LAKE DELTON ELEMENTARY SCHOOL

Summary of Findings

Despite ongoing maintenance efforts, the Lake Delton Elementary School is showing signs of deterioration. Items needing more urgent attention include exterior caulking, siding replacement, soffit repair, new asphalt paving and base course, sidewalk/stoop replacement to eliminate tripping hazards, re-grading to alleviate drainage problems at entries 1 and 3, and a safer arrangement for student drop off. This building is at a crossroads in the written opinion to either provide a significant reinvestment or consider a full replacement at some date in the near future.

Report Card

ITEM	EXISTING CONDITION	L1	L2	L3	COMMENTS
SITE & GROUNDS	C		X		Paving, walks critical, downspouts discharge above grade and run across sidewalks
STRUCTURAL (foundation, floors, walls, framing)	B	X			Correct moisture into face brick to reduce damage to structural backup system
LIFE SAFETY	C-		X		Equipment in corridors reduce egress width; Gymnasium and classroom doors reduce egress width
ACCESSIBILITY	D		X		Eliminate vertical changes in level at walks; update bathrooms with current Accessibility features
HAZARDOUS MATERIALS	Suspected		X		9 x 9 floor tile in gym; pipe wrap in classroom closet 160; questionable paint & stain age (floors, walls, wood)
BUILDING ENVELOPE	D			X	Replace caulk, siding. Repair soffits, glass block; find source of water & repair spalling face brick
INTERIOR FINISHES	C-		X		Replace carpet; VCT is highly patched; corridor book curb/coat hooks
SIGNAGE	F			X	Interior signs do not meet Accessibility requirements
OVERALL CLEANLINESS	B-		X		Restroom counters are failing, difficult to clean; clean cafeteria grilles need cleaning
SECURITY	C		X		Secure vestibules with camera; exterior lighting; room number decals on windows and entries; controlled
BUILDING SYSTEMS (MEP)	--	--	--	--	See report

Existing Condition Codes

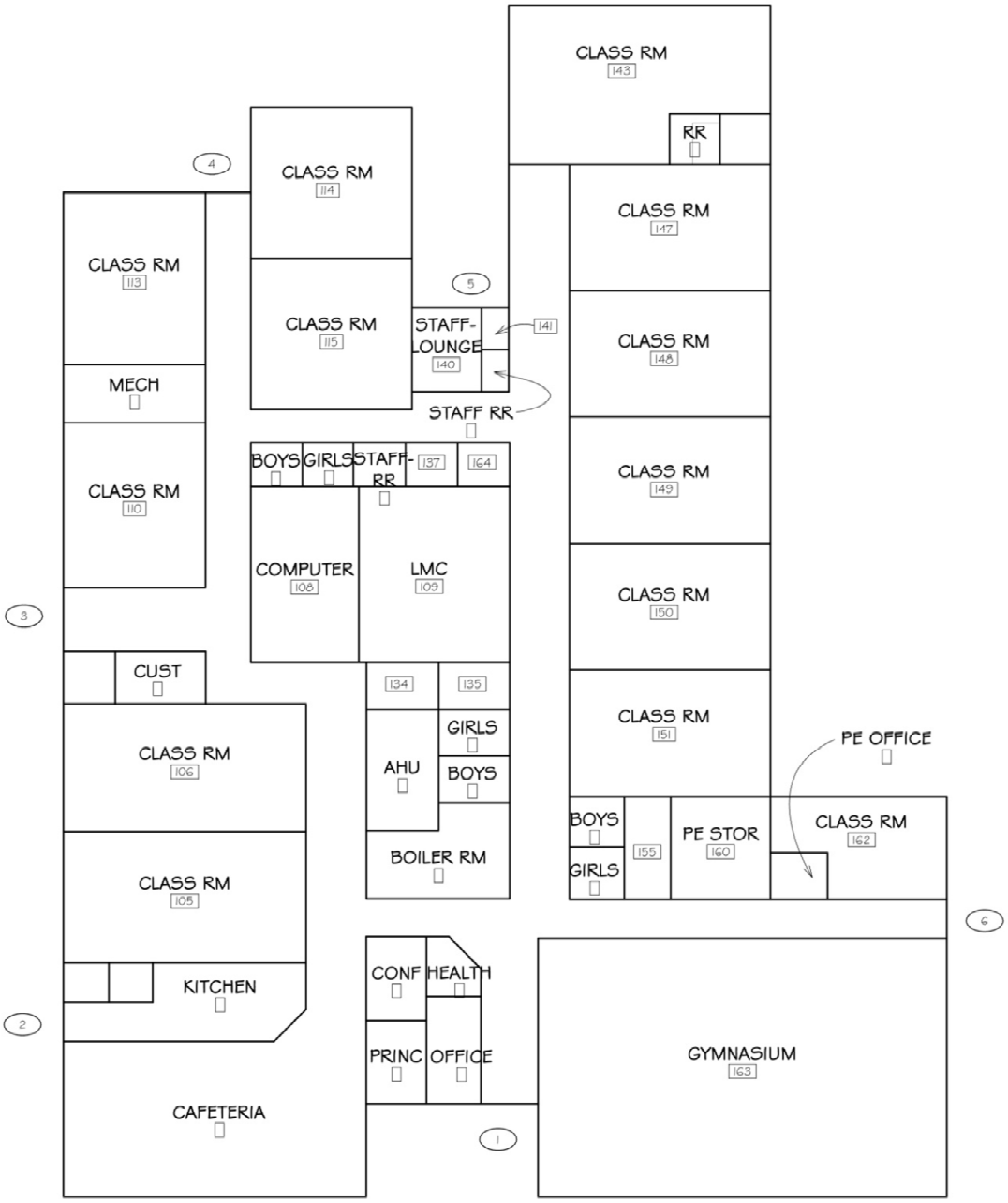
A Excellent: Clean, safe, functional. New or easily restorable to "like new" only minimal routine maintenance.
B Good: Only routine maintenance or minor repair required.
C Adequate: Some preventive maintenance and/or corrective repair required.
D Fair: Fails to meet code and functional requirement in 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



Lake Delton Elementary – Site Aerial



Lake Delton Elementary – Floor Plan Diagram

Site & Grounds

General | Lake Delton Elementary was constructed in 1952, with additions in 1961 and 1989. The interior was also comprehensively remodeled in 1989.

Drives / Adjacent Streets | The school is bordered by three streets and a City Park. Nearby buildings include residential, Police Station, Community Center, and restaurants.

Cross walks are painted at the corner intersection and sidewalks are present leading up to the school intersection, however, the school property has no raised sidewalks to separate pedestrians and cars. The safe path is designated only by pavement markings, which are difficult to see in the winter months.

A drop off area adjacent to the front door relies on pavement striping and a no parking sign. Two-way traffic is permitted in front of the school, which may present safety concerns (e.g., parent drop student in right lane crossing bus and other car traffic).

Site Topography | While the site is relatively flat, drainage issues include water flowing toward east door and downspouts that terminate above grade and run across sidewalks (potential ice hazard). Maintenance advised that water drains toward Entry 1 doors. Re grade and replace pavement to direct water away from building.

Site Furnishings | One bike rack is present (not secured to the ground). Benches appear adequate.

Landscaping & Parking | Parking alongside the buildings virtually eliminates the opportunity for plantings and separation of pedestrians from cars.

Fences | Fencing separates the playground from an adjacent park and surrounds the gas meter. It appears to be in good condition, with the exception of some loose barbed wire around the gas meter enclosure.

Site Lighting | Includes building mounted lights and street pole lighting along the east parking area. No issues observed.

Exit Discharge | Appears to be adequate, with at grade discharge points leading to playgrounds or adjacent streets. Several sidewalks and stoops pose tripping hazards and exceed the ¼” maximum height for change in level for Accessibility.

Emergency Access | A Fire Department Knox Box (key for emergency personnel) is in place at Entry 1. All entries and classrooms have large decal numbers on the outside of the building for safety.

Outbuildings | Two wood frame “yard barn” style storage sheds are located within 1-2 feet of the school building. Typically, code requires buildings on the same lot to either be separated from one another by physical distance or rated construction, or be considered one building for construction type and area limits. Further review of area limits and storage contents is needed to determine action.

Building Envelope

Soffits |All sections need paint, some need replacement. Close and seal gaps at brick.

Exterior Walls | Exterior walls have cracked and spalling brick veneer. Water may be entering via the rowlock masonry sill, freezing, and causing the face to spall from the brick. The source of moisture needs to be eliminated and brick repaired / replaced to avoid further deterioration. A few broken glass blocks need repair. Siding on the south gable needs replacement. Large gaps between soffit and face brick need closure and caulking.

Sealants | All exterior caulking is severely weathered and needs to be replaced as soon as possible. (e.g., window perimeters, door perimeters, penetrations, transitions between materials, movement joints, etc)

Doors | Door thresholds are rotting in some locations; need to address source of moisture and replace.

Windows | Windows are a combination of aluminum clad wood, aluminum storefront, and glass block. While the window units are generally in good condition, all windows need exterior caulking.

Building Interior

Life Safety & Accessibility

Construction Type | This construction would most likely be classified as Type VB Masonry unprotected (brick and concrete masonry exterior walls and any interior wall construction permitted by the code).

Number of Stories | One

Corridors | Doors to classrooms are not rated, have unlabeled glass and unprotected louvers. Their swing outward into the corridor exceeds current code limits (7” maximum protrusion).

Equipment stored in corridors reduces egress width to 56 ½”, below the current code requirement of 72” for E Educational occupancies.

Code requirements for Group “E” Education Occupancies have become more stringent in recent years. For example, corridor fire ratings are typically 1 hour rated if the building is not sprinklered; and sprinklers are required when the fire area is over 12,000 SF or has spaces below level of exit discharge, unless each classroom has an exterior door at grade. The extent of code required upgrades would need to be reviewed under any remodeling scenarios.

Gymnasium | The west fire alarm pull is obstructed by the telescoping bleachers. Acoustical wall covering is soiled. The west wall has a minor stepped crack in the CMU near the roof framing. Wired glass in the doors would not be permitted by today’s code (cut hazard). Exit doors encroach on clear width at the corridor at Exit 6. Drinking fountain lever is not Accessible; spout height exceeds requirements for children’s use at 31”.

Boiler Room | No rating was observed on boiler room door or frame. Typically, boiler rooms are 2 hour rated. Wall construction is CMU and penetrations appear to be sealed.

The Kitchen has commercial cooking equipment with residential exhaust hood.

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	BOYS	MEN (STAFF)	GIRLS	WOMEN (STAFF)	SUPPORTED OCCUPANT LOAD (Per IBC 2009)
Water Closet	1:50	3	2	6	2	500 M | 400 W
Urinal	2/3	5				Incl above
Lavatory	1:50	5	2	5	2	350 M | 350 W
Drinking Fountain	1:100					Not tallied
Service Sink(s)	1	---	---	---	---	More than one provided

Electrical 147 | A ¾ hour rated door has no closer, round knob, door binds, and CMU enclosure walls stop short of the roof deck (fire barriers are required to be continuous from foundation/slab to roof deck). Storage is present in front of electrical panels.

Exit lights are generally well located in the corridors. An additional directional sign could be considered near room 134 to direct occupants toward Exit 3.

Fire Alarm pulls generally exceed 42-48" high mounting range (higher than 48") and fire extinguishers are typically mounted higher than current Accessibility code reach ranges of 48". Several wall mounted fire extinguishers in the circulation path extend more than 4" from the wall face, which create protruding object hazards.

Mechanical/Custodial room 110 has unsealed pipe and duct penetrations into the rated room; items are stored in front of electrical panels; possible hazardous material at grey floor paint; cleaning supplies in locked cabinet within custodial room.

Typical Accessibility issues include:

- While corridors and classroom doors are typically wide enough to be an Accessible route, some restrooms, storage rooms, and staff only doors are too narrow and have round knobs.
- In classrooms, standard counters are too high at 36" or 31-1/4" (34" required in adult areas, less in those designed for Children's use), non-Accessible faucet controls (operable parts cannot require tight grasping, pinching, or twisting of the wrist), built in casework that encroaches on doorway maneuvering clearances, round door knobs at closets and service spaces.
- In corridors, wardrobe shelves are protruding object hazards (extend beyond 4" into the circulation path between 27" and 80" above the floor).

- The main boys and girls restrooms across from Classroom 151 have some Accessibility features such as adequate clear door width and maneuvering clearances, but stall dimensions and grab bars do not meet Accessibility requirements.
- The “short hall” staff restroom does not meet Accessibility requirements (e.g., insufficient clear door width, maneuvering clearances, non-compliant lavatory controls, no lavatory pipe protection, mirror too high, no grab bars, improper water closet location). Overall room dimensions do not support required clearances without moving walls.
- The “short hall” boys and girls restrooms (across from room 115) are not Accessible (e.g., clear door width less than 32”, inadequate maneuvering clearances at doors and stalls, no grab bars, no lavatory pipe protection, mirrors mounted to high).
- The men’s and women’s staff restrooms opposite the boiler room do not meet Accessibility requirements (e.g., insufficient clear door width, maneuvering clearances, non-compliant lavatory controls, no lavatory pipe protection, mirror too high, no grab bars, improper water closet location). Overall room dimensions would support a remodel to meet Accessibility requirements.
- Corridor drinking fountain spouts are generally under 36” high, but not below 30” high for Accessibility to fixtures for children’s use (Maximum height is typically 36” for adults, with allowance for 30” maximum where primarily for children’s use). Controls are a mix of push button, lever, and round knob.
- Interior signs have been upgraded since 2015.
- At Classroom 143, the step down reading nook (3 steps at 5-1/2”) does not have ramped access. The children’s restroom does not have maneuvering clearances for the water closet. Lavatory has insufficient knee clearance and piping is unprotected.

Finishes

General | Despite diligent maintenance efforts, finishes throughout the facility are worn.

- 2x4 suspended ceiling tiles are sagging; spots with water stained tiles
- Doors and frames are heavily worn (e.g., chipped, pitted, and scratched)
- VCT is highly patched
- Most carpet needs replacement but the LMC does have new carepet tile, wall base, and fresh paint.
- Wall base is waxed, loose in spots
- Silencers are missing on most door frames
- Wall paint is generally in good condition with recent coat of fresh paint applied to most walls.
- Acoustical wall covering (music room, corridors) needs replacement
- Areas with painted floors need new finish (PE storage, closets, etc)

Entries | Terrazzo flooring in good condition, no cracks, some staining. Wall tile has some cracks and chipped paint. Exposed wood decking is in good condition.

Offices | Carpet tile, VCT flooring, base, and walls are in average condition. Doors and frames are in average condition. Exposed decking and glu-lam framing is in good condition.

Gymnasium | Gymnasium was added in 1961, along with administrative offices, the boiler room, storage, and restrooms. The gymnasium floor is 9 x9 tile in good condition for its age (sealed well) though it likely contains asbestos. The 6” vinyl base is aged and loose; Acoustical wall covering in poor condition; glu-lam and wood decking in good condition.

Cafeteria | Needs updated finishes including new VCT, vinyl wall base, (replace Fiberglass Reinforced Panels (FRP)), and new ceiling (replace 2 x 4 with 2 x 2 suspended ceilings).

Kitchen | Quarry tile needs new grout and 2x2 vinyl wrapped gypsum board ceiling is in fair to poor condition. Plastic Laminate countertops in kitchen should be replaced with stainless.

LMC | Shelving is located in front of doors into adjacent spaces. Carpeting and base was recently replaced and walls were freshly painted; some sagging and stained ceiling tiles.

Computer Lab | Finishes in this room are in average condition.

Corridors | Corridor return air grilles need cleaning.

Classrooms | Original 1952 building had 4 classrooms. Original cabinetry and flooring remains in these rooms and is in poor condition. Furnishings vary widely from old original to newer in average to good condition. Older ceilings and walls are either gypsum wallboard or plaster in average condition.

Restrooms | Plastic laminate counters, mirrors are worn and in poor condition. Metal partitions were recently replaced with solid plastic compartments. Painted CMU is in good condition. Ceramic tile floor and base are in fair condition. Ceiling of 2 x 2 vinyl wrapped gypsum wallboard is in average condition.

Staff Areas | Restroom *finishes* and fixtures are generally dated, worn, and in poor condition aside from a recent fresh coat of wall paint.

Storage, Mechanical, and Service Spaces | Grilles, louvers and speakers are generally in poor condition.

Entry area - sidewalks covered with snow - necessary repairs noted in previous reports and see Picture 10



LD Elem 1

Recommend select masonry repairs and tuck pointing where necessary


LD Elem 2

Evaluate all control joints / expansion jonts - resealing is necessary with many


LD Elem 3

Brick continues to deteriorate



LD Elem 4

All steel lintels should be stripped of paint and rust and refinished



LD Elem 5

Soffits and fascia materials require repair or replacement



LD Elem 6

Entry stoops should have smooth transition to blacktop



LD Elem 7

Replace broken glass block



LD Elem 8

Loose barbed wire presents hazard around gas meter enclosure



LD Elem 9

From 2015 report - sidewalks are all in poor condition and pose trip hazard



LD Elem 10

Downspout should direct water away from face of building - repair grading and asphalt this area



LD Elem 11

Gaps between materials should be sealed



LD Elem 12

Significant cracking in masonry joints along with deterioration



LD Elem 13

Siding on south gable needs replacement



LD Elem 14

Evaluate masonry for settled joints - tuck point at select locations



LD Elem 15

Residential hood over commercial cooking appliance is a safety hazard



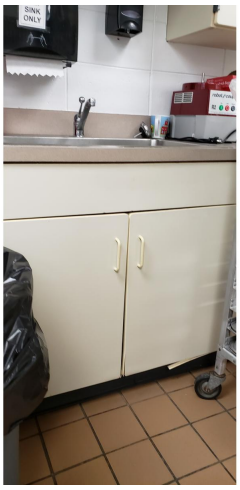
LD Elem 16

Dry storage reduces exit width presenting a safety hazard. Mismatched floor tiles



LD Elem 17

Worn plastic laminate cabinets in Kitchen

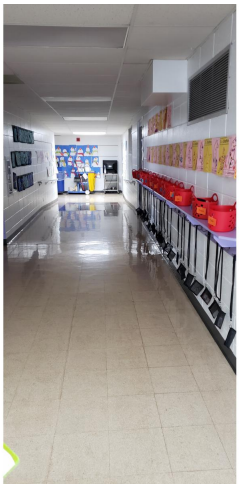


LD Elem 18



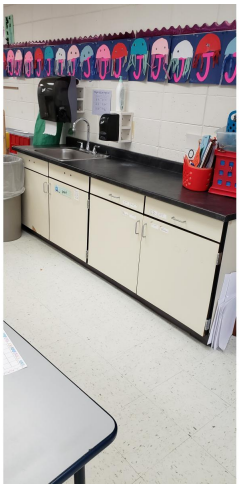
LD Elem 19

Despite fresh coat of wall paint, remaining finishes are in below average condition



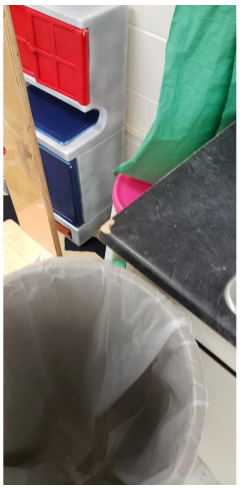
LD Elem 20

Worn plastic laminate cabinets in classroom



LD Elem 21

Chipped plastic laminate countertop



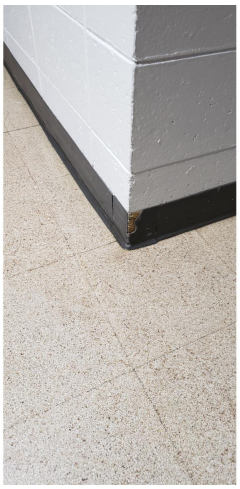
LD Elem 22

Attempts to enhance acceissiblity features with grab bars; round door knob does not meet accessibility requirements



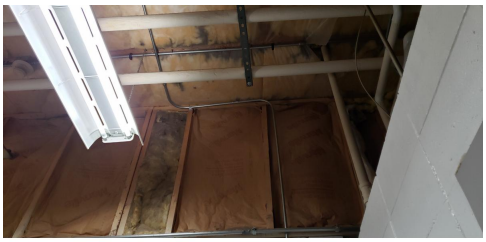
LD Elem 23

Damaged wall base



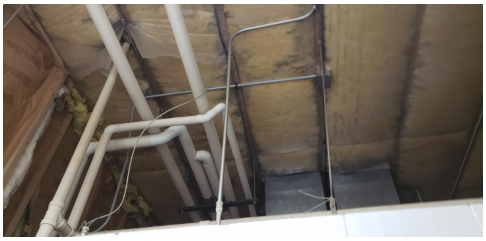
LD Elem 24

Evidence of roof leak and discontinuous vapor retarder



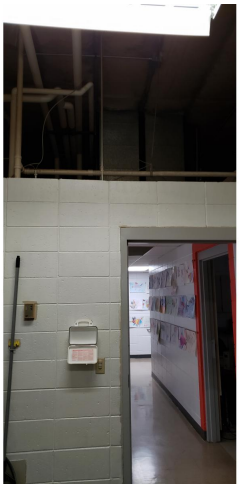
LD Elem 25

Evidence of roof leaks and discontinuous vapor retarder



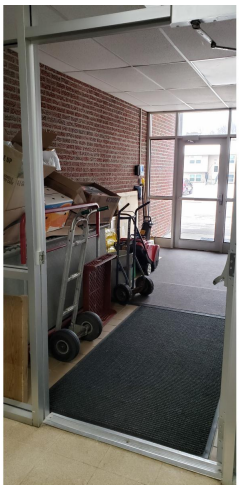
LD Elem 26

Questionable corridor continuity at demising wall with mechanical room



LD Elem 27

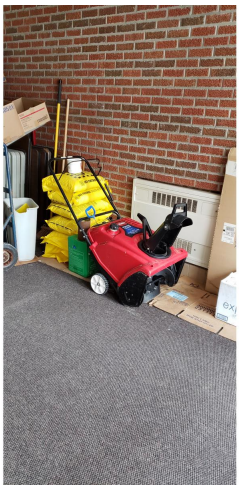
Inappropriate storage in vestibule presents safety hazard



LD Elem 28

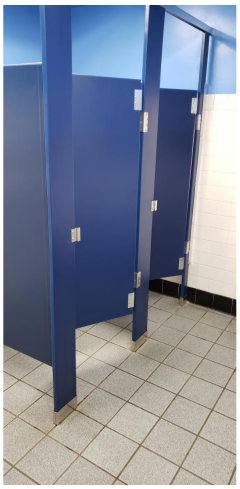


LD Elem 29



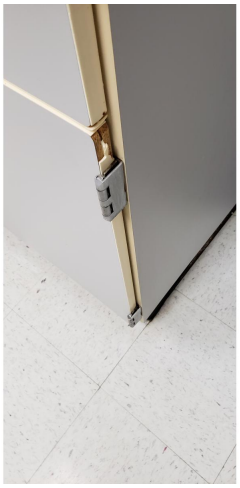
LD Elem 30

Toilet compartments replaced and fresh coat of paint since last report was written



LD Elem 31

Worn plastic laminate casework



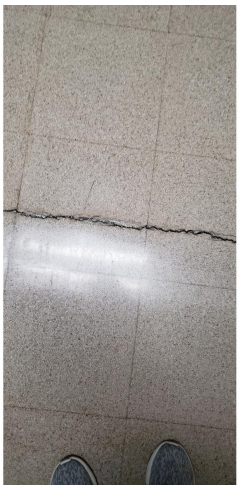
LD Elem 32

New carpeting, wall base, and fresh coat of paint since last report was written



LD Elem 33

Cracked VCT flooring



LD Elem 34

Typical lavatory - controls do not meet accesibility requirements - laminate counters in below average condition



LD Elem 35

Cracked terrazzo



LD Elem 36

Poor base in classroom



LD Elem 37

Wall base and louvers in poor condition - floor is a known hazardous material to the school district



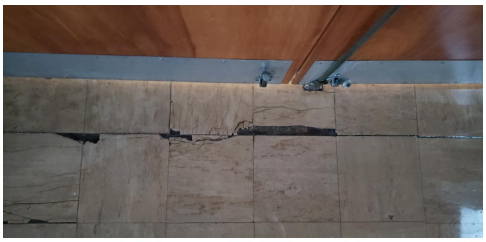
LD Elem 38

Broken window in Gym



LD Elem 39

Damaged gym floor



LD Elem 40

Gymnasium doors in poor condition



LD Elem 41

Cafeteria ceiling in poor condition - floor in below average condition - walls have fresh coat of paint



LD Elem 42

LAKE DELTON ELEMENTARY

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.

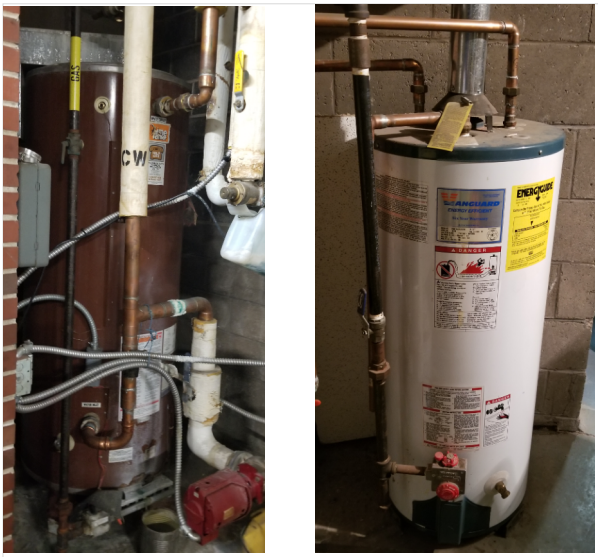


Fig 1 | 100 Gallon Water Heater (left) and 30 Gallon Water Heater (right)

Plumbing Systems

Most domestic water piping is original to the building and is galvanized. This piping has exceeded its useful life expectancy and is likely to result in leaks. Replacement of this piping is recommended.

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.



Fig 2 | Urinal (left) and Water Closet (right)

Domestic hot water is provided by two separate systems. The primary source is a 100 gallon, 270,000 Btu/h natural gas water heater and is old and in poor condition. A 30 gallon, 26,000 Btu/h natural gas water heater provides hot water for a smaller area and is in fair condition.

Restroom water closets are floor-mounted tank-type with a few select floor-mounted with manual flush valves on child-size water closets. Urinals are floor mounted with battery-operated automatic flush valves. Lavatories are wall-mounted or drop-in vitreous china with manual faucets.



Fig 3 | Single Restroom with Child-size Water Closet

Classroom sinks are a mixture of stainless steel or enameled cast iron with manual faucets.

All plumbing fixtures are generally in poor to fair condition with many being original to the building and could use replacement.

Electric water coolers are located in the corridors. The gymnasium includes a drinking fountain that is original to the building. All electric water coolers and drinking fountains are covered to prevent use due to COVID-19 and all are in poor to fair condition.

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

Roof drainage occurs mostly by exterior gutters and downspouts but a few locations with interior storm piping.



Fig 4 | Classroom Sinks



Fig 5 | Electric Water Coolers



Fig 6 | Gas-fired Boiler

HVAC Systems

The entire building is primarily heating-only with active cooling only available in the office area, library, and computer lab.

The heating source for the building is a single 1,800,000 Btu/h natural gas-fired boiler that is original to the building and in poor condition. The heating hot water piping system is configured as a primary constant flow pumping system and is also original to the building and due for replacement. The pump was being replaced during our visit. There is only one boiler and distribution pump so if either fails, the entire building would be without heating.

A majority of the classrooms and cafeteria are served by a constant volume air handling unit that distributes air to a series of zone-level heating hot water coils for temperature control. Return air utilizes the corridors as a path back to the air handling unit.

The remaining classrooms are served by four gas-fired furnaces that are over 30 years old, far exceeding their useful life expectancy and are in poor condition.

The offices, library, and computer lab are served by a constant volume air handling unit with direct expansion cooling coil connected to an outside air-cooled condensing unit. Air is distributed to a series of zone-level heating hot water coils for temperature control.

The gymnasium is served by a single zone, constant volume air handling unit with heating hot water coil.

Many perimeter spaces also include heating hot water fin tube radiation for supplemental heat.

Ventilation air is provided direct to each air handling unit and furnace. Exhaust air is provided through roof-mounted exhaust fans.

All air handling units have exceeded their useful life expectancy and are due for replacement. The constant volume air and heating hot water distribution is an energy inefficient system.

The kitchen exhaust hood above the range does not conform to current code. This hood should be replaced with a Type 1 grease hood and fan system.

With the exception of the furnaces, the HVAC system is controlled by a pneumatic temperature controls system that is original to the building, although the pneumatic air compressor has been replaced at some point. This system is outdated requiring frequent calibration for proper operation. Maintenance may be difficult due to limited availability of parts and service technicians with experience working on these types of systems. An upgrade to a building automation system is



Fig 7 | Air Handling Unit



Fig 8 | Gas-fired Furnaces



Fig 9 | Kitchen Exhaust Hood

recommended but not communicated as a high priority by facilities maintenance personnel.

The furnaces are controlled by local thermostats.



Fig 10 | Pneumatic Air Compressor

Electrical Systems

Service Entrance/Distribution/Branch Panel Equipment

The school's electrical service enters the building on the west side through a pad-mounted utility transformer. The main building feeders are routed underground to an electrical room along the exterior wall where they serve a distribution panel (800A 208Y/120V). The panel appears to have provisional space for additional breakers to support future loads.

The building distribution is 120/208 volt and serves the building loads such as large mechanical loads, lighting and plug loads. The main distribution equipment was installed in 1989 along with some of the branch panels. 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



Fig 11 | 208V Service Switchboard

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.

Some panels located throughout the building installed prior to 1989 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 1989 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.

Given the overall condition of most of the equipment installed in 1989, 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, many, but not all, 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



Fig 12 | 208V Panel in the Boiler Room



Fig 13 | 208V Panels in Room 131

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.

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.



Fig 14 | Typical Exit Sign with Battery

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.

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. Dual 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.

It was noted that some office spaces have 4x4 fixtures and layouts that may be spaced too closely together. The main office was measuring approximately 150 footcandles (FC) at the work surface while the adjacent Principal's office and staff room were 120FC. Today's energy codes would limit the amount of light that could be installed in these types of spaces. Typically office type space would have light levels ranging from 50-80FC. High artificial light levels can also lead to eye strain and fatigue over the course of the workday. Dimming for these fixtures or replacement with a lower output LED equivalent fixture is recommended.

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



Fig 15 | Gym Lighting



Fig 16 | Typical Classroom Lighting



Fig 17 | Typical 4x4 Office Fixture

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. 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 18 | Staff Room Lighting



Fig 19 | Typical Lighting Controls

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 20 | Typical Exterior Light Fixture

Exit/Emergency Lighting

Emergency lighting is provided by battery pack lighting located throughout the corridors. The overall coverage of the interior emergency lighting system and exit signs appears to be adequate. The emergency lights and exit signs are in fair condition. Some of these lights appear to be dated. 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 21 | Gym Exit and Emergency Fixture

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 22 | Typical Horn Strobe Device

Fire Alarm System

The building is currently supported by a Kidde non-addressable fire alarm system with horn notification. Based on dialogue with district staff, it is understood that this panel does not have 3rd party monitoring. The panel is functional but has reached its' end of useful life having been installed in 1989. The Fire Alarm Control Panel (FACP) is located in the boiler room. Compatible initiation and notification devices are still available for expansions/renovations.

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 23 | Kitchen Heat Detector

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. The kitchen and some of the corridor spaces include detection devices. Entry/exit points have manual fire alarm pull stations. The detection and initiation devices appear to be in fair to good 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.



Fig 24 | Typical Horn Device in Corridors

The building has fire alarm notification devices in corridors and some classrooms. Although not witness tested, the location and spacing of audible notification devices appears to be sufficient throughout the facility but 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.



Fig 25 | Typical Wireless Access Point

Voice/Data Systems

The main telecom room is located in a dedicated room within the data room. This room also includes the building's active systems such as switches, servers or hubs. All telecom cabling is distributed from this room to field devices. Cables are routed from the data rack up into the plenum space and dispersed to serve the building. Very little cable management was found in the room or at the rack 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 5e which should be sufficient for the foreseeable future. The data rack installation is within a dedicated room with security card access. Having dedicated spaces allows for secured access and environmental conditioning. The telecom room is of adequate size to support the equipment plus some additional rack space for future growth.

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.



Fig 25 | Typical Public Address Speaker and Clock

Public Address & Clock Systems

The building currently has a Dukane public address system with a head end controller located in the Principal's office. 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 Latham clock that is time correction controlled through hardwired connectivity to headend equipment. 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 26 | Typical Public Address Speaker and Clock

Intrusion Detection/Access Control/Camera Systems

There is no intrusion detection installed at this facility. A Bosch access control system monitors the main entry points for the building. Card or fob access is 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 27 | Typical Dome Camera

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.

There are dome type security cameras installed at the main entry to the building. Additional cameras could be provided to achieve a comprehensive view of the overall building corridor system. The cameras appear to be in good condition.