WISCONSIN DELLS MIDDLE SCHOOL

Summary of Findings

Report Card

ITEM	EXISTING CONDITION	L1	L2	L3	COMMENTS
SITE & GROUNDS	B+	X			Congested and poorly configured drop off area
STRUCTURAL (foundation, floors, walls,	A-	X			Good condition considering its age
LIFE SAFETY	C		X		Codes have become more stringent
ACCESSIBILITY	D			X	Routes non-compliant, trip hazards
HAZARDOUS MATERIALS	Suspected	--	--	--	Given building's age, suspected asbestos containing materials, lead paint
BUILDING ENVELOPE	B		X		Some repairs and window replacement needed; continue routine maintenance
INTERIOR FINISHES	C				Lower level locker rooms in poor condition, sagging ceiling tiles, areas of worn carpet, casework countertops deteriorating.
SIGNAGE	B	X			Interior signage has been replaced in past five years to meet accessibility requirements
OVERALL CLEANLINESS	B	X			Well maintained facility for its age
SECURITY	B	X			Secure vestibules with camera; exterior lighting; room number decals on windows and entries; controlled entries. Mulitple entries and additions over time complicate security
BUILDING SYSTEMS (MEP)	--	--	--	--	See report

Existing Condition Codes

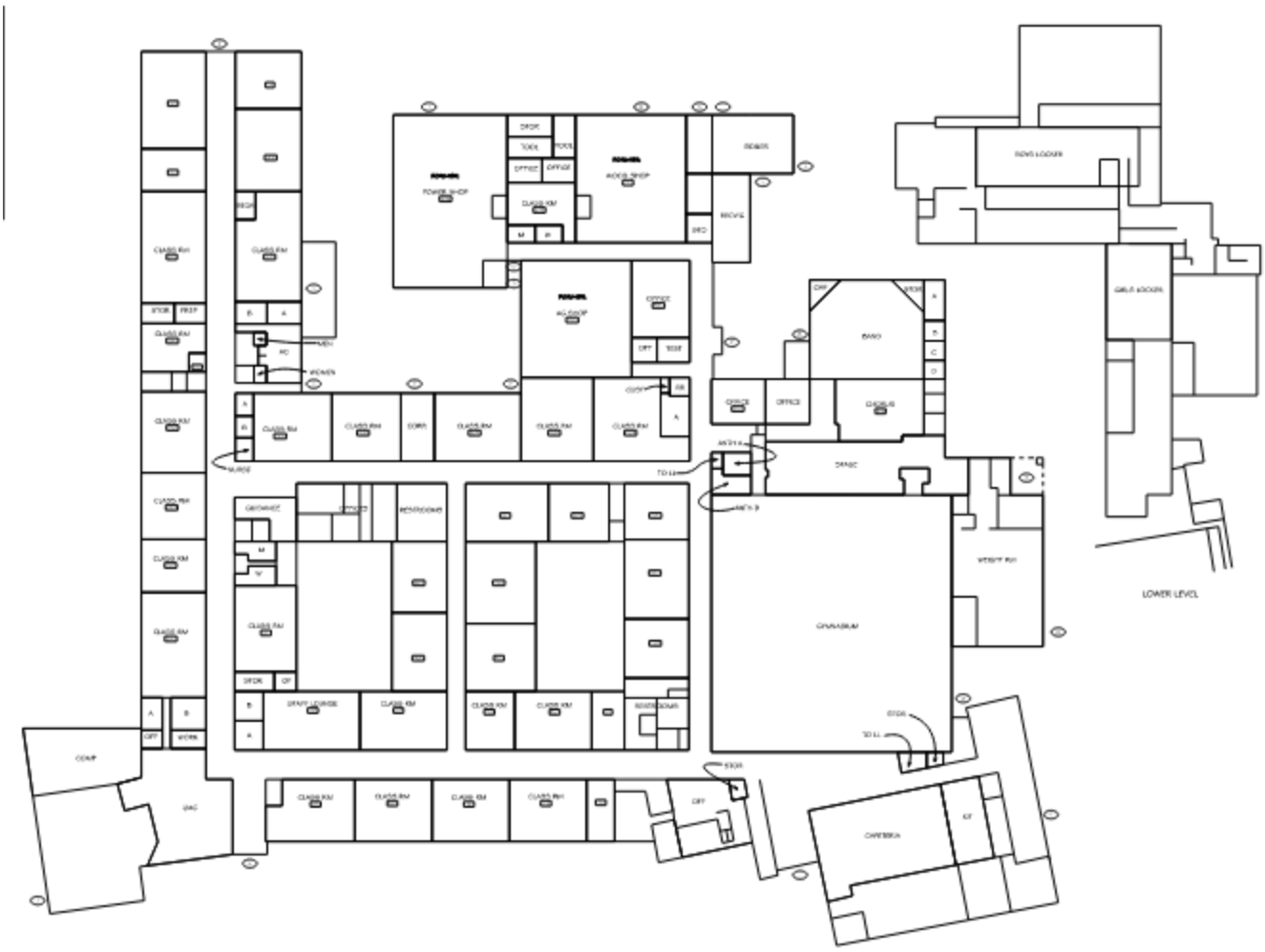
A Excellent: Clean, safe, functional. New or easily restorable to "like new" only minimal routine maintenance.
B Good: Only routine maintenance or minor repair required.
C Adequate: Some preventive maintenance and/or corrective repair required.
D Fair: Fails to meet code and functional requirement in some cases; extensive repair required.
F Poor: Non-operational; major corrective repair or overhaul required.

Renovation Codes

Level 1 Functional and in good repair with only minimal routine maintenance required.
Level 2 Some maintenance and/or corrective repair required.
Level 3 Fails to meet code and/or functional requirements; extensive repair or replacement required.
--- Not Applicable



Wisconsin Dells Middle School – Site Aerial



Wisconsin Dells Middle School – Floor Plan Diagram

Note: Some space uses may vary from above based on re-purposing of building

Site & Grounds

General | The original school was constructed in 1953, with additions in 1954, 1956, 1961, 1967, 1973, and 1997. The middle school is in a neighborhood setting, co-located with Spring Hill School.

Entry Drives are public City Streets (Race and Iowa Streets). Iowa Street does not go through which makes the drop off area congested and problematic.

Walks are generally in good condition; some cracks in sidewalks.

Accessible parking could be better placed (closer to entries) and striped to proper entry.

Exit Discharge | Most locations are in good condition; rear exterior concrete stair needs handrail and guardrail work.

Adjacent Buildings or Properties | Athletic fields, parking, and bus garages are also located on campus.

Site Topography is generally flat, with a gentle slope down toward Spring Hill School.

Site Furnishings are generally in good condition.

Landscaping is in generally in good condition. Plantings do not appear to pose any security concerns.

Paving and parking lots would benefit from sealcoat and re-striping.

Site lighting includes street lights and parking lot poles, generally in satisfactory condition.

Main ground sign is in satisfactory condition.

Fences appear to be in satisfactory condition.

Building Envelope

Roof | Roofing was not reviewed. It is understood that a routine replacement program that has all roof coverings in good condition. Some soffit and fascia repair work is needed.

Exterior Walls | Exterior masonry is in acceptable condition for its age; minor repairs and tuckpointing needed in a few spots. Exterior EIFS (Exterior Insulation and Finish System) requires repair and refinishing on the north side.

Foundation | Foundations are generally in good condition; only a few minor cracks needing repair.

Entrances/Doors | Exterior aluminum doors and frames are generally in good condition. Weather stripping and thresholds should be evaluated for replacement as necessary. Daylight can generally be seen below most door thresholds.

Windows | Windows are a combination of aluminum storefront and aluminum clad wood in acceptable condition. Windows in the former wood and former auto shop have been replaced in the last five years with thermally broken aluminum storefront with insulating glass. Windows in the welding area are single pane glass with non-thermally broken metal frames and need replacement.

Sealants | New exterior joint sealants are needed within the next 1-3 years.

Building Interior

Life Safety & Accessibility

Since 2015, this building has changed use from housing the high school to housing the middle school. Many spaces have repurposed use and some appear surplus. The former wood shop, auto shop, and welding area have been reconfigured for new uses. A food service lab has also been introduced. The re-purposed areas require a more comprehensive facility wide code evaluation to determine potential compliance issues.

Corridors | General observations:

- Corridors are generally signed appropriately for egress.

Egress | Egress observations include:

- Doors to classrooms are not rated, have unlabeled glass and unprotected louvers. Code requirements for corridor fire ratings in Group “E” Education Occupancies have become more stringent in recent years (typically 1-hour rated in non-sprinklered “E” Occupancy). Extent of code required upgrades would need to be reviewed under any remodeling scenarios.

- Asphalt at Stoops at Exits 7 and 17 has settled creating tripping hazard.

- Near rooms 145 and the former Agricultural Shop, **a dead end corridor exceeds the current code required 20 foot limit**.

- Egress route from lower level gymnasium locker rooms is confusing and requires travel through several intervening spaces. Emergency egress illumination was not observed in this area. These conditions should be reviewed further under any remodeling scenarios.

- Choir room 501 has only one exit.

- Kiln room off of the art classroom contains equipment and shelving that reduces egress width to less than 24” wide (signed exit to exterior)

- Administrative office area has outswinging doors into interior corridor that obstruct clear egress width.

- Administrative office area has rated room with keys and vital records.

- Gymnasium grilles have taken a bit more abuse and need to be refurbished

Emergency Egress Illumination | Emergency egress illumination was observed on portions of the facility. Current code requires battery operated egress lights along exit routes and at exterior doors. Extent of code required upgrades would need to be reviewed under any remodeling scenarios.

Emergency Access | A Knox box is located at main entrance for fire department access; paved drives exist around three sides of building.

Fire Alarm | Fire alarm is present; some pulls are higher than the 48” high reach range limit (e.g., former auto shop, former wood shop converted to STEM lab, gymnasium).

Fire Extinguishers | Combination of recessed cabinets and wall mounted extinguishers. A few fire extinguishers are obstructed by furnishings or built in equipment. Obstructions should be removed.

Boiler Room Rating | **It is unclear how the 2 hour boiler room fire rating is being maintained**. Observations include:

- Rated doors were removed from the frames and door stops on the outer room door prevented the door from closing and latching. Custodial equipment was stored in front of the electrical panel. These should be reviewed further and any corrections made immediately.
- In addition, several pipes, conduits, ducts penetrate the boiler and main electrical service room walls. These should be fire stopped with a UL approved system to maintain the wall’s hourly rating.

Art room has several sheets of pink rigid insulation board (painted white) that is not protected by a thermal barrier. This poses a life safety hazard and should be removed.

Several doors include older rated wire glass, which is no longer approved for use in schools (cut hazard).

School laundry near gym locker room has unsealed penetrations and door propped open at time of walkthrough. Current code requires laundry rooms over 100 square feet to be a 1 hour rated.

Hardware on laundry doors appears to be original and should be replaced (eg. closer is protruding object hazard as less than 80” above finished floor)

Lower level cardio room has unsealed penetrations into rated exit stair enclosure. Questionable exiting with one door swinging inward.

Electrical room off corridor near entry 21 has several unsealed penetrations.

While most of the science classrooms appear to have an emergency shut off, none were within a locked enclosure.

Accessibility | Accessibility issues include:

- Clear door width less than 32” at several older doors. Doors fitted with round knobs (mostly service and staff doors).

- Older restrooms lack maneuvering clearances at doors, stalls, fixtures, and within the room, lack of grab bars, and accessories that are mounted too high. Some restrooms have been updated with new high density polyethylene toilet partitions. Cabinet unit heaters are dented and aged.

- Interior Signage has been upgraded since 2015 to meet accessibility requirements.

- Music instructional area is not on an Accessible route (only accessed via stairs).

- Upper weight room drinking fountain is obstructed by built in casework. Built in casework does not have 36” high section for Accessibility.

Sanitary fixtures | Assuming the sanitary fixture count complied with the code in effect at the time of construction, the chart below shows the occupant load supported by today’s code standards. While not retroactive, any significant alteration or occupant load increase of more than 20 percent would trigger current code requirements.

FIXTURE	FACTOR	MEN	STAFF MEN	WOMEN	STAFF WOMEN	SUPPORTED OCCUPANT LOAD (Per IBC 2009)
Water Closet	1:50	6	2	17	2	1,000 M | 950 W
Urinal	2/3	12				Incl above
Lavatory	1:50	13	2	13	2	750 M | 750 W
Drinking Fountain	1:100					Not tallied
Showers	---	14		12		--
Service Sink(s)	1	---	---	---	---	More than 1 service sink

Finishes

General | Finishes are generally in average condition for their age.

- 2 x 4 ceiling tiles are sagging throughout the facility and are worn in several spaces. Consider replacement with 2 x 2 acoustical ceiling system.

- CMU and interior painted glazed block is generally in good condition with only minor touch up needed. Much was freshly painted in March, 2020

- VCT flooring is generally in average condition with a few areas where seams have opened up and furnishings have discolored tiles.

- Terrazzo flooring is generally in good condition with only minor cracks.

- Carpeting is worn throughout, and is a mixture of ages (ongoing replacement program). Estimate that roughly half of the carpeting dates to 1997 and needs replacement. New carpet tile, wall base, and paint has been recently installed within the LMC.

- Wall base is showing age. (primarily vinyl with sanitary coved ceramic tile in restrooms). Several areas need routine repairs and maintenance – estimate 30-40%.

- Vestibule “pedimats” (floor grates) are generally in poor condition and have been covered with loose floor mats.

- Interior walls are generally in good condition with an ongoing painting program in place. Auto shop walls need paint. It is evident that some painting has been refreshed since 2015 including the LMC and locker rooms.

- Interior doors are a combination of painted hollow metal with hollow metal frames, wood frames, and solid core wood. Doors are generally in average condition, though the wood frames have taken a lot of abuse and have been re-painted many times over the years. Most door frames are missing door silencers.

- Gymnasium floor is maple in good condition for its age.

- Stage has lift access and the lift has been replaced within the past 5 years. Non-compliant stairs (rise exceeds current code standards at 7-1/2”); and lacks handrail extensions.

- Upper weight room frameless mirrors do not have any safety labels. Raised platforms in weight room bring sill height at exterior windows below 24” height, which requires safety glass.

- Aside from fresh paint on the walls and ceilings, the lower level locker rooms are in below average condition. Fixtures and finishes are worn and dated; shower curtains should be replaced. Lockers are in average condition with some corrosion and dents, no safety markings on unframed room mirrors.

- Cafeteria finishes need refurbishing. Grilles are aged, walls need paint touch up, exposed metal decking has been field painted and fills many of the holes intended for acoustic control. Operable partition to corridor is in poor condition. Laminate counters are worn and need replacement.

- Cafeteria restroom finishes are generally in good condition.

- Kitchen adjacent to cafeteria is too small for number of meals required. Dry storage floor finish is worn, kitchen office has opening in walls with exposed insulation – refurbish.

- While some toilet partitions have been replaced with HDPE (solid plastic), remaining metal toilet partitions are in average condition (missing latches and bent panels) and should be replaced in the next 1-5 years.

- Aside from a fresh coat of paint, finishes in restrooms nearest auto and wood shop are most worn.

- Casework is generally in average condition with some areas showing signs of edge delamination.

Front entry is not accessible - include curb ramp



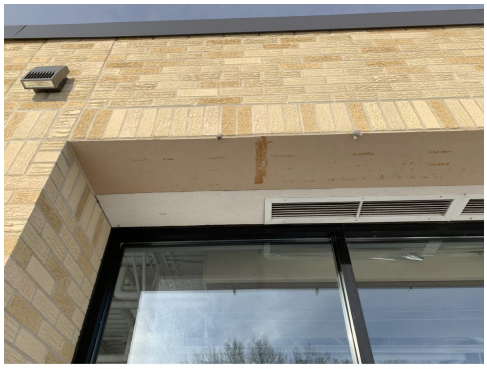
MS 1

Front of building - accessible parking isn't striped to accessible route



MS 2

Rust and wear on most steel lintels - strip and refinish



MS 3

Many window sills have deteriorating mortar - mason to review



MS 4

Handrail this stair and adjacent stair not compliant



MS 5

Concrete cracking at entry walk



MS 6

Trip hazard at several stoops and cracked concrete at this



MS 7

Paint trim boards



MS 8

Louver is damaged and dented



MS 9

Evaluate sealants and joints - this area may be experiencing settlement or building movement



MS 10

Strip and refinish louver



MS 11

Reseal deteriorated joint



MS 12

Window at former welding shop requires replacement due to age and single pane - Louver can be removed and more efficient storefront installed



MS 13

Soffit needs stripping and refinishing



MS 14

Overhead door jamb seems out of plumb - evaluate / repair / replace door



MS 15

Soffit in need of repair and refinishing - this entire elevation



MS 16

EIFS in need of repair



MS 17

Repair / tuck point masonry around sun-house



MS 18

Trip hazard at stoop



MS 19

Sealant / repair needed between dissimilar materials



MS 20

Lintels throughout facility should be evaluated for finish - strrp and refinish



MS 21

Refinish panel around louver



MS 22

Repair paneling - seal around edges of louver / investigate louver placement



MS 23

Repair damaged flashing - refinish panel around louver



MS 24

EIFS is either dirty or requires cleaning and refinish



MS 25

Masonry joint deteriorating - have mason evaluate entire building for select tuck pointing / fill



MS 26

Damaged masonry at entry corner - trip hazard at stoop



MS 27

Brick tuck pointing needed at chimney



MS 28

Select repair necessary at front soffit



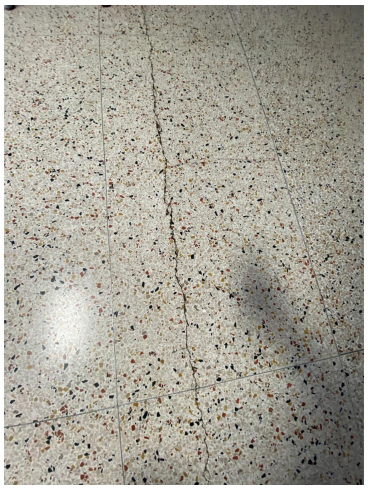
MS 29

Aged, deteriorating, and rusty unit heater at Entry 1 Vestibule



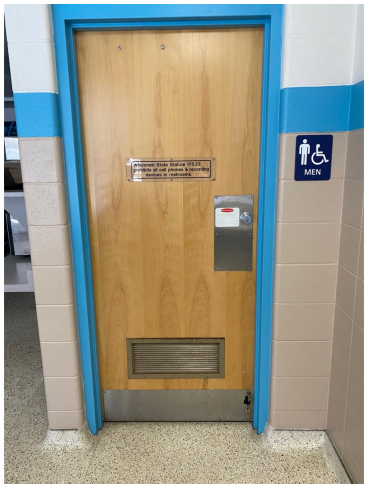
MS 30

Terrazzo shows age and is cracked in several locations
but remains serviceable.



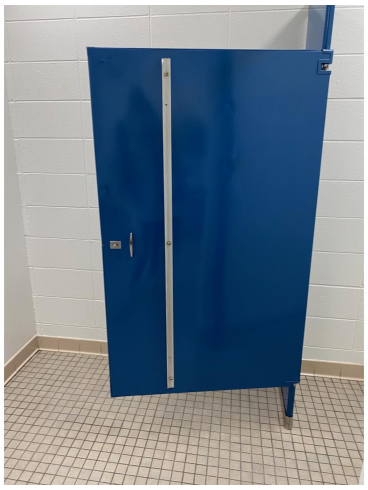
MS 31

Typical interior door and frame with fresh paint and some wear. Refurbishment needed.



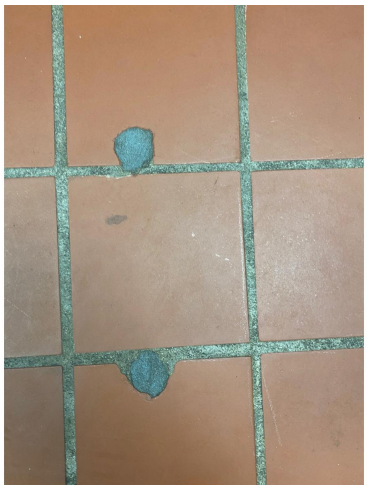
MS 32

Typical metal toilet partition with field modified reinforcement



MS 33

Damaged floor tile at kitchen off cafeteria



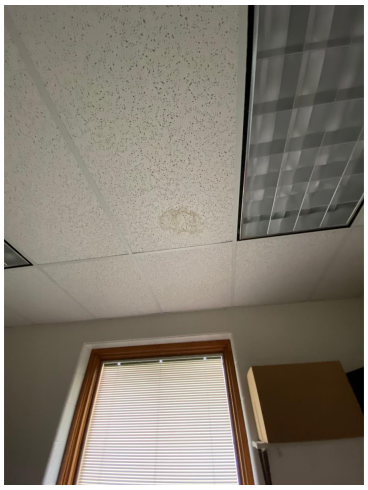
MS 34

Worn and damaged floor at dry storage off kitchen



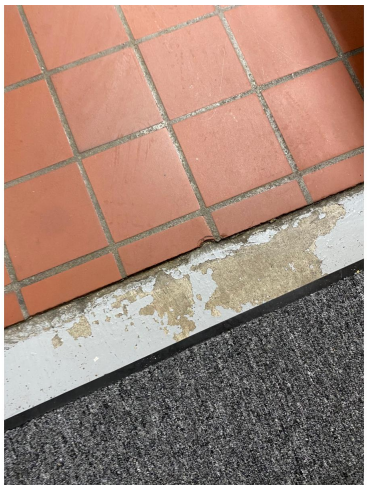
MS 35

Stained ceiling tile may be from leak above.
Representative of numerous locations in facility



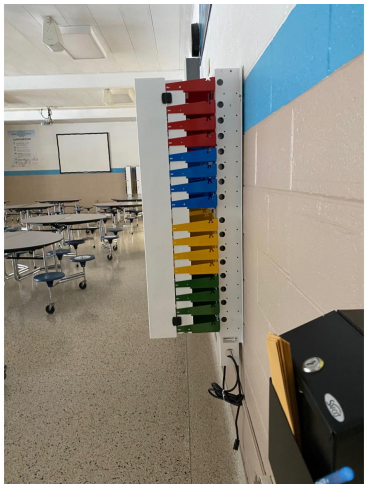
MS 36

Chipped floor tile and worn paint on concrete floor between kitchen and dry storage



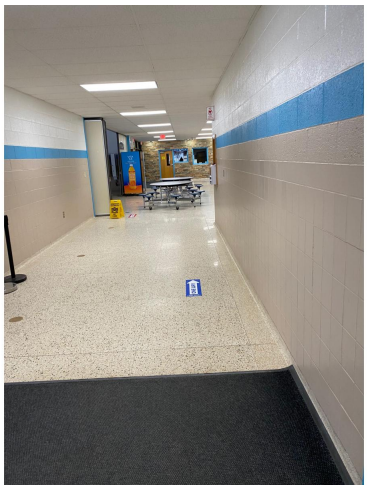
MS 37

Chromebook charging rack mounted on wall in cafeteria present a protruding object hazard



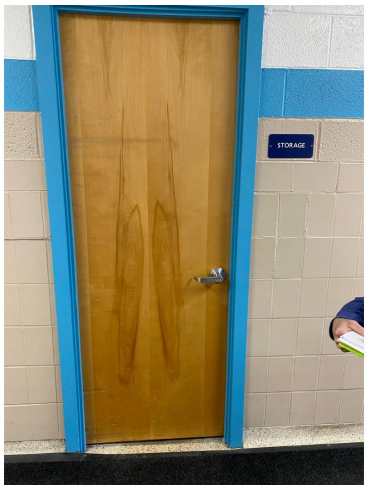
MS 38

View in Corridor



MS 39

Representative sample of vintage narrow door with painted wood frame; width does not meet currrent acccessibility requirements



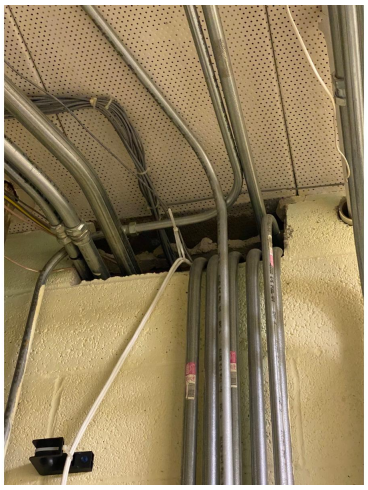
MS 40

Questionable compliance of unsealed penetrations in storage / eletrical room off Entry 21



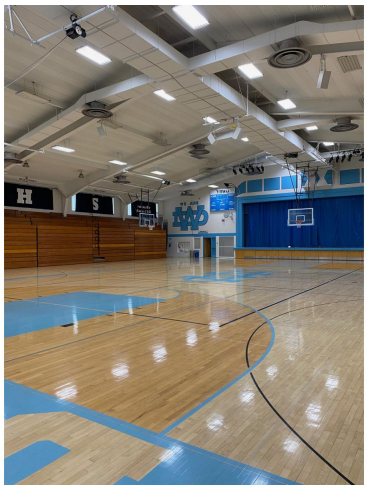
MS 41

Seal penetrations through rated wall



MS 42

Representative phot of Gymnasium; florring in good condtition



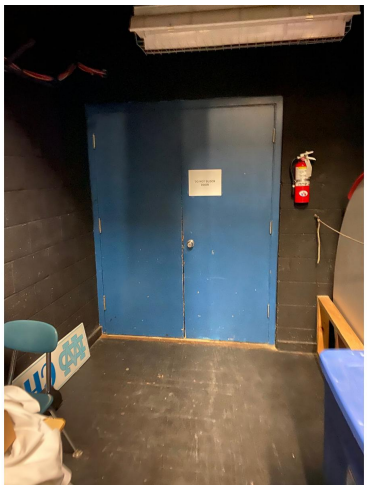
MS 43

Broken floor tile in gym needing replacement



MS 44

Stage door with non-compliant hardware, fire extinguisher mounting height is not code compliant



MS 45

Damaged emergency light near entry 19



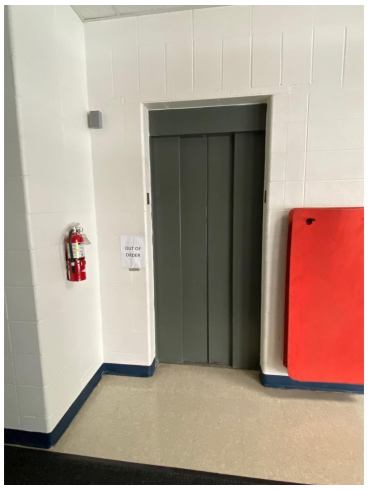
MS 46

Damaged flooring and floor transition



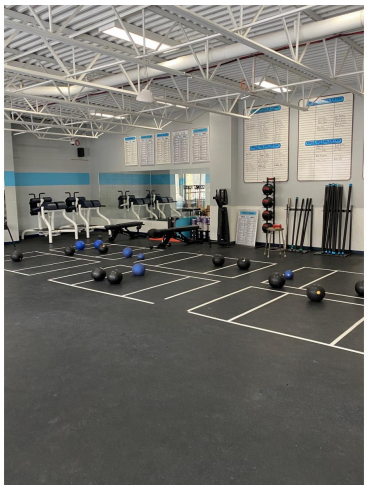
MS 47

Elevator out of order during time of visit - accessibility issue



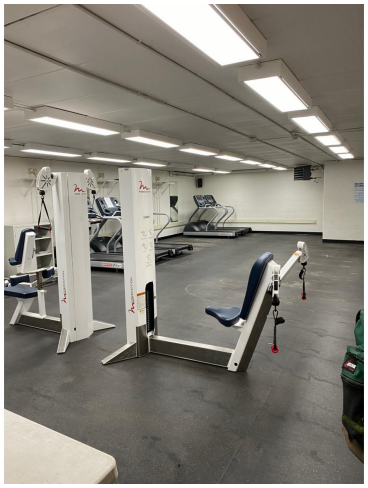
MS 48

Weight room during time of visit



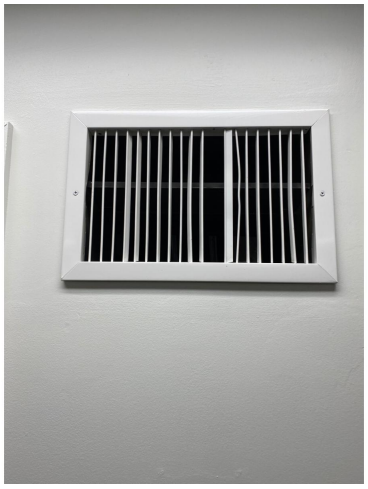
MS 49

Lower level former cardio room at time of visit



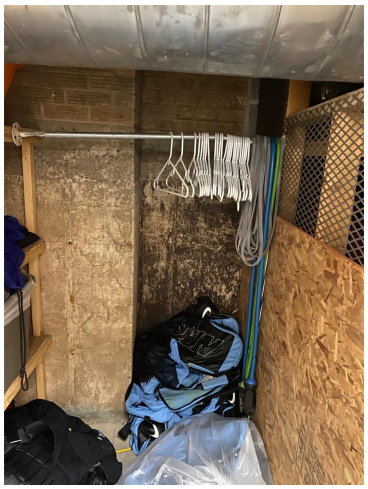
MS 50

Representative sample of vents throughout facility



MS 51

Exposed fire risk of oriented strand board in storage rooms off former lower level cardio room



MS 52

Representative sample of newer interior signs to meet accessibility rerquirements



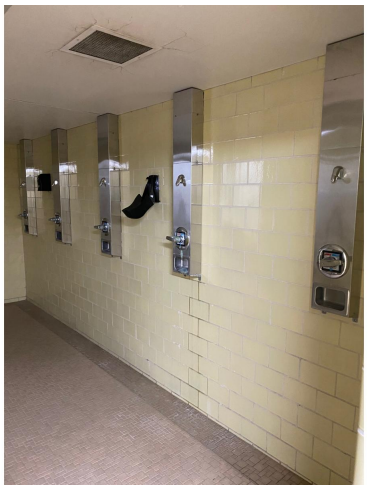
MS 53

Worn and dirty vents in lower level locker room



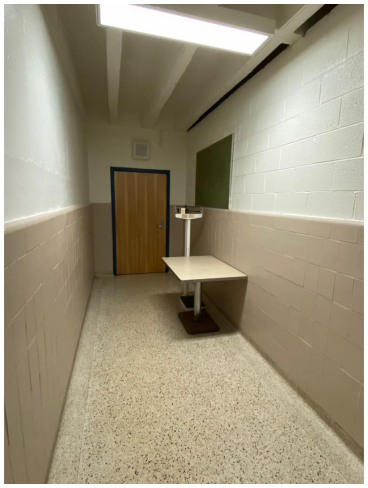
MS 54

Dated and worn tile in shower area of lower level locker room



MS 55

Storage in corridor reduces exit widths - egress path not clear, presents hazard near lower level locker room



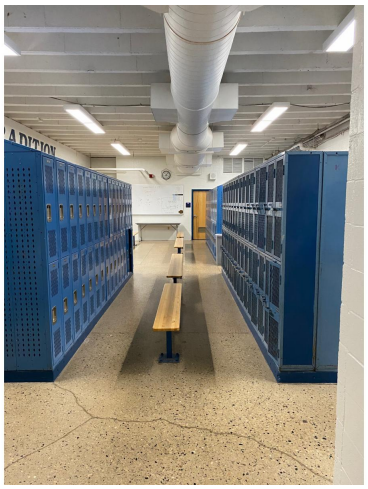
MS 56

Damaged flooring at golf simulator room



MS 57

Cracked flooring within locker room; egress path unclear (no diretional exit lights)



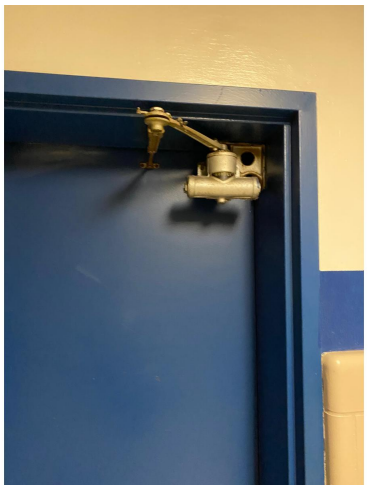
MS 58

Aged wall and floor tile in lower level locker room



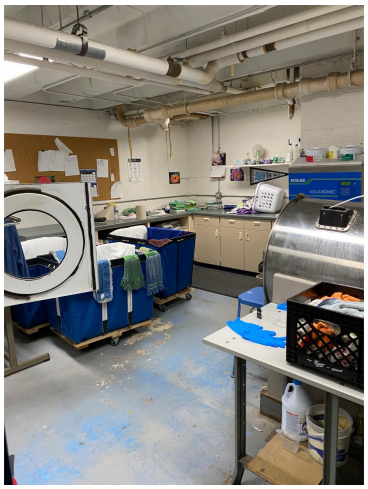
MS 59

Lower level laundry vintage door closer, protruding object hazard less than 80" above finished floor



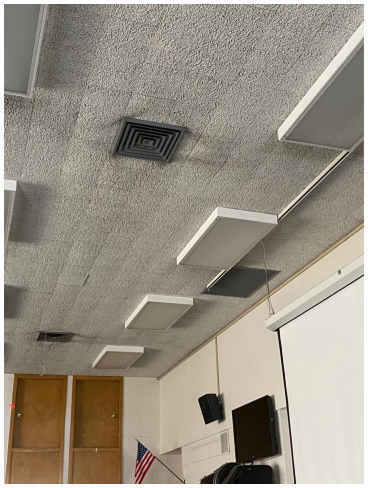
MS 60

Unsealed penetrations in lower level laundry; badly worn floor finish



MS 61

Damaged and aging ceiling tile in music / former band room



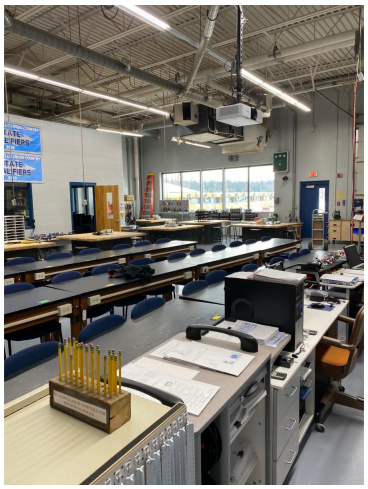
MS 62

Rusty ceiling panels and rusty painted steel in music former band area



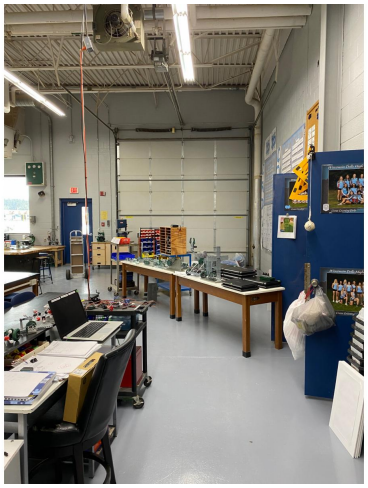
MS 63

Wood shop converted to STEM lab; condition at time of visit; remnants of wood shop such as dust collection ducts remain



MS 64

Wood shop converted to STEM lab; condition at time of visit



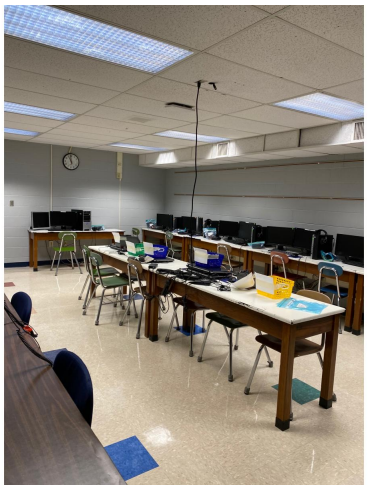
MS 65

Storage mezzanine above STEM lab. Uneven floor, residential finishes, questionable headroom and guardrail



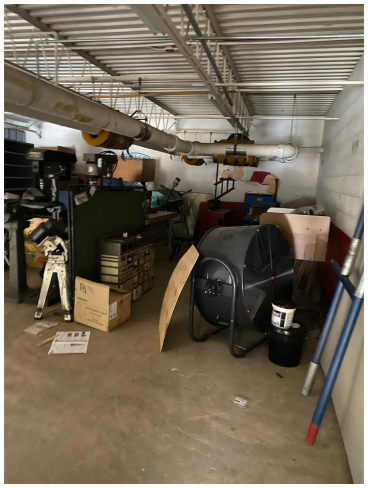
MS 66

Retrofitted STEM lab; table tops painted and chipping; sagging ceiling tiles



MS 67

Storage mezzanine above former Auto Shop
Quesionable headroom and guard
Removable section of guard not in place at time of visit leaving vertical drop hazard over 10-12 feet



MS 68

Door at exit 10 - round knob and vintage hardware at exit door; does not meet accessibility standards



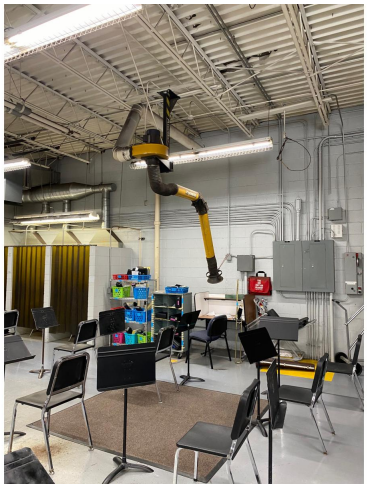
MS 69

Restroom near STEM lab, Faucet handles lack code compliant controls; clearances within room do not meet accessibility requirements



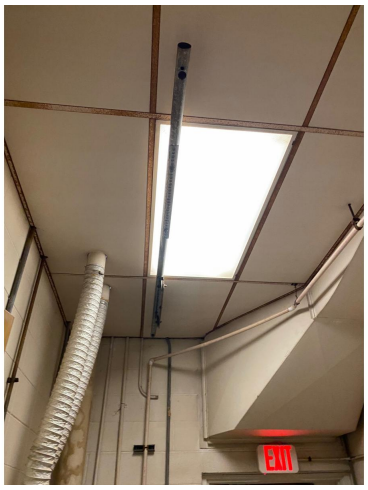
MS 70

Former welding shop converted to music room. Remnants of welding shop remain and should be removed



MS 71

Rusty ceiling grid at kiln room



MS 72

Exit path impeded by stored materials at kiln room, exit lacks code required hardware



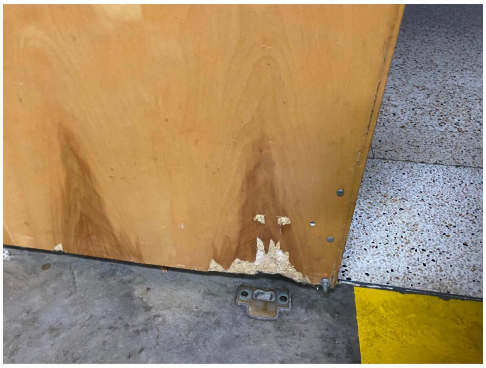
MS 73

Representative photo of raised carpet seams througout facility (5 "dots" of adhesive on back of product was not sufficient at install)



MS 74

Represenative photo of doors to high traffic / maintenance / custodial areas



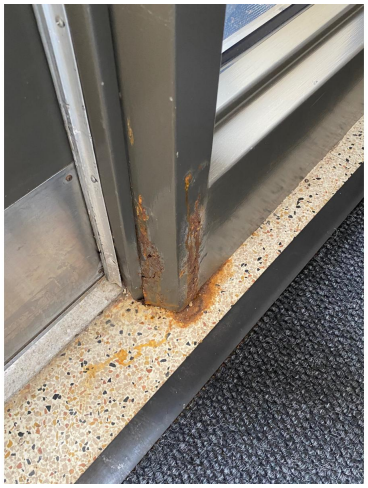
MS 75

Representative photo of several locations in facility



MS 76

Rusted door frame at entry 17 should be replaced



MS 77



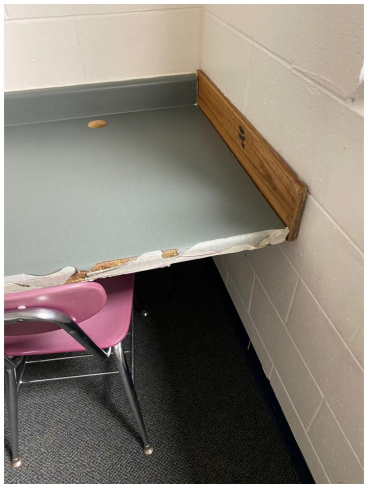
MS 78

Representative photo of condition at several locations



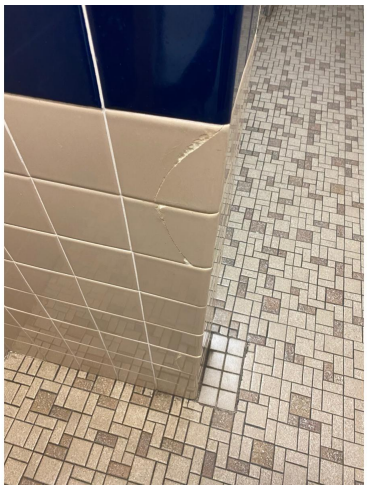
MS 79

Worn and damaged laminate on classroom work surface presents hazard



MS 80

Damaged wall tile in restroom should be replaced



MS 81

Sink showing rust in restroom. Sealant and laminate in below average condition



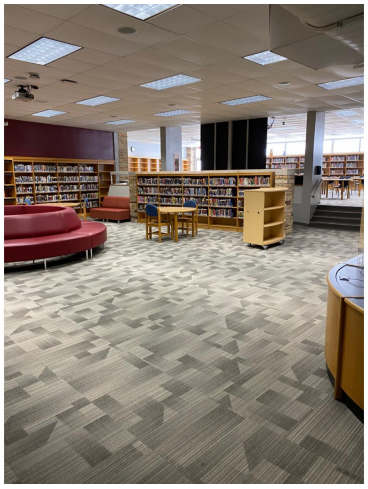
MS 82

Extremely sagging ceiling tile in staff work room presents hazard

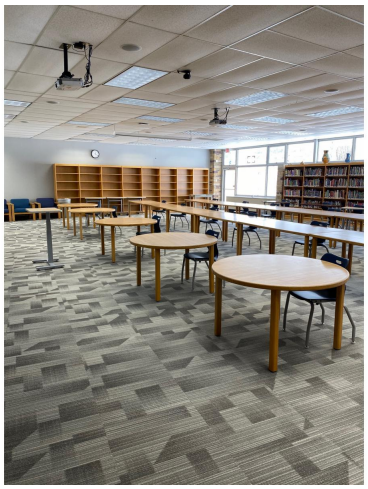


MS 83

LMC with new carpet tile, wall base, wall paint; ceiling tiles sagging



MS 84



MS 85

Sagging ceiling tile in staff lounge presents hazard outside restroom



MS 86

Pitted and won terrazzo lavatories



MS 87

Replace badly corroded restroom accessory - protruding object presents safety hazard; replace



MS 88

Buckets suspended within Art Room catching leak from roof
Exposed foam insulation without thermal barrier (painted white) remove



MS 89

WISCONSIN DELLS MIDDLE SCHOOL

Building Systems

The following building systems report is the result of a site visit by Jared Ramthun and Neil Gammon of Design Engineers that occurred on January 29, 2021. Site observations and interviews were used in the preparation of this report.

The building does not include a fire suppression system.

Plumbing Systems

The building includes two domestic water services and meters. One is located in the closet near Classroom 108. The other is located in a closet off of the SE corner of the gymnasium.

Most domestic water piping in the original portion of the building and is galvanized. This piping has exceeded its useful life expectancy and was noted to have leaks. Replacement of this piping is recommended. Piping in additions that have occurred since around the 1980s is copper.

The building does not have a water softener and facilities personnel have indicated that the water hardness from the city is not an issue so one is not needed.

Domestic hot water is provided by four separate systems. One system is located in the south central mechanical room and consists of two 65 gallon, 370,000 Btu/h input, natural gas-fired water heaters installed in 2012 or 2013 that appear to be fair to good condition. A second system is located in the boiler room and consists of one 100 gallon, 75,100 Btu/h input,



Fig 1 | Domestic Water Meeter



Fig 2 | Gas-fired Water Heaters



Fig 3 | Gas-fired Water Heaters

natural gas-fired water heater installed in 1994 that is in poor condition and in need of replacement. The third system in located in the central mechanical room and consists of one 55 gallon, 100,000 Btu/h input, natural gas-fired water heater installed in 2015 that is in good condition. The final system is small and serves the wrestling room area.

Restrooms in the original portion of the building have water closets that are floor-mounted with manual flush valves. Urinals are floor-mounted with battery-operated automatic flush valves. Lavatories are wall-mounted with manual faucets.

Restrooms in newer and renovated portions of the building have water closets that are wall-mounted with manual flush valves. Urinals are floor-mounted with battery-operated automatic flush valves. Automatic wash fountains are located with the restrooms for hand washing.

Locker room showers are grouped with no privacy.

Classrooms contain stainless steel sinks with manual faucets.

The older portions of the building have drinking fountains while the newer portions have electric water coolers.

In general, restroom fixtures are in fair to good condition, showers and classroom sinks are in poor to fair condition, and drinking fountains and electric water coolers are in poor condition.

The kitchen waste discharges into an exterior grease interceptor, which appears to be in fair condition.

Roof drainage occurs by interior storm piping.



Fig 4 | Urinals (left) and Water Closet (right)



Fig 5 | Lavatories

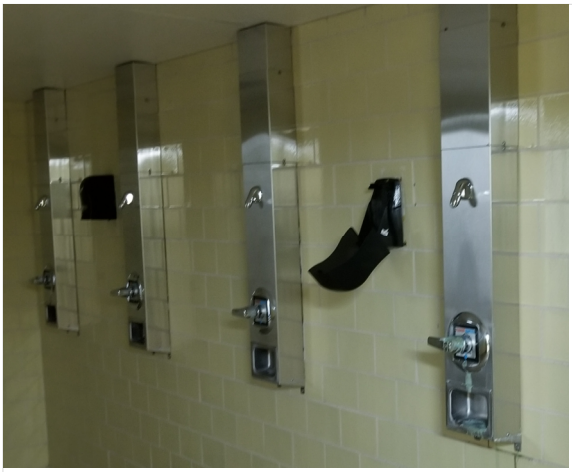


Fig 6 | Locker Room Showers

HVAC Systems

The entire building is both heated and cooled.

The heating source for the building is a boiler plant that consists of two 5,600,000 Btu/h output natural gas-fired boilers sized for the full building heating load and that are original to the building and two 987,000 Btu/h output condensing gas-fired boilers that allows for higher efficiency operation for the first stage of heat. The large boilers were installed in 1996 and are in fair to good condition. The condensing boilers were installed in 2008 and are in good condition.

The cooling source for the building is a 200 ton air-cooled chiller located on the roof of the boiler room with chilled water pumps located within the boiler room. The chiller was installed in 1996 and is in poor to fair condition.

Heating hot water and chilled water distribution is distributed by separate pipe systems to large air handling unit coils and a shared two-pipe system to unit ventilators. Much of the two-pipe system is routed in tunnels under the perimeter of the building. The two-pipe system allows those areas to operate in either heating or cooling; simultaneous heating and cooling is not possible.

All of the heating plant, chiller plant, and distribution pumps are in poor condition with many parts being rebuilt over time, including many with new motors. The two-pipe system distribution pumps are variable flow with VFDs and are very loud.

Perimeter classrooms are served by unit ventilators with a single coil used for either heating or cooling. The units are located along the exterior wall to allow outdoor air to be provided through the units. The units were



Fig 7 | Large Gas-fired Boilers



Fig 8 | Condensing Gas-fired Boilers



Fig 9 | Heating Hot Water and Chilled Water Pumps

installed in 1996 and have exceeded their expected useful life but are in fair condition. Discussions with facilities maintenance personnel indicated that converting the unit ventilators to a different system should be the top priority for this building.

The building consists of 15 different air handling units (AHUs). Most of the air handling units are constant volume with a single dual temperature coil. The main office area is served by a variable volume air handing unit that provides air to variable air volume terminal boxes with hot water reheat coils.

The six of the AHUs, including those in the gym (AHU-E1 and AHU-E2), band room (AHU-E3), and tech-ed wing (HV-1, HV-2, and HV-3) are original to the building and are in poor condition. Many of the other AHUs were installed in 1996 and are in poor to fair condition.

Ventilation air is provided by each air handling unit. Exhaust air is provided through roof-mounted exhaust fans.

A make-up air unit for the paint booth room and the dust collector for the tech-ed room are in poor condition. Similarly, the agricultural classroom contains welding booths, fans, etc., that are in poor condition. All of this equipment could be removed due to no longer utilizing those function with the conversion of the building from a high school to a middle school.

The agricultural classroom contains welding booths, fans, etc., that are no longer

Most of the building is controlled by an Andover building automation system that was installed in 1996. The technical education wing still consists of some pneumatic controls and should be considered for an upgrade to the



Fig 10 | Two-pipe System Pumps



Fig 11 | Unit Ventilator



Fig 12 | Typical Original Air Handling Unit



Fig 13 | Typical Air Handling Unit from 1996 Project

Andover system.

Electrical Systems

Service Entrance/Distribution/Branch Panel Equipment

The school's (2) electrical services enter the building on the east side through pad-mounted utility transformers. The main building feeders are routed underground to an electrical room along the exterior wall where they serve their respective switchboard (1200A 480Y/277V & 1600A 208Y/120V). Each of the switchboards appear to have provisional space for additional breakers to support future loads.

The building distribution is a mixture of 277/480 volt and 120/208 volt. The 277/480 volt distribution system serves the large mechanical loads such as supply fans, chillers and other cooling equipment as well as some of the lighting while the 120/208 volt distribution systems serve branch panels, smaller HVAC loads and the remainder of the lighting. The main distribution equipment was installed in 1997. Overall, the electrical distribution equipment including switchboards and panelboards appears to be in fair to good condition.

Electrical distribution equipment has a published operational life of 25 – 30 years. The published life expectancy for equipment is a good gauge for understanding when it may make sense to replace this equipment in kind. When electrical distribution equipment is kept within a relatively clean environment and is maintained properly, it may be able to operate safely well beyond its published life expectancy, in some cases 50 years and beyond. This is more of an observation than a recommendation to use equipment beyond its published operational life.



Fig 14 | 208V Service Switchboard



Fig 15 | Un-Named Panel in Room 602

Some panels located throughout the building installed prior to 1997 have started to show surface rust along the edges with some of that equipment being much older, having been installed in the 1950s and 1960s. Any equipment installed prior to 1997 should be considered for replacement. These older panels are obsolete and beyond their expected life. The older panels appear to be operating adequately but could pose a long downtime if a failure were to occur since breakers for this equipment are difficult to find. In general, there is adequate space in most of the panelboards for future loads.

Given the overall condition of most of the equipment installed in 1997, replacement is not a high priority at this time except for those older installations already noted. The electrical equipment should continue to be maintained and electrical spaces kept clean from dust and other pollutants to continue use of this equipment for the coming years. As renovations are planned, any electrical distribution equipment in the area of renovation should be considered for replacement as part of the plan. Additionally, a manufacturer's representative could be consulted to come in to review the internal components of the equipment which will help identify any maintenance issues and extend the gear's usable life.

In general, most of the electrical panelboards have additional mounting space for breakers to feed future loads. This does not necessarily speak to the actual capacity of these panels as the load is unknown without being metered. It is anticipated that most of the distribution equipment would have some available capacity to serve additional loads although this should be verified by field metering prior to using any of the panels as part of a renovation or to otherwise add new loads.



Fig 16 | Dust Filled Panel OBR in Anth A


Fig 17 | Typical Panels in Room 301

Emergency Power

Emergency power for the facility is limited. There are no generators or associated distribution equipment. Emergency power for systems such as egress lighting, exit lighting and fire alarm is provided through the use of batteries.

Given the size of the building and quantity of battery supported emergency lights and other loads, it may be worth considering the installation of an emergency generator or central battery inverter to replace the need for individual batteries located throughout the building. This would require new circuits to run throughout the school from the central inverter/generator distribution panel location so cost would be a factor. This cost would be offset by the reduction in ongoing field maintenance that is required since only the inverter or generator would need to be maintained.



Fig 18 | Typical 4 Lamp Light Fixture



Fig 19 | LMC Lighting

Electrical Branch Circuits

The branch circuit wiring throughout the building appears to be in good condition. No open junction boxes were observed above ceiling during spot checking. Ground Fault Circuit Interrupting (GFCI) receptacles appeared to be in appropriate locations and in operating condition. The existing branch raceway systems including conduits and surface mounted raceway appeared to be in fair condition.

Interior Lighting

The interior lighting in the building is predominantly fluorescent fixtures with retrofit LED replacement lamps. Duel level and single pole switches for controls are used throughout the facility. All these fixtures are in fair to good

condition and appear to be providing adequate illumination levels for the environments they are installed. Certain back room areas and portions of the buildings that have been omitted from renovations have fixtures in poor to fair condition but illuminate the spaces adequately. Lamps may still be incandescent or T8 in the back of house areas. Many of the fixtures in these spaces have exposed lamps which may be susceptible to damage during routine maintenance.

In general, classrooms are provided with dual level switching for partial and full light output control. The corridors are controlled by standard switches. Most of the other spaces are also controlled through local switches. The use of automatic controls is very limited throughout the facility and was only noted in some restrooms. The use of automatic controls using occupancy sensors is more consistent with today's energy codes. These modern controls help save energy and improve longevity for light fixtures. For any future renovations, occupancy (auto-on, occupancy stay on) and vacancy (manual-on, occupancy stay on) based controls are recommended and, in many cases, will be required.

Electronic ballasts have an expected life 10-15 years and will require maintenance similar to the lamps in the fixtures that can have a 20,000+ hour life. LED retrofit lamps will extend this life expectancy and save some energy as well. Based on the relatively short timeframe that LED retrofit lamps have been available, it is unknown how well they will perform over time when compared to LED based fixtures. LED technology has become the industry standard for new lighting installations. LED provides long life, usually 50,000+ hours per manufacturer testing and field reports from the installed base. They also provide energy savings and lower maintenance costs compared to fluorescent.

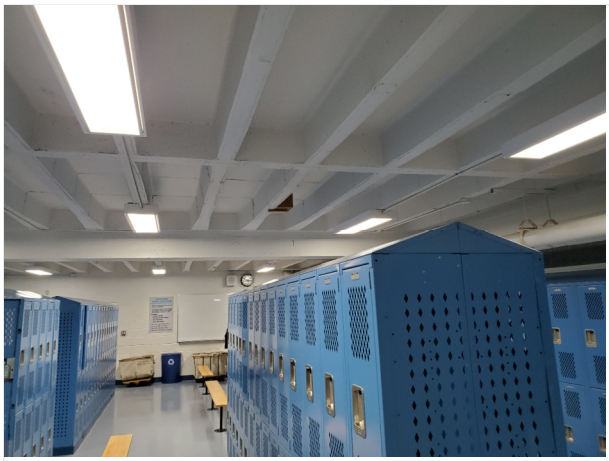


Fig 20 | Locker Room Lighting



Fig 21 | Gym Lighting



Fig 22 | Restroom Occupancy Sensor

The cost of LED has also become very competitive with fluorescent especially when factoring in some of these other benefits. In many cases, LED is a less expensive option. For any future renovations, it is recommended that LED technology be used.

LED fixtures are also inherently dimmable. Costs for dimming controls and ballasts used to be cost prohibitive so they were used sparingly. However, it is common practice today to include dimming capabilities in all occupied spaces such as offices and classrooms. Similar to automatic lighting controls, the ability to change light levels within a space so that full output is a user decision rather than automatic is more consistent with today's energy codes. For any future renovations, use of dimming controls is recommended and, in many cases, will be required.



Fig 23 | Typical Exterior LED Fixture



Fig 24 | Typical Exterior Door with Fixture Above

Exterior Lighting

In general, the exterior lighting of the school is in good condition. Each of the exterior doors includes a light fixture(s) above which partially complies with today's egress lighting requirements which also require these lights to be backed with a generator or battery source for at least 90 minutes. Most of the exterior lighting on the building is LED which is better for aesthetics and security purposes when compared to metal halide or high-pressure sodium. To comply with today's codes, it is recommended that the exterior fixtures at the building egress points be served from an emergency power source if not already.



Fig 25 | Typical Corridor Battery Pack Light

Exit/Emergency Lighting

Emergency lighting is provided by battery pack lighting located throughout the corridors and in some larger rooms. The overall coverage of the interior emergency lighting system and exit

signs appears to be adequate. The emergency lights and exit signs vary from fair to good condition. Some of these lights appear to be original from 1997 or earlier. All exit and exit pathways in the corridors are marked well. If not done already, the emergency batteries in these units should be checked regularly as they are susceptible to failure when they are most needed. Any failed units should be replaced immediately. Batteries typically last 5 – 7 years. Testing of batteries is an ongoing maintenance item and should be logged to show compliance with egress lighting requirements.



Fig 26 | Typical Exit Signage

It does not appear that any of the exterior lighting is served from an emergency power source. Any exterior fixtures mounted to the building at egress points should be served from an emergency power source if not already.



Fig 27 | Typical Fire Alarm Strobe

Fire Alarm System

The building is currently supported by a Simplex 4005 non-addressable fire alarm system with horn notification. The system also has dialing capability for offsite 3rd party monitoring. The panel is functional and still supported by Simplex. The Fire Alarm Control Panel (FACP) is located in a back of house space, room 507. Compatible initiation and notification devices are still available for expansions/renovations.



Fig 28 | Fire Alarm Control Panel

By today's codes and standards, a fire alarm panel with voice annunciation capability would be required in an educational facility. Voice capability allows the fire alarm system to provide instruction to the occupants during a fire event. Today's modern fire alarm systems with voice annunciation also allow the system to be used for mass notification purposes should there be an event other than fire that presents

danger to the building occupants. Considering the building has an extensive overhead paging system, the additional feature for mass notification, although it would be an upgrade to have supervised signaling (i.e. system monitors signal conductors for breaks and faults) to detect any issues with the announcement system, may not be necessary. Converting to a voice-based fire alarm system would also require the field annunciation devices to be replaced with speakers or speaker/strobes.



Fig 29 | Smoke Detector Outside LMC Telecom Room

Detection devices such as smoke detectors, heat detectors or other initiation devices are minimal which provide limited detection coverage compared to the overall size of the facility. Select storage rooms, kitchen and AG Shop 600 areas are some of the space types that include detection devices. Entry/exit points have manual fire alarm pull stations. The detection and initiation devices appear to be in fair condition. Commercial detection devices have a typical service life of 10-15 years after which time they should be replaced. The building does not have a sprinkler system so detection of smoke and fire is even more important for the protection of building occupants and property. Additional fire detection devices are recommended to limit the impact of fire conditions and to provide early warning for building occupants. One example of additional detection may be to provide corridor smoke detection coverage throughout the facility.

The building has fire alarm notification devices in corridors, classrooms, offices and common spaces. Although not witness tested, the location and spacing of notification devices appears to be sufficient throughout the facility although additional strobes may be required in common use spaces where more than one person can occupy the space. As part of future renovations, strobe placement should be

reviewed. The current state of the notification devices is fair to good condition.

Voice/Data Systems

The main telecom room is located in a dedicated room within the LMC area. This room also includes the building's active systems such as switches, servers or hubs. All telecom cabling is distributed from these types of rooms or satellite racks to field devices. Cables in each of these locations are routed from these racks up into the plenum space and dispersed to serve the building. Very little cable management was found in the rooms or at the racks to support the data cabling for the telecommunications network. Permanent information jacks are installed in many locations including media centers, classrooms, and offices but most of the building also has telecommunication service via Wireless Access Points (WAPs). A Cisco Voice Over IP system is also installed for communications.

The overall condition of the telecommunication equipment and cabling in the building is in good condition. Most of the installed cabling is CAT 6 which should be sufficient for the foreseeable future while some installations with CAT 5E were also noted. The data rack installation is within a dedicated room with security card access. Having dedicated spaces allows for secured access and environmental conditioning. There was a box fan noted in the room which calls the adequacy of the ventilation into question. The room cooling should be reviewed for proper ventilation of the equipment. The telecom room is of adequate size to support the equipment plus some additional rack space for future growth. However, opportunities to get out of the room with large quantities of cables appear to be limited is a large expansion is planned.

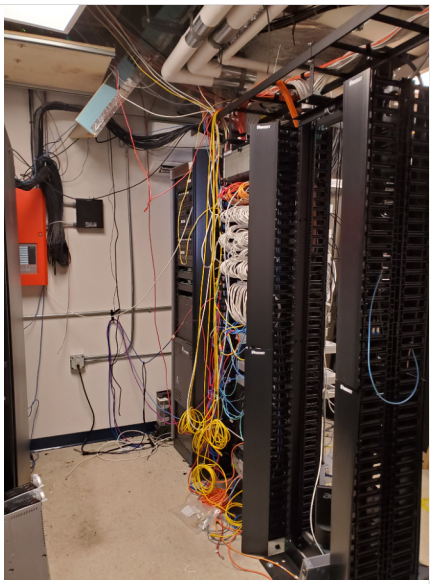


Fig 30 | LMC Telecom Room



Fig 31 | Path Out of LMC Telecom Room



Fig 32 | Typical Classroom TV Setup

The building has no cable management, i.e. cable tray, for routing of the voice/data cabling throughout the building. All the cabling down the corridors is supported either by the ceiling grid or with j-hooks.

All the classroom spaces have coax cable television connections to a TV within the rooms.

Public Address & Clock Systems

The building currently has a Dukane public address system with a head end controller located in the LMC telecom room. Each classroom has a minimum of 1 speaker to receive announcements. The corridors also have speakers. The speakers appeared to be in fair to good condition with varying models installed depending on the age of the speaker and environment it is installed in. The head end equipment is dated and should be considered for replacement to improve reliability and fidelity. Although not tested, the spacing of speakers and locations throughout the building appears to provide adequate overall paging coverage. Adding new or reusing existing speakers in renovated areas is recommended to maintain a comprehensive paging system.

Each of the classrooms have a Dukane clock that is time correction controlled through hardwired connectivity to headend equipment in the LMC telecom room. The clocks are connected to 120-volt power wiring or receptacles. Extension of the clock system to new renovated areas is recommended for consistency throughout the building. Advances in clock system technology have also led to digital clock displays and wireless time correction which may be desirable in the future.



Fig 33 | Dukane Public Address System



Fig 34 | Typical Classroom Clock

Intrusion Detection/Access Control/Camera Systems

A Bosch access control system provides Intrusion detection coverage at the main entry points and corridors throughout the building and provides coverage via motion detection sensors. Additional intrusion detection is located in rooms with high value assets such as the Band Room, AG Shop and LMC library. Operational status of the system was not confirmed but the coverage is consistent with industry standards for perimeter and main travel path monitoring to protect the building.



Fig 35 | Typical Corridor Intrusion Alarm Device

Card or fob access is also provided at some exterior doors. Additional card access locations at all perimeter doors would be beneficial to provide police and other first responders opportunities to enter the building at various locations depending on the event they are responding to. Modern security systems can include card readers that also have keypad codes so that first responders would not necessarily need cards or keys to gain entry.



Fig 36 | Card Access at the Main Telecom Room

Extending card access to interior doors is also becoming more common in the school setting. This allows access to be granted and revoked more readily without the necessity of tracking keys. Depending on the system selected and how the door card terminals are programmed, doors could also be locked simultaneously should an event necessitate this feature for protection of building occupants or property. It is recommended that the school district review their safety protocols and procedures to see if a modern, comprehensive security system is a high priority addition for the school specifically for interior classroom doors but also for the remainder of exterior doors.



Fig 37 | Card Access at the Main Telecom Room

There are dome type security cameras installed throughout the corridors of the facility. The

cameras have been replaced within the last 3 years according to staff. Overall, the camera layout is extensive and appears to provide a comprehensive view of the overall building corridor system. The cameras appear to be in good condition.