



La Farge School District 2020 FACILITY ASSESSMENT REPORT

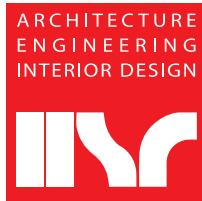


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La Farge School District

301 W. Adams Street
La Farge, WI 54639



HSR Associates, Inc.

100 Milwaukee Street
La Crosse, WI 54603

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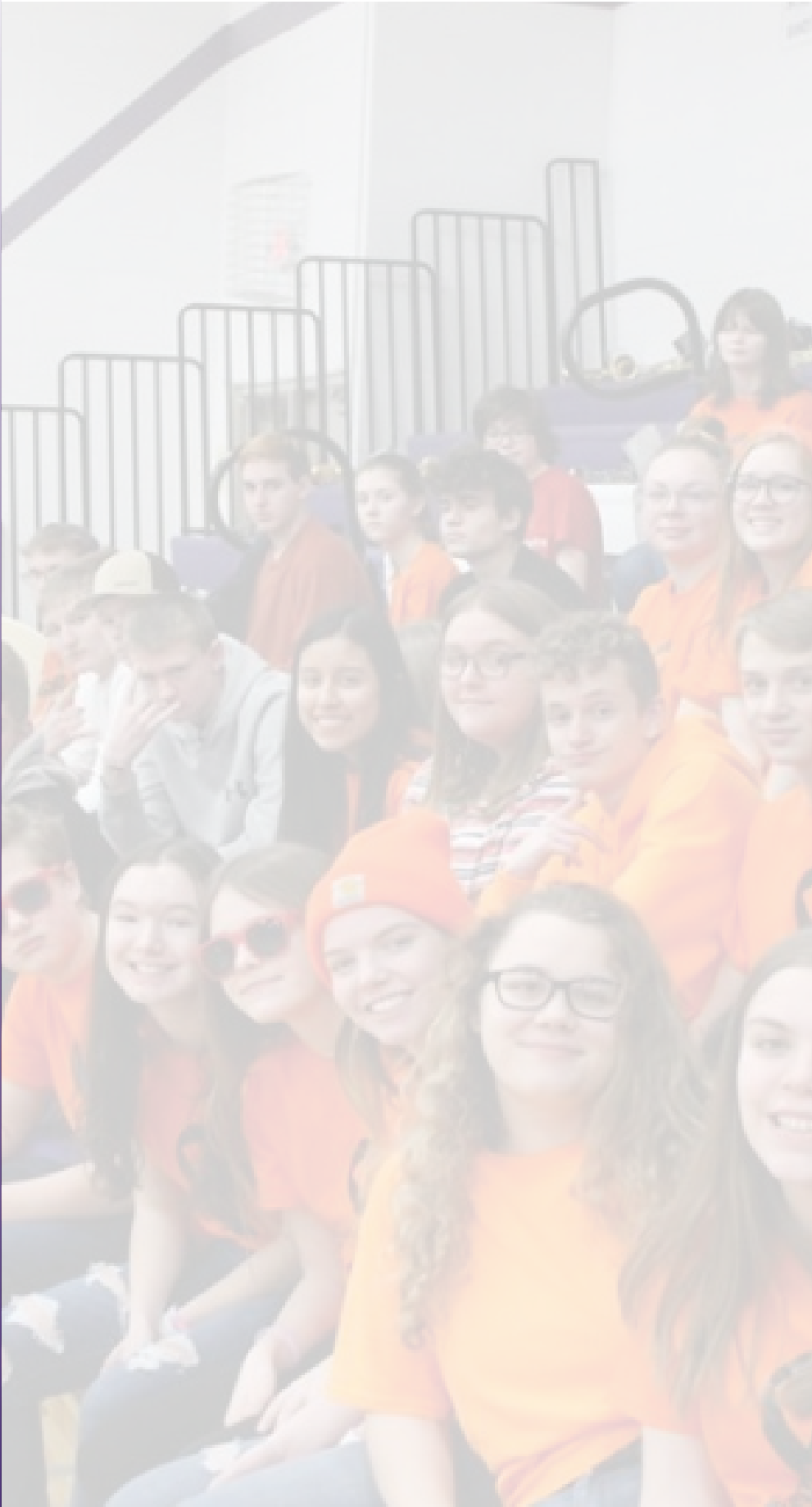
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SUMMARY STATEMENT

1.1 INTRODUCTION

In the late fall of 2019, La Farge School District held discussions with HSR Associates regarding the current state of educational facilities. The District desired to have additional information to assist with making important decisions about the future of the programming and facility needs.

HSR is pleased to submit this facility assessment to the La Farge School District. The assessment is generated through collaborative efforts of the District's Administrators, Staff and HSR's Architectural and Engineering Team. The outcome of the study is a strategic vision for future educational programming and long range facility planning.

This facility assessment studied all of the school property with an emphasis on the overall site and building condition, capacity and how the building functions in response to the changing needs and methods of education. Based on the facility evaluation, the purpose of this report will propose how best to utilize this facility and better plan for the future, including a prioritized list of improvements that will assist the school board in making informed decisions.

1.2 METHODOLOGY

Information for this report was obtained through the review of the original architectural drawings, visual observation and program improvement suggestions from the La Farge School District administration and faculty. The existing building drawings were provided by the La Farge School District.

The scope of this report does not include observation or testing of hazardous materials including but not limited to: asbestos, radon, PCB's, mold or lead based paint.

1.3 PROJECT SCOPE

- Walk-thru of existing building
- Review of existing plans and specifications
- Use of existing drawings
- Document existing site and building conditions through referencing site maps, photographs of areas on plans and details
- Describe existing conditions (Facility Study) and recommendations (Facility Study Executive Summary), covering but not limited to the following aspects: Site Evaluation, Building Envelope and Interior Spaces Analysis, Mechanical/Electrical/Plumbing System evaluation.
- Staff and Administration Discussions
- Board Discussions
- Community/Task Force Discussions

1.4 PROJECT TEAM (HSR ASSOCIATES)

- Project Manager - **Brad Simonson**
- Project Architect - **Tim Ruppert**
- Graphic Designer - **Janet Loeffler**
- Mechanical Engineer - **Jake Beran**
- Electrical Designer - **Scott Gerzsik**

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2 OVERVIEW

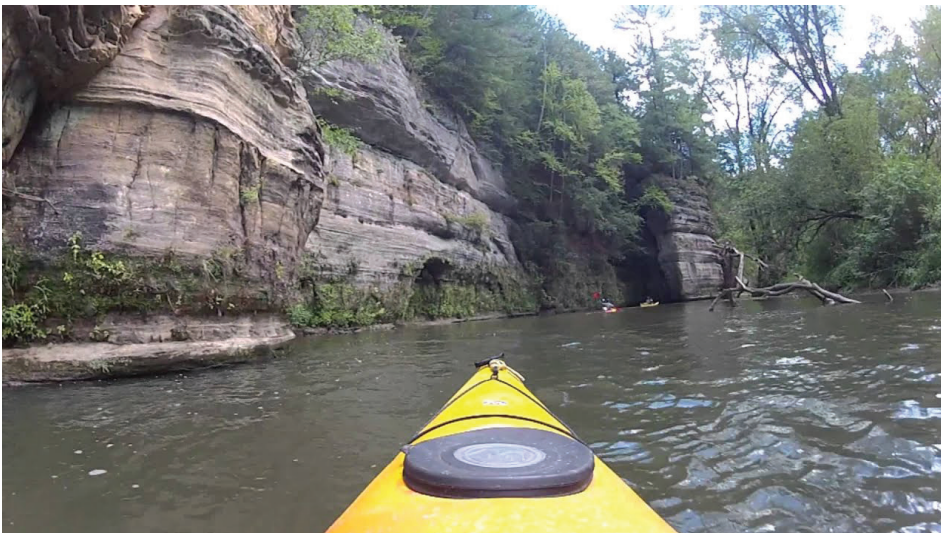


2.1 CONTEXT



The village of La Farge along the Kickapoo River is located in Vernon County, Wisconsin. The Kickapoo River runs 125 miles and is the longest tributary of the Wisconsin River. It meanders from its source in Wilton to Wauzeka. Since the glaciers missed the Driftless Area, it did not change the natural course of the river. The Kickapoo River Valley is one of the oldest river systems in the world.

La Farge is adjacent to the Kickapoo Valley Reserve. The reserve offers recreation and educational opportunities known for canoeing, hunting, snowshoeing, trout fishing, hiking, biking, snowmobiling and horseback riding. The Kickapoo Valley Reserve stretches 8,600 acres between Ontario and La Farge.



2.2 ECONOMY

At the southern tip of the reserve the Village of La Farge is home to Organic Valley. Organic Valley, the country’s largest organic farming cooperative, calls the Reserve its “big backyard.” Organic Valley represents more than 2,000 farmer members and 900 employees with a mission of saving family farms through organic farming. They produce organic products including dairy, soy, egg and produce products with distribution across the country. Organic Valley hosts the Kickapoo Country Fair on the last weekend of July. The celebration includes live music, sustainability workshops and rural heritage exhibits.

HISTORICAL POPULATION

<u>Census</u>	<u>Pop.</u>	<u>%±</u>
1900	488	—
1910	654	34.00%
1920	788	20.50%
1930	756	-4.1%
1940	921	21.80%
1950	905	-1.7%
1960	833	-8.0%
1970	748	-10.2%
1980	746	-0.3%
1990	766	2.70%
2000	775	1.20%
2010	746	-3.7%
2018	758	1.60%

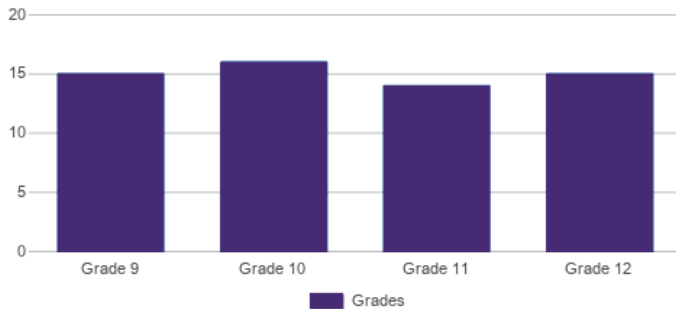


2.3 LA FARGE SCHOOL DISTRICT

La Farge School District consists of one K-12 building located at 301W. Adams Street. The district serves approximately 226 total students which has remained relatively consistent over the last 5 years.

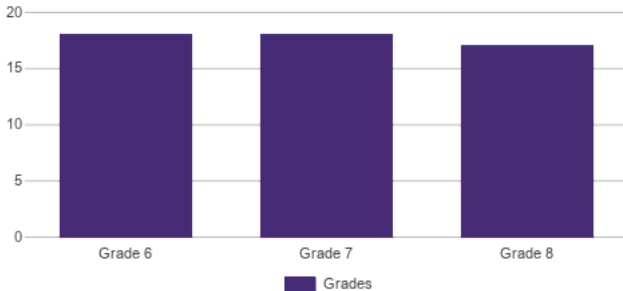
La Farge High School

- Serves approximately 64 students in grades 9-12
- The student ratio of 8:1 is lower than the Wisconsin level of 15:1



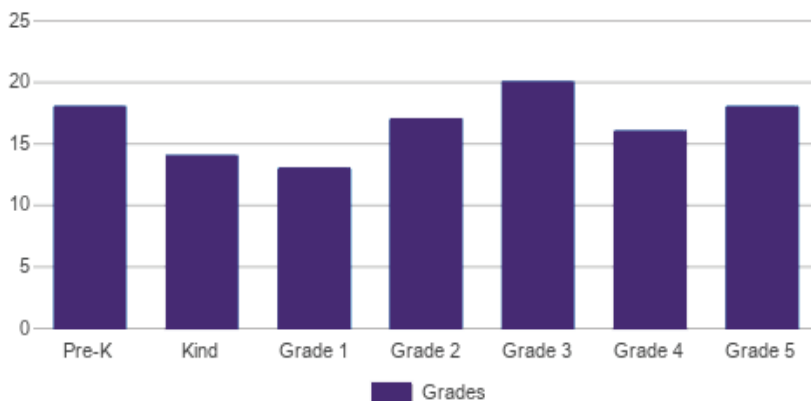
La Farge Middle School

- Serves approximately 50 students in grades 6-8
- The student ratio of 10:1 is lower than the Wisconsin level of 15:1



La Farge Elementary School

- Serves approximately 112 students in grades Pre-Kindergarten-5
- The student ratio of 11:1 is lower than the Wisconsin level of 15:1



2.4 MODERN EDUCATIONAL PLANNING

- Connection to Hallway
- Overlap of Spaces
- Open and Light Filled
- Abundant Use of Glass
- Exposed System



- Hands on Learning
- Utilitarian Industrial Feel
- Working Spaces
- Choice of Furniture
- Exposed Structure



- Building as Learning Tool
- Building Systems Exposed
- Roof Top Use
- Sustainable Design
- Living Wall



- Comfortable Spaces
- Make it a Destination
- Warm Color Palette
- Connection to Multiple Levels



2.5 DAYLIGHTING IN SCHOOLS



HEALTH

Daylight has physiological and psychological benefits for teachers and students. Physiological benefits due to daylight on school children are less dental decay (cavities), improved eyesight, increased growth, and improved immune system. *



ATTENDANCE

Schools that have integrated full-spectrum fluorescent or natural light show an increase in student and teacher attendance when compared to traditionally lit schools. *



ACHIEVEMENT

The study compares the scores of students from newly constructed daylight schools to schools that were artificially lit. Students in the daylight schools had higher reading and math achievement scores. *



SAFETY AND SECURITY

The introduction of windows in classrooms, offices and learning spaces helps build school's security plan. Natural surveillance involves the designing of features to maximize the visibility of areas that should be observed.



FINANCIAL BENEFITS

School administrators and designers have seen daylighting in school pay dividends through lower energy costs and an enhanced learning environment.

* Nicklas, M.G.; Bailey, G.B. (1998). "Daylighting in Schools." Strategic Planning for Energy and the Environment; Vol. 17, No. 2; pp.41-61

3
SITE
EVALUATION





3.1 SITE OVERVIEW

An adequate school site with expansion space will accommodate current and future educational programs and services, expanding student enrollments, increased community use of schools, and promote school-community partnerships. Conversely, continuing use of or selection of an inadequate school site with limited or no expansion possibilities will create ongoing problems such as program development, student enrollment, community use, and school community partnership issues.

The table below summarizes the recommendations for planning school construction. The intent of these recommendations is to ensure that an adequate site support area is available to serve external functions and provide for the safety of students as they arrive and depart from school.

School Level	Recommend Base Site Size
Pre-K through 12	25-35 Acres + 1 Acre/100 Students
La Farge School District	Recommend Base Site Size
Pre-K through 12 (226 Students)	26-36 Acres (10.09 Acres Actual)

The overall site for the building is significantly undersized for the intended use and is causing site pressures including future opportunities for building planning, green space, playground, and site safety and circulation. With a tight sight, any future master planning and/or site modification needs to be carefully planned for current and long term uses.

3.2 SITE ANALYSIS

The school site has evolved since the original construction of the 1901 facility. There have been five additions (1936, 1963, 1965, 1996, and 2016). All of the additions have met current school programming needs but have placed increased pressure on the tight site. Many of these site constraints involve storage needs, exterior receiving with cooler/freezer, accessibility (ADA) challenges, poor site drainage, interior courtyard problems, and underutilized site areas including the link.

Poor Site Drainage

The adjacent topography surrounding the site and building are generating site drainage concerns. There is limited storm water management on the site to address and control the natural runoff. Recommend a comprehensive site drainage for storm water control on the site.

Exterior receiving with cooler/freezer

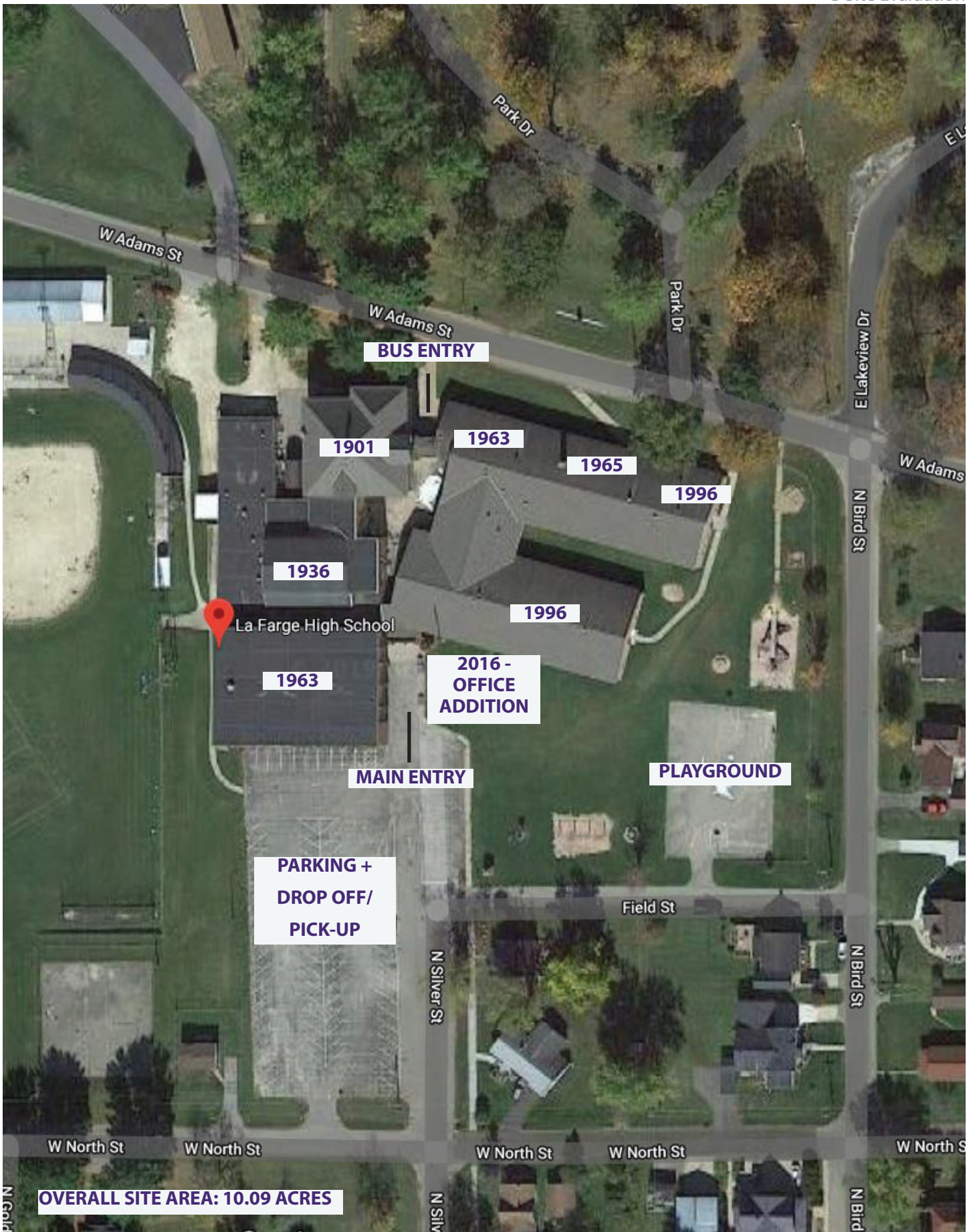
Due to building constraints, the food service cooler/freezer and receiving occur outside the kitchen. For efficiency, better food sanitation, and longevity of equipment, it is recommended to move this to a dedicated home within the kitchen.

Accessibility (ADA) Challenges

Due to the sloping site, there are handicap accessibility challenges throughout the site. The athletic play-fields are not accessible from the building. The covered exterior ramp accessing the music space forms drainage challenges. Any improvements to the site should include provisions to correct these issues.

Interior Courtyard Problems

The courtyard formed by the additions does not adequately divert the storm-water away from the buildings. The downspouts from the adjacent pitched roofs directly drain onto the surface causing drainage concerns and are shortening the life of the concrete pavement. Recommend adding a storm-water management system within the courtyard for better drainage and to make the space more usable. Permeable paving and/or synthetic turf could be added to the space. If made more usable, the courtyard could be an educational asset.



3.3 SITE ANALYSIS

Parking/Traffic Flow

Currently, the vehicle traffic and parking are all south of the building adjacent to the main entry. The staff and visitor share the same entry and exit. The traffic is organized with a one way directional flow. North Silver Street serves as the entry for the site. While most people are used to this flow, it can cause confusion for visitors not familiar with the traffic flow. Also, combining the drop-off and pick-up with the same drive lanes for the parking areas can cause greater congestion. Through on site observation, the traffic flow seems to work for the regular traffic volumes.

The overall parking count on the south is adequate for both staff and students for normal school days. As is the case for many school districts, there is increased pressure for overflow parking for events. The overflow parking is limited for events, and often the street serves these purposes.

Bus drop off and pick up is separate from the main parking lot. The buses travel on West Adams Street to the north. The students utilize the link adjacent to the courtyard. This arrangement keeps the buses separate from the vehicles which is preferred.

As part of long term site planning with limited site area, we would recommend looking at options for further parking lot expansion and site traffic improvements. If adjacent residential properties become available, it is recommended to look at options to procure them over time for future site flexibility.

Playground/Green Space

The playground and overall play green space on site are limited. With the additions over the years, the green space has become more limited. Having adequate green play space is critical for development for the young children. If adjacent residential properties become available over time, the addition of more green play space should be evaluated.

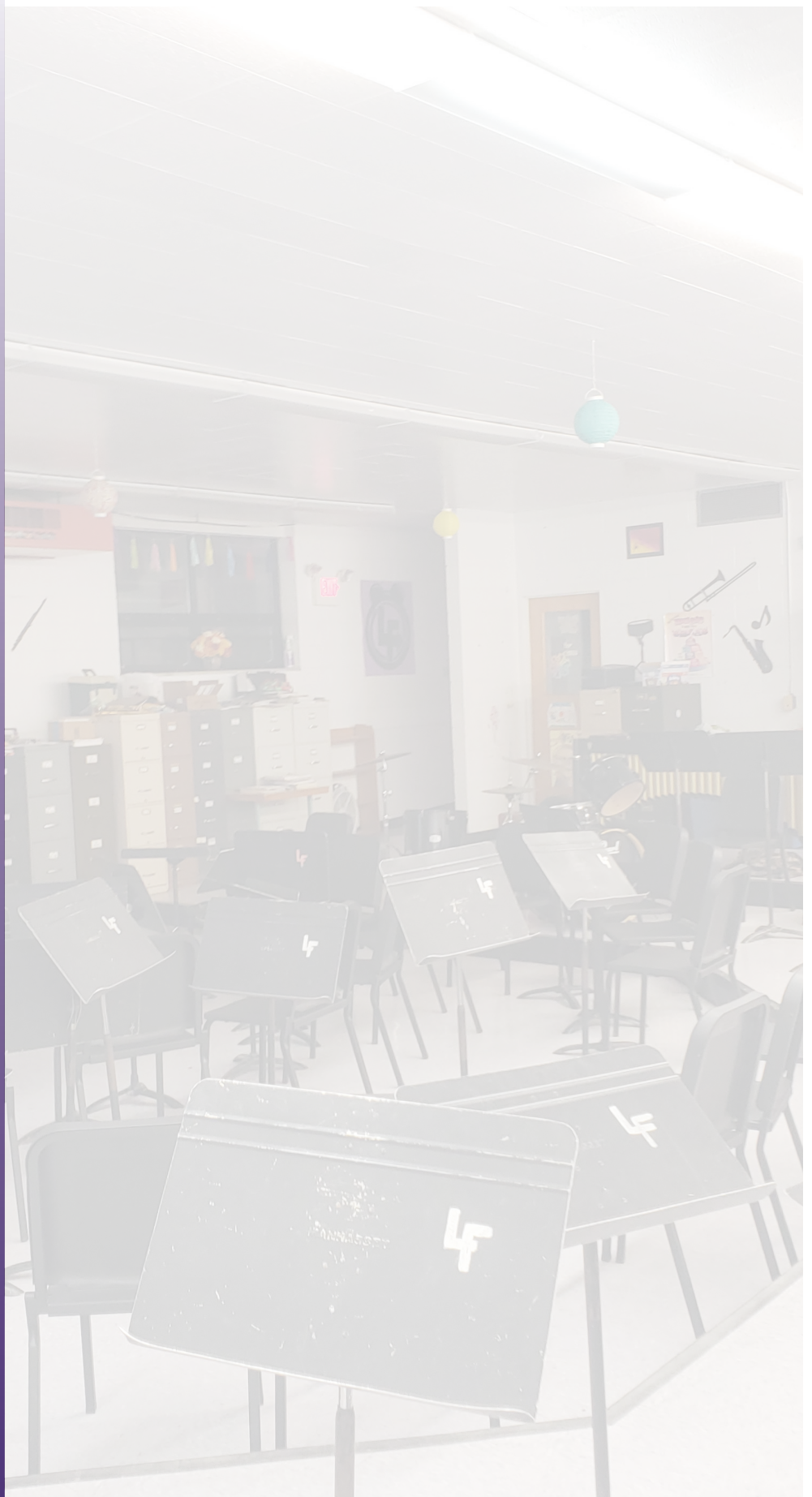


Parking/Traffic Flow

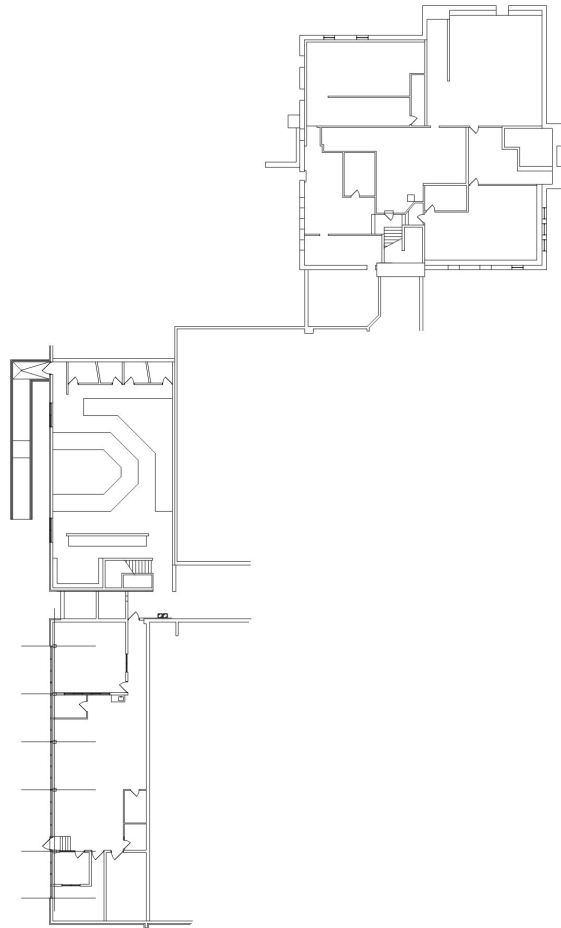


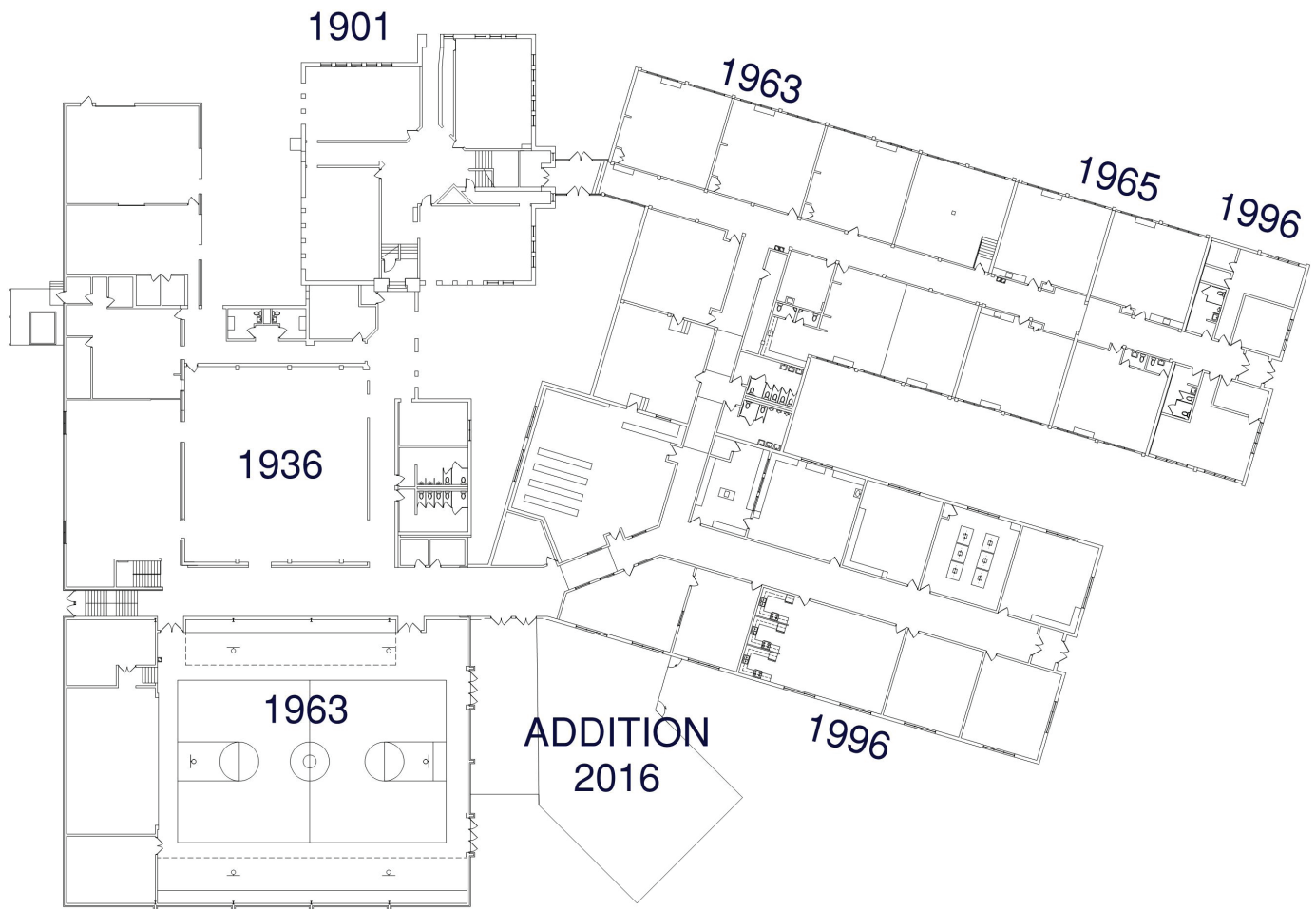
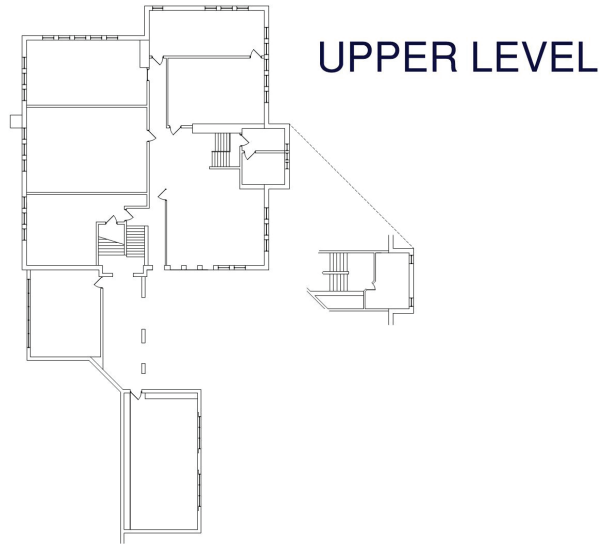
Playground/Green Space

4 BUILDING PROGRAM SPACES



LOWER LEVEL





4.1 OVERALL BUILDING ORGANIZATION

The building is primarily organized and influenced by the era of construction. When there was a need for additional programmatic space, an addition was added. While this may meet the basic need for the additional space, it tends to create an overall building organization that is not master planned. Further, when the additions were added, the existing roof pitches influenced the overall building organization. This created spaces like the central courtyard that is currently underutilized and difficult to maintain.

The original and oldest portion is the three story 1901 facility. This area is separated via links that were added in subsequent years. The links are transitional spaces between the different spaces but tend to create separation programmatically within the spaces. The building organization has radiated from this original base building and has evolved significantly.

Built in 1995, the high school is located in the southeast wing. This wing is adjacent to the main entry and has close proximity to the core of the building. Because of the high school's location, the lower grades have to pass through this space to get to the other core areas.

The three middle school classrooms are located within the 1901 facility. They are remote from the other grades and lack support spaces like restrooms. Shared spaces of Library and Art are also remote from the classrooms. The lockers are located quite a distance from the middle school classrooms.

The Elementary classrooms are located in the northeast corner within the 1963, 1965 and 1996 additions. They are contained and have close proximity to the elementary office area. This location works well within the building.

4.2 MULTIPLE BUILDING ADDITIONS

There have been a total of six additions to the campus at La Farge. The earliest being in 1901, and then 1936, 1963, 1965, 1996, and an office addition in 2016. The multiple building additions have influenced the overall building organization, type of construction, materials used, insulation values, and in many cases the building condition. It is common in educational facilities to have multiple additions from different vintages. However, it does create its own set of unique challenges when talking about creating one vision for the entire school district.

4.3 1901 BUILDING

The 1901 building is original construction and has only been slightly modified over time. The main floor is used by the Middle School. The upper and lower floors are underutilized and do not serve a definite programmatic function for the district. These areas are primarily used for storage and occasional overflow space. The entire 1901 facility is only accessed by stairs which limits access for anyone that has mobility issues. If this is going to be continued to be used for educational purposes, an elevator and/or ramp needs to be added to the space.

Educational Adequacy

Ag/Tech Ed and STEM

The Existing Tech Ed workshop and Agriculture labs are separated from each other on opposite sides of the building. This separation causes safety, supervision and staff collaboration challenges. One teacher currently travels between the two spaces. There is a lot of overlap between these two spaces. Therefore, as part of master planning, these two spaces should be located in one more centralized location.

The Existing Tech Ed workshop and Agriculture labs are too small, outdated and not designed to incorporate current equipment and technology, nor do they allow for real-world job experiences. A compressive renovation and/or addition would be recommended to meet the current educational needs.

Music Room

The music room is located in the lower level remote from the other school programmatic spaces. There is a small utilitarian stair case to access the music room. Its remote location creates challenges for access. With the low ceiling height, the acoustics of the space are not desirable and should be improved. There are space needs that are not adequately addressed as well. Recommend moving Music from the lower level and adding a larger volume for proper acoustics with adequate floor area for the number of students.

Storage Spaces

Storage is a premium in all facilities but is lacking within the current facility. When space is tight unfortunately storage is the first thing to be sacrificed. Storage within the high school and elementary wings is especially challenging.

Art Room

The art room is located in a central location and is shared by all students. The overall square footage for art is not suitable for the current student numbers and program being taught. There is a subdivision between the two spaces which makes the small space feel even smaller. Storage is not adequate and would recommend it be improved.

Kitchen

The kitchen is centrally located adjacent to the cafeteria space. The location becomes challenging for both kitchen serving and kitchen receiving. The cooler/freezers within the receiving area are currently outside of the Kitchen space causing inefficiencies. The Kitchen serving passes through the kitchen space. The flow of students during serving generates a bottleneck and is also not efficient for the volumes. The adjacent cafeteria could use some additional sound dampening to help control the noise within the space. It is recommended to improve the exhaust and humidity control within the kitchen.

Safety/Security

Safety and security is a primary concern in all educational facilities. With the recent addition of the office, security has been improved. All visitors are welcomed by the main office. With the overall building organization, there are some inherent challenging areas pertaining to overall supervision. The remote areas of the Tech Ed, Music, and lower/upper floors of the 1901 facility are separated from the main core facility and thus are more challenging areas to supervise. Greater use of technology through access control systems and video surveillance systems can help to mitigate the challenging areas. It is recommended that many of the exterior doors be monitored with a door position switch and video surveillance system to limit access and control who is in the facility.

4.4 HIGHLIGHTS OF STAFF/TEACHERS INPUT

HSR meet with representatives and staff of the school on December 12, 2019, to review educational and facility needs. Below is a highlight of the discussions with the staff:

- Older parts of the building for the MS is challenging
- Functionality of the MS portion does not meet educational needs
- Tech Ed and AG very separated and no connection
- No accessibility in band room with tiers. Difficult to access space
- No internal accessibility to get to band room
- Not much volume within the space makes for poor acoustics
- Space is tight especially with bubble grade(s)
- Storage space is a need
- Infrastructure needs always seems to be fixing
- Heating control issues – no consistent temperature
- MS is very remote from other parts of the building
- No restrooms within 1901 building
- Tech Ed and AG are very remote from each other and disconnected from remaining portions of the building
- Current ceiling height within AG space is not ideal – Ideally would be 3' to 4' higher
- Not enough clearance to have a car hoist
- Air ventilation within space is a major issue
- Dust collector not set up for current use. Current dust collector is more of a residential application.
- Poor acoustics within cafeteria space. Noise transfers far from the cafeteria
- 1901 building is underutilized
- Mini split cooling unit not keeping up within kitchen space
- Serving area creates congestion within hallway/ kitchen space

5
BUILDING
CONDITION



1901 BUILDING CONDITION

The 1901 facility is performing well considering it is 119 years old. There have been some improvements over the years, but it fundamentally remains very similar to its original construction. The exterior masonry is in good condition. However, it does need to have the brick tuck pointed in the near future. A structural analysis was performed and found the facility is fundamentally solid.

The current layout of the 1901 building is geared toward educational practices that were common when the facility was built. The traditional model does not meet the current educational needs of modern teaching. The classrooms are separated with little connection to other spaces. There are a series of stairs that further separates the spaces from the other parts of the building. Having the space being utilized as three Middle School classrooms is not ideal. The interior of the building has many spaces that are underutilized and should be evaluated for the long term potential.

There are many needs within the current 1901 building. The infrastructure is served by the existing steam boiler and is well past its anticipated life expectancy. A steam system like this is challenging to control individual spaces, and a full replacement is recommended. The existing building has limited insulation to provide adequate R values. With the volume of space there is a lot of heat loss within the current building. The windows are another source of considerable heat loss. When you take into account the existing steam boiler system, limited insulation, and under performing windows, operationally the facility is a challenge to utilize in its current state.

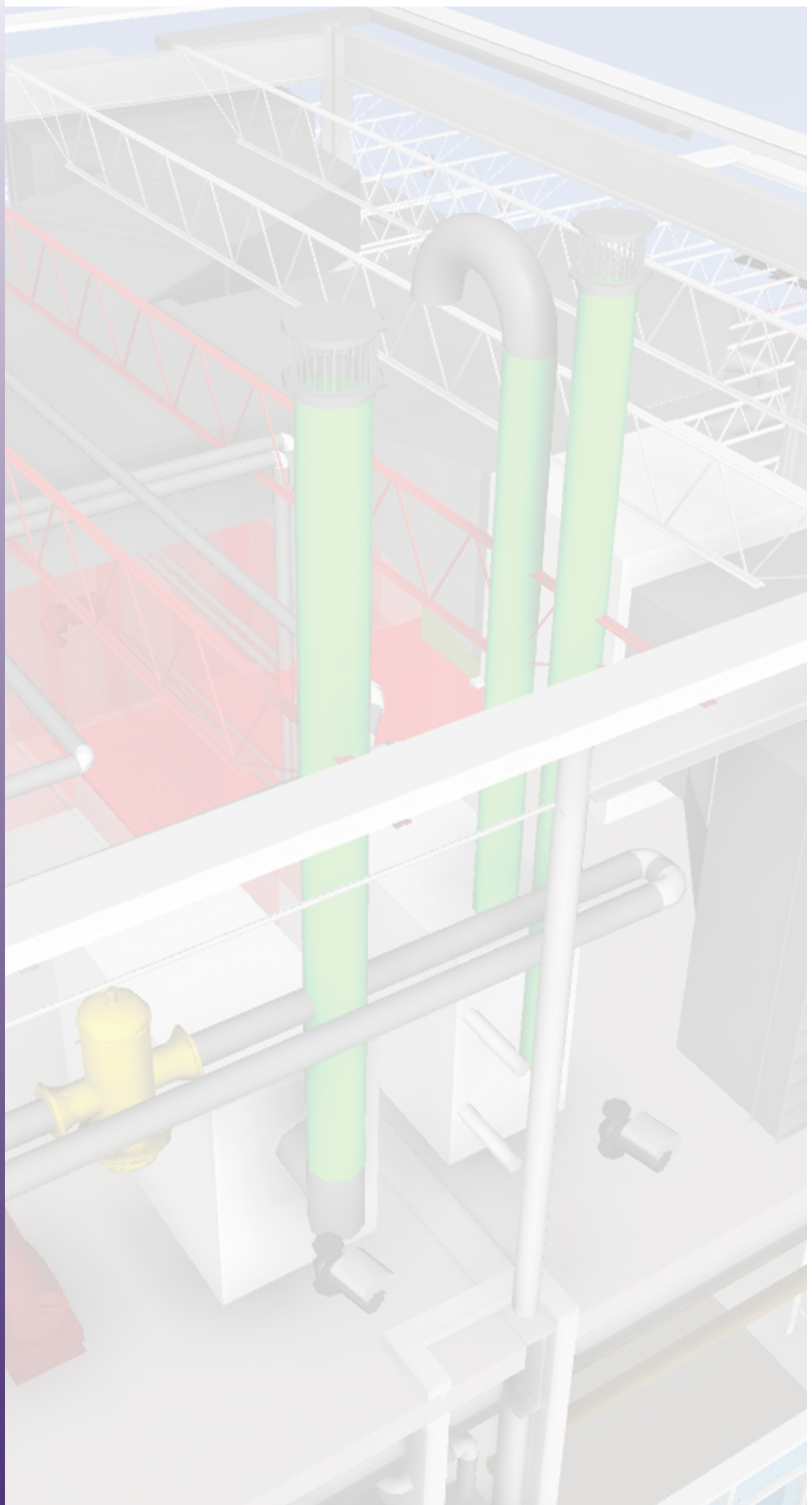
If the facility is to remain long term, we would recommend transforming the building into a special destination. The historic shell of the building can remain, but the inner spaces can be transformed into a specialized use. The interior of the building could be transformed into a potential community space, daycare, art and/or library destination. Each floor is approximately 4500 SF which can open up a lot of opportunities for future use if invested in. There has been some interest in community type partnerships that could be a great use for this type of investment.

ADA/ACCESSIBILITY

Some main public areas do not have proper accessibility. These areas include the shop areas, lower level music spaces and all 1901 areas. There is exterior access to the music space through an exterior ramp, but it does not have a required interior accessible entry. If any of these spaces are renovated, an accessible path will have to be provided via an elevator and/or ramp system.

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6 BUILDING SYSTEMS



HEATING SYSTEMS

The majority of the school is served by two steam boilers. One is a Kewanee Series 2X gas fired steam boiler that is original to the 1963 building addition. The second boiler was replaced in 2001 and is a Hurst FB505-15-10. The capacity of the boilers is 3,089,00 BTUH for the 1963 Kewanee and 3,485,00 BTUH for the 2001 Hurst. The Kewanee boiler is starting to fail as some of the tubes have been replaced or capped. The Kewanee boiler is beyond its expected useful service life and is used primarily as a backup boiler and on really cold days when necessary. Estimated service life is projected to be approximately 25-30 years for this type of boiler. Efficiency of the boiler is around 65-70%. The burners are dual fuel, natural gas and fuel oil. Utilizing interruptible natural gas isn't as big of a savings in operational costs as compared to firm gas rate as in previous years. Steam is distributed in piping running through tunnels below the floor. Condensate lines are also located in the tunnel and condensate pumps return the condensate to the boiler feed tank. Steam pressure is 5-10 psig. The steam and condensate piping are original to the 1963 building and are showing their age with leaks. There is a portion of steam pipe from the tunnels of the 1963 building addition to the original 1901 building that is direct buried with no access. These pipes have leaks which are not accessible to repair. Steam was previously utilized to heat domestic hot water in the storage tank. The steam heated domestic hot water system has since been abandoned and replaced with separate domestic hot water heaters.

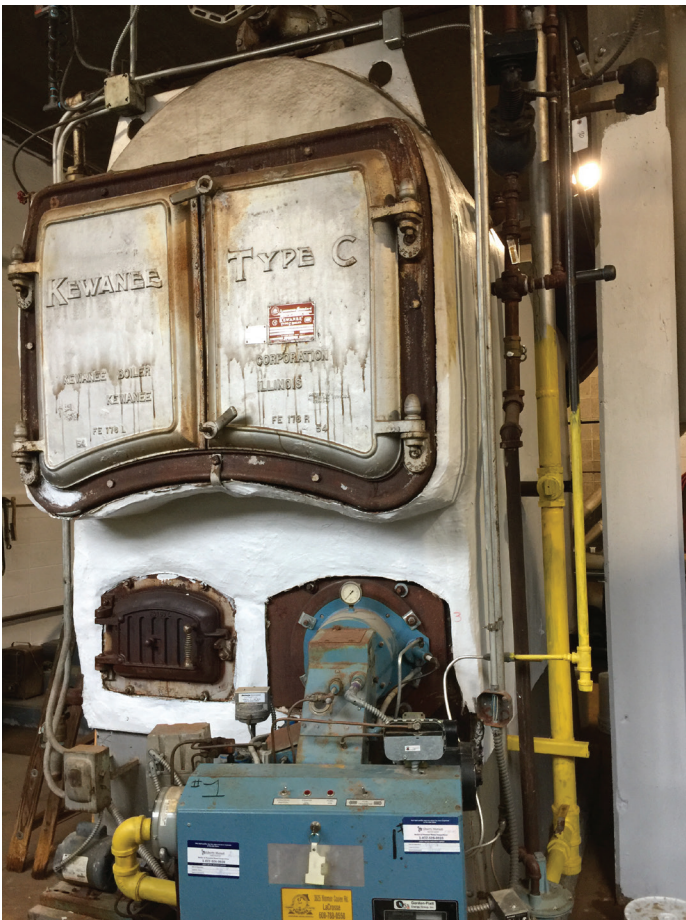
The 1996 building addition is served by natural gas fired furnaces. These furnaces are residential style furnaces with sealed combustion and condensing style design. The efficiency of these units is in the range of 93% AFUE. Furnaces are horizontal type and installed above the corridor ceiling. Servicing the furnaces is a bit of a challenge with clearances.

The 2016 addition is served by three different rooftop units. The rooftops contain natural gas-fired heat exchangers. The rooftop heating efficiency is in the 80% range. The rooftops still have expected useful service life. However, they should still be maintained on a regular basis. As a part of the 2016 addition, in floor heat was installed in all of the exterior rooms. However, the boiler and all of the above floor hot water system was never installed. The in floor heat manifold remains capped for a future use.

Recommendations

Replacement of the existing steam and hot water boilers with new high efficient condensing boilers. With the new technology available today that wasn't available when these systems were installed, it is possible to achieve better efficiencies. Condensing boilers allow efficiencies in the +90% when hot water temperatures permit. New hot water piping shall be run overhead to provide better access for service. Steam and condensate piping should be removed as the insulation may likely contain asbestos.

The steam boilers supply steam directly to a portion of the existing building for heating and ventilation purposes. These air handling units should be replaced and that portion of the building converted to hot water heating. The entire steam system including boilers, piping, coils, and condensate pumps shall be removed. The existing tunnel system shall be abandoned with the new heating system because there are water and maintenance access issues with the tunnels.



COOLING SYSTEMS

Most of the building is not air conditioned. The library and AV/Library Storage have A-coils mounted on the discharge of the furnaces that serve them. The condensing units sit on grade just outside the building. The condensing units and coils are Luxaire using R-410A refrigerant.

The gym has (4) 3-ton minisplits mounted above the bleachers. The condensing units are located on the roof using R-410A refrigerant. Typically minisplits perform well for spot cooling applications. During summer, these minisplits will have a hard time keeping up with bringing in warm/humid outside air for code required ventilation when the gym is occupied.

The kitchen has a 3-ton minisplit installed mounted on the wall. The condensing unit is mounted on the exterior wall just outside the AG shop. This minisplit is Blueridge using R-410A refrigerant. Similar to the gym, this minisplit will have a hard time cooling the outside makeup air required for the exhaust hoods.

The 2016 office addition has a 4-ton, 3.5-ton, and 2.5-ton rooftops that serve 3 different zones of the addition. The rooftops are packaged units containing compressors, evaporator coil, condenser coil, and condenser fans. These units have 1-stage of cooling (on/off operation) and utilize R-410A refrigerant. The rooftops still have useful service life left and should remain as is until needed to be replaced. When looking at replacement, these size rooftops are now available with variable speed compressors and fans to have better temperature and humidity control during shoulder seasons.

Recommendations

For the gym and kitchen cooling, cooling would be better served being tied into the main air handling units (gym) and makeup air units (kitchen). This way, outdoor air is pre-conditioned before it enters the space, mitigating humidity issues and having better temperature control during the summer.

If cooling is desired for the whole building, consideration should be given to the installation of a central chilled water cooling system. With a 4-pipe (hot water and chilled water) distribution system, the installed cooling capacity of a central system could be half of the summation of the individual split system air conditioners. The term for this fact is called "diversity". Through diversity, all of the building can be air conditioned some of the time, and some of the building all of time." It is a matter of setting a priority of which spaces can be cooled when the central chiller reaches maximum capacity. The real cost in providing a central system is the distribution piping. Since the heating system piping needs to either be upgraded or revised, now would be a good time to consider a central cooling system.

Another option for cooling would be individual DX units per classroom. This would be a cheaper upfront cost, but it would have many more condensing units to maintain around the building.

A couple limiting factors when looking at cooling is the electrical power service to the building and space available to run ductwork. A central chilled water system would likely require 3-phase power which the building currently does not have. With older vintage buildings, it is usually a challenge to run ductwork from a central location.

Cooling in classrooms is not required, as it is more of a comfort issue. Although, cooling in classrooms may provide a better student learning environment. Areas such as Auditoriums, LMC, Computer Labs, and Music Areas have a need for cooling whether it be for equipment, heating concerns or to preserve instruments.



VENTILATION SYSTEMS

The majority of the existing building including the 1963 addition have steam unit ventilators installed on an exterior wall. The unit ventilators consist of a filter, a steam heating coil, a fan, outdoor and return dampers. All of these components require service in the Classroom which is disruptive to teaching. The noise from the unit ventilators is also disruptive to teaching. With the age of most of these unit ventilators being from the 1963 addition, these units are well beyond their useful service life.

A portion of the school has the original air handling units with the steam coils that should be replaced with units with hot water coils and cooling, if desired. The areas involved are the Gym and Old Gym/Cafeteria. Locker rooms, shop areas and music have horizontal type steam unit ventilators mounted up high at the ceiling level.

The 1996 addition is served from furnace units that distribute supply ductwork to the classrooms. Typically, each furnace serves around 3 classrooms. Return air is transferred through classroom door grilles and into the corridor. From the corridor, return grilles in the corridor ceiling are ducted back to the furnace. Minimum outdoor air requirements are ducted to the return of each furnace to satisfy code required ventilation.

The 2016 office addition is served by 3 different rooftop units. These rooftops take care of mixing outside and return air within the unit and distributing it to the spaces. Rooftops have 0-100% economizers with barometric relief to allow for free cooling when outdoor temperatures permit.

Recommendations

Typically, the desired system is designing around a central air handling unit that will serve multiple classroom spaces. This reduces the equipment for servicing and still provides superior temperature control over the existing steam unit ventilators. The issue created with this system is the amount of ceiling space required to install the necessary ductwork, which is typically not available in older buildings. Another system type would be to install vertical style units in each classroom. These units are much quieter than the older style unit ventilators. They allow supply ductwork to be ducted from the top of the unit to get better distribution throughout the classroom space.

In the 1996 addition, the corridor space is being used as a return path for the furnaces. This is not allowed by code anymore because of life safety issues. If we are doing extensive work to this area, work will have to be done to resolve the problem and bring this up to code standards. If no major work is done in this area, code updates would not be required.

All of the existing exhaust fans in the building should be evaluated and replaced during this upgrade. Many of these fans are original and beyond their useful service life. Replacing the fans will improve exhaust flow and overall function of the systems. The existing dust collector and welding exhaust system should be replaced with the upgrade in these spaces. The dust collector appears not to be functioning properly. If the system is modified, there are some code deficiencies with this system that will need to be addressed.



CONTROL SYSTEMS

The majority of the school is served by pneumatic controllers or standalone electric thermostats. Much of the existing building have outdated controls, and temperature control is an issue with the steam heat.

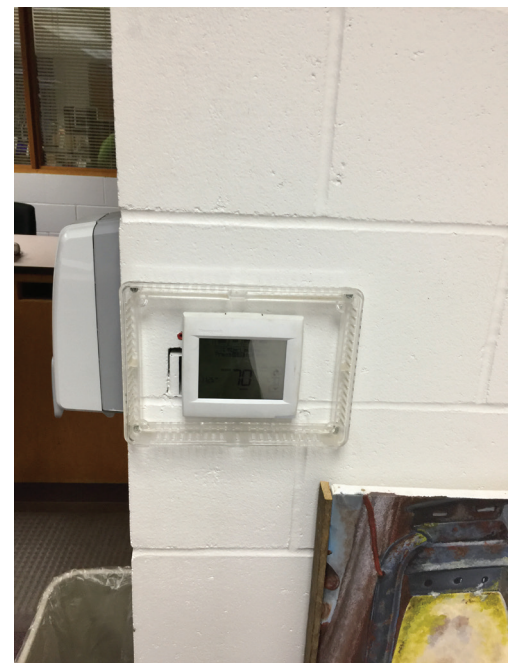
The 1996 addition furnaces have a single thermostat for each system. This sometimes presents challenges if classrooms have different loads and temperature requirements as some classrooms without the thermostat may be over or under temperature.

The 2016 office addition rooftops have a single thermostat for each rooftop system. The same challenges with temperature control exist as with the 1996 furnace systems. The rooftop systems are split up to serve "like" zones to try and mitigate this over or under temperature issue. When the radiant infloor heat is connected, this will help the temperature control of each office/zone.

Recommendations

Recommend converting the entire building to a central building automation system with direct digital controls (DDC). DDC controls are more reliable, precise, provide feedback relative to the controller position and can be trended for troubleshooting. When building automation systems and direct digital controls are combined, it allows for automated control of the temperature and ventilation throughout the facility. For example, the system can adjust temperatures in spaces based on season, occupancy, time of day, or day of week to reduce energy consumption. The system can also reduce the amount of outside air being brought into the building during unoccupied times thus saving on heating or cooling that air. They can adjust boiler supply water temperatures based on outside air temperature, which works well for condensing boilers in shoulder months. This system also has the capabilities to send out alarms for break downs, failures, and hazards that many times lead to costly situations being avoided. Pneumatic controls require a lot of continual calibration and maintenance to maintain accuracy.

With today's technology, a password protected, Web-based interface, could permit input access from any computer at any of the schools or from remote into the BAS. Scheduling, demand control ventilation, occupancy based exhaust, and other control strategies can be implemented to reduce energy consumption and cost. Typical energy savings when converting to DDC controls can be expected to be around 10-15% on both natural gas and electric.



ELECTRICAL SYSTEMS

Building Service Entrance and Primary Distribution Equipment

The electrical service to this building is 120/240volt, 1-phase, 3 wire. The service is underground to the building from a nearby power pole. The building has a 1200 amp service panel with main breaker. The equipment is older 1961 Kinney type with safety switches feeding subsequent additions and remodel areas.



Secondary Power Distribution

Secondary power distribution is comprised of Kinney, Cutler-Hammer and Square D electric panel boards. Generally, the panels have little or no space for additional circuit breakers.



Conduits in the older portion of the building's basement have conduits and flexible metal raceways with extensive rusting.

Recommendations

The current service is 1200 amps, 120/240 volt, 1 phase. Current service is undersized for any large additions or implication of mechanical cooling systems. Replace existing electric service with new 480 volt, 3 phase, 4 wire Service.

Replace all wiring and devices that are original to the 1901 building and 1936 addition.

Replace older type Kinney panel boards and feeders throughout the older portions of the building (approx. 1963 and before).

Replace 1 phase panel boards in areas that will be remodeled with new 3 phase boards.

Building Lighting

Corridor lighting is composed of 2'x4' recessed light fixtures with LED replacement tube lamps in most areas. Original building has surface fluorescent lighting with (old) T12 lamps.

The Classrooms have mainly 2'x4' recessed fluorescent troffers with electronic ballasts. Some areas still have older type lighting with T12 lamps.

The 2016 office addition/remodeling has all LED lighting; and lighting shut off control to meet current codes.

The Gymnasium has industrial type LED light fixtures.



Exit and Egress Lighting

Egress lighting is done with the use of wall mounted emergency lighting heads in the older parts of the building and with battery packs in the light fixtures for the 1996 addition and the 2016 additions. Most areas do not meet code requirements for minimum egress lighting requirements.

Exit lights are fluorescent lamp type.

Site Lighting and Building Exterior

Site lighting is accomplished by building mounted fixtures and pole mounted fixtures that have LED lighting.

Building Lighting Controls

Generally, most areas are controlled by light switches within each room. There are no occupancy sensors to control lighting.

The 2016 addition does have occupancy Sensors for lighting shut off and dimming controls.

Recommendations

Recommend to use LED lighting fixtures and lamps in lieu of fluorescent. They provide longer lamp life, have less maintenance, and Focus on Energy rebates.

Replace all existing fluorescent lighting fixtures with LED fixtures.

The Gymnasium is adequately illuminated and has LED lighting installed.

Both the parking lot and building exterior are adequately illuminated.

Provide programmable lighting control panel and low voltage switches to control lights in corridors, exterior lights, gymnasium, cafeteria and other large spaces. Provide occupancy sensors in all classrooms, toilet rooms, offices, and storage rooms for energy savings.



Fire Alarm and Primary Life Safety Systems

The main fire alarm panel is EST (Edwards System Technology).

The fire alarm panel is located in the 2016 addition.

Fire alarm notification devices (strobes and horns) are not adequately located to meet new fire alarm codes.

In general, the corridors fire alarm strobes are not spaced to meet current codes.

Fire Alarm and Primary Life Safety Systems Recommendations

The fire alarm system main panel is addressable, but it is connected to older systems which annunciate zones. Older fire alarm devices should be replaced with addressable type.

All classrooms and similar areas should have a fire alarm strobe device installed.

Provide additional fire alarm strobe in corridors.

Intercom/Public Address

Building has a speaker system used for paging, and telephones in each classroom.

Clock System

Clocks are battery powered atomic clocks.



Building Security System

There are security surveillance cameras in the main corridors, gymnasium and exterior entrance.

Camera Views are displayed on a monitor in reception area.

There is a secure entrance at the main doors. Vestibule intercom with Buzz-in entry at main office.

Computer Networking

In the summer of 2016, the computer networking was upgraded to category 6, consisting of a main server room and data hubs set throughout the entire building.

There is no need for computer networking upgrades.

General Systems

Most areas have enough receptacle outlets and data drops for the current use of the building and spaces.

