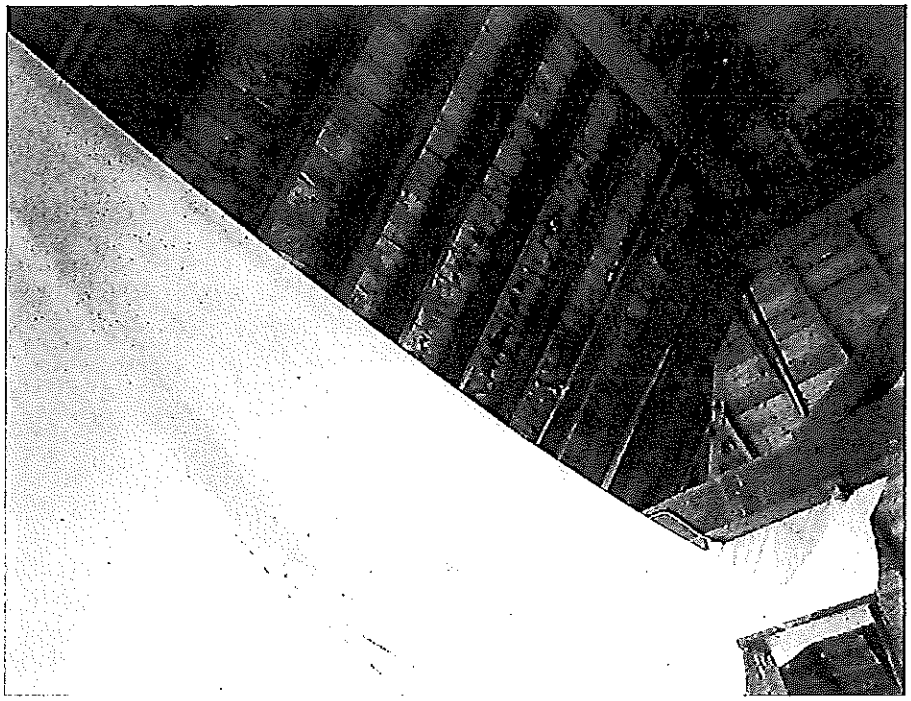
Unit heater, likely hot water operated

Picture 7



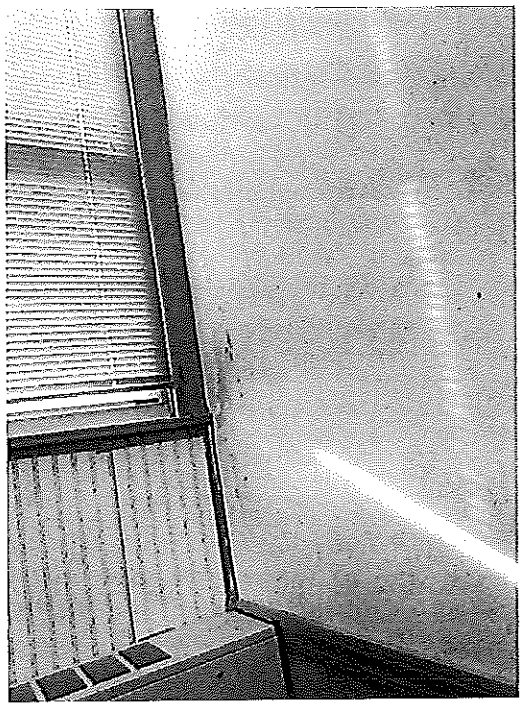
Automatic make-up air louvers for the garage exhaust system; note exhaust system on the right

Picture 8



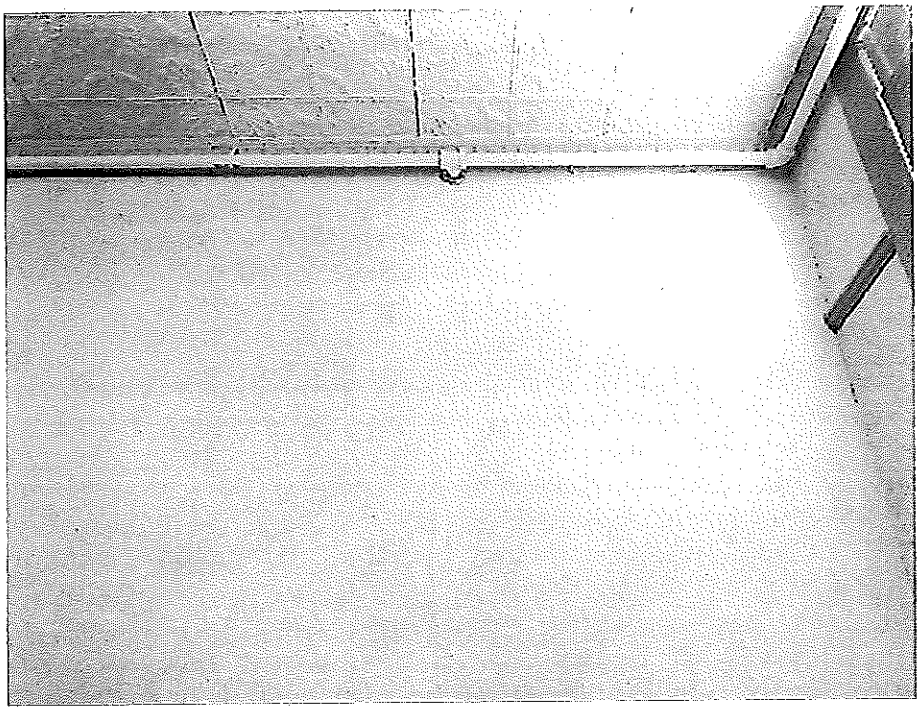
Tarp used to collect water from leaking roof

Picture 9



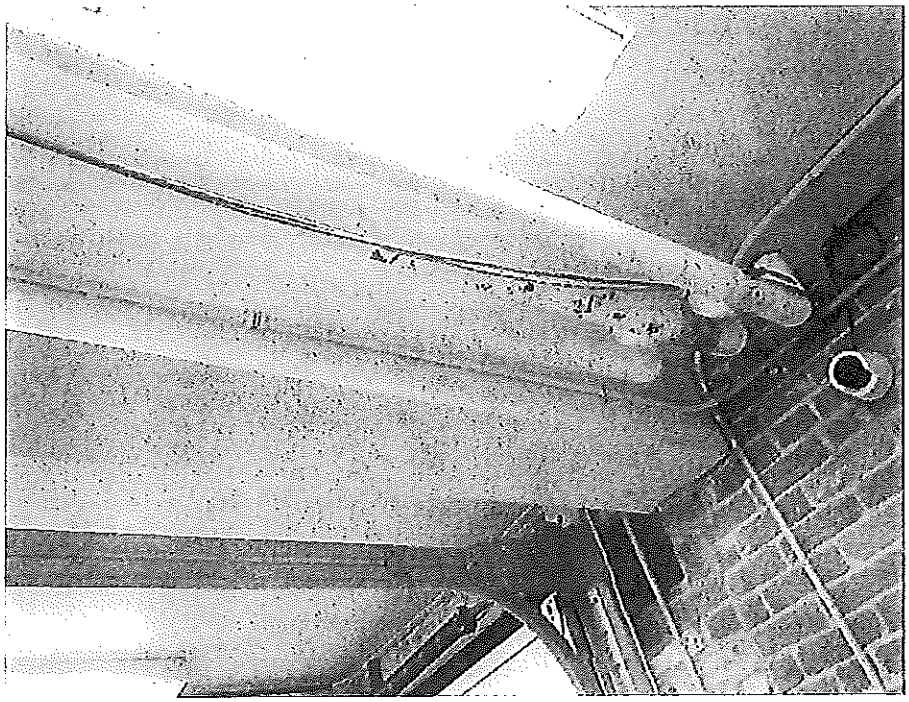
Damaged wall where moldy material had reportedly been cleaned/stripped

Picture 10



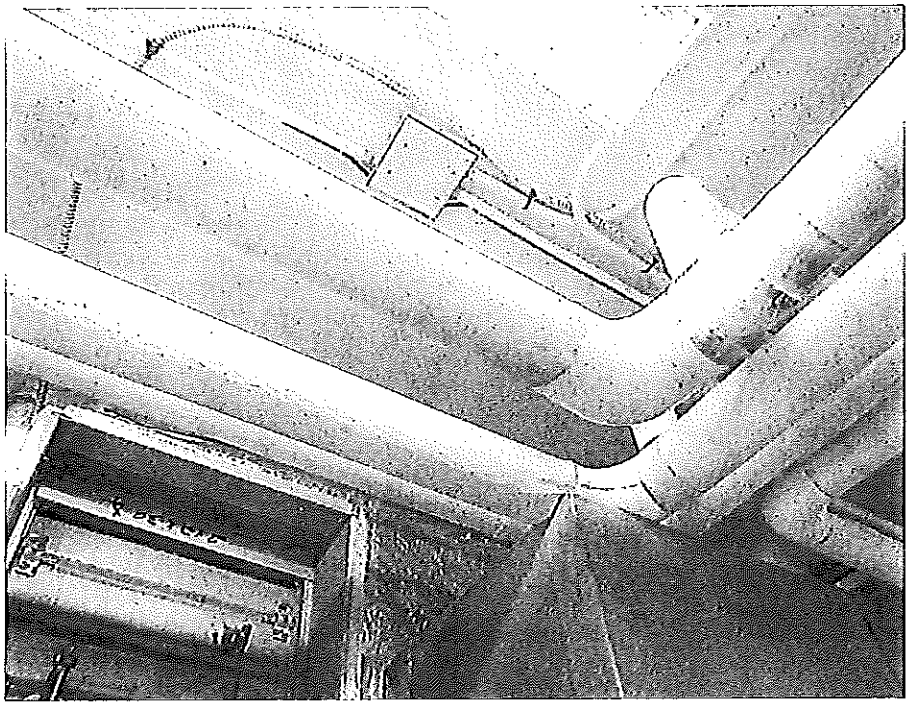
Water-damaged wall

Picture 11



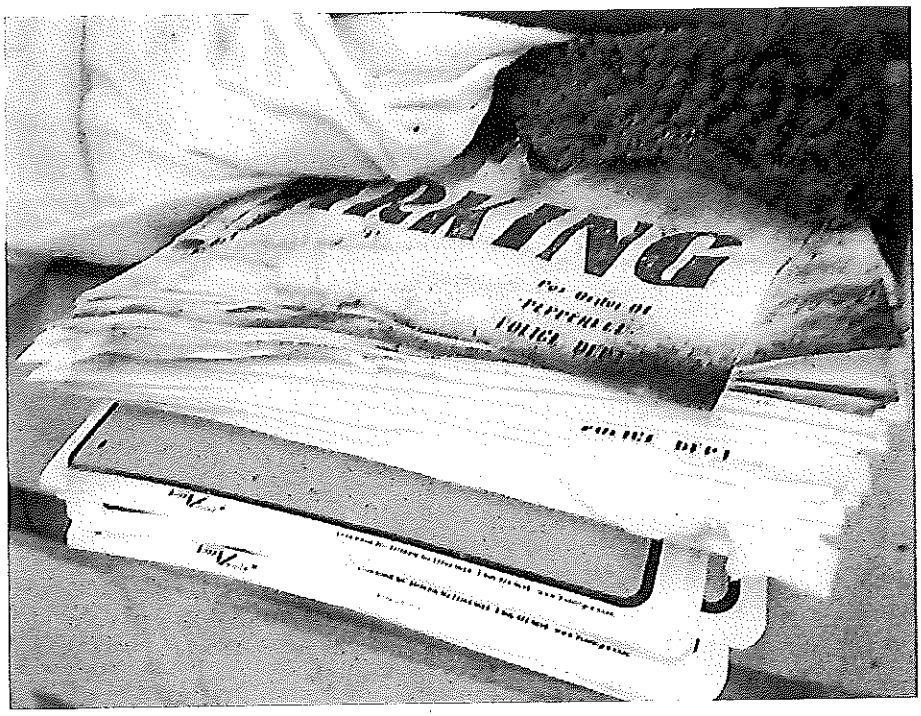
Likely mold spots on pipe wrap in the garage

Picture 12



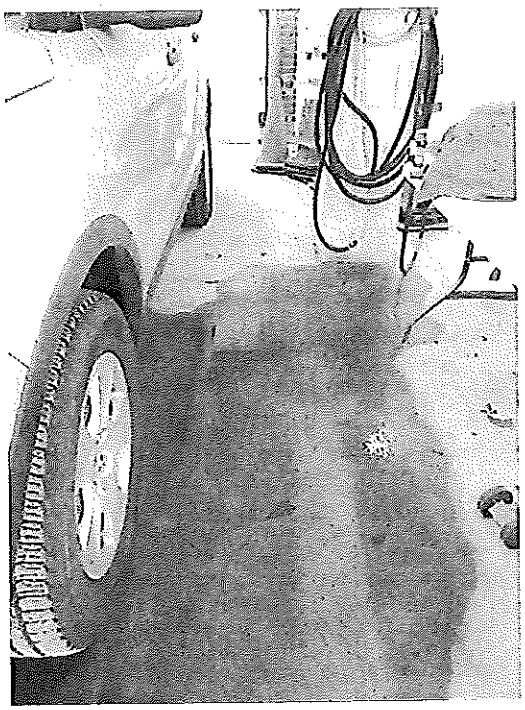
Likely mold spots on pipe wrap in the garage

Picture 13



Mold-colonized paper in the garage

Picture 14

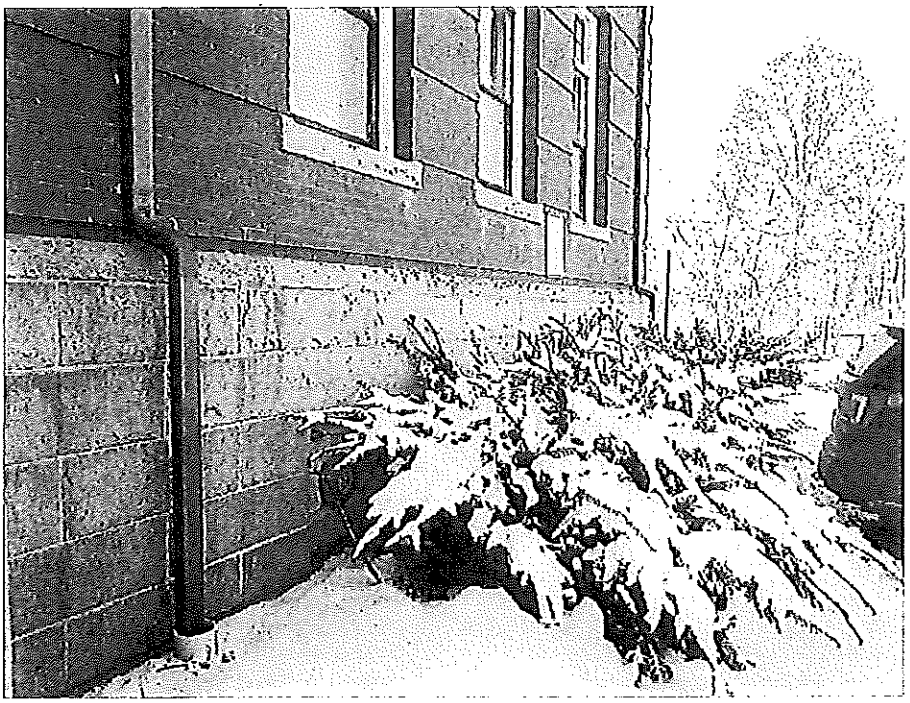


Puddle on garage floor

Picture 15

Stains from heating equipment drainage

Picture 16

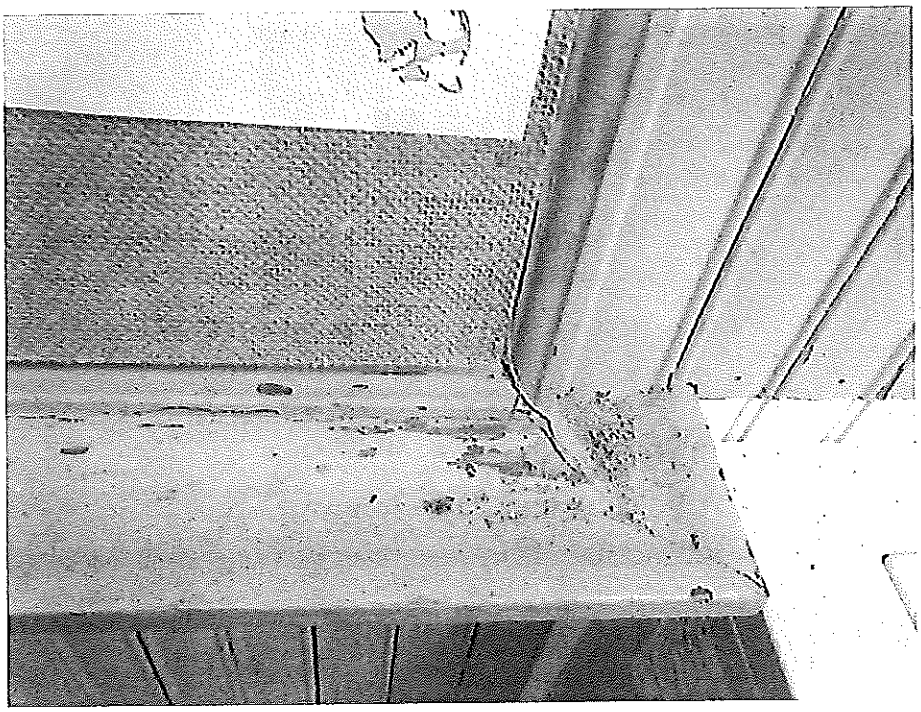


Bushes against the foundation

Picture 17

Dehumidifier, likely not plugged in

Picture 18

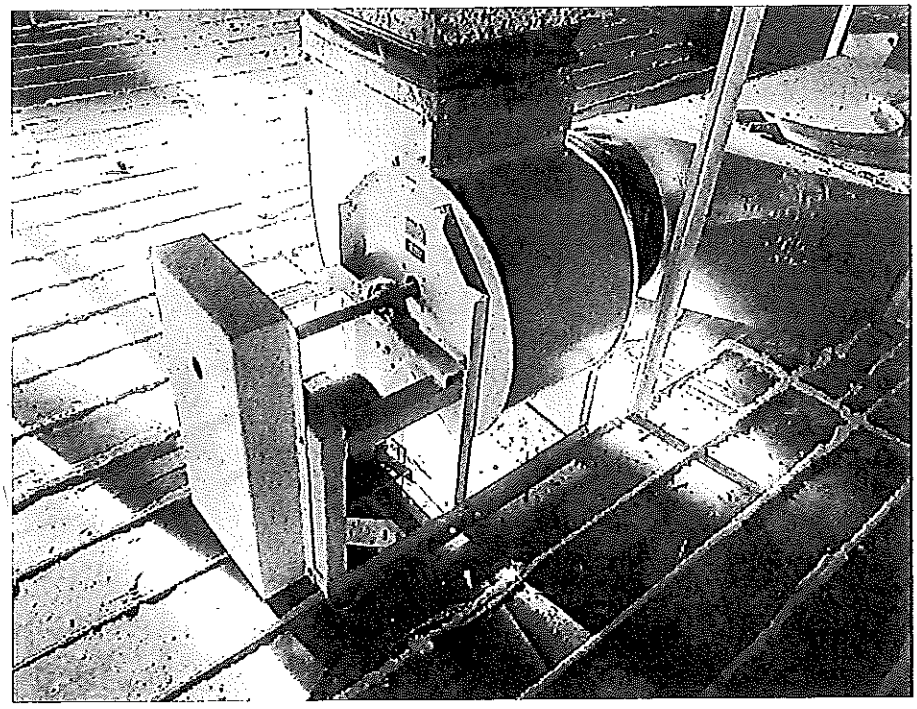


Brick and wood dust

Picture 19

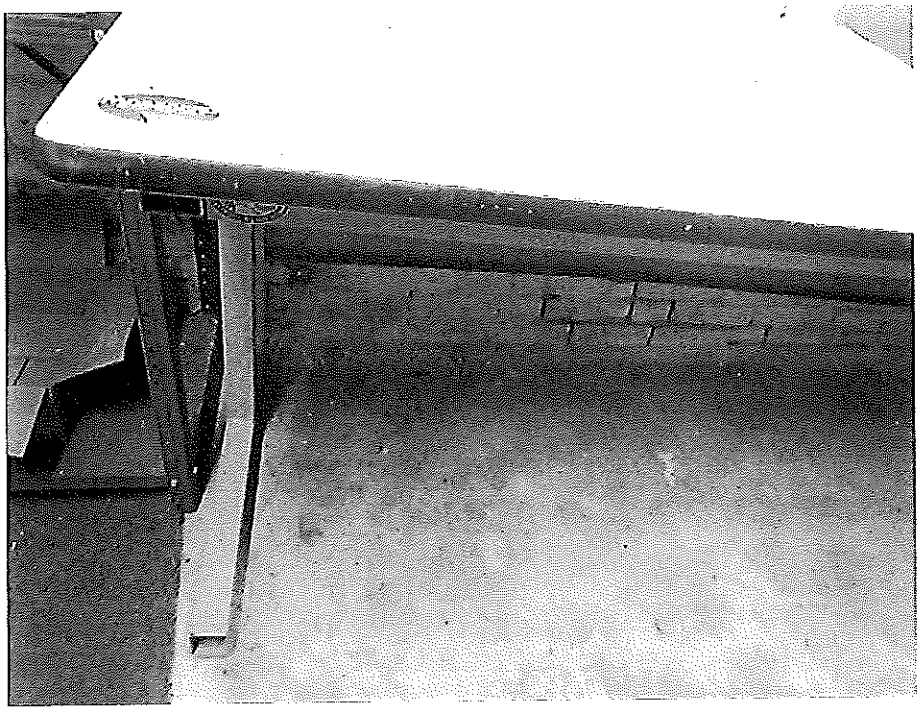
Dust and debris, including debris from foam insulation of attic floor

Picture 20



Debris and foam insulation on the attic floor

Picture 21



Debris in basement from deterioration of brick

Picture 22

Debris and brick deterioration in the basement

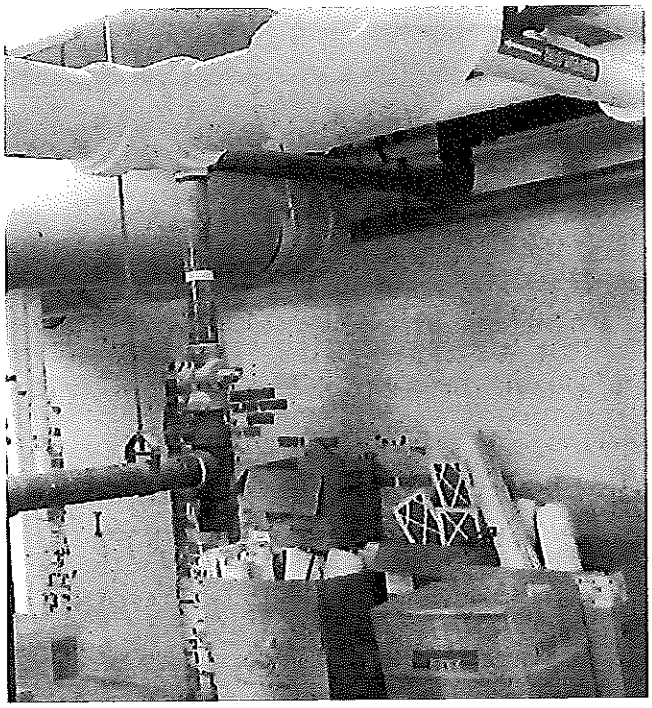
Picture 23

Flaking paint on upper level ceiling

Picture 24

Storage in the upper level

Picture 25



Storage of items in the basement, note filters

Picture 26

Storage including fluorescent bulbs in the upper level

Location: Pepperell Police Department

Address: 59 Main Street, Pepperell

Table 1

Indoor Air Results

Date: 12/12/2019

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 (µg/m³)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
First floor										
Conference		ND			2	4	Y	N		Damaged paint from previous water damage/cleanup, carpet (new), new FCU
Open area	511	ND	69	17	2	0	Y	N		CF, PC, thermostat not connected to system
Police lieutenant	350	ND	69	16	3	0	Y	N		FCU
Dave's office	330	ND	70	15	1	0	Y	N	Y	New carpet, FCU
Patrol sergeant	338	ND	70	15	2	0	Y	N	Y	Carpet
Reception	347	ND	71	15	2	0	N	N	Y	HS, FCU
Patrol officers	343	ND	72	14	2	0	Y	N	Y	Carpet, DEM, uniforms
Training room	333	ND	76	15	6	0	Y	N	Y	Carpet, wood dust, historic WD to wall
Police interview	326	ND	76	13	2	0	N	N	N	No heat or AC
1st floor interview room	334	ND	60	25	2	0	N		Y	

ppm = parts per million µg/m³ = micrograms per cubic meter ND = non detect WAC = window air conditioner WD = water damage

HS = hand sanitizer DEM = dry erase materials CF = ceiling fan FCU = fan coil unit PF = personal fan

Comfort Guidelines

Carbon Dioxide: < 800 ppm = preferable
> 800 ppm = indicative of ventilation problems

Temperature: 70 - 78 °F
Relative Humidity: 40 - 60%

Location: Pepperell Police Department

Address: 59 Main Street, Pepperell

Table 1 (continued)

Indoor Air Results

Date: 12/12/2019

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 (µg/m³)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
Communications room	387	ND	63	21	11	3	Y		Y	Fridge, CF, HS, carpet, communications equipment, DEM
Communications restroom	420	ND	65	21	2	0	N		Y	Exhaust on and dusty
Public restroom		ND				0			Y	
Women's locker	330	ND	65	18	2	0	Y		Y	
Men's locker		ND	65	14	2	0	Y		Y	WAC covered with insulation
Upstairs										
Exercise room	280	ND	72	12	3	0	Y	N	N	Wood floor, WAC with cloth and no sealant around it, PF
Hallway		ND	69	15	2	0			N	Unit heater
Police Auxiliary	270	ND	62	13	2	0	Y		N	Unit heater, drafts, no carpet
Upper level training		ND	61	18	3	0	Y		N	Old carpet, unit heater
Large storage	661	ND	60	22	3	0			N	Very old carpet. Items everywhere

ppm = parts per million µg/m³ = micrograms per cubic meter ND = non detect WAC = window air conditioner WD = water damage

HS = hand sanitizer DEM = dry erase materials CF = ceiling fan FCU = fan coil unit PF = personal fan

Comfort Guidelines

Carbon Dioxide: < 800 ppm = preferable
> 800 ppm = indicative of ventilation problems

Temperature: 70 - 78 °F
Relative Humidity: 40 - 60%

Location: Pepperell Police Department

Address: 59 Main Street, Pepperell

Table 1 (continued)

Indoor Air Results

Date: 12/12/2019

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 ($\mu g/m^3$)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
Basement										
Booking	348	ND	63	16	3	0	N	Y	Y	
Interview		ND	66	16	2	0	N	Y	Y	
Cell blocks		ND	67	16	2	0	N	Y	Y	
Lab		ND	68	17	3	0	N	Y	Y	
Lower tech office		ND	68	17	2	0	N			
Boiler		ND					N		Y	

ppm = parts per million | $\mu g/m^3$ = micrograms per cubic meter | ND = non detect | WAC = window air conditioner | WD = water damage

HS = hand sanitizer | DEM = dry erase materials | CF = ceiling fan | FCU = fan coil unit | PF = personal fan

Comfort Guidelines

Carbon Dioxide: < 800 ppm = preferable
> 800 ppm = indicative of ventilation problems

Temperature: 70 - 78 °F

Relative Humidity: 40 - 60%

APPENDIX A

Previous Recommendations

Conclusions/Recommendations from the letter sent in December 2013

In view of the findings at the time of the visit, the following recommendations were made verbally, and are reiterated below:

Removal/Cleaning of Mold-Colonized Materials

1. Conduct remediation activities in a manner consistent with recommendations in "Mold Remediation in Schools and Commercial Buildings" published by the US Environmental Protection Agency (US EPA, 2001). This document can be downloaded from the US EPA website: http://www.epa.gov/mold/mold_remediation.html. It is likely that the cell block cannot be used during the removal of the pipe wrap in the cell block. Alternative arrangement for possible prisoners should be planned during the removal phase of this project.
2. Discard/replace water-damaged/mold-colonized porous materials (e.g., GW in the crime lab, pipe insulation, and stored materials in the sprinkler room). These measures will remove actively growing mold colonies that may be present. Due to the scope of the project, consider hiring a mold remediation specialist.
3. Contact an HVAC engineering firm to inspect integrity of insulation around chilled water pipes and make repairs/replace as necessary.
4. Seal discarded mold-colonized materials in plastic trash bags for transport to prevent cross-contamination during removal from building.
5. Clean non-porous surfaces (e.g., chairs, desks, tables) with a mild detergent, soap and water or an appropriate antimicrobial agent.
6. Clean FCUs of scale and other debris; consider adopting a regular maintenance schedule for FCUs.
7. Ensure that during remediation/containment measures, the general mechanical ventilation system is deactivated and/or sealed (i.e., supply and return vents) in areas of remediation.
8. Completely wrap car seats stored in the sprinkler room in polyethylene bags and completely seal to render the bags airtight. Store the car seat in an area on the upper floors of the PPD until the seats are needed.
9. Seal remediation area(s) with a temporary impermeable barrier (e.g., plastic sheeting) as part of remediation activities. Ensure barrier is as airtight as possible by sealing edges and frames securely with duct tape. Inspect daily for drafts and/or light penetration to ensure that the barrier is airtight.

10. Use local exhaust ventilation and isolation techniques to control remediation pollutants. Precautions should be taken to avoid the migration of these materials into adjacent/occupied areas of the building.

11. Establish communications between all parties involved with remediation efforts, to prevent potential IAQ problems and address related concerns.

Long-term Recommendations to Prevent the Reoccurrence of Mold Growth

1. Continue with plans to consult with a building engineer to evaluate the building and its HVAC system to address chronic moisture issues and well as filtration upgrade for FCUs.

2. Develop an operation and maintenance (O & M) plan to monitor for water-damaged building materials and, in particular, pipe insulation in areas of chronic moisture issues. Building occupants should notify the maintenance department of mold/moisture issues if they occur for prompt action.

3. Consider replacing paper faced pipe insulation with a moisture resistant ridged foam material.

4. Seal any breaches/utility holes that can be means of egress for uncontrolled airflow, odors and particulates from the basement into occupied areas of the first floor.

5. Use local exhaust ventilation and isolation techniques to control for pollutant containment; ensure that precautions are taken to avoid the re-entrainment of these materials into the building. Consider obtaining an exhaust unit with a high-efficiency particulate air (HEPA) filter and ducting outside via basement windows or via the boiler plant vent.

Conclusions/Recommendations from the report issued in April 2014

Short-Term Recommendations

1. Implement recommendations made in the previously released MDPH letter dated December 31, 2013 (MDPH, 2013).

2. Regulate airflow using windows. Care should be taken to ensure windows are properly closed at night and weekends to avoid the freezing of pipes and potential flooding.

3. Operate local exhaust ventilation system in garage as needed to vent vehicle emissions.

4. For buildings in New England, periods of low relative humidity during the winter are often unavoidable. Therefore, scrupulous cleaning practices should be adopted to minimize common indoor air contaminants whose irritant effects can be enhanced when the relative humidity is low. To control for dusts, a high efficiency particulate arrestance (HEPA) filter equipped vacuum cleaner in conjunction with wet wiping of all surfaces is recommended. Avoid the use of feather dusters. Drinking water during the day can help ease some symptoms associated with a dry environment (throat and sinus irritations).

6. Relocate or consider reducing the amount of materials stored to allow for more thorough cleaning. Clean items regularly with a wet cloth or sponge to prevent excessive dust build-up.
7. Seal all open utility holes and wall cracks in the building.
8. Refer to resource manuals and other related indoor air quality documents for further building-wide evaluations and advice on maintaining public buildings. These materials are located on the MDPH's website: http://mass.gov/dph/iaq.

Long-Term Recommendations

1. Based on the age, physical deterioration and availability of parts, BEH recommends that an HVAC engineering firm evaluate options for providing adequate ventilation building-wide. Since restoration of original FCUs is not a likely option, consideration should be given to replacing them with modern FCUs and installing a mechanical exhaust ventilation system. Determine if existing airshafts, vents, ductwork, etc. can be retrofitted for (modern) mechanical ventilation.