READING MEMORIAL HIGH SCHOOL
REVIEW OF EXISTING CONDITIONS

8 OCTOBER 2002

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Executive Summary

Seven years after World War II, the Town of Reading constructed the Reading Memorial High School on Birch Meadow. The initial construction, now nearly 51 years old, currently houses classrooms, offices, auditorium, cafeteria, and girl's locker rooms. In 1969, the Town added a media center, science labs, math classrooms, and an athletic field house. Over the past thirty years, numerous improvements and small renovations have been carried out in response to fluctuating enrollment and evolving educational programs.

Purpose

The Town of Reading School Building Committee, through Flansburgh Associates, Inc., is studying the Reading Memorial High School. In addition to examining the building's capacity and program functions, this study considers the quality and anticipated life of the physical plant. The existing conditions report is the first phase of the overall study; it provides a description and analysis of the building's materials and systems. Athletic fields and site features are also addressed. The report documents ongoing, and anticipated, maintenance/repair concerns. In most cases, this report does not propose a solution. It documents the existing condition. Solutions are considered in proposals made during the ongoing study.

The findings of this report will inform the scope of proposed renovation work, and assure that systems and materials left in place are sound and appropriate to the High School program. Should construction not proceed, this document serves as a comprehensive guide for maintenance projects.

Scope

Each section of the existing building, as well as the field house, is included in the report. Athletic fields and site features throughout the Birch Meadow site are analyzed, though these fields are not currently under school department jurisdiction. The systems reviewed include exterior walls, windows, roofs, doors, hardware, interior finishes (walls, floors, ceilings), built-in equipment (cabinets, storage), lighting, electrical power, technology infrastructure, heating and ventilation, and plumbing. Handicapped accessibility is also analyzed, Finally, the report studies the existing building systems relative to the requirements of the current building code.

Method

The existing facility reviews occurred during June, July and August of 2002. These reviews included an exhaustive on-site investigation, as well as meetings with the School Principal, the Athletic Director, the School Facilities Department, Invensys personnel (the school department's HVAC system review provider), and the Town Engineer. The Fire Chief was also contacted for this report. Flansburgh Associates, Inc. and their consultants were provided with the following documents:

- Original Construction Drawings
  Aden, Parker, Clinch & Crimp Architects — May 1952
- Original Construction Drawings
  Stoner Associates — September 1969
- Reading Memorial High School Feasibility Study
  D.R.A. Drummey, Rosane, Anderson Inc. — February 1997
- School Space Needs Study
  Strekalovsky & Hoit, Inc. — April 2000
- Report on the State of Technology in the Reading Schools — May 2002

Findings

In the thirty years since the last major construction, numerous improvements and renovations have been made, including replacement of roof areas and portions of the heating/ventilation system. However, the school generally remains as originally constructed. Exterior walls, window systems and doors are well maintained, though original. Interior walls, floors, ceilings, doors, and equipment throughout classrooms, offices, locker rooms, and corridors are original. Electrical systems, including lighting, emergency power, general power, and fire alarms are maintained but have received only minor upgrades. The heating and ventilation systems have been upgraded in a patchwork fashion; the system relies on dated control technology. Importantly, the buildings do not meet the requirements of the Massachusetts Architectural Access Board, or the Americans with Disabilities Act. Finally, while the school has eliminated hazardous conditions, asbestos-containing materials, lead paint, and PCB's remain within the building.

Site Conclusions

- Traffic patterns at the school are poorly arranged and insufficient. The lack of an internal road loop forces many traffic actions onto the public road. Additionally, the school cannot control activity on the public way.

- Parking is insufficient and forces many cars to park on Oakland Road or Birch Meadow.

- There is a lack of accessible routes between buildings and fields. Curb cuts, crosswalks, and sidewalks do not exist in critical areas. The sloping site creates further difficulties in providing for accessibility.

- Athletic fields, while sufficient in number, are in poor condition and require renovation.

- The building is apparently structurally sound, with relatively minor repairs required.

- Mechanical, electrical and plumbing systems, including water piping, electrical equipment, and portions of the heating system, are well beyond their useful life and failing. Lighting is uniformly poor throughout the school, with certain corridor areas described as dark.

- Existing windows are painted steel and single glazed. Many have had the glass replaced with polycarbonate, which has clouded. These windows operate poorly, do not provide insulation value, and are subject to rust.

- Roofing is generally in good condition, although remaining older roofs must be replaced. Testing has detected areas of moisture penetration below many roof areas, threatening failure and further compromising already poor insulating value. Certain perimeter flashing areas require renovation to ensure that water does not penetrate the building.

- Interior wall surfaces, typically of painted masonry or plaster, are in good condition. Floors are worn, and ceilings (concealed spline system) are missing tiles, stained in places, and present a continuing maintenance problem.

- Individual science labs have been upgraded and operate well, however storage and equipment are insufficient and in poor condition. The layout, with chemical preparation and storage areas across a public corridor from the labs, is a hazard.

- The numerous level changes, including stairs in the gymnasium corridor and overly steep ramps to the science and math wing, render larger areas of the school inaccessible to the blind and the handicapped. The stage, lecture hall, library mezzanine, and all bathrooms are not accessible. Most doors have

knobs, rather than levers, and do not conform to accessibility requirements. Lab stations, sinks and built-in cabinets throughout the school are not accessible. The school is equipped with two elevators, both of which meet current codes, however, in emergency situations, a stretcher will not fit.

- The school, equipped with numerous stairs and exits, provides adequate egress in an emergency. While the school does not present specific hazards relative to the building code, two areas of insufficient egress were noted . Additional code compliance, such as a sprinkler system, would only be triggered by a significant construction project.

- The synthetic floor at the Field House is well beyond its anticipated life and has begun to blister and crack. This presents a hazard during use.

- While the ongoing study anticipates a capital project for renovation of the school, it is not certain that such a project will proceed. The report details items that will require significant maintenance or replacement in the near future. The items are summarized as follows:
    - Replace synthetic sports floor at the Field House.
    - Replace latex rubber surface at track.
    - Reconfigure lower parking and mark a pedestrian route.
    - Replace fencing around football field.
    - Replace tennis court surface.
    - Replace basketball court.
    - Apply new epoxy membrane at concrete roof overhangs.
    - Seal existing cracks in exterior masonry, install control joints.
    - Seal existing cracks in concrete foundation, install control joints.
    - Further investigate damage to, and repair solutions for, cracking at pre-cast column covers.
    - Rebuild the deteriorated exterior wall at the 'link'.
    - Replace sanitary and storm piping in crawl spaces.
    - Replace expansion tank.
    - Test and possibly replace existing steam piping throughout the building.
    - Install master gas shut off valves at science labs.
    - Remove gas incinerators and eliminate abandoned 'live' gas lines.
    - Remove unused stoves and eliminate abandoned 'live' gas lines.
    - Install a dedicated hot water heater at the kitchen to eliminate 'dangerous' hot water conditions.

- The report also summarizes additional scope items that do not present a threat of failure or a hazard to safety, but should be addressed to provide an adequate school facility.
    - Reconstruct bathrooms to meet accessibility requirements.
    - Replace classroom/office doors and hardware for accessibility
    - Provide an accessible route to the stage, by chair lift or ramp.
    - Provide a ramp or chair lift to the gymnasium and locker rooms.
    - Provide an elevator to the library mezzanine, or close the space.
    - Modify lab stations to provide for accessibility.
    - Reconfigure ramps at Science/Math wing to lessen the slope.
    - Replace fire alarm system.
    - Replace emergency generator and modify emergency power distribution.
    - Install chemical storage cabinets in the science labs.

- Finally, the following additional items should be addressed to provide a better educational facility.
    - Replace site lighting.
    - Replace or augment interior lighting.
    - Replace windows throughout the school and Field House.
    - Replace automatic temperature control system.
    - Install sprinkler unit substations and upgrade normal power distribution.

The three lists above present a strategy for 'nursing' the existing facility along if no immediate action is taken on the options developed by this study. The lists could be reviewed as "must do", "should do", and "desirable to do" in the context of maintaining a safe, comfortable and educationally appropriate high school.

I. Introduction

Introduction

This report describes the existing building, and identifies issues for renovation or on-going maintenance. Generally we have avoided making specific recommendations for addressing issues. Solutions will be addressed during the development of alternatives, and the schematic design.

Project Team

The following consultants contributed to this report. Sections developed by those consultants are labeled.

Flansburgh Associates, Inc.	Architect
TMP Consulting Engineers	Mechanical, Electrical, and Plumbing Engineers
Boston Building Consultants	Structural Engineer
Judith Nitsch Engineering, Inc.	Site Utilities, Wetlands
Geller Associates	Site Facilities, Athletic Fields
Edvance Technology Design	Technology
Abend Associates	Traffic
Diversified Environmental Corp.	Hazardous Materials
Crabtree McGrath Associates, Inc.	Kitchen

General Data

Reading Memorial High School is located near the geographic center of town, less than a mile north of Town Hall. The original building was constructed in 1952, with significant additions made in 1969. (Refer to section III, Part A). Numerous other renovation projects have occurred since that time including renovation of the Superintendent's offices and roof replacements. Significant heating & ventilating improvements were made between 1995 and 1998. The main entry to the school is located off Oakland Road, which forms the eastern border of the site. The site on which the school sits is bordered on the north by Birch Meadow Drive, and by residential neighborhoods to the south and west.

The school building is located in the southwestern portion of the overall site with athletic facilities immediately to the north and west of the facility. The site grades are highest at this southwestern end, sloping rapidly to the more level areas to the north and west. These areas are developed as athletic fields as described in Section II, Part C.

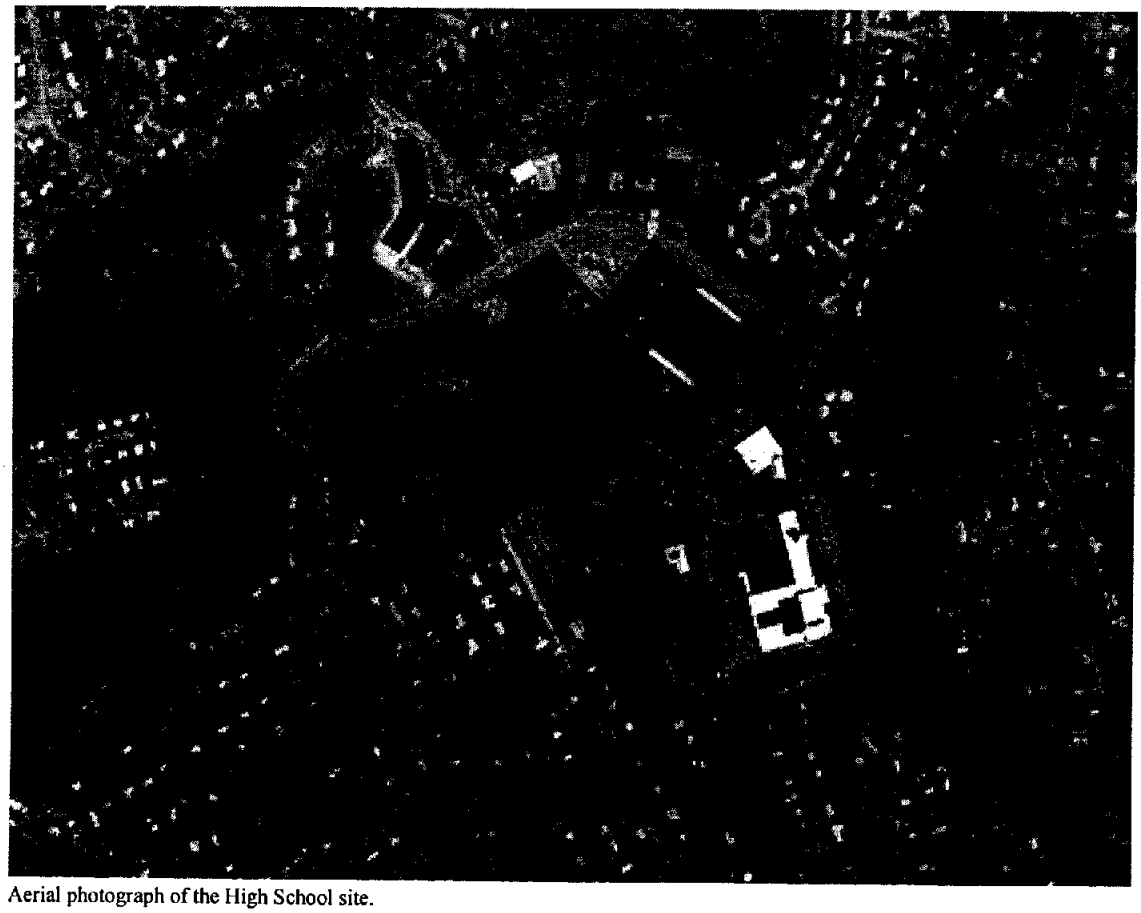
Prior to the construction of the high school in 1952, the site was Birch Meadow. This was an area of fields and surrounded by woodlands and marked by a stream running through it, with a dam at one end. The area often flooded. This earlier condition is reflected in the wetlands and waterways still present on the site, as discussed in Section II, Part B.

The site area is defined as a public playground. It is maintained by the Parks and Forestry Division of the Reading Department of Public Works. It appears that the school is in on land not formerly under the jurisdiction of the school department. According to signage on site, the school has preferential use of the fields and facilities each weekday until the evening hours. The existing field house, while used extensively for school athletics, is not under the jurisdiction of the school department at this time.

The site is accessible by auto from a number of directions. A major route is available from Route 28 along Birch Meadow Drive to Oakland Road. Access to the Superintendent's Office, the Athletic Fields & Field House, and the school department facilities offices is available from a drive located at the intersection of Oakland Road and Birch Meadow Drive. For parking and drop off, autos ascend Oakland Road to the main school entrance, marked by a tower. For a description of parking and traffic, refer to Section II, Part A. There is no public transportation available to the school.

Site Use

The overall site provides facilities for the high school educational program, it's associated athletic programs, the District superintendent's Office, the District SPED offices, the District Facilities Department, as well as pre-school programs. There is extensive community use of the both the field facilities and the building.



Aerial photograph of the High School site.

II. Site

A. Vehicular Circulation and Parking
B. Site Utilities
C. Site Facilities

A. Vehicular Access and Parking - Abend Associates

A1. Summary

The following is a list of various constraints and opportunities at the school related to traffic, parking, and access. It is based on several assumptions:

- The school needs to provide parking for faculty, staff, students, and visitors.
- Although only very limited bus service is currently provided (1-3 buses per day), it does need to be accounted for in future design plans.
- It is important to minimize travel speeds and traffic volumes through the adjacent neighborhood by using traffic calming measures, and to encourage the use of Route 28 as much as possible by enhancing traffic flows in that direction.
- Events must be accounted for, either within the school or along the playing fields.

A2. Site Elevations/Grades and the Position of the School on the Overall Site

- The school sits on the side of a hill so that the parking and access occurs on four or five different elevations along Oakland Road. This limits the connections between adjacent driveways and parking areas, but also provides at grade access to various levels within the school, allowing for vertical separation of access in addition to horizontal separation. There is little opportunity to provide broad parking areas within the site, at least directly adjacent to the school building. Such expansive areas tend to be more efficient. It also leads to an inability to centralize access into the building and into the school itself. A benefit of the grading and elevation changes is that they may provide an opportunity to develop deck parking more economically.

  Since Oakland Road climbs past the site, access to the school must account for one or more of the approaches to be a significant upgrade or downgrade. This affects both pedestrian and vehicular safety. These grades also create a problem for internal circulation within the site insofar as sidewalks and stairways are concerned. Even if separate parking areas have their distinct access points to the building, there should still be some interconnection for pedestrians through the site, particularly if parking is considered for athletic events where people on the opposite side of the school will be walking around to the lower level of the school. These grades also result in constraints with snow removal, snow storage areas, and landscaping, since much of the landscaping islands must be used for steep grades separating various elements of the traffic and parking network instead of being available for landscaping or snow storage purposes.

A3. Lack of Access Through the Site

- There is no clear roadway through the site. Such a roadway would balance traffic flows around the school and greatly improve circulation/parking management under all conditions. It is likely that a high percentage of vehicles use Oakland Road as a defacto internal circulation roadway if they drive between school parking areas looking for a space. This leads to a much higher number of turning movements along the public way. It is unusual that the site has such extensive frontage (extending all the way along Oakland Road, beginning just before Park View Road and extending along the athletic fields across from Coolidge Middle School and the YMCA), and yet has all of its driveways located along the least level frontage. This is compounded by the fact that this area also has the smallest setback between the street and the school buildings, causing constraints in traffic circulation and site access.

A4. Poorly Defined Internal Traffic/Parking Infrastructure

- Many of the driveways within the site are wider than necessary, allowing a significant amount of uncontrolled or awkward parking, higher travel speeds, and less controllable traffic flows. This results in unsafe conditions for both pedestrians and drivers. Elements that contribute to this issue are the

lack of curbing, a lack of raised traffic islands and the lack of internal sidewalks throughout the school site. In some places there are numerous traffic and parking control signs, clearly indicating that these areas are problematic. However, these do not appear to be uniformly applied.

A5. Roadway Widths Adjacent to the School

- Oakland Road and Birch Meadow Road are both wider than they need to be for the two-lane, two-way travel that they are striped for. Birch Meadow Road has more than sufficient room on both sides to allow for parallel parking and a travel lane in each direction. Between Oakland Road and Route 28 (Main Street) the roadway is sufficiently wide to provide a four-lane section with no parking. The layout currently calls for a single lane in each direction, although it is likely that it works as two lanes inbound in the morning and two lanes outbound in the afternoon as drivers queue up for the left turn onto Oakland Road in the morning or double up at Route 28 to turn left or right at this signal in the afternoon.

  In addition, the intersection of Oakland Road and Birch Meadow Road is severely lacking in traffic controls. Oakland Road is wide enough (greater than 60 feet across) to allow for five or six lanes of traffic, but is technically striped for only one lane in each direction. The access for the lower parking and service is also directly adjacent to this intersection.

  Oakland Road in front of the school is more than wide enough to accommodate the one travel lane and parking lane in each direction. Unfortunately, Oakland Road is also wide enough to easily accommodate U-turns when one side of the street is not used for parking or even with parking for smaller vehicles. In addition, the pavement itself is mottled in appearance, thereby reducing the clarity and definitiveness of traffic controls such as striping and curbs.

A6. Main School Access

- While the school does have a main entrance, it is unclear from the signage leading up to the school from Route 28 where visitors should go for either parking or access to the school. Such a distinct entrance would set the tone for the circulation and parking within the site. The current layout is too undefined and, therefore, the specific parking and access policies are not practical. It would be beneficial to parking and safety at the school to have all of the activities within the site (and not along the public way) so that the principal and the school itself will have authority over such activities. Currently, a significant amount of the activity related to the school occurs along the public roadway.

A7. Student Drop-Off Area Along Oakland Road

- The Principal described the morning drop-off activity that occurs along the front of the school on Oakland Road. The internal loop across the front of the school is reserved for the few buses that are used and for staff/visitor parking. The curb lane along Oakland Road is reserved for drop-off activity in the morning and then becomes parking after that activity has ended. This requires that drop-off activity occurs beyond the parking and access roadway, so that all students have to cross this travel way. Typically, drop-off activity occurs directly adjacent to a school building.

  The other problem with the drop-off activity along Oakland Road is that there is no convenient turnaround point for someone who has come up the hill and wishes to return toward Route 28. This leads to more traffic heading into the neighborhood to the south of the school as it leaves or adds to the number of U-turns or ins and outs in the upper parking lots as parents turn around. If this activity occurred within that drop-off lane in front of the school, parents would simply pull out of the school and turn left to travel down Oakland Road in a more orderly manner. Such a drop-off zone within the school grounds would be beneficial and consistent with the development of an internal circulation road within the site, as discussed previously.

A8. Reliance on Parallel Parking Along Public Roadways

- Parallel parking is often used as an overflow along access roads serving a school or along the internal roadways of a school. Typically, it is used as an overflow or for visitor parking since it occurs in places where it is preferable not to have parking. One reason for this is that parallel parking is inefficient. A parallel space is generally seven feet wide and 22-24 feet long. A standard parking space is typically nine feet wide by eighteen feet long. In addition, parallel parking requires more maneuvering time to get in and out of and is more disruptive to the traffic that is moving along the adjacent roadway or driveway.

  The parallel parking along Oakland Road is awkward because of the alignment of Oakland Road, the lack of a generally pedestrian-friendly environment (i.e., the roadway is wide and poorly controlled), and it occurs at a location where a lot of pick-up/drop-off activity is occurring.

  It was also noted that the fields along Birch Meadow Road are served by parallel parking on both sides of that roadway. Although observations were not done during recreation activities, it is expected that the maneuvering related to the parallel parking along here is disruptive to the overall traffic flows and pedestrian safety since half the people park on the opposite side of the roadway. It would be desirable to consider bringing as much of the parking activity to the school and/or field side of the street as practical to enhance pedestrian safety and traffic circulation.

A9. The Overlap of Uses in the Lower Lot

- The parking and driveway area around the field house and lower side of the school appears to have a number of overlapping uses. There are numerous garage doors opening into the school and the adjacent buildings that require extensive pavement area for truck access. These do not appear to be normal loading docks, which are also evident. The area between the field house and the school is awkward in width since it does not allow for clear separation of these uses and at the same time requires an extensive paved surface that is undefined and conducive to higher travel speeds. This is evident from the number of speed bumps and traffic control signs in this area.

  It would seem that this parking area is also the most desirable location when it comes to after school sports activities at the field house or on the playing fields. It would be desirable to reduce the parking and traffic activity crossing between the school and field house. While eliminating vehicular traffic from between the two buildings is probably unrealistic, at least controlling it more specifically would be beneficial, with a clear pedestrian route between the school, field house, and playing fields.

A10. Overlap of Adjacent School Schedules

- The Principal indicated that the Coolidge Middle School and the high school start relatively close to each other in the morning. The school department is likely to manage these times closely as part of normal procedures. Typically, communities manage school stop and start times to accommodate bus schedules in order to use the same buses for the various schools within the town. Without a constraint of this type in Reading at present, it may be that the schools start more closely to each than is necessary. Regardless, improvements along Birch Meadow Road should account for clear, distinct separation between traffic related to the Coolidge School and the high school.

A11. Off-Site Improvements

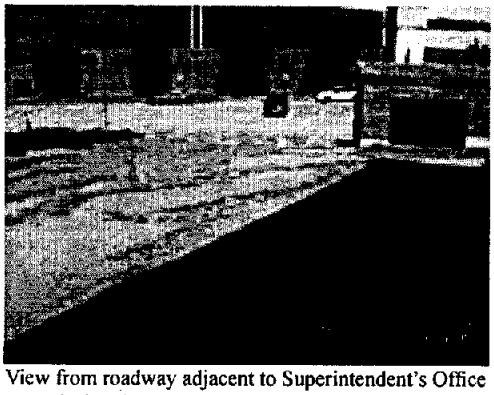
- While not specifically part of this site assessment, it is appropriate to consider off-site improvements in any school redevelopment. Generally, Birch Meadow Road and Oakland Road provide the primary access to the school from Route 28, the primary arterial through the town. It is recommended that Birch Meadow Road between Route 28 and the Coolidge School (and possibly to any access to the high school site in the vicinity of the Coolidge School) as well as Oakland Road up past the school should be evaluated for possible roadway improvements. These roadways are generally wide enough

so that the improvements are likely to include re-striping, defining the roadway edges better with curbing and sidewalks, and possibly enhancing the signal operations at Route 28. The intersection of Oakland Road and Birch Meadow Road covers far too large an area at present to operate as safely as it could.

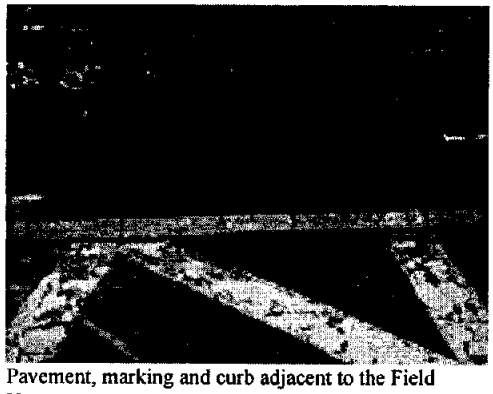
B. Site Facilities- Geller Associates

B1. Roadways and Sidewalks

- The site is organized into two main vehicular circulation routes: Oakland Street and the Field House driveway. Oakland Street is a steep and wide two-way road containing 8 different curb cuts into the site. The Field House driveway is essentially flat with a two-way circulation system. The grade differential between the Field House and the main entrance of the building is significant and presents several handicap accessibility issues (see below). There are two pedestrian circulation routes, one along Oakland Road to the main entrance, and one along the Field House drive terminating at the entrance to the football stadium. There is also a sidewalk around the Field House. All sidewalks are paved with bituminous concrete which over time has cracked and heaved in areas. Besides these walks, pedestrians are required to share the driveways and parking aisles with other vehicles. In most cases the curb cut ramps provided at pedestrian crosswalks are non-compliant. Service is often mixed in with other parking and student activities on site and it is good design practice to have these activities separated. The site is in need of a clear circulation system for pedestrians and vehicles alike.

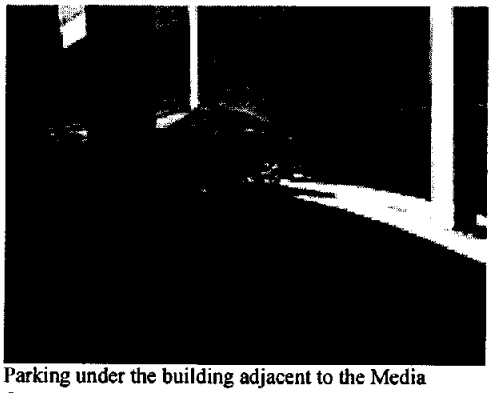


View from roadway adjacent to Superintendent's Office towards the Field House.



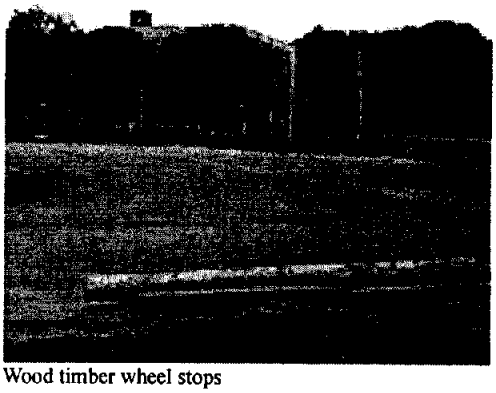
Pavement, marking and curb adjacent to the Field House.

Parking is sprawled throughout the site as well as along Oakland Road. There are four main parking areas, the Field House, the main entrance, the south lot, and the southwest lot. The parking lot layout around the Field House is poorly organized. While this expanse of paving may maximize parking it is difficult to navigate, poorly signed, and lacking painted directional arrows. There are angled spaces, head in spaces, and parallel spaces throughout this area. The parking at the main entrance is limited in quantity, organized with angled head in spots on a one-way driveway. It serves as a primary parking destination, due to its proximity to the front door, but also as a drop off. From a logistical standpoint this presents several safety conflicts between cars trying to park, cars dropping off and pedestrians crossing the drive. Ideally these activities should be separated. The south parking lot seems to be under utilized due to its proximity to the main entrance and difficult grade change. It is a two-way circulation system with two curb cuts on Oakland Road and head in parking spaces. The southwest lot is closed off to vehicles for the summer camp programs, however it is utilized while school is in session. There are secondary parking areas, including a small lot at the northeast corner of the building, underneath the building by the courtyard, and parallel spaces along Oakland Road. It is unclear whether the parking under the building is used during the school year but it should be reconsidered regardless. The pavement is in need of repair, the slope is very steep and the drive is shared with small children. There is also a rusted, damaged bike rack on the west side of this drive placed on a steep slope. This bike rack should be removed. In general the parking throughout the site is inefficient and insufficient to meet the demands and use of the school. The handicap parking design is non-compliant and is insufficient in quantity.



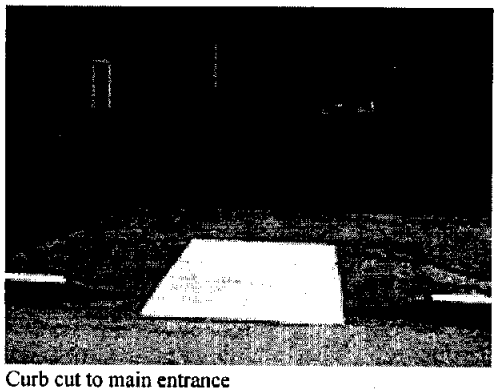
Parking under the building adjacent to the Media Center.

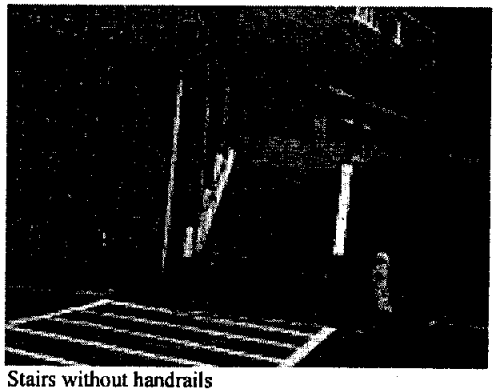
The paving and curbing materials throughout the site are in poor condition. The bituminous concrete pavement in most places is cracked and uneven. Wood timbers and concrete wheelstops are sporadically placed and should be removed in favor of curbing to direct storm water. There are also areas that are curbed with bituminous concrete berm. This curbing has been damaged over time by snow plowing and vehicular traffic. It is not considered a good curb material for long-term use and requires constant repair. While speed bumps are a good traffic calming measure the current ones throughout the site are in need of repair. The design of these should also be reconsidered. Speed humps, which are a raised surface over a larger area, or the incorporation of tabled crosswalks are current options being used in favor of speed bumps.


Wood timber wheel stops

B2. ADA/MAAB

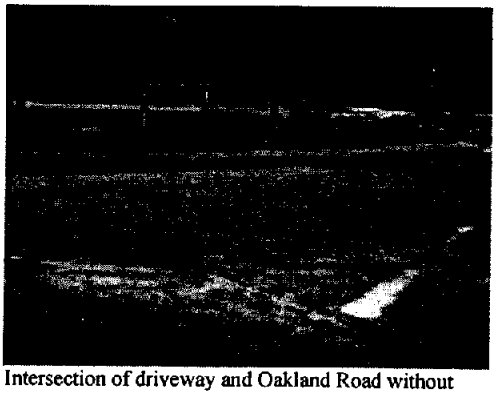
- The majority of the site is non-compliant with the current accessibility standards and guidelines. This includes curb cut ramps at crosswalks and handicap parking, ramps to the building entrances, and accessible routes from the handicap parking to building entrances. The handicap parking is not properly striped and signed, and there did not appear to be the required number of handicap spaces provided for the site. Existing exterior stairs do not include handrails while other ones are clearly non-compliant. Ramps will need to be installed where stairs currently exist or a variance with the MAAB will need to be filed. The current configuration of walks does not provide equal access to athletic facilities or building entrances. Some specific examples of this non-compliance include the following. A guardrail/handrail is required at the west elevation of Segment B due to the elevation change between the concrete deck and the driveway. This guardrail would need to be 42" in height with vertical pickets spaced 4" on center. The walk leading to the stairs to the west of the maintenance building seems to exceed the maximum slope of 5%. This walk would need to be redesigned to meet that requirement of the MAAB or a ramp would need to be built to provide handicap accessible access from the courtyard to the parking lot and Field House. The stairs at the end of that walk are without a handrail. A crosswalk and appropriate curb-cuts do not exist at the intersection of the Oakland Street and the driveway to the Field House. The flagpole at the buildings main entrance should be handicap accessible.


Curb cut to main entrance


Stairs without handrails

B3. Site Lighting

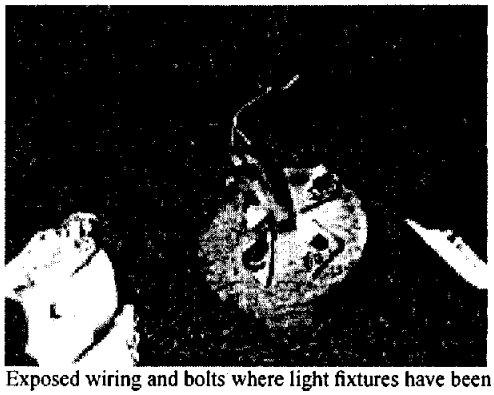
- The parking lots, driveways, walks, and athletic fields have outdated and insufficient lighting. It is important for a facility of this size and configuration to be well lit for public safety. The site layout requires pedestrians to walk where dark corners may exist in order to reach their destination. The athletic field lighting, while significant for a


Intersection of driveway and Oakland Road without crosswalks or curb cuts.

high school facility, is outdated and could be updated with better and more efficient fixtures (see Athletic Fields section). The lighting in the courtyard should be replaced. It appears that some fixtures in this area have been removed causing uneven light distribution. Where these poles have been removed the bases are still in place with exposed wiring and bolts.

B4. Landscape

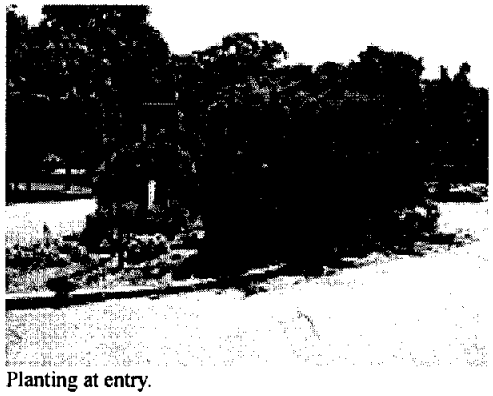
- The site contains several mature specimen trees as well as stands of large trees, which should be preserved. This is important for not only visual integrity but air quality and heat retention as well. The site is in need of enhanced entrance plantings, screening for service activities, and shade trees for the parking areas. The wetlands will need to be flagged to determine the impact of potential site improvements as well as permitting requirements. The cherry and crab trees are a nice feature for the front of the building and provide spring blossoms. They are both in need of pruning and approximately three trees should be removed, as their health is questionable. The maple trees along Oakland Road appear to be recently planted but are also in poor heath. The implementation of these trees is a nice design feature and should be maintained. Proper watering, pruning and fertilization will help their growth rate. The large locust trees at Segment A4 are also an asset for the site providing shade and good fall color. The juniper shrubs at the entrance sign should be removed as they are in poor health and impede site lines for cars and buses entering the drop off area. The existing courtyard space has several opportunities to incorporate landscaping and other site amenities.



Exposed wiring and bolts where light fixtures have been removed.

B5. Site Furniture

- The site is lacking adequate bicycle racks and benches at the main entrance and Field House. The existing bike racks are rusted and damaged. They should be placed on a level secure area that is easily accessible for all users. Trash receptacles at the building entrances and around the athletic facility are recommended. A clear informational signage program directing vehicular traffic to building entrances and parking areas should be considered.



Planting at entry.

B6. Athletic Facilities and Recommendations

a. Football Field

The varsity football game field is located within the existing running track. The preferred orientation for football fields in New England is north south. The field is oriented northwest – southeast, which could pose slight sun problems for late afternoon contests. The field is properly crowned to shed water, but the surface is uneven from years of compaction and settlement. The field generally has adequate grass cover, but is moderately compacted down the center as is indicated by the presence of knotweed and broadleaved plantain. Some crabgrass is also present. The predominant species of grass is rye with some fine fescue and Kentucky bluegrass. The preferred grass for athletic fields is Kentucky bluegrass due to its superior wear tolerance, resistance to hot and cold temperature extremes and its ability to heal bare spots

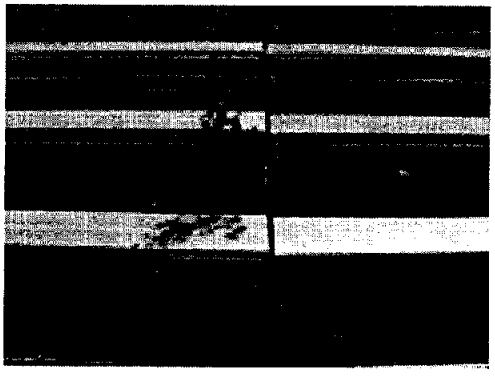
Existing bike racks. Racks are minimal and in poor condition.

quickly by the use of underground stems know as rhizomes. The field is irrigated with Hunter I-25 heads. The I-25 is designed specifically for athletic field applications. Operation of the system was not observed. Combination soccer/football goalposts were noted to be fairly old with rust and chipped paint present.

- While its condition is comparable to other high school fields, the field is in poor condition. It requires at least a modest renovation, which would include stripping of the sod, re-grading and either seeding or sodding the surface.

b. Running Track

The existing 6-lane running track is comprised of a latex bound rubber surface over an asphalt base. The black latex surface is in very poor condition. The surface is delaminating in several areas and patches were noted throughout the track surface. A crescent shaped high jump area and pole vault runway surrounded by grass were noted in the southern "D" area. A large patch was noted in the red latex surface near the high jump takeoff spot. This wear spot is not atypical in crescent shaped high jump areas because the mat cannot be shifted around to distribute wear as it would be in a rectangular or fully paved "D" area. The northern "D" area is comprised of two long jump / triple jump runways surrounded by grass. The wood edged sand pits were noted to be in very poor condition. A stone dust shot put area was noted northeast of the starting line adjacent to the main straightaway. A hammer/discus cage was noted in the adjacent practice field behind the press box.



A 4-foot galvanized fence in various states of disrepair surrounds the track and field. The fabric is rusted and unattractive, and the post and footings were noted to be heaved from the ground creating a dangerous and unattractive condition. The field is bordered on the east by an outdated 10 row aluminum visitors' bleacher which seats approximately 1000. The field is bordered on the east by an outdated 15-row aluminum home bleacher that seats approximately 1500. There is no accessible path to the visitor's bleacher and neither bleacher meets current ADA or state building codes. There are no provisions for accessible seating and no aisles, stairs or handrails are absent. The decks are open to below which poses both a safety hazard and a trash nuisance. Both sets of bleachers are in need of replacement .

A recently constructed press box is located behind the home bleacher. The press box is in excellent condition with many attractive programmatic features. Modifications to the existing this structure are not needed. The interior of the press box was not assessed. Lacking an elevator, the press box is inaccessible.

The track and field stadium is bounded by a six-foot perimeter fence that, like the 4' fence around the track, is in very poor condition. The galvanized fabric is rusting and unattractive and several fence posts are damaged and / or heaving due to inadequate footing depths.

- Complete reconstruction of the track and field events area as well as all interior and exterior fencing is required.

c. Practice Fields

The practice field(s) located southwest of the track were noted to be in very poor and unsafe condition. The surface was noted to be extremely compacted and uneven, which could lead to potential injuries. The fields are irrigated. The fields are covered with weeds including crabgrass, knotweed, broadleaved plantain and portulaca, all indicators of severe compaction, and clover, an indication of poor fertility. One set of combination soccer / football goalposts were noted. The field is partially lighted, presumably to provide a few extra minutes of practice time at dusk. The lighting is inadequate for true night competition or practice.

- The practice field is in need of complete reconstruction.

d. Practice Softball

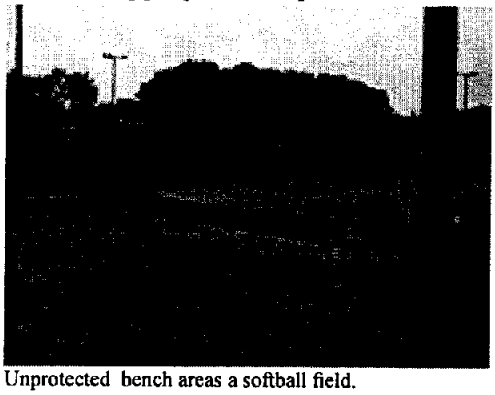
The two skinned softball fields northwest of the track and practice field were noted to be in moderate to poor condition. Severe lips were noted at both diamonds due to years of buildup from infield grooming. Some wear and low points (as evidenced by puddling and lack of vegetative cover) were noted in the overlapping outfield. The fields are irrigated and have moderate grass cover, but were still noted to be over compacted.

The galvanized chain link backstops were noted to be relatively new, but are totally inadequate for stopping all but the lowest of foul balls. The height of the backstops was approximately ten feet. In general, the lowest a backstop should be is 20 to 24 feet. The player's bench areas were protected by a low fence. Neither field is equipped with bleachers or spectator seating of any kind.

- A modest renovation of the fields, including removal and resodding of the built up infield lips and aggressive aerification and over-seeding of the overlapping outfield is appropriate. Replacement of the backstops with higher models should also be considered.

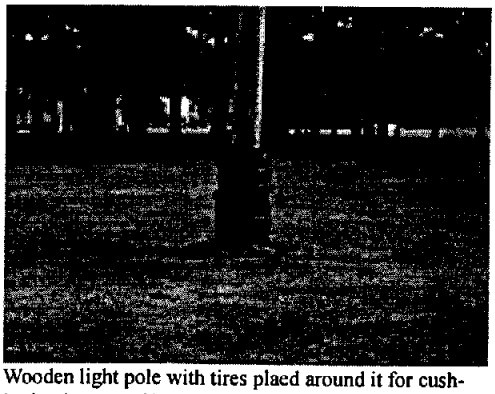
e. Varsity Softball

The main softball field located to the west of the smaller softball fields was noted to be in slightly better condition. The field is irrigated and noted to have adequate grass cover. Weeds species were noted which indicate at least some compaction of the soil. The field is bounded by a 10-foot fence spanning left to center field approximately 285 to 300 feet from home plate. Center to right field does not have a fence or barrier, which protects the smaller softball fields from long fly balls.



Unprotected bench areas a softball field.

The field is equipped with a small bleacher and an adequately high backstop, but does not have a fence to protect the bench areas. The galvanized steel backstop is approximately 40 feet high with a hood to prevent foul balls from leaving the playing surface. The hood is supported by internal posts, which could pose a ricochet hazard. The backstop appears to be sound, but is unattractive and in need of replacement.



Wooden light pole with tires plaed around it for cushioning in case of impact from athletes.

The field is lighted with outdated flood lighting. Wooden light poles in the outfield pose a significant hazard to players whose only protection is old tires, which are stacked around the pole. Many of the tires have been crushed down and do not present adequate cushion for a player crashing into the pole.

- Modest renovation including replacement of the benches, backstops and bleachers as well as lighting improvements for safety and efficiency are recommend.

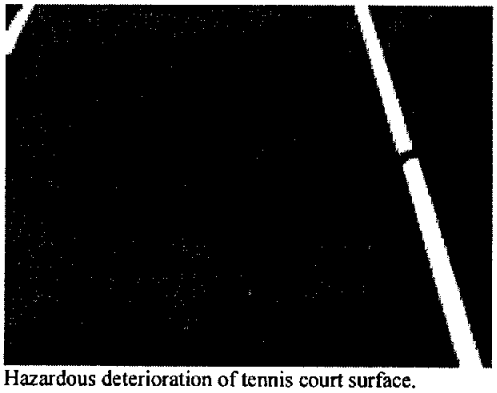
f. Varsity Baseball

The varsity baseball field is situated to the south of the main softball field. The field is oriented in the preferred north/northeast configuration and is bordered in left field by low fence protecting a drainage ditch, a wooded area in center and right center, and a chain link-batting cage in deep right field. The irrigated field is in fair condition, but with poor infield lip definition and a worn out pitcher's mound. The field has a high, but narrow backstop with no dugouts or fencing to protect the bench areas. A small bleacher is located along the third base line.

- Since the majority of activity in baseball occurs in the infield, complete renovation of the infield is in order. The addition of a permanent (or portable) outfield fence might also be considered. The placement of the fence should not conflict with possible multi-purpose use of the outfield.

g. Tennis

The existing tennis complex consists of six bituminous concrete courts which are laid out end to end in three sets of two court banks. A half court practice area with a rotted wood hitting board is located to the northeast. The courts are oriented in the preferred north south layout. Each court is surrounded by dilapidated and rusty chain link fence with heaving fence posts. There does not appear to be adequate clearance from the courts to the fence lines.



Hazardous deterioration of tennis court surface.

The bituminous concrete has been overlain at various stages and at various heights. The courts are on several different levels. The surfaces are painted, but serious cracks with weeds and debris were noted on all courts. Some of the courts are crowned from the center, which is not permitted under the rules of tennis. Each court is equipped with internal wind Edwards posts and nets. The Edwards posts and nets are of excellent manufacture and are salvageable. Each court is lit with obsolete flood lighting mounted on 30 foot wooden poles. Some poles are located within the court area and pose a threat to players making shots while rushing to the net and out of bounds. Some courts have overhead wires crossing at a height, which could easily interfere with a normally played ball.

- Each of the courts could be considered hazardous and are in need of complete demolition and reconstruction.

h. Basketball / Badminton

The existing bituminous concrete basketball and badminton courts located south of the tennis complex are in equally poor condition. The basketball court is partially enclosed with chain link fence. The badminton court is open. Both courts have large weed infested cracks in the surface and the backstops and net posts are beginning to heave from the ground.

- Each court is in need of complete reconstruction.

i. Little League Baseball

A little league baseball diamond is located to the east of the tennis courts and the west of the field house and parking area. The infield is in very poor condition with an exaggerated infield lip from years of inadequate grooming and maintenance. The outfield drops precipitously behind the second base and shortstop areas. The pitchers mound and plate area are in poor condition. The field is equipped with a dilapidated and unsafe bleacher and a galvanized steel backstop and players bench screen that is beginning to curl up from being repeatedly peppered with baseballs.

- The field is in very poor condition and requires complete reconstruction.

C. Site Utilities - Judith Nitsch Engineering, Inc.

As requested Judith Nitsch Engineering, Inc. (JNEI) has prepared this report describing the existing conditions of the site utilities (sewer, drain, water) at the Reading Memorial High School. To prepare this report, JNEI reviewed available "as-built" drawings and interviewed School Department and Town of Reading officials. JNEI also visited the site on August 1, 2002 in order to determine the presence of potential wetland resource areas.

C1. Storm Drainage

- The Reading Memorial High School is located on a steeply sloping site running along Oakland Street. The site is highest at the southern end and slopes downhill towards the play fields and field house at the northern end of the site. The existing school site is bounded to the north by Birch Meadow Drive, to the west by woods, Hartshorn Street and Bancroft Avenue, and to the east and south by residential properties, which are located across Oakland Street.

- The roof drains from the existing school buildings are collected by an underground site drainage system that connects into an 18-inch drain line that is located in Hartshorn Street and Bancroft Avenue. This 18-inch pipe connects into a 30-inch pipe that is located to the west of the existing baseball field. This 30-inch pipe discharges into a stream that is located to the north of the existing main baseball field. A 24-inch pipe, which also discharges into this stream, runs parallel to the 30-inch pipe. This 24-inch pipe collects stormwater runoff from the residential neighborhood areas that are located to the southwest of the playing fields.

- There is a 15-inch drainage pipe located in Oakland Street directly in front of the existing High School that increases to a 24-inch pipe at the intersection of Oakland Street and Waverly Road. This drain line discharges at a headwall into a stream channel located to the north of Birch Meadow Drive. The stormwater runoff appears to flow through this stream channel westerly to a 24-inch culvert that is located under Birch Meadow Drive. This culvert discharges into a second stream channel that is located between Birch Meadow Drive and the existing football field. This second stream channel changes direction directly across from the Coolidge Middle School and runs to the southwest (parallel to the north end zone of the football field). This stream ends at a 72"x44" culvert that runs towards the southwest. A 24-inch pipe and a 12-inch pipe, which are located under the baseball and softball fields adjacent to Birch Meadow Drive, connect into the 72"x44" culvert from Arthur B. Lord Drive and Birch Meadow Drive, respectively. This 72"x44" culvert discharges into a third stream channel that is located to the north of the existing main baseball field. A drainage swale that appears to discharge into the stream is located to the west of this baseball field. The stream exits the site through a 58"x36" culvert located under Birch Meadow Drive.

- The above mentioned drain lines and features are all part of the Town of Reading drainage collection system that serve the neighborhoods surrounding the school site.

- There is a depression located to the north of the last mentioned stream that the Town of Reading floods during the winter months by diverting water from the adjacent stream by the means of a dam/pipe system. This diverted water freezes and the Town uses the area as a skating pond. An overflow pipe exists at the northwest corner of this depression that discharges to a swale within Town of Reading Conservation Land located on the opposite side of Birch Meadow Drive. This depression appears to be the lowest part of the entire site.

- The entire site does not fall within an Aquifer Protection District. However, the area surrounding the skating pond, the stream located to the north of the baseball field and the swale located to the west

of the baseball field, fall within Flood Zone B as delineated on the FEMA Flood Insurance Rate Map for Community Panel Number 250211 001 B with an effective date of July 2, 1981. Flood Zone B are areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.

- The Town of Reading Engineering Department indicated that the only drainage issue in the area is that in the early spring months the baseball field and surrounding areas become saturated with groundwater and become unusable well into the spring athletic season, preventing use of the fields.

- The Town of Reading School Department indicated that to the best of their knowledge there have been no problems with the storm drainage line exiting the buildings.

C2. Wetland Resources

- JNEI has performed a preliminary investigation of the wetland resource areas at the Reading Memorial High School site. A check of the USGS Map indicates a perennial river runs through the High School site. Based on the USGS Map it is presumed under the Wetlands Protection Act and its regulations that the river is perennial. The perennial river noted on the USGS Map consists of the streams and stream channels that run through the site as noted in the Storm Drainage section. A 200-foot Riverfront Area as defined in the Wetland Protection Act is associated on either side of the river and development within the Riverfront Area is limited.

- On August 1, 2002, Joshua Alston and Sandra A. Brock, P.E. of JNEI visited the site to observe the existing conditions and investigate what wetland resource areas are located on the site. From the site observations JNEI has observed the following potential resource areas, and found that any work in or near those areas would require filing a Notice of Intent with the Town of Reading Conservation Commission under the Wetlands Protection Act:
    1. The stream channels noted previously are presumed to be part of a perennial river and would fall under the jurisdiction of the Wetlands Protection Act. JNEI did not observe flow within the stream channel located along Birch Meadow Drive at the intersection with Oakland Road and Waverly Road. Observable flow within the stream channel adjacent to the football field was not observed until approximately the location at which the stream changes direction across from the Coolidge Middle School. From this point downstream observable flow was observed to the 72"x44" culvert. Observable flow within the stream channel located to the north of the baseball field was observed to the 58"x36" culvert at Birch Meadow Drive. The area is in a drought condition so a determination if the stream in which no flow was observed is perennial or not can not be determined;
    2. There appears to be Bordering Vegetated Wetlands along the entire length of stream channels noted previously;
    3. There appears to be Bordering Vegetated Wetlands along the entire length of the drainage swale located to the west of the exiting baseball field; and
    4. A small isolated wetland may exist in the skating pond depression located near the daylight opening of the diversion pipe that the Town uses to fill the depression with water during the winter. This isolated wetland would be subject to filings with the Town of Reading Conservation Commission under the Town of Reading General Bylaws, Section 5.7.

- As part of the Notice of Intent filing, an alternative analysis would be required for all work within the Riverfront Area. The alternatives analysis would need to show practicable and substantially equivalent economic alternatives to the proposed project with less adverse effects on the interests of the Act. In addition, any proposed work including mitigation, can have no significant adverse impact on the Riv-

erfront Area. The site design will have to meet the performance standards of the Act and the Town of Reading Wetland Protection Regulations that at a minimum will consist of the following:

1. Within the 200-foot riverfront areas, the issuing authority may allow the alteration of up to 5,000 square feet or 10% of the riverfront area within the lot, whichever is greater;
2. At a minimum, a 100-foot wide area of undisturbed vegetation is provided from the mean annual high-water line along the river. If there is not a 100-foot wide area of undisturbed vegetation within the riverfront area, the existing vegetation cover shall be preserved or extended to the maximum extent feasible to approximate a 100-foot wide corridor of natural vegetation;
3. Under the local regulations, the Commission may require a Zone of Natural Vegetation bordering any wetland of sufficient width and vegetative community type to assure that silt and pollutants which may be carried by surface run-off shall not reach that wetland, but instead will be trapped by the natural mulch, soil and roots. Under most conditions, a zone width of a minimum of twenty-five feet would be considered sufficient to accomplish this purpose. A wider zone may be required, depending on specific site conditions; and
4. Areas for stormwater management systems to control stormwater runoff rates, treat stormwater runoff for total suspended solids and to recharge stormwater runoff to groundwater.

C3. Water Service

- There is an 8-inch water main located in the entire length of Oakland Road and in Birch Meadow Drive from Oakland Road to Arthur B. Lord Drive. The existing school service is connected to the 8-inch main in Oakland Road. From hydrant flow test data provided to JNEI from the Town of Reading Engineering Department of the water main located in Oakland Road, the static pressure was 65 PSI and flow rate of 2,350 GPM was observed at a radial pressure of 56 PSI. A 20-inch water main runs through the existing athletic fields from Arthur B. Lord Drive to Bancroft Avenue. A 12-inch dead end line connects to the 20-inch main within the school site and ends to the west of the existing school buildings. Two fire hydrants are connected to this 12-inch main. A 6-inch main from Hartshorn Street also ends at a fire hydrant that is also located to the west of the existing school buildings. The above water lines are all part of the Town of Reading water distribution system that serves the neighborhoods surrounding the school site.

- Asbestos cement pipe is considered a hazardous material. If any asbestos cement lines need to be removed, then the pipe material will need to be properly disposed of.

- The Town of Reading Engineering Department indicated that to the best of their knowledge there have been no problems with the water service in this area.

- The Town of Reading School Department indicated that to the best of their knowledge there have been no problems with the existing water service to the school.

C4. Sanitary Sewer Service

- There is a 10-inch asbestos cement (A.C.) pipe sanitary sewer main that enters the site at the driveway at the intersection of Oakland Road and Birch Meadow Drive near the football field. The pipe runs to the southwest until it reaches the south corner of the field house, where it changes direction to the west. The 10-inch sewer main intersects two 8-inch sewer mains at a manhole near the existing baseball field. These 8-inch sewer mains enter the site from Birch Meadow Drive and Bancroft Avenue. The 10-inch sewer main increases to a 12-inch pipe at this manhole, continues westward and exits the site at the intersection of Birch Meadow Drive and John Carver Road. The above mentioned sewer lines are all part of the Town of Reading sewer collection system that serve the neighborhoods surrounding the school site.

- The Town of reading Engineering Department indicated that to the best of their knowledge there have been no sewer back-ups and/or blockages with the sanitary sewer services in this area.

- The sanitary sewer service (8-inch vitrified clay pipe) for the original building appears to exit from the existing Boiler Room Building and connects to the 10-inch sanitary sewer main at a manhole located to the southeast of the existing field house. The sanitary sewer services for the addition buildings located to the south of the original school building are collected by a system that also connects to the 10-inch sanitary sewer main near the field house.

- The Town of Reading School Department indicated that to the best of their knowledge there have been no problems with the sanitary sewer service exiting the buildings.

C5. Electrical Distribution Service

- The existing underground primary electric service enters the school at the 1952 Building Segment A3 from an existing utility service pole located on Oakland Road. The distribution system is owned and maintained by the Reading Municipal Light Department.

C6. Natural Gas Distribution Service

- There is an existing small gas service for the school's kitchen stoves and oil boiler pilots. As shown on the existing record documents this service enters the school at the 1952 Building Segment A5 from an existing gas main located in Oakland Road. The gas main located in Oakland Road is a 6-inch low-pressure pipe that operates at a water column pressure of 12-inches. There is a 6-inch low pressure main (water column pressure of 12-inches) and an 8-inch high pressure main (60 psi Maximum Operating Pressure-MAOP) located in Birch Meadow Drive. The distribution system is owned and maintained by KeySpan Energy Delivery.

C7. Conclusions and Recommendations

- From the current research JNEI has determined that there are significant Town of Reading utility systems and wetland resource areas located within the school site as described above. Future development of the site should be designed so that the existing Town of Reading infrastructure is not affected and there is minimal alteration of areas within the 200-foot riverfront area and to bordering vegetated wetlands. Any stormwater management system designed for the future development of the site should utilize DEP's Stormwater Management Policy and use Best Management Practices (BMP's) to protect wetlands and waters from adverse water quality impacts of stormwater runoff.

- Once a program is determined the following tasks should be performed prior to the development of any design proposal:
    1. A detailed definitive site topographic survey by a Licensed Professional Surveyor should be performed;
    2. Wetland resource area delineation should be performed by a Wetland Specialist and a resource area report should be provided for permitting purposed; and
    3. Permeability testing and seasonal high ground water evaluation of possible stormwater management areas (detention/recharge areas) should be performed by a Geotechnical Engineer.

The existing Town of Reading water, sanitary sewer, and storm drainage systems may need to be repaired, relocated and/or upgraded if these mains are disturbed by the proposed development of the existing school site. Any design or replacement of the Town systems would need to be performed in conjunction with the Town of Reading Engineering Department. The existing building water, sanitary sewer, and storm drainage services may be reused depending on the proposed building service sizes and exit points.

III. Building

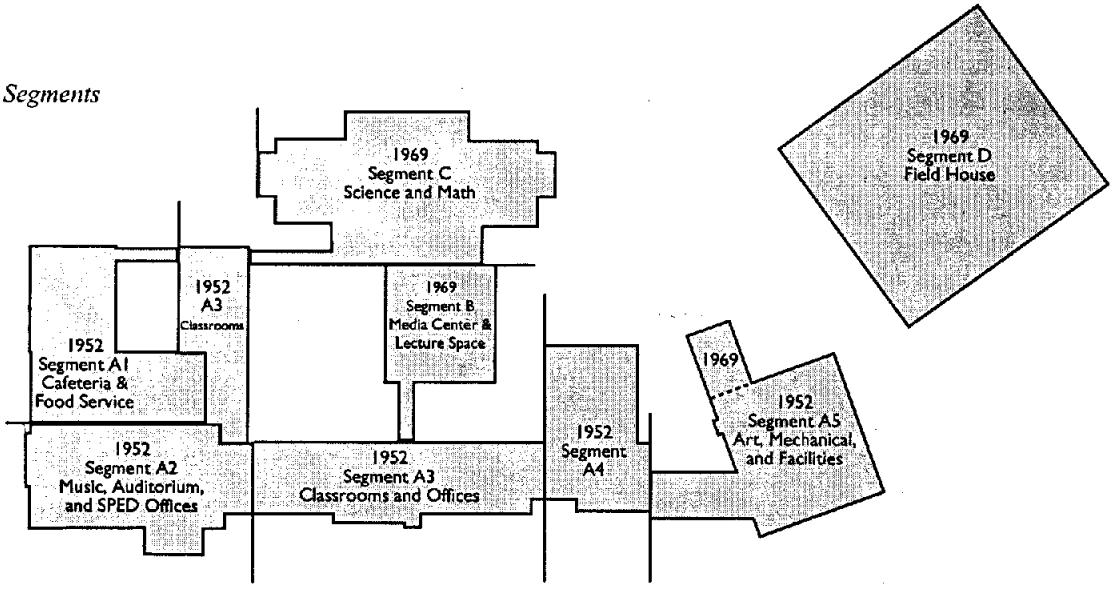
A. Organization
B. Exterior Envelope
C. Interior
D. Doors and Hardware
E. Casework and Equipment
F. Accessibility
G. Building Code Review
H. Structural Systems
I. Mechanical, Electrical and Plumbing Systems
J. Technology
K. Kitchen
L. Hazardous Materials

A. Organization

A1. Summary

- Reading Memorial High School has evolved over its 50-year life to an enclosed campus plan. Only the field house is a detached functional element. No building segment is more than three stories, except Segment C (1969), which has four levels. The original 1952 building entry/flag design element is also four stories. As the site drops from south to north, the three level organization actually resolves into 10 different floor elevations connected by open corridor steps and (3) different non-compliant 1-in-10 slope ramps. The school's overall length and breadth is 400 ft x 800 ft, with the field house in addition. A walk from the cafeteria to the northern end of the field house exceeds 1000 ft.

Building Segments



Note: The listed segments generally conform to the numbering system employed by the school for assignment of classrooms. However, Segment A has been further divided for clarity.

A2. Breakdown

- The building includes approximately 284,000 sf, with the field house providing an additional 56,000 sf. This area breaks down as follows:

1952 Original Building - Segment A1-A5

Includes Classrooms, Kitchen/Cafeteria, Auditorium, Gymnasium, Power Plant/Vo Tech, and Offices

Lowest Level	18,550 sf
Ground Floor	48,100 sf
First Floor	78,300 sf
Second Floor	34,975 sf
Segment A Total	179,925

1969 Additions – Segment B

Includes Media Center, Classrooms, Lecture Room, and Conference Room

Ground Floor	10,700 sf
First Floor	11,475 sf
Second Floor	8,500 sf
Segment B Total	30,675 sf

1969 Additions - Segment C

Includes Science Labs, Classrooms, Offices, and Locker Space

Lowest Floor	5,575 sf
Ground Floor	22,725 sf
First Floor	28,475 sf
Second Floor	17,150 sf
Segment C Total	73,925 sf

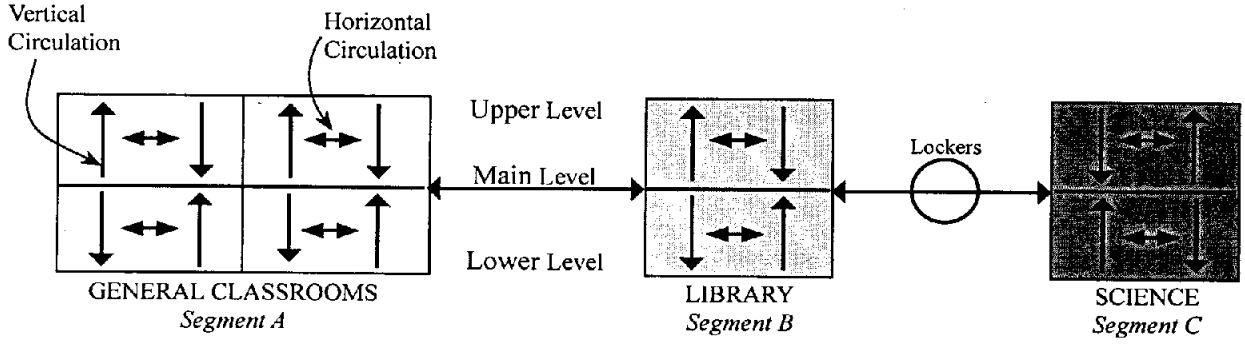
1969 Field House 56,000 sf

A3. Building Circulation

a. Components

- The Building's circulation components--corridors, stairs, ramps, elevators and entry/exit points--are excessive. There are 17 fire stairs, 1 monumental stair, 4 open corridor stairs (3 to 4 ft rise), 3 ramps (+/- 2 ft.), 2 circular stairs accessing mechanical areas, 3 elevators, and 35 exterior doors, of which 11 are used daily for entry and exit.

- Internal circulation occurs in the middle of the three primary functional levels. Except for the distance of horizontal movement, this is a reasonable approach to the siting of the academic building units, Science Classrooms, Library, and General Classrooms. Furthermore, the lockers in the 1969 addition between Segments A and B create congestion in a central location. The diagram below illustrates the circulation throughout the Segments.



- Vertical connection by elevator is very limited. Only 15% of the school is accessible by elevator. The notable areas not covered are the Library Mezzanine, the Gymnasium, and the Vocational/Art and Boiler Maintenance area. By current standards, both elevators, in Segments A and C, are undersized. The fire department reports that none of the elevators can accommodate a stretcher.

b. Entries

- The entry/exit points have increased through the siting of the 1969 additions. The original building had a single main entry for students with two subordinate entries for public access to the Auditorium and Gymnasium events and 2 material receiving doors for food and building products, which still remain.

- The 1969 planning decision to separate the girl's locker function from the new field house (which is detached from the school buildings) and the addition of non-core H.S. programs (i.e. REAP and RISE and school district administration), have impacted the building entry points. They have created distinct entry uses from multiple parking locations and have increased external foot traffic between school buildings and disconnected athletic locations.

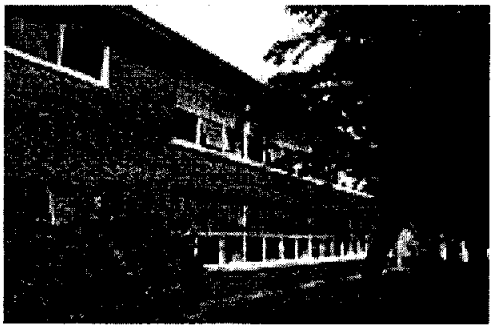
B. Exterior Envelope

B1. Walls

- Segment A is 12-inch thick solid masonry with the majority of surface being 4-inch brick. Approximately 15% is limestone veneer also in a solid 12-inch masonry construction.

These walls are generally in good condition with minor thermal cracking. Some corner conditions at long brick walls show expansion cracks, which typically occur at the corners in walls of this era without control joints.

While these walls have endured the test of time and remain in generally good condition, they have a very poor R-value of 1.8. This contributes to high-energy usage.



Exterior of Segment A classroom wing.

Table of R- Values

Roof Construction - 1952 Buildings

Type I - Gymnasium, Auditorium, Cafeteria

Tar and Gravel	.33
Vapor Barrier	.15
3 1/4" Durisol Plank	8.33
TOTAL R VALUE	8.81

Type II - Classroom Wings

Tar and Gravel	.33
1 1/2" Insulation	4.17
Vapor Barrier	.15
2 1/2" Concrete	.275
10" Rib withTerra-cotta Block	2.225
1/2" Glued Tile	1.78
TOTAL R- VALUE	8.88

*Code Minimum R- Value for Roof on slab is R- 23.

Typical Exterior Walls - 1952 Buildings

Type IA - Classroom - Brick

12" Masonry	
8" Block	1.11
4" Brick	.20
3/4" Air Space	1.01
5/8" Plywood (back of open casework)	.81
TOTAL R-VALUE	3.13

Type IB - Classroom - Glass & Brick Composite

4" Glass Block		1.67
(41% of wall)	.68	
Single Glaze		.89
(31% of wall)	.27	
Masonry Type IA		3.13
(28% of wall)	.87	
TOTAL R-VALUE	1.82	

Type II - Auditorium

12" Masonry	1.28
3/4" Plaster Inside	.15
TOTAL R-VALUE	1.43

Type IIIA - Gymnasium - Brick

12" Masonry	1.31
TOTAL R-VALUE	1.31

Type IIIB

12" Masonry	1.31
4" Air Space	1.01
4" Brick	.20
TOTAL R-VALUE	2.52

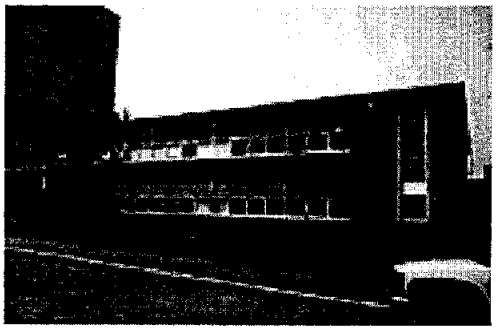
Type IIIC - Glass

4" Glass Block	1.67
TOTAL R-VALUE	1.67

*Code Minimum R-Value for Walls on slab is R-13

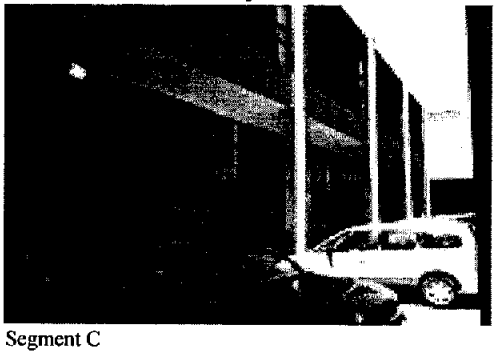
Left: Segment A3 from courtyard.

Right: Segment A3 with Tower in background



Segment B and C structures are more complex in that they have four (4) differing wall systems. The primary system is a 12-inch brick and block wall with 2-inch air space without insulation. This is most prevalent in the Library. The classroom wing is about equally covered with an 8-inch concrete wall with 2 inch glazed tile soaps inside (no air space), and a pre-cast panel wall with 4-inch CMU backup. The fourth wall system works with the window fenestration and is standing seam copper over 3/4-inch plywood on 1 1/2-inch wood frame (no insulation). All original moisture control systems, ie. weeps and flashing, are still functioning. See table on III-3 for wall type 3B R-values.

The Field House has three (3) wall systems with the predominant being a 14-inch wall of 8-inch CMU, a 2-inch air space, and a 4-inch brick veneer. The wall to roof form edge transition is mostly seamed copper of 3/4-inch plywood and 4-inch studs and an interior 1-inch panel of fibrous wood (similar to Tectum). The third system is 5-inch pre-cast concrete panel with 4" studs holding the interior fibrous wood panel. With the exception of the minimal fiberglass in stud walls (less than 5%), the field house 2-inch air space added in the 1969 wall systems over the 1952 systems was felt by the industry to better prevent water penetration. It has only minimal effect on thermal transfer, increasing the R-value of these walls to 2.52 – still very inefficient to energy usage and winter comfort.



Segment C

Further, the continuous brick wall angle supports at floor slabs have popped the masonry joint due to moisture coming out of the flashing rather than through weeps. While it will take several more years, this condition will ultimately lead to failure of the veneer bricks at these shelf angles.

a. Conclusions and Recommendations

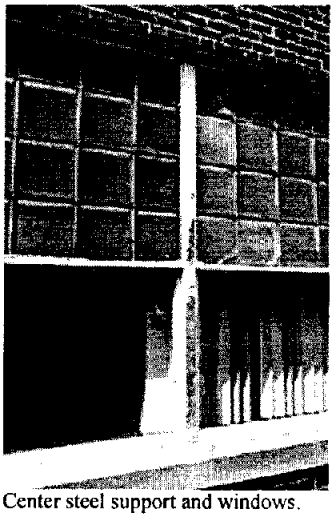
The exterior walls, while in generally good condition, will require significant issues to be addressed in a major renovation.

Field House

- The thermal resistance (insulating value) of the existing walls is poor. Strategies for improving the performance of these walls should be considered in any proposed scope.
- The thermal performance of existing windows is equally, if not more, inadequate. Additionally, the use of polycarbonate reduces the light available inside the school. The windows should be replaced.
- Assuming the estimated cost of renovation will exceed 50% of the building's value, the exterior window walls at classrooms must be braced laterally, or removed and replaced. Reference the structural report Section III, Part H for seismic issues and additional information concerning wall structure.

B2. Windows

- All windows (in both 1952 and 1969 structures) are steel without thermo break, single glazed, failed caulking (even where replaced), and often with broken or inoperative hardware on operable sections. The glass block windows and upper section of the 1952 classroom windows are in fair condition. All glass block appears intact from the inside, however approximately 5% are broken on the outer surface. The glass block is integral with and supported by the steel window systems.

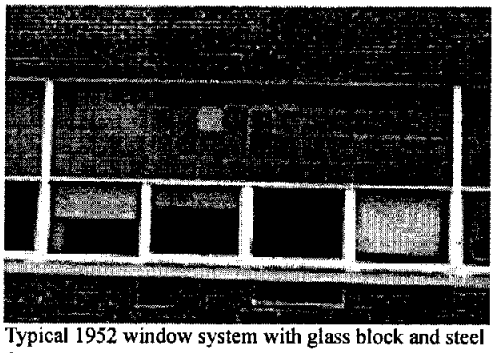

Center steel support and windows.

The ceilings in many areas in the 1952 structures show water stains from leaks at the window heads and/or brick spandrel flashing failure from the sill down at the window above. The 1969 addition ceiling spaces show similar failures to a lesser degree.

Previous research indicates that any attempt to upgrade this era steel window costs as much as a total replacement. Further, the structural engineer has noted significant lateral bracing concerns for the brick spandrels below the windows. This is similar to an unbraced parapet condition. See page III 25, part *c*.

B3. Roof

- Approximately 60% of roof coverings have been replaced within the last 10 years. The replacements are with various forms of single-ply welded membrane systems. Segments C, A2, part of A1 and part of A5 remain tar and gravel. These are in poor condition and in serious need of replacement. Over the years, tar has become plastic, flowing toward drains creating blockage and restricted water flow.


Typical 1952 window system with glass block and steel frames.

Unfortunately most of the replaced roof areas did not address full insulation replacement, proper slope to drains (i.e. tapered insulation), roof drain replacement, proper flashing depths at vertical interface with walls, or parapet conditions. On sections A1 through A5, considerable water ponding is evident. The Field House main roof has multiple small areas of ponding. The intricate roof edge forms of the Field House slope in towards a roof drain near the clerestory windows. Any blockage of a single roof drain will cause severe ponding depth with resultant leaks at vertical flashing elements.

The basic roof insulation depth throughout the school building complex is 1 1/2 inches. This is placed over three different roof deck structural systems as follows: 1952 structures are ribbed concrete slab, 1969 academic structures are gyp-crete over qypsum plank, and the Field House is a wood fibrous plank similar to Tectum. Simple calculations of R-value yield a range of 8.5 to 9.5. Although the code minimum R-value is R-23, the typical standard for a roof today is in the range of 25 to 30.

In the 1969 building roof deck systems, there is concern that previous and current moisture has penetrated the roof membrane. There are two issues, 1) the insulation becomes highly degraded once it is saturated with moisture, and 2) the roof deck systems are also prone to accumulation of moisture, which causes degradation and decreases structural capacity. Infrared testing will assist in locating potential areas where this may have occurred.

C. Interior

Finishes within the building are generally well suited to school use, and they have been reasonably well maintained. However, many ceilings and floors are beyond their serviceable life and require complete replacement. This is particularly true of carpeted areas in the Media Center and Offices; of original vinyl tile in corridors and classrooms; and of acoustic ceilings (hung and adhered) in corridors and classrooms. Walls are generally in fair condition often constructed of masonry.

Light quality in all areas of the school is poor; despite large areas of glazing, especially in the 1952 Wing. Corridors are uniformly dark. Because they generally end in walls, rather than windows, they appear longer and can be disorienting.

The acoustic quality of the school is fair. Acoustic treatment is limited to acoustic ceilings, and acoustic ceiling panels adhered to walls. This review took place during the summer, while the school was unoccupied, however, it appears that classrooms would have considerable background noise from older light ballasts and unit ventilators. The auditorium is primarily hard finishes and requires much acoustic treatment to improve performance.

The following items discuss rooms and spaces more specifically. Additionally, a schedule of existing finishes is included in the appendix.

C1. Main Spaces

a. Lobby and Corridors

The general finishes of these areas are in fair condition. The walls of the original 1952 building and the 1969 addition are of glazed brick, painted concrete block, and structural glazed tile, respectively. The original building corridors have serviceable student lockers. The 1969 addition's central locker concept has proven less than desirable. This is partly due to the lockers being the wrong type for current student use trends. Floors of the 1952 areas are VAT, worn and needing replacement. The acoustic ceilings have no value and need complete replacement. The floors in the 1969 addition are showing wear and will also need replacement. The concealed spline ceiling system is very difficult to maintain once access was needed. Assuming any major system upgrades, the ceilings in the 1969 addition should be replaced in their entirety. Isolated elements in the 1969 addition require major reconstruction. These are parged concrete/cement plaster columns and stair walls, along with all wall types interfacing with steel window and steel/glass wall systems.

b. Gymnasium

The original 1952 Gymnasium is primarily used for Physical Education classes with some evenging use. Physical Education, Athletic practices, and various weekend and evening events are held in the 1969 Field House. The finishes are in good and serviceable condition. It's 4 and 7 foot floor differences from the main school make it a challenge to usefully integrate with the main school functions viewed with respect to ADA and MAAB.

The Field House functions very well and is a major asset to the school and community. Minor finish upgrades, a new paint scheme, repair of deferred maintenance issues, and attention to some roofing problems, can bring this structure into a long-term, very serviceable facility. However, the athletic floor surface is worn and cracked. It is a hazard and is in need of replacement

c. Auditorium

This space has been well maintained in it's original sparse finishes and narrow plywood seating. The stage has also been maintained and is very serviceable. The original smoke vents in the fly loft are

left in an open position. This is unusual because in cooler seasons a great amount of conditioned air escapes from the building. The condition would seem to create high negative pressure, causing cold air infiltration throughout this segment of the building. Stage storage and scenery production is in the crawl space below, with access via a trap door and hoist. A difficult but usable solution. The fly tower scenery grid and lights are accessed by a spiral stair, as is the mechanical space below. The stage lights contain asbestos and many are not operational. Users also stated that the light control board is inoperable.

As noted in Section III, Part F, the seating layout does not meet current ADA/MAAB requirements and would require significant modification. The plywood form seating, while in reasonably good condition, is narrow. 1950's standards were 18 to 20" seat width. The current width standard is to 20 to 22".

The finishes are very sparse, with concrete floors, aisles of cork tile, smooth plaster walls, and an acoustic tile ceiling. The general acoustics of the auditorium are very poor due to the low balcony, hard finishes, and flat ceilings.

d. Media Center

A traditional organization in a pleasant, naturally lit space provides students and staff with perhaps the most comfortable environment in the school. The wood finish materials are warm, with plaster walls and bands of color. The two story space, with focal open stair, provides internal access to book stacks and reading carols on the open mezzanine level. The circulation desks and work rooms are connected to the upper stack area and a lower level book storage area by a vertical book lift (i.e. dumbwaiter).

The lower level book retrieval has been modified for other uses and does not currently function now as part of the library. An area adjacent to the circulation desk houses several computers for media research. The stair to the upper mezzanine levels contains additional supports to reduce the normal vibration of a suspended structure. The original suspended light fixtures have been replaced with industrial, high intensity fixtures, which are inappropriate to the computer and reading activities in the Media Center. A reassessment of artificial lighting for this space is recommended.

The many reading carols on the upper level do not seem to be in use. Carpeting is worn, soiled, and in need of replacement.

e. Cafeteria

The cafeteria seating areas are adequate in space, allowing for a two-period lunch serving. Half of this space is in the 1969 addition. Both spaces overlook an enclosed courtyard, which does not appear to be maintained. It is overgrown and in disrepair. The floors are VAT and showing considerable wear. Glass in a few locations is broken and replaced with plastic. The rear entry corridor has two step areas, and the 1969 glass wall system has been boarded up (rather than replaced with new glass) and is in poor condition. The ceiling/lighting system, which is currently serviceable, will require replacement if renovation requires the addition of any fire protection or mechanical systems.

The original serving line is very tight and congested. The serving area in the 1969 section is not clearly organized. For discussion of the kitchen area, refer to Section III, Part K of this report.

The many senior class signature banners should be preserved for future re-use. The unit ventilator open discharge grills are partly obstructed by food service materials.

C2. Academic Spaces

a. General Classrooms

The 1952 teaching spaces clearly show 50 years of use. While a few classrooms have had new vinyl floors and replacement ceiling tile installed, the vast majority are in fair to poor condition. These typically exhibit water stained ceiling tiles, worn VAT floors, marginal artificial lighting, (ref. page III 47, item 6) original chalk boards often with partial white boards attached over them, and exterior wall systems in poor condition. The exterior casework storage is typically in very poor condition. Many attempts to repair and rejuvenate it have been made over the years. It appears that the majority of this exterior casework is used for classroom text book storage. Many classrooms are undersized - 100 to 150 S.F. smaller than current requirements.

b. Science Rooms and Labs

The 1969 classrooms are more appropriately sized and in generally good condition apart from specific components of the building that were previously discussed. Windows, ceilings, lighting and flooring should be replaced in the event of renovation of mechanical, electrical and fire protection systems. These systems are serviceable for another 10 years, although the concealed spline ceiling will be an ongoing maintenance issue.

The planning scheme of the science classrooms has undergone construction modifications for various operational and functional concerns. If major renovation includes sprinkler systems, the exit travel distance, corridor configuration, and reduction in fire ratings may open new opportunities to re-integrate the prep rooms with the science classrooms.

c. Art, Music and Performing Arts

These classrooms are separated at either end of the facility - a distance of more than 800 feet. Grouped together, they would promote greater interdisciplinary student development. The Music and Performing Arts areas are undersized for their current use. The Art Classrooms in Segment A5 are heavily used and laid out in a circuitous plan. This layout may exceed maximum Massachusetts Building Code travel distance to an approved exit in several cases, as Segment A5 has only one stair, as noted in Section III, Part A. Casework, sinks, storage, and equipment are issues needing programming and replacement throughout this area. Finishes are generally original and are in fair to poor condition.

D. Doors and Hardware - Smoot Associates

D1. Main Building (Segments A, B, & C)

- Exterior doors need to be replaced. While some are fairly new, they need weather-stripping and painting.

- The cross corridor and stairwell doors will need replacement; the narrow widths of most of them would not meet ADA. The hardware at cafeteria and library doors would also need replacement.

- In the 1952 section of the school, there are mortise locks with knobs at the classrooms, and some of the mechanical/electrical/janitorial doors. These appear to function, though reportedly many do not. Already, in many cases, a heavy-duty cylindrical lock is being used with a wrap-around plate to replace those with a defective mortise. We recommend removal of all mortise knob locks/latches, and the use of a steel wrap-around conversion plate and a new heavy-duty cylindrical lever lock/latch. The knob configuration does not meet accessibility codes and must be replaced.

- At the washroom there is a similar situation to the field house – non-compliance to the ADA in the pulls and door widths.

- The exterior doors are under a Medeco keying system, though some of them have Sargent cylinders and keying. The interior door locks are Schlage. As with many older projects, the keying system may have been compromised through the distribution of keys, and may not keep the building secure. New keying for the entire school is recommended.

- In conclusion, most openings built in the 1950's and 1960's buildings are still operational. However, any moving hardware components that are 30 years old or older have exceeded their life cycle and should be replaced.

D2. Field House

- The exterior main entry doors, frames and hardware have been repaired many times and are at the point of needing more repairs. They should be replaced. Some of the other exterior openings have newer doors, frames and hardware, but a few closers need to be re-attached, weather stripping and painting is also required.

- The doors from the gym to the lobby currently do not meet code because they do not have exit devices. They have dead locks and pulls. New doors and new exit hardware are required. The frames are in good shape.

- The stair and corridor doors currently do not meet code.. They have 60 inches of opening, thus 30 inch leafs. Code requires at least 32 inches clear per leaf, thus we recommend un-balanced pairs. The final size would be defined by the code review. Most of the openings are 80+/- inches high and would not meet current code. Most of the wood doors, excepting those in high use areas, are in good shape and should remain, provided it is cost effective.

- Currently, this building has cylindrical-type locks/latches with knob trim. This does not meet ADA and would have to be replaced with new heavy-duty levers in proper functions. At the washrooms, the pulls do not meet ADA.

E. Casework and Equipment

E1. Summary

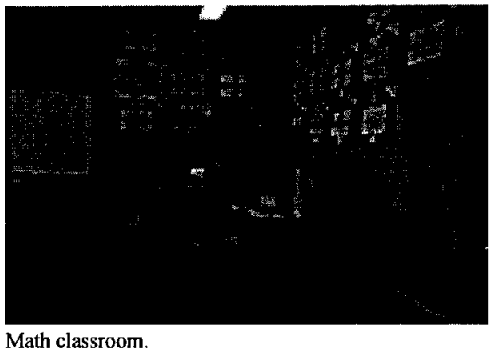
- The existing facility includes casework equipment in nearly all classrooms, workrooms, science labs, art rooms, and offices.

- Most casework was installed during the general construction of the 1952 and 1969 buildings. Renovations completed in the past 10 years, which occurred in one classroom on each floor in the Science section, were incorporated to address programmatic issues. Generally, casework installed in 1952 is currently in fair to poor condition and does not suit the current functions of each room. Casework installed in 1969 is in fair condition, however it requires upgrades to serve current educational functions.

- The general conditions of casework in each type of classroom are described below. Specific information is included in Appendix C.

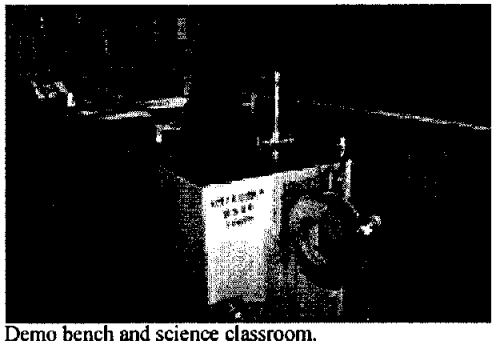
E2. Science Classrooms

- The casework in most of the science classrooms is in poor condition: Missing locks make the drawers unusable for materials storage. There are no handicap accessible stations. The safety equipment, some of which may not be working properly, is in very poor condition. Emergency drench showers are not accessible and in some cases the fume hoods are used for storage. A number of the countertops are of the original wood and all are heavily damaged by chemical spills. None of the faucets are accessible. Generally there is insufficient storage in the classrooms. There is no cabinet storage for chemicals. Chemicals are currently brought across the access corridor from the preparation room.



Math classroom.

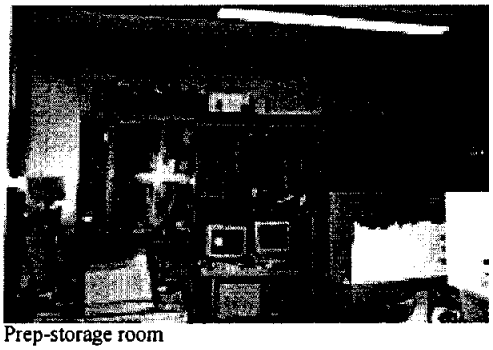
- At least one classroom on every floor has been upgraded in the last few years to accommodate accessibility and program requirements. Some of the science tables, fume hoods and emergency safety equipment have been altered to add appropriate facilities to properly access technology and to incorporate accessible lab stations changing the counter top for the appropriate material. Although they have been recently replaced, the counter tops and sinks are very badly damaged by chemical usage.



Demo bench and science classroom.

- Demonstration Benches: These benches, which consist of some upgraded casework and some original casework, do not have proper clearance and are not accessible. The countertops are in poor shape; they are not accessible and the associated faucets are not ADA accessible.

- Preparation Rooms: These rooms are used for storage of chemicals, TV carts, balances, etc. They are closed at all times to assure that the equipment is not accessible to stu-



Prep-storage room

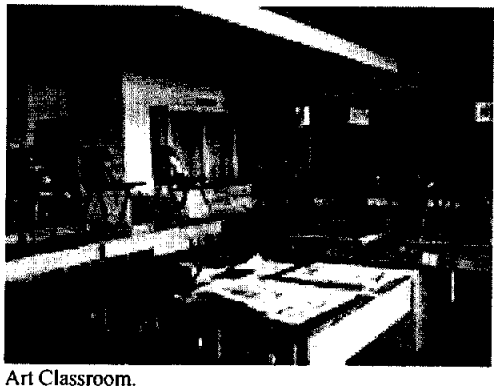
dents. The casework is in poor shape. There are missing doors, broken cabinets and the casework is not ADA accessible.

- Storage Rooms: These rooms have a mixture of original and older cabinets. Some of the wood countertops are in poor condition from chemical usage. The cabinets to store books paper, and chemical instruments are in very poor condition. Sinks and faucets are in poor condition as well and do not meet the accessibility code.


Prep-storage room.

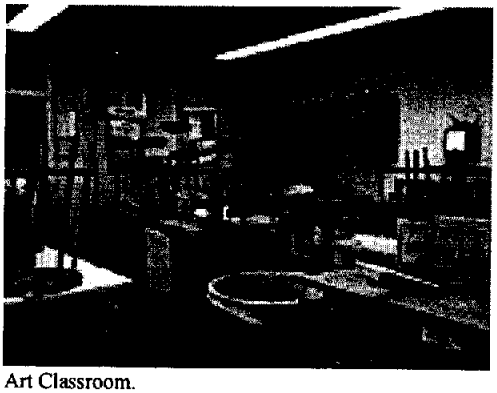
E3. Pre-K Section (REAP)

- This section is not currently equipped to meet the appropriate programmatic requirements of Pre-K classrooms. Although the casework has recently been updated, it still has counter heights that are too high for children younger than 5 years old. Additionally the casework does not meet accessibility requirements. There is a lack of cabinet storage space and there are no toilet rooms in the classrooms. There are new unit ventilator base cabinets with doors and locks in good condition.


Art Classroom.

E4. General Classrooms

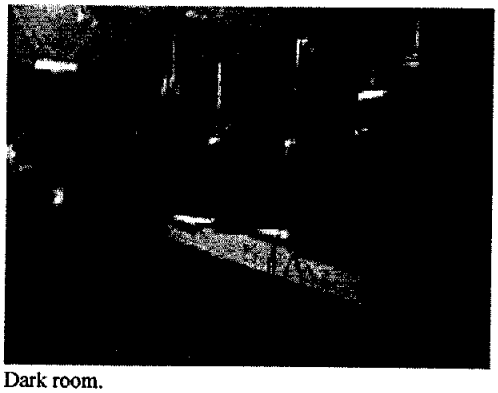
- There are, in almost all classrooms, unit ventilator base cabinets that include a wood cabinet with wood doors and shelves in different sizes, some of them missing. Some of the doors have been painted in various colors. The teacher wardrobes consist of a gypsum board frame with two wood doors. They are in fair shape. The window sills are wood and are in very poor shape. In some of the classrooms, especially foreign language classrooms, there are a variety of cabinet styles; these are specifically documented in appendix C.


Art Classroom.

E5. Art Classrooms

- The casework in all of these classrooms is in very poor condition. The countertops are wood and the tables have no knee space and are not accessible. The kiln does not have an enclosed space, which is a dangerous condition, although it is not a code issue. There is very little display space. The office area is very large and is used for storage. The classrooms need more sinks to meet programmatic requirements and more storage space. In general, the art rooms need a great deal more storage space for art projects and more locked storage.

- The Dark room is in very poor shape; it is extremely dirty and there is no table for photography trays. The sink is in poor condition and does not meet the accessibility code.


Dark room.

E6. Library-Media Center

- There is insufficient casework for display, storage and bookshelves in the Library-Media Center. The area is not currently designed to include functions such as group study areas and meeting rooms, and there is no teacher resource section.

- The circulation desk is in very poor condition, and does not have the proper height to comply with accessibility requirements.

E7. Department Offices

- The storage cabinets in almost all offices are insufficient and not ADA compliant. They are in fairly good shape, with the exceptions of some missing locks and stained plastic laminate counter tops.

E8. Teacher Work Rooms

- The teacher workrooms are equipped with a single cabinet assembly with plastic laminate countertops in fairly good condition. The wood base cabinets are in good condition. However, this casework is not accessible, and is higher than the suggested height for units in these spaces. Some of the workrooms are currently being used for storage.

E9. Offices and Administration

- In office spaces there is minimal casework. There are wood and plastic laminate shelves, however there are not enough lockable cabinets.

- Reception counters are in fair condition, but are not accessible.

- Work spaces and circulation are not defined.

E10. Conclusions and Recommendations

a. Science Rooms

- Science tables should be replaced with new properly accessible lab stations with the updated equipment required to teach high school science.
- Every science classroom should be equipped with the required safety equipment; safety shower, eye wash, extinguishers, first aid kit, etc.
- Faucets must be replaced with accessible type.
- All resin and wood countertops should be replaced with new resin countertops.
- All Chemistry and Physical Science classrooms require proper lockable storage for chemicals, microscopes, balances, and other equipment.
- Instructor demo bench should be made accessible and should be provided with safe access to water, gas, electricity, and emergency eye wash.
- All sinks should be replaced with new resin sinks with science mixing valves and at least one with blade handles (accessible handles) per classroom.
- Every science station should be provided with a lockable drawer for the students to store their supplies and tools.

b. General Classrooms

- Every classroom should be equipped with a lockable teacher wardrobe and a tall storage cabinet for personal and classroom storage.
- Unit ventilator counters and base cabinets should be replaced or removed

c. Storage Rooms

- Storage rooms should be provided with consistent metal shelving to store materials.

f. Library – Media Center

- Provide an accessible circulation desk with accessible storage and correct counter height and knee space on the work side of the circulation desk.
- Provide accessible reading tables, computer stations, magazine storage, and book shelving.

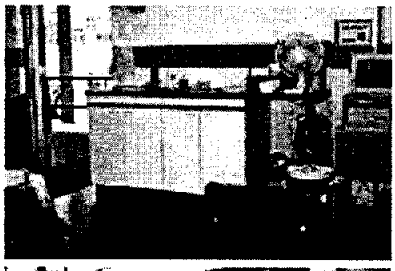
g. Additional Suggestions

- Some of the issues listed above illustrate the concern of handicap inaccessibility – the inability for handicapped users to access independent spaces in the school. This inaccessibility affects teachers, students and members of the community. Any significant renovation must incorporate as many items as possible to accommodate disabled users to the fullest extent.

E11. Specific Casework Items

Below is a photographic log of the various types of existing casework that can be reused in any renovation project. The photographs portray all types of classrooms and all types of casework existing in the school. The casework items/types not listed below are recommended to be replaced with new casework for any of the following reasons: water damage, chemical damage, non-ADA compliance, lack of hardware, or minimal storage space. Replacement could also be recommended on account of program requirements or upgrades, or simply if the item is unserviceable due to age.

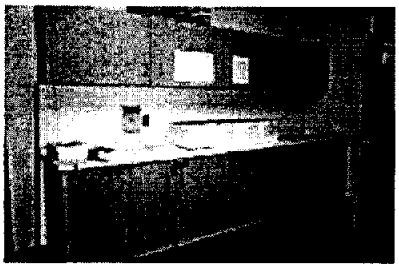
Health Classroom
The casework in this room is in very good condition.



RISE Classroom U.V. Counter
All RISE classrooms have been renovated to comply with current program requirements.

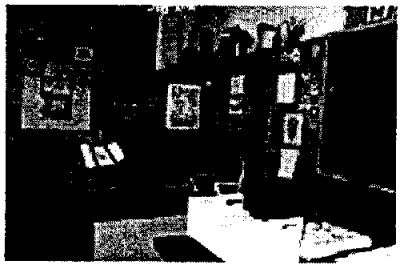
Non-typical U.V. Condition in a Regular Classroom
In some of the classrooms renovated in 1969, wood doors were added to the U.V. cabinets along window walls. Only those in good condition can be salvaged. Those that show signs of water damage or are beneath water damaged window sills cannot be saved.

Art Classroom #A121 Art
In this room, the existing casework on the south and east walls is in good condition. New counter tops are recommended.



Yearbook Classroom #203
The casework in this classroom is in good condition, however it does not comply with ADA requirements. It can be used as storage.

Superintendent's Office
The casework in this office has recently been replaced and is in good condition.

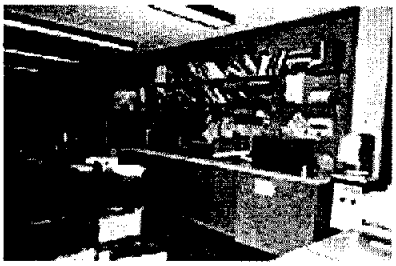


Millwork Wall - Science Room (typical)
This millwork wall will remain, however the hardware will require replacement in order for the cabinets to be lockable.

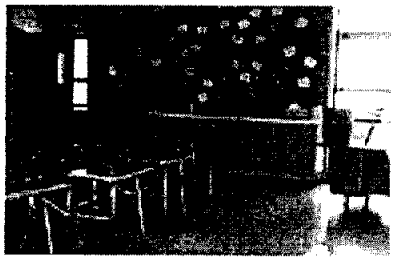
U.V. Counter - Humanities Classroom (typical)
This casework is in good condition.

Health Suite - Nurse
This casework has been recently replaced and can be saved.

U.V. Counter - Science Room
In this casework assembly, the sink and faucet must be replaced by a new resin counter and sink, and an ADA compliant faucet. The cabinetry can remain as is.

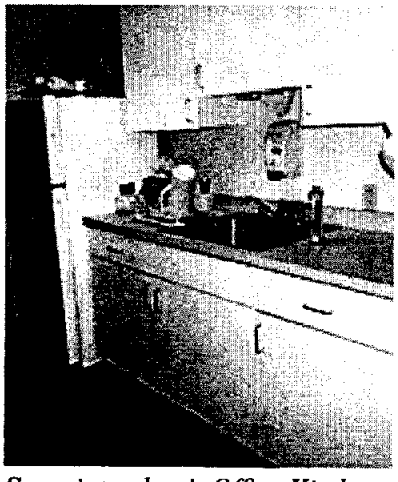


Teacher Workroom
This casework assembly is in good condition and may remain, although it is not accessible.

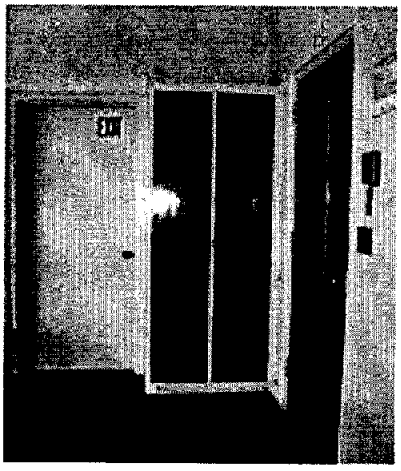


Math Classroom (typical)
U.V. cabinets are in good condition.

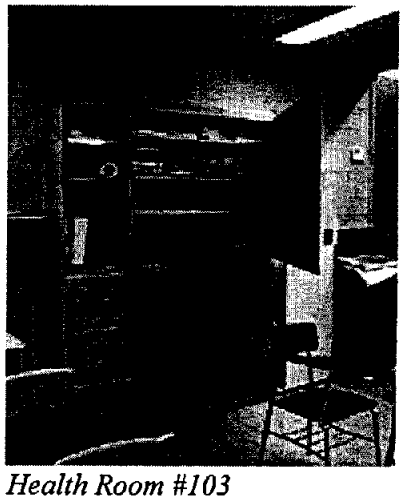
Reception Office Desk
This casework does not comply with ADA requirements and therefore can not continue to be used as a reception desk. However, it can be moved to another location and used for storage.



Superintendent's Office Kitchen
This cabinet assembly is in good condition, however it is not accessible and must be made ADA compliant.



Classroom Wardrobe (typical)
The teacher wardrobes in the 1969 addition can be reused, however some shelf alterations and door replacements are recommended. All teacher wardrobes in the 1952 classrooms must be replaced.



Health Room #103
The casework in this classroom is in very good condition.

F. Accessibility

F1. Summary

- This analysis documents the existing accessibility throughout the school as it applies to the 521 CMR-MAAB (Massachusetts Architectural Access Board) regulations. The following accessibility report includes all building related issues. Refer to the "Site" section of the Feasibility Study for all exterior conditions. Investigation of the interior conditions includes stairs, elevators, corridors, toilets, auditorium and seating capacity as it is evaluated under current 521 CMR guidelines. The 521 CMR is designed to make public buildings and facilities accessible to, functional for, and safe for use by persons with disabilities. This analysis relies on the MAAB because it is generally more restrictive than the ADA.

F2. Existing Buildings

- If the work performed amounts to 30% or more of the full and fair cash value of the building, the entire *building* is required to comply with 521 CMR. For the purpose of this review it is assumed any renovation project will exceed the 30% limitation and the facility must comply with 521 CMR.

F3. Educational Facilities

Educational facilities shall include but are not limited to: public and private schools, nurseries, preschools, day care facilities, colleges and universities, libraries, galleries, museums, and training facilities.

- Existing library tables, counters and circulation desk do not have proper clearances and heights.
- Existing countertops and sinks need proper clearance in Science and Arts segments.

F4. Places of Assembly

Places of Assembly shall include but are not limited to theaters, auditoriums, lecture halls and conference rooms. Associated, support, or related areas, including but not limited to lobbies, ticket offices, seating, stages, backstage areas, dressing rooms, toilet rooms, showers and green rooms, shall also be accessible.

- Additional wheelchair spaces are needed in the auditorium. There are two wheelchair spaces currently and a total of twelve are required.
- 4 additional wheelchair spaces are needed in the Lecture Hall.
- Additional companion seats are required next to each wheelchair seating space.
- Accessible seating must be distributed. Currently they are located in the middle of the auditorium on a sloped surface.
- Aisle seats in auditorium have no removable or folding armrests.
- Accessible wheelchair space is not level and does not comply.
- An assistive listening system is required in the Auditorium and Lecture Hall.
- A wheelchair lift or ramp is needed to access the Auditorium stage and the Lecture Hall platform from the seating section. The Auditorium slope from the middle of the room is 1:24.

F5. Recreational Facilities

Recreational facilities shall include but are not limited to courts, gymnasiums, whirlpool, Jacuzzis, gyms and weight lifting areas. All areas open to and used by the public, including but not limited to locker rooms, shower facilities, saunas, steam rooms, weight rooms, aerobics and dance rooms and spectator areas in recreation facilities shall be accessible.

- Locker rooms aisles are 30" wide and do not comply.
- Existing lockers do not meet code. Lockers with opening devices that are operable with a closed fist and mounted no higher than 42" from the floor are required.
- See "Site" section regarding exterior bleacher accessibility.
- Existing toilets, showers and sinks in locker space do not comply.

F6. Accessible Route

An accessible route shall provide a continuous unobstructed path connecting accessible spaces and elements inside and outside a facility. Accessible routes may include but are not limited to walks, halls, corridors, aisles, skywalks, and tunnels. Accessible routes may not include stairs, steps, or escalators.

- Different floor elevations throughout the school are connected by a 4'-0" and 7'-0" stairs with chair lift. Lifts can only be used with a variance granted by the 521 CMR.
- The passageway to the darkroom is approximately 20 inches wide and does not comply.

F7. Ramps

Any part of an accessible route with a slope greater than 1:20 (5%) shall be considered a ramp. A ramp greater than 1:12 is not allowed.

- Ramps in school have 15% slope and do not comply with code.
- Handrails need to be provided in the corridor connecting A4 and A5.

F8. Entrances

All public entrance(s) of a building, or tenancy in a building shall be accessible.

- The connector along the cafeteria courtyard has two sets of stairs. A lift or ramp is needed to access levels.
- The entrance to the Field House is not accessible doe to a pad between the path and doors.
- The main entry has a non-conforming ramp to negotiate the 4" pad between the drive and the doors.

F9. Doors and Doorways

All doors and openings along accessible routes shall comply with 521 CMR 26

- Exterior and interior door hardware are knobs and do not comply. Lever-operated, push-type and U-shaped mechanisms are acceptable design.
- The building has many 60-inch openings consisting of two 30" doors. All doors must provide at least one door leaf, which is at least 32 inches clear in width.
- Doors exiting the field house to the lobby would not meet code, because they do not have exit devices.
- Stairwell doors in the main building need replacement because of the narrow width and currently would not meet ADA.

F10. Stairs

Stairs in the building must comply with 521 CMR.

- Existing handrails do not meet current building and accessibility codes.
- Handrails require being continuous, correct diameter and mounted at the proper height.
- The handrails do not extend the required distance past top and bottom treads.
- Open risers in the library stair are not permitted by code.

F11. Elevators

In all multi-story buildings and facilities, a passenger elevator shall serve each level including mezzanines.

- Existing elevator cab size appears to be undersized, allowable under MAAB, but insufficient for ADA.
- There are no elevators in Seg.B, Seg.A4 and Seg.A5, which are multi-leveled.

F12. Public Toilet Rooms

In each adult toilet room, at least one water closet and one sink in each location shall be accessible to persons in wheelchairs, or a separate accessible unisex toilet room shall be provided at each location. Where children's toilet rooms are provided, at least one water closet and one sink in each location shall

be accessible to children in wheelchairs, or separate accessible unisex toilet room shall be provided at each location.

- Current toilet room fixtures must be replaced with handicap accessible fixtures and proper clearances must be established.
- Wheelchair turning space is non-compliant in all toilet areas throughout the building.
- If RISE and REAP programs remain, children's toilet room fixtures must be replaced with accessible fixtures and proper clearances must be established.

F13. Drinking Fountains

- Drinking fountains must be replaced with new units at proper clearance height and corridor projection.

F14. Public Telephones

Wherever public pay telephones, public closed circuit telephones, or other public telephones are provided, at least one telephone shall be accessible at each location.

F15. Signage

- Room signage must be provided with braille characters.
- Assistive listening systems must be identified with signage.
- Accessible entrees must be identified.
- Accessible toilet rooms must be identified.

G. Building Code Review

G1. Massachusetts State Building Code

a. General

- The existing facility has been reviewed per the requirements of the following codes. These codes should be reviewed thoroughly at each phase of the design work.
  1) Massachusetts State Building Code, 780 CMR, Sixth Edition, February 28, 1997.
  2) The Commonwealth of Massachusetts, Architectural Access Board, Rules and Regulations.
  3) ADA Accessibility Guidelines for New Construction

- The International Building Code, which is not currently applicable in Massachusetts, was also referenced

- The existing facility is in compliance with the code. This does not mean that it meets every standard of the current code for new construction. In accordance with the code, an existing building is presumed to have met the codes and regulations in effect at the time of it's construction and it is allowed to continue in it's use provided it is maintained per the code. Current building codes are applicable to any alteration, addition, or change in use of the structure, in accordance with Chapter 34.

G2. Use or Occupancy

a. Code Classification 780 CMR 302.1

- The occupancy of the facility is non-separated mixed use, with assembly, business, and educational uses as follows;

Classrooms, School Offices, Science Rooms	Use Group	E-Educational
Auditorium		A3 - Assembly
Cafeteria		A3 - Assembly
Gymnasium		A3 - Assembly
Lecture Room*		A3 - Assembly
TV Studio		B - Business
RISE & REAP Programs		E - Educational
Superintendent's Office		B - Business

* (780 CMR 303.4).

- The Media Center is considered Accessory Area to the Educational Use (302.1.2).
- The Media Center is an Atrium (404.1)
- The Stage at the Auditorium is a 'Legitimate Stage' (412.2). The raised area at the Lecture Room is a Platform (412.2). Under Article 34 of the code (discussed below) the existing enclosure is in conformance with code.
- The Field House is an A3 Assembly Use. It is not mixed, all non-assembly functions are accessory uses.

G3. General Building Limitations

a. Construction Classification

- Based on the definitions in the current code, the minimum classification for each section of the building is as follows:

1952 Original Building	Type 1B	non-combustible
1969 Media Center Addition	Type 2B	non-combustible
1969 Science Wing Addition	Type 2B	non-combustible
1969 Field House	Type 2C	non-combustible

G4. Chapter 34: Repair, Alteration, Addition, and Change of Use of Existing Buildings

- A renovation project is governed by Chapter 34. This chapter is 'intended to maintain or increase public safety, health, and general welfare, without requiring full compliance with the code for new construction.'

a. Building Renovation

- For continuation of the same use group the building shall comply with 780 CMR 3404.0.

b. New building systems

- Any new building system or portion thereof shall conform to 780 CMR for new construction to the fullest extent practical.

c. Alterations and Repairs

- Alterations or repairs to existing buildings which maintain or improve the performance of the building may be made with like materials, unless required otherwise under 780CMR 3408 – Structural Requirements for Existing Buildings.

d. Number of Means of Egress

- Every floor or story shall provide at least the number of means of egress required by the code for new construction. Egress for the existing facility is sufficient with the exception of the following areas:
  a) There are not enough exits from the art area. (2) means are required, there is only (1) because there is a common path of travel greater than 75'. (1011.3)
  b) The corridor to the Tech Ed. Room is considered a 'dead end corridor,' as it exceeds 20 feet in length. (1011.2)
  c) The Music room requires (2) means of egress, because it serves more than 50 occupants. There is only (1).
  d) The Weight Room requires (2) means of egress, because it serves more than 50 occupants. There is only (1).
  e) At least one means of egress from every occupied space must be 'accessible.' (1007.1) The mezzanine in the Media Center, and the classrooms on that level, are not served by an exit stair meeting code requirements for this section.
  f) Due to existing concrete pads, and a lack of ramps meeting code, the majority of exterior egress doors do not satisfy the accessibility requirement.

e. Capacity of Exits

- Required Means of Egress shall comply with the code for new construction. There is sufficient egress capacity at stairs and doors throughout the facility.

f. Length of Access Travel

- Shall not exceed 200 feet, in buildings without a sprinkler system. All areas of the existing building are within 200 feet of exit.

g. Exit Signs and Lights

- Shall be provided in accordance with the code for new construction. For notes on the existing system, refer to the Electrical existing conditions report, Section III, for further information.

h. Means of Egress Lighting

- Shall be provided in accordance with the code for new construction. Refer to the Electrical Existing Conditions Study Section III, for further information on lighting.

i. Height and Area Limitations

- Under Chapter 34, the building is in conformance with applicable height and area limitations, so long as there is no change in use. Additions may be made to the structure.

j. Fire Protection Systems

- Fire protection systems must be provided for existing buildings which are substantially altered or substantially renovated where required for the specific use group. 780 CMR 9 requires fire protection for Use Groups A3, B, and E in buildings over 12,000 sf. In our opinion, the potential renovations anticipated would constitute Substantial Alteration and Renovation. A Fire Protection System would be required in any major renovation.

k. Enclosure of Stairways

- Open stairways are prohibited. There shall be no minimum fire resistance rating required for an existing enclosure of a stairway. The existing stairways are enclosed, those with glazed partitions meet this code requirement.

l. Assembly Use Groups

- Any alteration within an assembly use group shall comply with the code for new construction. This applies to the auditorium, lecture, and gymnasium spaces. These spaces neet not be further separated, with new fire rated walls

m. Accessibility for Persons with Disabilities

- Accessibility for Persons with Disabilities shall be provided in accordance with the regulations of the Architectural Access Board. Refer to Section III, Part F of this study.

n. Energy Provisions for Existing Buildings

- Alterations to Components affecting Energy conservation performance shall comply with 780 CMR 13 generally, and 780 CMR 1304.2 or 780 CMR 1304.5 or 780 CMR 1309 specifically. Existing components may remain.

o. Evaluation of Existing Building

- The structural engineer shall make a structural evaluation of the existing building to determine the adequacy of all structural systems that are affected by alteration or damage to be repaired. The existing conditions report Section III, Part H serves as a part of that evaluation.

p. Existing Lateral Load Capacity (refer to Section III, Part H for further information)

- Alterations shall not be made to elements or systems contributing to the lateral load resistance unless the altered lateral load resisting system conforms to 780 CMR 1611.0 and 1612.0; or there is no reduction in the lateral capacity of the building as a whole.

- Existing elements or systems may be reinforced or replaced with new elements or systems of equivalent strength and stiffness.

q. Earthquake Loads (refer to Section III, Part H for further information)

- For no change in use groups, but alterations exceeding 50% of the assessed valuation of the building, the project is defined as Seismic Hazard Category 2. Earthquake resistance shall comply with the requirements of 780 CMR 3408.3.5 (above). All earthquake hazards as described in 780 CMR 3408.6.4 shall be corrected.

r. Fire Resistant Materials

- Fire resistance construction systems are governed by the provisions of 780 CMR 34.

G5. Interior Finishes 780 CMR 8

- Interior trim and Finishes altered as a part of the renovation shall conform to the requirements of 780 CMR 801. Flame spread of Interior Finishes for the A-1 and B use Groups, shall conform to Table 803.4, summarized as follows:

A-1

Required vertical exist and passage ways	I
Corridors providing exist access	II a
Rooms or enclosed spaces	II b
a) Lobby areas shall not be less than Class II	
b) Class III materials are permitted in places of assembly with a capacity of 300 persons	
Required vertical exist and passage ways	I
Corridors providing exist access	II
Rooms or enclosed spaces	III

Accessibility

- The building code requires that all buildings shall be designed in conformance with the Massachusetts Architectural Access Board Rules and Regulations, 521 CMR 1.00.

Note: The client is also subject to the provision of the American with Disabilities Act. This act is civil legislation, it is not enforceable by the building official. However, the client can be liable for violations. For the purposes of this review we have focused on MAAB regulations, as they are generally, (not always) more rigorous than the ADA. In the case of conflict we will recommend conformance with the most restrictive of the two codes.

H. Structural Systems - Boston Building Consultants

We have completed our investigation of the existing Reading High School in Reading, MA. We have reviewed the available drawings of the existing buildings, investigated the structures in the field and performed a preliminary structural analysis to accommodate possible future work.

Following is a structural evaluation report of the existing buildings including a description of the as-built structure, observations noted during our site visit and conclusions and recommendations in reference to our observations and the feasibility of renovations and additions.

H1. Original 1952 Buildings

According to the available documents, the original High School design was completed in the spring of 1952 and most likely construction began the same year. The Architect of Record was Adden, Parker, Clinch and Crimp of Boston, MA with Structural Consultant Gilbert Small & Co. According to your key plan, the original building is labeled as follows: Sections A1, A2, A3, A4 and A5. Note that some sections include the original building and new 1969 additions. The structural description, evaluation and recommendations of all five are similar; therefore for brevity and clarity we have combined the executive summary, descriptions and recommendations.

a. Executive Summary

- The existing floors and roofs appear to be structurally sound and capable of supporting the design floor and roof loads for its current and proposed future use. Visible cracking of the interior and exterior masonry walls and concrete foundation walls is due to thermal movements, water absorption and poor control joint detailing and construction. The cracking does not represent settlement; however, the cracks should be repaired and new control joints installed to prevent future water infiltration and additional damage to the masonry, concrete and steel embedded in the walls. Exposed reinforcing at the roof overhangs will require cleaning and a new epoxy coating to prevent further decay

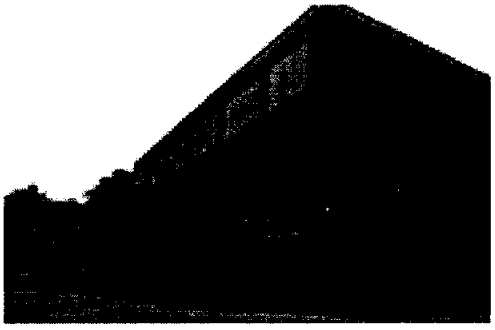
- Buildings in 1952 were not designed or built to resist earthquake loads, however the interior and exterior masonry walls are currently providing lateral resistance. We understand the proposed plan might include minor alterations to existing lateral load resisting elements, there is no change in use, the weight and area of the building will not be increased by more than 10% and all new additions will be structurally isolated. Therefore, in accordance with the State Building Code, the existing building does not need to be upgraded to resist current earthquake loads. Assuming cost of alterations will exceed 50% of the building's assessed value, the Massachusetts State Code requires laterally bracing all interior and exterior masonry walls, bracing the exterior walls at the strip windowsill elevations and bracing the roof parapets to eliminate potential seismic hazards.

- Note that building Sections A1, A2 and A3 are structurally isolated from Sections A3 and A4. Therefore, alterations to lateral force-resisting elements of any one connected section will affect all other connected sections.

b. General Building Description

- Most building sections are two stories above grade with a basement. The gymnasium is a two story high space with a locker room below. The auditorium and cafeteria are two story high spaces with pipe spaces in the basement. The vocational tech area is a single story building with a two-story boiler room in the basement. The balance of the spaces, mostly classrooms are two stories with classrooms

at each level and a basement that is occupied by classrooms and an unexcavated pipe space. There is also the three-story tower at the front (east) elevation.



- The majority of the exterior façade is brick veneer with a concrete masonry backup without an air space. According to the drawings, the brick is toothed to the CMU backup at all header courses. There are operable strip windows with glass block walls at the classroom spaces. The façade at the two front entrances and adjoining offices and the tower is limestone with a masonry backup.

- The roofs are all flat with slight pitches to interior roof drains. Roof elevations vary significantly throughout. The auditorium, cafeteria, classrooms and gymnasium are higher than adjacent roofs, thereby creating areas of potential snowdrift. Roofs at the brick facades overhang the brick approximately 16". There are parapets at the limestone facades.

- The basement (ground floor) is occupied by classroom spaces and pipe spaces in Sections A1, A2, A3 and A4 and by the Boiler room and pipe space in Section A5. The unexcavated pipe spaces with limited headroom and a dirt floor are separated by the occupied spaces by a concrete foundation walls. There is a fan room located below the auditorium stage.

c. Building Structure Description and Observations

- The footings as noted from the original drawings are unreinforced concrete spread footings bearing on natural non-organic soil or ledge with a minimum allowable bearing capacity of 5 tons per square foot. The perimeter and interior foundation walls appear to be a reinforced concrete walls. There did not appear to be any signs of concrete cracking indicative of settlements. Vertical cracks in the exterior foundation walls were noted periodically and the corners of the concrete foundation wall had spalled in a few places.

- The basement (ground floor) occupied classrooms; corridor spaces and the locker/team rooms above pipe spaces are cast in place reinforced concrete two-way flat slabs. Concrete columns and exterior and interior concrete foundation walls support the slab. There is an expansion joint between the basement slab and interior foundation wall located below the auditorium and cafeteria north walls, however the expansion joint is not evident at the first floor. The boiler room floor is an 18" thick concrete mat slab that also servers as the foundation support for the floor and roof structures above. There did not appear to be any obvious signs of cracking or signs of settlements in the slabs, however many of the floors had finishes that may hide cracking.

- The first floor slabs are reinforced cast in place concrete slabs. The heavily loaded slabs, such as the cafeteria, auditorium, original library, laboratory classrooms, offices, gymnasium and vocational wood shop, are concrete flat slabs. Concrete columns at the interior and the exterior along with interior and exterior perimeter concrete walls support the two-way slabs. The lighter loaded spaces, mostly classrooms, are reinforced cast in place concrete joist construction with terra cotta tile infill. Concrete beams, which are supported by concrete columns, support the joist slabs. There did not appear to be any obvious signs of cracking or signs of settlement in the floor slabs.

- The auditorium balcony is constructed with a main steel beam that spans across the width of the auditorium supported by two steel columns located within the auditorium sidewalls and two exposed steel columns in the interior of the auditorium. Five cantilever steel trusses extend from steel columns

hidden within the rear (north) auditorium wall to the main steel beam and cantilever to the edge of the balcony. Spanning between the cantilever steel trusses are sloping and stepped steel purlins that support a stepped concrete balcony slab. There did not appear to be any signs of distress noted in the balcony structure.

- The second floor slab construction, except for the mechanical equipment room in Section A1, is reinforced cast in place concrete joist construction with terra cotta tile infill. Concrete beams, which are supported by concrete columns, support the joist slabs. The mechanical equipment room is a 5" thick reinforced concrete flat slab supported by steel beams that are supported by steel columns. There did not appear to be any signs of distress noted from below, however floor and ceiling finishes inhibited a close inspection of the concrete slabs.

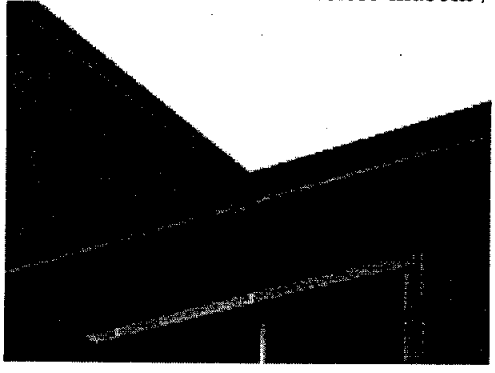
- The roof structure above the auditorium is a 2" lightweight concrete plank deck spanning between steel beam purlins that are spaced approximately 4'-6" on center. The steel purlins are supported by steel trusses that clear span the full width of the auditorium, approximately 73 feet. The steel trusses are spaced at approximately 20 feet on center and are supported at each end by steel wide flange columns that are hidden in the auditorium sidewalls. Diagonal cross bracing below the roof deck provides an acceptable roof diaphragm.

- The roof structure above the gymnasium is a Durisol plank deck spanning between steel beam purlins that are spaced approximately 4'-6" on center. The steel purlins are supported by steel trusses that clear span the full width of the gymnasium, approximately 82 feet. The steel trusses are spaced at approximately 16 feet on center and are supported at each end by steel wide flange columns that are hidden in the auditorium sidewalls. Diagonal cross bracing below the roof deck provides an acceptable roof diaphragm.

- The roof decking above the cafeteria is a poured gypsum acoustic decking that spans approximately 5 feet between steel purlins. Wide flange steel girders spaced 20 feet on center span across the width of the cafeteria support the steel purlin. Four columns, two interior columns within the cafeteria and one steel column in each cafeteria sidewall support the steel girders. Diagonal cross bracing below the roof deck provides an acceptable roof diaphragm.

- The balance of the roofs, i.e. above the classrooms and vocational tech area, are reinforced cast in place concrete joist construction with terra cotta tile infill. Concrete beams, which are supported by concrete columns, support the joist slabs. The concrete roof cantilever and overhangs the veneer approximately 16". We noted reinforcing was exposed and rusted at the underside of the overhangs.

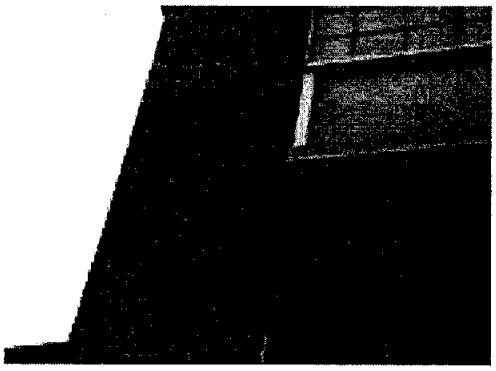
- The exterior walls are non-bearing brick veneer or limestone with a CMU backup. The CMU backup is infilled between the perimeter beams and columns. There is no indication on the drawings, nor was it typical for this era of construction, to provide vertical reinforcement in the exterior masonry walls. Steel angles connected directly to the perimeter concrete beams support the brick veneer above the strip windows and glass block walls. The drawings do not indicate the CMU backup was connected to the concrete columns and there is no indication of a horizontal wall girt at the windowsill elevation of the strip windows. There were no visible control joints in the veneer that has resulted in cracking in a few isolated locations.



- The majority of interior walls are non-bearing CMU and glazed tile infilled between and around the concrete and steel columns and beams. Due to finishes we were unable to determine if the CMU extends to the underside of the floor and roof structure, however a few areas we observed indicated the walls were not laterally tied at the top to the structure. We did not note any masonry control joints. Vertical cracks in the plaster finishes of the classroom demising walls and corridors were noted. The cracks were at mid-length in the demising walls and at approximately 40'-0" on center in the corridor walls.

d. Structural Conclusions And Recommendations

- The floors structures as per the available documents are capable of supporting live loads for classrooms, corridors and open floor plans (i.e. gymnasiums, auditoriums and cafeteria) in accordance with the current building code for new construction. In addition, our observations indicate the floor structures to be structurally sound, free of structural distress and capable of supporting the anticipated live loads. New floor openings are feasible provided new structural reinforcements are provided that conform to the State Building Code for New Construction.



- The roof structures as per the available documents are capable of supporting the basic snow loads in accordance with the current building code for new construction. In addition, the roof areas susceptible to snowdrifts, except adjacent to the Tower, appear to have been designed to accommodate snowdrift. The current building code does not require existing buildings be reinforced for snowdrift requirements, however, we suggest to eliminate a hazardous condition the roof adjacent to the tower be reinforced to support snowdrift loads in accordance with the State Code for new construction.

- Cracking on the underside of the concrete roof overhangs is the result of inadequate concrete cover over the reinforcing. Cleaning the rusted reinforcing and applying a new epoxy protective membrane to the reinforcing to prevent further decay should repair these areas.

- Cracking in the exterior and interior CMU walls is the result of inadequate control joints. Exterior masonry typically has control joints every 20'-0" on center and interior walls every 40'-0" on center in order to relieve stresses induced by thermal movement of the masonry. The as-built CMU did not appear to have any control joints. Therefore, the walls have cracked relieving thermal stresses and creating permanent control joints. The cracked CMU is not a structural concern, however it will allow water to enter the façade uninhibited and may result in damage to the interior structure and steel lintels embedded in the wall. Therefore, the cracked joints should be repaired, new control joints installed and the walls and window openings weatherproofed to prevent water infiltration.

- Vertical cracking in the concrete foundation walls is shrinkage cracking that occurred soon after construction and may have continued due to freeze thaw cycles of water that infiltrates the cracks. Spalling of the concrete at the corners of the foundation wall is the result of brick growth without expansion joints. Brick will expand after construction as it absorbs moisture. Without joints this expansion along with the bond between the brick and the top of the foundation wall, results in cracking and spalling of the outside corner of the foundation wall. The expansion subsides within a year after construction, but freeze thaw cycles of water that infiltrate the initial crack can continue indefinitely.

- At the time of construction the building code did not require a lateral force system to resist earthquake loads. In accordance with the current state Building Code, existing structures do not need to

be capable of resisting an earthquake provided there is no change in use, proposed alterations to an existing structure do not increase the building's weight or area by more than 10%, the alterations do not decrease the structure's seismic resistance and / or the alterations do not result in the creation of an unsafe condition. If the proposed alterations will exceed 50% of the buildings assessed value; the building must comply with Seismic Hazard Category 2, which will require the elimination of all seismic hazards. Elimination of the seismic hazards in this building will include the following:

1. Laterally brace all interior and exterior masonry walls to the floors and roof structure. This is typically accomplished with steel angles spaced approximately 8 feet on center connected to the masonry wall and the floor or roof structure.
2. Laterally brace the exterior walls below the strip windows. This may be accomplished by the addition of horizontal steel girts installed at the windowsill elevation and connected to the existing columns at each end.
3. Laterally brace the masonry parapets. This may be accomplished with horizontal girts at the top of the parapet and diagonal struts attached to the existing roof structure.

- The existing masonry interior and exterior walls are the lateral force-resisting elements for this building; therefore demolition of these walls will result in a decrease in lateral resistance. Reduction of the building's lateral resistance will require the addition of new lateral force resisting elements, such as diagonal bracing or new shear walls, to offset the losses. However, some of the existing walls are 4" masonry, terra cotta and walls that are not tight to the structure, which do not contribute to the lateral force resistance of the building and may be demolished without structural implications. The exact requirements for new lateral force elements cannot be determined until the proposed architectural plans are developed.

- The existing structure must be capable of resisting a minimum wind load regardless of the proposed alterations. Based on our current engineering judgment the existing exterior and interior CMU walls will be adequate to resist the minimum wind load. However, alterations to the masonry walls will adversely affect the lateral resistance of the building and may require new lateral force resisting elements (steel diagonal braces or new shear walls) be added into the project. The exact requirements for new lateral force elements cannot be determined until the proposed architectural plans are developed further.

- The current building code requires verification that the soil supporting the super structure is not susceptible to liquefaction. Based on the allowable soil bearing pressure and our observations, this site is not susceptible to liquefaction.

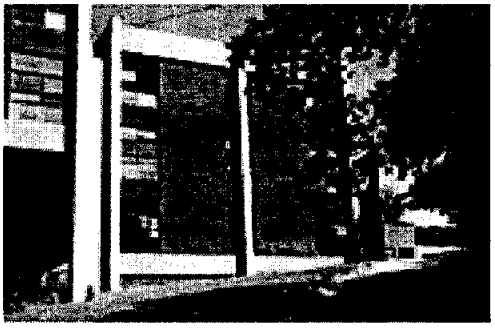
- There is an expansion joint separating Section A3 and A4, however the expansion joint between Sections A1, A2 and A3 is not continuous from the foundations to the roof. Structurally Sections A1, A2 and A3 are laterally connected; therefore, any modifications to the lateral force resisting elements to one section will adversely affect the other.

H2. 1969 Buildings

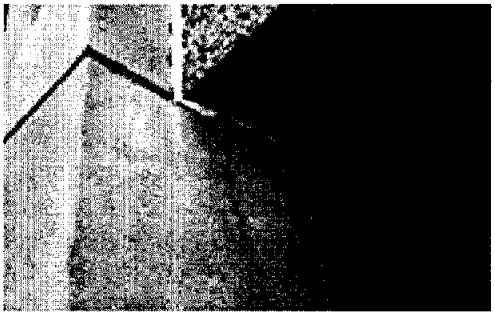
- According to the available documents, the 1969 High School addition design was completed in 1969 According to the available documents, the 1969 High School addition design was completed in 1969 and most likely construction was completed by 1971. The Architect of Record was Stoner Associates of Boston, MA with Mr. Robert Rumpf as the Structural Engineer of Record. The 1969 drawings divided the original building and new additions into nine sections, however, this report includes the labels according to your office as follows: Buildings A1, A2, A3, A4, A5, B and C. Note that some section labels include parts of the original 1952 building and1969 additions. The 1969 structural documents did not include any work within the original buildings, therefore we assume there were

no significant structural alterations to the original building. See the previous section for information regarding the original 1952 building structures.

- This is a multi-story building with a center section and two wings, north and south of the center section. This section also includes the corridor link between sections C and A3 and a locker space adjacent to the Section B media center.



- The center section and the two wings are of varying height. The Superintendent's office on the lower level and classrooms at the ground and first floor level currently occupy the north wing. The north wing roof is approximately at the second floor elevation of center and south wing sections. The locker space and corridor link is one level at the second floor elevation. The floor is elevated, thereby allowing pedestrian and vehicular access under the link and locker space.



- Laboratory and classroom spaces on the ground, first and second floors occupy the center section. Note there is no lower level. The floor plan steps back at the second floor on the east elevation. The setback exposes a Vivarium, greenhouse type structure, at the second floor elevation.

- Classrooms on the ground, first and second floor occupy the south wing. Note there is no lower level.

- The center section ground floor is raised above the finished grade, thereby allowing pedestrian traffic to pass under the structure.

- The exterior façade is brick veneer and precast concrete panels with a concrete masonry backup. There are vertical strip window openings with metal panels a full story, each side of each column line. The north façade of the north wing and the south façade of the south wing are entirely precast panels. The corridor link is precast panels with windows a full story vertical each side of each column. The locker space façade is strip windows with a continuous precast concrete band at the top and bottom of the strip windows.

- The roofs are all flat with slight pitches to interior roof drains. Roof elevations vary throughout. The south wing and the center section (excluding the setback) are at the highest elevation. The north wing, setback roof at the center section, corridor link and locker space roof are approximately at the second floor elevation, thereby creating areas of potential snowdrift. There are approximately 2'-0" high parapets at all roof edges.

- There is a crawl space, accessible outside the Superintendents office, under the north wing.

a. Section B

- Section B is adjacent to the locker space of Section C. The ground floor is occupied by a lecture hall with a sloped / stepped floor in the center and classrooms and storage spaces around the perimeter.

- A reading room of the media center occupies the majority of first floor. Support offices, conference rooms and bathrooms flank the east and west sides of the reading room. A corridor, two egress stairs and bathrooms on the south side of reading room link Section B to the original Section A3.

- A reading room, classrooms and support offices occupy the second floor. The center of the second floor is an atrium open to the first floor reading room. There is an internal stair that connects the first and second floor reading rooms.

- The exterior façade is brick veneer with a CMU backup. There are few punched openings in the exterior façade.

- The roof is flat with interior drains. There is a clerestory above the atrium with a high roof approximately 10'-0" above the adjacent roof. The façade of the clerestory is glass and metal panel.

b. Section A5, Field House

- The field house is occupied by a two-story basketball court with a running track around the perimeter at the first floor level. Adjacent to the two-story court are a lobby and men's locker rooms on the first floor and a viewing balcony, wrestling room and women's locker room on the second floor.

- The exterior façade is brick veneer with a CMU backup to approximately 15'-0" above the first floor and metal and / or precast concrete panels above the brick to the roof elevation.

- The gymnasium roof is above the adjacent support space roof. The difference in roof elevations is approximately 9 feet at the dormers and 24" between the dormers.

c. 1969 Addition Section A1 / A3

- Section A1 / A3 includes a single story cafeteria plus support spaces adjacent to the original kitchen. In addition, Section A1 includes a corridor that links the new cafeteria to the original building Section A3. The 1969 addition also includes a single story incinerator room that is attached to the west end of original building Section A3.

- The exterior façade of the new cafeteria and link west façade are brick veneer with a CMU backup to approximately 4'-0" above the finished floor. Above the brick veneer is a glass curtain wall that extends to the roof. The incinerator building and the link east façade are brick veneer with CMU backup the full height with punched openings.

- Roofs of all sections are flat with interior roof drains. The new and original cafeterias appear to be at similar elevations, however the incinerator roof is well below the adjacent building roof, thereby susceptible to snow drifting.

d. 1969 Section A5 Addition

- 1969 Section A5 addition includes a new boiler room, additional classrooms, garage and a maintenance facility at the ground floor level surrounding the original 1952 Section A5 Vocational Tech building.

- The new boiler room is a single story building with a low roof at the first floor elevation. Additional classrooms occupy the first floor elevation above the ground floor garage, wood shop and maintenance facility.

- The exterior façades in general are brick façades with CMU backup and continuous strip windows, except for the north elevation that has a metal panel façade.

- The roofs are flat with interior roof drains. The roof of the new Boiler room is below the adjacent roof thereby creating a potential snowdrift on the new roof. The roof of the new woodshop is above the original link thereby creating potential snowdrift on the original link roof.

e. 1969 Addition Structure Description:

- The perimeter foundation walls, except at Section B, as noted from the original drawings, are unreinforced concrete spread footings bearing on natural soil or ledge with a minimum allowable bearing capacity of approximately 1.5 to 1.3 tons per square foot. Section B perimeter walls are bearing on reinforced grade beams that span between concrete columns that are bearing on isolated column footings. The interior foundation walls appear to be a reinforced concrete walls with unreinforced continuous concrete footings. Interior columns are bearing on reinforced isolated concrete spread footings.

- There did not appear to be any signs of concrete cracking indicative of settlements. Vertical shrinkage cracks in the exterior foundation wall were noted periodically. A diagonal step crack in the exterior brick veneer of Section B was noted, but the foundation wall was not visible to confirm the crack extends into the concrete.

- Ground floor slabs without crawl spaces are typically 3" concrete slabs on grade. Ground floor slabs with crawl spaces or access below, i.e. north and south wings of Section C, are precast concrete planks supported by the exterior perimeter concrete foundation walls and interior steel beams and columns. There did not appear to be any obvious signs of cracking or signs of settlement in the floor slabs.

- The Lecture Hall in the ground floor of Section B is a 4" minimum stepped concrete slab on grade with wire mesh reinforcing in the bottom and (1) #5 bar at each nosing.

- The first and second floor slabs are 3-1/4" concrete decks slabs on metal form deck supported by steel bar joist spaced 24" on center. Structural steel beams and columns support the steel joists. The heavily loaded slabs in Section A5 maintenance facility and the second floor of Section A5 (Field House) are precast concrete plank floors supported by interior and perimeter structural steel beams and columns. There did not appear to be any obvious signs of cracking or signs of settlement in the floor slabs. However floor and ceiling finishes inhibited a close inspection of the concrete.

- The hanging stair in the interior of the media center (Section B) has been modified by the addition of a floor-mounted support. Perceptible floor vibrations from footfalls on the stair were felt in the first floor media center.

- The roofs of all new structures, except Section A5 field house, are framed with steel bar joists spaced at 4'-0" on center supported by structural steel beams and columns. According to the available documents the roof decks are poured gypsum supported by steel bulb tees that span between the bar joists.

- Section A5, field house, roof is framed with long span structural steel trusses spanning the full width of the field house, approximately 140 feet, supported at each end by structural steel columns. Wide flange steel beam purlins spaced at 8 feet on center span between the trusses. The roof deck is a poured gypsum deck supported by steel bulb tees that span between the steel purlins.

- The roof structures appeared to be sound, however ponding of the older tar and gravel roof was evident three days after a rainfall. In addition, water stains in the ceiling, buckling of the floor tiles, plaster damage and efflorescence on concrete and masonry was evident in the link and locker space of Section C. We would recommend a contingency for damage steel roof deck be included in the project budget.

- The Architectural precast concrete column covers in the link corridor and locker space in Section C have wide vertical cracks along the full height of the column enclosures in the interior spaces. The cracking is less severe, but still evident from the exterior. In addition, buckling of the floor tiles and water damage of the finishes was clearly evident in the interior adjacent to the damaged columns.

- The precast concrete covers around the double column at the expansion joint between Section B and C have a vertical crack the full length of the concrete as noted from the exterior.

- The interior walls are non-bearing CMU and glazed tile infilled between and around the steel columns and beams. Due to ceiling finishes we were unable to determine if all the CMU extends to the underside of the floor and roof structure. We noted in a few isolated areas that the tops of the masonry walls were not laterally tied to the structure. According to the documents, the steel columns abutting masonry were supplied with steel straps, however, it is unclear if the tops and bottoms of the walls were laterally tied to the floor or roof structures.

- Exterior brick masonry veneer walls appear to be supported at each floor level with structural steel relieving angles attached directly to the steel floor beams. The CMU backup is bearing on the floor and is laterally tied to the steel columns. Except at the Field House, Section A5, the drawings do not indicate wall girts were installed at the tops of masonry walls at the sill elevation of the strip windows.

- A stepped diagonal crack was noted on the west elevation of Section B adjacent to Section C. The crack appeared to start at the first floor relieving angle and extend to the foundation. The crack was not evident on the interior CMU backup, nor were settlements noted in the second floor conference room. Cracking of the foundation grade beam could not be inspected due to asphalt paving; however, the paving appeared to have settled slightly.

- The exterior walls of the link corridor between the 1969 cafeteria addition Section A1 and the original Section A3 are deteriorated. Water has infiltrated the wall and deteriorated the mortar and masonry ties.

f. Structural Conclusions And Recommendations

- The floors structures, as per the available documents, are capable of supporting live loads for classrooms, corridors and open floor plans (i.e. media center, gymnasium and cafeteria) in accordance with the current building code for new construction. In addition, our observations indicate the floor structures to be structurally sound, free of distress and capable of supporting the anticipated live loads for its current use and adequate for the proposed alterations.

- The roof structures, per the available documents, are capable of supporting the basic snow loads in accordance with the current building code for new construction. The roof of incinerator room, the new boiler room and the north wing of Section A do not appear to have been designed to accommodate snowdrift. However, the setback roof adjacent to the Vivarium does appear to have been designed to accommodate snowdrifts. The building code at the time of construction did not buildings to be designed for snowdrift. We suggest the areas susceptible to snow drifts be reinforced because in accordance with the current code they pose a potential hazard to public safety.

- The new stair support in the media center has been added recently to reduce vibration in the stair. However, the floor does not appear to have been designed or reinforced for the added stair load. We suggest the hanging stair support be investigated, the current floor support be removed assuming the hangers and their support are adequate and an alternate structural design be developed to reduce the vibrations in the stair.

- Cracking of the precast concrete column covers in Section A is most likely the result of water infiltration from the roof and poor construction and detailing at the windows. The buckling floor tiles, water stains on the ceiling, efflorescence on the concrete and the new PVC roof indicate water had infiltrated the column. The water infiltration most likely rusted the steel column and the precast lateral ties to the column. According to the drawings, the steel column is tight to the inside face of the precast on the interior side and over a foot away from the column on the exterior face. Therefore, rusting of the steel would result in immediate jacking and cracking of the column on the interior, but may be tolerated on the exterior. However, once a crack has formed water can penetrate the concrete and continue to crack from freeze thaw cycles. The roof has been repaired to stop water leakage. The precast column covers are not structural, however, water infiltrating the structure can result in decay to the steel columns and lateral precast ties that are a hazard. Therefore, we suggest the concrete covers be removed and the structure be inspected to determine the extent of damage and a possible repair scheme.

- Water infiltration is prevalent throughout the 1969 building, however damage is not as noticeable as the cracking precast columns. Therefore, we would anticipate and suggest the Owner include adequate contingencies to account for additional water damage that will be discovered during construction.

- Cracking of the precast column cover at Section C as noted from the exterior is the result of parging across the building expansion joint. The expansion joint should be opened and filled with a flexible sealant to allow differential movement between the two independent structures.

- The step crack in the brick veneer of Section B appears to be the result of foundation settlements. The column footing at grid BV7 is undersized for the supported loads. The footing in question supports the floor and roof loads of the locker space in Section A and a significant wall load from the exterior precast wall of the locker space and brick veneer of the media center. We were unable to verify the settlements in the foundations without further digging and investigation, however this area should be exposed to confirm our conclusions.

- Vertical shrinkage cracks in the exterior concrete foundation walls are the result of long concrete wall pours. Concrete will shrink soon after placement and movement due to this shrinkage should be anticipated. If the wall pours exceed recommended length of approximately 40 feet shrinkage cracks will form to relieve stresses. The cracked concrete is not a structural concern, however the cracks will allow water to enter uninhibited and may result in further damage from freeze thaw cycles. Therefore, the cracked joints should be repaired and sealed to prevent water infiltration.

- The exterior wall deterioration of the link in Section A1 should be repaired and rebuilt. It is unclear the full extent of the damage. We suggest further investigation and removal of finishes be done prior to determining an accurate structural assessment and recommendations for this area.

- At the time of construction the building code did not require a lateral force system to resist earthquake loads. In accordance with the current state Building Code, existing structures do not need to be capable of resisting an earthquake provided there is no change in use, proposed alterations to an exist-

ing structure do not increase the building's weight or area by more than 10%, the alterations do not decrease the structure's seismic resistance and / or the alterations do not result in the creation of an unsafe condition. We understand the proposed alterations will exceed 50% of the buildings assessed value; therefore the building must comply with Seismic Hazard Category 2, which will require the elimination of all seismic hazards. The seismic hazards in this building include the following:

1. Laterally brace all interior and exterior masonry walls to the floors and roof structure. This is typically accomplished with steel angles spaced approximately 8 feet on center connected to the masonry wall and the floor or roof structure.
2. Laterally brace the exterior walls below the strip windows. This may be accomplished by the addition of horizontal steel girt installed at the windowsill elevation and connected to the existing columns at each end.
3. Parapets in the 1969 building appear to be laterally braced therefore new structural reinforcements will not be required.
4. Anchor all precast elements to the structure. The available documents indicate adequate lateral ties, however the cracking in the precast indicates deterioration that should be investigated and reinforced if necessary.

- The existing masonry interior and exterior walls are the lateral force-resisting element for this building; therefore demolition of these walls will result in a decrease in lateral resistance. Reduction of the buildings lateral resistance will require the addition of new lateral force resisting elements, such as diagonal bracing or new shear walls, to offset the losses. However, some the existing walls are 4" masonry and walls that are not tight to the structure that do not contribute to the lateral force resistance of the building and may be demolished without structural implications, but will require lateral bracing at the tops of the walls. The exact requirements for new lateral force elements cannot be determined until the proposed architectural plans are developed further.

- The existing structure must be capable of resisting a minimum wind load regardless of the proposed alterations. Based on our current engineering judgment the existing exterior and interior CMU walls will be adequate to resist the minimum wind load. However, alterations to the masonry walls will adversely affect the lateral resistance of the building and may require new lateral force resisting elements (steel diagonal braces or new shear walls) be added into the project. The exact requirements for new lateral force elements cannot be determined until the proposed architectural plans are developed further.

- The current building code requires verification that the soil supporting the super structure is not susceptible to liquefaction. Based on the allowable soil bearing pressure and our observations of the site the soil is not susceptible to liquefaction.

H3. Proposed New Additions

All new additions should be isolated from the existing building structures whereby lateral wind and earthquake loads are not transmitted from the new building to the existing. However, new additions may be connected to existing structures without adverse affects on the existing lateral-force resisting elements if the additions do not increase the existing building's area or weight by more than 10%.

I. Mechanical, Electrical and Plumbing Systems - TMP Consulting Engineers, Inc.

Summary

- The following report discusses the existing conditions of the Mechanical, Electrical, Plumbing and Fire Protection systems within the Reading Memorial High School.

  This assessment is based upon meetings with facility personnel, site visits on 06/25/02, 07/16/02, and 07/23/02, as well as a review of the existing plans that have been made available. This includes the 1969 addition plans, and some of the 1952 plans.

  The School is made up of approximately 325,000 gsf, which consists of 153,000 square feet for the original 1952 construction and an additional 172,000 square feet from the 1969 Work.

Heating Ventilating and Air Conditioning

- The heating system is a combination of low pressure steam and hot water (hydronic). In general, the original 1952 construction is served by the steam system and the 1969 additions are served by the hot water system. With proper steam trap maintenance and positive results from pipe testing, this dual system can be maintained.

- The boilers are new (1995-1998) and can last at least 20 years with proper maintenance. The fuel source is #4 oil from a 30,000 gallon underground fuel oil tank installed in 1969. The school should convert to natural gas or install low NOX burners. Future use of the underground storage tank is per the Reading Fire Marshall's approval.

- A past report mentioned a possible need for another boiler. Future plans will determine this need.

- The (1995-1998) classroom unit ventilators should function for another 15-25 years dependant upon yearly maintenance. The 1969 vintage hot water unit ventilators should be replaced. All other ventilation equipment (H&V Units and Fans) is original 1952 and 1969 and should also be replaced.

- The Building Automatic Temperature Control (ATC) system should be upgraded to new tech-nology.

a. General

- This HVAC report is based on site visits made on July 16 and 25, 2002, as well as a review of the original plans H-1 through H-10 dated May 20, 1952 and the 1969 Addition plans, H-1 through H-19, dated 9-15-69. Plans for the 1995-1998 renovations were not available. TMP also met with Dominic Cacciapouti, the acting Director of Facilities, and Steve Mitton from INVENSYS.

b. Heating

- The Reading Memorial High School (RMHS) is heated by (2) large steel fire tube low pressure steam boilers located in the original (1952) Boiler Room in area "A5".

- Boiler # 1 was installed in the summer of 1995. The boiler is a Superior boiler model "MS6-X-1000-S15-100F-A5", sold to Industrial Combustion (IC), who packaged their burner with the boiler and sold it to Reading under the "Highlander" name. The Highlander boiler is a "Scotch Marine" wet back type rated at 200 boiler horsepower, with (86) 2-1/2" tubes. The IC burner is a model MM-84P, which utilizes #4 oil and has full modulation control capability and natural gas pilot.

- Boiler # 2 was installed in 1998. This boiler is a packaged steel fire tube boiler from Cleaver-Brooks, model CB-200. This boiler is also rated at 200 horsepower. The forced draft burner, configured to fire #4 oil, also has full modulation control and natural gas ignition.

- These boilers provide the equivalent of approximately 40 BTUH per S.F. of heating for the facil-ity. TMP's experience with school construction indicates this is consistent with other schools.

- A new condensate receiver, with triplex boiler feed pumps, was installed with the new boilers. (Pump #1 serves Boiler #1, Pump # 2 serves Boiler # 2, and Pump # 3 acts as a standby for either P-1 or P-2.) There is also a vacuum feed pump located in this boiler room that might serve the domestic hot water system (see below).

- The breeching from the boilers is new, double-walled and was installed with the boilers. The breeching runs to the existing chimney (1952), located in the northwest corner of the Boiler Room. The condition of the chimney is unknown and should be tested prior to the final report.

- The #4 fuel oil is stored in an underground 30,000 gallon storage tank installed during the 1969 addition construction. The existing tank is inspected and pressure tests every two years and the certificates are on file with the Reading Fire Department. A duplex fuel oil transfer pump system is located in the northwest corner of the 1969 Boiler Room building addition to area "A5". The # 4 oil is pumped to the new boilers that have been provided with electric heaters at the burners to maintain oil flow during the cold winter months. The original 1952 fuel oil pump set is abandoned in the southwest corner of the 1952 Boiler Room near the electric switchgear.

- As mentioned above, there are two (2) Boiler Rooms in RMHS. The first was built in 1952 during the initial construction of the school and houses the newer steam fire tube boilers described above. The second Boiler Room was built in 1969 and houses (3) abandoned (moth-balled) cast iron sectional H.B. Smith boilers. These (3) boilers generated hot water to provide the heating for the new additions indicated on the 1969 plans. There are (5) (original 1969) circulating pumps located in the 1969 Boiler Room. They are still in use and serve (3) zones.

- Zone 1 is the Field House and is served by Pumps P-1 and P-2. (P-2 is a stand-by for P-1). P-1 supplies 225 GPM of hot water at 90' head pressure and has a 10HP, 208 volt, 3 phase motor. The piping loop is direct buried between the Boiler Room and the Field House.

- Zone 2 is the 1969 addition indicated as areas "B" and "C". Pump P-3 serves Zone 2 and supplies 350 GPM of hot water at 110' head pressure and has a 15 HP, 208 volt, 3 phase motor. The piping loop is direct buried between the Boiler Room and the crawl space "C".

- Zone 3 is the addition indicated as area "A1" (the Cafeteria addition and "new" kitchen) and also the Industrial Arts addition to the original Boiler Room (area "A5"). Pump P-5 serves Zone 3 and supplies 225 GPM of hot water at 134' head pressure and has a 15 HP, 208 volt, 3 phase motor. The piping loop runs through the 1952 building crawl spaces.

- Pump P-4 serves as a stand-by for Pump P-3 or P-5.

- The new fire tube boilers supply steam to the original 1952 buildings ("A2", "A3", "A4", and partial "A5") and to a steam-to-hot water converter installed in 1995. This converter is also located in the 1952 Boiler Room section of "A5". Hot water is supplied to the original (5) pumps located in the 1969 Boiler Room section of "A5". Expansion tanks, air separator and all hot water specialties are original to the 1969 construction. The fire tube boilers also supply steam to four domestic hot water storage heaters. (For information on these storage tanks refer to the Plumbing Section of this report.)

- The steam and hot water is distributed throughout the buildings via a series of crawl spaces and underground direct buried piping. Original hazardous piping insulation has been removed from most of the

piping with the exception of pipes located within the crawl spaces. Equipment and some piping within the boiler rooms have not been re-insulated after the abatement.

- Heating for the classrooms, in the 1969 addition indicated as area "C" (Zone # 2) is via hot water classroom unit ventilators and finned tube radiation. This wing houses the Math and Science classrooms and has a crawl space under most of the building for hot water distribution to the Ground Floor equipment. Piping loops at the ceiling of each floor serve the floor above i.e., Ground Floor piping serves the First Floor, First Floor piping serves the Second Floor equipment. This equipment is original 1969.

- Heating for the Library and Lecture Hall wing (area "B"), also Zone # 2, is via duct mounted re-heat coils, which are served by (3) H&V units. One unit serves the Lecture Hall and (2) units serve the Library areas. These units are located on the Ground Floor.

- Heating for the detached Field House addition, Zone # 1, is via a direct buried hot water piping loop which serves finned tube radiation at exterior walls, cabinet unit heaters in entryways and coils in the Field House H&V units.

- Heating for the Cafeteria addition and Kitchen (area "A1") is hot water piped to unit ventilators, finned tube radiation, cabinet unit heaters and a hot water coil in the Kitchen make up air H&V unit. This equipment is original to 1969 and is part of the Zone # 3 hot water system.

- The existing (1952) Cafeteria is heated via steam unit ventilators. These UV's were replaced in 1995-1998, at the same time the fire tube boilers were installed.

- The Classroom wing, between "A1" and "A3" overlooking the Courtyard and adjacent to the Cafeteria, is original 1952 construction and is heated by low pressure steam piped to classroom unit ventilators. These UV's have also been replaced during the 1995-1998 renovations. The existing 1952 supplemental heat, steam convectors, was left in place in the classrooms. Existing (1952) stairwell steam finned tube radiation and convectors remain.

- The wing indicated as "A2" is the original 1952 Auditorium and is still utilized as such. The heat for this section is steam. The Auditorium, Dressing Rooms, and Music Practice Rooms have original convectors and a 1995-1998 classroom unit ventilator. Two H&V units are located in the "Fan Room" below the stage. These units serve the Auditorium.

- Area "A3" is original 1952 and houses the Main Entry (Lobby), Administration Offices, Health Suite and miscellaneous classrooms. This area is heated via low pressure steam finned tube radiation, convectors and classroom unit ventilators. The UV's were replaced during 1995-1998, as well as some of the finned tube radiation on the First Floor. Existing (1952) convectors, and cabinet unit heaters in the stairwell and entries, remain.

- Area "A4" is original 1952 construction. This area houses the Girl's Locker Rooms and a Gymnasium. The heating medium is steam, piped to unit ventilators, which were replaced in 1995-1998. Supplemental convectors for heat and finned tube radiation are original to 1952. Two H7V u nits (steam) are located in a Fan Room at the Upper Level of the Gymnasium.

- Area "A5" as discussed earlier, houses the (2) Boiler Rooms and the Industrial Arts addition constructed in 1969. The addition is part of Zone # 3 and is served by the hot water system. The finned tube radiation, unit heaters, H&V units and classroom unit ventilators are original 1969.

- The heating equipment indicated on the original plans for the toilets has been removed due to vandalism.

c. Ventilation

- Ventilation air for all classrooms is via the floor mounted unit ventilators. The unit ventilators are connected to exterior wall louvers through a series of various details based on the architectural configuration of the area. Exhaust air is via shafts to roof mounted exhaust fans, which are original to 1952 and 1969.
- The Cafeteria ventilation is similar to that of the classrooms – floor mounted unit ventilators connected to exterior wall louvers, with roof mounted exhaust fans. The Kitchen cooking hood and associated exhaust fan is original 1969. This hood exhaust fan is located in a fan room over the corridor adjacent to the Auditorium on the Second Floor. The exhaust is ducted to an exterior wall mounted louver.

- Large areas, such as the Auditorium, Gymnasium, Field House, Library, and Lecture Hall, have been provided with H&V (heating and ventilating) units for ventilation requirements. Exhaust fans relieve the pressure and exhaust areas such as the Locker Rooms, Weight Room, Toilets and Janitor Closets. The units are all original equipment, vintage 1952, 1969. The existing equipment has reached the end of its useful life. All ventilation equipment, i.e. fans, H&V units should be replaced.

- There is no mechanical ventilation provided for the Administrative Offices, Health Suite, and Guidance areas. These areas must rely on operable windows for fresh air. This is problematic in winter.

- The corridors also have no ventilation.

d. Air Conditioning

- There is no central air conditioning at the RMHS. Miscellaneous window units provide cooling for Offices. There is a condensing unit suspended from the outside wall of the Library. The Library Offices and TV Studio were not accessible at the time of the site visits. TMP will investigate this unit for capacity and function for the Design Development Phase.

e. Temperature Control

- The automatic temperature control system is pneumatic. An existing (1969) air compressor is located in the 1952 Boiler Room and was probably replaced during the 1969 renovations. A second compressor has recently been added in the area below the Auditorium (referred to as the Civil Defense Area by school personnel). This compressor was added to supplement the control system at the furthest end of the high school.

- The boilers have their own packaged controls and operate as lead/ lag unless it is very cold, at which time both boilers are required. A three way valve in the hot water system provides hot water temperature reset control based on outdoor temperatures.

- Pneumatic thermostats in each classroom control the unit ventilators and interlocked fresh air dampers. A time clock provides for night temperature set back – occupied / unoccupied control.

- Space thermostats control the re-heat coils in the ductwork in the Library and Lecture Hall.

- At the present time, RMHS has signed a contract with INVENSYS Controls (formerly SEIBE Controls) to maintain and operate the school. Steve Mitton is assigned to the school full time and is on site every day to check on equipment, and provide maintenance as needed. INVENSYS has replaced some malfunctioning control valves, performed some steam trap maintenance, replaced motors in non-functioning equipment and acted as a building operator.

f. Miscellaneous

- A separate 500 gallon diesel fuel oil tank is located in the area between the two boiler rooms. This tank serves the existing emergency generator and appears to be about 5 – 10 years old. The tank installation should be upgraded to present codes and as directed by the Reading Fire Department.

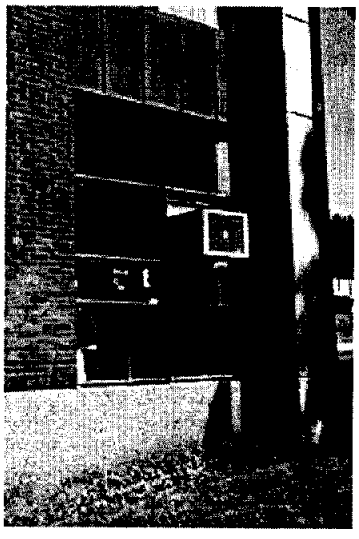
- The Industrial Arts program, as originally configured, has a dust collection system, which appears to be abandoned in place. The unit is not operational.

- Air quality testing has been performed in the past, when complaints have been received. No specific problems were detected, but a full testing of the school should be performed in the Fall as described in Part IV.

- Boiler Room ventilation and water treatment need to be provided for the steam and hot water systems.

g. Conclusions and Recommendations

- The heating plant is in fairly good shape. Much of the central plant steam equipment and some of the terminal units have been recently replaced. The remaining 1969 and older equipment, such as the hot water pumps and associated valves and fittings, should be replaced. The expansion tanks should be replaced. This equipment is 30 years old and has reached the end of useful life expectancy (based on ASHRAE published information). The new hot water equipment should be moved into the existing 1952 Boiler Room. The Boiler Room can then be consolidated into the 1952 space. The 1969 addition space can be freed up for other uses. The boilers should be converted to natural gas, or provided with new low NOX (pollution control) burners. The existing chimney should be inspected and approved for use by the Reading Fire Marshal.



- The ventilation system, all original 1952 and 1969 fans and H&V units, have reached the end of their useful life and should be replaced with more efficient equipment. Cooling (air conditioning) should be provided for the Library / Lecture Hall units. Cooling for the Auditorium and Cafeteria should be considered. All interior spaces should be provided with Massachusetts Building Code required ventilation. TMP recommends cooling be provided as well. Toilet ventilation and Corridor ventilation must be upgraded to meet new code requirements. Indoor air quality testing should be performed in the Fall when students and faculty return to determine any additional ventilation requirements.

- The original steam piping is 50 years old and should be performance tested to determine a reasonable remaining "life expectancy". If corrosion inside the pipe is shown to be extensive, this pipe loop should be replaced. Damage to the building structure and the cost of continued maintenance on a leaking pipe system should be considered.

- The building automatic temperature control system should be updated to the newest technology the Town of Reading can afford. An Energy Management / Building Management system should be installed. The cost of energy will only get higher. The RMHS building efficiency should be improved to reduce future operation costs. There are rebate programs offered by utility companies, which might provide monies for some of the recommended improvements. This should be investigated during the design phase.

Fire Protection

- There are no "sprinkler" or standpipe systems evident in the building, and the existing water service into the building would not support such systems, and a new water service (in a new location) would be required.

- The 1969 drawings indicate a CO2 system serving the kitchen exhaust hood and associated ductwork. This system is active and is tested once a year.

Conclusions and Recommendations

- If the renovation scheme turns out to be "substantial", according to Article 34 of the Massachusetts Building Code, those substantially renovated areas would be required to be sprinkled. Under such conditions, the entire facility should be sprinklered.

- If the cost of the sprinkler system was "low", relative to the total cost of the renovation work, it would trigger this code requirement. There is no "defined" percentage trigger however, costs less than 10%, or so, are usually considered low.

- A sprinkler system could also be triggered by any of the following issues:
  1. Owner's desire.
  2. Fire Department requirement. To be discussed with the Reading Fire Department, including Article 26G.

Plumbing

- The plumbing systems are 50 years old in the original portions of the facility, and are "at or beyond" their useful life. Items that are retained in any renovation scheme, will require a dedicated maintenance budget that will increase each year.

- Piping is corroding and exhibiting leaks; valves are not very accessible, and are not reliable for positive shutoff; and fixtures are antiquated, generally not accessible to the disabled and do not meet any of the water conservation goals of the current codes.

- The condition of the central domestic water heating plant is deplorable, Facilities has reported elevated and dangerous temperature conditions at the (remote) Food Handling area. Temperatures beyond the code level of 120° F can cause scalding and skin burns.

a. General

- This write-up is based on site visits and a review of existing addition Design Drawings P-1 through P-16, dated 9/15/69, and original drawings P-1 through P-10 dated 5/20/58. In addition, there is information herein from Watson Plumbing & Heating, a local Contractor who has done work over the years on the plumbing systems. A wall plaque in the corridor lists building areas as 153,000 SF for the 1952 building and 172,000 SF for the 1969 additions. The crawl spaces were not surveyed due to the reported presence of hazardous insulation.

b. Roof Storm Water

- The roof storm water systems are piped from roof drain inlets and appear to be separate from the building sanitary systems. The Site Utilities Plan (U-1) indicates most drains leaving to the west (rear) of the main building.

- All storm appears to leave the facility by gravity.

- The (1969) Plumbing Specification indicates the use of extra heavy cast iron pipe and fittings, bell and spigot, with neoprene gaskets.

- Input from Watson Plumbing & Heating indicates that any problems with the storm system are sporadic, and not perceived to be excessive.

c. Sanitary

- Building sanitary systems appear to be piped separately from the storm systems.

- The drawings and specifications indicate a separate (glass/durion) "acid waste piping system" from the Science areas in Unit "C". This is piped through an outside "dilution chamber" and then into the sanitary sewer system. Without chemical usage lists from the Science Department, we would default to assuming that chemical treatment and PH adjustment equipment would be required in a renovation.

- There is an outside "Gasoline Trap" (outside Unit "A5"), which was added with the 1969 Work. This appears to take the drainage from the two "garage areas", with the discharge connecting to the existing sanitary system. The 1952 drawings also indicate an "inside" gasoline trap, also in Unit "A5". This appears to have been retained with the 1969 work, but with piping connecting to only one floor drain from one original garage area on the first floor. These devices must be cleaned out during construction, if these building areas remain part of the project.

- The (1969) drawings indicate that the Kitchen is not piped with a dedicated grease waste piping system. Kitchen drains and waste inlets, therefore, tie into the building's "general sanitary system" in that portion of the building. There are two "point-of-use" grease traps denoted on the 1969 plans; one for the pot sinks and one for drainage from the dishwasher conveyer tray. Note: One point-of-use grease trap is required by code. A central system is not specifically required by code, but is good engineering practice and would help keep grease out of the piping system and the Town's Treatment Plant.

- There are two "drip sinks" in the unabated crawl space. One takes the indirect wastes from various Kitchen equipment and the other is located in "A1", and appears to serve the drainage from Biology Room aquariums.

- The (1969) drawings indicate all sanitary lines leaving the building by gravity, without pumping.

- School facilities and Watson Brothers Plumbing reported that there have been some problems with sanitary lines in the crawl spaces. It is difficult to connect to the lines due to deterioration and some piping (5' and 10' here and there) has been replaced. It is possible that this deterioration could have been contributed to by the town water system; well water, which was "aggressive" (corrosive) for so many years prior to the upgrades to the water treatment plant in the early 90's.

- Piping is indicated in the (1969) specifications to be extra heavy cast iron pipe and fittings for all buried lines and all lines above grade 3" and larger in size. Watson Brothers Plumbing Contractors have indicated that there are a lot of blockage, corrosion, and leak problems with drainage piping from the urinals, and their associated "stacks", especially in the 1952 building. Without the original specifications, we are not sure of the materials used, or of the reason for failure. Drains and stacks serving the drinking fountains are also reported to be in poor condition.

- Floor drains do not have any automatic trap primers and need to be "manually" primed to maintain sanitary water seals.

d. Natural Gas

- The school has a small gas service (3" ±) with three inside meters, located in the original Boiler Room. There is a regulator that is vented to the outside. The pressure is adequate for the devices served and the incoming pressure is not known. However, it is preferable to located these regulators (and meters) outside.

- Gas currently serves: Cooking, the Science Room gas cock outlets, pilots on the heating boilers and the "summer" domestic water boiler. Gas is also piped to some ranges in the old Home Economics areas in Units "A1" and "A5", but these are no longer used. There are also two (2) old gas incinerators that are no longer used; one on the lower level of Unit "A4" and one on the first floor of Unit "A1". These unused devices result in abandoned gas pipe runouts, which are actually 'live'!

- The existing gas service would not support a conversion to gas for building heating. It is reported that a new line was put in Birch Meadow Drive, when gas was upgraded for the YMCA, Coolidge Middle and the Elementary School. The Town Manager and Superintendent of Schools made arrangements with the Gas Company so that the line would be sized to also handle the gas conversion expectations for the High School. Any new designs will review all loads and pressures with the Gas Company.

- Gas for the 1969 Science areas is indicated on the drawings as being piped through "Master Gas Shut-Off Valves" (MGV's). However, it appears that the original "open" room configuration was changed, at some point, by adding corridors/walls. This puts some of the MGV's "outside" of the actual class-room spaces that are being served. In addition, some spaces are indicated as not having MGV's.

- Piping is indicated in the (1969) specifications as being "black steel", threaded malleable iron with screwed joints, and was noted as such in the Boiler Room.

e. Domestic Water

- There is a 6" water service from (an 8" line in) Oakland Drive. There was no access to the domestic water service entry - locked access panel to the crawl space. This is reported to be metered, with the meter located in the crawl space of Unit "A3", toward the front of the building (Oakland Drive). It is assumed to be the original meter and valving (1952).

- The main water distribution, and original valving, is located in the pipe space below Unit "A3". The main (5" and 6") domestic cold water lines are indicated as being "cement lined cast iron".

- The size of the water mains in the surrounding streets, looping and pressure characteristics are not known. Approval for water flow tests is being pursued and should be scheduled in the near future.

- The Specifications indicate gate type valves were to be installed. These are, for the most part, original. When replacements have been done over time, ball valves have been utilized.

- The 1969 specifications call for air chambers and shock absorbers on the domestic water systems, to handle shock from water hammer. Access to shock absorbers was not found. The 1952 piping systems are assumed to contain only (inoperative) air columns/chambers, at the top of the risers. The only reported problems of this nature were noted in the Kitchen area; piping shaking/rattling due to quick-closing valves.

- Most threaded outlets (hose bibbs, sill cocks, service sinks, etc.) do not contain vacuum breakers, and are piped from the building's potable water system. The dishwasher does not have backflow protection.

- Science areas are fed from the "potable" water systems. Renovation would require that these be fed from reduced pressure backflow preventers.

- The domestic water piping is indicated in the (1969) Specifications to be copper, with 95/5 soldered joints. The original (1952) domestic water piping is stated by Watson Brothers to also be copper, but would be assumed to be made up with 50/50 lead solder joints. Pipe joints are occasionally beginning to exhibit leak problems.

- The (1969) drawings indicate that the Field House is fed from buried CW, HW and HWC piping from Unit "A5".

f. Domestic Hot Water

- Domestic hot water is produced in two, 1969 vintage heaters, for the Field House and the Girls Locker/Showers and, in two original 1952 vintage heaters, for the remainder of the facility. Both systems are horizontal, steam-to-water storage type heaters. The only reported problems are with some corrosion/weeping at the steam bundles. Note: we woul not recommend bundle replacement on tanks this old, rather total replacement.

- During the summer months, there is a gas-fired domestic water boiler, which generates domestic hot water. Typically, one horizontal heater (in each of the two systems) is valved off, utilizing just one tank (per system) during this off-season period. It is reported that there are fewer "cross-flow temperature" problems when the summer boiler is used, as versus the steam heating boilers; and that the summer boiler is run "most of the time" now. The reason for this is unknown.

- For the original 1952 areas, there are two old (non-working) base-mounted, domestic water circulators, and a mixing valve, which existed in 1969 and was reused. It was reported that there are problems with hot water at the (remote) Kitchen, and that the circulators have not been operable for quite some time. One circulator has been removed and is being re-built. Due to this, it is reported that domestic hot water is generated at high temperatures, up to 180°F, to attempt to compensate for the circulation problems and shortages, yet still provide proper water temperatures at the Kitchen. This is reported to be causing temperature "cross-flow" problems at sinks, etc., with hot water coming from cold water taps. This would be an expected problem for this type of high temperature condition, since faucets are not thermostatic devices and cannot mix enough cold water to temper water that is that hot. This would not be permitted under the code for new construction. This is currently a safety concern.

- There is an electric, 54kW (Hubbel) booster heater in the Kitchen at the dishwasher.

- Domestic hot water and recirculation lines feed the showers in the Field House through buried piping. Facilities reports that there has been a shortage of HW in the Field House. Steve Mitton of Invensys reported that there have been problems with the circulation pump on this system that could be the reason for the hot water issues.

- In the Field House, (Boys) column showers are fed with tempered water from master mixing valves. One column in each shower area is fed with hot and cold water, for manual mixing at the shower valves.

- The domestic hot water systems do not contain expansion tanks.

- Emergency showers and eyewash units are not piped with tempered water, as would be required by code for new construction.

- In the Unit "A4" (Girls) locker/shower area, showers are shown to be fed with hot and cold water, for manual mixing at the shower valves.

g. Fixtures

- The fixtures that were installed in 1969 will be almost 40 years old when any renovations are complete, offer minimal accessibility, do not meet ADA and would not meet the water conservation requirements of the present Plumbing Code. Water closets are estimated to use 3.5 gpf.

- The 1969 Work "reused" most of the toilet fixtures that existing in the 1952 portions of the building; removing some water closets, and resetting a couple of urinals to offer (minimal) accessibility. These fixtures are antiquated and have an even higher water usage (possibly up to 5.6 gpf for water closets) than the 1969 fixtures.

- A renovation will require code compliance with the current code regarding fixture quantities. Current codes would generally require more water closets and lavatories, especially for women, but less urinals.

- Existing fixtures are as follows:
    1. 1952 areas
        a. Water Closets - Floor-mounted, floor-outlet, elongated, flush valve, white, open-front seat w/o cover.
        b. Urinals - Wall-hung, extended side shields (w/o vanity shields), top spud, flush valve.
        c. Lavatories - Wall-hung (on wall hanger?), 20 X 18 with high back, vitreous china, faucet on 4" centers (not metering or temperature limiting).
        d. Drinking Fountains - China, recessed.
    2. 1969 areas
        a. Water Closets - Wall hung, elongated, flush valve, white open-front seat w/o cover.
        b. Urinals - Wall-hung, top spud, flush valve.
        c. Lavatories - Wall-hung (on wall hanger?), 20 X 18, vitreous china, (not metering or temperature limiting).
        d. Showers
            i. Boys - Column style, tempered water and mixing types.
            ii. Girls - Cubicle style, mixing style.
        e. There are no accessible sinks in the Science areas.

h. Miscellaneous

- In the crawl space of Unit "A2" (Auditorium), near Stair #2, there is a concrete structure that used to have a sump pump. The 1952 drawings indicate that this received the drainage from the 1952 Elevator Pit as well as a floor drain below Stair #2, with discharge to the sanitary system. The discharge piping was not evident and appears that there is no longer an operable pump.

- The Water Department tests water lead levels once or twice a year. There was a time, 7-8 years ago, when the school was told to open a faucet every morning and let it run for a while. This issue seems to have been resolved, as they are not asked to do this any longer. Facilitie reports that this issue is resolved.

- The Town has a "once-a-year" backflow preventer testing program.

- There are two toilets on the lowest level of Unit "A3" that have been closed off for about 10 years. There are reported to be cracked fixtures, sinks not working, etc. Fixtures remain and traps are (manually) primed with a non-evaporating solution.

- There are problems in the Boiler Room with old valves that do not operate properly or provide for positive shut-off.

- There is a sump receiver in the original Boiler Room, which is indicated on the 1952 plans to take the drainage from the floor drains in the room, and discharge to the buried sanitary system.

- The 1952 drawings indicate a boiler "blow-off" tank in the Boiler Room, with a cold water connection for cooling the boiler blow-down condensate prior to discharging to the sanitary system. It is not known if this is still utilized.

- Domestic water piping for the 1969 additions was run through the crawl spaces for Units "B1"& "C" and underground to the Field House.

i. Conclusions and Recommendations

- The roof drains and storm water piping from the 1952 portions of the facility are 50 years old, and will be nearing the end of their useful life. In a renovation mode, we would recommend replacing all piping and accessories above grade. Below grade/horizontal crawl space piping may be able to be reused, pending size, location, conditions and invert. Test samples may help with a decision.

- The building sanitary/waste systems are reported to be in a deteriorated condition, such that making new connections to the existing piping is difficult. Some sections have been replaced. We understand that this is mainly horizontal, extra-heavy cast iron piping in crawl-space type areas. Since this piping has been here for 50 years, it is possible that the deterioration was mainly due to the "hardness/aggressive" nature of the Town's well water over the years. This is believed not to be the case now, with the improvements to the water treatment plant over the last 15 years or so. A complete replacement should be anticipated for any major renovation scheme.

- The Kitchen does not have a dedicated "Grease Waste" piping system. If upgrades to the Food Handling areas were more than modest, we would recommend a dedicated piping system.

- The locations and number of "Master Gas Valves" (for shut-off in the Science Rooms) are not adequate and do not meet code. Revisions to these devices would be required, even in a minor renovation scheme.

- Since there are some old gas-fired devices, which remain in place but are no longer used (stoves, incinerators, etc.), there may be abandoned gas lines that are "live"! All abandoned/live gas lines would be removed and capped back at "active" mains.

- The existing domestic water service entry, meter and valving, is old original equipment with minimal accessibility. This should be replaced, along with the service entry piping.

- Valves from the 1952 systems are near, at or beyond the end of their useful life. In addition, many are located in crawl spaces that offer difficult access for usage. As a minimum, all valves should be replaced. How-ever, complete new distribution water piping should be provided for all 1952 areas of the facility.

- Piping to the 1952 toilet areas contains only "air chambers" as a means of controlling water hammer. Access to shock absorbers for the 1969 toilet areas was not evident. Shock absorbers would need to be incorporated in any toilet renovation work.

- There are many threaded type outlets in the domestic water systems that are not protected with vacuum breakers, as well as the dishwasher, which also does not have backflow protection. These devices are required for safety and public health reasons, and should be done regardless of any particular renovation scheme.

- The domestic hot water heaters, pumps, and mixing valves are near the end of their useful life, and are recommended for replacement.

- The domestic hot water recirculation system is basically inoperable (for the Main Building). This results in inadequate hot water, elevating domestic water temperatures, dangerous high temperature "cross-flow" conditions at sinks, etc. As a "temporary" solution, until the renovations are incorporated, the Owner may want to consider installing a dedicated water heater at the Kitchen, exclusively for the Kitchen. Note: Recirculation is required by current code.

- There is a reported shortage of domestic hot water in the Field House also. This is believed to have been caused by (electrical) problems in the circulator, as opposed to system under sizing.

- Emergency showers and eyewash units are not provided with tempered water. Mixing valves would be required under any renovation scheme involving the Science areas, by code.

- Plumbing fixtures are 33 and 50 years old, offer minimal accessibility, and do not meet the water conservation requirements of the current plumbing code. All toilets and fixtures in the 1952 areas are recommended for a complete upgrade and replacement. Toilets in the 1969 portions could probably be renovated, if supplemented with proper ADA accessible fixtures.

Electrical

a. Summary

The existing electrical systems in the 1952 original building and the 1969 additions are generally original building materials, which visually appeared to be installed in conformance with the applicable code requirements and electrical practices at the time of installation.

Massachusetts Electric Code, NFPA Standards, Massachusetts State Building Code, and Life Safety re-quirements relating to educational facilities, including ADA regulations, necessitate replacement or up-grading of affected normal and emergency power distribution systems, fire alarm and emergency lighting, and exit sign systems. Lighting control systems and new lighting for energy savings, communication systems, and building security system demands of today's educational facilities warrant the replacement/renovation or installation of these systems as well.

Therefore, it is TMP's recommendation that, in order for this School to provide enhanced educational opportunities in a safe, well lighted, and pleasant environment, replacement or upgrading most of the existing electrical systems will be a fundamental requirement.

Priority Electrical Issues:

1. (Highest) Replace non-code compliant fire alarm system.
2. (Highest) Replace emergency generator and modify emergency power distribution system into Life Safety Branch and Standby Branch in accordance with Massachusetts State Electric Code.
3. (Lower Priority) Replace unit substations and upgrade normal power distribution system for enhanced data technology systems and mechanical system replacement and upgrade for Air Conditioning.

4. (Lower Priority) Replace building lighting systems with new energy efficient lighting fixtures and controls.
5. (Lowest Priority) Ugrade site lighting.
6. (Lowest Priority) Replace building communications and security systems.

b. General

- This existing Electrical Conditions Report is based on an examination of the existing building electrical contract drawings, dated May 20, 1952 and dated September 9, 1969, and several site visits to visually observe existing conditions. Existing Electrical Specifications and Shop Drawings were not available. The existing main building was constructed in 1952 and additions/renovations were added in 1969.

- Site inspection efforts included visual observations of all existing electrical systems herein noted and follow-up meetings with the Director of Facilities and maintenance staff. Conclusions drawn are based on opinion, the experience of personnel consulted and good engineering practice.

- In addition, TMP met with the Director of Facilities on 07/18/02 regarding building issues.

c. Exterior Building Power Distribution

- The High School is presently served by 4 #2/0, 5kV primary electric service cables in an underground ductbank from Oakland Road to existing Unit Substation No. 1 in Building 'A3' Basement Level (1952 Building), and then distributed out to Unit Substations No. 2 (Existing Boiler Room 1952 Building 'A5'), No. 3 (Building 'B1'1969 Addition), No. 4 (Building 'A1' Basement), and No. 5 (New Boiler Room Addition 1969) Building 'A5'.

- Secondary service electrical characteristics are 120/208 volts, 3 phase, 4 wire, 60 hertz.

- It was visually noted that two additional overhead electrical services from Oakland Road appear to serve the existing Snack Shack and Grandstand Press Box. The second overhead service appears to serve pole mounted floodlights, which may have been installed by Reading Municipal Light Plant.

- The site appears to be primary metered.

d. Electric Service Equipment

- Existing main electrical service distribution equipment consists of five (5) unit substations owned and maintained by the Owner and located in various buildings within the complex. Existing unit substations are as follows:
    1. No. 1: 1000 amp, 120/208 volts, 3 phase (1952)
    2. No. 2: 2500 amp, 120/208 volts, 3 phase (1952)
    3. No. 3: 800 amp, 120/208 volts, 3 phase (1969)
    4. No. 4: 1600 amp, 120/208 volts, 3 phase (1969)
    5. No. 5: 1600 amp, 120/208 volts, 3 phase (1969)

- Condition and capacity of the 1952 unit substations is highly questionable and probably not reusable in a major renovation project. The condition and capacity of the 1969 unit substations is also questionable and will need to be tested by an independent and certified electrical testing company to establish condition and reuse in a major renovation.

- Replacement parts for the 1952 unit substations are difficult or near impossible to find. In addition, replacement parts for the 1969 unit substations are also difficult to find.

- Interrupting ratings for the unit substations may not meet present Reading Municipal Light Plant Standards for Network Distribution.

e. Building Normal Power Distribution Equipment

- Existing building distribution systems consist of distribution panelboards, lighting panelboards, power panelboards, and motor control centers. This equipment varies in age from original 1952 and 1969 installed equipment to present day added panelboards to feed specific areas or functions.

- Condition and capacity of the 1952 and 1969 Power Distribution Equipment is very questionable. Original equipment replacement parts are difficult or near impossible to find.

- It was indicated by the Director of Facilities that many of the existing panelboards have no remaining capacity and that some individual branch circuits are overloaded. The Director of Facilities indicated that panelboards that serve classrooms and the Administrative Area have had overloaded circuit issues in the past.

f. Building Emergency Power Distribution Equipment

- The campus is presently served emergency power from a 200kW/250kVA, 120/208 volt, 3 phase, 4 wire Kohler diesel fueled interior generator located in the new 1969 Boiler Room Addition Building 'A5'. The generator has 664 running hours indicated on its instrumentation and physically appears operational at best.

- The condition and capacity of the 1969 installed Kohler 200kW emergency generator is questionable and will be needed to be tested by an independent and certified electrical testing company to establish condition, capacity, repair requirement and estimated remaining life expectancy.

- The existing 1952 installed emergency generator is abandoned in place and of no practical use and not salvagable..

- It was noted that the 1969 emergency generator is installed in a separate room as required by present day Massachusetts Electric Code. However, a review may be required to address whether the emergency generator room is two-hour rated, as required by State Building Code.

- The 1969 emergency generator is fueled by an interior (500 gallon estimated) diesel fuel storage tank located within the 1969 boiler room. It is the opinion of TMP that this tank will need to be relocated or enclosed by at least a two-hour rated enclosure. This item is presently being reviewed with the Authorities in Jurisdiction.

- The emergency power distribution system consists of one central automatic transfer switch wired from the 1969 emergency generator, which in turn feeds emergency power distribution panel MOP-E (300 amps, 120/208 volts, 3 phase), which sub-feeds emergency loads throughout the complex.

- The sub-emergency distribution system consists of local emergency panelboards located within the campus buildings to serve emergency lighting loads as well as selected heating, refrigeration and building elevators.

g. Present Day Code Deficiencies

- Life safety panelboard feeders are not presently 2-hour rated in accordance with Massachusetts State Electric Code.

- Sub-distribution life safety panelboards are not located in 2-hour rated enclosures or rooms in accordance with Massachusetts State Electric Code.

- Life safety and non-life safety emergency loads are not properly separated per Massachusetts State Electric Code. This requirement necessitates separate equipment rooms for Life Safety system automatic transfer switch, distribution panelboard, and local building branch circuit emergency lighting panelboards.

h. Branch Circuit and Feeder Wiring

- Existing branch circuit and feeder wiring is copper, generally concealed in raceways in walls and above ceilings. Wiremold (surface metal raceway) was noted in many classrooms for receptacle, sound, tel/data system expansions, and corridors for building fire alarm system.

- Materials are generally 33 and 50 years old, except for new receptacle devices and associated device wiring and emergency lighting battery unit wiring. Some branch circuit wiring and possibly feeder wiring is original building material (1952).

- All 1952 branch circuit wiring and feeder wiring is well beyond its normal life expectancy, which is related by the U.S. Government as 30 years and is an industry accepted standard.
- All 1969 branch circuit wiring and feeder wiring has reached its normal life expectancy, which is related by the U.S. Government as 30 years and is an industry accepted standard.

i. Lighting System

- Interior
    1. Generally, existing lighting consists of ceiling surface black sided metal box or wrap-around, or suspended fluorescent type 8" x 4', 1' x 4', 1' x 8', 2' x 4' and 2' x 2' recessed prismatic lensed fixtures and 4 x 4 fluorescent light fixtures in Library.
    2. Gymnasium and Field House lighting is suspended H.I.D. high-bay type fixtures with wire guards.
    3. Auditorium lighting consists of ceiling recessed 300 and 500 watt incandescent down light fixtures and performance stage lighting including stage front and side floodlighting, and ceiling suspended connector strip/border lights on stage. Performance lighting is controlled from stage dimmer cabinet and console. It was reported by the Director of Facilities that performance lighting and equipment are functional, but aged and in need of upgrading.
    4. Cafeteria lighting consists of ceiling surface mounted linear fluorescent fixtures mounted in a sort of recessed soffit.
    5. The Library was originally equipped with 4 x 4 fluorescent light fixtures but these where abandoned and Gymnasium type H.I.D. light fixtures were added to improve the deficient light level.
    6. Eighty to eighty five percent of the existing fluorescent lighting fixtures appear to be in marginal to poor condition. Broken and missing lenses, and lens color deterioration is apparent on many fixtures. It was reported by the Director of Facilities and visually observed that some classrooms, corridors, and stairhalls are insufficiently lighted.
    7. All existing classrooms have multiple switches at entrance doors, providing two or three levels of illumination.
    8. The Superintendent's Office suite has undergone major renovation and new 2 x 4 parabolic style fluorescent light fixtures have been installed.
    9. Exit signs "illuminated type" are generally located at all points of egress from the building.

- Exterior
  1. Existing exterior lighting consists of the following types:
     a. Utility pole mounted H.I.D. type floodlighting in parking area, which appears to be leased from the Town of Reading Municipal Light Department.
     b. Wall mounted lensed H.I.D. type light fixtures at various locations around building.
     c. Pole mounted 100 and 400 watt H.I.D. light fixtures mounted on painted poles. The paint finish has long since flaked off leaving discolored base metal. The 100 watt pole mounted light fixtures are mounted to close to finished grade to provide overall illumination of walking paths.
  2. Exterior lighting is automatically controlled by photoelectric sensors and/or time clocks.
  3. It was noted that quantity and multiple different types of exterior lighting fixtures appear to adequately illuminate most exterior areas. However, maintaining supply of various lamp and ballast types has been an ongoing maintenance problem.

j. Fire Alarm System

- Existing multi-plex, zoned fire alarm system is 23 years old. Control panel and standby batteries are located in ground floor main electric room of 1952 Building 'A3'. System is connected to Reading Fire Department via a pedestal mounted street type master box located on Oakland Street. System consists of heat detectors in all classrooms; smoke detectors in all corridors at smoke doors, stairhalls, and large group areas; horn/light (A/V) signals in corridors and large group areas; pull stations in corridors and near most egress doors, and magnetic holders on some smoke doors.

- It was reported by the Director of Facilities that the system is functional.

- It was noted that A/V signals are non-NFPA or ADA Code Compliant type and that classrooms, and toilets, are not provided with A/V signals as required by NFPA and ADA.

- Majority of system wiring to devices is installed in the 1952 Building in surface wall and ceiling mounted wiremold. Wiring in the 1969 building addition is concealed.

k. Receptacles and Switches

- Existing receptacles and switches visually appear in serviceable condition. Receptacles are grounded type and switches are toggle type throughout facility, except for key switching in some corridors.

- Quantity of general service and computer plug-in academic classroom receptacles is inadequate by today's standards for educational technology. Most academic classrooms have only two or three receptacles requiring many multi-outlet extension cords.

l. Clock and Program System

- Existing master clock and program system appears reasonably new and consists of master clock in Administration Office Building 'A3', and secondary clocks in classrooms, large group areas and administration areas. The master clock/controller was replaced. Existing program system consists of program bells in corridors, large group areas and on exterior walls.

- It was reported that most system clocks are not working correctly, but that program bells are working adequately. Many system clocks have been replaced with battery operated or 120 volt plug-in type clocks.

m. Cable Television System (Refer to Section J. Technology)

- Existing cable television system consists of a Media One Cable TV service from Oakland Road to the 1952 Building 'A3'.

- It was reported by the Director of Facilities that system is functional.

n. Computer Data Technology System (Refer to Section J. Technology)

- A system of data outlets, head end equipment and data wiring have been provided in the recent past in classrooms, some laboratories and other spaces. System cabling is installed in surface wall and ceiling mounted wiremold. Outlets are located in administrative offices, library, computer room, and classrooms.

- System outlets have required additional receptacles and circuiting to be installed in most areas. Some of these circuits are problematic with tripping and overloaded circuits.

- It was reported by the Director of Facilities that system is functional.

o. Security System

- Existing security system consists of control panel, door alarm contact switches and motion detectors located in high value rooms and selected entrances. System is connected to Police Department via communications transmitter.

- Control panel is located in 1952 Building 'A3'.

- It was reported by the Director of Facilities that the buildings have been broken into and minor vandalism has occurred.

- The security system was reported by the Director of Facilities to be operational but in need of repair and upgrade.

p. Conclusions and Recommendations

- Electric Service and Service Equipment

1. Existing underground primary service and unit substations are approximately 30 and 50 years old. Distribution panels fed from unit substations are approximately 30 and 50 years old. Ownership and maintenance of primary service is responsibility of Reading Municipal Light Department. Unit substations and distribution panels are owned and maintained by the School.
2. Original equipment replacement parts are no longer available for unit substations and distribution panels due to manufacturers being out of stock. Replacement parts by alternate manufacturers are available but costly. Capacity and condition of this equipment is inadequate to serve present day educational and environmental technology needs.
3. Interrupting rating of the unit substations and panelboards may not meet present interrupting rating of the Town of Reading's municipal power network distribution system.
4. Service and service equipment should be replaced.
5. The existing building service and interior distribution system presently serves the the needs of the existing high school. The existing building service and interior distribution should have sufficient capacity to serve minor renovations within the complex. However, any major renovation or mechanical system upgrade (air conditioning) will trigger the need for a new electric service.
6. It should be noted that even with minor renovations, the existing interior distribution system by need to be upgraded or replaced becauyse of existing physical condition.

- Interior Distribution System and Branch Circuit and Feeder Wiring
    1. Existing panelboards, motor controls and majority of wiring system are 30 to 50 years old, and therefore, have exceeded their useful life.
    2. Panelboards, motor controls and all wiring should be replaced. Existing conduits may be reusable.

- Emergency System
    1. Existing 200kW 120/208V, 3f, 4W interior diesel fueled generator and indoor 600 amp automatic transfer switch, 30 years old, appear to be in functional condition and are exercised regularly. However, based on age and visual appearance, it is recommended that the emergency generator be replaced.
    2. New Life Safety system automatic transfer switch, distribution equipment and branch panelboards must be provided in new 2-hour fire rated rooms in order to comply with Massachusetts Electric Code.
    3. Existing automatic transfer switch may be able to be reused as non-proprietary (standby) equipment and remain in main electric room with new distribution and isolation control equipment added.
    4. It was also reported by the Director of Facilities that the Town of Reading does use a portion of the High School as a Storm Shelter. This issue generally requires a much larger generator to fully provide the proper features for an emergency storm shelter.

- Lighting System
    1. Existing lighting system is generally 30 to 50 years old with some newer types in specific areas. However, ballasts have been failing and present a persistent maintenance problem. Majority of fixtures appear in marginal to poor condition and lens discoloration and ballast failures will continue. Additional lighting should be provided in classrooms, corridors and stairhalls where existing lighting is insufficient. Exterior lighting is only adequate at best, and variety of lamp/ballast types result in high maintenance costs.
    2. Interior and exterior lighting systems should be replaced.

- Fire Alarm System
    1. Existing fire alarm system is approximately 30 years old and does not comply with present day ADA, NFPA, and State Building Code requirements due to insufficient coverage in classrooms, improper type visual alarm signals, and device mounting heights on walls.
    2. System should be replaced with Code compliant system. Existing conduit and outlet system may be reusable.

- Receptacles and Switches
    1. Existing receptacles and switches are a variety of 30 to 50 year old materials, except for newer devices in specific renovated areas. Quantity of classroom receptacles and associated branch circuiting is inadequate.
    2. Older devices should be replaced. Quantities of classroom receptacles/branch circuiting should be substantially upgraded to provide for the educational technology standards of today.

- Clock and Program System
    1. Existing master clock and program system was reported by the Director of Facilities as only partly operating and has exceeded its useful life.
    2. System should be replaced.

- Cable Television System
    1. Existing system is reportedly functional.
    2. System should be able to be maintained and expanded to satisfy academic needs.

- Door Signal System
    1. Existing doorbell system probably needs replacement or integrated into new telephone, intercom and paging system.
    2. System may be maintained.

- Security System
    1. Existing security system is functional as reported by the Director of Facilities but in need of evaluation by School and possible replacement. Exact age of system is unknown and generally wiring is installed in surface wall mounted wiremold or cabling above hung ceilings.
    2. Noting that vandalism is present, a new state-of-the-art security system should be provided throughout facility with all wiring concealed and motion detection added to ground floor perimeter rooms with on-grade reachable windows.
    3. Installation of an additional CCTV (closed circuit surveillance television system) should be evaluated by the Town of Reading, budget permitting.

Items Requiring Further Study

a. General

- Regarding testing, there are certain procedures that should be accomplished in order for the work to be meaningful, so that the expenditures are worthwhile. These proposed tests were addressed at the building committee meeting of August 7m 2002.

- TMP should be given a couple of days notice before any test, to have the opportunity to input specifics and/or to meet the contractor at the site to review exactly what should be done for the test to be meaningful to TMP.

- The contractors should fill in a log, similar to a work order, for all work. This would list the company doing the work, the specific personnel, when the work was done, any other comments, etc.

- Each contractor doing work should be given 8-1/2 x 11 (or similar), small-sized plans, so that samples can be "tagged" (by number, type of pipeline, etc.), with the tag numbers keyed in to specific locations on the plans. (We often see money spent for testing and we get sent a box full of unlabelled pipe samples. We do not know if it is from a storm line, sanitary line, where it was taken, etc.)

- A photograph should be taken, beforehand, of each location that is to be tested.

b. HVAC

- Indoor Air Quality
- Zone Valves / Control Valves
- Low Pressure Steam Piping (supply and condensate return)
- Chimney Testing

c. Plumbing

- Domestic water piping/joints
- Valve Reliability
- Roof storm water piping in the 1952 portions of the facility
- Sanitary Piping

- Domestic Water Service Entry
- Janitor's Sinks
- Domestic Water Heaters

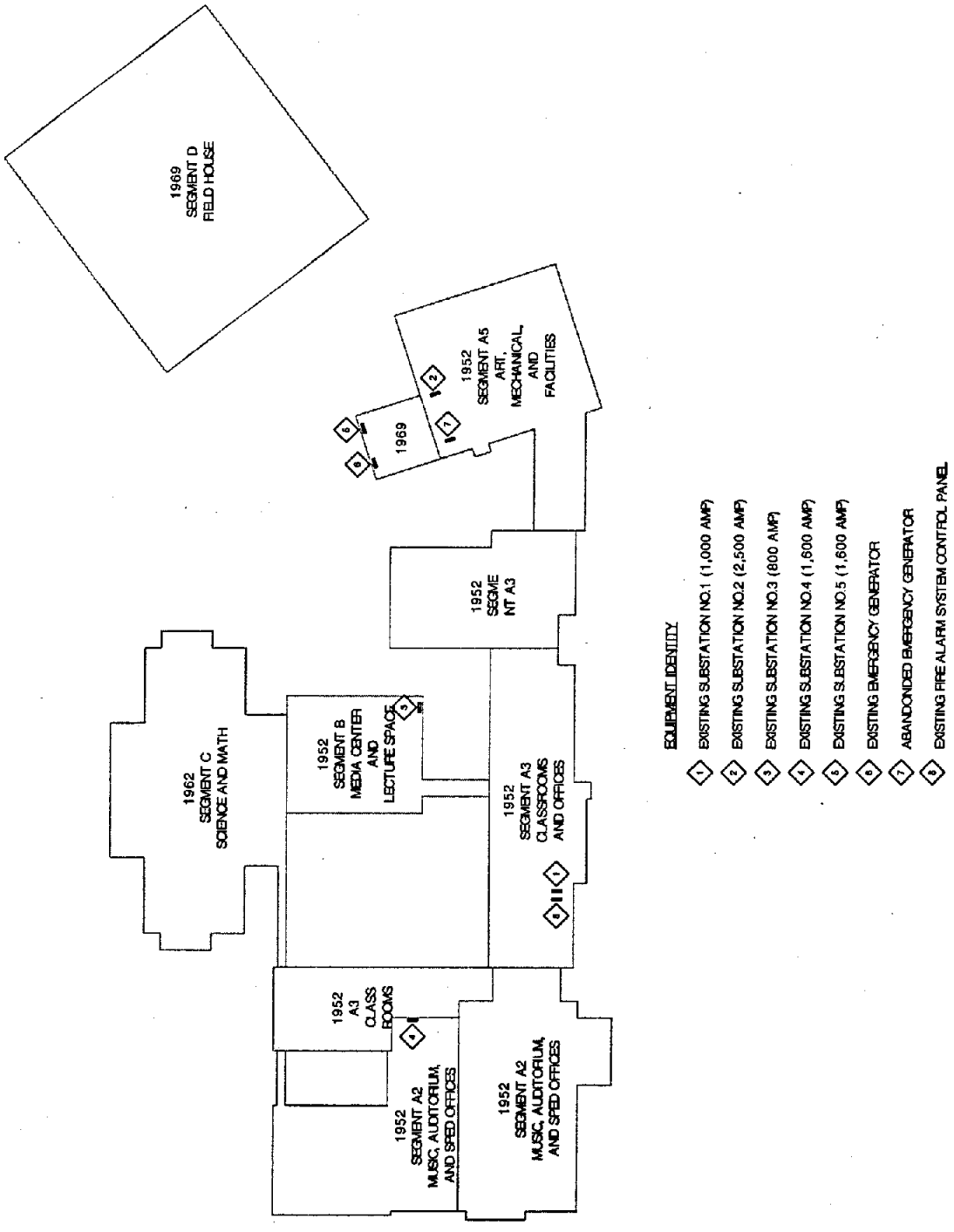
d. Electrical

- Emergency Generator
- Building Normal Distribution System
- Distribution Test
- Electrical Testing Companies

READING MEMORIAL HIGH SCHOOL - EXISTING CONDITIONS - HVAC EQUIPMENT

EQUIP. TYPE	LOCATION	SERVICE	INSTALLED	FUNCT./NON-FUNCT.	REPLACE
(2) H&V Units	SEG A_2 (Below Stage)	Auditorium	1952	(1) FUNCT. (1) NON-FUNCT.	YES
(2) H&V Units	SEG A_4	GYM	1952	FUNCT.	YES
(2) H&V Units	SEG A_5	Industrial Arts	1969	FUNCT.	YES
(2) H&V Units	SEG B (Below Lecture Hall)	Library	1969	FUNCT.	YES
(1) H&V Unit	SEG B	Lecture Hall	1969	FUNCT.	YES
(1) H&V Unit	SEG A_1	Kitchen	1969	FUNCT.	YES
(51) Unit Ventilators (UV's)	SEG A_2, A_3, A_4	Classrooms	1995 - 1998	FUNCT.	NO
(40) Unit Ventilators (UV's)	SEG C SEG A_1	Classrooms Cafeteria	1969	FUNCT	YES
(5) Pumps	1952 Boiler Room	Hot Water Heating System	1969	FUNCT.	YES
Expansion Tanks	1952 Boiler Room	Hot Water Heating System	1969	FUNCT	YES
(2) Boilers	1969 Boiler Room	Heating System	1995 - 1998	FUNCT	NO
(1) Convertor	1969 Boiler Room	Heating System	1995 - 1998	FUNCT	NO
(1) Boiler Feed System	1969 Boiler Room	Heating System	1995 - 1998	FUNCT	NO
Fuel Oil Transfer System	1969 Boiler Room	Heating System	1969	FUNCT	YES - if #4 fuel oil is maintained

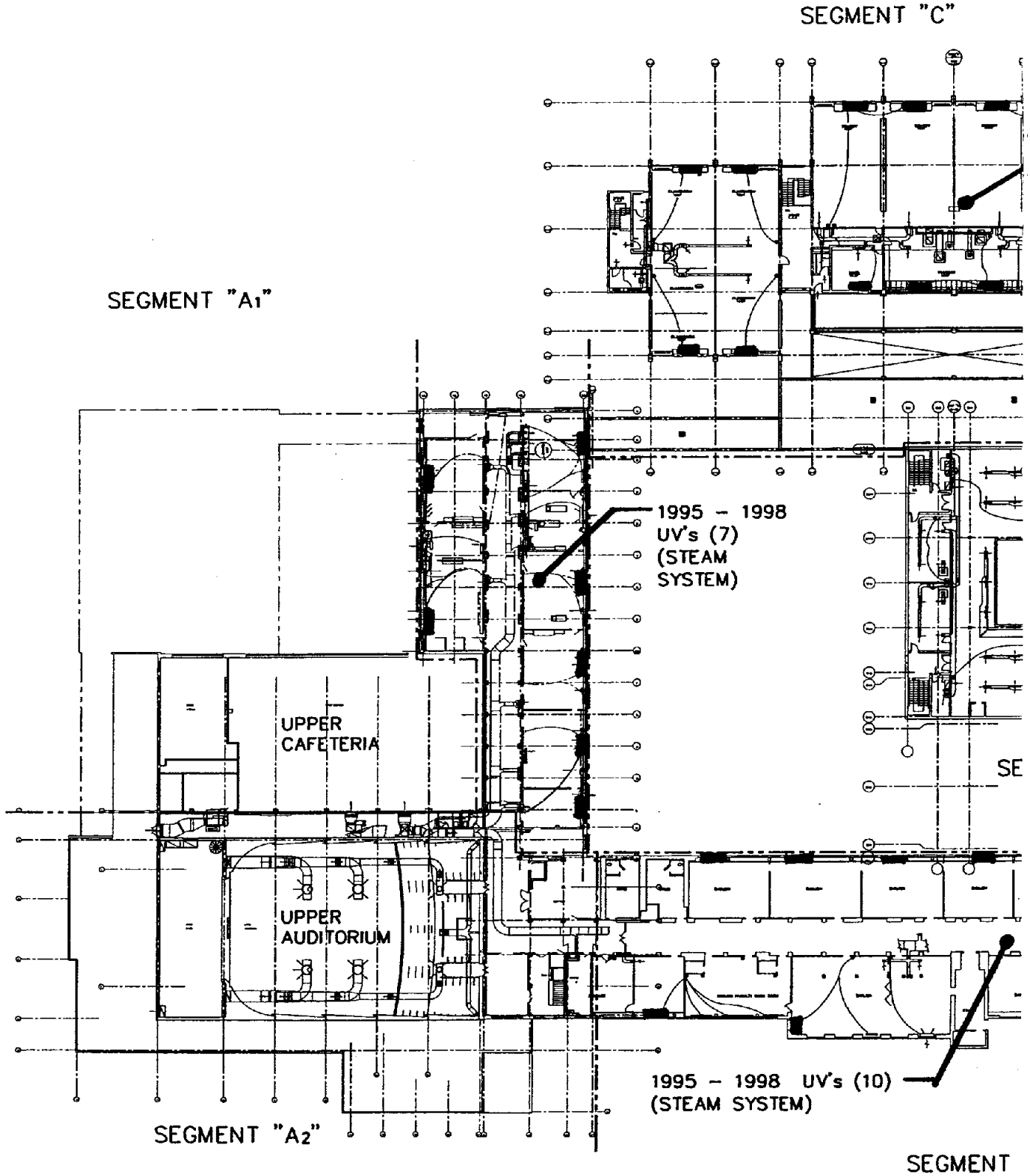
Note: ALL fans, fintube radiation, unit heaters and cabinet unit heaters should be replaced as they are vintage 1952, 1969.



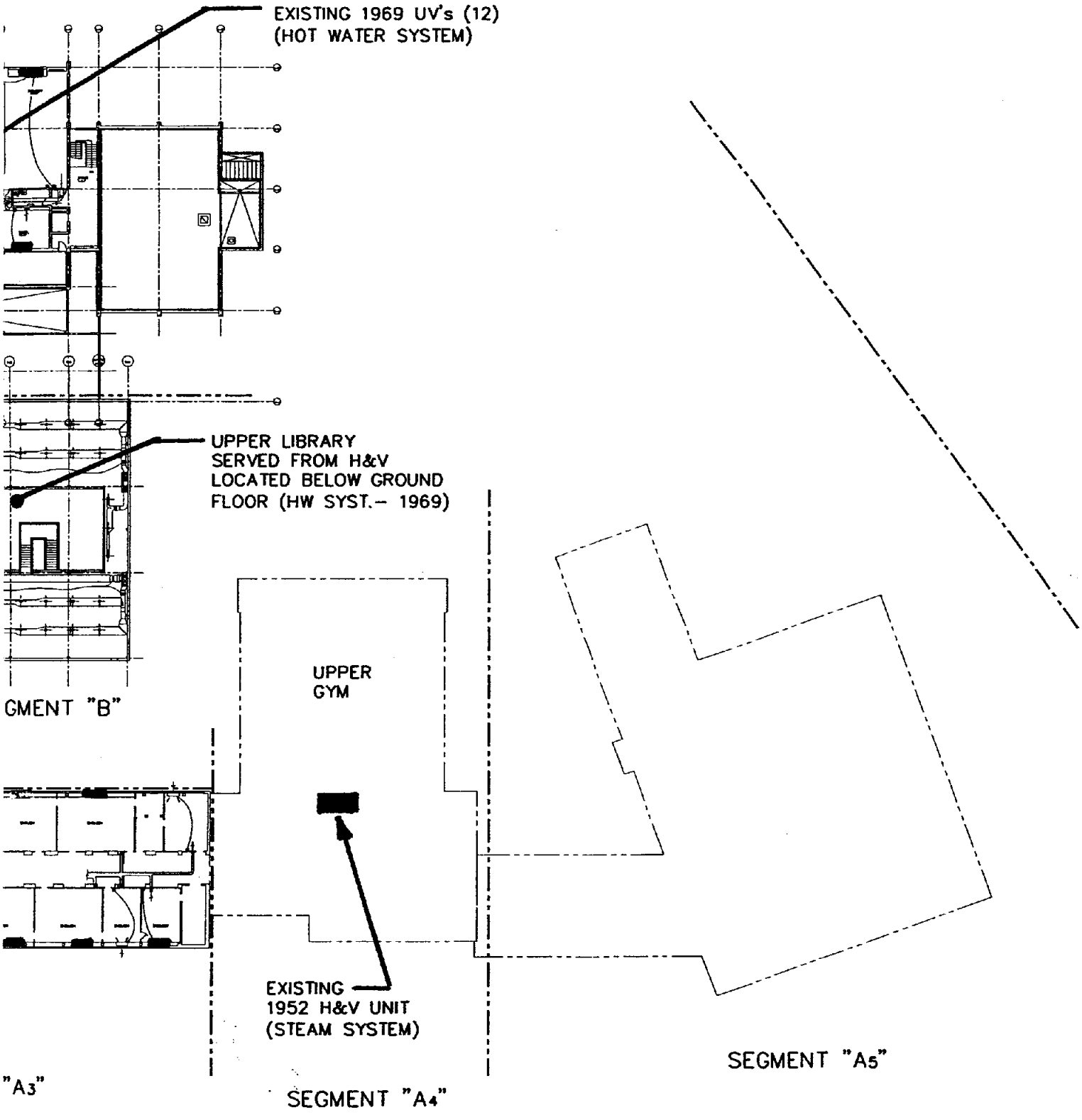
REFERENCE DRAWING.

Date: 09-24-02	Project: READING HIGH SCHOOL	TMP Consulting Engineers Inc.	Dwg. No.: SKE-1
Scale: N.T.S.	Title: ELECTRICAL EQUIPMENT KEY PLAN		
Job No.: 02-2022			

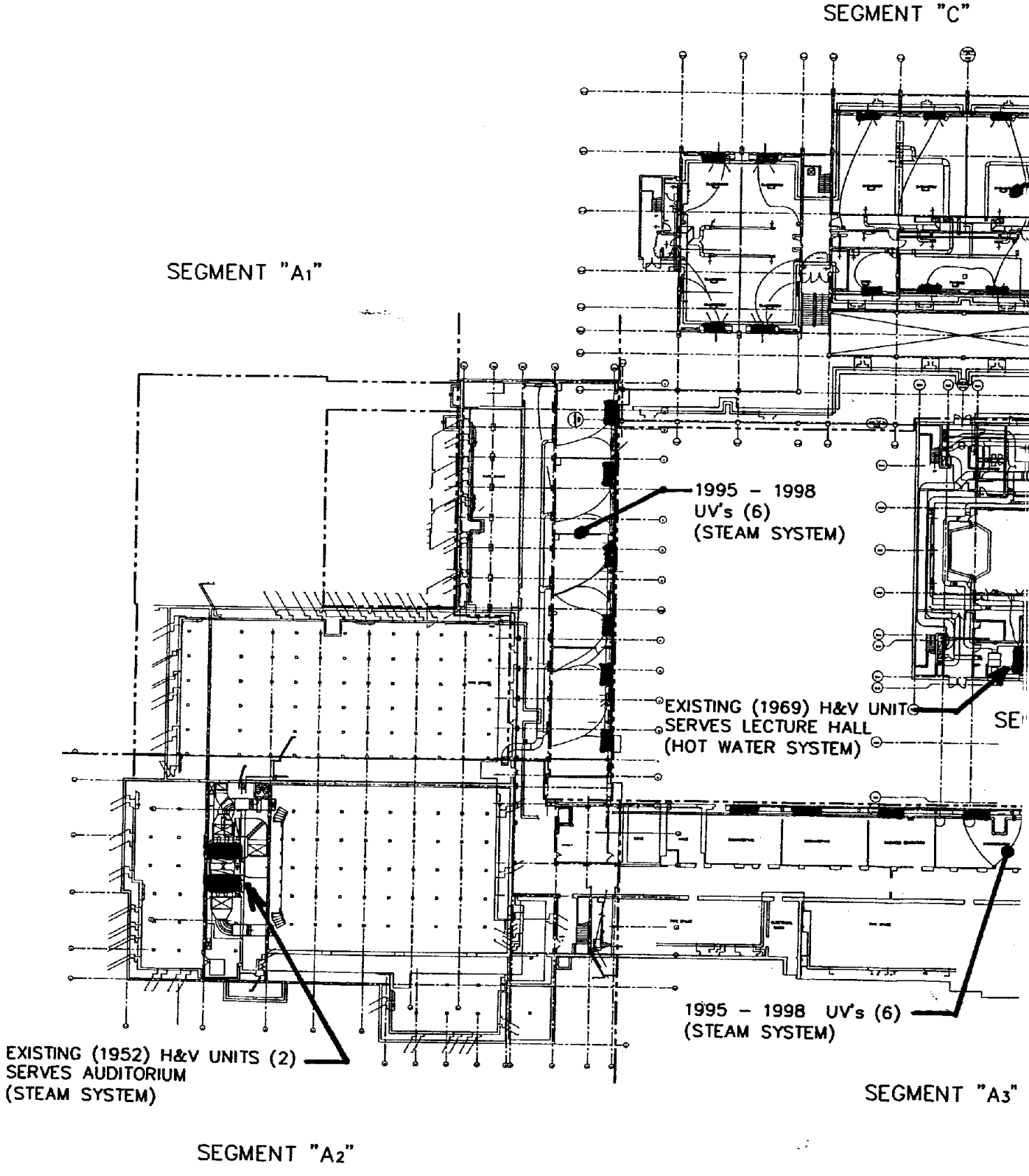
52 Temple Place
Boston, Massachusetts 02111
TEL.(617)357-6060
FAX.(617)357-5188



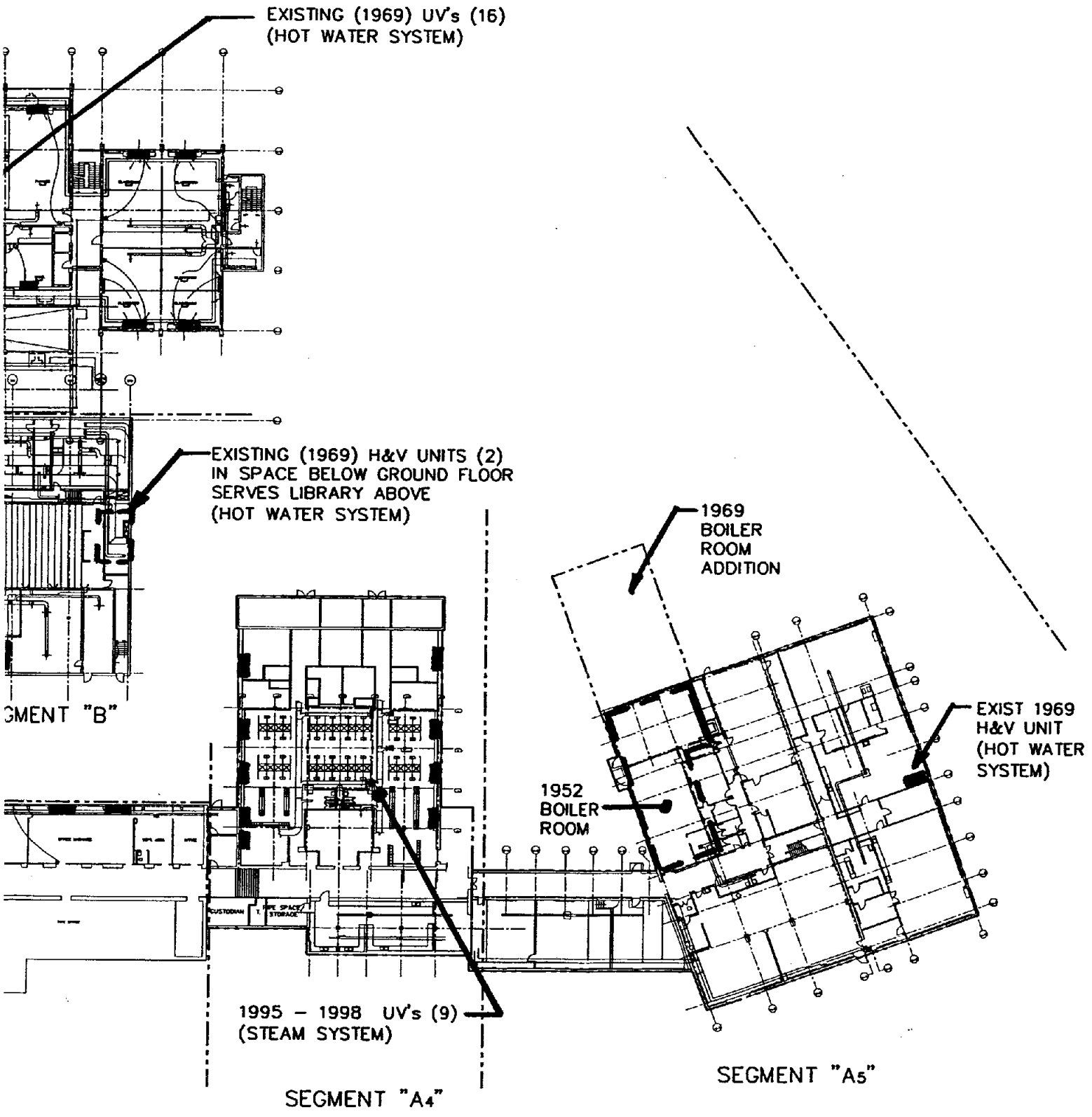
SECOND FLOOR - HV



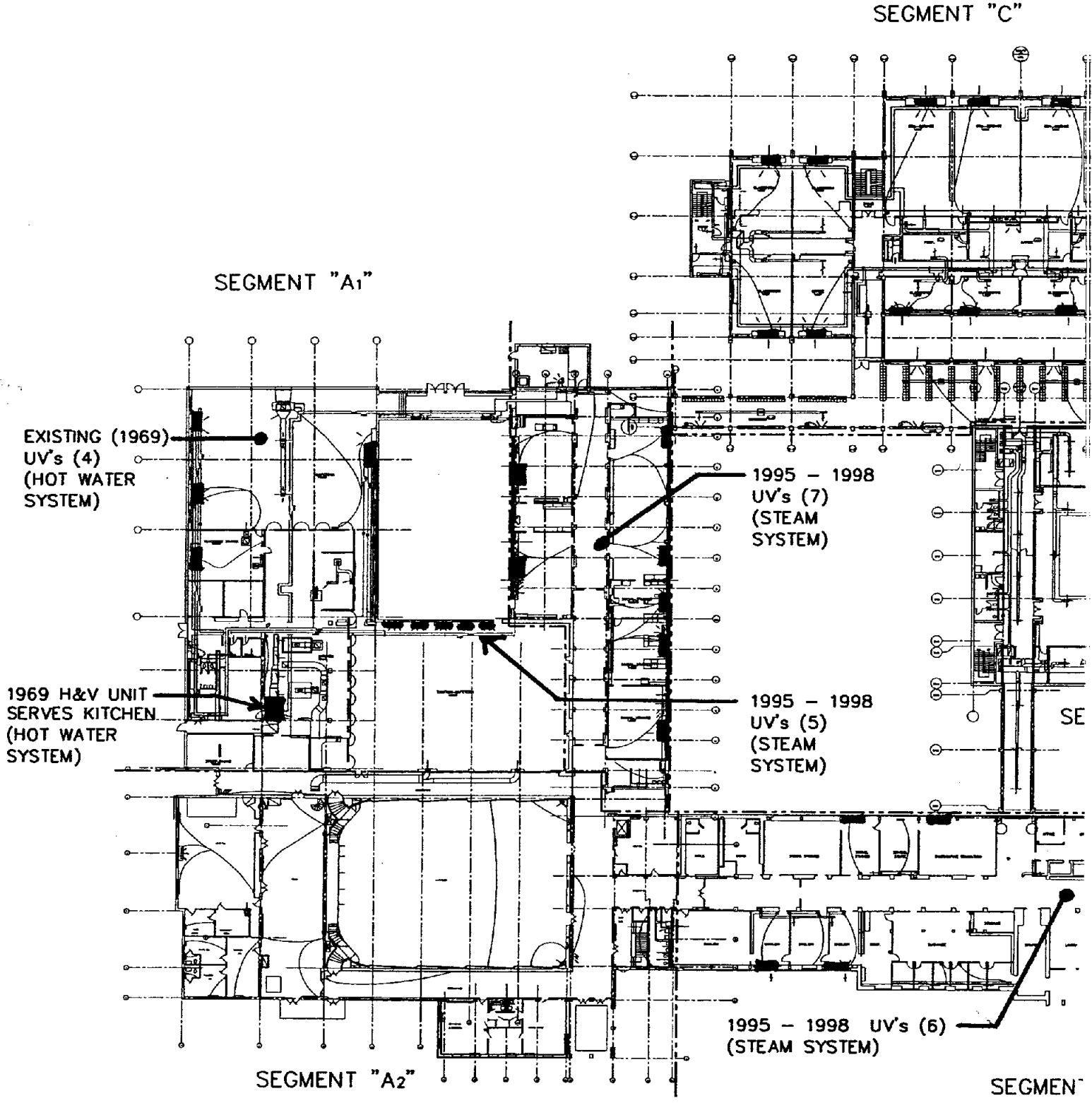
/AC – EXISTING CONDITIONS



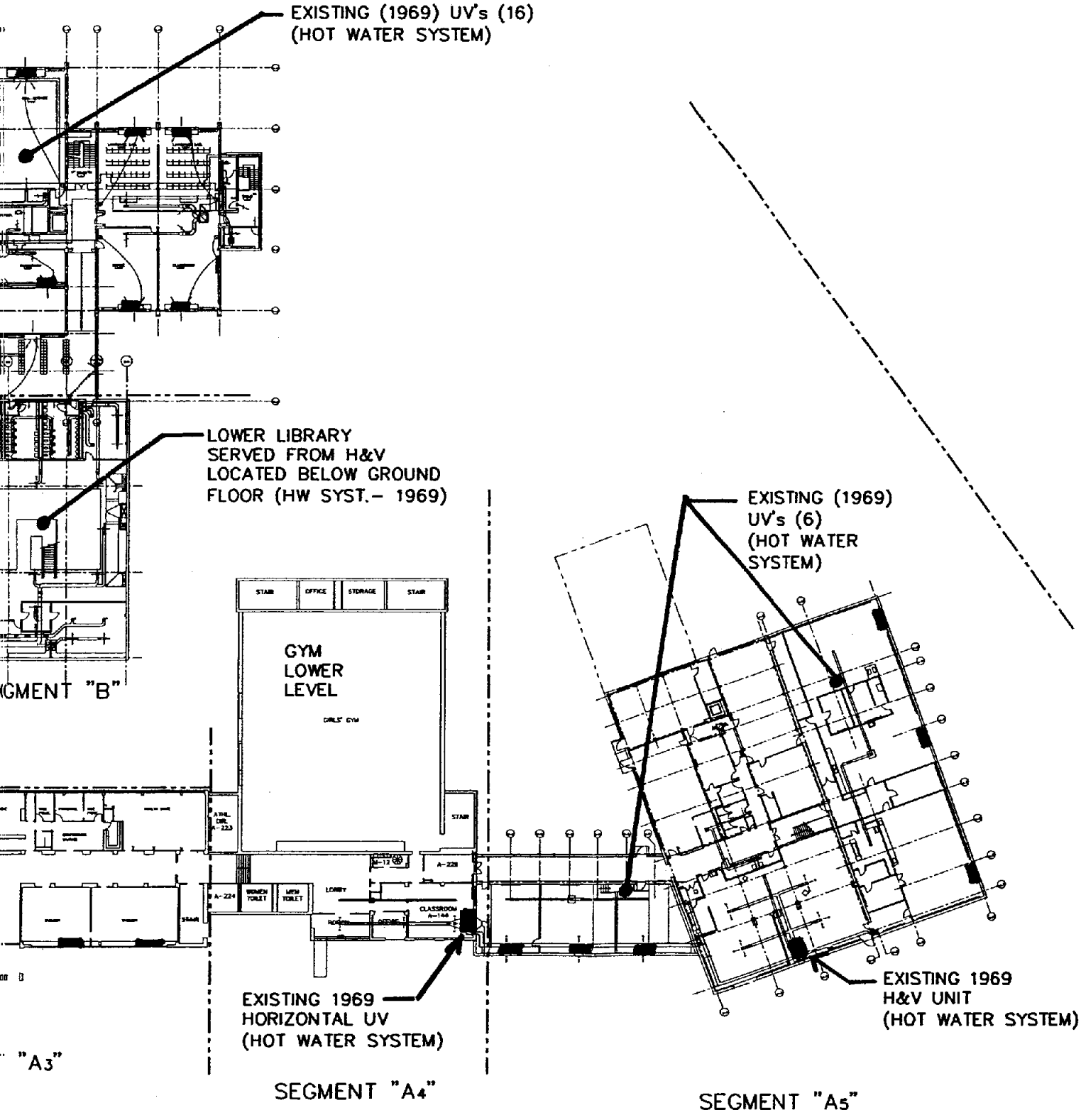
GROUND FLOOR - HV



AC – EXISTING CONDITIONS



FIRST FLOOR – HVA



C – EXISTING CONDITIONS

J. Technology - Edvance Technology Design

J1. Cabling Infrastructure

- For the purposes of this report, the cabling infrastructure will consist of the voice, data and video cabling systems within the Reading Memorial High School. It consists of both backbone and horizontal cabling components. There is a town-wide fiber optic backbone connecting all town buildings that enters the High School at the western corner of C Building. The Fiber optic cable is 24-Strand Single Mode.

  The horizontal cabling extends from the work area outlet/connector to the horizontal cross-connect in the technology room. The voice and data horizontal cabling includes the horizontal cables, the outlet/connector in the work area, the mechanical termination, and patch cords or jumpers located in the telecommunications closet. The existing data horizontal cabling is Category 5 UTP configured in a star-topology. All cables appear to be within the maximum horizontal distance of 90 m (295 ft.) from termination on the horizontal cross-connect to the work area outlet/connector. The voice (telephone) horizontal cabling is also Category 5. Every classroom has been cabled with four data jacks and one voice jack. All administrative areas are cabled with a minimum of 2 data and 2 telephone jacks.

  The backbone cabling connects intermediate technology rooms, main technology rooms and entrance facilities. It consists of backbone cables, intermediate and main cross-connects, mechanical terminations and patch cords or jumpers used for backbone-to-backbone cross-connection. The existing data backbone cabling is fiber optic cable configured in a star-topology. The voice backbone cabling consists of multi-pair riser cables. There are eight intermediate technology rooms (IDFs) throughout the facility and one Head End Room (MDF). The MDF is located in Room A-219. There are five IDFs in A building. IDFs A-100, A-200, A-300 are stacked on the eastern side of A building. IDFs A-110 and the "Art Closet" are on the western side. There is an IDF in B Building in the Media Center. There is an IDF in C building in Room C-206. The final IDF is located in the Field House. Plans showing these locations will be provided with the as-builts.

  There is an existing structured cabling system for video distribution. The video cabling consists of RG-6 coax capable of transmitting and receiving audio and video signals. However, none of these cables are terminated at the closet end and there is no amplification. The installation of the video cables was obviously for future use. All video cables are run to the IDF in the Media Center. The video cabling was installed during the summer 1998 and is in all classrooms - all classrooms have one jack.

J2. Systems Overview

a. Voice

The facility is served by a Merlin II Phone System. Most phones are BIS-5 (5 line). All phones are in administrative and staff areas only. There are currently no phones in any classrooms. The facility is also served by a master clock and public address system. Public address speakers cover all spaces including classrooms, offices and hallways.

b. Data

•The facility utilizes five network servers, as follows:

1. Proxy Server – Administrator Plus, Town Financial Software, Athletic and Nursing Software
2. Primary Domain Controller
3. Graphics/Field Biology Server
4. Library Resources – Storage for CDROM data
5. Library Circulation – Winnebago Software

- There are approximately 170 computers in the building. There are three categories of computers. Category I: Approximately 40% of these computers are 6+ years old. Most of these are Pentium 100/16MB. Category II: Approximately 25% are Pentium 100 – Pentium 266. Category III: The remainder are Pentium 300 and above.

- Between 55 and 60 new computers will be purchased over the summer months of 2002 through the existing operating budget and the town technology fund.

- The school has the following computer labs:
    1. Graphics – 16 Computers; approximately 1/3 Category I, 1/3 Category II, 1/3 Category III.
    2. Field Biology – 6 Category III, rest Category I and lower
    3. CAD – 6 Category III, rest Category I and lower
    4. Business A-108 – All new
    5. Business A-109 – All Category I and lower
    6. Writing Lab – Mostly reconditioned
    7. Media Center – 26 New or Category I

- The administrative offices have a mix of computers. Approximately 1/3 of the administrative computers are Category I, 1/3 Category II and 1/3 Category III. E-mail is done primarily through Hotmail and Yahoo accounts. There are a few users with .edu e-mail. The computers in the Superintendent's offices are Category I and II.

c. Video

- There are no television monitors on the classrooms. There are a few television monitors on rolling carts available in the Media Center for general use. These are primarily used in conjunction with VCR's.

J3. Conclusions and Recommendations

- The Town of Reading and Reading High School has been in the process of raising funds to acquire new technology equipment for the high school. Current purchases have been based on laptop and wireless technology. If this program proves successful and continues on its current course, future infrastructure design for Reading High School will provide flexibility for the placement of additional wireless access points throughout the facility where and when necessary. During the equipment phase of the project, current wireless equipment will be factored into the programmatic and technical decisions to create a seamless network. Head end and terminal end electronics will be specified to meet the curriculum and technical goals of the facility.

a. Telephone/Paging Systems

- The use of the telephone in public schools has changed dramatically over the past several years. Telephone systems have become much more than simply a means of two-way communication between school staff, administrators and the outside world. With the emergence of such technologies as voice-mail and the digital PBX, telephones have become a frequent tool in the classroom.

- Newer telephone systems allow for integration with general paging systems. In the past, these two systems were installed independently of one another. Today, telephone systems represent a fully integrated system capable of providing paging service from anywhere within the system. This allows the telephones in classrooms and elsewhere to act as the microphone/zone selector equipment of older traditional public address systems. The systems are also equipped with software that allows administration to control how calls are made and received by an area and time of day basis.

- The existing telephone system at the High School is not capable of sufficient expansion to provide adequate services to the entire facility. A newer, larger system, capable of providing services and voice-mail to the entire facility and staff would be more adequate. The cabling infrastructure should also be evaluated according to TIA/EIA standards at the time of construction.

- The installation of a new clock/bell and public address system should be considered. These systems could be integrated with each other and the telephone system.

b. Data Systems

- Computer technology was once a subject that was added to the curriculum and as such was isolated to specialized locations within a school where the technology could be used. Today, computer technology is essential and necessary for all aspects of delivering the curriculum, and therefore is finding its way into the classroom in increasing regularity as a vital tool in the educational process. Additionally, interaction with technology is occurring on the individual, small group, whole class, and larger group level resulting in all educational spaces within a school being equipped with access to computer technology.

- The existing data infrastructure should also be evaluated according to TIA/EIA standards at the time of construction. Replacement and/or upgrade of Servers, workstations, and network electronics should be considered. Network support structure needs evaluation prior to a significant influx of computer and computer networking technology.

c. Video Systems

- A bi-directional video distribution system consists of a structured cabling system capable of transmitting and receiving audio and video signals. Access to this system is critical in all instructional areas within a school. These systems allow for the facility wide distribution of resources such as CATV and local video source equipment while at the same time allowing a user to distribute video signal to any other location in the school.

- A bi-directional video distribution system to all classrooms and instructional areas would be advantageous. Wherever applicable, cabling connections from the teacher's location to a separate video outlet would allow for computer to TV/projection device connections for instructional purposes.

K. Kitchen - Crabtree McGrath Associates

K1. Summary

- On August 1st, we visited the site to the existing conditions at this 1,200 pupil high school's kitchen and serving facility. In our opinion, it needs work to address the needs of the current population let alone the boost to the ultimate 1,500 students.

  Our visit and the following notes are based on our observations as no kitchen staff was available to add insight on the current condition of the viewed pieces. Our pronouncements are based primarily on our knowledge of the equipment's construction, its effectiveness when compared to modern pieces, and any obvious failings.

  We have since talked to Cathy Cook, Reading's Foodservice Director, and have obtained end-user input. She agreed with our assessment of the viewed equipment. In the process, we learned that the school receives all the groceries and frozen foods for the community and then redistributes them. (Dairy and bread products are delivered directly to the individual schools.) This process creates a load on the facility.

  The school does not operate as a cooked food source for a satellite system. The only prepared food that ships from this school are sheet cakes. Normal weeks have production of ten to twelve cakes, on two days. The impact is that a suitable baking area be included in the kitchen.

K2. Space

- The kitchen's footprint is more than adequate but needs a reshaping to better address the cooking and serving processes. The receiving area is well located and large enough. It has the dedicated utility closet with mop sink.

  A 120 square foot walk-in freezer on the floor in the storeroom, is believed to be roughly 18 years old. While it still works, thought must be given to its remaining life. Some panel joints are failing resulting in water puddles forming on the outside. It is nearing the end of its useful life. This room is used for receiving and distributing goods to the city's other schools. It is located in the larger storeroom and would have been better placed in the small storeroom as it has destroyed this room's capacity. The room had a number of electric panels (possibly seven) that render it less-than-secure due to the number of key holding persons needing access.

  The newer cooler/freezer with its 90 and 100 square foot rooms, respectively, is vintage 1996. It is in decent condition and features recently upgraded refrigeration systems, but it is not adequate for the enlarged school. When built, it had restraints from existing walls. For the enlarged school and the continuing program, we would recommend a cooler of 150 square feet and a freezer of 300 square foot area; an additional 60 square feet of cooler and 80 square feet of freezer.

  The office is too small and should be enlarged when upgrades take place. Staff toilets and lockers will need improvements to address ADA considerations

  The kitchen is huge and double-high with lots of pipes, an air handler, and ductwork with "top surfaces". Health departments frown on these hard-to-clean surfaces over food prep areas where the accumulated dust can drop into open foodstuffs. The dishwashing room, and the former serving area space that has been converted to the snack line, are oversized. All told, there is plenty of space to upgrade the facility. The addition of a mezzanine over part of the production area could bring the ceiling down to a reasonable height while housing ductwork and air handling equipment in a sanitary manner.

K3. Equipment

- The kitchen's equipment is relatively old. A few pieces are suitable for reuse: 60 quart mixer, automatic slicer (provided it becomes secondary to a new unit), potwashing sinks (with new brass), reach-in refrigerated cabinets, the 1996 vintage cooler/freezer, and an assortment of tables. Most of the cooking equipment has come of age . . . although scattered countertop pieces could be considered for reuse. An inventory of seen equipment follows and defines the potential pieces in more detail. All would be subject to review at the time when a project is designed.

  Serving lines are ready for modern replacements. Serving methodology needs to be discussed with the community's decision makers as there is room for improvement to the 50's (through 70's) serving style. Controlled multi-choice serving areas are popular and can be designed to keep stealth to a minimum. A food court as one might view at a college dining hall, while attractive, does not work in a cash operation due to potential losses.

  The steam cooking equipment and convection ovens are aging. The Koch refrigerators are old but appear to be running beautifully. (Thirty years ago, Koch was the best you could get and with the addition of outside reading thermometers, they should be satisfactory for years to come.)

  The hoods with their galvanized steel interior surfaces and mechanical construction joints have not met code (NFPA-96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations) for over twenty years. The modern canopy must be of all welded construction with a stainless steel interior. Ductwork must also be all welded construction.

  The dishwashing room needs a complete re-thinking to make it more effective. Currently, the overall machine is excessive with its conveyor table. The traydrop area is equally oversized. There is an opportunity to reduce the room substantially.

K4. Conclusions and Recommendations

- There is enough area within the current perimeter walls to create a new, modern facility. It would require a serious gutting of the existing space and a reorganization of functional areas with substantially new equipment.

  A problem would probably occur in scheduling as that amount of work would take a window in time larger than a "summer". The reconstruction effort would be complex, involving considerable demolition and reconstruction of infrastructure and kitchen surfaces. Placement of equipment would be the least complex part of the job. Maintaining a full dining program in these conditions would reduce the current offerings and require extreme care to maintain a safe and sanitary atmosphere.

  With careful scheduling, it might be possible to upgrade part of it, say dishroom and serving during one summer, and the remaining kitchen and storage equipment a year later. The simpler plan would be to build a new cafeteria facility.

K5. Equipment Cost

- Based on 2002 prices, we estimate that the cost to upgrade the facility in either scenario would cost between $250,000 and $300,000. These prices are based on equipment delivered and installed, left ready for final connections by related trades and include a one-year warranty.

No.	*Description*	*Make/model*	*Comments*
1	Reach-in freezer	Victory FS-2D-S7-HD	Good
2	Serving counter & related pieces	Fabricated	Poor, discard
3	Serving counter & related pieces	Fabricated	Poor, discard
4	Milk cooler, 8 case	Powers	Fair
4	Milk cooler, 8 case	Powers	Fair
5	Household "coffin" freezer	Kelvinator, 48x28	Not UL for commercial use
6	Reach-in refrigerator	Koch M-3, 80x33	Good, old
7	Table, 72x30, classroom type		Non-code; discard
8	Twenty quart mixer	Hobart A-200	Good
9	Microwave oven, household	Kenmore	Not UL for commercial use
10	Table, 72x30, wood top		Discard
11	Hand sink	Legion	Fair
12	Stanchion assembly	T&S	Consider retirement
13	Sixty quart mixer	Hobart H-600	Good
14	Table, 96x30, wood top, shelf over	Drawers right	Good
15	Table, 96x30, wood top, shelf over	Drawers left	Good
16	Table, 72x30, s/s		Good
17	Thirty quart mixer	Hobart	Retire, old, replace
18	Forty gallon tilt kettle	Market Forge MT-40	Fair
19	Forty gallon tilt kettle	Market Forge MT-40	Fair
20	Pressure steamer, two compartment	Market Forge 2AE	Retire
21	Pressure steamer, two compartment	Market Forge 2AE	Retire
22	Spreader cabinets (4), 12"	Market Forge	Retire
23	Double convection oven	Market Forge	Retire
24	Double convection oven	Market Forge	Retire
25	Exhaust canopy, 103x78		Non-code, discard
26	Pot sink	Fabricated	Good, new outlets & faucets
27	Clothes washer		Good
28	Clothes dryer		Good
29	Table, 72x30, wood top, 2 drawers		Aging, retire
30	Automatic slicer	Hobart 1712	Aging, retire to standby
31	Table, 72x30, s/s		Good
32	Stand, fryers	Patched together	Discard
33	Fryer	Star 116	Fair
33	Fryer	Star 116	Fair
34	Stand, griddles	Patched together	Discard
35	Griddle, 36" electric	Star	Fair
35	Griddle, 36" electric	Star	Fair
36	Spreader cabinet, 18"	Market Forge	Retire
37	Hot plates in cabinet, 18"	Market Forge	Retire
38	Double convection oven	Market Forge	Retire
39	Exhaust canopy, 12'x7'		Non-code, discard
40	Fire suppress. system, wet chemical	RangeGuard	Enlarge & relocate
41	Reach-in refrigerator	Koch M-2	Good, old
42	Table, 72x30, s/s, rack over		Good, rack non-code
43	Table, 72x30, s/s, one drawer		Good
43	Table, 72x30, s/s, one drawer		Good
44	Table, 72x30, s/s, two drawers		Good
45	Film sealer		Good

46	Manual slicer	Hobart 1612	Aging, retire to standby
47	Reach-in refrigerator	Koch M-2	Good, old
48	Table, 72x30, s/s		Good
49	Serving counter w/7 wells		Discard
50	Table, 72x30, s/s, shelf removed		Fair
51	Serving counter, flat top		Discard
52	Milk cooler, 8 case	Beverage Air	Poor
53	Serving counter, flat top, 92x42		Discard
54	Table, 72x30, s/s		Good
55	Soiled dish table		Probably replace
56	Garbage disposer		Unknown
57	Garbage disposer		Unknown
58	Hose reel		Aged, replace
59	Circular warewasher	Hobart	Aged, consider retiring
60	Hot water booster	Hubbell	Replace
61	Hand sink	Legion	Fair
62	Cooler/freezer	Brown, 1996 purchase	Good, enlargeable and relocatable
63	Cooler/freezer shelving	1996 purchase	Good
64	Walk-in freezer	Early 1960's	Aged, retire
65	Storeroom shelving		Room secured, not seen

Note: List is of material seen during visit. No input from Owner or staff regarding hidden problems.

L. Hazardous Materials - Diversified Environmental Corporation

L1. Summary

• The following is a summary of the potential environmental issues observed by Diversified Asbestos Inspector, Matt Dolan and Lead Inspector, Scott Clark during a walkthrough of the subject property. The walkthrough occurred on August 1 & 2, 2002 and included a review of the asbestos presently identified in the building, additional suspect asbestos materials that may impact renovation, PCB/Non-PCB ballasts & tubes, lead paint and underground storage tanks.

Earlier surveys were completed in accordance with AHERA regulations. These are EPA requirements for documenting Hazardous Materials in schools. Notably, AHERA does not require exterior, or inaccessible, materials to be addressed.

This review notes suspect asbestos containing materials at exterior and inaccessible locations. Testing of materials, to confirm the presence of asbestos, was not done as part of this review. A full NESHAP survey must be performed prior to any renovation, construction, or abatement project.

Based on the walkthrough and limited testing, DEC has prepared a cost estimate for removal of materials at the subject site. Table I contains a cost breakdown for the various materials. Please note that such materials as foundation mastics, mastic on bl ock and underground transite pipe are only rough estimates and may not be accurate with regard to costs. Also, as these materials are assumed, they may not exist at all, therefore cost impact should take these factors into consideration. Prior to any renovation work these assumptions would need to be verified to avoid unnecessarily inflating or deflating the costs.

L2. Asbestos

• Various suspect and tested asbestos-containing materials were observed throughout the building. They included such materials as floor tile & mastic, pipe, boiler, breeching, tank, exhaust & fitting insulation, contaminated soil (i.e. in crawl spaces, etc.), glue daubs (i.e. 1x1 ceiling tiles, etc.), chalkboards, plasters, hoods and window caulking & glazing. In addition, other materials such as roofing material, foundation mastic, mastic on block and underground transite pipe was also assumed to be present. The condition of these materials varied with most in generally good condition and some in need of repair or removal. Any of these materials that would be disturbed would require abatement and in some cases would need to be inspected and tested to verify asbestos content. Appendix A contains a copy of the locations of previously identified asbestos as well as other assumed materials.

L3. Lead Based Paint

• Lead paint was observed throughout the building on most painted surfaces, including walls. The Occupational Safety & Health Administration has a zero tolerance for lead paint and any amount of lead in paint would constitute need for compliance. In occupational setting, it may include such items as making paint intact, exposure assessment monitoring and hazard communication. However, if building is to be renovated additional items would also be required such as, worker protection, medical monitoring, disposal testing, as well as proper disposal depending on lead levels. Appendix B contains a breakdown of the limited testing performed at the building.

L4. PCB/Non-PCB Ballasts

• Potentially PCB containing ballasts and florescent tubes were observed throughout the building. These materials are considered hazardous and require proper disposal when removed. No signs of any leaking ballasts or tubes were noted and no action is required until these materials are planned for disposal. It should be noted that although not hazardous, non-PCB ballasts have special disposal requirements due to oil. It is also assumed that the Reading Public Schools under their normal building management activities would handle any stored chemical products in the building.

L5. Underground Storage Tanks

- Presently, the school building has a 30,000-gallon underground storage tank that is currently in service. This tank was installed around 1970 and utilizes #4 fuel oil. Previously, a 500-gallon diesel tank was removed from the site. Diversified Environmental was provided with no records or information stating that the tank had been tested, however Diversified costs did carry 60 tons for disposal of contaminated soil.

IV. Appendices

A. Site Plan and Plans
B. Exterior
C. Interior
D. Casework
E. HVAC
F. Hazardous Materials

A. Site Plan and Plans

Site Plan

Reading High School

Reading, Massachusetts
October 8, 2002

FLANSBURGH ASSOCIATES
77 North Washington Street
Boston, Massachusetts 02114

Lower Floor Plan

Reading Memorial High School
Existing Conditions
October 8, 2002

FLANSBURGH ASSOCIATES
77 North Washington Street
Boston, Massachusetts 02114

Ground Floor Plan

Reading Memorial High School
Existing Conditions
October 8, 2002

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77 North Washington Street
Boston, Massachusetts 02114

- CORE
- CUSTODIAL / SERVICE
- ADMIN. / GUIDANCE / HEALTH
- SCIENCE
- MATH
- SOCIAL STUDIES
- ENGLISH
- FOREIGN LANGUAGE
- BUSINESS
- SPECIAL EDUCATION
- ATHLETICS
- PHYSICAL EDUCATION
- ARTS
- TECHNICAL EDUCATION
- PRE-K
- TOWN USE

First Floor Plan

Reading Memorial High School
Existing Conditions
October 8, 2002

FLANSBURGH ASSOCIATES
77 North Washington Street
Boston, Massachusetts 02114

Second Floor Plan

Reading Memorial High School
Existing Conditions
October 8, 2002

FLANSBURGH ASSOCIATES
77 North Washington Street
Boston, Massachusetts 02114

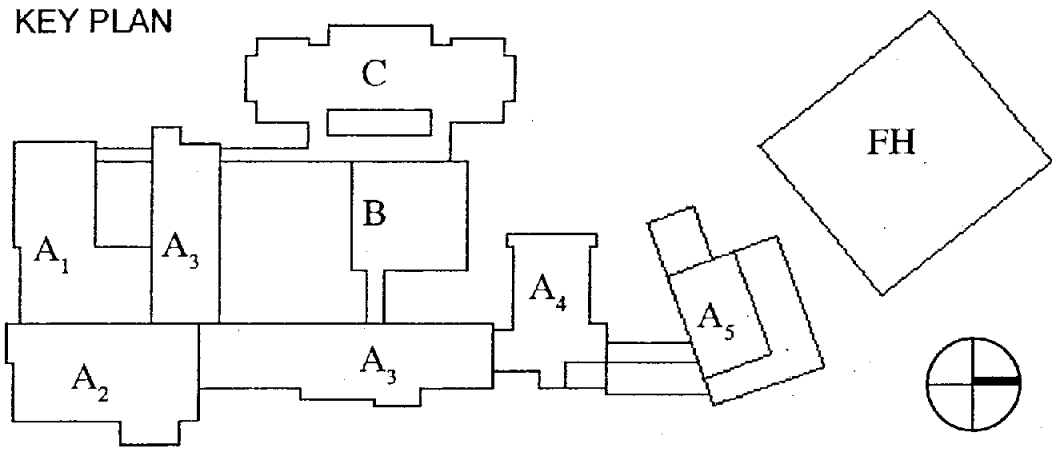
B. Exterior

READING HIGH SCHOOL
EXISTING EXTERIOR SURVEY

Numbers correspond to conditions on exterior elevations.

1. Window frame caulk is dry and brittle . Remove and replace caulk. Remove chipped paint, sand and repaint.
2. Masonry shelf steel angle is exposed to elements.
3. Missing 3/8" joint @ loose lintel above window/door. Loose lintel to be sanded & refinished.
4. Control joint caulking is dry and brittle. Remove & replace caulk.
5. Extensive masonry cracks.
6. Extensive mortar joint cracks.
7. Remove bird nest. Replace screen.
8. Door frame caulk is dry and brittle. Remove and replace caulk. Remove chipped paint, sand and refinish.
9. Remove caulk at louvers and replace.
10. Rake out joint at stone sill and repoint.
11. Rake out joint in stone and precast panels and repoint.
12. Remove loose parging and repair to match.
13. Remove graffitti, paint, asphalt on exterior surfaces.
14. Metal infill panel is rusting.
15. Replace broken glass block.
16. Rake out rowlock sill and repoint.

KEY PLAN



FLANSBURGH ASSOCIATES

EXISTING BUILDING EXTERIOR SURVEY

Segment: A1

CONDITION KEY CRITERIA:
0- Poor - (not servicable or failed), **1**-Poor/Fair - (failure expected), **2**-Fair - (servicable, maintenance required)
3- Fair/Good - (functioning, maintained), **4**- Good - (fully functional, new), **N/A**- Not applicable/ not available, **M**- Missing

GENERAL DESCRIPTION

Basement/Foundations (general condition, non-structural evaluation):

Veneer
[ ] Rubble/stone [ ] Struc. Tile [2] Concrete
[ ] Brick [ ] Conc. Block [ ] Other

Condition:
Small cracks and loose parging.

Backup
[ ] Rubble/stone [ ] Struc. Tile [x] Concrete
[ ] Brick [ ] Conc. Block [ ] Other

Condition:

Exterior walls (general condition, non-structural evaluation):

Veneer
[2] Brick [ ] Concrete [ ] Curtain Wall
[ ] Conc. Block [ ] Wood [ ] Other
[ ] Stone [ ] Metal panel

Condition:
Extensive masonry cracks.
Provide bird sceen at brick opening.
Repair rowlock sill (rake and repointl)

Joints
[2] Mortar [ ] Other
[ ] Sealant

Condition:
Extensive masonry joint cracks.
Control joints are dry and brittle.
Missing joints at loose lintel above windows.

Backup
[ ] Brick [ ] Struc. Tile [ ] Mtl. Studs
[x] Conc. Block [ ] Wood [ ] Other
[ ] None [ ] Concrete

Condition:

Architectural Trim (soffits, fascias, columns, etc.):
[1] Wood [ ] Precast Conc.
[ ] Stucco [2] Metal - Type & Finis Copper
[ ] Stone [ ] Other

Condition:
Replace wood soffit at music/ cafeteria entry.
Copper fascia is dented thoughout.

Windows:

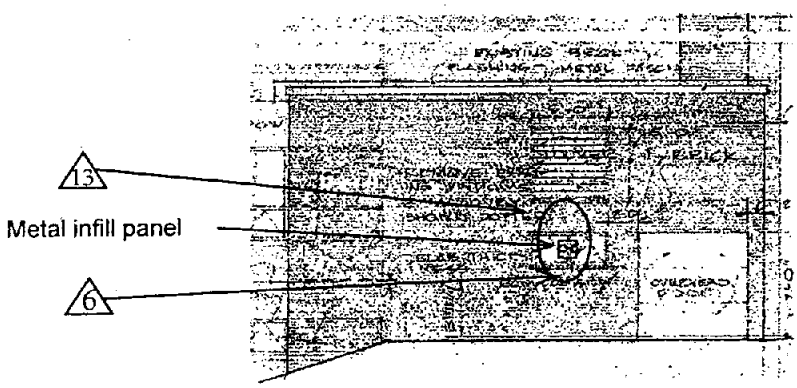
Frames/Sash
[ ] Wood [1] Steel [ ] Other
[ ] Aluminum - Finish _____

Condition:
Caulk is brittle and cracking.
Paint is chipped and frame is rusting.

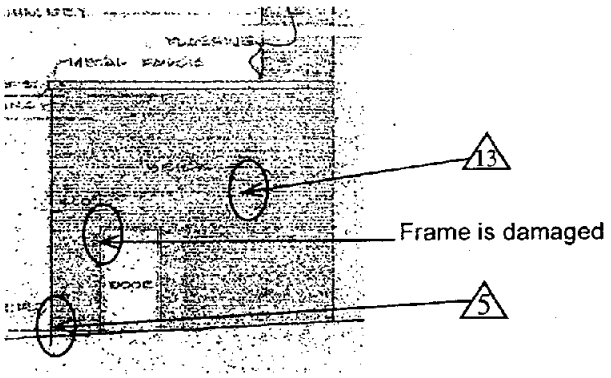
Glazing
[1] Single Glass [1] Plastic/Lexan [ ] Spandrel Glass
[ ] Insul. Glass [ ] Insul. Panel [0] Other

Condition:
Replace plexi and metal infill with clear glass.

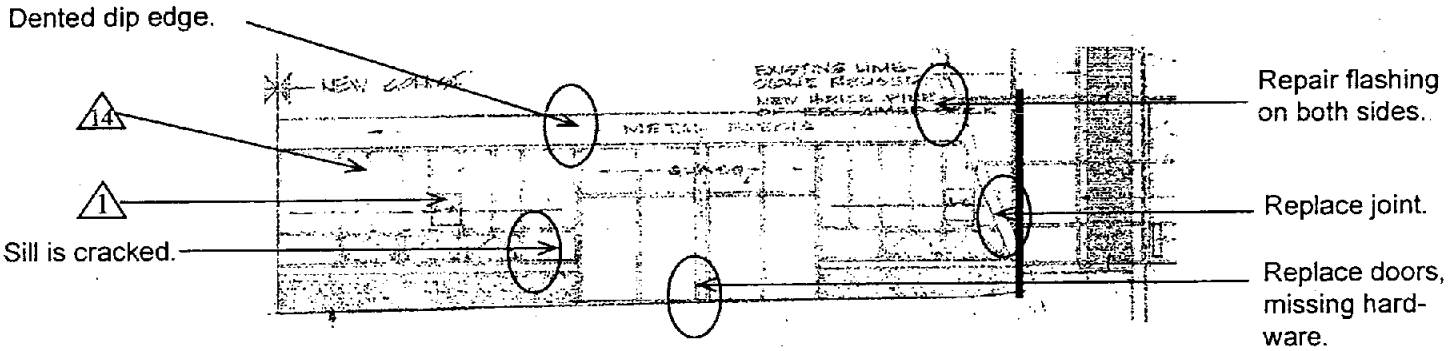
77 North Washington Street Boston, MA 02114 T 617-367-3970 F 617-720-7873



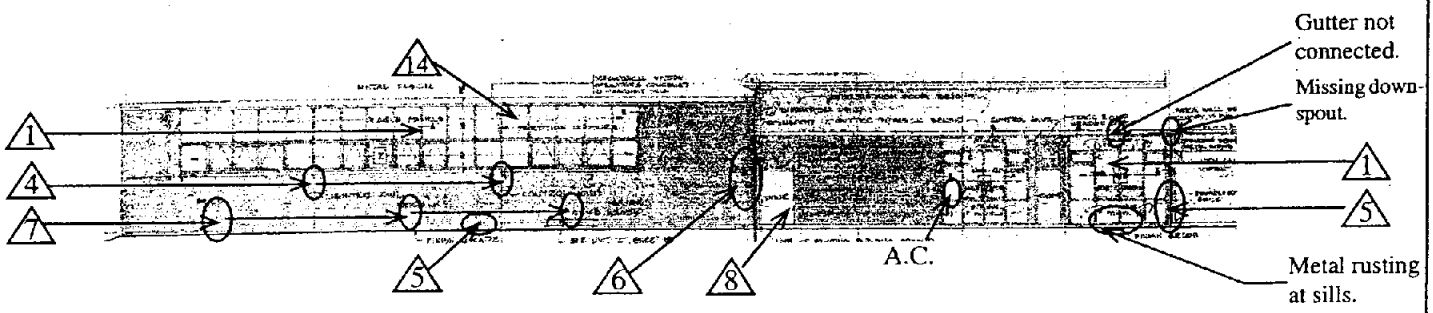
West Elevation / Seg.A_1



South Elevation / Seg.A_1



West Elevation / Seg.A_1



South Elevation / Seg.A_1

West Elevation / Seg.A_1

West Elevation / Seg.A_1

South Elevation / Seg.A_1

South Elevation / Seg.A_1

West/South Elevation / Seg.A_1

EXISTING BUILDING EXTERIOR SURVEY

Segment: A2

CONDITION KEY CRITERIA:
0- Poor - (not servicable or failed), **1**-Poor/Fair - (failure expected), **2**-Fair - (servicable, maintenance required)
3- Fair/Good - (functioning, maintained), **4**- Good - (fully functional, new), **N/A**- Not applicable/ not available, **M**- Missing

GENERAL DESCRIPTION

Basement/Foundations (general condition, non-structural evaluation):

Veneer
- [ ] Rubble/stone
- [ ] Struc. Tile
- [2] Concrete
- [ ] Brick
- [ ] Conc. Block
- [ ] Other

Condition: Cracking at concrete/brick joint

Backup
- [ ] Rubble/stone
- [ ] Struc. Tile
- [x] Concrete
- [ ] Brick
- [ ] Conc. Block
- [ ] Other

Condition:

Exterior walls (general condition, non-structural evaluation):

Veneer
- [2] Brick
- [ ] Concrete
- [ ] Curtain Wall
- [ ] Conc. Block
- [ ] Wood
- [ ] Other
- [2] Stone
- [ ] Metal panel

Condition: Extensive masonry joint cracks.
Exposed re-bar in concrete cornice
Cracks in stone panel

Joints
- [2] Mortar
- [ ] Other
- [ ] Sealant

Condition: Extensive masonry joint cracks.
Rake joints at stone sill and panel and replace.

Backup
- [x] Brick
- [ ] Struc. Tile
- [ ] Mtl. Studs
- [x] Conc. Block
- [ ] Wood
- [ ] Other
- [ ] None
- [ ] Concrete

Condition:

Architectural Trim (soffits, fascias, columns, etc.):
- [ ] Wood
- [ ] Precast Conc.
- [ ] Stucco
- [ ] Metal - Type & Finish _____
- [ ] Stone
- [ ] Other

Condition:

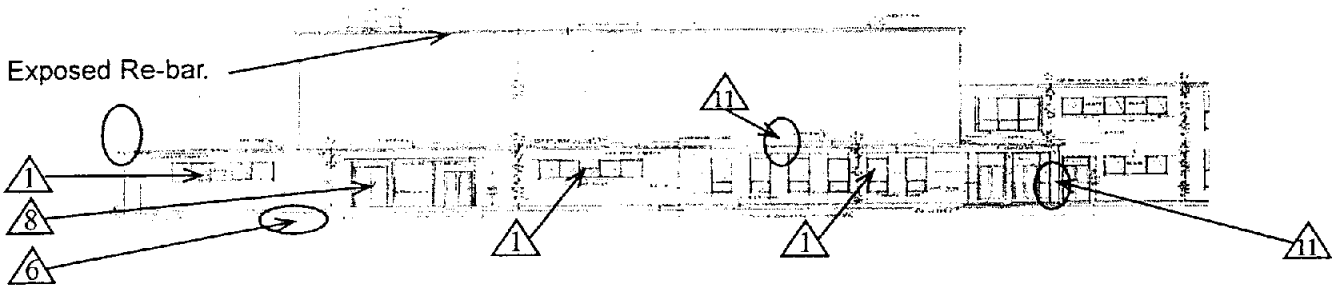
Windows:

Frames/Sash
- [ ] Wood
- [1] Steel
- [ ] Other
- [ ] Aluminum - Finish _____

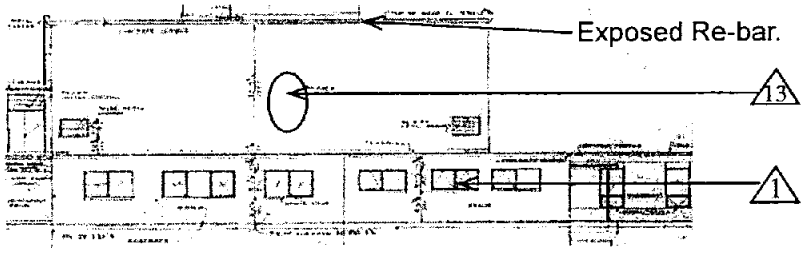
Condition: Caulk is brittle and cracking.
Paint is chipped and frame is rusting.

Glazing
- [1] Single Glass
- [1] Plastic/Lexan
- [ ] Spandrel Glass
- [ ] Insul. Glass
- [ ] Insul. Panel
- [ ] Other

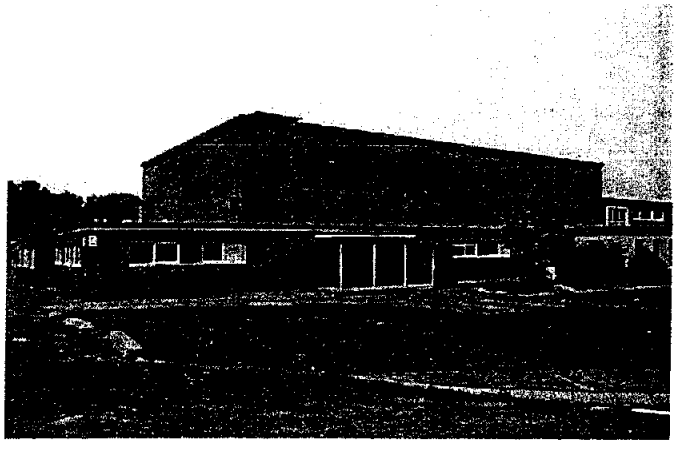
Condition: Replace plexi and metal infill with clear glass.



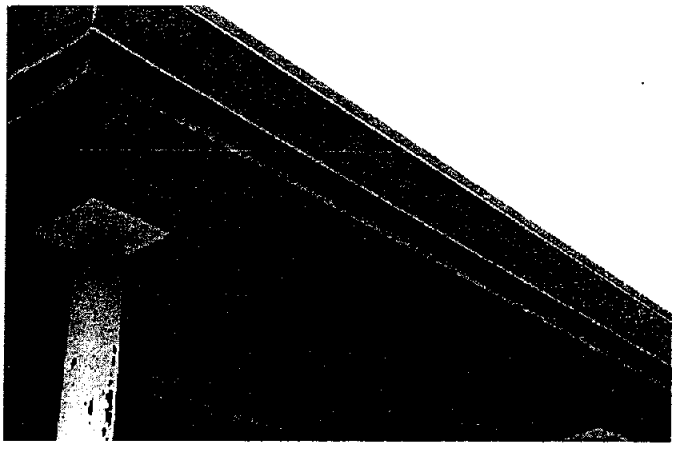
South Elevation / Seg.A_2



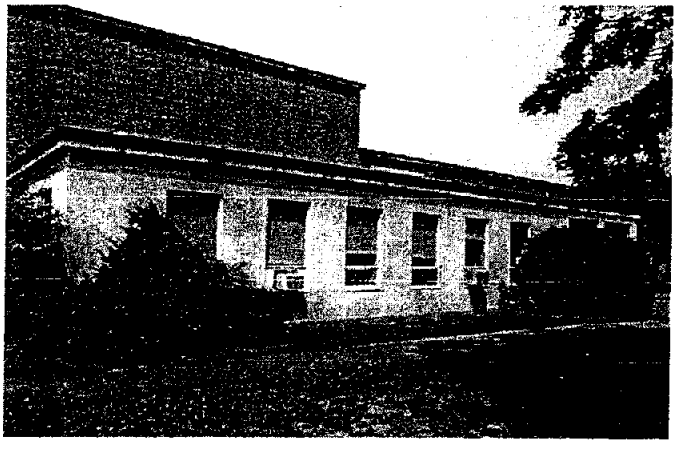
West Elevation / Seg.A_2



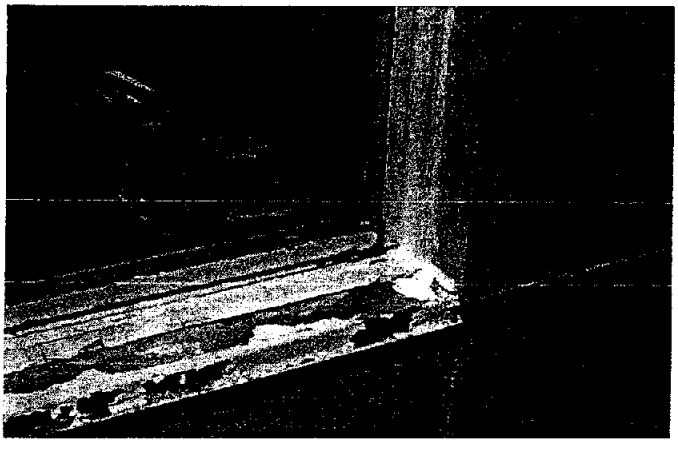
East Elevation / Seg.A_2



East Elevation / Seg.A_2

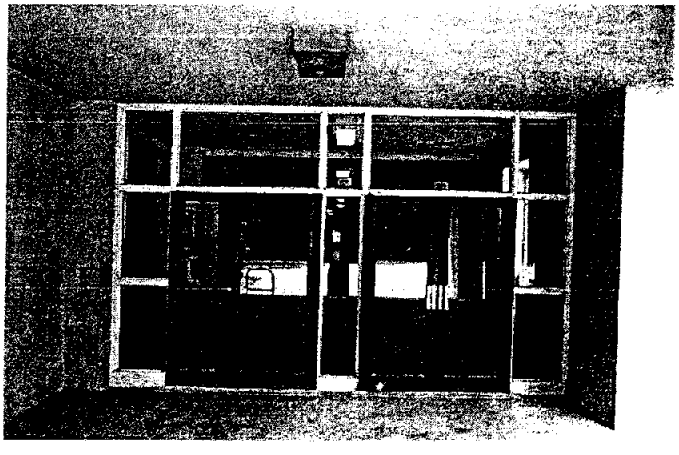


East Elevation / Seg.A_2



East Elevation / Seg.A_2

East Elevation / Seg.A_2



East Elevation / Seg.A_2

EXISTING BUILDING EXTERIOR SURVEY

Segment: A3

CONDITION KEY CRITERIA:
0- Poor - (not servicable or failed), **1**-Poor/Fair - (failure expected), **2**-Fair - (servicable, maintenance required)
3- Fair/Good - (functioning, maintained), **4**- Good - (fully functional, new), **N/A**- Not applicable/ not available, **M**- Missing

GENERAL DESCRIPTION

Basement/Foundations (general condition, non-structural evaluation):

Veneer
- [ ] Rubble/stone
- [ ] Struc. Tile
- [2] Concrete
- [ ] Brick
- [ ] Conc. Block
- [ ] Other

Condition:
Repair loose parging to match.

Backup
- [ ] Rubble/stone
- [ ] Struc. Tile
- [x] Concrete
- [ ] Brick
- [ ] Conc. Block
- [ ] Other

Condition:

Exterior walls (general condition, non-structural evaluation):

Veneer
- [2] Brick
- [ ] Concrete
- [ ] Curtain Wall
- [ ] Conc. Block
- [ ] Wood
- [ ] Other
- [2] Stone
- [ ] Metal panel

Condition:
Exposed metal lintel is rusting
Remove copper and water stains
Exposed re-bar in concrete cornice

Joints
- [2] Mortar
- [ ] Other
- [ ] Sealant

Condition:
Extensive masonry joint cracks.
Rake out jnts. at stone sill and panel and repoint.

Backup
- [x] Brick
- [ ] Struc. Tile
- [ ] Mtl. Studs
- [x] Conc. Block
- [ ] Wood
- [ ] Other
- [ ] None
- [ ] Concrete

Condition:

Architectural Trim (soffits, fascias, columns, etc.):
- [ ] Wood
- [ ] Precast Conc.
- [ ] Stucco
- [ ] Metal - Type & Finish _____
- [ ] Stone
- [ ] Other

Condition:

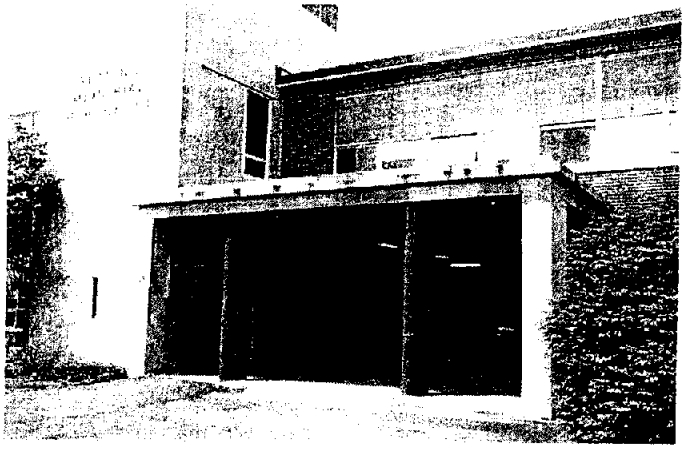
Windows:

Frames/Sash
- [ ] Wood
- [1] Steel
- [ ] Other
- [ ] Aluminum - Finish _____

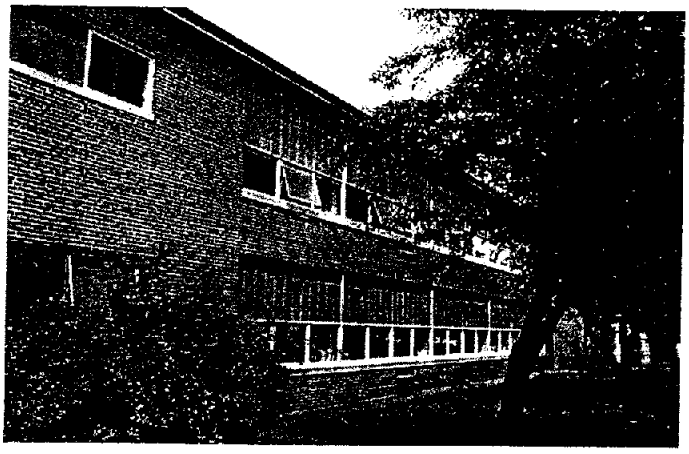
Condition:
Caulk is brittle and cracking.
Paint is chipped and frame is rusting.

Glazing
- [1] Single Glass
- [1] Plastic/Lexan
- [ ] Spandrel Glass
- [ ] Insul. Glass
- [ ] Insul. Panel
- [2] Glass block

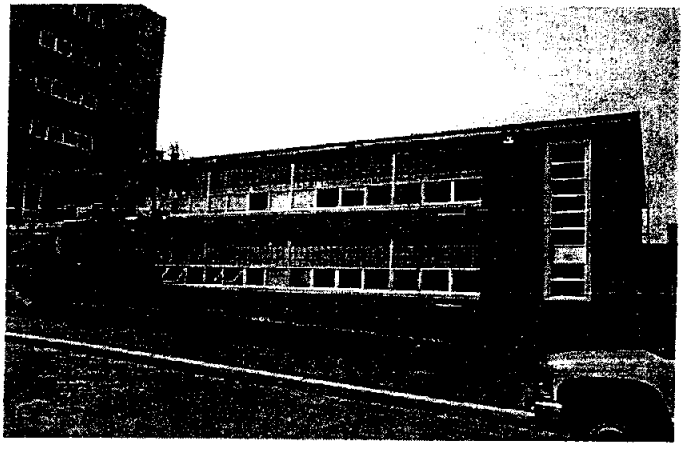
Condition:
Replace plexi and metal infill with clear glass.
Broken glass block throughout.



East Elevation / Seg.A_3

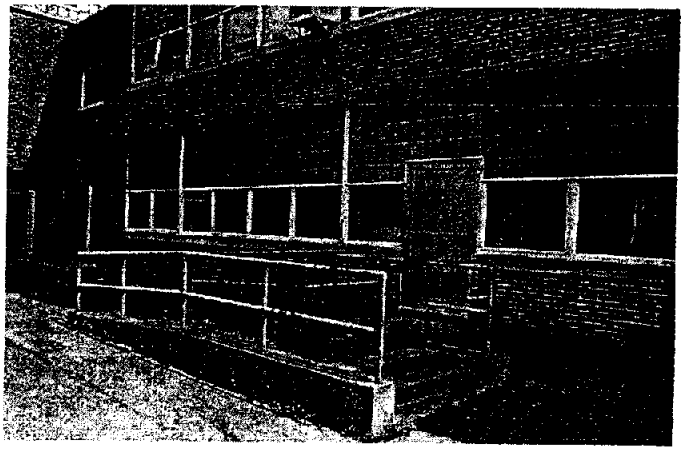


East Elevation / Seg.A_3

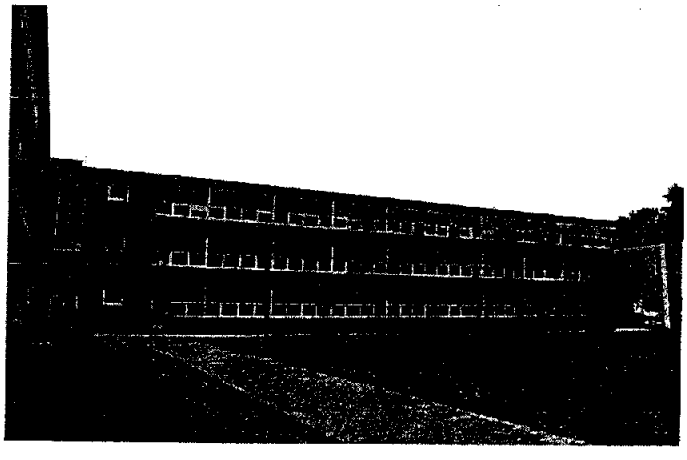


East Elevation / Seg.A_3

West Elevation / Seg.A_3



West Elevation / Seg.A_3



North Elevation / Seg.A_3

EXISTING BUILDING EXTERIOR SURVEY

Segment: A4

CONDITION KEY CRITERIA:
0- Poor - (not servicable or failed), **1**-Poor/Fair - (failure expected), **2**-Fair - (servicable, maintenance required)
3- Fair/Good - (functioning, maintained), **4**- Good - (fully functional, new), **N/A**- Not applicable/ not available, **M**- Missing

GENERAL DESCRIPTION

Basement/Foundations (general condition, non-structural evaluation):

Veneer
[ ] Rubble/stone [ ] Struc. Tile [2] Concrete
[ ] Brick [ ] Conc. Block [ ] Other
Condition: Repair loose parging to match existing.

Backup
[ ] Rubble/stone [ ] Struc. Tile [x] Concrete
[ ] Brick [ ] Conc. Block [ ] Other
Condition:

Exterior walls (general condition, non-structural evaluation):

Veneer
[2] Brick [ ] Concrete [ ] Curtain Wall
[ ] Conc. Block [ ] Wood [ ] Other
[2] Stone [ ] Metal panel
Condition: Extensive masonry cracks. Remove copper stains, water stains and asphalt on masonry.

Joints
[2] Mortar [ ] Other
[ ] Sealant
Condition: Extensive masonry joint cracks. Rake out jnts. at stone sill and panel and repoint.

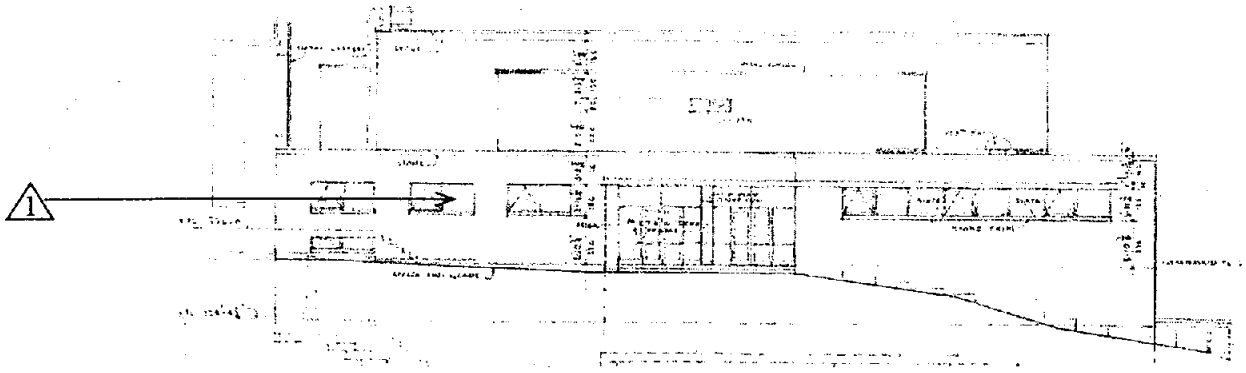
Backup
[x] Brick [ ] Struc. Tile [ ] Mtl. Studs
[x] Conc. Block [ ] Wood [ ] Other
[ ] None [ ] Concrete
Condition:

Architectural Trim (soffits, fascias, columns, etc.):
[ ] Wood [ ] Precast Conc.
[ ] Stucco [ ] Metal - Type & Finish _____
[ ] Stone [ ] Other
Condition:

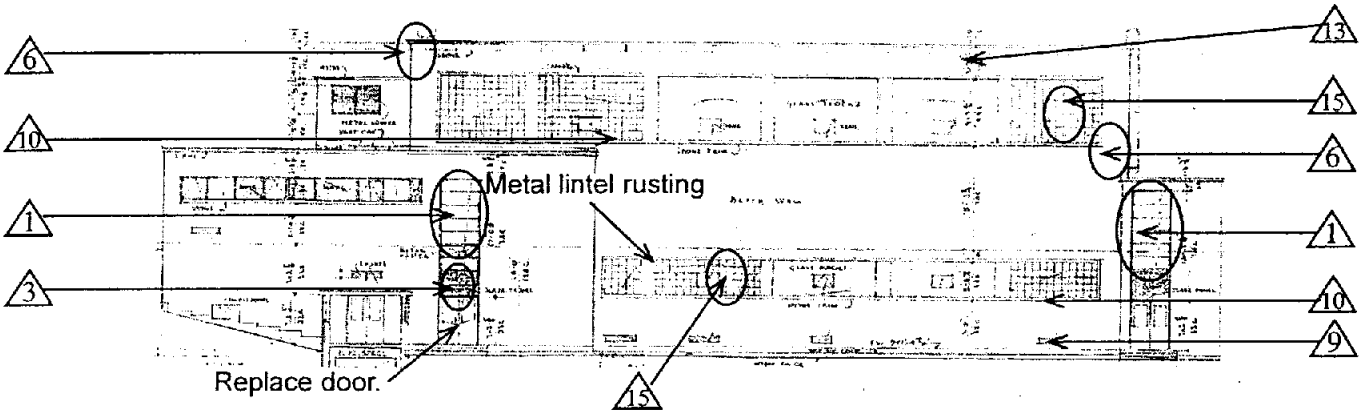
Windows:

Frames/Sash
[ ] Wood [1] Steel [ ] Other
[ ] Aluminum - Finish _____
Condition: Caulk is brittle and cracking. Paint is chipped and frame is rusting.

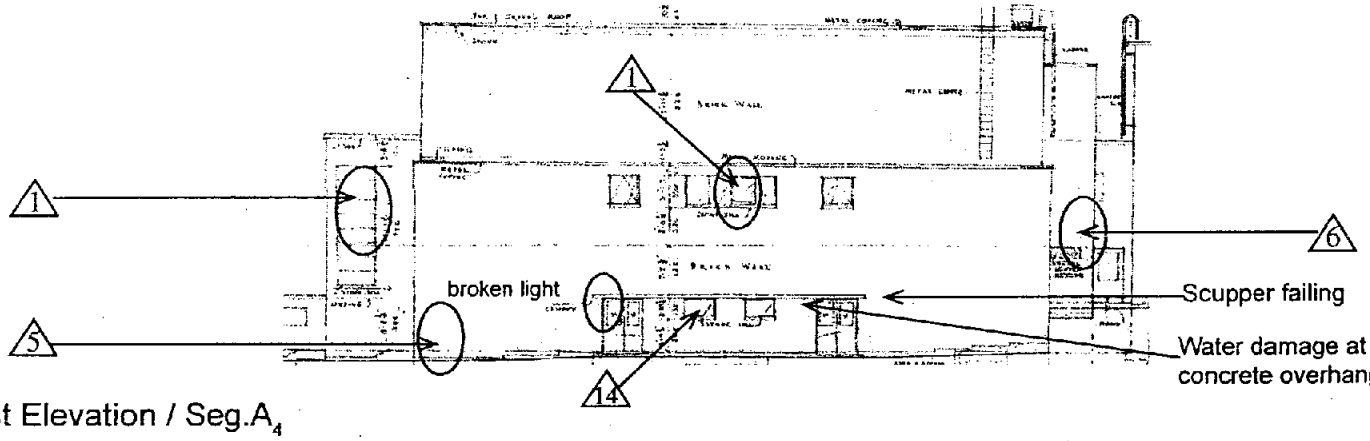
Glazing
[1] Single Glass [1] Plastic/Lexan [ ] Spandrel Glass
[ ] Insul. Glass [ ] Insul. Panel [2] Glass block
Condition: Replace plexi and metal infill with clear glass. Broken glass block throughout.



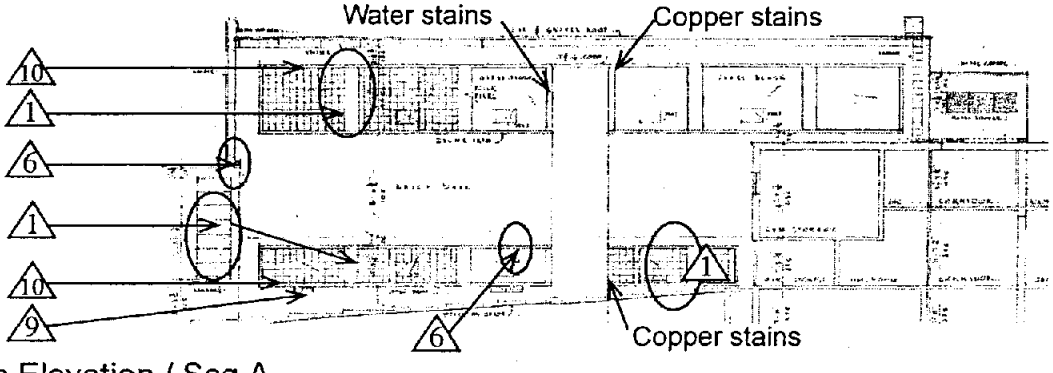
East Elevation / Seg.A_4



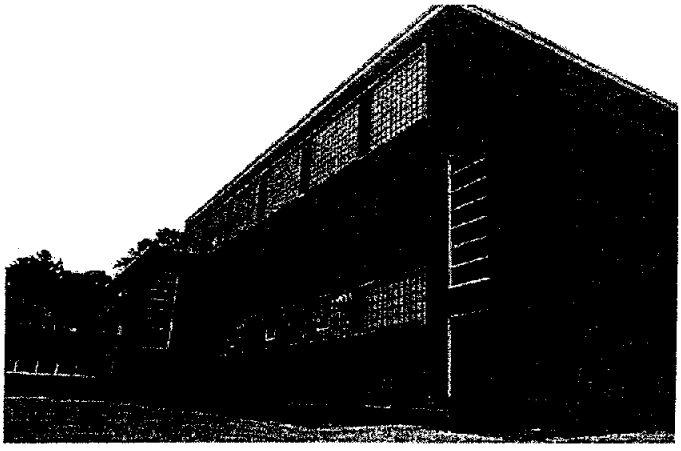
North Elevation / Seg.A_4



West Elevation / Seg.A_4

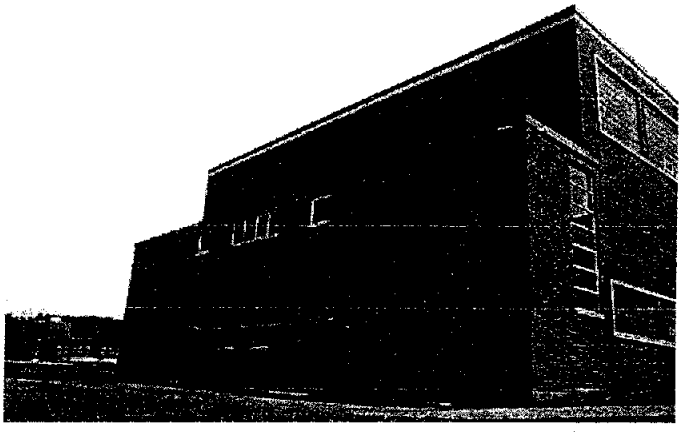


South Elevation / Seg.A_4

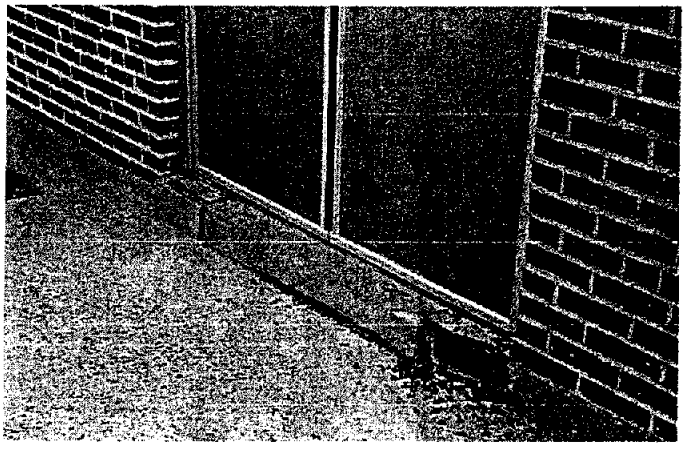


North Elevation / Seg.A_4

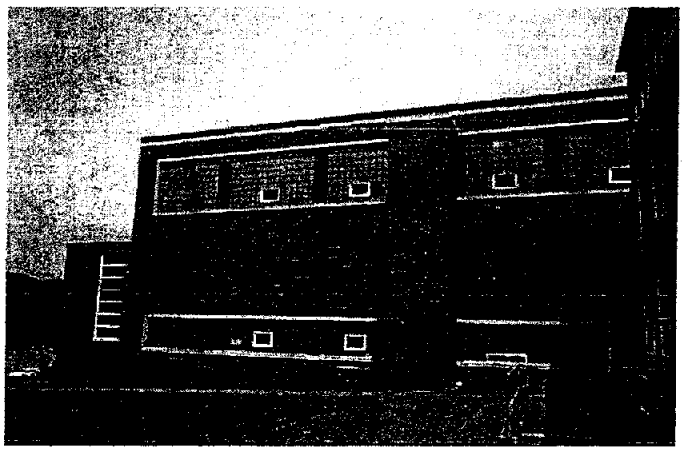
North Elevation / Seg.A_4



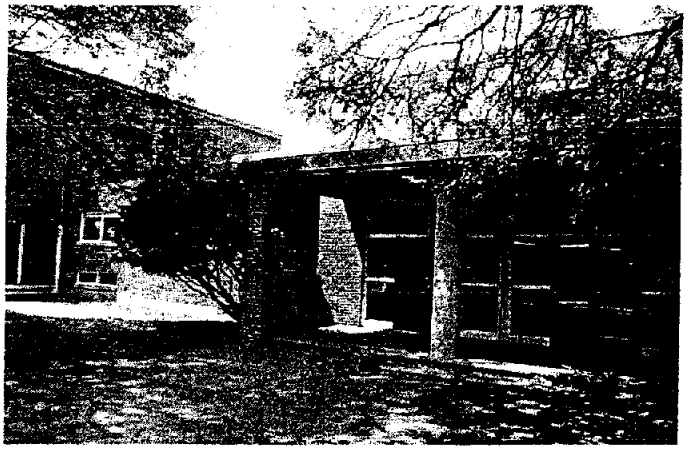
West Elevation / Seg.A_4



West Elevation / Seg.A_4



South Elevation / Seg.A_4



South Elevation / Seg.A_4

EXISTING BUILDING EXTERIOR SURVEY

Segment: A5

CONDITION KEY CRITERIA:
0- Poor - (not servicable or failed), **1**-Poor/Fair - (failure expected), **2**-Fair - (servicable, maintenance required)
3- Fair/Good - (functioning, maintained), **4**- Good - (fully functional, new), **N/A**- Not applicable/ not available, **M**- Missing

GENERAL DESCRIPTION

Basement/Foundations (general condition, non-structural evaluation):

Veneer
[ ] Rubble/stone [ ] Struc. Tile [2] Concrete
[ ] Brick [ ] Conc. Block [ ] Other
Condition: Parging required where concrete is exposed.

Backup
[ ] Rubble/stone [ ] Struc. Tile [X] Concrete
[ ] Brick [ ] Conc. Block [ ] Other
Condition:

Exterior walls (general condition, non-structural evaluation):

Veneer
[2] Brick [ ] Concrete [ ] Curtain Wall
[ ] Conc. Block [ ] Wood [ ] Other
[ ] Stone [3] Metal panel
Condition: Remove copper and water stains
Repair rowlock sill (rake and retool joints)
Copper panels dented in areas

Joints
[2] Mortar [ ] Other
[ ] Sealant
Condition: Extensive masonry joint cracks.
Rake joints at stone sill and panel and replace.
Control joints are dry and brittle.

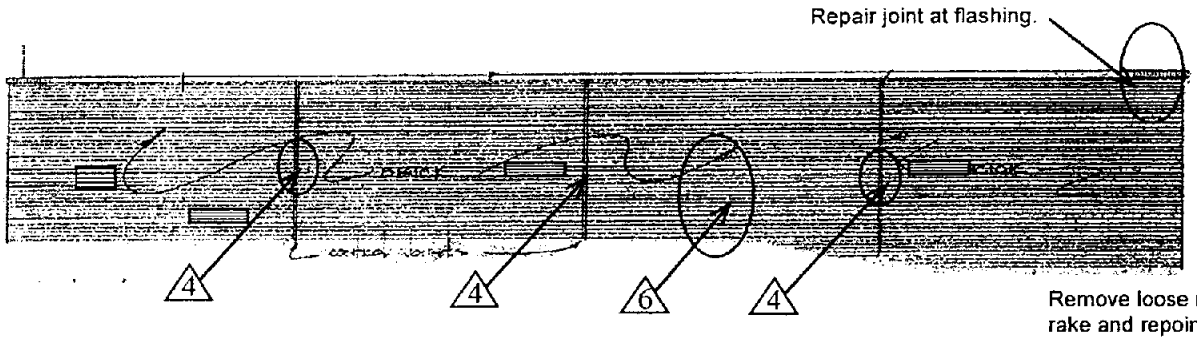
Backup
[ ] Brick [ ] Struc. Tile [ ] Mtl. Studs
[X] Conc. Block [ ] Wood [ ] Other
[ ] None [ ] Concrete
Condition:

Architectural Trim (soffits, fascias, columns, etc.):
[ ] Wood [ ] Precast Conc.
[ ] Stucco [3] Metal - Type & Finish Copper
[ ] Stone [ ] Other
Condition: Repair flashing on east elevation.

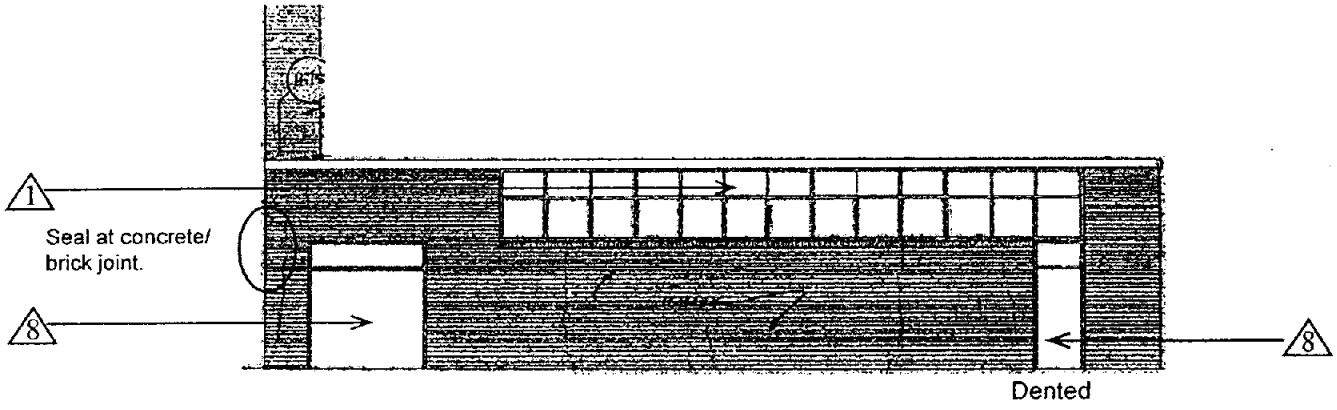
Windows:

Frames/Sash
[ ] Wood [1] Steel [ ] Other
[ ] Aluminum - Finish _____
Condition: Caulk is brittle and cracking.
Paint is chipped and frame is rusting.

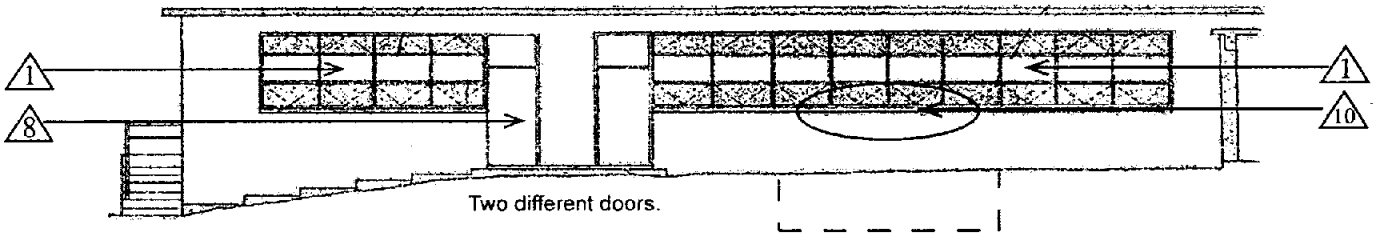
Glazing
[1] Single Glass [1] Plastic/Lexan [ ] Spandrel Glass
[ ] Insul. Glass [ ] Insul. Panel [2] Glass Block
Condition: Replace plexi and metal infill w/ clear glass.
Broken glass block throughout.



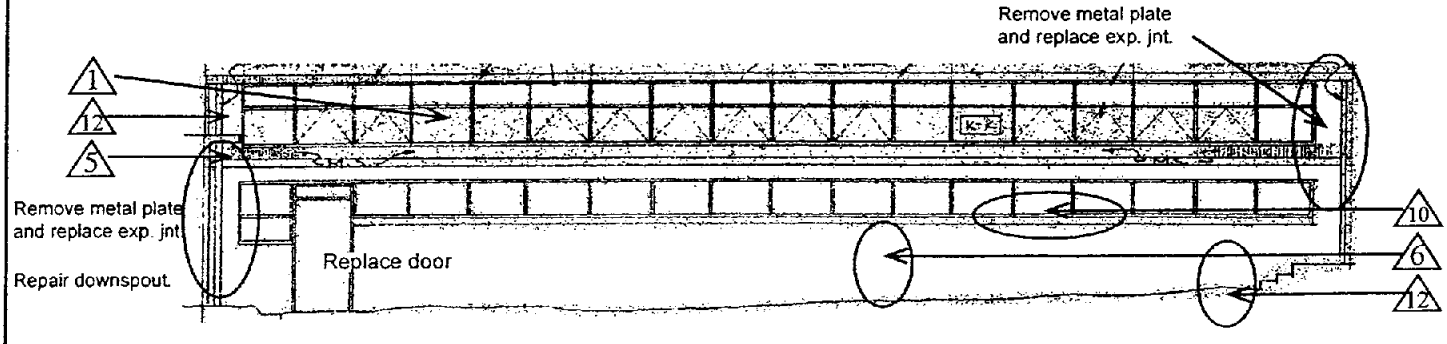
East Elevation / Seg.A_5



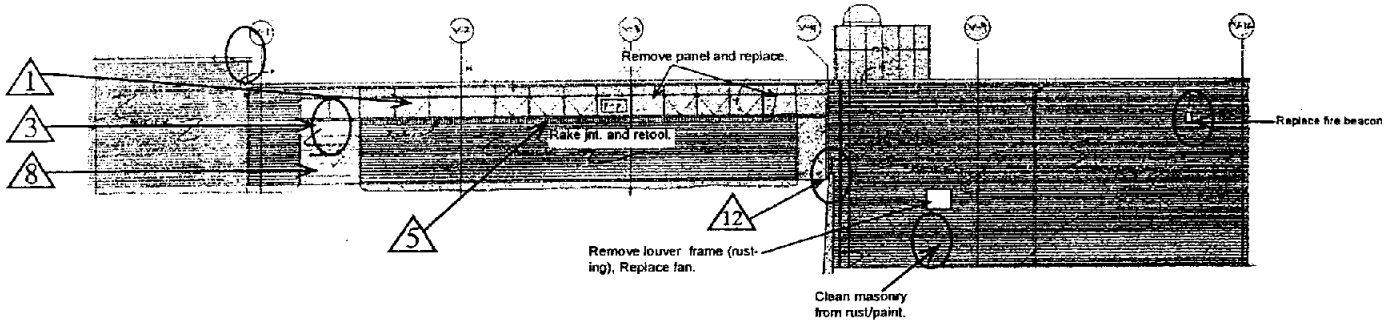
North Elevation / Seg.A_5



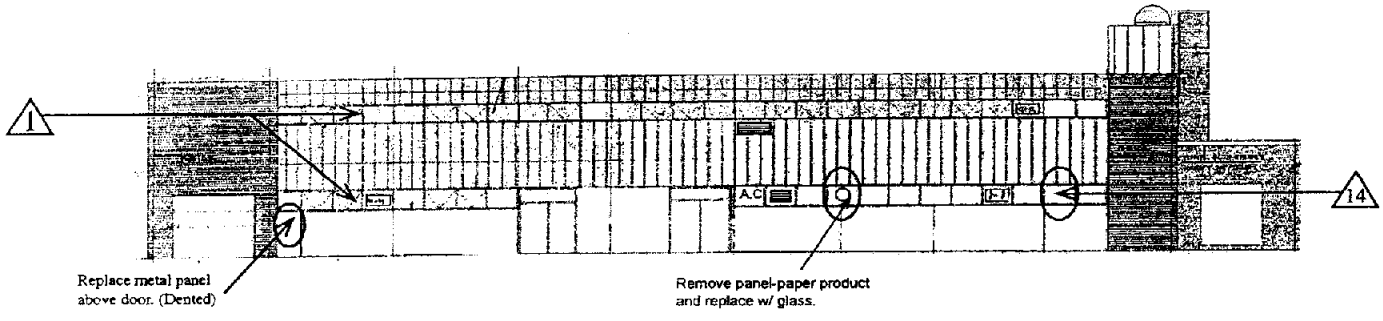
South Elevation / Seg.A_5



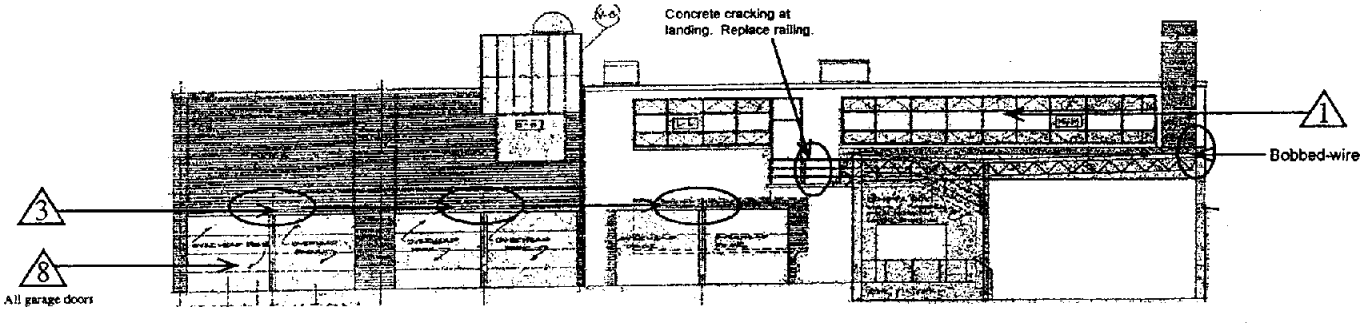
West Elevation / Seg.A_5



East Elevation / Seg.A_5

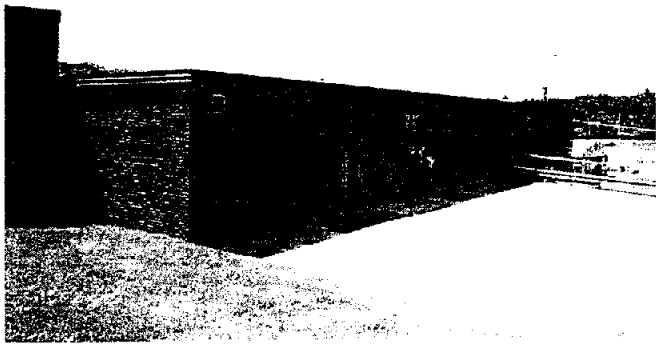


North Elevation / Seg.A_5

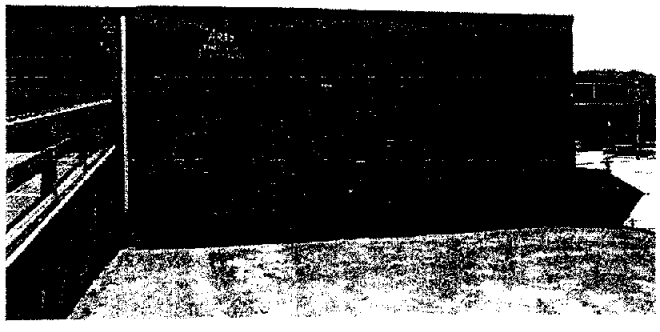


West Elevation / Seg.A_5

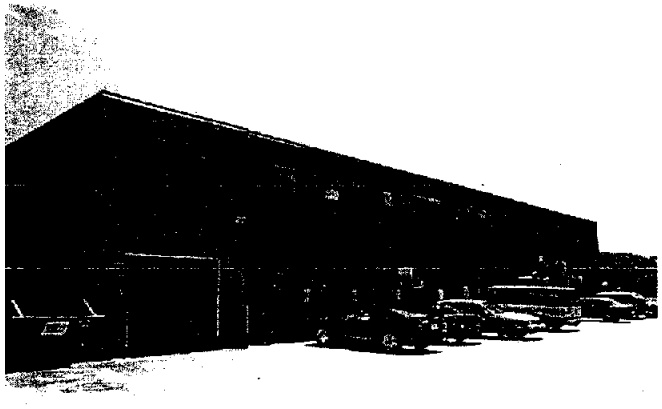
East Elevation / Seg.A_5



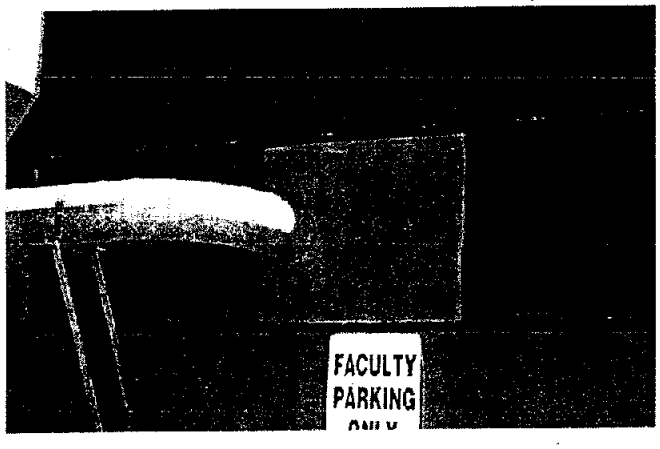
East Elevation / Seg.A_5



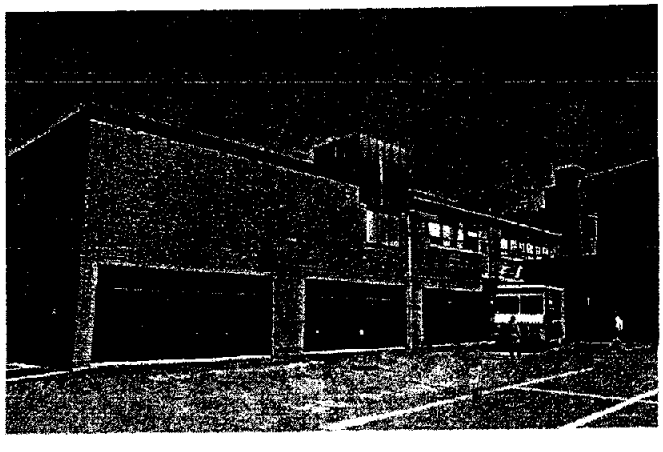
East Elevation / Seg.A_5



North Elevation / Seg.A_5



North Elevation / Seg.A_5



West Elevation / Seg.A_5

EXISTING BUILDING EXTERIOR SURVEY

Segment: B

CONDITION KEY CRITERIA:
0- Poor - (not servicable or failed), **1**-Poor/Fair - (failure expected), **2**-Fair - (servicable, maintenance required)
3- Fair/Good - (functioning, maintained), **4**- Good - (fully functional, new), **N/A**- Not applicable/ not available, **M**- Missing

GENERAL DESCRIPTION

Basement/Foundations (general condition, non-structural evaluation):

Veneer
- [ ] Rubble/stone
- [ ] Struc. Tile
- [2] Concrete
- [ ] Brick
- [ ] Conc. Block
- [ ] Other

Condition:
Repair loose parging to match existing.

Backup
- [ ] Rubble/stone
- [ ] Struc. Tile
- [X] Concrete
- [ ] Brick
- [ ] Conc. Block
- [ ] Other

Condition:

Exterior walls (general condition, non-structural evaluation):

Veneer
- [2] Brick
- [2] Concrete
- [ ] Curtain Wall
- [ ] Conc. Block
- [ ] Wood
- [ ] Other
- [ ] Stone
- [2] Metal panel

Condition:
Extensive masonry cracks.
Remove loose parging and repair to match.
Masonry shelf steel angle expose to elements.
Remove graffiti on brick surface.

Joints
- [2] Mortar
- [ ] Other
- [ ] Sealant

Condition:
Extensive masonry joint cracks.
Control joints are dry and brittle.
Missing joints at loose lintel above windows.

Backup
- [ ] Brick
- [ ] Struc. Tile
- [ ] Mtl. Studs
- [X] Conc. Block
- [ ] Wood
- [ ] Other
- [ ] None
- [ ] Concrete

Condition:

Architectural Trim (soffits, fascias, columns, etc.):
- [ ] Wood
- [ ] Precast Conc.
- [ ] Stucco
- [3] Metal - Type & Finish Copper
- [ ] Stone
- [ ] Other

Condition:

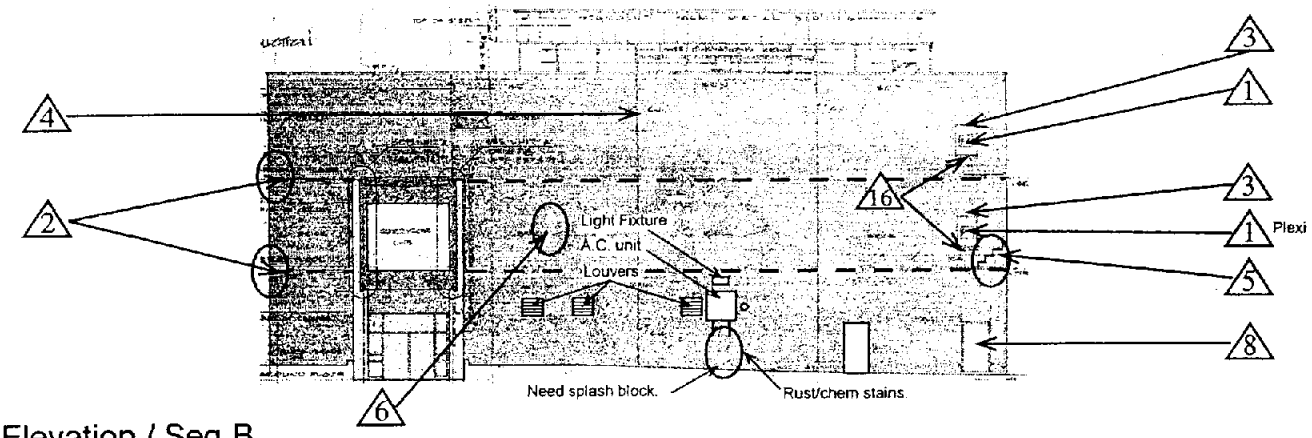
Windows:

Frames/Sash
- [ ] Wood
- [1] Steel
- [ ] Other
- [ ] Aluminum - Finish _____

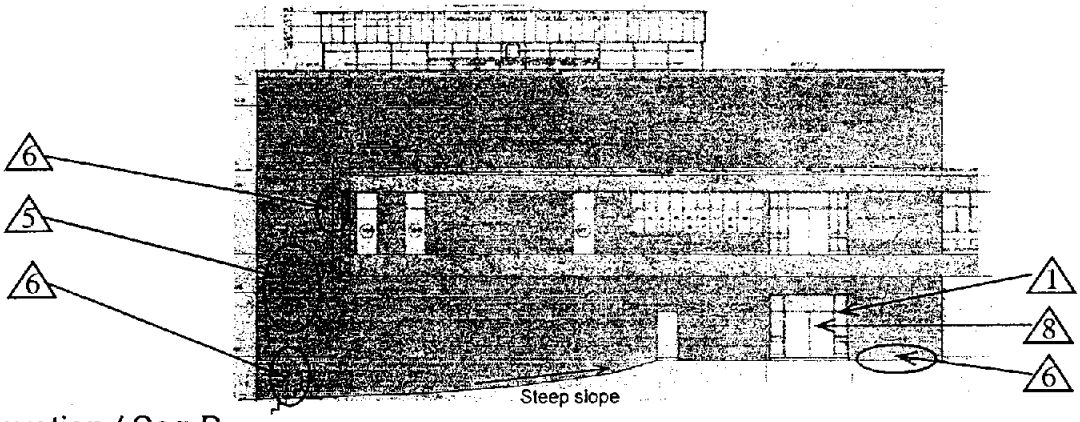
Condition:
Caulk is dry and brittle.
Paint is chipped and frame is rusting.

Glazing
- [1] Single Glass
- [1] Plastic/Lexan
- [ ] Spandrel Glass
- [ ] Insul. Glass
- [ ] Insul. Panel
- [ ] Other

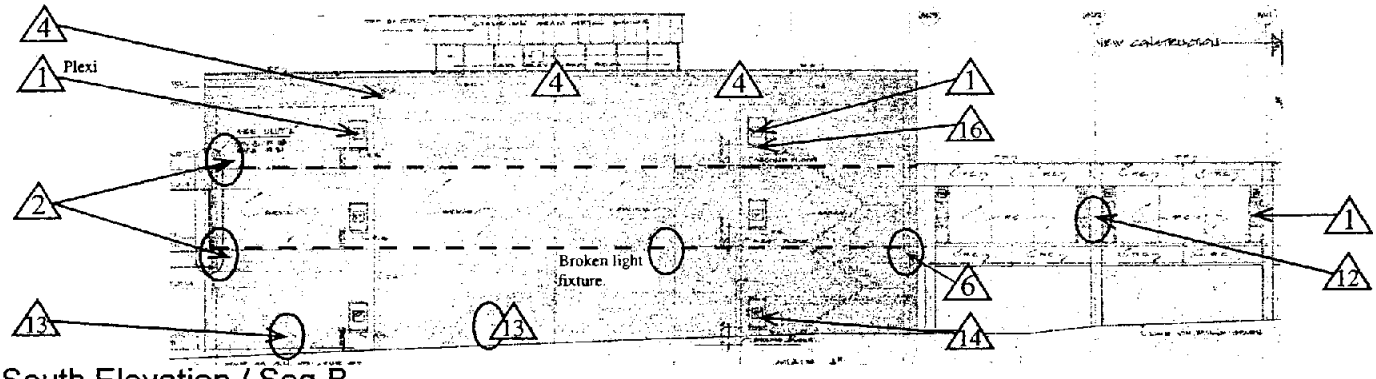
Condition:
Replace plexi and metal infill with planel with clear glass.



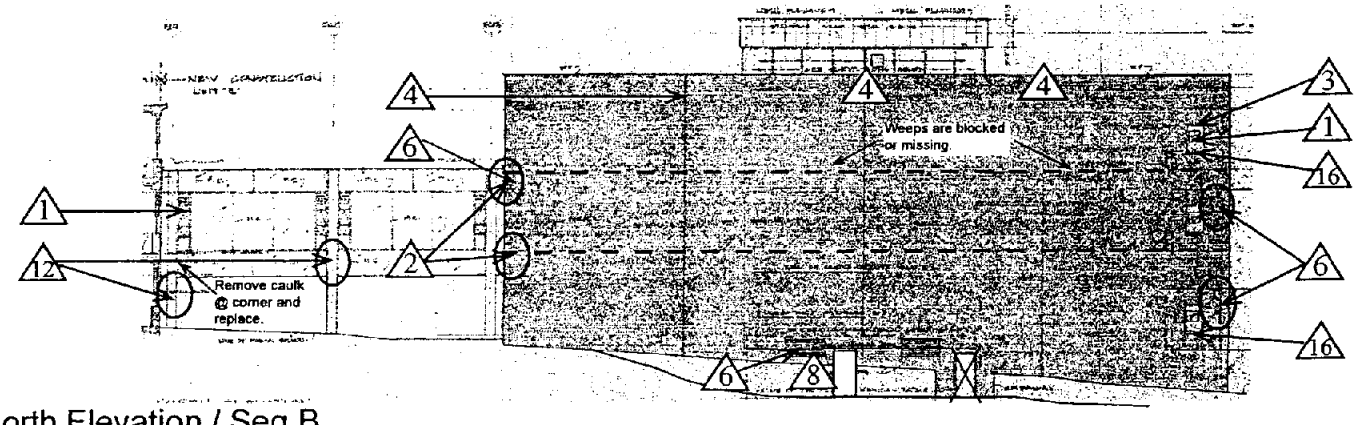
East Elevation / Seg.B



West Elevation / Seg.B

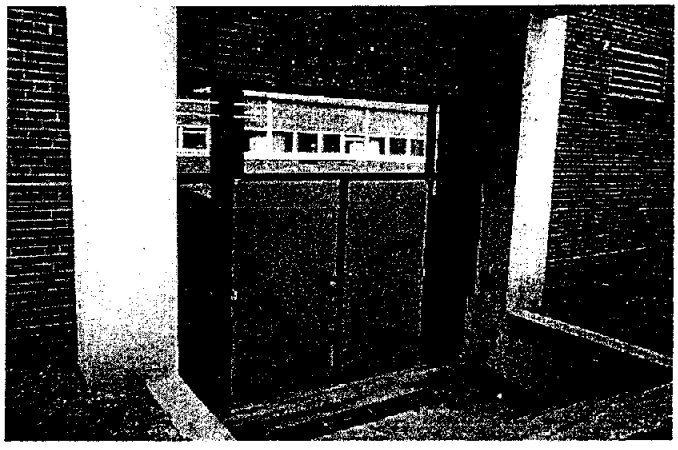


South Elevation / Seg.B

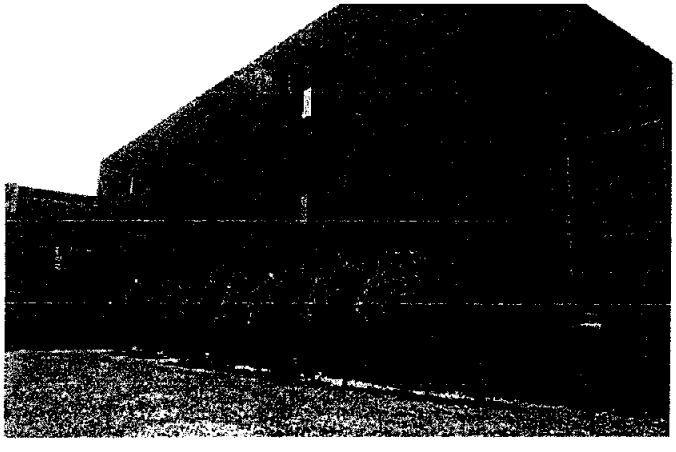


North Elevation / Seg.B

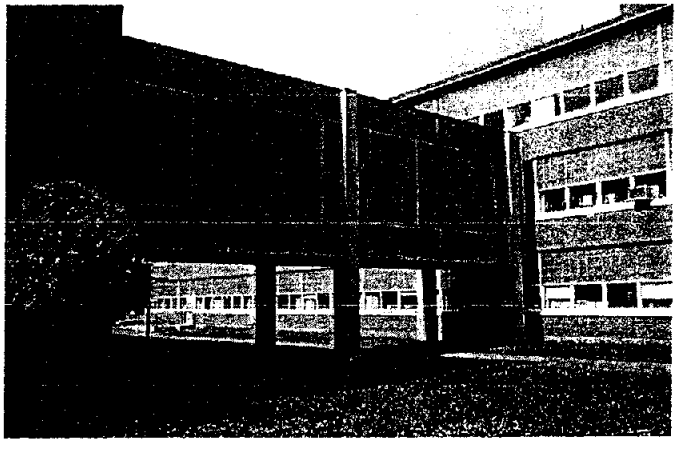
East Elevation / Seg.B



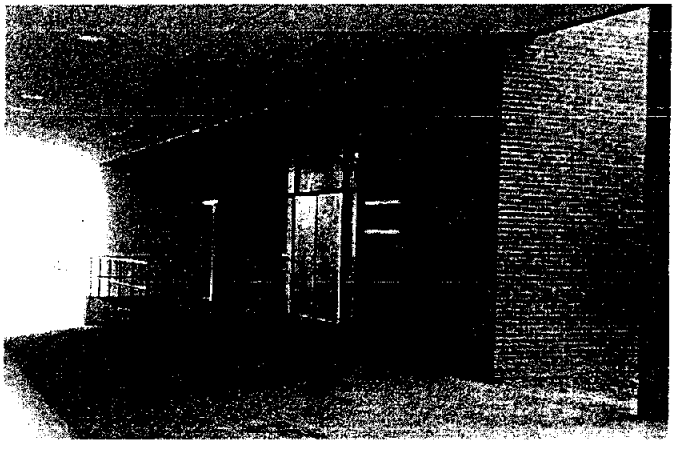
East Elevation / Seg.B



South Elevation / Seg.B



South Elevation / Seg.B



West Elevation / Seg.B

West Elevation / Seg.B

EXISTING BUILDING EXTERIOR SURVEY

Segment: C

CONDITION KEY CRITERIA:
0- Poor - (not servicable or failed), **1**-Poor/Fair - (failure expected), **2**-Fair - (servicable, maintenance required)
3- Fair/Good - (functioning, maintained), **4**- Good - (fully functional, new), **N/A**- Not applicable/ not available, **M**- Missing

GENERAL DESCRIPTION

Basement/Foundations (general condition, non-structural evaluation):

Veneer
- [ ] Rubble/stone
- [ ] Struc. Tile
- [2] Concrete
- [ ] Brick
- [ ] Conc. Block
- [ ] Other

Condition:
Repair loose parging to match existing.

Backup
- [ ] Rubble/stone
- [ ] Struc. Tile
- [x] Concrete
- [ ] Brick
- [ ] Conc. Block
- [ ] Other

Condition:

Exterior walls (general condition, non-structural evaluation):

Veneer
- [2] Brick
- [2] Concrete
- [ ] Curtain Wall
- [2] Conc. Block
- [ ] Wood
- [2] Precast Conc.
- [ ] Stone
- [2] Copper

Condition:
Repair loose parging to match existing.
Remove copper and water stains
Provide bird sceen at brick opening.

Joints
- [2] Mortar
- [ ] Other
- [ ] Sealant

Condition:
Extensive masonry joint cracks.

Backup
- [ ] Brick
- [ ] Struc. Tile
- [ ] Mtl. Studs
- [x] Conc. Block
- [ ] Wood
- [ ] Other
- [ ] None
- [ ] Concrete

Condition:
Severe hole in masonry, concrete plank exposed

Architectural Trim (soffits, fascias, columns, etc.):
- [ ] Wood
- [ ] Precast Conc.
- [ ] Stucco
- [ ] Metal - Type & Finish _____
- [ ] Stone
- [ ] Other

Condition:

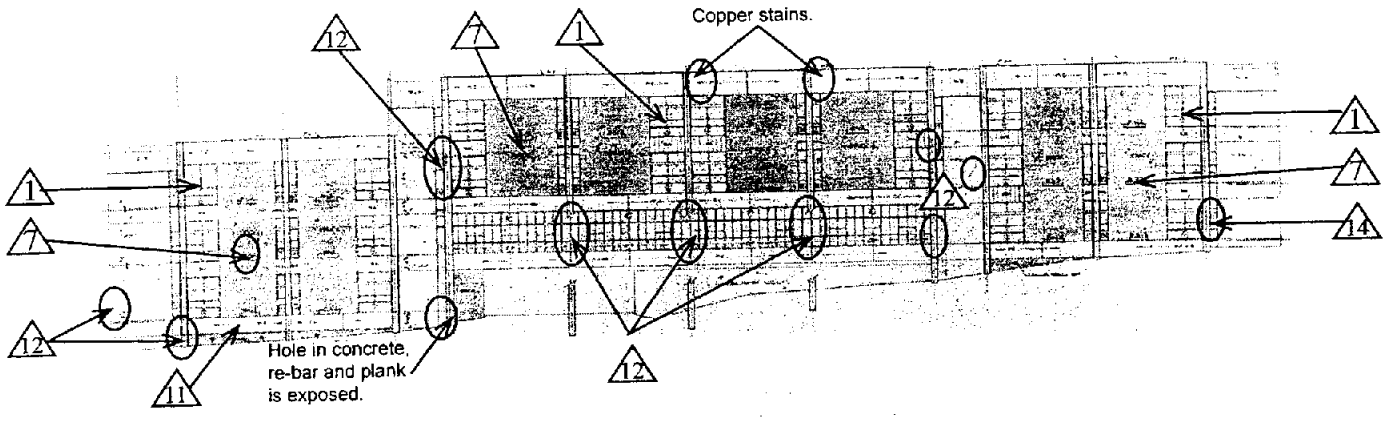
Windows:

Frames/Sash
- [ ] Wood
- [1] Steel
- [ ] Other
- [ ] Aluminum - Finish _____

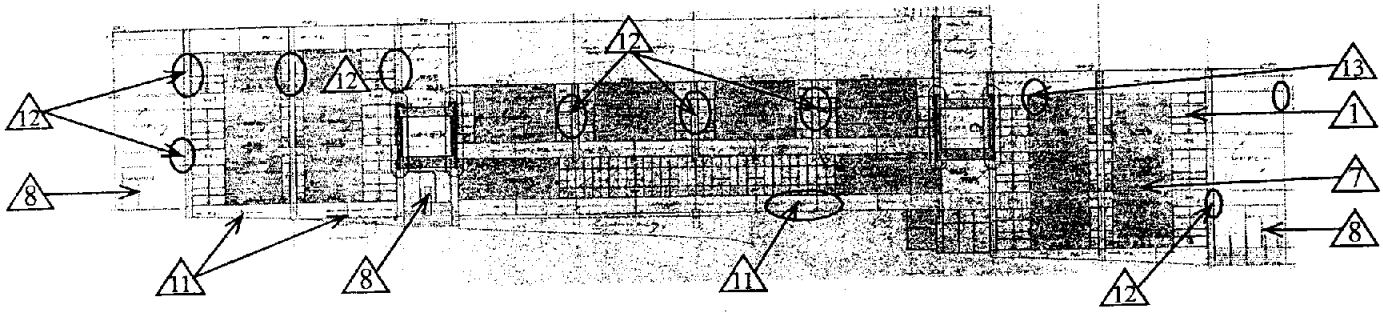
Condition:
Caulk is dry and brittle.
Paint is chipped and frame is rusting.

Glazing
- [1] Single Glass
- [1] Plastic/Lexan
- [ ] Spandrel Glass
- [ ] Insul. Glass
- [ ] Insul. Panel
- [ ] Other

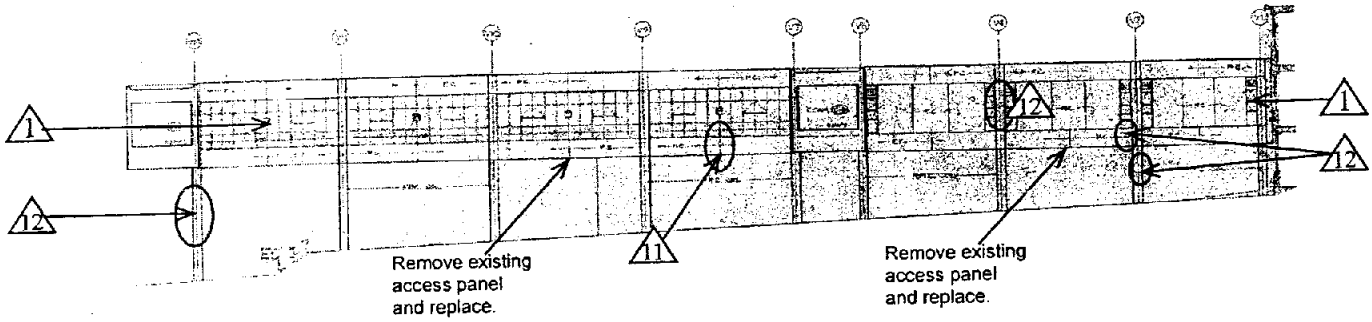
Condition:
Replace plexi and metal infill with planel with clear glass.



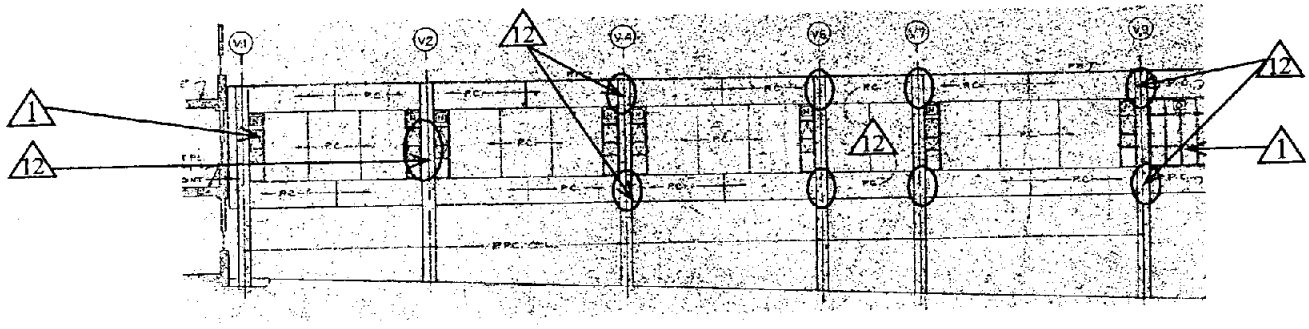
West Elevation / Seg.C



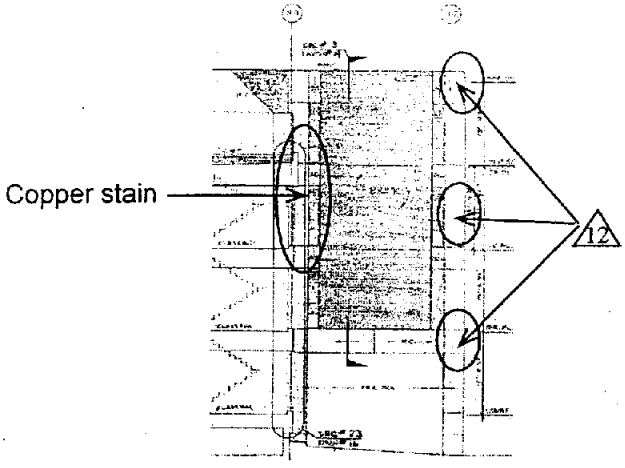
East Elevation / Seg.C



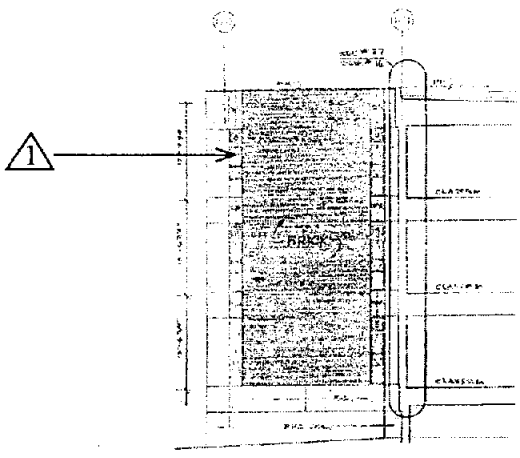
West Elevation / Bridge / Seg.C



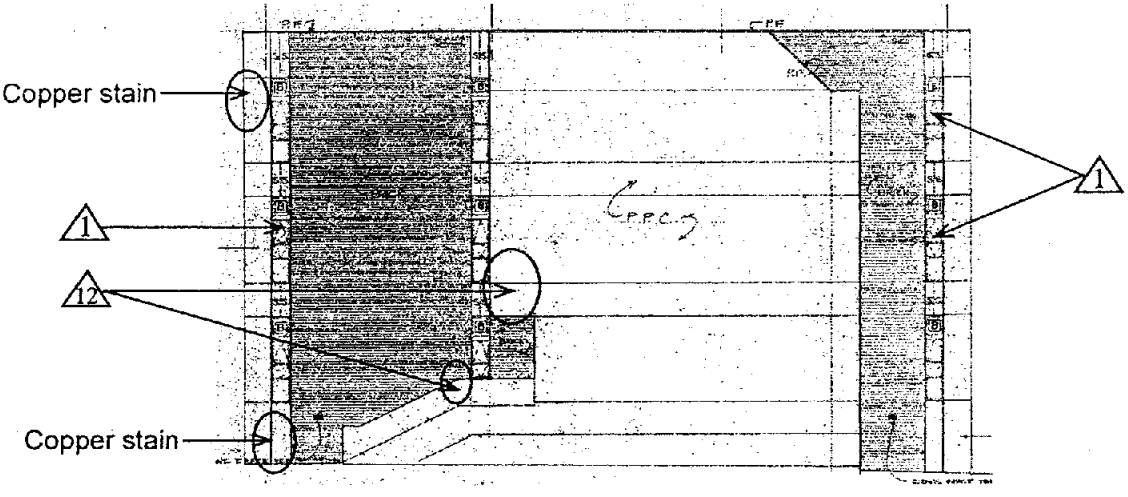
East Elevation / Bridge / Seg.C



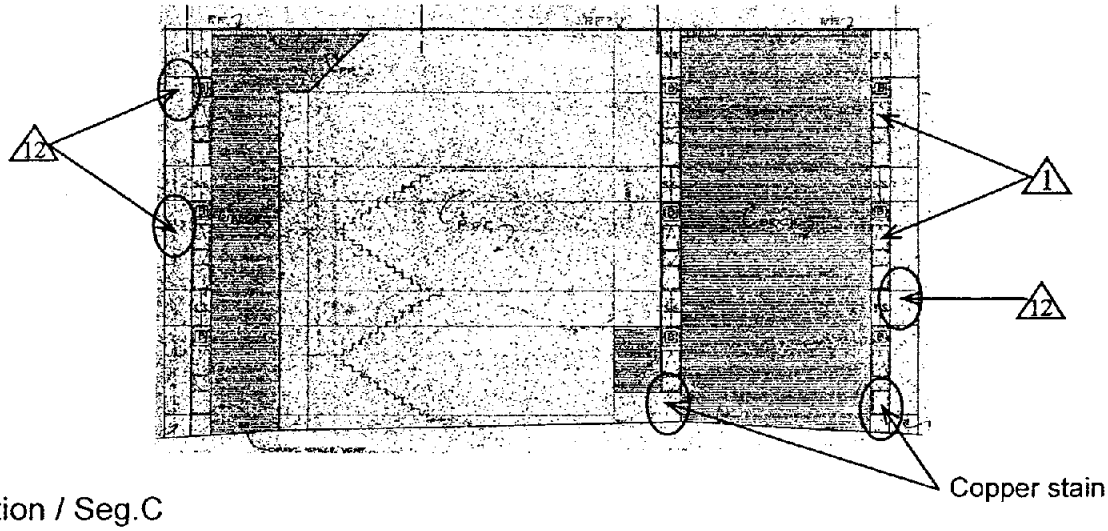
North Elevation / Seg.C



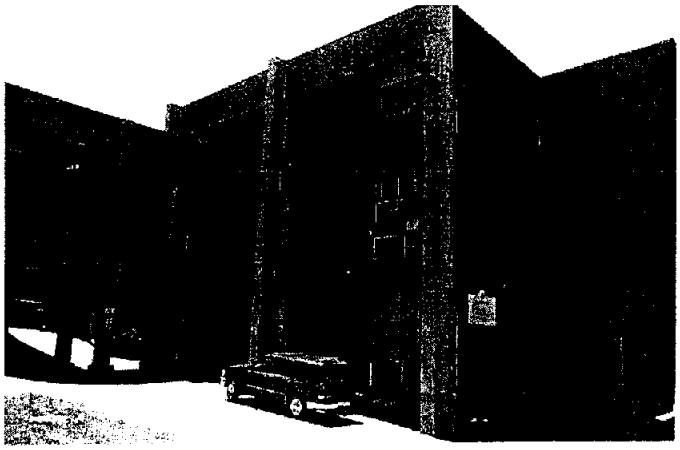
South Elevation / Seg.C



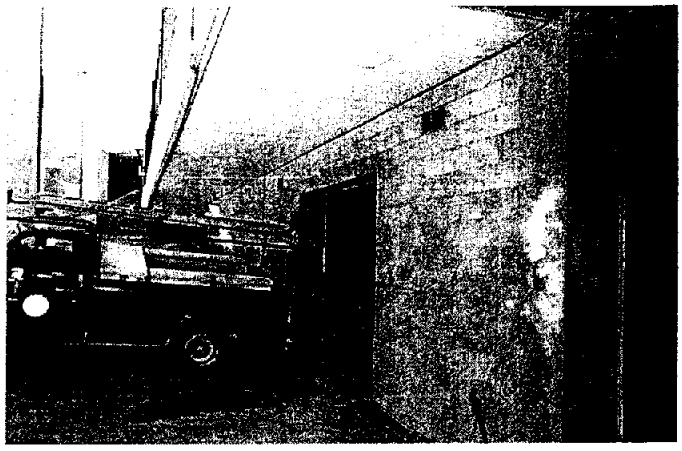
North Elevation / Seg.C



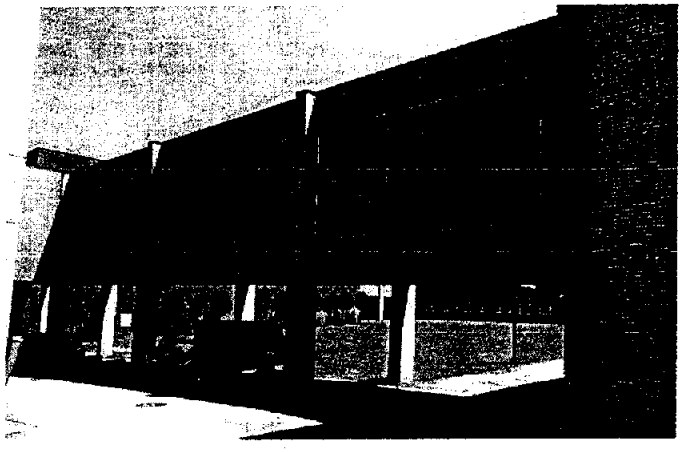
South Elevation / Seg.C



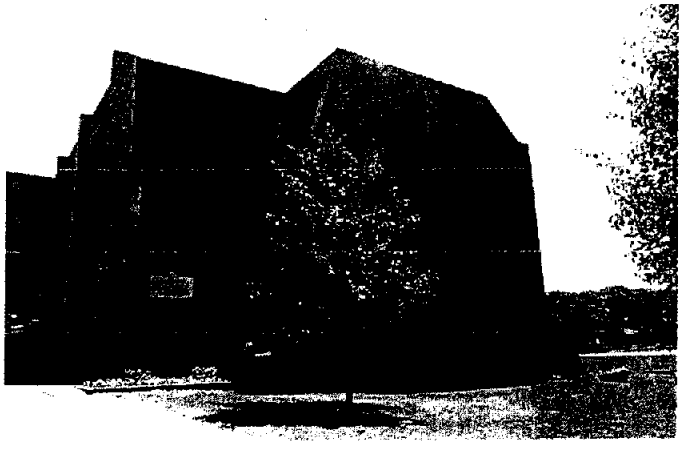
East Elevation / Seg.C



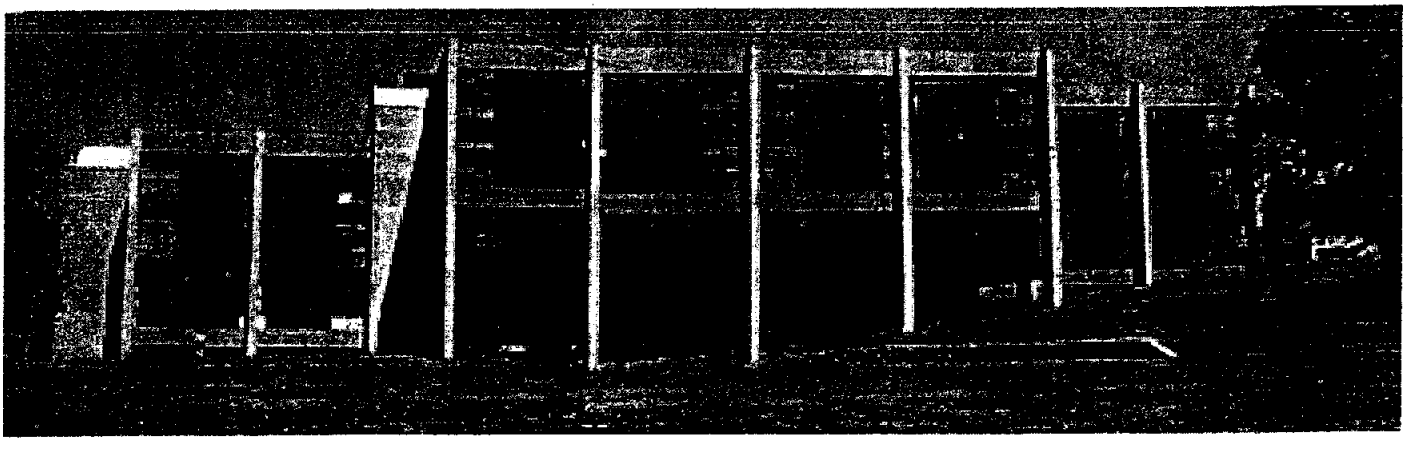
East Elevation / Seg.C



West Elevation / Seg.C



North Elevation / Seg.C



West Elevation / Seg.C

EXISTING BUILDING EXTERIOR SURVEY

Segment: F H

CONDITION KEY CRITERIA:
0- Poor - (not servicable or failed), **1**-Poor/Fair - (failure expected), **2**-Fair - (servicable, maintenance required)
3- Fair/Good - (functioning, maintained), **4**- Good - (fully functional, new), **N/A**- Not applicable/ not available, **M**- Missing

GENERAL DESCRIPTION

Basement/Foundations (general condition, non-structural evaluation):

Veneer
[ ] Rubble/stone [ ] Struc. Tile [2] Concrete
[ ] Brick [ ] Conc. Block [ ] Other

Condition:
Repair loose parging and pair to match.

Backup
[ ] Rubble/stone [ ] Struc. Tile [ ] Concrete
[ ] Brick [ ] Conc. Block [ ] Other

Condition:

Exterior walls (general condition, non-structural evaluation):

Veneer
[2] Brick [2] Concrete [ ] Curtain Wall
[ ] Conc. Block [ ] Wood [2] Precast conc.
[ ] Stone [2] Metal panel

Condition:
Repair loose parging and pair to match
Dents in copper from balls.
Exposed tension rods at precast panels.
Corner bricks are damaged/missing.
Steel angle is exposed and rusting

Joints
[2] Mortar [ ] Other
[ ] Sealant

Condition:
Extensive masonry joint cracks.
Control joints are dry and brittle.
Missing joints at loose lintel above doors.

Backup
[ ] Brick [ ] Struc. Tile [ ] Mtl. Studs
[X] Conc. Block [ ] Wood [ ] Other
[ ] None [ ] Concrete

Condition:

Architectural Trim (soffits, fascias, columns, etc.):
[ ] Wood [ ] Precast Conc.
[ ] Stucco [ ] Metal - Type & Finish _____
[ ] Stone [ ] Other

Condition:

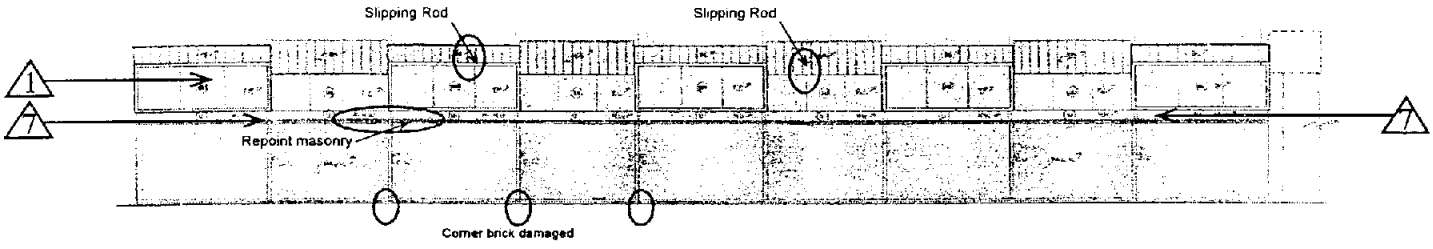
Windows:

Frames/Sash
[ ] Wood [2] Steel [ ] Other
[ ] Aluminum - Finish _____

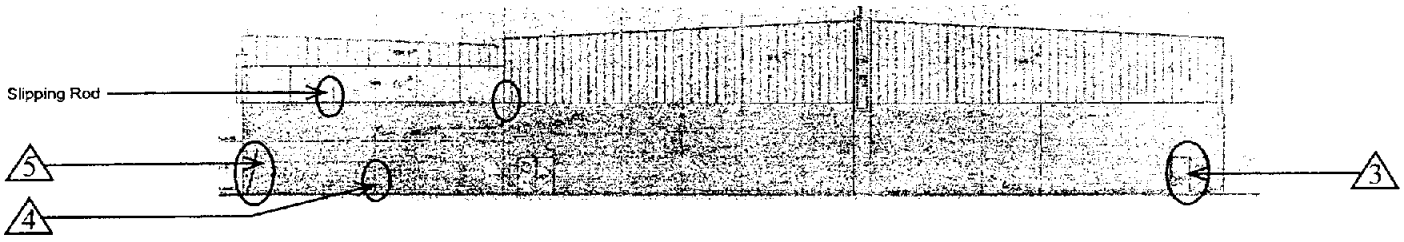
Condition:
Rusting under projecting steel window boxes.

Glazing
[ ] Single Glass [1] Plastic/Lexan [ ] Spandrel Glass
[ ] Insul. Glass [ ] Insul. Panel [ ] Other

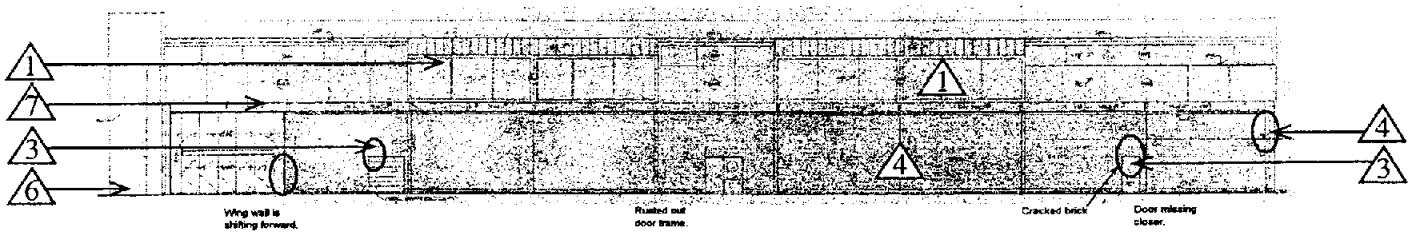
Condition:
Broken panels



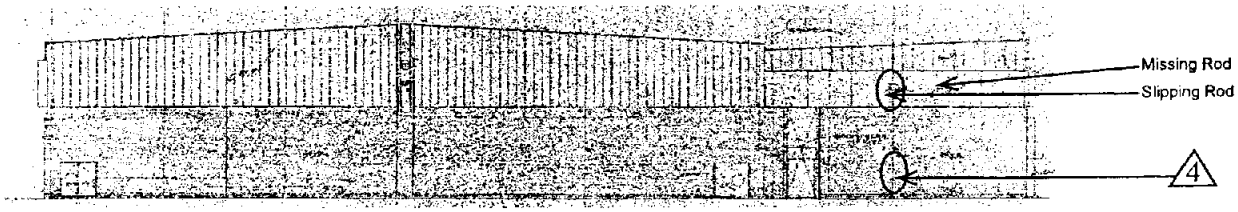
West Elevation / Field House



North Elevation / Field House

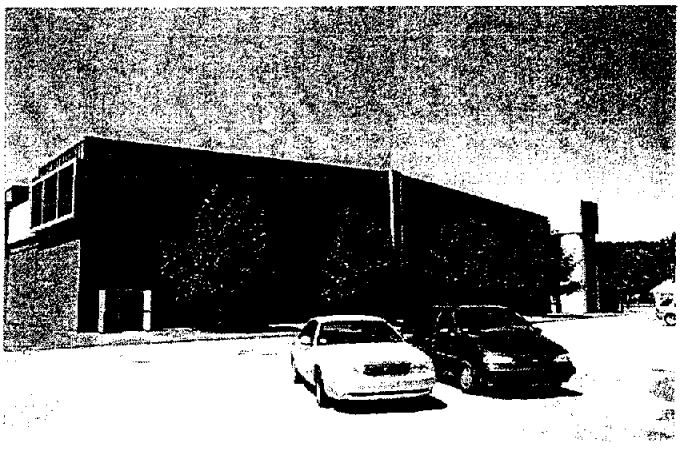


East Elevation / Field House

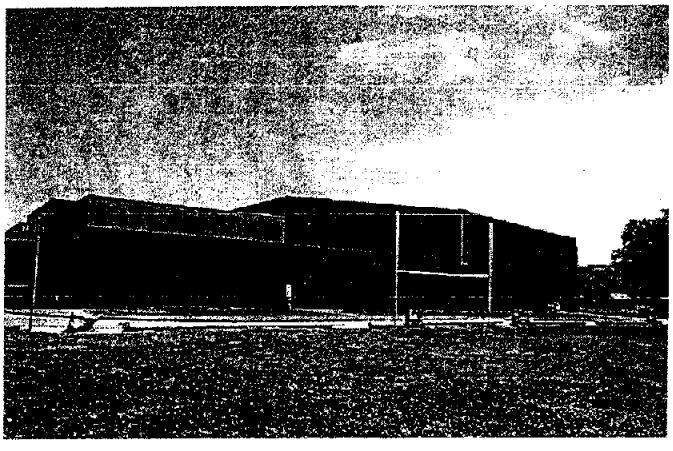


South Elevation / Field House

East Elevation / Field House

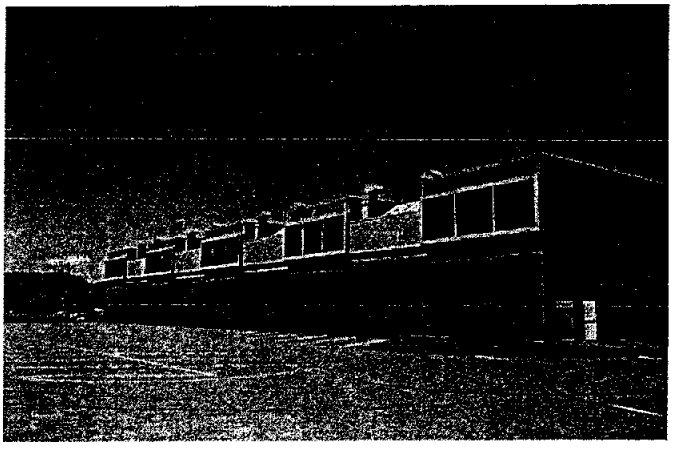


South Elevation / Field House

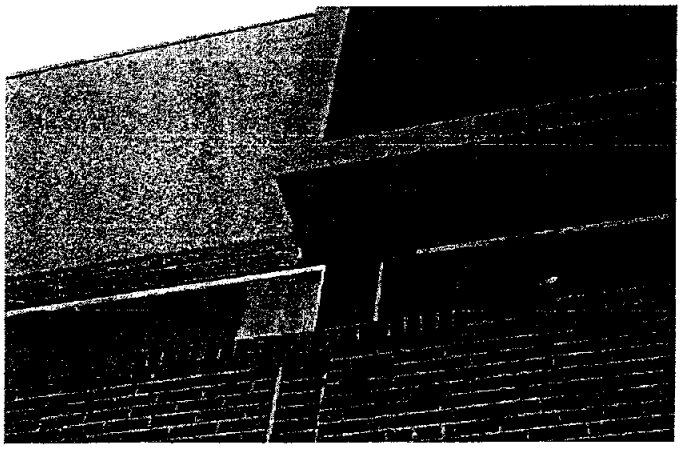


North Elevation / Field House

North Elevation / Field House



West Elevation / Field House



West Elevation / Field House

C. Interior

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
A	Passage (music)	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' DAA		
A	Dressing Rm.	CMU	pnt	CMU	pnt	CMU Brick	pnt	CMU	pnt	VAT		1'x1' DAA		
A	Prac. Rm. #1	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' DAA		
A	Boy's Toilet	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' DAA		E- crack at joints (dressing)
A	Girl's Toilet	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' DAA		(dressing)
A	Prac. Rm. #2	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' DAA		
A	Instrmt. Stor.	CMU	pnt	CMU		CMU	pnt	CMU	pnt	VAT		open		E- missing block
A	Music Office	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	carpet		2'x4' ACT		
A	Auditorium	plaster	pnt	plaster	pnt			plaster	pnt	Conc.		2'x4' ACT		
A	Stage			CMU	pnt	CMU	pnt	CMU	pnt	wood		open		
A	Comp. Switch	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' DAA		
A	Janitor	CMU ST T	pnt pnt	CMU ST T	pnt pnt	CMU ST T	pnt pnt	CMU ST T	pnt pnt	CT		clay conc.		next to A-210
A	Men's Toilet	CMU ST T		CMU ST T		CMU ST T		CMU ST T		CT				next to A-210
A	F.L. book stor.	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		(A-302)

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
A	Wom.'s Toilet	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	VAT CT		1'x1' DAA		Next to A-207
A	Boy's Toilet	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	CT		1'x1' DAA		Next to A-209
A	Girl's Toilet	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	CT		1'x1' DAA		Next to A-209
A	Custodial													no access
A	Cafeteria (52)	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		2'x4' ACT		3' wood wainscot W-glass wall
A	Cafeteria (69)	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		Columns rusting
A	Teach. Dining	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
A	Kitchen	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	5"x5" quarry		Plaster		
A	Utility Room	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Plaster		kitchen
A	Cook's Office	Brick		CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
A	Supr. of Kitch.													no access
A	Janitor storage	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	VAT		1'x1' DAA		
A	Staff Dining	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
A	Dish Room	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	CMU ST.T	pnt	5"x5" QT		Plaster		Ceiling-water damage

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
A	Servery	CMU ST T	pnt			CMU ST T	pnt	CMU ST T	pnt	5"x5" QT		Plaster		E-alum. panel system
A	Food Storage													no access
A	Freezer/ Stor.	Brick		CMU	pnt	CMU	pnt	CMU	pnt	Conc.				(kitchen)
A	S3													no access (kitchen)
A	Receiving	Brick		CMU	pnt	CMU	pnt	CMU ST T	pnt	Conc.		Plaster		
A	Corridor (C-2)	Brick		Brick		Brick		Brick		Conc.		Plaster		north side of courtyard
A	Passage (cafe)	CMU	pnt			CMU	pnt			VCT		1'x1' ACT		E- roll-up door
A	Cook's Toilet	ST T		ST T		ST T		ST T		5"x5" QT		Plaster		
A	Office	CMU	pnt	Brick	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' ACT		next to A-144
A	Girl's Gym	Brick	pnt	Brick	pnt	Brick	pnt	Brick	pnt	wood		Tectm		
A	Men's Toilet	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CT		1'x1' ACT		near Gym
A	Wom.'s Toilet	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CT		1'x1' ACT		near Gym
A	Team Locker	CMU	pnt	Brick	pnt	CMU Brick	pnt	CMU	pnt	Conc.		Conc.		off of A111
A	Cust. Storage	Brick	pnt	CMU	pnt	CMU	pnt	Brick	pnt	Conc.		Conc.		near A-M3 Insinerator

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
A	Cust. Storage	Brick	pnt	Brick	pnt	CMU	pnt	Brick	pnt	Conc.		Conc.		near A-M3 stor. off od Insinerator
A	Boiler Rm. (69)	CMU		Brick		Conc.		CMU		Conc.		Plaster		
A	Lumber Stor.	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Conc.		N-severe horiz. cracking (A-124)
A	Boiler Rm. (52)	CMU		CMU Conc.		Conc.		Conc.		Conc.		Conc.		
A	Garage	CMU		CMU		CMU		CMU		Conc.		Conc.		N-stuco W- garage doors
A	Finishing	CMU		CMU		CMU		CMU		Conc.		1'x1' ACT		(A-124)
A	Planning	CMU		CMU		CMU		CMU		Conc.		Conc. ACT		(A-124)
A	Project Storage	CMU		CMU		CMU		CMU		Conc.		Conc.		(A-124)
A	Supply	CMU		CMU		CMU		CMU		Conc.		Conc.		(A-124)
A	Storage/ Insin.	Brick		Brick		Brick		Brick		Conc.		Conc.		(A-124)
A	Corridor	CMU	pnt	Brick	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' ACT		(A-124)
A	District SPED	plaster	pnt	plaster	pnt	plaster	pnt	plaster	pnt	carpet		1'x1' DAA		
A	Principal Off.	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	carpet		1'x1' ACT		
A	General Office	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
A	Guidance Stor.	GYP	pnt	GYP	pnt	GYP	pnt	GYP	pnt	VAT		Plaster		Located to north
A	Guidance Stor.	GYP	pnt	GYP	pnt	GYP	pnt	GYP	pnt	VAT		2'x2' ACT		3' wood wainscot Located to south
A	Guidance Suite	GYP	pnt	Plaster	pnt	GYP	pnt	GYP	pnt	carpet		1'x1' ACT		Darveaa office
A	Guidance Suite	GYP	pnt	Plaster	pnt	GYP	pnt	GYP	pnt	carpet		1'x1' ACT		Smith office
A	Guidance Suite	GYP	pnt	Plaster	pnt	GYP	pnt	GYP	pnt	carpet		1'x1' ACT		Quinlain office
A	Guidance Suite	GYP	pnt	Plaster	pnt	GYP	pnt	GYP	pnt	carpet		1'x1' ACT		Gregoriese office
A	Guidance Suite	GYP	pnt	Plaster	pnt	GYP	pnt	GYP	pnt	carpet		1'x1' ACT		Visconti office W- Clerestory
A	Guidance	Plaster	pnt	GYP	pnt	GYP	pnt	GYP	pnt	carpet		1'x1' ACT		
A-1	Corridor	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt			1'x1' ACT		
A-101	Social Stud. CR			Plaster Wood	pnt	Plaster Wood	pnt			VCT		1'x1' DAA		
A-102	Social Stud. CR			Plaster Wood	pnt	Plaster Wood	pnt			VAT		1'x1' DAA		E- plaster cracking
A-103	Social Stud. CR			Plaster Wood	pnt	Plaster Wood	pnt			VCT		1'x1' DAA		W- crack through block
A-104	Business(typing)			CMU						VCT VAT		1'x1' DAA		
A-105	Account Comp.	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VCT		1'x1' ACT		One new UV

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
A-106	Business CR	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VCT		1'x1' ACT		
A-107	Business CR	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VCT		1'x1' ACT		
A-108	Bus. comp. lab	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		2 new UVs
A-109	Bus. comp. lab	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		
A-110	Bus. dept. office	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		
A-112	Phys/Hlth Off.	CMU	pnt	CMU	pnt	CMU	pnt			VCT		1'x1' ACT		tall cabinets on west wall
A-113	Health	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		E,W - fin tubing W- Clerestory
A-114	Health	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		E,W-fin tubing
A-115	Health	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		E,W - fin tubing W-Clerestory
A-116	Sci. (Vernal)	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' ACT		W- upper/lower cabinets
A-117	Weight Room	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Open		
A-118	Office/ Storage	CMU	pnt	Brick	n/a	CMU	pnt	CMU	pnt	VAT		1'x1' ACT		lower casework all walls
A-119	Art (graphics)	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' ACT		
A-120	Tech-Ed (CAD)	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' ACT		

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
A-121	Art	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		N.W-fin tubing
A-122	Art	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc		1'x1' ACT		
A-123	Art (graphics)	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
A-144	Book Storage	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		open		
A-144	SPED CR	Brick	pnt	Brick	pnt	Brick	pnt	Brick	pnt	VAT		1'x1' ACT		
A-201	For. Lang. CR							GYP		carpet		1'x1' DAA		
A-202	For. Lang. Off.									VAT		1'x1' DAA		
A-203	Asst. Princ. Off.	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	carpet		1'x1' DAA		wall mounted conduit
A-204	For. Lang. CR	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' DAA		
A-205	Soc. Std./Comp									VAT rubber		1'x1' DAA		S-wall panel system W-wall panel system
A-206	Music Room	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	carpet		2'x4' ACT		Ceiling- water damage
A-207	Social Stud. CR			Plaster Wood	pnt	Plaster Wood	pnt			VAT		1'x1' DAA		
A-209	Social Stud. CR									VAT		1'x1' ACT		
A-210	SPED													

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
A-211	Social Stud. CR									VAT		1'x1' ACT		
A-212	SPED													
A-213	Tech Repair	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		
A-213	Teach. Admin.													
A-214/16	Conference	Plaster	pnt	n/a		n/a		Plaster	pnt	carpet		1'x1' ACT		W-unit vent (new)
A-219	Lobby (Nurse)	GYP	pnt	GYP	pnt	GYP	pnt	GYP	pnt	VCT		1'x1' ACT		2'-6" wood base
A-220	Social Stud. CR	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		
A-222	Social Stud. CR	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		N-blistered plaster
A-301	For. Lang. CR									VAT		1'x1' DAA		
A-302	Foreign Lang.	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		One new UV
A-303	For. Lang. CR									VAT		1'x1' DAA		
A-304	Foreign Lang.	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		One new UV
A-305	For. Lang. CR	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' DAA		
A-307	For. Lang. CR	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' DAA		

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
A-310	Latin	Plaster	pnt			CMU	pnt							E- shelves W- 2 doors
A-311	Reading	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' DAA		
A-312	SPED LLD	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		N- peeling plaster(water)
A-313	English CR	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		
A-314	English Office	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		W- fin tubing
A-316	English Comp.	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		
A-317	English CR	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		S-plaster coming off
A-318	English CR	Plaster	pnt	Plaster	pnt	Plaster	pnt	Plaster	pnt	VAT		1'x1' ACT		
A-319	English CR	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' ACT		N- crack above tack brd
A-320	English CR									VAT		1'x1' ACT		W-water damage
A-321	English CR									VAT		1'x1' ACT		
A-322	English CR									VAT		1'x1' ACT		
A-323	English CR									VAT		1'x1' ACT		N-water damage over green brd
A-324	English CR									VAT		1'x1' ACT		

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
A-327	SPED	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' ACT		
A-6	Corridor	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	VAT		1'x1' DAA		
A-M12	Janitor	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc		Conc		near Gym N- hole in CMU
A-M12	Mech. (2nd Lev)	CMU	pnt	CMU	pnt	Brick	pnt	Brick	pnt			Tectm		near Gym
A-M3	Custodian	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	Conc		Conc		S- severe cracks
A111	Locker Rm.	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	Conc CT		Conc		
A124	Woodshop	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc wood		2'x4' ACT		
A223	Athletic Dir.	GYP	pnt	GYP	pnt	GYP	pnt	GYP	pnt	VAT		1'x1' ACT		2'-6" wood base
A224	SPED													no access
B	Media Center	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	carpet		1'x1' ACT		
B	Passage	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		S,W-wired glass
B	corridor to lift	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
B	Reading (2nd L)	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	carpet		1'x1' ACT		
B	Lecture Hall	wood				CMU	pnt	acoust block		carpet VCT		2'x2' ACT		

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
B	Office (REAP)	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	wood		1'x1' ACT		
B	Elec./Transfrm.													no access
B	Studio Produc.													no access
B	Janitor													no access
B	Control/ Cable													no access
B	Storage													no access
B-22	REAP	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
B-23	General Conf.	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
B-25	Computer Lab	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
B-26	Library Office	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		E- wired glass
B-27	Lib. Work Rm.	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
B-301	ESL													no access
B-302	Yearbook													no access
B-303	Classroom	GYP	pnt	GYP	pnt	CMU	pnt	CMU	pnt	carpet		1'x1' ACT		

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
B-304	Classroom	GYP	pnt	GYP	pnt	GYP	pnt	CMU	pnt	carpet		1'x1' ACT		
B-305	Math CR	CMU	pnt	GYP	pnt	GYP	pnt	CMU	pnt	carpet		1'x1' ACT		
B-S1	Storage (lect.)	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		1'x1' ACT		
B-T1	Boy's Toilet	ST.T		ST.T		ST.T		ST.T		5"x5" QT		Plaster		S-steel column rusting at base.
B-T2	Girl's Toilet	ST.T		ST.T		ST.T		ST.T		5"x5" QT		Plaster		
B-T3	Wm.'s Toilet	ST.T		ST.T		ST.T		ST.T		5"x5" QT		Plaster		
B-T4	Men's Toilet	ST.T		ST.T		ST.T		ST.T		5"x5" QT		Plaster		
B-T5	Boy's Toilet	ST.T		ST.T		ST.T		ST.T		5"x5" QT		Plaster		
B-T6	Girl's Toilet	ST.T		ST.T		ST.T		ST.T		5"x5" QT		Plaster		
C-1	Bus. Book Rm.	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VAT		1'x1' ACT		next to A-110
C-102	RISE	GYP	pnt	GYP	pnt	GYP	pnt	GYP	pnt	VCT		1'x1' ACT		E-water stains at pier
C-103	RISE		carpet		carpet	ST.T						1'x1' ACT		S-Crack in ST.T
C-104	RISE	GYP ST.T	pnt	GYP ST.T	pnt	GYP ST.T	pnt	GYP ST.T	pnt	VCT		1'x1' ACT		
C-105	Chemistry CR	GYP	pnt	ST.T		ST.T		ST.T		VCT		1'x1' ACT		

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
C-106	Storage	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	VCT		1'x1' ACT		
C-107	Chemistry CR	CMU	pnt	GYP	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
C-108	Chemistry CR	CMU	pnt	GYP	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
C-109	Physics CR	CMU	pnt	CMU	pnt	CMU	pnt	CMU ST T	pnt	VCT		1'x1' ACT		N- water stain at pier.
C-110	Storage	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	VCT		1'x1' ACT		W-wired-glass
C-111	Chemistry CR	CMU ST T	pnt	CMU GYP	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
C-112	Math CR	GYP	pnt	CMU	pnt	CMU ST T	pnt	CMU GYP	pnt pnt	VCT		1'x1' ACT		W- cracks at piers
C-113	Math CR									VCT		1'x1' ACT		
C-114	Math CR	CMU	pnt	CMU	pnt	CMU ST T	pnt	CMU GYP	pnt pnt	VCT		1'x1' ACT		N-severe crack at pier
C-115	Math CR	CMU	pnt	CMU	pnt	CMU	pnt	CMU GYP	pnt	VCT		1'x1' ACT		
C-15A	Locker Space	ST T		Brick ST T						VCT		1'x1' ACT		
C-201	Math Off.	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
C-202	Math CR	ST T						ST T		VCT		1'x1' ACT		
C-203	Math CR	CMU	pnt	CMU	pnt	CMU ST T	pnt	CMU	pnt	VCT		1'x1' ACT		

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
C-204	Math CR	CMU	pnt	CMU	pnt	CMU GYP	pnt	CMU	pnt	VCT		1'x1' ACT		
C-205	Chem/ Physics	CMU	pnt	CMU	pnt	CMU ST. T	pnt	CMU GYP	pnt	VCT		1'x1' ACT		
C-206	Storage/ Prep	CMU ST. T	pnt	CMU ST. T	pnt	CMU ST. T	pnt	CMU ST. T	pnt	VCT		1'x1' ACT		
C-207	Chem/ Physics	CMU GYP	pnt	CMU	pnt	CMU GYP	pnt	CMU	pnt	VCT		1'x1' ACT		
C-208	Science Office	CMU GYP	pnt pnt	CMU GYP	pnt pnt	CGU GYP	pnt pnt	CMU GYP	pnt pnt	VCT		1'x1' ACT		
C-209	Chem/ Physics	CMU	pnt	CMU	pnt	CMU GYP	pnt	CMU GYP	pnt	VCT		1'x1' ACT		
C-210	Storage/ Prep	CMU ST. T	pnt	CMU ST. T	pnt	CMU ST. T	pnt	CMU ST. T	pnt	VCT		1'x1' ACT		
C-211	Chem/ Physics	CMU ST. T	pnt	CMU	pnt	CMU	pnt	CMU ST. T	pnt	VCT		1'x1' ACT		
C-212	Social Stud. CR	GYP	pnt							VCT		1'x1' ACT		
C-213	Social Stud. CR					GYP	pnt			VCT		1'x1' ACT		
C-214	English CR	CMU ST. T	pnt	CMU ST. T	pnt	CMU ST. T	pnt	GYP	pnt	VCT		1'x1' ACT		
C-215	English CR	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
C-216	SPED Office	CMU ST. T	pnt	CMU ST. T	pnt	CMU ST. T	pnt	CMU ST. T	pnt	VCT		1'x1' ACT		
C-217	SPED	CMU ST. T	pnt	CMU ST. T	pnt	CMU ST. T	pnt	CMU ST. T	pnt	VCT		1'x1' ACT		

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
C-218	SPED	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	VCT		1'x1' ACT		
C-219	SPED	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	VCT		1'x1' ACT		
C-301	Math CR								pnt	VCT		1'x1' ACT		
C-302	Math CR	GYP	pnt					GYP	pnt	VCT		1'x1' ACT		
C-303	Math CR	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	VCT		1'x1' ACT		
C-304	Math CR	CMU ST T	pnt			GYP	pnt			VCT		1'x1' ACT		
C-305	Biology CR	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	VCT		1'x1' ACT		
C-306	Passage	ST T		ST T		ST T		ST T		VCT		1'x1' ACT		
C-307	Biology CR	GYP								VCT		1'x1' ACT		
C-308	Vivarium	ST T		ST T		ST T		ST T		5"x5" QT		Plaster		
C-309	Biology CR			GYP	pnt	CMU	pnt			VCT		1'x1' ACT		
C-310	Prep/ Storage	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	CMU ST T	pnt	VCT		1'x1' ACT		
C-311	Biology CR	CMU ST T	pnt							VCT		1'x1' ACT		
C-4	Corridor	Brick		CMU	pnt	CMU	pnt			VCT		1'x1' ACT		

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
C-J3	Janitor	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Plaster		4'-0" of ST.T at sink. Water damage at ceiling
C-J4	Janitor	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Plaster		
C-J5	Toilet	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Plaster		E-plaster texture
C-J5	Janitor	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Plaster		Water damage at ceiling
C-J6	Janitor	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Plaster		
C-J7	Janitor	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Plaster		
C-J8	Custodian	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Plaster		
C-J9	Custodian	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Plaster		
C-S1	Chem. Storage	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		N.S.- cracks in joints
C-S2	Physics Prep	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		N.S.W.-cracks in joints
C-S3	Storage	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc.		Plaster		
C-S4	Prep/ storage	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
C-S6	Prep/ storage	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	VCT		1'x1' ACT		
C-T3	Boy's Toilet	ST.T	pnt	ST.T	pnt	ST.T	pnt	ST.T	pnt	5"x5" QT		Plaster		Water stains on ceiling

Reading Memorial High School
Interior Room Survey

ACT - Acoustic Ceiling Tile **DAA** - Direct Applied Acoustic **CT** - Ceramic Tile **STT** - Structural Tile **QT** - Quarry Tile **SRM** - Synthetic Resinous Material

		North Wall		East Wall		South Wall		West Wall		Floor		Ceiling		
Room #	Room Name	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Mat	Fin	Comments
C-T4	Girl's Toilet	ST T		ST T		ST T		ST T		5"x5" QT		Plaster		Water damage at ceiling
C-T5	Boy's Toilet	ST T		ST T		ST T		ST T		5"x5" QT		Plaster		
C-T6	Girl's Toilet	ST T		ST T		ST T		ST T		5"x5" QT		Plaster		
C-T7	Boy's Toilet	ST T		ST T		ST T		ST T		5"x5" QT		Plaster		
C-T8	Girl's Toilet	ST T		ST T		ST T		ST T		5"x5" QT		Plaster		
F	Field House	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	SRN		Tectm		
F	Lobby	Brick		Glass doors		Brick		Slate		Slate		Plaster		
F	Ticket	wood		wood		wood		wood		Slate		Plaster		
F	Eqiupment	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc		open		
F	Storage	CMU	pnt	CMU	pnt	CMU	pnt	CMU	pnt	Conc		open		
F	Outdoor stor.	CMU		CMU		CMU		CMU		Conc		open		
F	Senoir Girl's L.	CWU		CWU		CWU		CWU		QT		Plaster		
F	Visiting Team									SRN		Plaster		
F	Var. Team Rm.									SRN		Plaster		

D. Casework

Reading Memorial High School
FAI Project No. 2204.00

Existing Building Conditions Survey
Interior Casework

New | Sort | Find | Delete

Condition Criteria
0.... Poor - not servicable or failed
1.... Poor/Fair - failure expected
2.... Fair - serviceable, maintenance req.
3.... Fair/Good - functioning, maintained
4.... Good - fully functional, new
N/A Not Applicable
M.... Missing

Room #	COUNTERTOP						CAB			SINK				HARDWARE						Notes/Remarks
	Wood	P. Laminate	Stone	Metal	Resin	Condition	P. Laminate	Wood	Condition	Stainless Stl	Porc/Iron	Resin	Condition	Brass	Stainless Stl	PVC	Wood	Lock	Condition	
A-(113off)	x					3		x	4				-		x			x	3	Cab.OK.Good maintenance
A-(C-2)	x					1		x	2				-		x				1	Some in Poor Conditions
A-(C-7)		x				3			-				-						-	Just Counter-Good cond.
A-(P-5)						-		x	2				-							Original book shelves
A-(S-6)		x				0		x	2	x			0		x				1	Cab.OK
A-(S-8)	x					2		x	3	x			1		x				2	Cab.OK.Good maintenance
A-101	x					1		x	2				-		x				2	Original UV Cab. missing doors
A-102	x					1		x	2				-						2	Original UV Cab. missing doors
A-103	x					1		x	2				-						2	Original UV Cab. missing doors
A-104	x					1		x	2	x			1		x				2	Original UV Cab. w/doors
A-105	x					1		x	2				-		x				2	Original UV Cab.Gyp. frame tall sto.
A-106	x					1		x	2				-		x				2	Original UV Cab.Gyp. frame tall sto.
A-107	x					1		x	2				-		x				2	Original UV Cab.Gyp. frame tall sto.
A-108	x					1		x	2				-		x				2	Original UV Cab.Gyp. frame tall sto.
A-109	x					1		x	2				-		x				2	Original UV Cab.Gyp. frame tall sto.
A-110						-		x	2				-		x				2	Gyp. frame tall sto.w/wd doors
A-112		x				3		x	3		x		1		x			x	3	New casework.Good cond.
A-113						-			-				-						-	NO CASEWORK
A-114		x				3		x	3	x			2		x				3	New casework
A-115						-		x	3				-		x			x	3	New Casework- No base cab.
A-116	x					1		x	1				-		x				1	Poor conditions
A-118		x				0		x	3	x			1		x				2	Cab.OK.
A-119		x				0		x	2	x			0		x				1	Cab. OK.
A-120		x				0		x	1	x			0		x				0	Poor conditions
A-122	x					0		x	2	x			0		x				1	Cab.OK.
A-123		x				2		x	2	x			1		x				2	Cab.OK.sink- poor cond.
A-201						-		x	3				-		x				3	Diferent stile of residential cab.
A-202	x					1		x	2				-					x	2	UV Counter,Gyp. frame tall sto.
A-203 off.		x				2		x	3				-		x				-	Good maintenance
A-204	x					1		x	2				-		x				2	UV Counter,Gyp. frame tall sto.
A-205	x					2		x	2				-		x				2	Original casework-Good maintenanc
A-206	x					2		x	2				-						-	Original low book shelf cab.
A-207						-		x	3				-		x				3	Gyp. frame tall sto.
A-209	x					1		x	2				-		x				2	Original UV Cab.Gyp. frame tall sto.
A-210	x					1		x	2				-		x				2	Original UV Cab.Gyp. frame tall sto.
A-211	x					1		x	2				-		x				2	Original UV Cab.Gyp. frame tall sto.
A-212	x					1		x	2				-						-	Original UV Cab.Book shelves
A-213	x					1		x	2				-		x				2	Original UV Cab.Gyp. frame tall sto.
A-214	x					1		x	2				-						-	Original UV Cab.Book shelves
A-216	x					1		x	2				-						-	Original UV Cab.Book shelves
A-219		x				4		x	4				-		x				4	Mixture of stiles.New cabs.
A-220	x					1		x	2				-						-	Original UV Cab.Gyp. frame tall sto.
A-222	x					1		x	2				-						-	Original UV Cab.Gyp. frame tall sto.
A-301		x				3	x	x	3				-		x				3	Mixture of new & original painted cab
A-302	x					2		x	2				-		x				2	UV Counter,Gyp. frame tall sto.
A-303		x				3	x	x	3				-		x				3	New casework
A-304		x				3		x	3				-		x				3	UV Cab w/doors,Gyp. frame tall sto.
A-305						-		x	2				-		x				3	Gyp. frame tall sto.w/wd doors
A-307	x					2		x	2				-		x				2	UV Cab w/drws.Gyp. frame tall sto.

Flansburgh Associates, Inc.
Reading Memorial High School
FAI Project No. 2204.00

Existing Building Conditions Survey
Interior Casework

New | Sort | Find | Delete

Condition Criteria
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1.... Poor/Fair - failure expected
2.... Fair - serviceable, maintenance req.
3.... Fair/Good - functioning, maintained
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N/A Not Applicable
M.... Missing

Room #	COUNTERTOP						CAB			SINK				HARDWARE						Notes/Remarks
	Wood	P. Laminate	Stone	Metal	Resin	Condition	P. Laminate	Wood	Condition	Stainless Stl	Porc/Iron	Resin	Condition	Brass	Stainless Stl	PVC	Wood	Lock	Condition	
A-309						-		x	2				-		x				2	Gyp. frame tall sto.w/wd doors
A-310	x					1		x	2				-						-	Original UV Cab. missing doors
A-311	x					2		x	2				-		x				2	Original book shelves
A-312	x					1		x	2				-						-	Original book shelves
A-313	x					1		x	2				-		x			x	1	Original UV Cab.Gyp. frame tall sto.
A-314						-			-				-						-	NO CASEWORK
A-315	x					1		x	2				-		x			x	1	Original UV Cab.Gyp. frame tall sto.
A-316	x					1		x	2				-						-	Original UV Cab.Book shelves
A-317	x					1		x	2				-		x			x	1	Original UV Cab.Gyp. frame tall sto.
A-318	x					1		x	2				-						-	Original UV Cab.Book shelves
A-319	x					1		x	2				-		x			x	1	Original UV Cab.Gyp. frame tall sto.
A-320	x					1		x	2				-		x			x	1	Original UV Cab.Gyp. frame tall sto.
A-321	x					1		x	2				-		x			x	1	Original UV Cab.Gyp. frame tall sto.
A-322	x					1		x	2				-		x			x	1	Original UV Cab.Gyp. frame tall sto.
A-323	x					1		x	2				-		x			x	1	Original UV Cab.Gyp. frame tall sto.
A-324	x					-		x	2				-		x			x	1	Original UV Cab.Gyp. frame tall sto.
A-327						-		x	2				-						-	Original book shelves
A-Art 107	x					2		x	3	x			1	x	x				2	Cab.OK.Good maintenance
A-C1						-			-				-						-	NO CASEWORK
A-D-rm	x					0		x	0	x			0		x				0	Poor conditions
A-G1caf.						-		x	2				-		x			x	3	Original Display case
A-G2caf.						-			-				-						-	NO CASEWORK
A-G4 T.D						-			-				-						-	NO CASEWORK
A-Health						-		x	3				-		x				3	New casework.Good cond.
A-Lobby						-		x	3				-		x			x	3	Original Trophy cases
A-off. 126						-		x	2				-						-	Original book shelving
A-Sto.	x					1		x	1				-		x				1	Original-Poor conditions
A-STORE				x		4	x		4				-		x			x	4	New Comercial Cabinets
B-102		x				2		x	2				-		x				2	Original casework.Reading-rm.
B-201						-			-				-						-	NO CASEWORK
B-21		x				3	x	x	3	x			3		x	x			3	Mixture of dif.cab. stiles.(PRE-K)
B-22		x				3	x	x	3	x			3		x	x			3	Mixture of dif.cab. stiles.(PRE-K)
B-23						-		x	3				-		x				3	Good maint.Mailboxes
B-25		x				3		x	3	x			3		x				3	Good maintenance
B-26								x	3				-						-	Good maintenance
B-27		x				3		x	3	x			3		x				3	Good maintenance
B-302		x				2		x	2				-		x				2	Original casework
B-302						-			-				-						-	NO CASEWORK
B-304						-			-				-						-	NO CASEWORK
B-305						-			-				-						-	NO CASEWORK
B-A.princ		x				3		x	3				-						-	Good maintenance
B-G3						-			-				-						-	NO CASEWORK
B-J2 Sto.						-		x	1				-						-	Original casework
B-Read.						-			-				-						-	NO CASEWORK
B-S3 Sto.						-			-				-						-	NO CASEWORK
C-101		x				3	x		4	x			3		x				3	Used as a Pre-k class-rm.
C-102		x				3	x		4	x			3		x				3	Used as a Pre-k class-rm.
C-103		x				3	x		4	x			3		x				3	Used as a Pre-k class-rm.
C-104		x				3	x		4	x			3		x				3	Used as a Pre-k class-rm.

Reading Memorial High School
FAI Project No. 2204.00

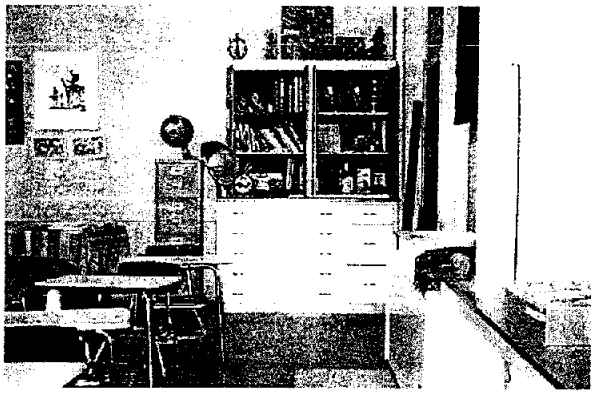
Existing Building Conditions Survey
Interior Casework

New | Sort | Find | Delete

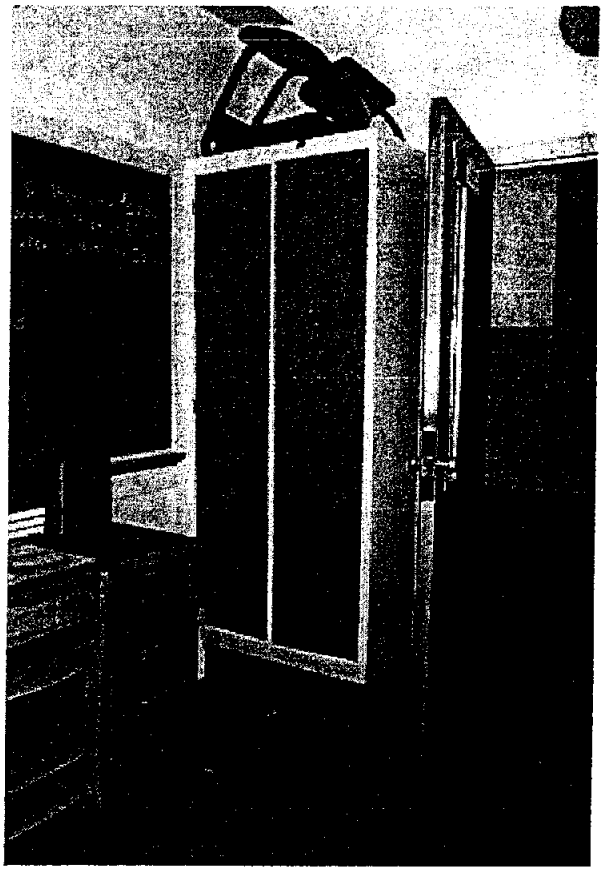
Room #	COUNTERTOP						CAB			SINK				HARDWARE						Notes/Remarks
	Wood	P. Laminate	Stone	Metal	Resin	Condition	P. Laminate	Wood	Condition	Stainless Stl	Porc/Iron	Resin	Condition	Brass	Stainless Stl	PVC	Wood	Lock	Condition	
C-105					x	1		x	1			x	0		x				2	Original casework,missing locks
C-106	X					0	X					X	0		X				1	Original casework
C-107					x	1		x	1			x	0		x				2	Original casework,missing locks
C-108					x	1		x	1			x	0		x				2	Original casework,missing locks
C-109					x	2		x	3			x	2		x			x	3	Cab. Added 10 Years ago
C-110					x	0		x	3			x	3		x				2	Original casework,missing locks
C-111					x	2		x	3			x	2		x			x	3	Cab. replaced 10 years ago
C-112		x				1	x		3				-		x			x	3	Math-classrm. Broquen countertop
C-113		x				3	x		3				-		x			x	3	Math-classrm. New casework
C-114		x				3	x		3				-		x			x	3	Math-classrm. New casework
C-115		x				3	x		3				-		x			x	3	Math-classrm. New casework
C-201		x				3		x	3				-		x				4	Just UV cabinets w/doors.
C-202		x				3		x	3				-		x				4	Just UV cabinets w/doors.
C-203		x				3		x	3				-		x				4	UV cabinets w/doors. & side counter
C-204		x				3		x	3				-		x				4	Just UV cabinets w/doors.
C-205	x					0		x	1			x	0		x				2	Original casework-Changed use
C-206					x	2			3			x	1		x			x	3	Good maintenance
C-207					x	3		x	4			x	2		x			x	4	Cabinet replaced recently- New Cab
C-208		x				3		x	4				-		x				-	Good- New cabinet (office)
C-209					x	0		x	1			x	0		x				2	Original casework,missing locks
C-210					x	2		x	3			x	1		x			x	3	Broquen & missing wall cab.
C-211					x	0		x	1			x	0		x				2	Original casework,missing locks
C-212		x				4		x	4				-					x	2	Just UV cabinets w/doors.
C-213		x				1		x	3				-		x			x	2	Just UV cabinets w/doors.
C-214		x				1		x	3				-		x			x	2	Just UV cabinets w/doors.
C-215		x				3		x	3				-		x			x	2	Good maintenance
C-216						-			-				-						-	NO CASEWORK
C-217						-			-				-						-	NO CASEWORK
C-218						-			-				-						-	NO CASEWORK
C-219		x				1		x	3						x				2	Broquen doors- (Office)
C-301		x				3		x	4				-		x			x	3	Just UV cabinets w/doors.
C-302		x				3		x	4				-		x			x	3	Just UV cabinets w/doors.
C-303		x				3		x	4				-		x			x	3	Just UV cabinets w/doors.
C-304		x				3		x	4				-		x			x	3	Just UV cabinets w/doors.
C-305					x	2		x	2		x	x	0		x			x	2	Mixture of new and original cab.
C-307					x	3		x	4			x	2		x			x	4	New cabinet/sink shall be replace
C-307	x				x	0		x	1		x	x	0		x				1	Original demobench.very damaged
C-308					x	2		x	2			x	0		x			x	2	Original casework. Vivarium
C-309					x	3		x	4			x	2		x			x	4	New cabinet/sink shall be replace
C-309	x				x	0		x	1		x	x	0		x				1	Original demobench.very damaged
C-310	x					0		x	1			x	0		x			x	2	Original casework.very damaged
C-311	x				x	2		x	2		x	x	0		x			x	2	Mixture of new and original cab.
C/Pre-S1	x					0		x	0		x		0		x				1	mixture of new and original cwr.
C/Pre-S2	x					0		x	1			x	0		x				1	mixture of new and original cwr.
C/Pre-S4					x	2		x	3			x	1		x			x	3	Good maintenance
C/Pre-S6					x	2		x	3			x	1		x			x	3	Good maintenance
I-(G-3)		x				1		x	1	x			0		x				1	Poor conditions-Not Servicable
I-(V-7)		x				2		x	3				-		x			x	2	New.good maintenance

Condition Criteria

0.... Poor - not servicable or failed
1.... Poor/Fair - failure expected
2.... Fair - serviceable, maintenance req.
3.... Fair/Good - functioning, maintained
4.... Good - fully functional, new
N/A Not Applicable
M.... Missing

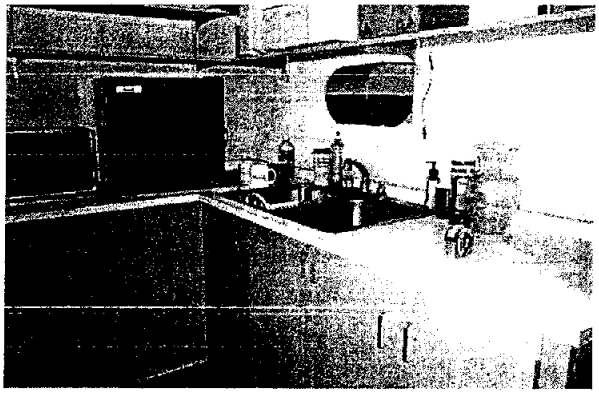


Typical classroom storage

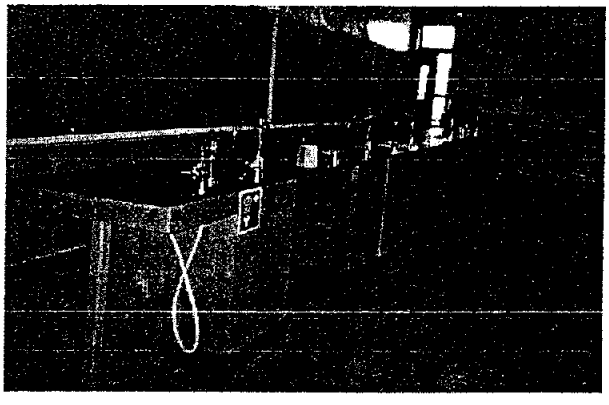


Typical teacher wardrobe

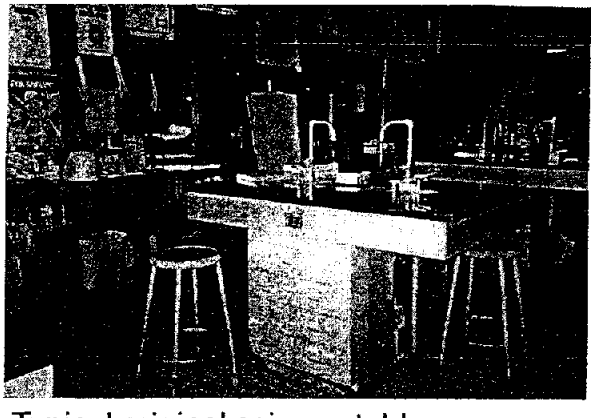
Typical offices counters



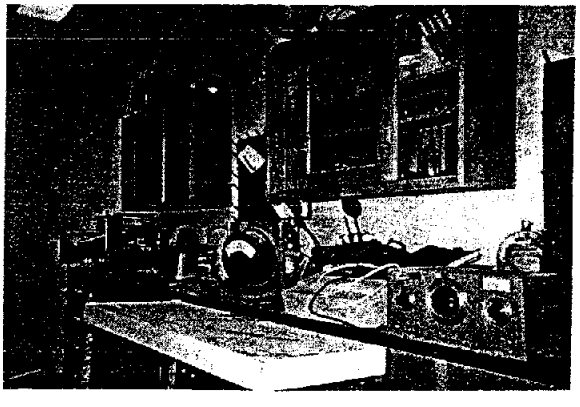
Typical workroom sink assembly



Typical updated science table



Typical original science tables



Typical science prep. rooms

E. HVAC

Table 3 Estimates of Service Lives of Various System Components

Equipment Item	Median Years
Air conditioners	
Window unit	10
Residential single or split package	15
Commercial through-the-wall	15
Water-cooled package	15
Heat pumps	
Residential air-to-air	15[2]
Commercial air-to-air	15
Commercial water-to-air	19
Roof-top air conditioners	
Single-zone	15
Multizone	15
Boilers, hot water (steam)	
Steel water-tube	24 (30)
Steel fire-tube	25 (25)
Cast iron	35 (30)
Electric	15
Burners	21
Furnaces	
Gas- or oil-fired	18
Unit heaters	
Gas or electric	13
Hot water or steam	20
Radiant heaters	
Electric	10
Hot water or steam	25
Air terminals	
Diffusers, grilles and registers	27
Induction and fan-coil units	20
VAV and double-duct boxes	20
Air washers	17
Ductwork	30
Dampers	20
Fans	
Centrifugal	25
Axial	20
Propeller	15
Ventilating roof-mounted	20
Coils	
DX, water, or steam	20
Electric	15
Heat Exchangers	
Shell-and-tube	24
Reciprocating compressors	20
Package chillers	
Reciprocating	20
Centrifugal	23
Absorption	23
Cooling towers	
Galvanized metal	20
Wood	20
Ceramic	34
Air-cooled condensers	20
Evaporative condenser	20
Insulation	
Molded	20
Blanket	24
Pumps	
Base-mounted	20
Pipe-mounted	10
Sump and well	10
Condensate	15
Reciprocating engines	20
Steam turbines	30
Electric motors	18
Motor starters	17
Electric transformers	30
Controls	
Pneumatic	20
Electric	16
Electronic	15
Valve actuators	
Hydraulic	15
Pneumatic	20
Self-contained	10

Source: Data obtained from a national survey of the United States by ASHRAE Technical Committee TC 1.8 (Akalin 1978). Data updated by TC 1.8 in 1986.

[2]See Lovvorn and Hiller (1985) and Easton Consultants (1986) for further information.

L#5743-A

B#1

#2

SUPERIOR

FINAL

SPEC SHEET - STEAM — PAGE 1 OF 3

S.O. NO. 75906 — NAT'L. BOARD NO. 12810

DATE RECEIVED: _____ SHIP WEEK OF 9/4/95

STATUS: W&R ( ) RELEASED (X) DATE: _____

SUBMITTAL REQ'D: 6 SETS PROPOSAL #- 8522

R&D SHEET (X) W.D. (X) NUMBER: 3982

BURNER ( ) GAS PIPING ( ) OIL PIPING ( )

DATE REQ'D: _____ MANUALS REQ'D. 6

SPARE PARTS LIST INCLUDED IN OPERATION MANUALS.

JOB: Reading Memorial High School

LOCATION: _____

SOLD TO: Industrial Combustion
351 21st Street
Monroe, WI 53566-2798

MODEL MS6-X-1000-S15-ICCF-A5

NOMINAL HP --- OUTPUT ---- MBH

DESIGN PRESSURE

SECTION IV -- 15 PSI STEAM

NAME PLATE: IC PAINT Blue

STACK DAMPER: W/LOCKING QUAD ( ) W/BEARINGS ( )

STACK THERMOMETER: N/S (L)

DIAL ____ STEM ____ RANGE ____ °F

BOILER JUNCTION BOX (X) _____ (LS)

GAUGE GLASS (X) TRI-COCKS (X)

PRIMARY L.W.C.O.: RS( ) LS(X) TOP( )

MODEL MM157 (M)

WATER COLUMN BLOWDOWN VALVE(S): (M)

(1) Apollo FIG.NO. 70-105-01 SIZE 1"

AUX. L.W.C.O.: RS( ) LS( ) TOP(X)

MODEL Warrick 1G10DA (M)

HIGH WATER: RS( ) LS( ) TOP( )

CUTOFF ( ) ALARM ( )

MODEL N/S ( )

(1) OPERATOR L404A 1354 RANGE 2-15 PSI (M)

(1) LIMIT L404C 1147 RANGE 2-15 (M)

(1) FIRING RATE L91B 1035 RANGE 0-15 (M)

( ) _____ RANGE _____ ( )

STEAM GAUGE: W/GAUGE/TEST COCK (X) (L)

Weksler FIG.NO. BA16

DIAL 6" RANGE 30x30 PSI

SAFETY VALVES(S): Kunkle (L)

(2) 930 SIZE 2-1/2" SET @ 15 PSIG

( ) _____ SIZE _____ SET @ _____ PSIG

FEEDWATER VALVE(S): R.S.( ) L.S.( ) ( )

GATE: N/S FIG.NO. _____ SIZE _____

CHECK: N/S FIG.NO. _____ SIZE _____

****

FEEDWATER CONTROL: ON-OFF X ELECT.MOD. _____

PNEUMATIC MOD _____ ( )

LEVEL CONTROLLER Integral LWCO (M)

VALVE MAKE N/S MODEL NO. _____ SIZE _____

IMPORTANT: VALVE SELECTION BASED ON MINIMUM _____ PSI PRESSURE DROP ACROSS VALVE. PUMP SUPPLY PRESSURE TO BE APPROXIMATELY _____ PSI ABOVE BOILER OPERATING PRESSURE. DO NOT EXCEED _____ PSI DROP ACROSS VALVE.

3-VALVE BY-PASS: ( )

( ) GATE N/S FIG.NO. _____ SIZE _____

( ) GLOBE N/S FIG.NO. _____ SIZE _____

****

SURFACE BLOWDOWN VALVE(S): ( )

METERING N/S FIG.NO. _____ SIZE _____

STOP N/S FIG.NO. _____ SIZE _____

FULL LENGTH SKIMMER ( ) N/S

BOTTOM BLOWOFF VALVE(S): RS( ) LS( ) (L)

( ) N/S FIG.NO. _____ SIZE _____

( ) N/S FIG.NO. _____ SIZE _____

TURBULATORS: ( ) N/A

COMPLETED BY:	DATE
SALES: BJB	6/2/95
ENG: ALS	6/2/95
SCHED:	
PURCH:	

: BOILER TO MEET THE FOLLOWING CODES:
: CSD-1 ( ) UL LABEL B ( ) ( ) _____
: FACTORY FIRETEST W/REPORT (X) _____
: (M) SHIPPED MOUNTED (N/A) NOT APPLICABLE
: (L) SHIPPED LOOSE (N/S) NOT SUPPLIED
: (P) PREPIPED/SHIPPED LOOSE

REVISIONS

REV.	DATE	BY
A	6/22/95	BJB
B	9/18/95	

#2

SUPERIOR

SPEC SHEET - SPECIAL INSTRUCTIONS PAGE 3 OF 3

S.O. NO. 75906

SPECIAL INSTRUCTIONS:

Boiler to have removable skids.

Maximum height of boiler to be 78".

#2

FORM H-2 MANUFACTURERS' DATA REPORT FOR ALL TYPES OF BOILERS
EXCEPT WATERTUBE AND THOSE MADE OF CAST IRON
As Required by the Provisions of the ASME Code Rules, Section IV

ured and certified by Superior Boiler Works, Inc., 3524 E. 4th, Hutchinson, KS 67501
(name and address of manufacturer)

ured for Industrial Combustion, 351 21st Street, Monroe, WI 53566
(name and address of purchaser)

of installation Reading Memorial High School, 62 Oakland Road, Reading, MA 02867
(name and address)

lication	(complete boiler, superheater, waterwall, economizer, etc.)	(mfr's serial no.)	(CRN)	(drawing no.)	(Nat'l Bd. no.)	(year built)
Scotch Marine	Wetback	12810	----	000-009-315	12810	1995

hical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, constru
manship conform to ASME Code, Section IV, 1992 (year) 1994 (addenda (date)) ---- (Code Case no.)

urers' Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items on this report: ----------

(name of part, item number, mfr's. name and identifying stamp)

drums:	1	SA516-70	.375"	67"	208"	---- ----
	(no.)	(mat'l. spec. gr.)	(thickness (in.))	(dia. (I. D.))	(length (overall))	(dia. (I. D.)) (length (over
	Welded	85%		Welded		2
	(long (seamless, welded))	(eff. (as compared to seamless))		(pitch (seamless, welded))		(no. of shell courses)

et: (2) SA285C .562" Tube holes: 86 2.525"
(mat'l. spec., grade) (thickness)

No. SA178A Straight Dia. 2.5" Length 38 @ 208.5" 40 @ 180" Gauge .105"
(mat'l. spec., grade) (straight or bent) (if various, give max. & min.)

SA285C .562" Flat ----
(mat'l. specification no.) (thickness) (flat, dished, elliptical) (radius of dish)

SA285C .375" 1 30" O.D. 91.25" 182.5" Plain Seams: Welded
(mat'l. spec., gr.) (thickness) (no.) (size (O.D. or W x H)) (length (each section)) (total) (type (plain, corrugated, etc.)) (type (seamless, we

s: 7 --- SA675-70 1.375" None 1.48 Sq. In. 14" 30
(no.) (size (dia.)) (mat'l. spec., gr.) (size) (telltale) (net area) (pitch (nor. to ver.)) (MAWP (psi))

braces:

ation	Mat'l Spec.	Type	No. & Size	Pitch	Total Net Area	Fig. HG 343 U's	Dist. tubes to shell	Area to be Stayed	MAW psi
above tubes									
above tubes	SA675-70	Diag.	(1) 1.375"	----	1.48 Sq. In.	1.18	Not Required		30
below tubes									
below tubes									
pper stays									

ers: 1. Turnaround 2. Inner Tubesheet 3. Cleanout Port
(brief description - i.e. dome, boiler piping, etc.)

A285C	48" ID.	25" L.	.312" 30 PSI
A285C	47.75"	Dia.	.562" 30 PSI
A106B	18" OD.	8" L.	.375" 30 PSI

(mat'l. spec., grade, size, material thickness, MAWP)

s, inspection and safety valve openings:

purpose (outlet, drain, etc.)	No.	Dia. or Size	Type	How Attached	Mat'l.	Nom. Thickness	Reinforcement Mat'l.	Locati
le up to 3" x 4"	5	3"x4"	Ellip.	NA	NA	NA	NA	Note
ad	1	12"x16"	Ellip.	Welded	SA675-70	1"	NA	Shell
ty Valve	2	2.5"	Cpl.	Welded	SA105	.357"	NA	Shell
off Conn.	2	2"	Cpl.	Welded	SA105	.298"	NA	Shell
ad	1	8"	Flg.	Welded	SA106B	.322"	NA	Shell
	2	2"	Cpl.	Welded	SA105	.297"	NA	Shell

#2

SUPERIOR BOILER WORKS, INC.
3524 East 4th (67501)
P.O. Box 1527
Hutchinson, KS 67504-1527
Phone: (316) 662-6693
Fax: (316) 662-7586

WARRANTY REGISTRATION

Please complete this form and return it to Superior Boiler Works, Inc.

National Board Number 12810 SBW S.O. No. 5906

Boiler Sold To: _____

Owner of the Boiler _____

Installation Address _____

City _____ State _____ Zip _____

Boiler Installed By _____ Date _____

Phone Number _____

Boiler Started Up By _____ Date _____

Phone Number _____

GENERAL INFORMATION

Is this your first Superior Boiler Works boiler? _____ Yes _____ No

Boiler is used for: _____

_____

Did the boiler arrive in satisfactory condition? _____ If no,

please explain. _____

_____

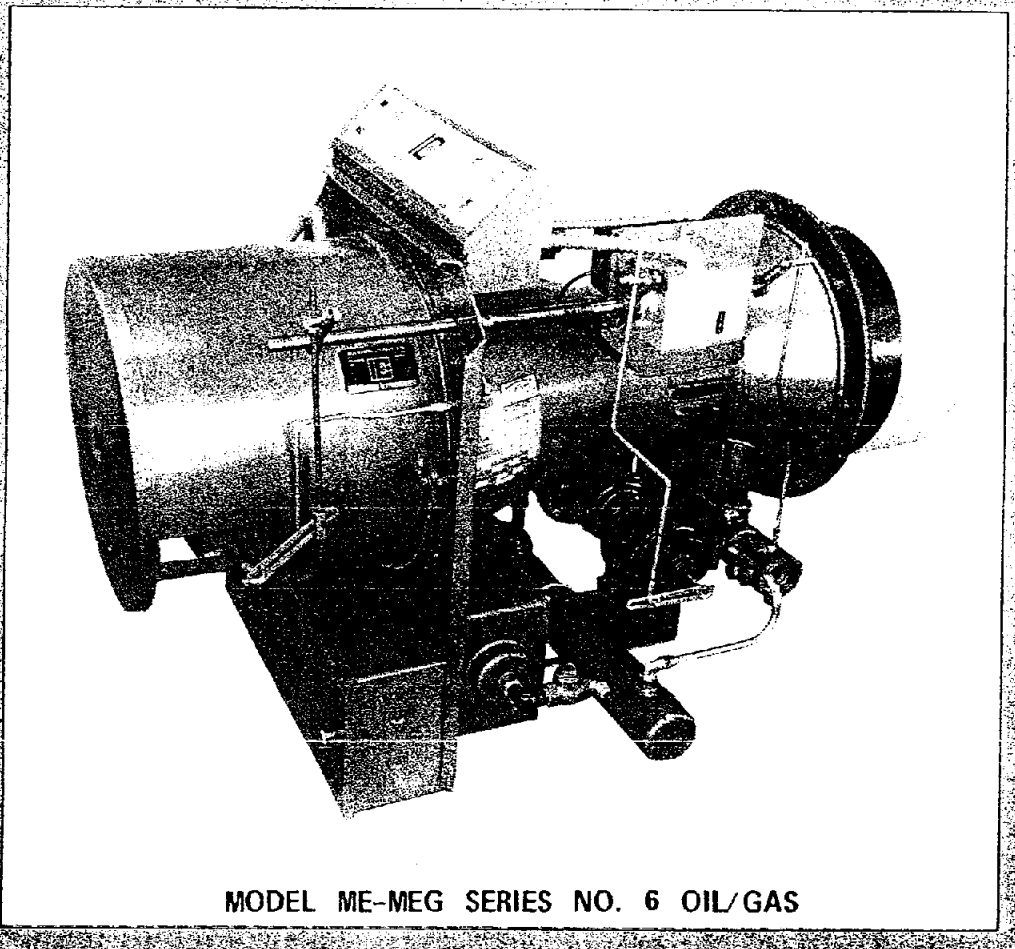
Completed By: _____

Phone Number: _____ Date: _____

MARC II

COMMERCIAL–INDUSTRIAL FORCED DRAFT BURNERS FOR GAS, OIL, OR COMBINATION GAS/OIL FUELS

BURNER FOR B# 1

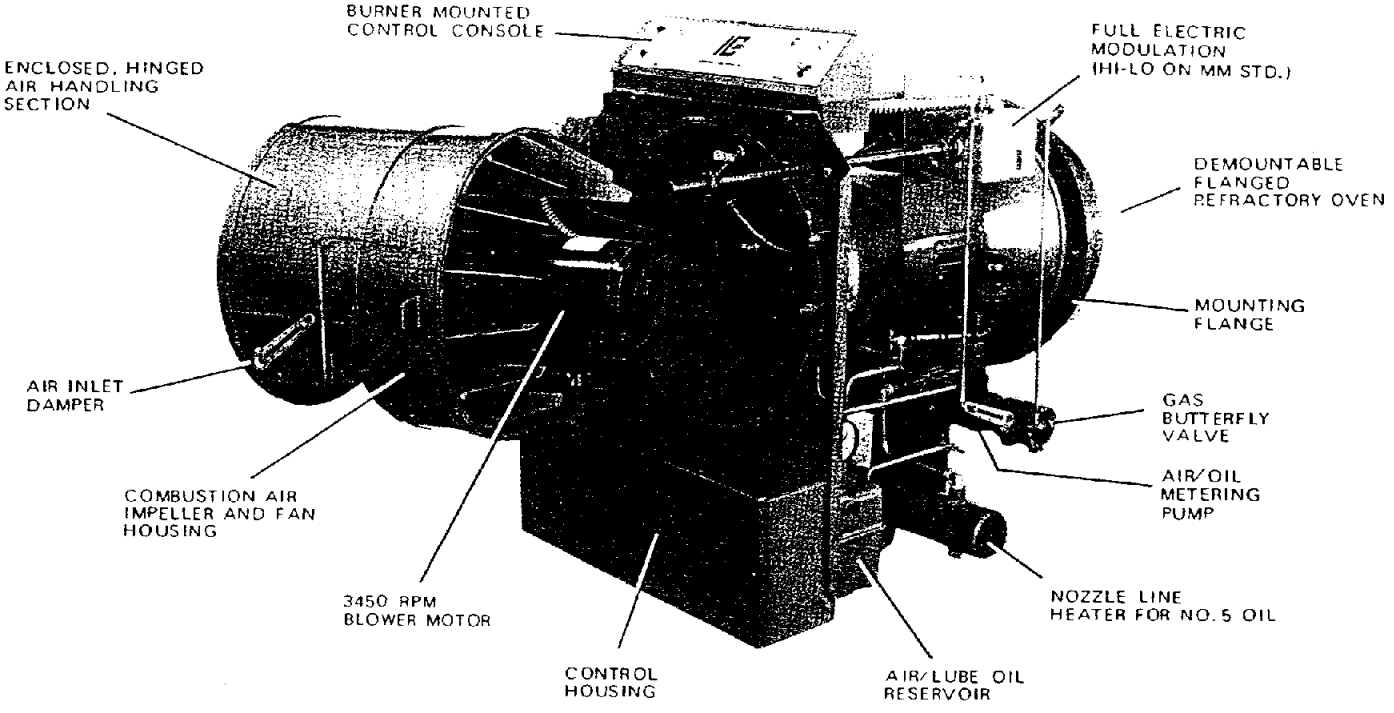


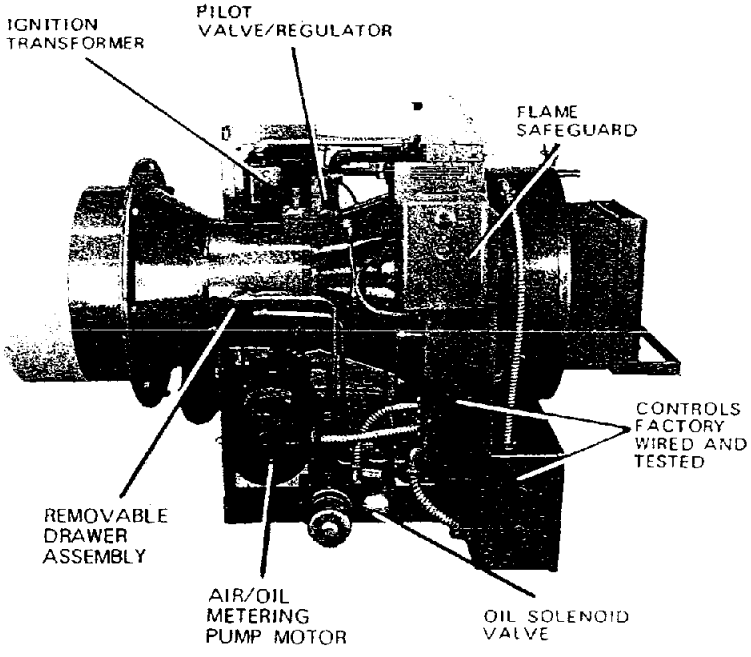
MODEL ME-MEG SERIES NO. 6 OIL/GAS

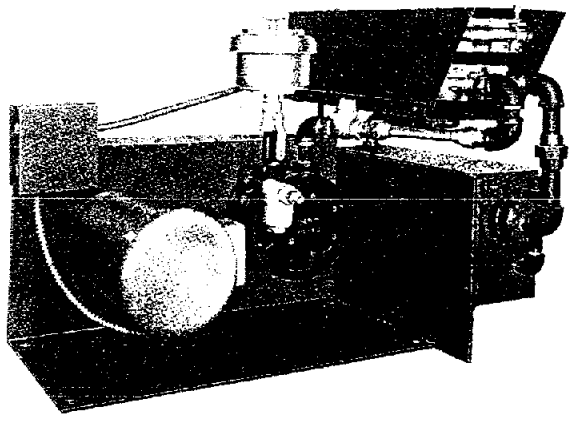
INPUT: 3400 TO 10500 MAX. MBh. GAS
24 TO 75 MAX. G.P.H. OIL
OUTPUT: 80 TO 250 BPH @ 80% EFF.

INDUSTRIAL COMBUSTION
DIVISION OF AQUA-CHEM, INC.
351-21st Street - Monroe, Wisconsin 53566

MM-MMG SERIES







AIR COMPRESSOR MODULE TYPICAL

Marc II burners utilize an advanced air handling system resulting in low blower motor horsepower, significantly lower noise levels and the ability to fire against higher furnace pressures.

Models MM and MMG use I.C.'s separately driven air/oil metering pump. Atomizing air pressure is generated and oil is metered volumetrically for consistent fuel/air ratio—regardless of oil temperature or viscosity. "ME" models use remote air compressor.

Models ML and MLG use a separately driven 2-stage fuel unit, metering valve and return flow nozzle. Atomizing pressure ranges from 100 to 300 psi. No circulating oil pump is required.

Models MG, MLG, MMG, and MEG burn gas under a controlled rate gas/air pressure mix. Gas is emitted from jets surrounding the air stream, producing a turbulent mixture which burns quietly and efficiently.

Combination burners allow fuel changeover by the flip of a switch, burning light oil, heavy oil or gas interchangeably with no equipment modification.

Burner mounted controls are standard, fully installed, wired and factory tested. Flame safeguard programmer and motor starters are mounted on the burner frame.

All Marc II burners are built to U.L. requirements. I.R.I., F.M. and other code requirements available on order.

- FORCED DRAFT TECHNOLOGY (for firing against high furnace pressure) also suitable for neutral or negative draft systems.
- SWING AWAY air housing.
- POSITIVE LOW FIRE START and smooth modulation.
- SIMPLE ADJUSTMENTS, easy service access – all controls completely wired and FACTORY TESTED.
- LOWER MOTOR HORSEPOWER and significantly LOWER SOUND LEVELS.
- Refractory lined combustion chambers NOT required to aid combustion.
- Standard burners U.L. APPROVED–F.M., I.R.I. and other code requirements on order.
- Low fire potentiometer (oil side ML, MLG34-105) (gas side MLG84-105)

AIR ATOMIZING OIL SYSTEM (Models MM, MMG, ME, MEG)

- Exclusive I.C. separately driven AIR/OIL METERING HEAD – consistent air-to-fuel ratio regardless of oil temperature or viscosity.
- Remote Compressor (ME, MEG)
- Burner mounted air/lube oil SEPARATOR-RESERVOIR.
- 3-way SOLENOID VALVE.
- NOZZLE LINE HEATER with cold oil lockout switch (for No. 5 and No. 6 oil).
- J40 type atomizing air proving switch.
- Burner fuel oil strainer standard.

[illegible] OIL SYSTEM (Models ML, [illegible])

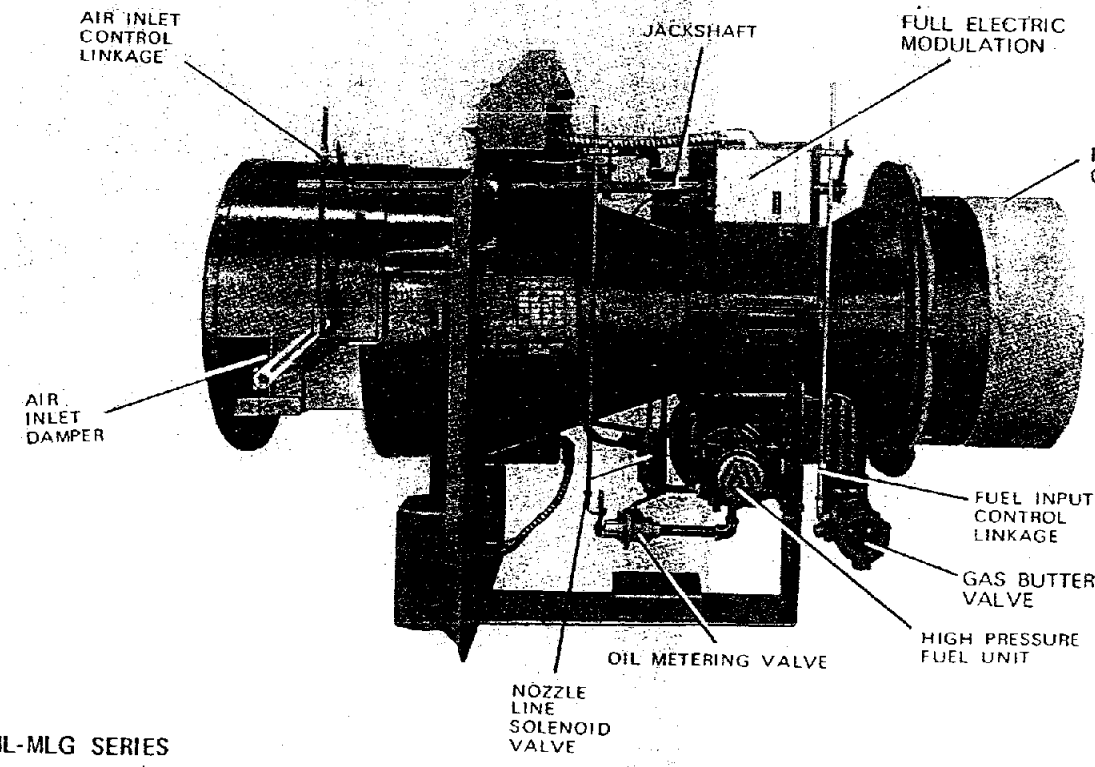
- Separately driven 2-stage, HIGH PRESSURE (up to 300 psi) FUEL OIL PUMP.
- NO circulating pump required.
- MODULATING OIL METERING VALVE.
- Nozzle line SOLENOID VALVE.
- Return flow OIL NOZZLE.
- Fuel oil filter standard.

GAS HANDLING SYSTEM (Models MG, MMG, MLG, MEG)

- MOTORIZED MAIN GAS VALVE with closure interlock (M34-42).
- One motorized and one K3 solenoid valve (M54-105).
- BUTTERFLY TYPE gas rate input valve.
- Manual main gas valve(s).
- Main gas PRESSURE REGULATOR (low pressure).
- HIGH and LOW gas pressure switches.
- PILOT SOLENOID/REGULATOR for gas-electric ignition.

CONTROL SYSTEM

- BURNER MOUNTED CONTROLS – remote panel optional.
- FOUR PANEL SIGNAL LIGHTS – power on, main fuel, ignition, flame failure.
- Electronically programmed FLAME SAFEGUARD SYSTEM.
- FUEL CHANGEOVER SWITCH (MLG, MMG, MEG) – burn gas or oil interchangeably with no equipment modification.
- COMBUSTION AIR and ATOMIZING AIR proving switches – STANDARD.
- FULL ELECTRIC modulation, except 2-STAGE PNEUMATIC modulation (MM34-63).
- GAS-ELECTRIC IGNITION (direct spark ignition ML, MM34-63).



ML-MLG SERIES

MARC II EQUIPMENT
S = Standard Equipment
O = Optional Equipment

ML = No. 2 Oil Pressure Atomizing
MM = No. 2 to No. 5 Oil Air Atomizing
MLG = Gas/No. 2 Oil Pressure Atomizing
MMG = Gas/No. 2 to No. 5 Oil Air Atomizing
ME = No. 6 Oil Air Atomizing
MEG = Gas/No. 6 Oil Air Atomizing

	MODEL						
	MG Gas	ML	MM	MLG	MMG	ME	MEG
1. Burner mounted control panel (remote panel optional at extra cost)	S	S	S	S	S	S	S
2. 120/60/1 control circuit	S	S	S	S	S	S	S
3. Control circuit transformer, 120/60/1 secondary	O	O	O	O	O	O	O
4. Fuel changeover switch	–	–	–	S	S	–	S
5. PBC2-5023 or R4140G flame safeguard programmer (See Note 1)	S	S	S	S	S	S	S
6. 4 Panel mounted indicating lights (power, ignition, fuel valve, flame failure)	S	S	S	S	S	S	S
7. 208-230-460/60/3, 3450 rpm blower motor (See Note 2)	S	S	S	S	S	S	S
8. Motor starter(s), panel mounted	S	S	S	S	S	S	S
9. High-low pneumatic modulation (MM34-63 only)	–	–	S	–	–	–	–
10. Full electric modulation (also suitable for high-low operation)	S	S	O	S	S	S	S
11. Low fire potentiometer (oil side ML, MLG34-105) (gas side MLG84-105)	–	S	–	S	–	–	–
12. Manual potentiometer (135 Ohm)	–	O	–	O	–	–	–
13. Manual firing rate limiting potentiometer (270 Ohm)	O	–	O	–	O	O	O
14. Combustion air proving switch	S	S	S	S	S	S	S
15. Gas-electric ignition, combination regulator/valve	S	O	O	S	S	S	S
16. Direct spark ignition (ML-MM34-63 only)	–	S	S	–	–	–	–
17. Ignition transformer	S	S	S	S	S	S	S
18. Air-oil metering pump, separately driven (See Note 3)	–	–	S	–	S	–	–
19. Metering pump separately driven, remote compressor	–	–	–	–	–	S	S
20. Air-lube oil separator/reservoir	–	–	S	–	S	S	S
21. Burner fuel oil strainer	–	S	S	S	S	S	S
22. Circulating oil pump set (See Note 3)	–	–	O	–	O	O	O
23. Auxiliary heater w/cold oil lockout switch, 220/60/1, 3 KW M34-63, 5 KW M84-105	–	–	S	–	S	S	S
24. Atomizing air switch, J-40	–	–	S	–	S	S	S
25. High pressure fuel unit, separately driven – 115/1/60	–	S	–	S	–	–	–
26. Oil control valve(s)	–	S	S	S	S	S	S
27. Motorized gas S.S.O.V. with closure interlock (M34-42) (See Note 4)	S	–	–	S	S	–	S
28. 1-Motorized gas S.S.O.V. with closure interlock and 1-K3 solenoid (M54-105)	S	–	–	S	S	–	S
29. Butterfly gas rate valve	S	–	–	S	S	–	S
30. Gas shutoff cock(s)	S	–	–	S	S	–	S
31. Main gas regulator (low pressure)	S	–	–	S	S	–	S
32. High and low gas pressure switches	S	–	–	S	S	–	S
33. Burner mounting flange	S	S	S	S	S	S	S
34. Separately demountable, flanged refractory oven, 16" M34-63, 19" M84-105	S	S	S	S	S	S	S

NOTES

1. Lead sulphide scanner standard, U.V. and other controls optional.
2. Single phase, totally enclosed and 50 cycle motors optional.
3. Separate oil circulating pump required for MM, MMG, ME, MEG.
4. Main gas valves and accessories upstream of butterfly valve are shipped unmounted.

CAPACITIES AND SPECIFICATIONS

* Burner Model	INPUT Max. MBh. Gas	INPUT Max. G.P.H. No. 2 Oil	OUT-PUT Boiler H.P. @ 80% Eff.	Std. Gas Train Size (In.)	** Gas Pressure Req. At Train Inlet ("W.C.)	Impeller Motor H.P./ 3450 R.P.M. S	Impeller Motor H.P./ 3450 R.P.M. P	*** (MM-MMG) Air Atomizing Oil/Air Metering Pump Motor H.P./ 1725 R.P.M.	*** (ME-MEG) Metering Pump Motor H.P./ 1725 R.P.M.	*** (ME-MEG) Compressor Motor H.P./ R.P.M.	(ML-MLG) Pressure Atomizing High Press. Oil Pump Motor H.P./ 3450 R.P.M.
34	3400	24	80	2	7.7	2	2	1	1/2	2-1725	1/2
42	4200	30	100	2	9.3	2	2	1	1/2	2-1725	1/2
54	5400	38	125	2½	8.9	2	3	1	1/2	2-1725	1/2
63	6300	45	150	2½	10.9	3	3	2	1/2	3-1725	3/4
84	8400	60	200	3	12.2	5	7½	2	1/2	3-3450	1
105	10500	75	250	3	16.4	7½	7½	2	1/2	3-3450	1

*Use Model "S" up to 0.5" WC furnace pressure. Use Model "P" up to 1.5" WC. For higher furnace pressures, consult the factory.

**Gas pressure at train inlet at high fire. For higher or lower pressures, see IC-986.

***Air atomizing burners require separate circulating pump. Marc II burners are designed for No. 2 thru No. 6 oil per A.S.T.M. D-396 depending on model selection.

Gas firing inputs based on natural gas at 1000 BTU/Cu. Ft. and 0.65 S.G.

All ratings for elevations up to 2000 ft. Higher altitudes and 50 cycle applications, consult the factory.

Table A2-1. Model CB Steam Boiler Ratings (15 - 100 hp)

BOILER HP	15[C]	20[C]	30[C]	40[C]	50	60	70	80	100
RATINGS - SEA LEVEL TO 3000 FT									
Rated Cap. (lbs steam/hr @212°F) Btu Output (1000 Btu/hr)	518 502	690 670	1035 1004	1380 1339	1725 1674	2070 2009	2415 2343	2760 2678	3450 3348
APPROXIMATE FUEL CONSUMPTION AT RATED CAPACITY									
Light Oil (gph)[A]	4.5	6.0	9.0	12.0	15.0	18.0	21.0	24.0	30.0
Heavy Oil (gph)[B]	-	-	-	-	14.0	16.5	19.5	22.5	28.0
Gas (cfh) 1000 Btu-Nat Gas (Therm/hr)	625 6.3	835 8.4	1255 12.6	1675 16.8	2095 21.0	2510 25.1	2930 29.3	3350 33.5	4185 41.9
POWER REQUIREMENTS - SEA LEVEL TO 3000 FT, 60 HZ									
Blower Motor hp (except gas)	1	1	1-1/2	2	2	2	2	2[D]	3
Gas Models (only)	1	1	1-1/2	2	2	2	2	2[D]	3
Oil Pump Motor, hp No. 2 Oil	Belt-Driven From Blower				1/3	1/3	1/3	1/3	1/3
Oil Pump Motor, hp No. 6 Oil	-	-	-	-	1/3	1/3	1/3	1/3	1/3
Oil Heater kW No. 6 Oil	-	-	-	-	5	5	5	5	5
Air Compressor Motor hp (Oil firing Only)	Air Compressor Belt-Driven from Blower Motor				2	2	2	2	2

NOTES:
1. For altitudes above 3000 ft, contact your local Cleaver-Brooks authorized representative for verification of blower motor hp.
A. Based on 140,000 Btu/gal.
B. Based on 150,000 Btu/gal.
C. No. 6 Oil not available in 15-40 hp range.
D. 3 hp above 2000 ft.

Table A2-2. Model CB Steam Boiler Ratings (125 - 800 hp)

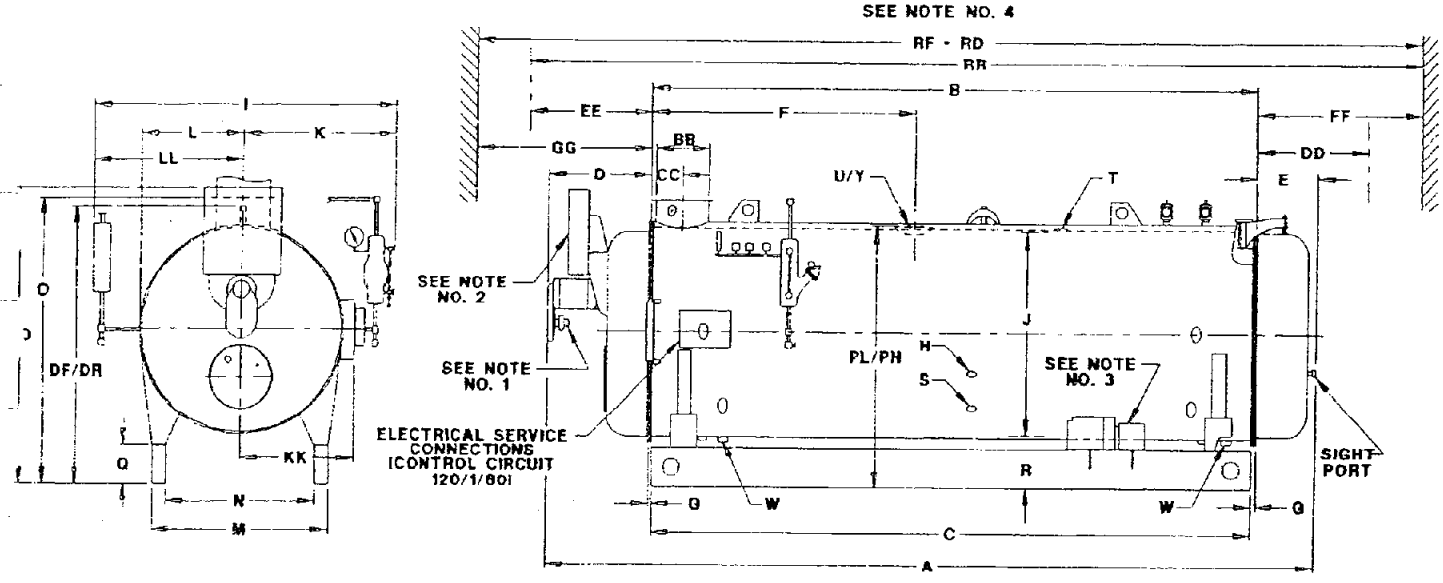
BOILER HP	125	150	200	250	300	350	400	500	600	700	800
RATINGS SEA LEVEL TO 3000 FT[J]											
Rated Cap. (lbs steam/hr @ 212°F) Btu Output (1000 Btu/hr)	4313 4184	5175 5021	6900 6695	8625 8369	10350 10043	12075 11716	13800 13390	17250 16738	20700 20085	24150 23432	27600 26779
APPROXIMATE FUEL CONSUMPTION AT RATED CAPACITY											
Light Oil (gph)[A]	37.5	45.0	60.0	74.5	89.5	104.5	119.5	149.5	179.5	209.0	239.3
Heavy Oil (gph)[B]	35.0	42.0	56.0	69.5	83.5	97.5	111.5	139.5	167.5	195.5	223.4
Gas (cfh) MBTU-nat Gas (Therm/hr)	5230 52.3	6280 62.8	8370 83.7	10460 104.6	12555 125.5	14650 146.5	16750 167.5	20925 209.3	25100 251.0	29300 293.0	33480 334.8
POWER REQUIREMENTS - SEA LEVEL TO 3000 FT, 60 HZ											
Blower Motor hp (except gas)	5	7-1/2	15	7-1/2	10[C]	15[D]	10[C]	15[E]	20[F]	30[G]	50[H]
Gas Models (only)	5	5	10	7-1/2	7-1/2[I]	15	10[C]	15[E]	20[F]	30[G]	50[H]
Oil Pump Motor, hp No. 2 Oil	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4	1	1
Oil Pump Motor, hp No. 6 Oil	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4	3/4
Oil Heater kW No. 6 Oil	5	5	5	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2[K]	7-1/2[K]	7-1/2[K]	7-1/2[K]
Air Compressor Motor hp (Oil firing Only)	Air Compressor Belt-Driven From Blower Motor						7-1/2	7-1/2	7-1/2	7-1/2	7-1/2

NOTES:
1. For altitudes above 3000 ft, contact your local Cleaver-Brooks authorized representative for verification of blower motor hp.
A. Based on 140,000 Btu/gal.
B. Based on 150,000 Btu/gal.
C. 15 hp above 2500 ft.
D. 20 hp above 2500 ft.
E. 20 hp above 2000 ft.
F. 30 hp above 2500 ft.
G. 40 hp above 2000 ft.
H. 60 hp above 3000 ft.
I. 10 hp above 2500 ft.
J. Sea level to 2,500 ft for 300 and 350 Hp sizes.
K. 10 kW on low pressure.

Table A2-5. Steam Boiler Safety Valve Openings

VALVE SETTING	15 PSIG STEAM		100 PSIG STEAM		125 PSIG STEAM		150 PSIG STEAM		200 PSIG STEAM		250 PSIG STEAM	
BOILER HP	NO. OF VALVES REQ'D	OUTLET SIZE (IN.)	NO. OF VALVES REQ'D	OUTLET SIZE (IN.)	NO. OF VALVES REQ'D	OUTLET SIZE (IN.)	NO. OF VALVES REQ'D	OUTLET SIZE (IN.)	NO. OF VALVES REQ'D	OUTLET SIZE (IN.)	NO. OF VALVES REQ'D	OUTLET SIZE (IN.)
15	1	1-1/2	1	1	1	3/4	1	3/4	1	3/4	1	3/4
20	1	1-1/2	1	1	1	1	1	3/4	1	3/4	1	3/4
25	1	2	1	1	1	1	1	1	1	3/4	1	3/4
30	1	2	1	1-1/4	1	1	1	1	1	1	1	3/4
40	1	2-1/2	1	1-1/4	1	1-1/4	1	1-1/4	1	1	1	1
50	1	2-1/2	1	1-1/2	1	1-1/2	1	1-1/4	1	1-1/4	1	1
60	1	2	1	1-1/2	1	1-1/2	1	1-1/2	1	1-1/4	1	1
70	1	2-1/2	1	2	1	1-1/2	1	1-1/2	1	1-1/4	1	1-1/4
80	1	2-1/2	1	2	1	1-1/2	1	1-1/2	1	1-1/2	1	1-1/4
100	1	2-1/2	1	2	1	2	1	2	1	1-1/2	1	1-1/2
125	1	3	2	1-1/2	2	(1) 1-1/2 (1) 1-1/4	2	(1) 1-1/2 (1) 1-1/4	2	(1) 1-1/4 (1) 1	2	(1) 1 (1) 1-1/4
150	1	3	2	(1) 2 (1) 1-1/2	2	1-1/2	2	(1) 1-1/2 (1) 1-1/4	2	1-1/4	2	(1) 1 (1) 1-1/4
200	2	2-1/2	2	2	2	(1) 2 (1) 1-1/2	2	(1) 2 (1) 1-1/2	2	(1) 1-1/2 (1) 1-1/4	2	(1) 1-1/4 (1) 1-1/2
250	2	(1) 2-1/2 (1) 3	2	(1) 2-1/2 (1) 2	2	2	2	2	2	1-1/2	2	1-1/2
300	2	3	2	2-1/2	2	(1) 2-1/2 (1) 2	2	(1) 2-1/2 (1) 2	2	(1) 2 (1) 1-1/2	2	1-1/2
350	3	(1) 2 (2) 3	3	(1) 2-1/2 (2) 2	2	2-1/2	2	(1) 2-1/2 (1) 2	2	2	2	(1) 1-1/2 (1)2
400	3	(2) 3 (1) 2-1/2	3	(1) 2 (2) 2-1/2	2	2-1/2	2	2-1/2	2	(1) 2-1/2 (1) 2	2	2
500	3	(3) 3	3	2-1/2	3	(2) 2-1/2 (1) 2	3	(1) 2-1/2 (2) 2	2	(1) 2-1/2 (1) 2	2	(1) 2 (1) 2-1/2
600	4	3	4	(3) 2-1/2 (1) 2	3	2-1/2	3	(2) 2-1/2 (1) 2	2	2-1/2	2	(1) 2 (1) 2-1/2
700	5	(4) 3 (1) 2	5	(3) 2-1/2 (2) 2	4	(3) 2-1/2 (1) 2	3	2-1/2	3	(1) 2-1/2 (2) 2	2	2-1/2
800	5	(4) 3 (1) 2	5	(3) 2-1/2 (2) 2	4	(3) 2-1/2 (1) 2	3	2-1/2	3	(1) 2-1/2 (2) 2	2	2-1/2

NOTE: Valve manufacturers are Kunkle, Consolidated or Conbraco, depending on availability.



BOILER HP	DIM	125	150	200	250	300	350	400	500	600	700	800
LENGTHS												
Overall	A	174-1/2	199-/12	232-1/2	197	227	257	210	244	284	317	319
Shell	B	125	149	180	144	171	201	152	186	222	255	255
Base Frame	C	124	148	179	143	170	200	151	185	221	254	254
Front Head Extension	D	30	31	33	29	32	32	26	26	30	30	32
Rear Head Extension	E	19-1/2	19-1/2	19-1/2	24	24	24	32	32	32	32	32
Front Ring Flange to Nozzle - 15 psig	F	62-1/2	74-1/2	90	72	85-1/2	100-1/2	76	93	111	127-1/2	127-1/2
Front Ring Flange to Nozzle - 150 psig	F	55	66	78	59-1/2	73	88	62	79	97	127-1/2	127-1/2
Ring Flange to Base	G	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
WIDTHS												
Overall	I	85	85	85	103	103	103	123	123	123	123	123
ID, Boiler	J	60	60	60	78	78	78	96	96	96	96	96
Center to Water Column	K	45	45	45	54	54	54	64	64	64	64	64
Center to Ouside Hinge	KK	35	35	35	51	51	51	62	62	62	62	62
Center to Lagging	L	33	33	33	42	42	42	51	51	51	51	51
Center to Auxiliary LWCO	LL	40	40	40	49	49	49	59	59	59	59	59
Base, Outside	M	52-1/2	52-1/2	52-1/2	64-3/8	64-3/8	64-3/8	72	72	72	72	72
Base, Inside	N	44-1/2	44-1/2	44-1/2	52-3/8	52-3/8	52-3/8	56	56	56	56	56

Figure A2-2. Model CB Steam Boiler Dimensions and Weights (15 and 150 psig Design Pressure - 125 to 800 hp) Sheet 1 of 2

BOILER HP	DIM	125	150	200	250	300	350	400	500	600	700	800
HEIGHTS												
Base to Steam Outlet (15 psig only)	PL	77	77	77	96	96	96	116	116	116	116	116
Overall	OO	86	86	86	106	106	106	126	126	126	126	126
Base to Vent Outlet	O	85	85	85	106	106	106	126	126	126	126	126
Base to Steam Outlet (150 psig only)	PH	77	77	77	96	96	96	116	116	116	116	116
Davit (Front)	DF	-	-	-	104	104	104	125	125	125	125	125
Davit (Rear)	DR	84-3/4	84-3/4	84-3/4	104	104	104	126	126	126	126	126
Height of Base	Q	12	12	12	10	10	10	12	12	12	12	12
Base to Bottom of Boiler	R	16	16	16	17	17	17	19	19	19	19	19
BOILER CONNECTIONS												
Chemical Feed	H	1	1	1	1	1	1	1	1	1	1	1
Feedwater, Right and Left	S	1-1/2	1-1/2	2	2	2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2
Low Pressure (15 psig only) Steam Nozzle (Note A) Drain, Front and Rear	U W	8 1-1/2	8 1-1/2	10 2	10 2	12 2	12 2	12 2	12 2	12 2	12 2	12 2
High Pressure (150 psig only) Surface Blowoff, Top C_L Steam Nozzle (Note B) Blowdown, Front and Rear	T Y W	1 4 1-1/2	1 4 1-1/2	1 4 1-1/2	1 6 1-1/2	1 6 1-1/2	1 6 1-1/2	1 6 2	1 8 2	1 8 2	1 8 2	1 8 2
VENT STACK												
Diameter (flgd. connection)	BB	16	16	16	20	20	20	24	24	24	24	24
Front Ring Flange to Vent C_L	CC	9	9	9	10-1/2	10-1/2	10-1/2	12-1/2	12-1/2	12-1/2	12-1/2	12-1/2
MINIMUM CLEARANCES												
Rear Door Swing	DD	32C	32C	32C	43C	43C	43C	53C	53C	53C	53C	53C
Front Door Swing	EE	67	67	67	89C	89C	89C	108C	108C	108C	108C	108C
Tube Removal, Rear	FF	115	139	170	131	157	187	135	169	205	238	238
Tube Removal, Front	GG	103	127	158	116	142	172	116	151	187	220	220
MINIMUM BOILER ROOM LENGTH ALLOWING FOR DOOR SWING AND TUBE REMOVAL FROM:												
Rear of Boiler	RR	307	355	417	364	417	477	395	363	535	601	601
Front of Boiler	RF	260	308	370	303	356	416	322	390	462	528	528
Thru Window or Doorway	RD	224	248	279	275	302	332	313	347	383	416	416
WEIGHT IN LBS												
Normal Water Capacity		5750	7250	8625	10670	13000	15465	15340	19300	23425	27790	27790
Approx. Ship Wgt - 15 psig		12200	12900	15200	21800	24000	27300	33500	38400	44000	51400	51400
Approx. Ship Wgt - 150 psig		12800	13800	16300	23400	26000	28500	36500	41400	47000	54100	54100
Approx. Ship Wgt - 200 psig		13400	14500	17100	25200	28000	30000	38300	44000	50500	57700	57700

NOTES:
1. Air compressor belt driven from blower motor on sizes 125 thru 350 hp.
2. Control Panel relocation on boilers 250 hp and up.
3. Air compressor module on sizes 400 thru 800 hp.
4. Accompanying dimensions, while sufficiently accurate for layout purposes, must be confirmed for construction by certified dimension prints.

A. 40 hp thru 800 hp, connection threaded unless indicated - flg. 150 psig.
B. 100 hp thru 800 hp, connection threaded unless indicated - flg. 300 psig ASA.
C. Davit equipped, standard 125 - 800 hp .

Figure A2-2. Model CB Steam Boiler Dimensions and Weights (15 and 150 psig Design Pressure - 125 to 800 hp) Sheet 2 of 2

Table A2-7. Predicted Fuel-to-Steam Efficiencies (%), Model CB Boilers - 10 psig, Natural Gas

BOILER HP	FIRING RATE (%)			
	25	50	75	100
50	79.5	81.0	81.0	81.0
60	80.5	81.5	81.5	80.5
70	81.0	82.5	82.5	82.5
80	81.5	83.0	83.0	82.5
100	84.4	85.0	84.8	84.4
125	83.3	83.6	83.4	83.2
150	84.4	84.6	84.5	84.3
200	85.0	85.3	85.1	84.9
250	85.0	84.7	84.0	83.3
300	85.3	85.3	84.6	83.9
350	85.3	85.7	85.2	84.5
400	84.5	84.7	84.6	84.4
500	85.5	85.7	85.5	85.2
600	85.7	86.0	85.8	85.6
700	85.7	86.2	86.0	85.7
800	85.8	86.1	85.9	85.6

Table A2-8. Predicted Fuel-to-Steam Efficiencies (%), Model CB Boilers - 125 psig, Natural Gas

BOILER HP	FIRING RATE (%)			
	25	50	75	100
50	75.5	78.0	78.5	78.5
60	76.5	78.5	78.5	78.5
70	77.0	79.0	80.0	80.0
80	77.5	79.5	80.0	79.5
100	81.5	82.4	82.3	82.2
125	80.4	80.9	81.0	81.0
150	81.5	82.0	82.0	82.1
200	82.2	82.7	82.7	82.7
250	82.0	82.0	81.6	81.3
300	82.6	82.7	82.2	81.9
350	82.6	83.2	82.8	82.5
400	81.8	82.2	82.4	82.2
500	82.8	83.2	83.3	83.1
600	82.9	83.5	83.6	83.5
700	83.0	83.6	83.6	83.6
800	83.1	83.6	83.7	83.5

Table A2-9. Predicted Fuel-to-Steam Efficiencies (%), Model CB Boilers - 10 psig, No. 6 Oil

BOILER HP)	FIRING RATE (%)			
	25	50	75	100
50	83.5	85.0	85.0	85.0
60	84.0	85.0	85.0	85.0
70	84.5	86.0	86.5	86.0
80	85.5	86.5	86.5	86.5
100	88.2	88.5	88.3	87.1
125	87.2	87.4	87.2	87.0
150	88.4	88.5	88.3	88.1
200	88.9	89.2	88.9	88.7
250	88.8	88.5	87.8	87.1
300	89.1	89.2	88.4	87.7
350	89.1	89.5	89.0	88.4
400	88.4	88.5	88.4	88.1
500	89.4	89.5	89.3	89.2
600	89.5	89.9	89.7	88.4
700	89.6	90.0	89.8	89.6
800	89.7	90.0	89.8	89.5

Table A2-10. Predicted Fuel-to-Steam Efficiencies (%), Model CB Boilers - 125 psig, No 6 Oil

BOILER HP	FIRING RATE (%)			
	25	50	75	100
50	79.0	81.5	82.0	81.5
60	80.0	82.0	82.5	82.5
70	80.5	83.0	83.5	83.5
80	81.0	83.5	84.0	84.0
100	84.6	85.8	85.9	84.8
125	84.1	84.6	84.7	84.8
150	85.3	85.8	85.8	85.8
200	86.0	86.5	86.4	86.5
250	85.8	85.7	85.3	85.0
300	86.3	86.4	86.0	85.6
350	86.4	87.0	86.6	86.2
400	85.5	85.9	86.0	85.9
500	86.5	86.9	87.0	86.9
600	86.7	87.3	87.4	87.2
700	86.8	87.3	87.4	87.4
800	86.9	87.4	87.5	87.3

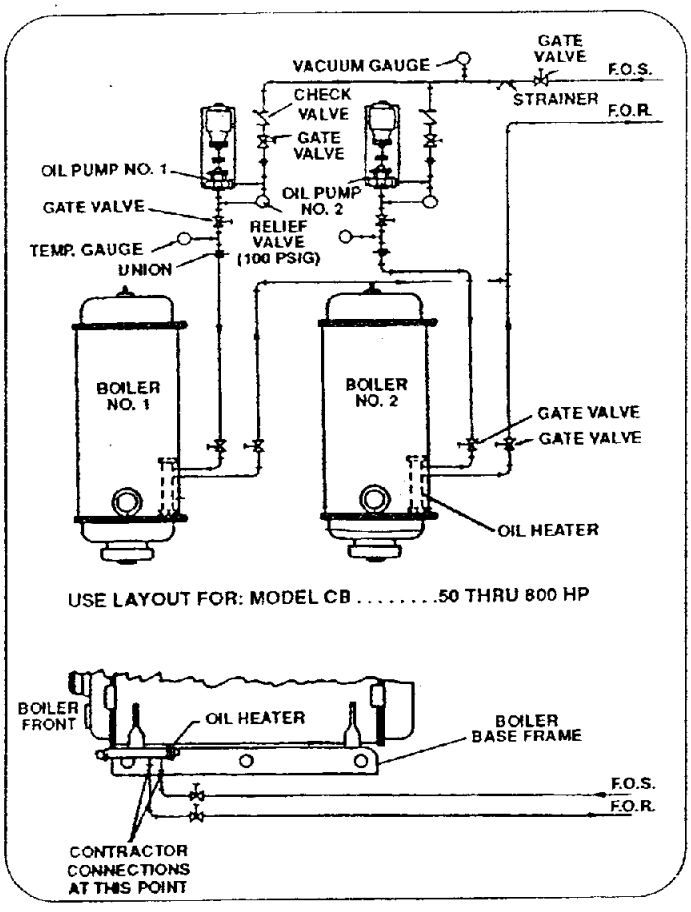


Figure A2-20. No. 6 Oil Piping, Multiple Boiler Installation, Remote Oil Pumps

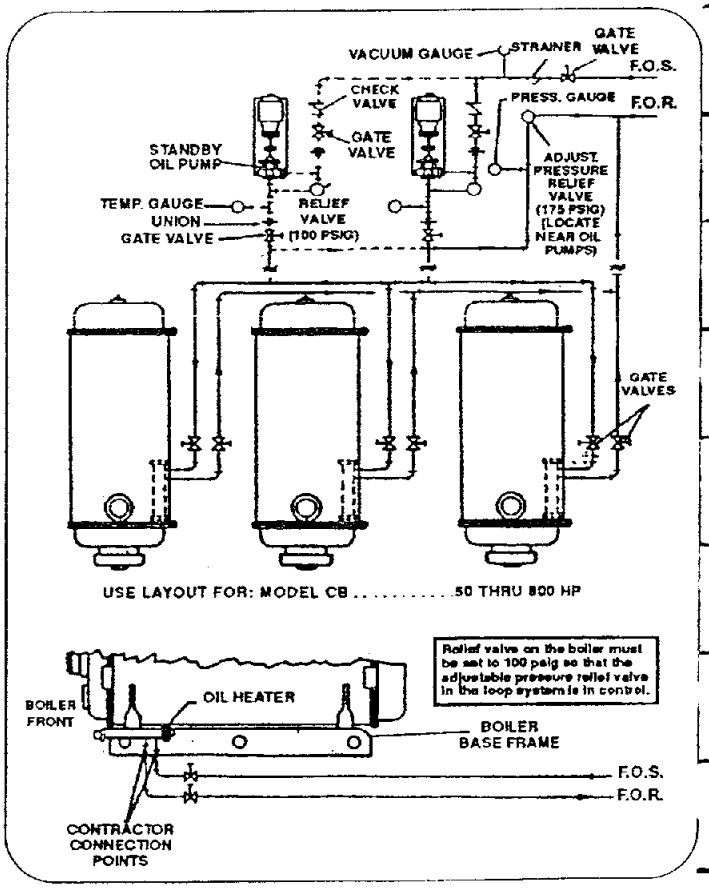


Figure A2-21. No. 6 Oil Piping, Multiple Boiler Installation

Boiler Room Information

Figure A2-26 shows typical boiler room length requirements.

Figure A2-27 shows typical boiler room width requirements.

Figure A2-28 shows typical breeching arrangements.

Stack Support Capabilities

Cleaver-Brooks Firetube Boilers 15 hp through 100 hp can support up to 1,000 lbs without additional support. Firetube boilers 125 hp through 800 hp can support up to 2,000 lbs without additional support.

Firetube sizes 250 hp through 800 hp can be reinforced to support 3,000 lbs.

Stack/Breeching Size Criteria

A constant pressure at the flue gas outlet of a Model CB Boiler is not required. The high static presure developed in the windbox by the forced draft fan and high pressure drop type burner provides a safety margin for pressure changes at the boiler outlet.

However, it is necessary to size the stack/breeching to limit the flue gas pressure variation. The allowable pressure range is – 0.5" WC to + 0.5"WC. The maximum pressure variation at any firing rate for the boiler is 0.5" WC. Consult with your local Cleaver-Brooks authorized representative if you have a specific question on your application.

Boiler Room Combustion Air

When determining boiler room air requirements, the size of the room, air flow, and velocity of air must be reviewed as follows:

1. Size (area) and location of air supply openings in boiler room.

   A. Two (2) permanent air supply openings in the outer walls of the boiler room are recommended. Locate one at each end of the boiler room, preferably below a height of 7 feet. This allows air to sweep the length of the boiler.

   B. Air supply openings can be louvered for weather protection, but they should not be covered with fine mesh wire, as this type of covering has poor air flow qualities and is subject to clogging by dust or dirt.

   C. A vent fan in the boiler room is not recommended, as it could create a slight vacuum under certain conditions and cause variations in the quantity of combustion air. This can result in unsatisfactory burner performance.

   D. Under no condition should the total area of the air supply openings be less than (1) square foot.

   E. Size the openings by using the formula:

   Area (sq-ft) = cfm/fpm

2. Amount of air required (cfm).

   A. Combustion Air = Rated bhp x 8 cfm/bhp.

   B. Ventilation Air = Maximum bhp x 2 cfm/bhp or a total of 10 cfm/bhp - up to 1000 feet elevation. Add 3 percent more per 1000 feet of added elevation.

3. Acceptable air velocity in boiler room (fpm).

   A. From floor to (7) foot height - 250 fpm.

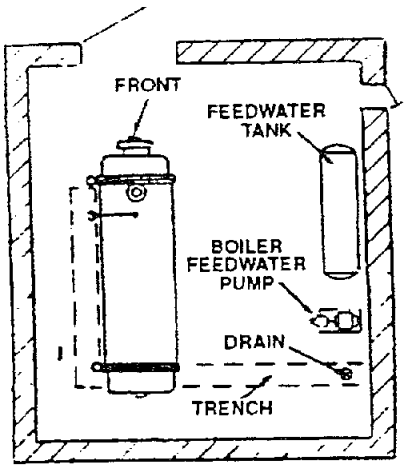
   B. Above (7) foot height - 500 fpm.

Example: Determine the area of the boiler room air supply openings for (1) 300 hp boiler at 800 feet altitude. The air openings are to be 5 feet above floor level.

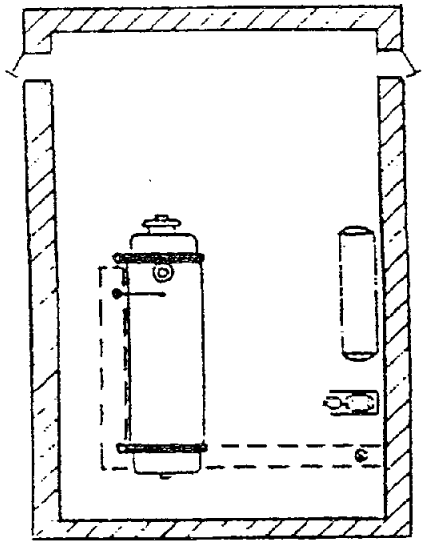
- Air required: 300 x 10 = 3000 cfm (from 2B above).
- Air velocity: Up to 7 feet = 250 fpm (from 3 above).
- Area Required: Area = cfm = 3000/250 = 12 Sq-ft total.
- Area/Opening: 12/2 = 6 sq-ft/opening (2 required).

NOTICE

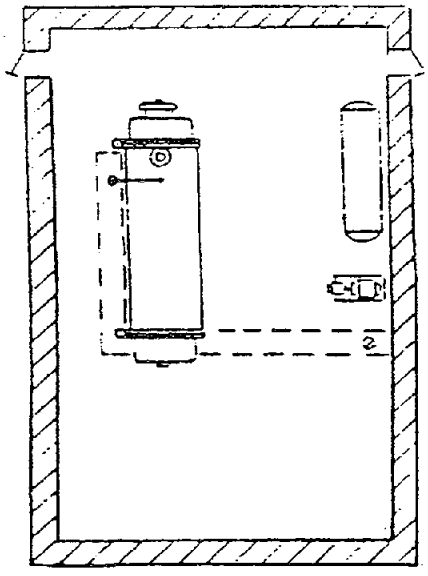
Consult local codes, which may supersede these requirements.



DRAWING A



DRAWING B



DRAWING C

1. Shortest boiler room length (Dwg A) is obtained by allowing for possible future tube replacement (from front or rear of boiler) through a window or doorway. Allowance is only made for minimum door swing at each end of the boiler. This arrangement provides sufficient aisle space at the front of the boiler but a "tight" space condition at the rear.

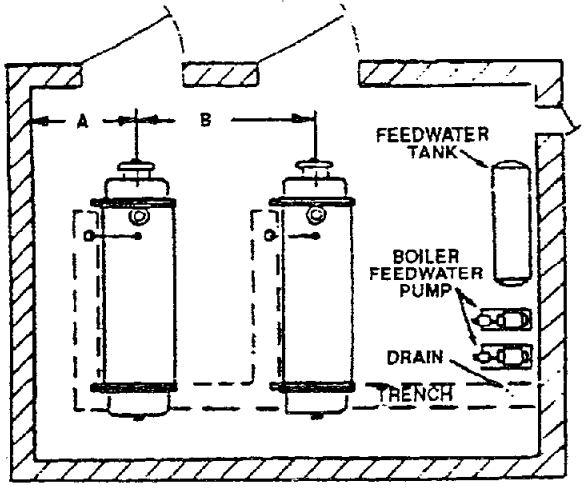
If space permits, approximately 1.5 additional feet should be allowed at the rear for additional aisle and working space.

2. Next shortest boiler room length (Dwg B) is obtained by allowing for possible future tube replacement from the front of the boiler. Allowance is only made for minimum door swing at the rear.

If space permits, approximately 1.5 additional feet should be allowed at the rear for additional aisle and working space.

3. A slightly longer boiler room (Dwg C) is obtained by allowing for possible future tube replacement from the rear of the boiler. Allowance for door swing at the front provides sufficient aisle and working space at the front.

Figure A2-26. Boiler Room Length (Typical Layout)



BOILER HP	15-40	50-100	125-200	250-350	400-800
Dimension A	69	78	82"	93"	102"
Dimension B	89	105	115"	141"	171"

NOTES:
1. Recommended Minimum Distance Between Boiler and Wall. Dimension "A" allows for a "clear" 42" aisle between the water column on the boiler and the wall. If space permits, this aisle should be widened.
2. Recommended Minimum Distance Between Boilers.
   Dimension "B" between boilers allows for a "clear" aisle of:
   42" - 15-200 hp
   48" - 250-350 hp
   60" - 400-800 hp
   If space permits, this aisle should be widened.

Figure A2-27. Boiler Room Width (Typical Layout)

F. Hazardous Materials

Limited Lead Testing

Reading High School

Location	Substrate	Description	Lead Content	Condition
Ground Floor				
Hallway	Brick	White Wall	0.0	Good condition
	Metal	Brown Door Closing	0.1	Good condition
	White	Door Closing	0.3	Good condition
Room #101	White	Window Unit	-0.2	Good condition
	White	Door Closing	0.1	Good condition
	Block	Wall	0.0	Good condition
	Plaster	Wall	-0.2	Good condition
Room #117	Block	Wall	0.1	Good condition
	Metal	Door Closing	0.0	Good condition
Room #121	Block	Wall	0.2	Good condition
	Metal	Window Unit	0.1	Good condition
Room #116	Block	Wall	0.0	Good condition
	Metal	Window	0.3	Good condition
	Metal	Door Casing	-0.1	Good condition
Room #101	Block	White Wall	0.4	In Tact
	Metal	Black Door Casing	0.0	In Tact
Room #109	Block	White Wall	0.1	Good condition
	Metal	White Window Unit	-0.2	Good condition
Room #112	Block	Black Door Casing	0.0	Good condition
	Block	White Wall	0.1	Good condition
Hall	Block	White Wall	0.0	Good condition
	Block	White Wall	-0.2	Good condition
First Floor				
Room #203	Block	White Wall	0.1	Good condition
	Metal	Black Door Closing	0.0	Good condition
	Metal	White Window Unit	-0.2	Good condition
Room #207	Block	White Wall	0.3	Good condition
	Metal	White Door Closing	0.1	Good condition
	Metal	White Window Unit	0.0	Good condition

Analysis of air samples in accordance with NIOSH Analytical Method #7400, "A" Rules.

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First Floor (cont.)

Center Resource	Block	White Wall	0.1	Good condition
	Metal	White Door Closing	-0.0	Good condition
	Block	White Wall	-0.3	Good condition
Café	Block	Red Wall	0.1	Good condition
	Block	White Wall	-0.4	Good condition
	Metal	Brown Window Unit	0.1	Good condition
	Metal	White Window Unit	0.0	Good condition
	Metal	Black Door Closing	-0.1	Good condition
	Metal	Black Door Closing	0.0	Good condition
Room #204	Block	White Wall	0.3	Good condition
	Metal	White Window Unit	-0.1	Good condition
Room #205	Block	White Wall	0.0	Good condition
	Metal	White Door Closing	-0.2	Good condition
Room #210	Block	White Wall	0.1	Good condition
	Metal	White Window Unit	-0.3	Good condition
	Metal	White Door Closing	-0.1	Good condition

Second Floor

Room #301	Block	White Wall	-0.3	Good condition
	Metal	White Door Casing	0.0	Good condition
	Metal	White Window Unit	0.1	Good condition
Room #305	Block	White Wall	0.0	Good condition
	Metal	White Door Casing	-0.4	Good condition
	Metal	White Window Unit	-0.0	Good condition
Room #307	Block	White Wall	0.1	Good condition
	Metal	White Door Casing	0.0	Good condition
	Metal	White Window Unit	-0.2	Good condition
Hall	Block	White Wall	0.1	Good condition
	Block	White Wall	-0.4	Good condition
	Metal	White Door Casing	0.1	Good condition
	Metal	White Door Casing	0.0	Good condition
Room #323	Block	Blue Wall	-0.3	Good condition
	Metal	Blue Door Casing	-0.4	Good condition
	Metal	Blue Window Unit	0.0	Good condition
Room #325	Block	Blue Wall	0.1	Good condition
	Metal	Blue Door Casing	0.0	Good condition
	Metal	White Window Unit	-0.2	Good condition

Analysis of air samples in accordance with NIOSH Analytical Method #7400, "A" Rules.

Second Floor (cont.)

Room #324	Block	Blue Wall	0.1	Good condition
	Metal	Blue Door Casing	-0.4	Good condition
	Metal	White Window Unit	0.0	Good condition
Room #307	Block	White Wall	0.1	Good condition
	Metal	White Door Casing	-0.2	Good condition
	Metal	White Window Unit	0.1	Good condition

Exterior

Metal	White Window Unit	-0.4	Good condition
Metal	White Window Unit	0.1	Good condition
Metal	White Window Unit	-0.0	Good condition
Metal	White Window Unit	0.2	Good condition
Metal	Brown Door	0.1	Good condition
Metal	Brown Door	-0.4	Good condition
Metal	Brown Door	0.1	Good condition
Metal	Brown Door Casing	0.0	Good condition
Metal	Brown Door Casing	-0.3	Good condition
Metal	Brown Door Casing	0.1	Good condition
Metal	Brown Door Casing	0.0	Good condition

Analysis of air samples in accordance with NIOSH Analytical Method #7400, "A" Rules.