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ALLENSTOWN SCHOOL DISTRICT
ARMAND R. DUPONT MIDDLE SCHOOL
Allenstown, NH 03275
PROJECT # 18345

March 11, 2019

FACILITY ANALYSIS

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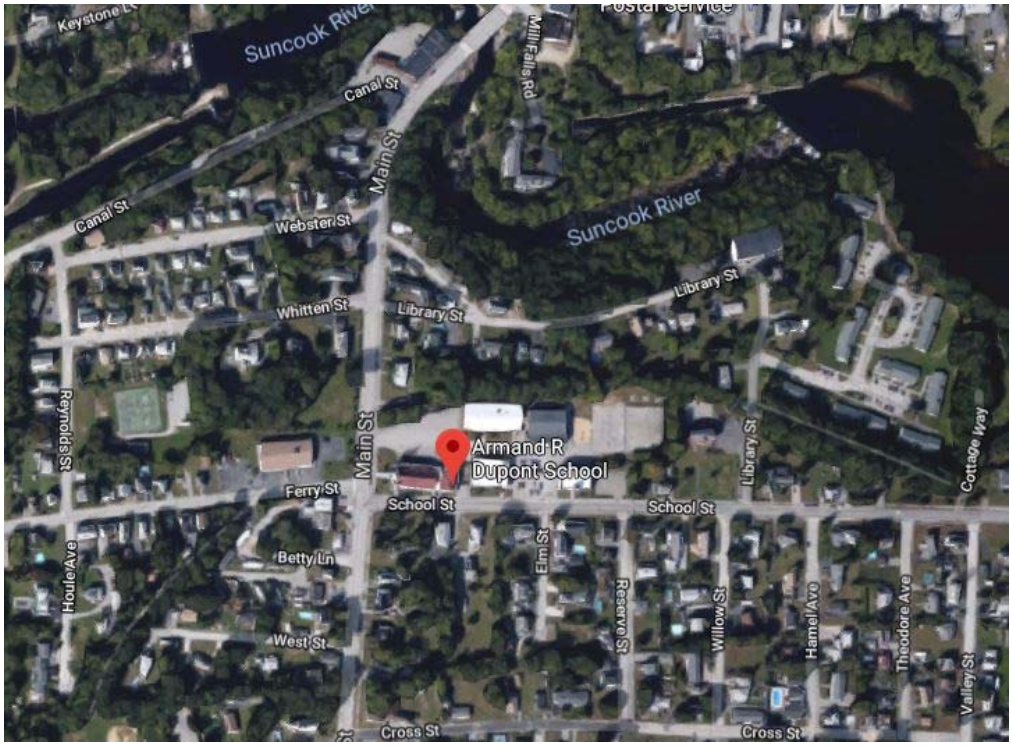
ALLENSTOWN ARMAND R. DUPONT SCHOOL - FACILITY ANALYSIS

INTRODUCTION AND OVERVIEW

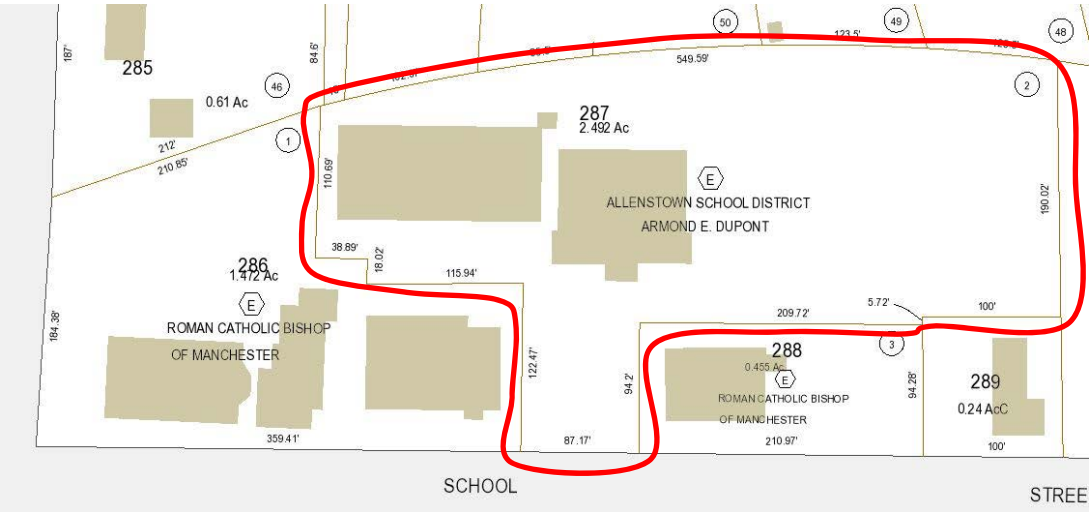
General

Harriman of Portsmouth, New Hampshire was retained by the Allenstown School District to prepare a facility analysis of the Allenstown Elementary and Armand R. Dupont Middle School in Allenstown, New Hampshire. The intent of this analysis is to evaluate the condition of the existing building and systems, and to identify necessary upgrades as required by current applicable codes and standards to reuse the existing facility, and to evaluate the possibility to combine the two schools into one building. This report is to aid in understanding the current condition of the entire facility in order to help facilitate the decision making process as to what possible renovations and/or additions may be required.

The narrative that follows is based on observations made during site visits in August of 2018 by Harriman's architects, civil, mechanical, electrical, and structural engineers. No destructive investigation was conducted during the site visits other than the removal of ceiling tiles and access panels from mechanical spaces.



ALLENSTOWN ARMAND R. DUPONT SCHOOL - FACILITY ANALYSIS



Tax map indicating ARD site 2.492 acres

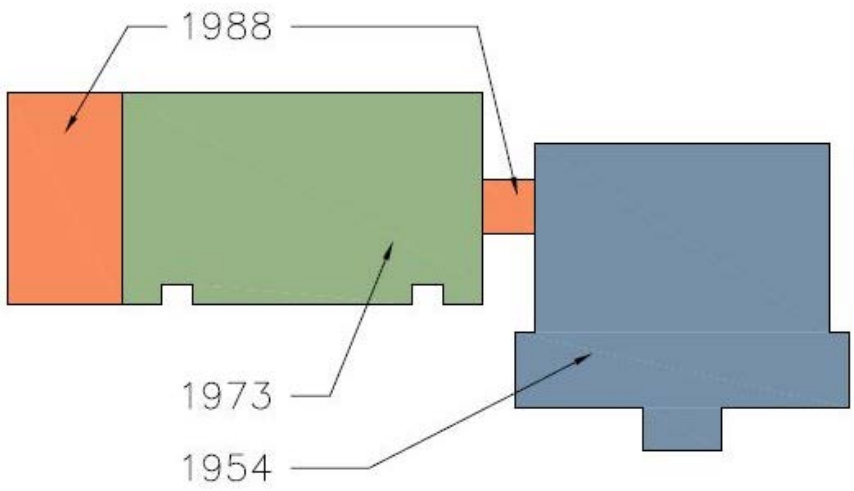
Note: ARD site is located on Parcel 287 which contains 2.492 acres. If the remaining church properties (Church & former Convent) Parcel 286 & 288 were purchased, the entire site would total 4.419 acres. Department of Education requires 10 buildable acres.

ALLENSTOWN ARMAND R. DUPONT SCHOOL - FACILITY ANALYSIS

Square Footage Summary

YEAR BUILT	FIRST FLOOR	SECOND FLOOR	TOTALS SF
Original 1954	8,140	8,140	16,280
Original 1973	7,260	7,260	14,520
Addition 1988	2,615	2,615	5,230
Totals	18,015	18,015	**36,030**

Year Built



Historical Perspective

The present school site was part of the St. John the Baptist Parish and was founded as Saint Jean Baptiste in 1873. A parochial school was founded in 1888 as part of the Convent. The present gymnasium and cafeteria were built in 1954 as a gymnasium-parochial center. The two story parochial school was built in 1973. The present Armand R. Dupont Middle School was sold to the Allenstown School District in 1987. The following year the School District added a two story addition at the end of the school towards South Main Street and a connector to the Gymnasium/Cafeteria.

The school serves grades 5 through 8 with a current enrollment of 160 pupils.

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ALLENSTOWN ARMAND R. DUPONT MIDDLE SCHOOL - FACILITY ANALYSIS

EXECUTIVE SUMMARY

General

The Allenstown Armand R. Dupont Middle School facility is comprised of three different construction areas. The original 1954 and 1973 addition are two story brick buildings that were part of the St. John the Baptist Parish founded as Saint Jean Baptiste in 1873. Both buildings were sold to the Allenstown School District in 1987 on a 2.5 acre lot.

The 1988 addition was added to the west end of the 1973 portion and was built as a two story school. The addition included two science areas, two general classrooms and an elevator that allowed most of the school facility to be ADA accessible.

The School District currently services grades 5 through 8 with 160 pupils.

Note: Refer to Attachments for Existing Floor Plans.

Building Life Expectancy

To determine the life expectancy of the buildings, data has been taken from Article 3.2.7, Commercial Building Median Lifetimes (Years), from the Building Energy Data Book, dated March 2012, Source(s) EIA. Below are four building types and the years of building survival rate:

	Median (1)	66% Survival (2)	33% Survival (2)
Education:	62	45	86
Assembly:	55	40	75
Small Office:	58	41	82
Food Service:	50	35	71

Notes:

1. PNNL estimates the Median lifetime of Education buildings is 62 years.
2. Number of years after which the building survives. For example, a third (33%) of the Education buildings constructed today will survive for 86 years.

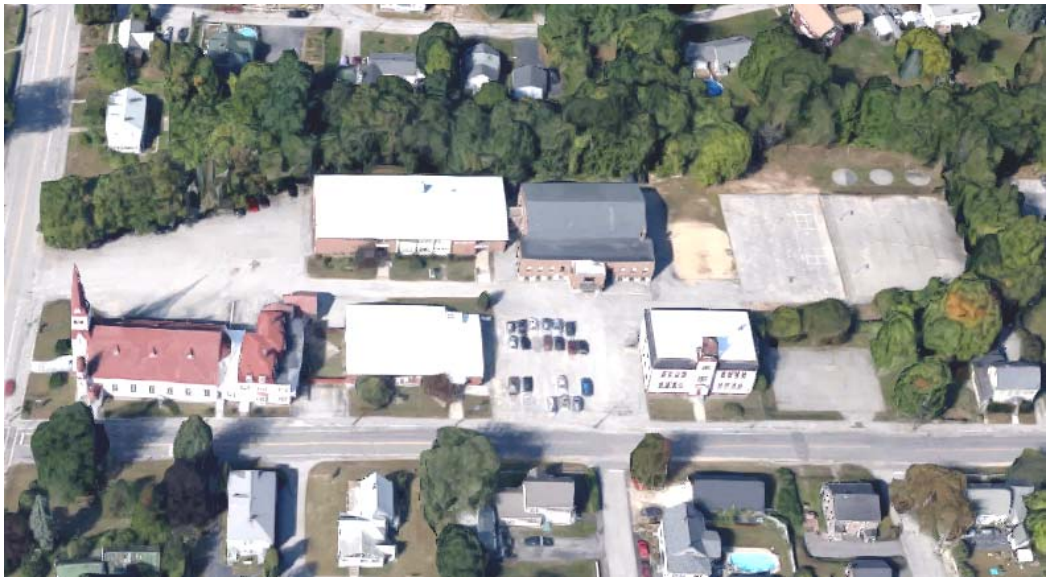
Original 1954 Building, 1973 Addition, and 1988 Addition

The original structure is over 65 years old and the building shell appears to be in fair to poor condition. Building codes in 1959 were just being introduced and followed. Many of the codes have been updated and the school district has evidence that updating the original building long term is not feasible without extensive funding. This report outlines many building code and ADA accessibility issues; many of the systems and equipment have also outlived their life expectancy. These are significant indicators that the original 1954 facility and the 1973 addition are due for some major upgrades in order to remain viable.

The 1988 building shell appears to be in fair to good condition.

ALLENSTOWN ARMAND R. DUPONT MIDDLE SCHOOL - FACILITY ANALYSIS

Note: Building codes are typically updated every three years with a new edition. The State of New Hampshire is presently enforcing the 2009 IBC codes. The NH Building Code Review Board is now reviewing the 2015 IBC codes, which are most likely to be adopted by the state by 2020. Over time, we have seen newer editions increase design loads. Please note that the applicable code takes effect at the time of obtaining a building permit. By waiting, codes will eventually change and may require additional upgrades to the structure and building systems.



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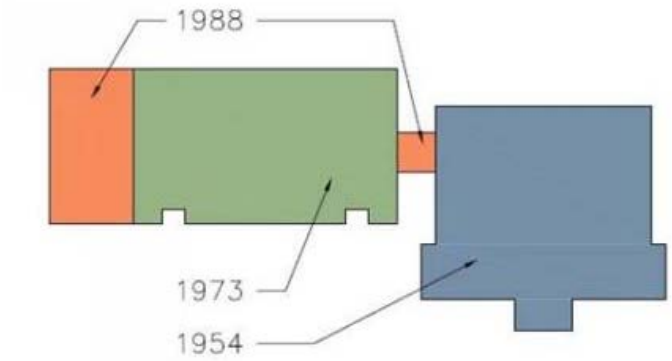

ALLENSTOWN ARMAND R. DUPONT MIDDLE SCHOOL - FACILITY ANALYSIS

Site

If no additions are added, the ARD school site does not require many repairs.

- Repair damage surrounding the catch basins including removing sediment.
- Repair pavement within the school parking lot.
- Coordinate for ADA parking spaces and pavement markings.
- Monitor pavement damage alongside the exterior drive along the school's edge.
- Control sediment build up throughout the paved surfaces.
- Repaint the striping within the school parking lot.
- Reseed the grassed eastern perimeter drive and repair erosion rills.

Architectural and Codes

- Exterior walls 1954 and 1973: If a renovation is to take place, the Energy Code (IEEC) will need to be adhered to. Increase building shell energy efficiency.
  By not taking on a major renovation project, IEEC does not apply.
- Remove all insulation above suspended acoustical tile ceilings on first and second floors.
- Replace suspended acoustical ceiling tile throughout due to most areas being in fair to poor conditions.
- Remove and replace exterior windows with commercial grade thermally broken frames.
- Updated Kitchen plan for the future with an office, storage room and ADA accessible staff toilet.
- Review with Integration/Data Specialist to update with LCD projector with interactive white boards.
- All casework to be replaced.
- All interior classroom/teaching space doors to be replaced with reduce view windows into rooms.
- Interior stairs to be updated to meet code requirements regarding handrails, guardrails, fire rating enclosures.
- Exterior stairs to be rebuilt or replaced.
- Toilet rooms to be updated to meet ADA code requirements. Some may be technically infeasible and will require waiting for a major renovation or addition project. Single user restrooms will require additional square footage from adjoining spaces.
- Additional toilets would be required to meet Educational and Assembly requirements per current Plumbing code.
- Issue with Vestibule/Lobby entrance to Gymnasium and Cafeteria regarding stairs and ADA accessibility.

Structural

Further detailed and specific analysis would be necessary to evaluate the impact and develop necessary reinforcements. Renovations and/or additions, if being considered, will impact the existing structure. The major upgrade currently under review is to the mechanical system, including adding roof top units on the existing roof.

- Brick exterior is deteriorating: loose mortar and bricks occur throughout the 1954 building including over walkways and doorways. Recommend structural engineer for structural integrity review before re-pointing.

Fire Protection

- The sprinkler system is a dry system and is known to be more susceptible to interior corrosion than wet piping. An interior inspection of the piping should be completed and documented.
- It is also recommended that five sprinklers shall be removed and replaced with the sprinklers sent out to a testing agency.

Plumbing

- Replace the gas fired water heater with a high efficiency indirect fired water heater unit.
- Replace the domestic hot water thermostatic mixing valve with a unit of higher capacity.
- Replaced all restroom plumbing fixtures with water conserving models with new flush valves and faucets.
- Replace all classroom sinks with ADA height fixtures. Refer to Architectural section for casework condition.
- Replace the sump pump with similar equipment.

Mechanical

- At a minimum, the existing wall hung boilers should be replaced with new floor mounted condensing boilers that will have a longer life expectancy and be sized to provide full redundancy. The current layout of the boiler room may not allow the boilers to be located in this space, so a new location or expanding in an adjoining space will need to be considered.
- The typical classroom consists of perimeter fin tube for heat and a combination of a small amount of exhaust which provides minimal, indirect ventilation. The school lacks proper ventilation to meet current ASHRAE 62.1-2016. Recommend providing a dedicated outdoor air system (DOAS) to provide 100 percent outdoor air.
- Pipes that are uninsulated should be insulated. Use PVC covers in exposed areas.
- If cooling is desired for the entire school, then rooms such as classrooms and smaller should be connected to a central variable refrigerant flow system. If large spaces are to be cooled, such as the Cafeteria or Gymnasium, a central air handler should be size with heating and cooling coils to provide heating, cooling, and ventilation.
- Pneumatic controls should be removed and replaced with direct digital controls which allow users to access a graphical user interface from any location with the proper credentials.

Electrical

The service entrance is served by a pole mounted transformers also serving St. John the Baptist Church. Presently, the peak demand shows available capacity on the Utility side of the service. However, the service is not adequate to accommodate the additional ventilation requirements

and require updates as listed below. A new transformer separate from St. John the Baptist Church should be pursued. The upgraded service within the building will require floor space be taken from another location in the building.

- The service disconnect is a manual transfer switch for connection to a portable generator. This does not meet the National Electrical Code. Redesign portable service disconnect and portable generator automatic transfer switch. Consider permanent generator life safety systems such as emergency lighting, exit signs, etc.
- The service entrance disconnect should be locked shut to keep unauthorized persons from opening the switch.
- Upgrade service throughout the building with additional circuit breakers and locate in spaces dedicated for electrical. In some areas code required working clearances do not exist.
- Circuits should be traced to update panelboard directories with accurate, legible, typed directory cards.
- Panelboards that are 30 years or older require replacement. Panelboards in egress stair, kitchen, and custodian closets to be relocated per code and for safety reasons.
- Upgrade lighting with LED for both interior and exterior lighting fixtures. There is little exterior building mounted lighting and none of the lighting is cut off per code so lighting spills above the horizon.
- Energy codes require automatic lighting control (dimmers) for most lighting fixtures. Use low-voltage lighting control, local occupancy sensing controls in rooms.
- Replace the existing fire alarm system with new system that provides voice evacuation throughout the building to comply with code.
- Replace existing emergency egress / life-safety lighting battery units with new or tie into a generator. Present spacing does not meet code for required lighting levels. There is no notification in classrooms to comply with code.
- Battery unit to be powered from local lighting circuit to meet code.
- Provide smoke detection to comply with code.
- Replace existing exit signs and add signs where required; relocate as necessary.
- Wiring with cloth insulation, non-metallic sheathed (Romex) was observed above ceilings and “attic” space located above the stage. Non-metallic sheathed cables (Romex) are not permitted; should be replaced with MC.
- CCTV: review coverage, re-aim cameras as/if needed for better coverage, add cameras as/if needed.

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ARMAND R. DUPONT MIDDLE SCHOOL – FACILITY ANALYSIS

SITE

General

Evaluation of the site at Armand R. Dupont Middle School involved walking around the school and the grounds, making observations of existing site features. Photographs were taken to document these existing conditions. The goal of the study is to look for deficiencies and to gather relevant information on the conditions of the site. Included is an evaluation of the surface drainage and associated infrastructure, evidence of erosion from stormwater runoff, and existing site circulation and parking, including observations associated with Americans with Disabilities Act (ADA) access from the adjacent streets and the parking areas to the building.

Existing Conditions

Google Earth Image: Dated September 11, 2017

The Armand J. Dupont Middle School is located on a site that is approximately 2.5 acres in size. The school is located off of School Street and abuts properties of Saint John the Baptist Parish including the church, a church hall, and convent building. Based upon a drawing titled "Subdivision Plan Prepared for St. Jean's Church" prepared by Duval Survey, Inc., dated June 7, 1988, the school's lot is approximately 2.5 acres. Based upon the aerial and observations on the site, the school has been constructed in various phases. Please refer to Introduction section for year of construction of various phases and adjoining properties. The western building is set at a lower elevation than the eastern building.

Site topography gradually slopes from south to north and from east to west. Pavement surfaces generally surround the building, with minor exceptions to the northeast where existing woods separate the school property from the adjacent residential lots. Site circulation is irregular as the apparent bus loop utilizes adjacent property owned by the church to pick-up and drop-off students before exiting out onto S. Main Street. Buses enter the area by turning left off of School

Street, heading north towards the school before turning to the west in front of the school then driving through the church parking lot and exiting onto S. Main Street.

The school parking is located to the south of the building, between the church hall and the convent building. This parking area is accessed off of School Street and has an approximate capacity of 40 vehicles. It is presumed that if there are additional vehicle capacities needed, the school has permission to utilize the parking area owned by the church located immediately to the west of the school.

The pavement throughout these areas is generally in fair condition. Observations of the pavement included numerous potholes, large cracks, and areas of differential settlement. Vegetative growth was also observed within various large cracks within the pavement. Pavement markings were not easily visible or were non-existent. The pavement surrounding the main entrance to the eastern building (approximately 50 ft^2) looks to have been recently installed.

Potholes and sediment observed along access way

Differential settlement and sediment observed in lot

The pavement along the eastern portion of the building is generally in good condition and appears to have been recently installed. This pavement area serves as a hardscape play area and as a fire lane to access the back of the building.

Pavement east of the school (looking south)

Pavement north of school (looking east)

East of the school is a vegetative play area that includes a paved walk that generally circles the perimeter of the area. The area is fairly well maintained, but the grass is a bit overgrown and there

were notable areas where the vegetation was sparse and had some erosion located near the northeast of the building.

Erosion area noted to the northeast of the building

Vegetative area to the east of the building

The amount of drainage infrastructure observed on the site was minimal. No drainage structures were observed in the parking lots. Two catch basins were noted to the south of the western building, while a trench drain was observed at a curb cut location where a concrete walk extends towards an entrance into that building. This entire infrastructure is in place because in this location, the ground surface slopes towards the building. Also noted was a perimeter foundation drain that is located along this same southern-facing wall of the western building. It is unknown whether the foundation drain has underdrain piping, but there is an approximate 4' wide trench area filled with stone to receive the stormwater.

Perimeter drain along southern wall of western building

Curb cut that leads to catch basin

Trench drain at curb cut leading to entrance

Catch basin within the vegetated area near building

Other observations made during the site visit included perimeter fencing, signage, and ADA accessibility throughout the site. The perimeter fencing was mostly in good condition, including some fencing that appeared to be relatively new located along the northern property line. Notable issues of concern included some rusting of the perimeter fence and the exposure of some of the post foundations along the western property limit.

Northern perimeter fence in good condition

Exposed concrete post foundation at west perimeter

Observed signage at the site was minimal. Because this school shares area with many of the adjacent properties, it is likely difficult for unknowing drivers to understand the site circulation. Signs observed included a “one-way; do not enter” sign on the access way heading eastbound in front of the western building section, and a set of signs on a single post that states “drug-free school zone,” “tobacco-free school zone,” and “no skateboarding or rollerblading on school property”.

One-way signage heading eastbound on access way

School signage in front of entrance to west building

ADA parking spaces were not observed on the property. Accessibility, in terms of sloping, appears sufficient as the site's topography is generally gradual throughout. While there are entrances to both the eastern and western building sections that are ADA accessible, safe maneuvering to the western building is insufficient. There were no observed dedicated walkways for pedestrian circulation on the site.

Recommendations

Harriman understands that the School District's intent is to consolidate the two local schools (Allenstown Elementary and Armand J. Dupont Middle Schools) into one site. Based upon this understanding, the Allenstown Elementary School site would be preferable because the existing site at the elementary school (6.1 acres) is more than double the size of the site at Armand J. Dupont (2.5 acres). The elementary school also has more surrounding land potentially available for required expansion per Ed 321.03: Minimum Standards for School Sites. Please refer to the Allenstown Elementary School Facility Analysis.

If the two schools do not consolidate into one facility, Harriman would recommend the following site improvements at Armand R. Dupont Middle School:

- Repair pavement within the school parking lot and access way from the school lot to the church parking lot;
- Repair the areas surrounding the two catch basins, including removing the overgrown vegetation and sediments from the area;
- Reconstruct pavement that conveys stormwater to the eastern catch basin;
- Control sediment build up that was observed throughout the paved surfaces;
- Repair existing surfaces around the western perimeter fence to cover exposed concrete post foundations;
- Coordinate for ADA parking spaces and pavement markings;
- Provide additional directional signage for drivers;
- Repaint the striping within the school parking lot; and
- Reseed the existing grassed areas along the eastern perimeter drive, including repairing the erosion rills within the area.

Harriman would also recommend consideration to providing paved or concrete sidewalks for safe wayfinding around the school. Current conditions do not provide adequate separation of pedestrian and vehicular traffic.

ARMAND R. DUPONT MIDDLE SCHOOL – FACILITY ANALYSIS

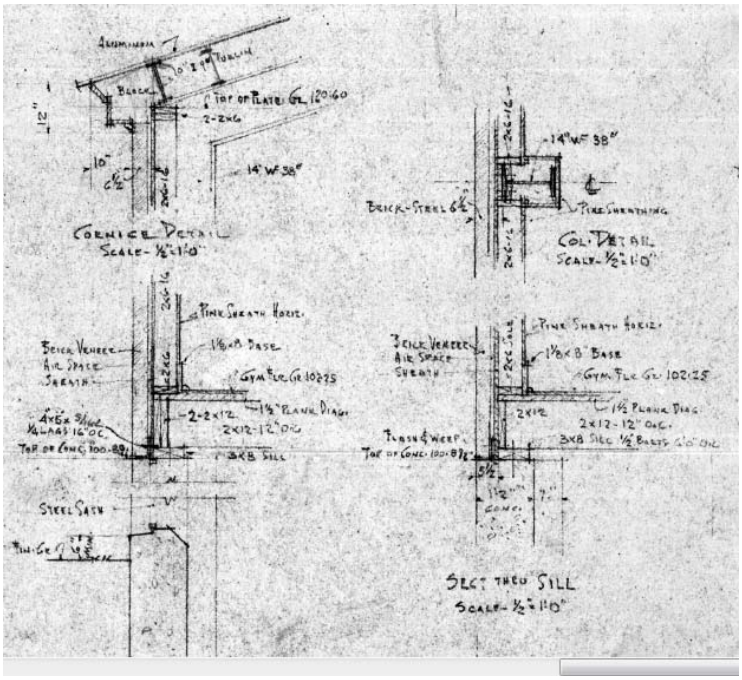
ARCHITECTURAL AND CODES

Building Shell

Original 1954 Section

This section of the Armand R. Dupont Middle School, known as ARD is a two-story exterior masonry wall bearing with brick veneer with a center pitch 4:12 roof and flat roof at entrance. A few drawings were obtained from the school district in poor condition and were hard to read. First floor original construction indicates partial height exposed 12 inch concrete foundation walls with no insulation. Above the foundation is exterior veneer brick with air space with 2x6 framing; exterior sheathing to air space and "pink sheathing" interior finish. Based on the era of construction, little to no insulation was used in the exterior walls. The original interior walls are typically 8 inch concrete masonry units (CMU) acting as bearing walls. At the first floor, the main framing is steel wide flange beams and columns infilled with 2x wood floor framing. At the roof, steel framing clear span the gymnasium with steel purlins with wood sheathing. It appears that between purlins is infill with possible insulation; unknown if roof is insulated.

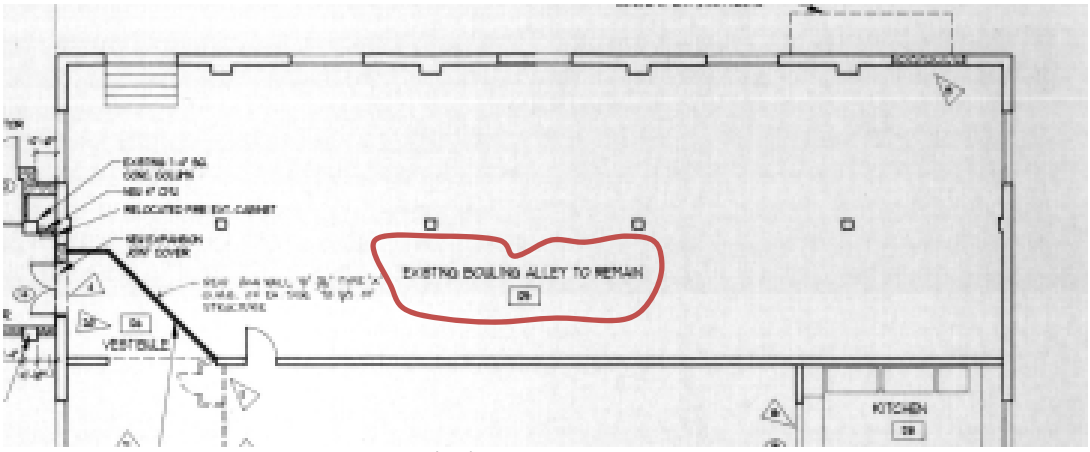
The 1954 roof was reported to have been replaced in 2017 with a shingle roofing system. According to school district's documents, the existing roof was removed down to existing wood sheathing. The roofing system included laminated asphalt shingle over ice and water barrier 6 feet along eave and valleys with a synthetic underlayment over the remaining roof and drip edge at roof perimeter.



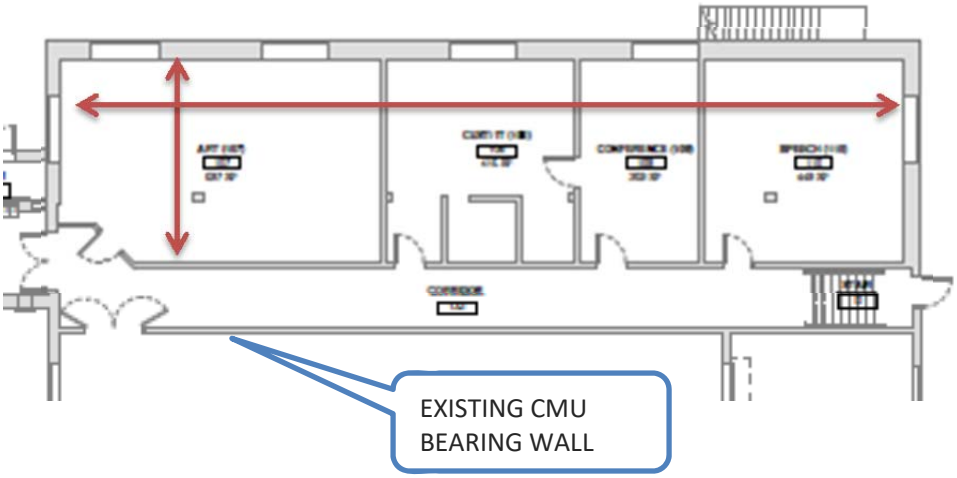
From original drawings 1954

Gymnasium area

With the 1988 addition the school district infilled the existing bowling alley to create teaching spaces. The exterior of these walls appear to be furred out with 2x4 wood studs and gypsum wall board. We assume fiberglass insulation filled in the stud cavity.



Drawing dated 08/29/1988 notes as "existing bowling alley"



Present existing conditions with new walls for Corridor, Art, Custodial/IT, Conference & Speech. New walls were constructed within red arrows. Assume exterior walls were insulated.

Front south elevation - Main entrance through Lobby #117 to Gym and Cafeteria

West elevation of 1954 original building with corner of 1973 building on the left

Connector elevation with original 1954 Gym & Cafeteria on the right

Southeast elevation

East elevation

East elevation

North elevation with 1973 building beyond

East elevation with Church steeple on left

The exterior brick walls appear to have been patched and repointed several times. There is major evidence of loose mortar, bricks dislodging, and cracking. Some interior walls indicate cracks at CMU walls along Corridor #133. There have been no reported leaks at this time. The school district as obtained quotes for repointing at approximately $100,000. Harriman recommends a structural engineer to review condition before proceeding repointing.

Exterior brick wall with loose mortar joints

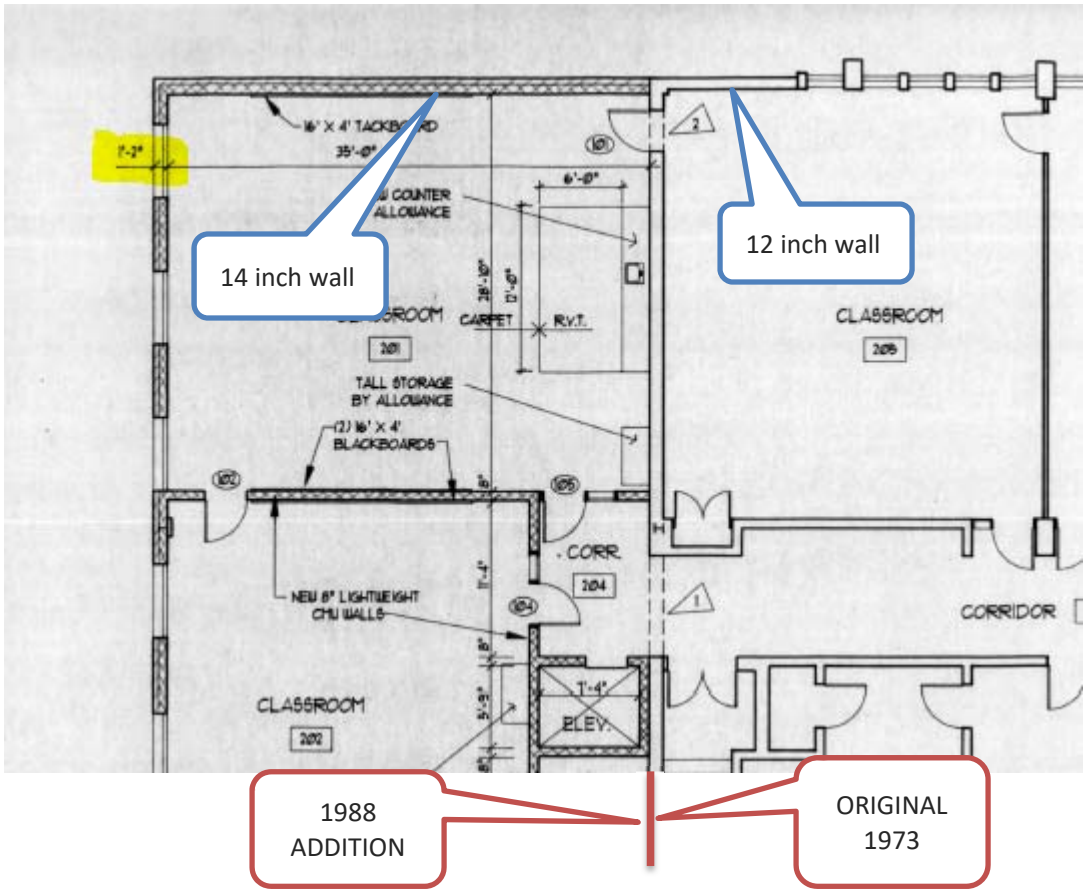
Close up view

Original 1973 Section and 1988 Addition

This 1973 portion of the building is a two story structure consisting of an exterior face brick with interior load bearing masonry walls (concrete masonry units - CMU). The walls measure 12 inches and we assume 4 inch face brick with 8 inch CMU. There is no space between brick and CMU for insulation. No drawings are available however; the addition in 1988 to the west end is clearly shown on the drawings as 14 inch wall thickness with a 2 inch air space for insulation. Based on the era of construction and minimal existing drawings, little to no insulation was used in the 1973 building exterior walls.

The 1988 addition is a two story structure consisting of an exterior face brick with interior load bearing masonry CMU walls with a 2 inch air space for insulation. The addition includes an elevator allowing ADA access to most of the school, two science classrooms and two regular classrooms.

The 1973 and 1988 roofs were reported to have been replaced in 2012 with a 15 warranty roofing system. According to school district's documents the existing roof was removed down to metal deck and a new fully adhered PIMA white PVC membrane that was installed over a new mechanically attached 3.5 inch polyisocyanurate insulation with a 24-R value.



North elevation of 1988 addition

North elevation of original 1973 building

Space between corner of 1988 addition to residential area; approximately 20 feet

Red storage addition by connector reduces site access to less than 20 feet

Red storage addition by connector

Paved accessed drive along east elevation

Note: Site access along the rear of the two story classrooms is very limited. When designing a new school or renovation/additions to a school building, codes require access for fire apparatus. Local fire departments typically are very sensitive to accessing buildings in an event of a fire.

Building Shell Recommendations

Exterior Walls

If a renovation is to take place, the Energy Code (IEEC) will need to be adhered to. In order to increase the envelope performance, one option would be to apply metal furring to the interior side of the exterior walls with metal studs. Prior to applying metal studs, remove plaster and wood furring (if any exist) down to the existing CMU. Fill the voids with spray foam insulation to seal the perimeter of the envelope and a layer of gypsum dry wall. The cavity would allow for electrical and data wiring with devices.

Foundation/Floor

Foundations are typically back filled with no insulation. Floors are concrete slab on-grade with no

insulation. Very little can be done to add insulation other than excavating exterior walls down approximately 4 feet and adding 2-1/2 to 3 inches of rigid insulation. This would not be recommended due to the extensive disruption and cost.

By not taking on a major renovation project, IEEC does not apply.

Roof

No action is recommended.

Windows

Some windows have been recently replaced such as in the locker areas and Sped office. The windows in the 1973 and 1988 buildings appear to be original and are aluminum thermal pane glazing. Most of the original 1954 building has original steel windows with single pane glass. They vary in function; slide-by, awning, and fixed. They appear to be in fair to good condition. It has been reported that many of the windows are difficult to open. Many screens are broken or missing. A commercial window's life expectancy is based on average wear-and-tear of windows. Aluminum windows are expected to last between 15 and 20 years, and can be extended with regular maintenance.

Observation of the large windows in the gymnasium noted curtains to shade the sun. The sun shining in is a typical issue with all gymnasiums. The window system should be replaced with another option that allows daylighting and there are many products that perform well. Another concern would be ventilation, and Harriman recommends exploring solutions to satisfy both daylighting and ventilation.

Original 1973 two story north elevation original windows

Close up view of window condition

1988 Addition west elevation. Note wood dowel used to secure window due to latch not functioning.

Same window, noting caulking failure.

Original 1954 examples at Gymnasium with steel frame single pain windows

Window Recommendations

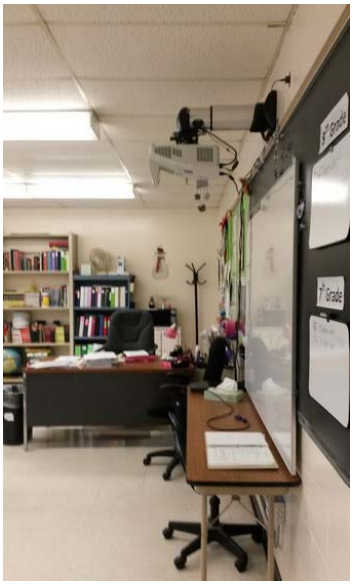
Remove all windows other than recently replaced windows as noted above. Replace with new aluminum thermally broken with desired function and thermal pane glazing. Existing operable gymnasium windows should be reduced in size to lessen heat loss. Windows should be insulated glazing, low-E and argon filled for best performance. Also, replace window shades with clutch shades.

Visual Display Boards/Projector/IT/Electrical Outlets

Marker and Tack Boards: Many of the teaching spaces have a variety of projectors to facilitate interactive boards. It appears most classrooms have interactive white boards with wall mounted short throw projectors. An inventory should be completed prior to deciding upon replacing any outdated equipment. All teaching spaces have a variety of marker and tack boards in a variety of conditions.

Technology Integration: In the digital world of teaching and integration of technology the school curriculum is forever evolving. Presently, there is a variety of delivery methods in the teaching spaces. It is our understanding that within each year's budget the Technology Department is upgrading classrooms, IT data drops and wireless access points, including sound enhancement amplification systems in all teaching spaces.

Electrical Receptacles (outlets): The average classrooms have 3 to 4 electrical outlets. Power cords are being used for connecting a variety of devices. Harriman conducted a review of recently renovated schools. Typical installation is between 8 - 10 duplex receptacles per classroom. The number of receptacles and circuits depends on the available wall space, layout and needs of a room.



Projector with marker board mounted over existing chalk board

Wall mounted projector with marker board

Wall mounted projector with marker board

Projector with marker board mounted over existing chalk board

Visual Display Boards/Projector/IT/Electrical Outlets Recommendations

Harriman recommends that when providing new interactive boards, marker and tack boards, to remove the old boards (if existing) prior to installation. The existing chalk boards should be tested for asbestos containing materials and abated prior to removal.

The School District should be commended for keeping up with technology.

Asbestos Containing Building Materials

Note regarding ACBM: Asbestos containing building materials (ACBM) per AHERA require a re-inspection report every 3 years. Per an email copy from Building Director of ARD dated October 26, 2017 as stated from the hygienist "I believed that the school is cleaned out. There should be one on final re-inspection stating that all identified asbestos has been removed." The Building Director of ARD has contacted the hygienist for a copy for the file.

Prior to any renovation or construction work further testing should be taken to verify in accordance with State and federal regulations. Abatement of ACBM should be designed and monitored by a qualified/certified consultant.

Interior Finishes

Flooring

Interior floor finishes in the classroom floors are vinyl composition tiles (VCT) in good condition. Other areas are typically VCT with some variations such as toilet rooms with ceramic tile, mosaic tile. The VCT in these areas varies from good to poor conditions. The Admin area, Principal Office and teacher's lounge have vinyl wood veneer planking in good condition. The locker rooms are mosaic tile.

Walls

The interior finished walls are a mix of painted concrete masonry units (CMU), painted gypsum wall board and painted panels in the gymnasium. The walls are generally in good condition throughout.

Ceilings

There is suspended acoustical ceiling (ATC) tile throughout most areas of the building. A variety of conditions, from very poor to good, were noted. Many ceiling tiles have been discolored and stained. Typically there is insulation above ATC. Shown below is fiberglass batt insulation with additional ATC above. This occurs in both the first and second floors. This was commonly done during the energy crisis in 1979. It is understood now that this can create an indoor air quality issue where moisture may condensate in the fiberglass insulation and ATC. Due to the amount of ceiling tile staining, it is suspected that some materials may be absorbing moisture.

First floor ceiling

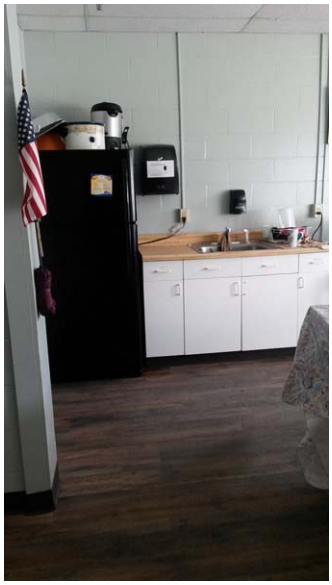
First floor ceiling

Kitchen Equipment

The Kitchen is located in the original 1954 building and is the same size as originally built. It is an extremely small space and was not designed to serve the present student population. It is a very cramped space with minimal isle width. Some kitchen equipment is very old and not functioning or being used. The Kitchen does have direct access from exterior by way of a stair, which is very narrow. For additional information, refer to the Mechanical and Plumbing reports.

Casework

All built-in casework (cabinetry, counters, shelving, etc.) appears to be original to the respective portions of the building. Some of the casework has been modified or added too, similar to AES. Much of the casework is damaged and missing parts. Many parts are outdated and no longer available, including sinks and faucets. Science areas are original 1988, with one sink over 30 years old, and no longer meet current educational needs. The Art room has minimal counter space for student projects with one sink and no longer meets current educational needs. The majority of casework does not meet ADA standards. Refer to Plumbing section for additional information.



Residential style casework

Various cabinets and book shelving

Typical Science classroom/lab

Residential style casework

Art room extent of casework with one sink

Casework Recommendations

- All casework to be replaced. Consider redesigning with a combination of open and closed cabinets/shelving. Provide all spaces to meet ADA requirements for accessibility.
- Most spaces need additional storage space.

Doors and Hardware

Most classroom doors have partial glass consisting of an upper viewing glass panel. Per Homeland Security's Physical Security Enhancement Master Plan, doors are to have less glass so as to deter perpetrators from easily viewing into classrooms and breaking glass to unlock the door.

All the teaching spaces have hardware locksets that have security functions, allowing teachers to lock the door without entering the corridors.

Exterior doors have a variety of maintenance repairs and finishes. Most doors are aluminum and are in good condition.

Interior doors vary and include wood doors in wood frames, wood doors in hollow metal frames, and metal doors in hollow metal frames. Hardware varies in age and quality. Most meet ADA accessibility with lever handles while some others have knob sets that do not meet code.

Typical door with knob set

Science room door with full glass and lever handle

Typical door with half glass

Recommended classroom door

Door and Hardware Recommendations

- All interior classroom and teaching space doors to be replaced with new doors with partial glass, upper viewing glass panel.
- All doors with knob sets to be replaced with lever handles. Provide fire rating assemblies as required.

Building Codes - General

The New Hampshire State Building Code Review Board has made revisions effective April 1, 2010. Below are the code sections that are most relevant to this analysis:

New Hampshire "fire code" or "state fire code" means the adoption by reference of the:

- Life Safety Code NFPA 101, 2009 edition
- Uniform Fire Code NFPA 1, 2009 edition

New Hampshire "building code" or "state building code" means the adoption by reference of the:

- International Building Code 2009 (IBC)
- International Existing Building Code 2009 (IEBC)
- International Plumbing Code 2009 (IPC)
- International Mechanical Code 2009 (IMC)
- International Energy Conservation Code 2009 (IECC)
- National Electric Code 2011 (NEC)

As amended by the state building code review board and ratified by the legislature in accordance with RSA 155-A: 10.

Per 155-A: 2 State Building Code.

I. All buildings, building components, and structures constructed in New Hampshire shall comply with the state building code and state fire code. The construction, design, structure, maintenance, and use of all buildings or structures to be erected and the alteration, renovation, rehabilitation, repair, removal, or demolition of all buildings and structures previously erected shall be governed by the provisions of the state building code.

II. To the extent that there is any conflict between the state building code and the state fire code, the code creating the greater degree of life safety shall take precedence.

Construction Type and Occupancy

NFPA 101 classifies the occupancy of this facility as mixed use of both:

- Existing educational: classrooms, kitchen, and offices/support spaces
- Existing assembly: gymnasium, cafeteria, Library and offices/support spaces. Per NFPA under Existing Educational; these spaces can be classified as Accessory Assembly, Offices and Storage.

Because the building is fully sprinklered, the corridors that are typically part of the means of egress need to be smoke resistive.

Fire Protection System

There is an actual automatic sprinkler system. Refer to Fire Protection section.

International Building Code 2009 (IBC)

Allowable Height and Building Area

On March 14, 2014 the NH Building Code Review Board voted to approve an amendment, submitted by NHBOA, to remove all New Hampshire amendments to the International Building Code (IBC) 2009 regarding Building Height and Area Section 506.

The following reflects Chapter 5 of IBC 2009, Table 503: Building with automatic sprinkler system.

Group E – Education mixed use, Construction Type III-B.
- Allowable height 2 story - MET

Group E – Education mixed use first floor footprint = 36,030 sq. ft. Construction Type III-B.
- Allowable square footage 14,500 sq. ft.

Note - We are allowed to increase building area due to Fire protection system x 200%
- Allowable square footage 14,500 sq. ft. x 2 = 29,000 sq. ft. + 14,500 = 43,500 sq. ft. – MET

Recommendation

With any future addition or major renovation, Harriman would recommend consulting the Authorities Having Jurisdiction to review design options.

Life Safety Code NFPA 101

Estimated Occupant Load based on Table 7.1.1.2

Gymnasium – Assembly Use

Assembly fixed seating 5,224 ft2 /15 = 348 occupants.
Assembly concentrated use without fixed seating 5,224ft2 /7 = 276 occupants.

Number of Exits

Number of Exits - Assemble – 13.2.4.2
Assembly occupancies with occupant loads of 600 or fewer shall have two separate means of egress.

Presently four separate means of egress exist.

Recommendation

No action is recommended other than adding EXIT signage.

Arrangement of Means of Egress

Common path of travel – 15.2.5.3.2
Common path of travel shall not exceed 75 feet in a building protected throughout by an approved, supervised automatic sprinkler system. The facility is in compliance.

No action is recommended.

Dead-Ends – 15.2.5.2
No dead-end corridor shall exceed 20 feet, other than in buildings protected throughout by an approved, supervised automatic sprinkler system, in which case dead-end corridors shall not exceed 50 feet. The facility is in compliance.

No action is recommended.

Travel Distance – 15.2.6
15.2.6.2 Travel distance to an exit shall not exceed 150 feet from any point in a building, unless otherwise permitted by 15.2.6.3 or 15.2.6.4.

15.2.6.4 Approved existing travel distances shall be permitted to continue in use.
The facility is in compliance.

No action is recommended.

Chapter 7 – Means of Egress, Stairs

Dimensional Criteria - 7.2.2.2
7.2.2.2.1.1 Stairs shall meet the following criteria (included interior and exterior to a building):
(2) Existing stairs shall be permitted to remain in use, provided that they meet the requirements for existing stairs shown in Table 7.2.2.2.1.1 (b).

Table 7.2.2.2.1.1 (b) Existing Stairs

Minimum width clear	36 inches
Maximum height of risers	8 inches
Minimum tread depth	9 inches
Minimum head room	6 feet 8 inches
Maximum height between landings	12 feet
Landing	See 7.2.1.3 & 7.2.1.4.3.1

7.2.2.3.2 Landings
7.2.2.3.2.2 Stairs and intermediate landings shall continue with no decrease in width along the direction of egress travel.

NOTE (b): Other stair requirements are dimensions of guardrails, handrails, balusters handrail extensions, etc.

Accessibility Rules and Standards - ADA

General

Please refer to Accessibility Rules and Standards – ADA towards the end of this section. Below are requirements which are similar to NFPA 2009.

505.2 Where Required. Handrails shall be provided on both sides of stairs and ramps.

505.4 Height. Top of gripping surfaces of handrails shall be 34 inches (865 mm) minimum and 38 inches (965 mm) maximum vertically above walking surfaces, stair nosing's, and ramp surfaces. Handrails shall be at a consistent height above walking surfaces, stair nosing's, and ramp surfaces.

Advisory 505.4 Heights. The requirements for stair and ramp handrails in this document are for adults. When children are the principal users in a building or facility (e.g., elementary schools), a second set of handrails at an appropriate height can assist them and aid in preventing accidents. A maximum height of 28 inches (710 mm) measured to the top of the gripping surface from the ramp surface or stair nosing is recommended for handrails designed for children. Sufficient vertical clearance between upper and lower handrails, 9 inches (230 mm) minimum, should be provided to help prevent entrapment.

505.10.2 Top Extension at Stairs. At the top of a stair flight, handrails shall extend horizontally above the landing for 12 inches (305 mm) minimum beginning directly above the first riser nosing. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent stair flight.

505.10.3 Bottom Extension at Stairs. At the bottom of a stair flight, handrails shall extend at the slope of the stair flight for a horizontal distance at least equal to one tread depth beyond the last riser nosing. Extension shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent stair flight.

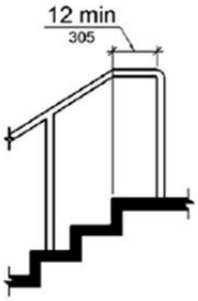


Figure 505.10.2 Top Handrail Extension at Stairs

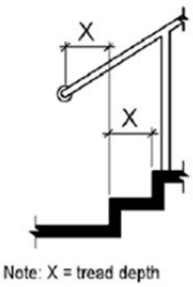
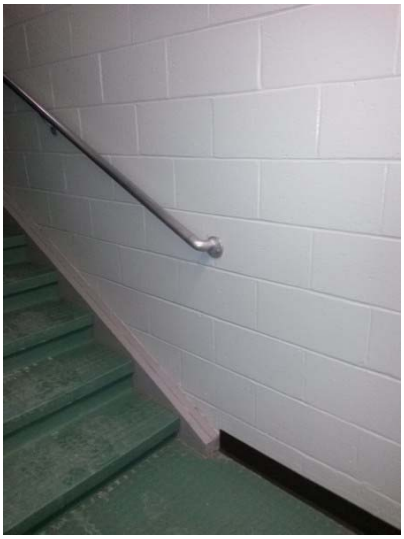


Figure 505.10.3 Bottom Handrail Extension at Stairs

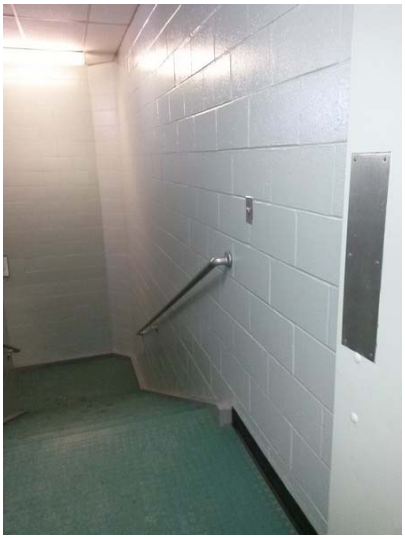
Observations

Stairs conformance to the code:

- Stair A and B - handrail extensions do not meet code.
- All stairs in 1954 do not meet many dimensional criteria.
- Exterior stairs K and M do not meet many dimensional criteria.

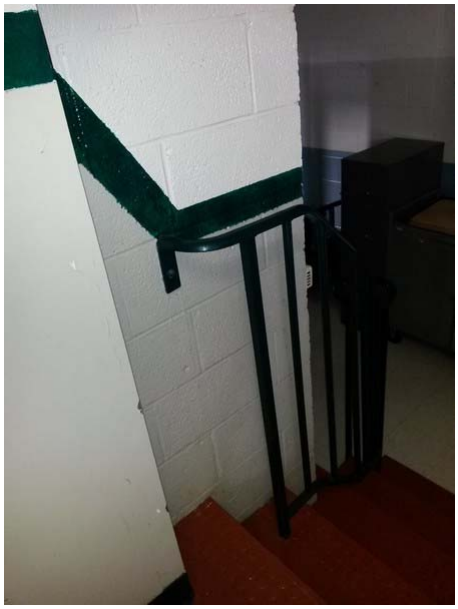


Stair A & B, need to extend handrail.



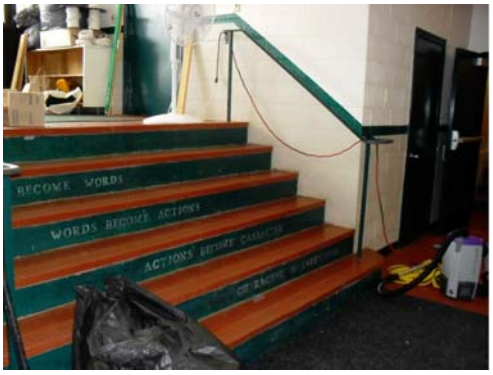
Stair A & B, need to extend handrail.

Stair C, needs handrails both sides of stair.



Stair F from Lobby #117 handrail does not meet dimensional criteria. (Stair E similar)

Stair F from Cafeteria #111 iron handrail, balusters and guardrail do not meet code.(Stair E similar)



Stair G handrail height and extensions do not meet code.

Stair L, wood stair handrail, balusters and guardrail do not meet code.

Stair D, needs handrail on right of stair. Note conflict with unit heater.

Exterior stair M need handrails both sides of stair and balusters and guardrail do not meet code.

Exterior stairs K need handrails both sides of stair and balusters and guardrail do not meet code.

Recommendations

- Stairs A, B and D: These stairs can be fixed fairly reasonably.
- Stair E, F, G, H and I: In original 1954 building with many issues. If this building is to remain as an educational facility, redesigning will be required. Review with Authority Having Jurisdiction in order to retain for any length of time.
- Stair J: Does not meet code. If this building is to remain as an educational facility new stairs maybe the only option.
- Stair K and M: These stairs can be fixed at a high cost.
- Stair L: Rebuild the stairs.

Egress Stairs

Egress stairs require having fire rated enclosures and lead to a public way in an enclosure of same fire rating as the stair enclosure. Stair enclosures cannot have rooms within the enclosure and cannot have storage access from the stair enclosure.

Observations

- Stair A and Vestibule #130 (lead to a public way), due to the secretary view window opening are not protected.
- Stair B from second floor corridor double doors is not rated.
- Stairs E, F, and G enclosures have no evidence fire ratings. Review with Authority Having Jurisdiction in order to remain.

Recommendation

- Stair A and Vestibule provide 1-hr rated frame and glass assembly at secretary view windows.
- Stair A and B at second floor to corridor replace double doors, frames and glazing with new 1-hr fire rated assembly.
- All stairs in 1954 original building need to be re design and reviewed with AHJ.

Chapter 15 – Existing Educational Occupancies, Corridors 15.3.6

Corridors shall be separated from other parts of the story by walls having a minimum of 1/2-hour fire resistance rating in accordance with Section 8.3, unless otherwise permitted by the following:
(2) The following shall apply to buildings protected throughout by an approved automatic sprinkler system with valve supervision in accordance with Section 9.7.
(a) Corridor walls shall not be required to be rated, provided that such walls form smoke partitions in accordance with Section 8.4.

Note: door openings shall meet other requirement such as door closures, smoke gaskets, etc.

ARMAND R. DUPONT MIDDLE SCHOOL – FACILITY ANALYSIS

Observations

Presently the entire facility as an approved automatic sprinkler system.

Recommendation

Replace all non-conforming doors, frames and hardware or consider an automatic sprinkler system.

International Energy Conservation Code 2009 – IECC

Section 101 Scope and General Requirements

101.4 Applicability.
101.4.1 Existing buildings: Except as specified in this chapter, this code shall not be used to require the removal, alteration or abandonment of, nor prevent the continued use and maintenance of, an existing building or building system lawfully in existence at the time of adoption of this code.

This code was adopted by New Hampshire State Building Code Review Board and revised effective April 1, 2010. The code is designed to regulate new construction and new work, and is not intended to be applied retroactively to existing buildings except where existing envelope, lighting, mechanical, or service water heating systems are specifically affected by Section 101.4.3.
This section addresses that the code does not affect existing buildings.

101.4.3 Additions, alterations, renovations or repairs.
This section simply states that new work must comply with the current requirements for new work. Any alteration or addition to an existing system involving new work is subject to the requirements of the code.

Accessibility Rules and Standards - ADA

General

Note: AB (Architectural Barrier-Free) Committee has amended the rules as they have expired. AB has adopted the 2010 ADA Standards as the AB Code. This coincides with the Department of Justice stating that as of March 15, 2012 the 2010 ADA Standards for Accessibility be used.

Below are the Rules and Standards that are applicable:

- 2010 ADA Standards
- 2009 International Building Code (IBC). (Accessibility scoping provisions which describe “what, where and how many”. Chapter 11 “control the design and construction of facilities for accessibility to physically disabled persons”.)
- 2003 ICC/ANSI A117.1-03 standards: Accessible and Usable Buildings and Facilities. (Technical requirements which describe “how”.)

ARMAND R. DUPONT MIDDLE SCHOOL – FACILITY ANALYSIS

Please note: Due to the construction between 1954 through 1973, most portions of the building do not comply with current requirements for new construction. In many cases, alterations to the portions of the building did comply at the time of the alteration. With future addition/renovations it is required to upgrade the facility depending on the extent of the proposed addition/alterations to the facility. Refer to Percent of Alterations and Cost at the end of this section.

New Construction And Alterations

35.151 New construction and alterations
(b) Alterations, (4) Path of Travel, (i) Primary functions. A "Primary functions" is a major activity for which the facility is intended. Areas that contain a primary function include, but not limited to, the dining area of a cafeteria, the meeting rooms in a conference center, as well as offices and other work areas in which the activities of the public entity using the facility are carried out.

Multi Floor Entrance of Original 1954

It is our opinion that an "accessible path of travel" during public events will be required to access the Gymnasium #207 and Cafeteria #111 for "primary functions" by way of the Lobby #117. The accessible path of travel may consist of ramps, elevators and lifts.

Recommendation

To be in compliance with applicable requirements, in our judgment, is technically infeasible due to the taking of adjoining spaces. No action is recommended unless altered or renovated. Provide access to these spaces from the 1973 school entrances.

Plumbing Elements and Facilities

Plumbing fixtures appear to be original to the date of construction. Refer to Mechanical and Plumbing sections of this report.

Alterations

Should alterations to the facility be planned, at least 20% of the alteration budget must be applied to providing an accessible path of travel to the area(s) of primary function, unless the only alterations planned are to provide accessibility, in which case, the entire budget is dedicated to improving accessibility of the facility.

In overall alterations, where the cost to provide accessible facilities exceeds 20% of the alteration budget, Title II, Section 35.151(b)(4)(iv) provides priorities for barrier removal:

(A) When the cost of alterations necessary to make the path of travel to the altered area fully accessible is disproportionate to the cost of the overall alteration, the path of travel shall be made accessible to the extent that it can be made accessible without incurring disproportionate costs.

(B) In choosing which accessible elements to provide, priority should be given to those elements that will provide the greatest access, in the following order:

(1) An accessible entrance;
(2) An accessible route to the altered area;
(3) At least one accessible restroom for each sex or a single unisex restroom;
(4) Accessible telephones;
(5) Accessible drinking fountains; and
(6) When possible, additional accessible elements such as parking, storage and alarms.

Alterations must be completed in compliance with the ADA Standards for Accessible Design (ADA Std.) per ADA Title II, § 35.151 New construction and alterations http://www.ada.gov/regs2010/titleII_2010/titleII_2010_regulations.htm#a35151.

ADA Standards for Existing Buildings and Facilities
http://www.ada.gov/regs2010/2010ADAStandards/2010ADAstandards.htm#pgfId-1010052

STRUCTURAL

Existing Structural System - General

When evaluating an existing building structure, the structural system is investigated to identify areas of damage or deterioration as well as confirm that the as-built condition of the structural components are adequate to support the loads prescribed at the time of original construction. In accordance with the 2015 international Existing Building Code, it is not specified that the building's structural system be capable of supporting current building code requirements unless renovations, alternations, or additions are included that will alter the loading conditions or magnitudes.

For wind and seismic loading, the 2015 IBC identifies wind and seismic forces to be resisted by the structural framing system. These forces are determined through consideration of numerous criteria related to soil type, exposure, height, and structural system. It is noted that while current code recommendations for wind and seismic effects are more stringent than at the time this building was designed and constructed, the 2015 International Existing Building Code does not require structural upgrades to an existing building unless an addition, alteration (such as an increase in roof insulation) or change of use prompts or causes an increase in loads. Should significant structural renovations be made which affect the lateral force resisting system, seismic upgrades would be required. Further detailed and specific analysis would be necessary to evaluate the impact and design necessary reinforcements.

Structural drawings were not available and would require extensive investigation. We recommend reserving our efforts to when the School District determines a direction on which school would be considered for consolidation and at what portion an addition would be recommended.

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FIRE PROTECTION

General

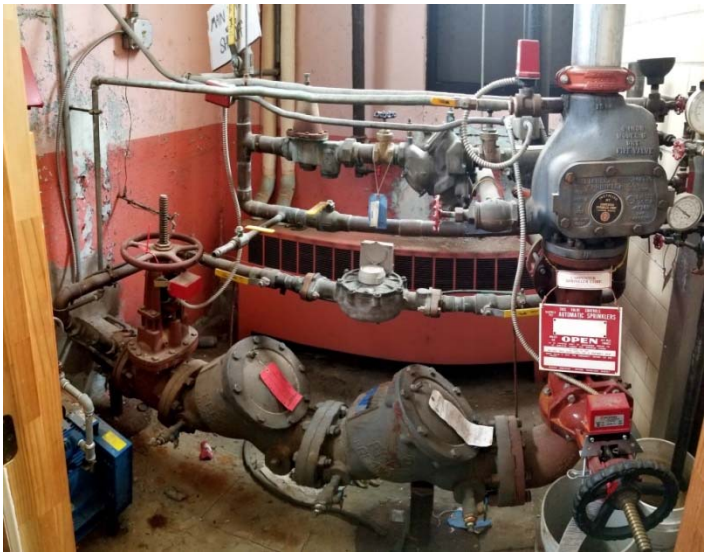
The fire protection system review consists of:

- Sprinkler water service
- Piping and coverage
- Sprinklers

Fire Protection System

The entire building is fully protected by a dry pipe sprinkler system. The sprinkler system was installed in 1988. The system is now 30 years old. The system is in good condition with no obvious performance issues. The interior condition of the piping is unknown.

The sprinkler system is served by a 6" ductile iron supply pipe entering the lower level of the building in the Women's Locker area. The 2" domestic water service is tapped from the 6" main just inside the foundation wall. The 6" sprinkler shut-off valve is downstream of the domestic connection. Incoming water pressure is approximately 90 to 100 psi. Air pressure on the system is maintained at approximately 40 psi.



Sprinkler Room

A 6" double check valve backflow preventer is installed upstream of the dry alarm valve and looks to be in good condition. The system is monitored by the fire alarm system. All valves have tamper switches, as well as low air alarm and flow switches.

The dry alarm valve is vintage 1988. It is unknown if the valve has required maintenance or repairs over the years. The floor mounted air compressor looks relatively new and is assume to be in good operating condition. The compressor did not start during the survey, indicating that the system does not have any serious leaking of air.

Domestic Water Tap, Shut-off Valve and Backflow Preventer

Dry Alarm Valve

Air Compressor

The sprinkler consists of a black steel piping system throughout the building except in the girls' locker room. The exposed piping in the girls' locker room is galvanized steel piping. The piping system is joined with Victaulic couplings and threaded fittings. Threaded fittings connect piping 2"

and smaller while the Victaulic couplings connect piping 2-1/2" and larger. Sprinkler coverage meets current NFPA 13 requirements, although not every space and closet, etc. was surveyed for compliance. NFPA 25 requires piping to have an internal investigation at 5 year intervals. It is unknown if the piping has been inspected six times since it was installed in 1988.

Galvanized Piping with Victaulic Couplings

The sprinklers are vintage 1988 when the system was installed. The sprinklers are "standard response" type sprinklers with fusible link activation. The 30 year old sprinklers do not need to be tested until they are 50 years old. At that time, five sprinklers shall be removed and replaced, with the sprinklers sent out to a testing agency. If the sprinklers pass the testing, all other sprinklers may remain in place and will need to be tested again at 75 years old.

Spare Sprinkler Cabinet

System Recommendations

- Dry piping is known to be more susceptible to interior corrosion than wet piping since any water remaining in the piping evaporates over time causing corrosion. The more times the piping is filled, the greater the possibility of interior corrosion. An interior inspection of the piping should be completed and documented. The internal inspection shall include the dry alarm valve, system riser, cross main and branch line.

A recent site visit by Harriman in February 2019 with the Director of Building Maintenance revealed the following:

- Sprinkler backflow preventers were inspected by local Department of Public Works and passed.
- Tri State Fire Protection sprinkler maintenance contractor noted leakage on domestic line at two - 2 inch pressure reducing valves. School District is pursuing repairs.

Leaking Pressure Reducing Valve

Close-up of Water Leak

ARMAND R. DUPONT MIDDLE SCHOOL - FACILITY ANALYSIS

PLUMBING

General

The basic plumbing systems that were reviewed consisted of:

- Domestic hot water heating
- Water service
- Drainage and domestic water piping condition
- Plumbing fixtures

Plumbing System

Domestic hot water is generated by a natural gas fired water heater which was installed 10 years ago in 2008. The water heater is a Bradford White model 75T80B3N, 75 gallon storage capacity with an input of 76,000 btuh. The heater can recover 82 gallons per hour with a first hour rating of 135 gallons. It is estimated that the hot water is stored at 140°f. The hot water is mixed through a 3/4" Honeywell AM-1 Series thermostatic mixing valve located above the water heater. It is estimated that the hot water temperature is reduced to 120°f and distributed to the building. Temperature gauges could not be located to indicate actual hot water temperatures.

Existing Natural Gas Fired Water Heater

Existing Natural Gas Fired Water Heater

Existing Honeywell Thermostatic Mixing Valve

The water service entrance consists of a 2" copper supply connected to the 6" sprinkler service entrance. There is a 2" water meter with a 2" reduced pressure zone backflow preventer and 2" pressure reducing valve. The static water pressure is 93 psi. The water pressure delivered to the building is estimated at 70 psi downstream of the PRV.

2" Domestic Water Service

2" Water Meter

2" RPZ Backflow Preventer

2" Pressure Reducing Valve

Plumbing fixtures appear to be in good condition. The toilet fixtures are modern design, but do not appear to be water conserving models. Water conserving models have been a requirement since 1991. Water conserving models use 1.6 gallons or less per flush. The existing fixtures use 3.5 gallons per flush. The lavatories are modern design with single lever faucets. The urinals are a wall hung modern design and use 1 gallon per flush. Fixtures on the second floor are more up to date and in better condition.

Girls Locker ADA Stall

Girls Locker Typical Stall

Boys Locker ADA Stall

Boys Locker Typical Stall (no seat)

Second Floor Boys

Second Floor Boys

Second Floor Boys ADA Lav

Second Floor Boys

Second Floor Boys ADA Stall

Second Floor Boys Typical Stall

Second Floor Girls ADA Stall

Second Floor Girls Typical Stall

Second Floor Girls

Second Floor Girls ADA Lav

The kitchen has an above floor grease interceptor. The grease interceptor serves the two wash bays of the three compartment sink. The kitchen pre-rinse sink, dishwasher, three bay sink and grease interceptor discharge into a sump pump recessed in the floor of the boiler room.

Three Bay Sink Drains

Copper Dishwasher Drain

Three Bay Sink

Pre-Rinse Sink & Dishwasher

Hand Sink

Grease Interceptor Discharge

Sump Pump for Kitchen

Sump Pump for Kitchen

The drainage and vent piping consists of cast iron with hub and spigot joints and fittings. The interior condition of the piping is unknown. Typically, cast iron in a commercial installation has a lifespan of 50 to 75 years. The piping condition can be evaluated with a camera inserted into the piping. The domestic water piping is copper tube with soldered joints and fittings. Solder used in plumbing systems prior to 1986 contained 50% lead, 50% tin. Since 1986 lead solder is not allowed to be used in drinking water systems. It is recommended piping with lead solder be flushed prior to drinking.

System Recommendations

- Replaced all restroom plumbing fixtures with water conserving models with new flush valves and faucets.
- Replace the gas fired water heater with a unit with a high efficiency 80 gallon unit with 199,000 btuh input.
- Replace the domestic hot water thermostatic mixing valve with a unit of higher capacity.
- Replace the sump pump with similar equipment.

ARMAND R. DUPONT MIDDLE SCHOOL - FACILITY ANALYSIS

MECHANICAL

General

The basic mechanical systems that were reviewed consisted of:

- boiler plant
- heating distribution
- temperature control
- air moving
- classroom heating and ventilating
- heating terminal units
- local air conditioning units

Mechanical System

The main boiler plant consists of three Triangle Tube wall mounted boilers. Each natural gas boiler has an input of 399,000 BTUs with a max output of 330,000 BTUs. A dedicated circulation pump operates in unison with its respective boiler to inject hot water through a closed spaced tee into the central heating loop. One of the boilers is not operational and is used to scavenge replacement parts for the other boilers.

Typical Boiler

A main return header located in the boiler room is connected to seven individual circuit setters which can be used to balance flow to various zones.

Return Header

Hot water is circulated through the building with two base mounted pumps which operate in a lead/standby arrangement. Variable frequency drives modulate the speed of the pumps based on the differential pressure sensor in the boiler room.

Hot Water Pump

Differential Pressure Sensor

Existing building controls are pneumatic with the central air compressor located in the boiler room.

Controls Air Compressor

Typical classrooms consist of perimeter fin tube for heat and a combination of a small amount of exhaust which provides minimal, indirect ventilation that does not meet current codes.

Similarly, the gym is heated with perimeter fin tube. Indirect ventilation is achieved by exhausting the space. A few ceiling paddle fans are located in the gym as well, which are mostly ineffective in a space this size.

The kitchen contains ovens which are located under a hood to remove heat. A dishwasher located in the middle of the kitchen is located under a hood as well, which removes heat and condensate.


Kitchen Cooking Equipment

The only rooms that are air conditioned are the administration area, server room, and the PE Office/Storage Room located adjacent to the gym. The three rooms are cooled with ductless split units with wall mounted evaporators. Outdoor condensing units are located on wood sleepers at the ground level, entrance overhang, and wall mounted bracket. Additionally, the P.E. Office/Storage Room has a window mounted air conditioner.


Outdoor Condensing Units

System Recommendations

Ventilation

The school lacks proper ventilation that meets current ASHRAE 62.1-2016 which requires 10 cfm of outdoor air per person plus 0.12 cfm per sqft for a classroom. For a typical classroom with 25 students and a teacher, this will result in approximately 375 cfm. Since rooms are heated with perimeter fin tube, a dedicated outdoor air system (DOAS) is recommended to provide 100 percent outdoor air. The DOAS unit will consist of a supply fan, exhaust fan, hot

water heating coil, and either a flat plate or rotating wheel sensible heat recovery module. Air would be delivered to the spaces at neutral temperature to minimize the heating needed from the perimeter fin tube. On a design heating day, the discharge air temperature at the heat recovery module will be approximately 40 degrees. This will require a heating coil to temper the air up to a neutral temperature of 70 degrees.

Heating Plant and Distribution

The boiler plant is at capacity, or near maximum capacity, to heat the building. The system lacks redundancy which would prevent the building from maintaining set point should a boiler fail. The remaining boiler may struggle to heat the building on a design heating day when average temperatures are at their lowest. The addition of any ventilation systems would add to the heating demand on the school. Any plans for future expansion would also exceed the capacity of the existing boiler plant. At a minimum, the existing wall hung boilers should be replaced with new floor mounted condensing boilers that will have a longer life expectancy and sized to provide full redundancy. The current layout of the boiler room may not allow the boilers to be located in this space, so a new location will need to be considered. Any new boilers should be sealed combustion to minimize the impact of providing combustion air to the new boilers.

Cooling

If cooling is desired for the entire school, then rooms such as classrooms and smaller should be connected to a central variable refrigerant flow system. This will consist of either wall mounted or ceiling cassette evaporators with condensing unit clusters strategically located on the roof. If large spaces are to be cooled, such as the multi-purpose room, a central air handler should be size with heating and cooling coils to provide heating, cooling, and ventilation.

Controls

Pneumatic controls should be removed and replaced with direct digital controls which allows users to access a graphical user interface from any location with the proper credentials.

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ARMAND R. DUPONT MIDDLE SCHOOL - FACILITY ANALYSIS

ELECTRICAL

Service Entrance and Power Distribution

Observations

The electrical provider for this site is Eversource. The service entrance is served by three 25kVA, pole mounted transformers located on School Street. The transformers also serve St. John the Baptist Church located between the school and School Street. The 25kVA transformers have a full load rating of about 67.5kW @ .9pf (208 amps at 208 volt, three-phase). Information provided by Eversource indicates that the peak demand measured on April 16, 2018 was 47.8kW (about 133 amps @ 208 volt, three-phase).

Pole mounted transformers serving St. John the Baptist Church and Armand R. Dupont Middle School

The service disconnect is a manual transfer switch for connection to a portable generator. This does not meet the National Electrical Code as the unprotected secondary conductors have no overcurrent protection until after the transfer switch. Overcurrent protection of the incoming service is the main circuit breaker of panelboard MP (400A circuit breaker). The manual transfer switch and main panel are located in a first floor electrical room adjacent to the girls' locker room.

Manual transfer switch (service disconnect) with CT cabinet and feeder from utility on the left, panelboard with overcurrent protection at right of transfer switch

Knockout on transfer switch covered with tape

The meter is located on the building exterior. The main panelboard is located in the same first floor electrical room as the manual transfer switch (located to the right of the transfer switch). There appears to be additional circuit breakers tapped off ahead of the main panelboard. The main panelboard is 400amp, 208V, 3ph/4w panelboard with 400amp main circuit breaker. The main panelboard is a Siemens CDP-7 that appears to be in good shape; manufacturer date is 01/89.

1st floor, main electrical room

Main panelboard MP main circuit breaker, first overcurrent protective device downstream of the manual transfer switch

1st floor, main electrical room, main panelboard MP, manufacturers badge

There is a generator connection box/disconnect located on the building exterior at the connector of the gymnasium and classroom portions of the building. The switch has a 400amp rating at 250V. Wiring connecting to an existing generator is still attached to the generator connection box/ disconnect. The disconnect is padlocked in the “off” position.

Generator connection box/disconnect

Generator connection box/disconnect with generator umbilical still attached

Panelboards downstream of the main panelboard are not located in electrical rooms. They are located in the kitchen, cafeteria, and janitor’s closets. One is located in a stair from the gymnasium adjacent to the music classroom. Many panelboards are single phase. Most panelboards are older

and beyond their expected useful life expectancy. Circuit breakers become difficult and sometimes impossible to find when needed.

Cafeteria panelboard, semi-recessed

Kitchen panelboard, surface mounted

Panelboards in typical janitors closet, code required working clearances do not exist

Panelboard L1 located in first floor janitors closet, single phase panelboard

Panelboards have been added next to some panelboards for additional circuit breaker space, this panelboard is adjacent to panelboard L1 in first floor janitors closet

Panelboard LPG is located in an egress stair at the music classroom

Recommendations

The peak demand as measured by Eversource indicates that there is about 20kW (55 amps @208 volt, three phase) of available capacity on the Utility side of the service. There is adequate capacity in the 400 amp main panelboard to support about 96kW (265 amps @ 208 volt, three phase). However, the service is not adequate to accommodate the additional ventilation requirements of the building once renovated.

In order to accommodate a renovation the service will be required to be increased in capacity. An 800 amp service at 208V volt, three phase will be required. The upgraded service will require floor space be taken from another location in the building. Due to the size of the existing space and location, there is not enough space to accommodate a new service in the existing location.

- Upgrade service throughout the building with additional circuit breakers and locate in spaces dedicated for electrical.
- Remove LPG from the Gymnasium egress stair.
- Panelboards that are 30 years old or older should be considered for replacement. Expected useful life expectancy is around 30 years.
- Circuits should be traced to update panelboard directories with accurate, legible, typed directory cards.

Branch Wiring and Circuits

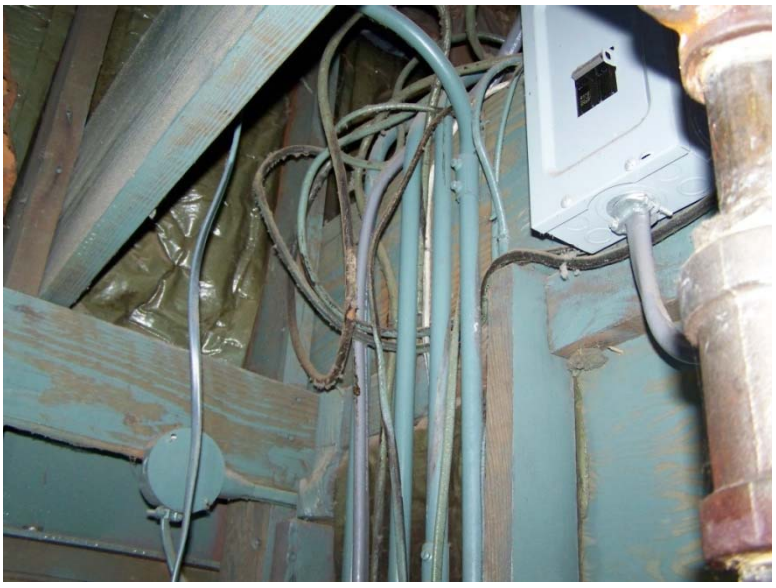
Observations

No panelboards were opened however, wiring with cloth insulation, non-metallic sheathed (Romex) and MC cable were observed above ceilings and "attic" space located above the stage.

Cloth insulated wiring (black) with non-metallic sheathed cable (white), above stage

Non-metallic sheathed cable serving circuit breaker, above stage

Mixture of non-metallic sheathed and cloth insulated wiring above stage



Some cloth insulation is damaged – center of picture

Recommendations

Non-metallic sheathed cables are not permitted in a structure of this construction type (type II).

- All non-metallic sheathed cable should be replaced with MC.

Lighting and Lighting Controls

Observations

Interior building lighting is primarily accomplished with the use of both surface and flush mounted fluorescent lighting. There are still a few incandescent lights fixtures in the building, mostly in the attic space above the stage.

Typical corridor lighting

Lamp color varies

Typical classroom with surface mounted lighting

Recessed / flush lighting, cafeteria

Incandescent lighting in attic space above stage

Lighting in the gymnasium/cafeteria is accomplished with six lamp fluorescent high bay fixtures.

Gymnasium lighting fixture

There is little exterior building mounted lighting and no pole mounted lighting. None of the lighting is cut off, so lighting spills above the horizon. There is little for security lighting around the building.

Building mounted lighting fixture

Lighting controls is provided with local toggle switches only. With the exception of the gymnasium, no automatic controls were observed (occupancy sensors or lighting control systems). Each gymnasium lighting fixture has an integral occupancy sensor that turns the lighting fixture on when occupancy is detected and turns the fixture off when occupancy is not detected for a set duration.

Recommendations:

- Upgrade lighting with LED for both interior and exterior lighting fixtures.
- LED lighting fixtures are amiable with 0-10V dimming as a standard option so each office and classroom should be provided with dimming.
- Energy codes require automatic lighting control for most lighting fixtures:
  - Provide centralized low-voltage lighting control relay system for common area lighting (corridors, vestibules and lobbies) and exterior lighting. This system allows programmed scheduling, photocell control, and occupant override of lighting.
  - Provide local occupancy sensing controls in rooms (offices and classrooms) that automatically turn lighting “OFF” when the space becomes un-occupied for 30 minutes. Each space would be provided with a 0-10V dimmer switch to allow occupant control “override” of the room lighting.
  - Spaces where safety may be a concern (kitchen and mechanical spaces) do not require automatic lighting controls. In these spaces standard toggle type (“ON” / “OFF”) switching is recommended.

Emergency Egress / Life-Safety Lighting

Observations

Emergency egress / life-safety lighting is provided throughout the building via emergency battery units with remote heads. A number of locations are covered by a single lamp remote head. NFPA101, 7.8 (Illumination of Means of Egress) requires that the failure of any single lighting unit does not reduce the lighting level below 0.2fc. Location of the heads does not provide adequate coverage to give the required average fc level of 1.0fc. There is no emergency egress / life-safety lighting on the building's exterior at egress doors.

Typical emergency egress / life-safety lighting battery unit

Recommendations

- Replace existing emergency egress / life-safety lighting battery units with new.
- Each battery unit to be powered from and monitor the local lighting circuit of the area the unit serves to meet code.
- Provide denser spacing to provide the code required lighting levels and redundancy.

Fire Alarm System

Observations

The fire alarm system is by Mircom. The fire alarm control panel is a series 1000 (zoned fire alarm system).

The system does not comply with code:

1. There is no notification in classrooms or many other rooms within the building.

2. Many of the notification appliances are lights and do not provide the required candela (cd) level to meet code.
3. There is no voice evacuation in the building.
4. Smoke detectors are not located within five feet of doors on hold opens.

The fire alarm system reports to a city loop. Connection to the city loop is by aerial cable run to a utility pole located on School Street.

Fire alarm control panel located in gymnasium lobby

Fire alarm system light

Building fire alarm connection to the city loop at School Street

Recommendations

- Replace the existing fire alarm system with new system that provides voice evacuation throughout the building to comply with code.
- Provide notification in classrooms to comply with code.
- Provide smoke detection to comply with code.

Exit Signage

Observations

Exit signs exist throughout and properly mark the means of egress.

Recommendations

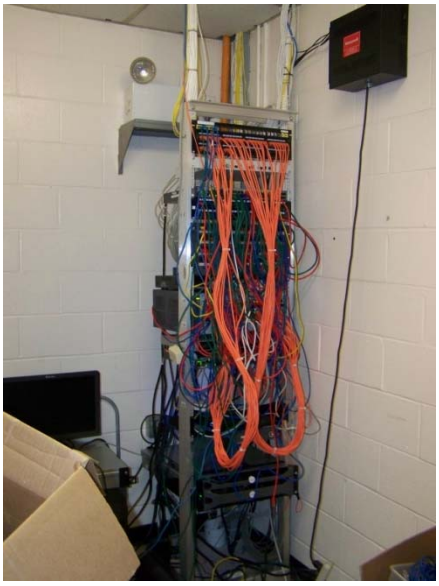
Provide LED exiting signs for reduced maintenance and evenly illuminated face.

Communications Systems

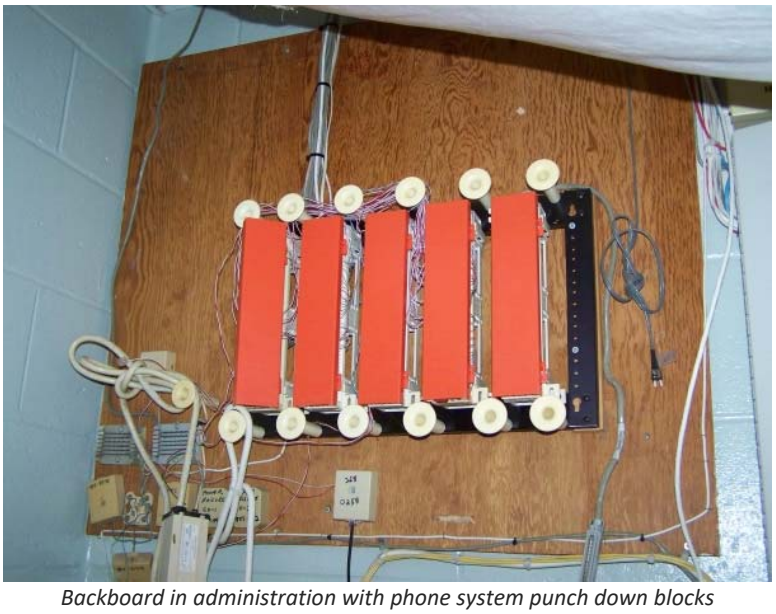
Observations

Communications serve the building via overhead lines from a utility pole on the opposite side of Main Street from the building. The communications demarcation appears to be in the main electrical room. There is one communications rack serving the building. The rack is located on the second floor adjacent to the Library. There is a backboard mounted in the first floor administration/secretary area that has phone system punch down blocks and intrusion detection system panels. Data drops are distributed throughout the building. Each classroom had a couple of jacks and a wall phone located next to the door. There were a number of wireless access points throughout.

Demarcation in main electrical room



Communications rack in storage room adjacent to library



Backboard in administration with phone system punch down blocks

Recommendations

- Provide a dedicated air conditioned space for the main communications rack (building a room around the rack).

Instructional Technology

Observations

Every classroom utilizes a voice reinforcement system by Lightspeed Technologies Inc. Most classrooms utilize interactive projector/boards. There is a variety of products being utilized.

Classroom sounds reinforcement system

Classroom interactive projector/ board

Recommendations

- Maintain sound reinforcement systems in all teaching spaces.
- Add interactive teaching devices to any space that do not currently have any, upgrade oldest devices.

CCTV System

Observations

The head end of the CCTV system resides on the communication system rack that is located in the main electrical room. The system appears to have been installed recently and appears to have adequate coverage both on the interior and exterior of the building.

Exterior camera

Typical interior camera

Recommendations:

- Review coverage, re-aim cameras as/if needed for better coverage, add cameras as/if needed.

Public Address System

Observations

The public address system is by Bogen. It is a zoned system that requires each zone be hard wired back to the head end equipment. The head end equipment is located in the main office. The system appears to be is good shape with space to add approximately thirty additional zones.

Public address system head end equipment

Typical recessed speaker, non-classroom locations

Typical classroom speaker and call button

Recommendations

- If administration/secretary location is relocated, all zones will have to be re-run to the new location.
- If administration/secretary location remains no work is required.

Intrusion Detection System

Observations

There is an intrusion detection system in the building. Common areas are covered by motion sensors with key pad located at the main entrance / admin area.

Recommendations

- Expand the system to monitor the position of all exterior doors with magnetic switches.

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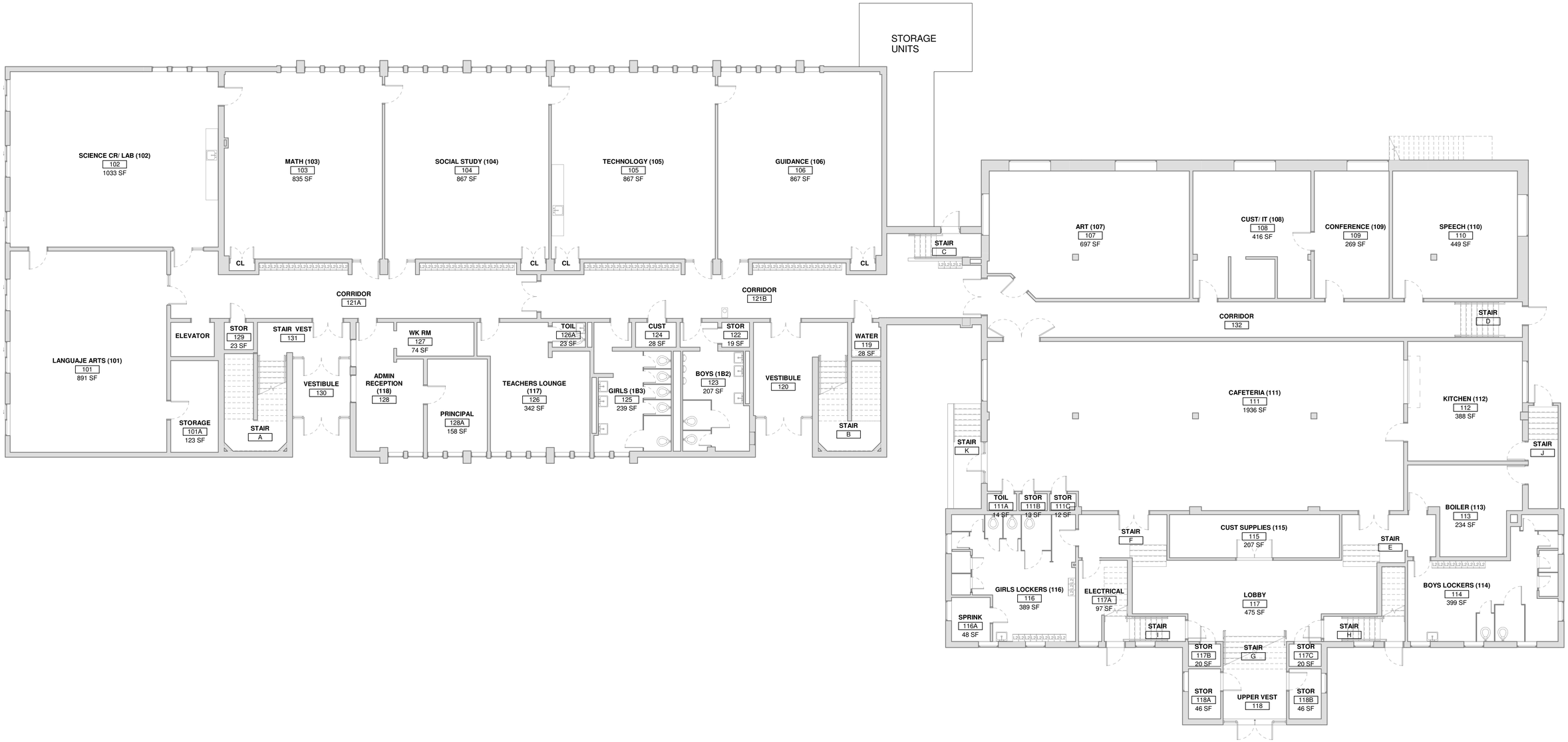


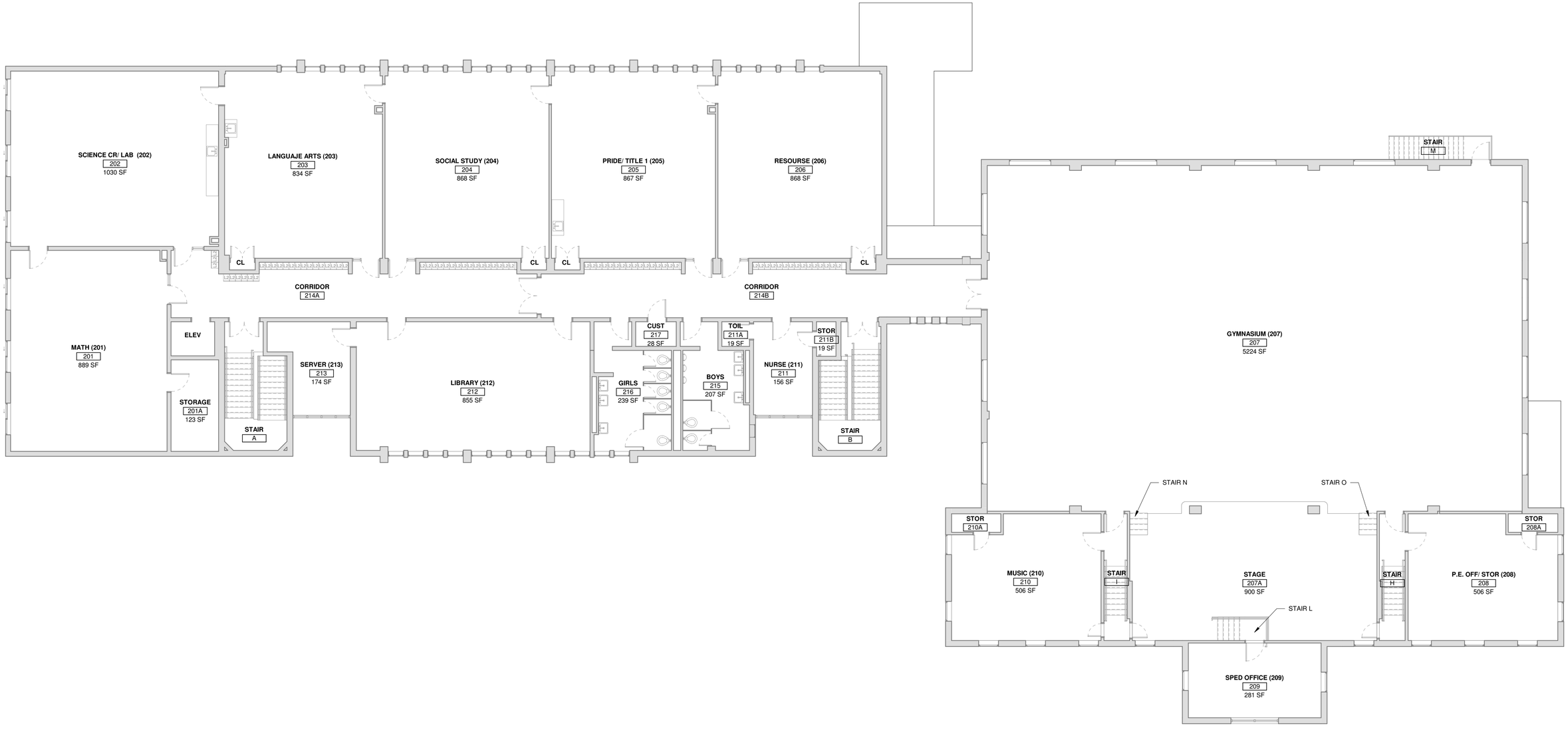
HARRIMAN

ALLENSTOWN
ARMAND DUPONT MIDDLE SCHOOL

HA: 18345

EXISTING FIRST FLOOR PLAN

03/05/19



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HA: 18345

EXISTING SECOND FLOOR PLAN

03/05/19

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