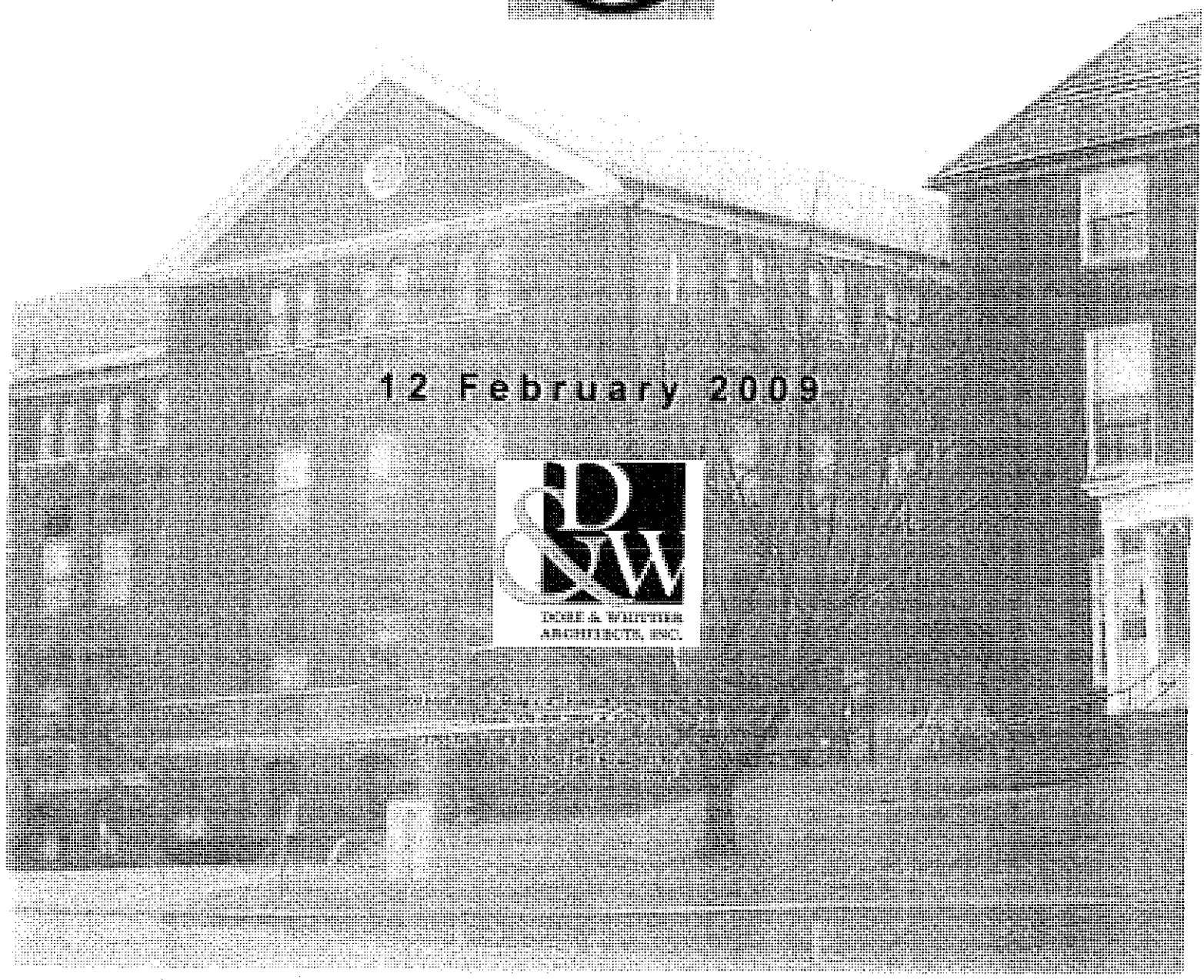
Facilities Assessment STUDY

Of

Dr. John C. Page Elementary School

For

West Newbury, Massachusetts



12 February 2009

DORE & WHITTIER
ARCHITECTS, INC.

Facilities Assessment Study

D&W Project # 08-566

Dr. John C. Page Elementary School

West Newbury, Massachusetts

Town of West Newbury

Albert H. Knowles, Jr., *Board of Selectmen-Chairman*
Glenn A. Kemper, *Board of Selectmen*
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Thanks to Lizabeth Perry, Marc Barry, Mrs. G., and the rest of the faculty and staff for their assistance, patience and insight regarding the physical and educational needs of The Dr. John C. Page School.

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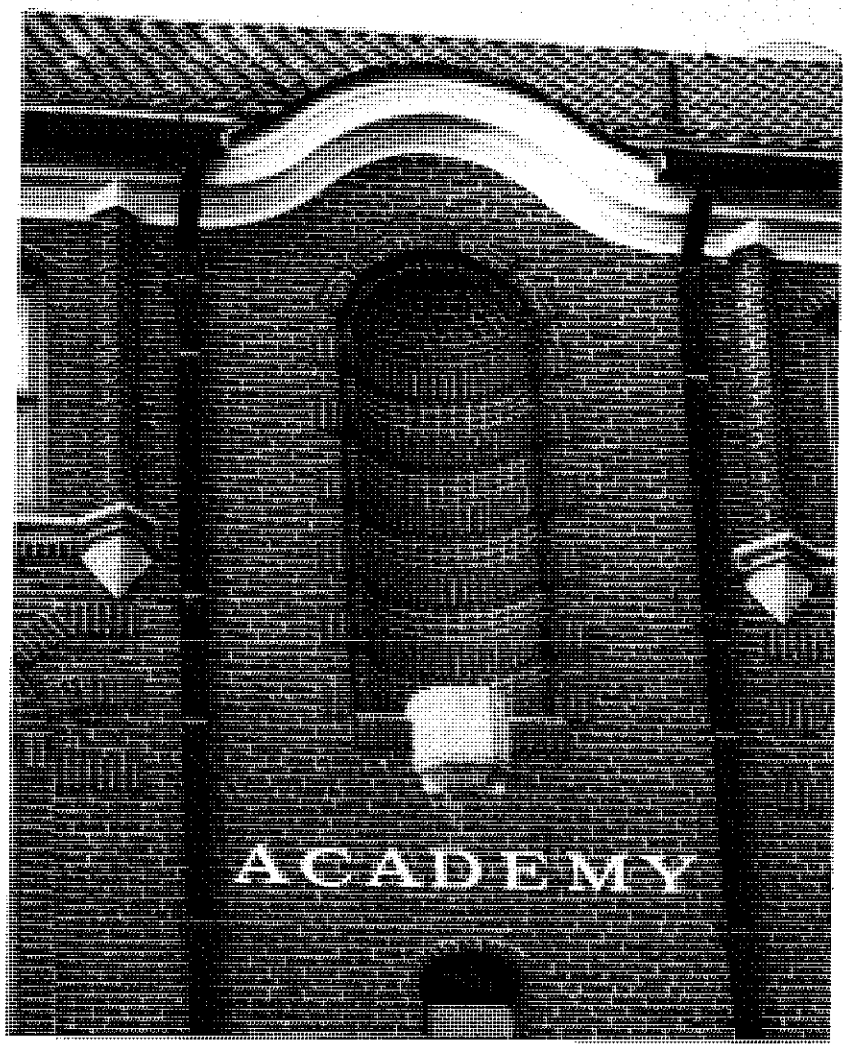
Introduction and Background



INTRODUCTION AND BACKGROUND

Concerns regarding aging facilities as well as building and space deficiencies prompted the Town of West Newbury to commission a feasibility study for the Dr. John C. Page Elementary School.

In November 2008, the Town of West Newbury hired the architectural firm of Dore & Whittier Architects, Inc to evaluate the current physical condition and educational function of the school building, identify problems and provide options and recommendations for the long term viability of the facility as an elementary school.

While the school buildings have served West Newbury students and residents for the past 30 plus years, this study's approach looks to the future use of the building as it relates to changes in building and energy codes, educational programs, space use and technology in education. The building has been maintained well, but due to the age of the buildings, improvements and/or replacements are needed to extend the life of many of the building systems. All conclusions shall support the integration of energy efficiency, renewable energy technology and environmentally friendly materials.

Building Summary

The Dr. John C. Page Elementary School is located at 694 Main Street in West Newbury Massachusetts. The facility was originally a boarding school for wayward boys built in 1926. The facility as currently constituted is approximately 90,200 square feet (sf) and is connected to another masonry structure known as children's Castle, which is a private daycare which leases the space from the Town. The facility set on 129 acres of land stretching from Main Street to River Road bordering the Merrimac River. There is also a Town Public Works building and a Town Recreation Department building on the site.

The Town of West Newbury purchased the building and the property for use as a public school in 1970. In 1973 a significant addition was built incorporating a large kitchen, gymnasium, library, and a number of classroom spaces. The entire school building was renovated in 1986. The scope of work included: window replacement, masonry repairs, mechanical, plumbing, electrical updates, the addition of an elevator, and many changes in room configurations. These renovations were no doubt an effort to maintain a school facility which would meet the growing needs of the school and town, and update the facilities to meet building and safety codes at that time.

Documentation

This report is based on information gathered by visual observations of the building and site reviewed by Dore & Whittier Architects, Inc. and its consultants, existing building drawings, studies and documents, discussions with school staff, administration, and local officials. Codes used in this review are: the current edition of the Massachusetts Building Code, NFPA 101 Life Safety Code, Massachusetts Architectural Access Board Regulations (521 CMR), Federal ADAAG (ADA), Department of Education Regulations, National Electrical Code, Mass. Electrical Code, NFPA Fire and Sprinkler Code, Mass Plumbing and Gas Code, and the National Mechanical Code.

General Comments

The building was visited by our team of professionals in December 2008 and January 2009 to assess the site, architectural aspects, structure, hazardous materials, mechanical, plumbing, electrical and fire protections systems and technology infrastructure.

The following general comments are background for our findings and recommendations which are detailed in Section III of this study.

Space Utilization

There are a number of changes that have occurred to education since the original construction of these buildings. Some current programs and services were not offered or planned for in the original building design. Over the years, new programs developed, other programs were removed and new requirements have been mandated by the state. The use of space evolved into one of the greatest challenges facing schools today. The factors affecting the Space Utilization review include:

A. In 1993 Massachusetts enacted the Massachusetts Education Reform Act that set uniform standards for space requirements in schools across the State. This piece of legislation was developed for a number of reasons including;

- Establishment of uniform standards for space requirements, allowing for flexibility
- Establishment of certain space requirements for core areas such as: the library/media, kitchen/cafeteria, gym, etc
- Improved and set standards for student/teacher ratios
- An aggressive approach toward building schools for the future with space for computer stations, hands-on projects, and community space

B. In 2006 the Massachusetts School Building Authority (MSBA) established new standards for space requirements in schools across the State. These guidelines established gross square foot/student ratio based on the total student population, increased overall classroom size guidelines and addressed new and different curriculum development

C. State mandated Special Needs regulations have been adopted requiring space in the school for special needs programs

D. Federal and State funded programs such as Speech, Title I, English as a Second Language (ESL) and others

E. Original design capacity vs. current enrollments combined with recommended State guidelines

F. Original vs. current building use

The facilities must be flexible and be adaptable to adequately provide for today's and tomorrow's educational program. Some existing spaces could be relocated to match the current desired program. Where existing spaces are not conducive to the prescribed curriculum, the school should consider modifications. Flexibility in educational spaces should be incorporated into any renovation/expansion plan for the future so that as requirements change, the school program may adjust more easily than in years past.

Handicap Accessibility

Requirements for handicap accessibility were non-existent when this building was constructed. In 1990, the Americans with Disabilities Act (ADA) was enacted into law by the Federal Government to provide civil rights protections and nondiscrimination on the basis of disability. Since 1990, the original regulations have

been updated and new requirements and clarifications have been added. In addition, the Commonwealth of Massachusetts has developed their own regulations (521 CMR Architectural Access Board) that are in many instances more stringent than the ADA Regulations and these are updated and/or added to almost every year.

Many updates were made as part of the 1986 renovations to provide handicap accessibility including ramps, handrails, ADA fixtures, lever-type door hardware, signage, etc.. However items listed within Section III of this study note deficiencies in the building based on requirements stated in the current ADA MAAB regulations.

Structural Assessment

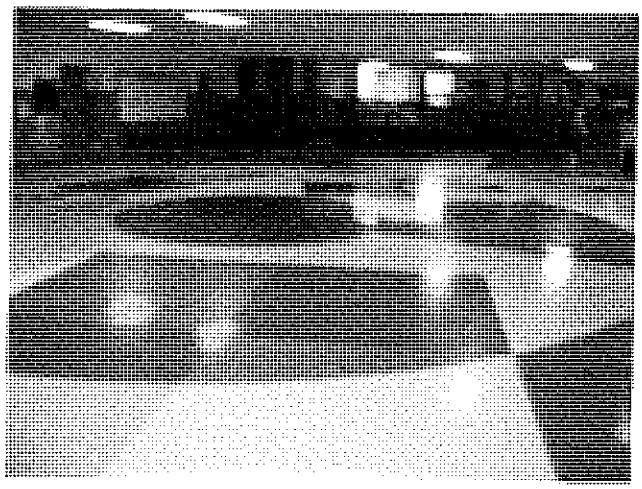
Based on Chapter 34 of the new 7th Edition of the Massachusetts State Building Code (Repair, Alteration, Addition and Change of Use of Existing Buildings) any future renovations need to be assessed in relation to the provisions contained in this chapter.

If any repairs, renovations or additions are made to the structure, a check for compliance with 780 CMR, Chapter 34 "Existing Structures" of The Massachusetts State Building Code is required. The intent of 780 CMR, Chapter 34 is to permit repairs, alterations, additions and/or a change of use without requiring full compliance with the code for new construction

Assuming no major structural renovations are made to the existing building and the additions are structurally separated from the existing building, and the extent of the renovations to the existing building are limited to architectural renovations, such as removal and replacement of ceilings, partitions, interior facing of exterior walls, finishes, etc. and upgrade or replacement of HVAC and electrical systems and since the renovations will exceed 20,000 square feet or 50% of total floor area of the building, the level of work on the existing building would be classified as LEVEL 2 WORK as defined in Chapter 34 of The Massachusetts State Building Code.

If the renovation of the school includes major structural work in the existing building, the scope of work may move up to LEVEL 3, 4 OR 5 WORK, which would bring us closer to conforming with the code for new construction.

Section II
Executive Summary



EXECUTIVE SUMMARY

Study Intent Overview

This feasibility study is intended to provide an independent architectural and engineering assessment of the building and site at the Dr John C Page Elementary School located at 694 Main Street in West Newbury Massachusetts Throughout the course of this study, Dore & Whittier Architects, Inc worked closely with the school district officials, gained input from school faculty and staff, and met with Town personnel. The driving force behind commissioning this study was to understand the current building conditions and what would be required to renovate the building, in whole or in part, such that it would meet the educational needs of the town

In addition to conducting the facility assessment, the Design Team reviewed aspects of the building that were identified by the Owner as problematic or that otherwise appeared to be deficient. As noted in many areas of this report, this building was originally constructed in 1926 and as such it can be expected that many areas are old, outdated and/or inconsistent with what a new modern educational facility would provide. Nevertheless, the structure itself while constructed over 80 years ago remains functional with some issues that need to be addressed (see individual assessment sections for further details). Areas that were identified as warranting further attention were reviewed with the Owner and an effort was made to prioritize individual items and provide an estimated range of costs. This exercise is difficult at best since many of these individual projects would normally be considered as part of a building renovation and could be carried out in various combinations depending on need, cost and overall phasing concerns. It should also be noted that the actual design of potential solutions was not included as part of this study and therefore the project scope which is presently not defined will need to be further reviewed at the time a project is to be implemented. Depending on the scope of a particular repair/maintenance project or renovation, a detailed phasing plan should be developed and implemented at the time of the project Prioritization or specific projects and cost estimates are included as part of Appendix E.

Facilities Overview

The existing facilities at the Page School were reviewed by Dore & Whittier Architects, Inc and its consultants Based on an assessment of the building and site we can offer the following conclusions regarding the suitability for a renovation and/or expansion:

Generally speaking the facility is in need of significant improvements including most building systems and components, technology, windows, doors, hazardous materials abatement, etc. in order to prepare the school for the 21st Century and the next 50 years.

Site/Civil

A visual survey was conducted of the entire site including areas along adjacent properties, the adjacent street, and outlying areas of the site to the north where the sanitary leach fields and an abandoned ski hill exist Existing documents were reviewed and the members of the staff and town personnel were interviewed in order to gain as complete an understanding of the system as possible. There are many areas of the site where improvements can be made, but the overall site is functioning adequately for the needs of the school. See the site/civil assessment portion of this report for further details.

Structural

An extensive survey of the structural condition of the school was conducted using a limited destructive testing approach. The bare structure was exposed in sixty-four locations to examine the underlying design and the structural integrity of the building Existing documents were reviewed and members of the staff and

town personnel were interviewed in order to gain as complete an understanding of the system as possible. While there are certain locations that currently require repairs, there is not an immediate threat of structural failure. See the structural assessment portion of this report for further details.

Architectural

A visual inspection of each space was conducted to assess various aspects of the existing building The physical condition of the of the spaces finishes and building materials was documented along with conditions related to size and use of the spaces, handicapped accessibility, and life safety. Existing documents were reviewed and members of the staff and town personnel were interviewed in order to gain as complete an understanding of the building as possible This review has resulted in conditions for current concern, as well as some long-term recommendations and conclusions about the continued use of the facility. See the architectural assessment portion of this report for further details.

Heating and Ventilating

A visual inspection of the existing heating and ventilating equipment, machinery, and the overall system function and design was conducted. The central boiler plant and the distribution equipment were examined to determine performance of the system The physical condition and organization of the distribution was assessed in spaces throughout the building Existing documents were reviewed and members of the staff were interviewed in order to gain as complete an understanding of the system as possible. The heating system is well beyond its serviceable life expectancy and the ventilation system is not used due to a lack of proper controls, and issues of noise disrupting daily activities See the MEP/FP Assessment portion of this report for further details

Plumbing

A visual inspection of the existing water services, distribution, fixtures, and the overall system function and design was conducted. Water mains and distribution piping were examined to determine performance of the system. The physical condition and organization of the fixtures was assessed in spaces throughout the building Existing documents were reviewed and members of the staff and town personnel were interviewed in order to gain as complete an understanding of the system as possible While there is adequate service to the site there are concerns about the water pressure within the building There are issues with the distribution and plumbing fixtures which affect the current daily use of the building and issues which require improvements as part of any renovations to the building. See the MEP/FP assessment portion of this report for further details

Fire Protection

A visual inspection of the existing fire service, equipment and distribution, and the overall system function and design was conducted Standpipe system and Distribution piping were examined to determine performance of the system. The physical condition and organization of the sprinkler heads was assessed in spaces throughout the building. Existing documents were reviewed and members of the staff and town personnel were interviewed in order to gain as complete an understanding of the system as possible. The fire suppression system does not currently cover the entire building, and portions of the existing system do not appear to be functional. There are additional recommendations and procedures which should be implemented for the current system. See the MEP/FP assessment portion of this report for further details.

Electrical

A visual inspection of the existing electrical service, distribution, fixtures, fire alarm system, and the overall system function and design was conducted The service to the building and electrical panels, and distribution wiring were examined to determine performance of the system The physical condition and organization of the fixtures was assessed in spaces throughout the building. Existing documents were reviewed and members of the staff and town personnel were interviewed in order to gain as complete an understanding of the system as possible There are many aspects of the electrical system which are approaching the end of their serviceable life expectancy. There are also issues with the efficiency and output of the lighting fixtures and with the capacity of the branch circuits to many spaces in the building The existing fire alarm system is functional, however many improvements would be required as part of any renovations to the building See the MEP/FP assessment portion of this report for further details

Hazardous materials

A visual inspection of the building was conducted and documentation of current testing, control practices, and abatement of hazardous materials conducted at the building were reviewed There are known instances of finishes, adhesives, insulations and other items containing asbestos lead and other hazardous materials, which were used at the time the original building was built Some remediation and/or encapsulation methods have been employed while others, known and likely unknown remain in the building today These materials are considered to be a health hazard, and are no longer permitted for use in buildings. It is recommended that, as part of any renovations planned for this facility, a licensed environmental hygienist survey the building for the existence and abatement of such materials See the hazardous materials assessment portion of this report for further details.

Voice/Data & Video

A visual inspection of the overall system function and design was conducted. The physical condition, organization and capabilities of the technologies in place were assessed in spaces throughout the building. Existing documents were reviewed and members of the staff and town personnel were interviewed in order to gain as complete an understanding of the system as possible The services provided to the building are somewhat limited. While improvements to peripheral devices is ongoing the overall systems for clocks, audio visual, computers, telephone and networking are in need of many improvements. See the Voice, Data, and Video assessment portion of this report for further details.

Conclusions

This building had a major addition in 1973 and a comprehensive renovation in 1986, as well as a broad program of regular maintenance Portions of the building have been modified and are in reasonable condition, while other areas are in need of improvement. Based on the condition of the building, the following actions should be considered as part of any renovation project:

1. Parking and roadway paving improvements to create a more cohesive and better functioning environment on the site
2. Overhead cover at all entrances providing protection from weather, as well as protection from snow and ice build-up on stairs and ramps and snow and ice falling from roofs to ensure the safety of students, staff and visitors to the building
3. A full survey of existing on site utilities to ensure all services are known and are functioning properly.

4. Continued maintenance of the sanitary system to prevent failures, and the addition of a program to remove trees around tanks and grass from manhole covers, thus improving the ability to maintain the system.
5. Maintenance and repair of existing site stairs and retaining walls
6 Exterior envelope improvements: windows, doors, insulation and air/vapor barrier to provide a more efficient and more thermally comfortable facility.
7. Review use of space needs for more efficient use of the existing spaces and the provide insight into additional space needs to provide for the current and future educational needs of the Town.
8 Handicap accessibility improvements to remove existing barriers and to provide equal access for all users to all available facilities
9 Life Safety Improvements: fire rated doors, area separations and partitions, automatic fire suppression system (currently partial coverage), stairway egress, etc
10 Heating and Ventilation Improvements to bring the systems up to today's standards, and to provide appropriate interior air quality and thermal comfort
11 Consideration of central air conditioning for office, assembly, and dedicated computer spaces for improved efficiency and comfort, if not for the entire facility, to improve the overall thermal comfort of the building
12 Plumbing improvements including a larger main line within the building, installation of a back-flow preventor at the main line from outside the building, installation of water efficient fixtures, and provision of grease traps for all appropriate kitchen fixtures.
13 Expansion of and improvements to the automatic fire suppression system
14 Electrical improvements to afford appropriate levels of infrastructure development and implementation of technology
15. Fire alarm improvements to meet the today's standards and provide a safer environment for students and staff.
16. Control and/or abatement of hazardous materials are present in pipe insulation, floor tile, etc.
17 Technology infrastructure improvements and updates to equipment.

Section III
Site and Building Assessments

Section 3.1
Site Assessment

CIVIL ENGINEERING ASSESSMENT
Dr. John C. Page Elementary School

Introduction

TFMoran Inc. (TFM) performed a site investigation on December 29, 2008 to assess the site conditions of the Dr. John C. Page Elementary School grounds. The school is situated on top of a hill that is located between Route 113 and Indian River in the northeast part of West Newbury, Massachusetts. The overall site is a large tract of land consisting of approximately 129 acres, owned by the Town and used by many other Town organizations. These organizations may or may not utilize land controlled by the School District. No plan was available at the time of inspection that clearly delineates the area the School District is responsible for from other Town land. Many of the site improvements and utilities cross feed to and from this property in order to service the School. The site development of the school-controlled area will be explained in the sections below.

Pavement

A general overview of the pavement observed on-site reveals it is generally in fair to poor condition. Numerous areas have failed along the access drive from Route 113 to the "S" curve, which is identified in Figure 1 and are shown on Photo's 1 and 2 below. This is likely the result of the heavy bus traffic on inadequate or poorly constructed road base material and drainage systems. This is most evident from the inside corner of the access drive just east of the lower parking lot entrance near the parking lot entrance along the edge of the pavement although it exists along the entire access drive along both sides. Another area of pavement failure is located in the older section of the lower parking lot, Photo 3, below, identifies some of this failure. See Figure 1 for this location. Potholes and excessive pavement cracking are visible throughout the lot. Other areas that were observed with deficiencies are where the pavement meets the student drop off sidewalk, student drop off access drive at the intersection of the exit road and multiple areas where pavement has been patched and cracks/pavement seams have been treated with a liquid bituminous filler, which are shown on Photo's 4, 5 and 6 below. The pavement of the main access drive in front of the main entrance to the building appears to be in satisfactory condition. The edges of the upper parking area are showing signs of cracking and failure. The pavement in the rear of the school shows signs of pavement failure as well and has been repaired in spots. The area appears to be very flat which allows water to puddle. This area is used as school play space. TFM has also been told that this area is used for bus drop off and pickup.

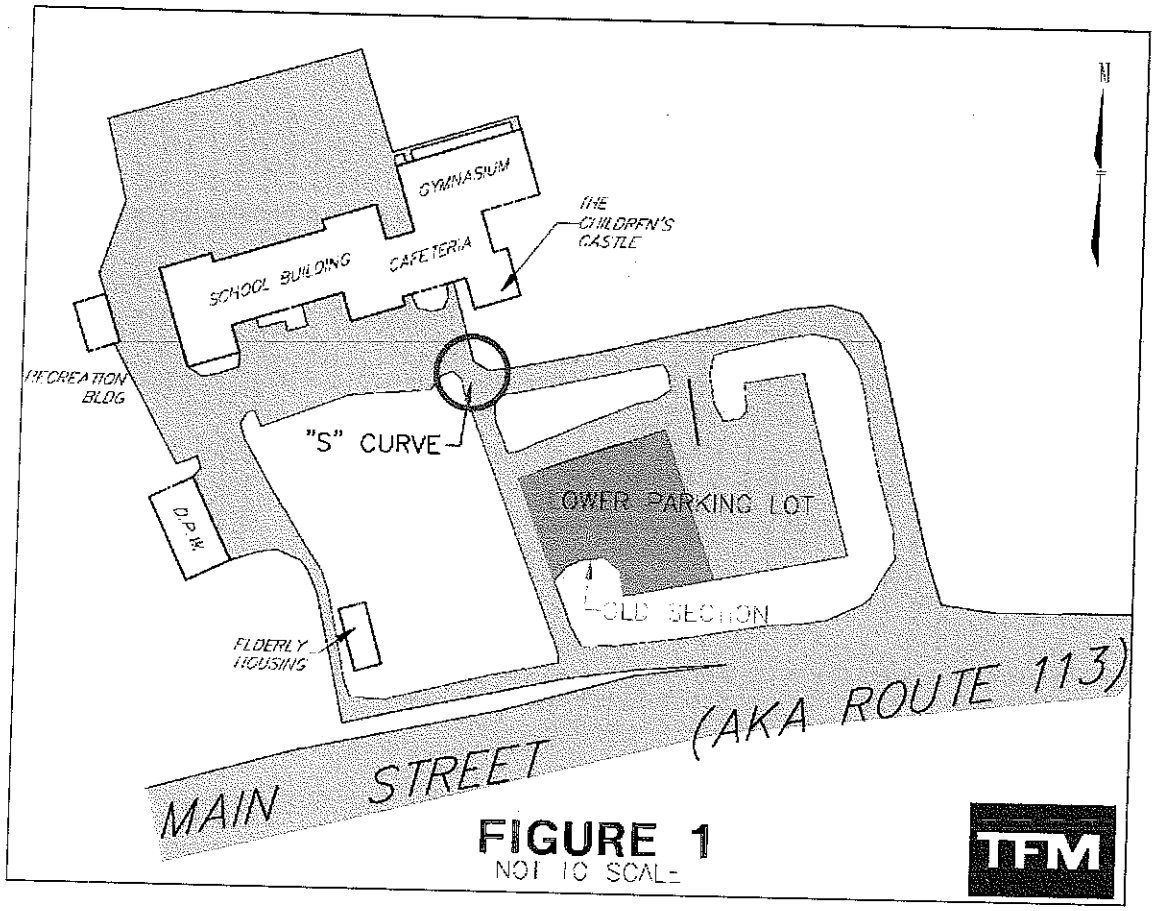


FIGURE 1
NOT TO SCALE

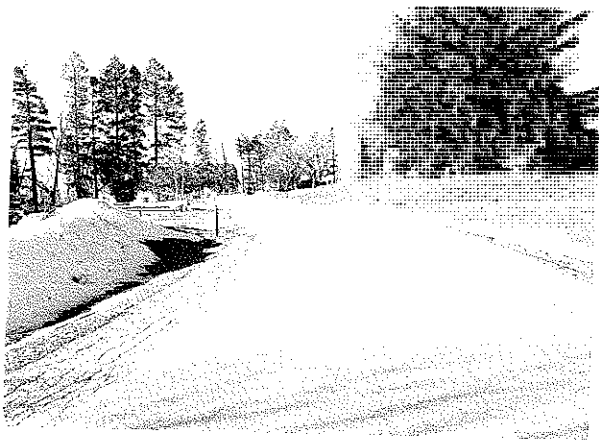


Photo 1

Photo 2

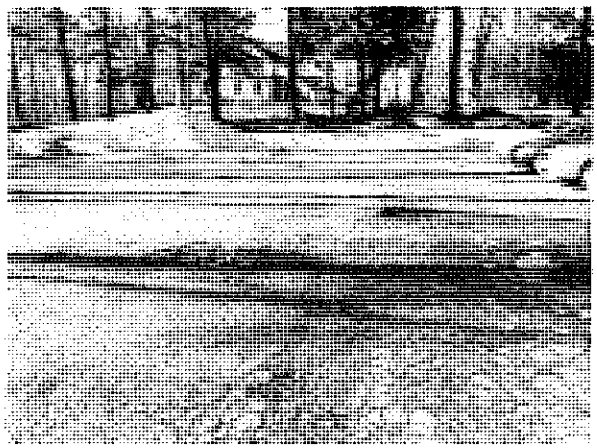


Photo 3

Photo 4

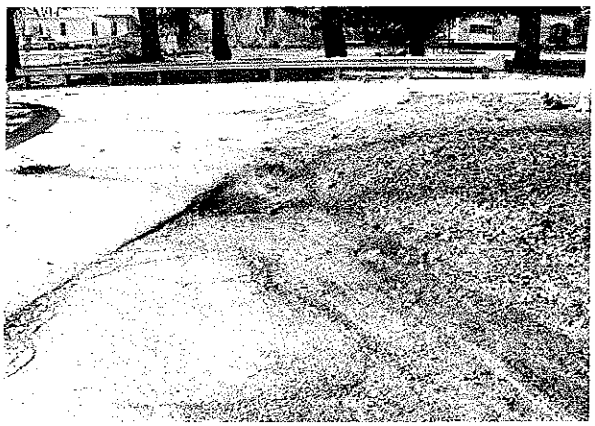


Photo 5

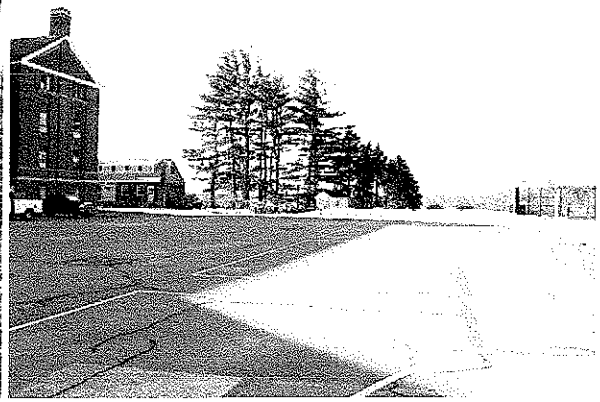


Photo 6

Movable speed bumps areas were observed in two locations, the first just east of the pedestrian crosswalk and the second located just south of the west end of the building west of the crosswalk at the ADA parking area. These were removed and stockpiled on-site for winter snow removal operations. See Photo's 7 and 8 below that show movable speed bumps stockpiled.

Photo 7

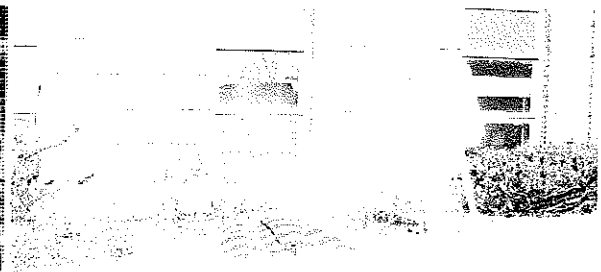


Photo 8

Pavement markings appeared to be old and have not been repainted in recent years. Many were unable to be seen when driving. The pedestrian crosswalks were very hard to find when walking. More information regarding crosswalks will be discussed in the Pedestrian Circulation Section of this report.

Building Access

The layout of the School provides many access doorways. Internal circulation concerns were not part of TFM's review. An overview of the existing facility has identified a designated numbering system for the entrances. That system identifies the south side of the building, also known as the front, as A1 through A5, the west side as B1, the north side or rear of the building as C1 through C5 and the east side as D1 and D2. There was an unnumbered door located on the east side that appeared to access the gymnasium. Refer to Figure 2 for the access doorway locations. All of these access points are discussed below.

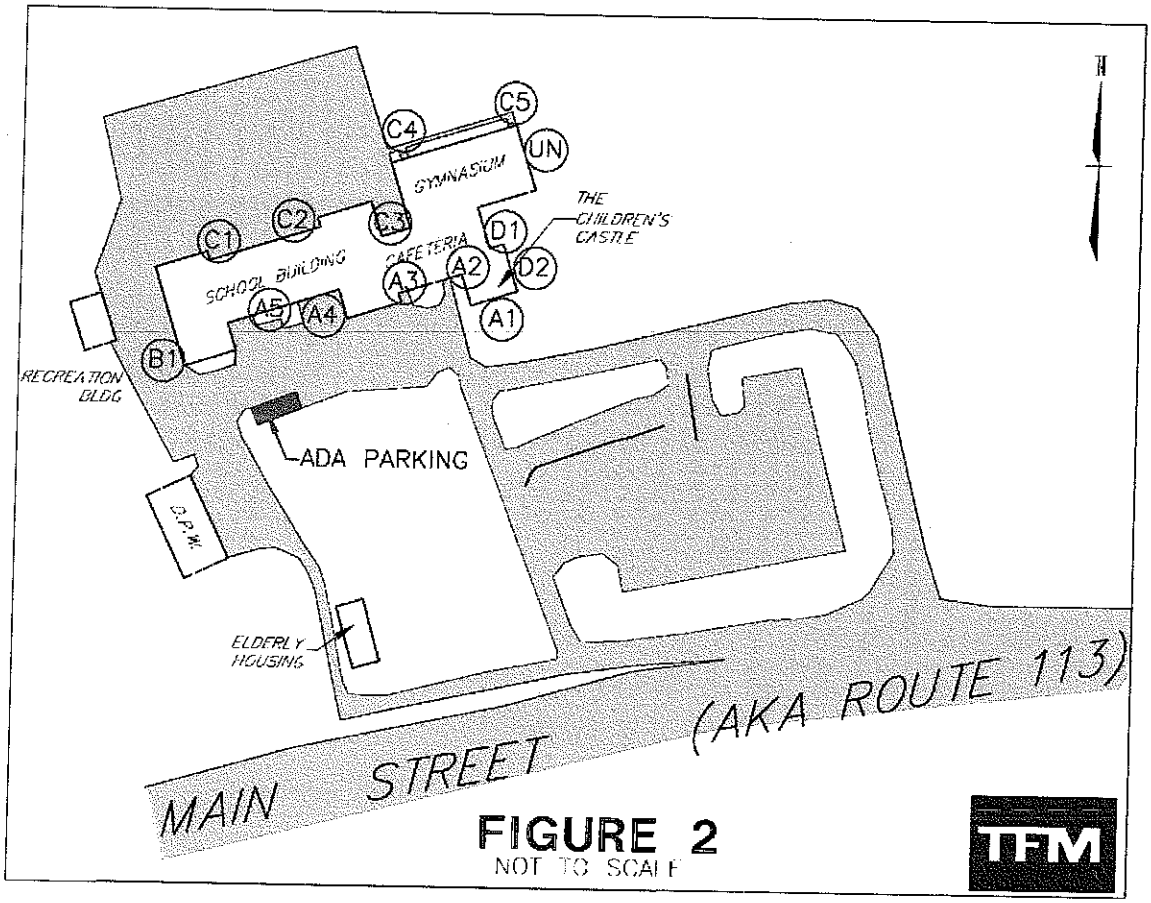


FIGURE 2
NOT TO SCALE

Door A1 services "The Children's Castle", which is a private facility utilizing the school facilities. This access is narrow and has two stairways to access the building. This appears to be the main entrance and does not meet ADA standards. See Photo 9 below. No ADA parking spaces are within close proximity to this entrance.

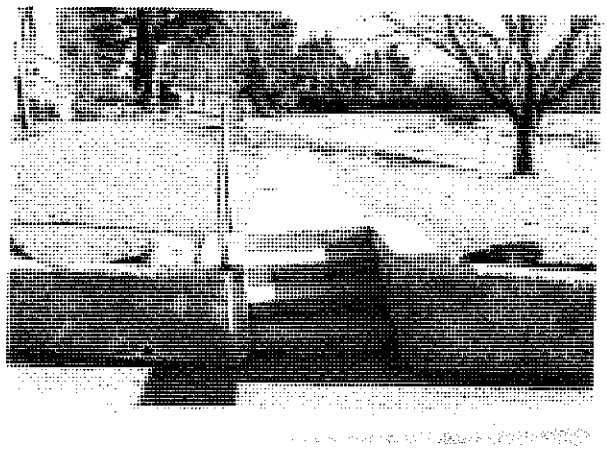


Photo 9

Door A2 services the kitchen area see Photo 10 This door access is a below grade with a wooden landing. The concrete from the foundation that forms the sunken landing extends above the pavement causing a trip hazard condition. It is unknown if a surface drain exists below the wooden landing. This area does not have a roof to protect it from snow or debris from blocking the door from opening.

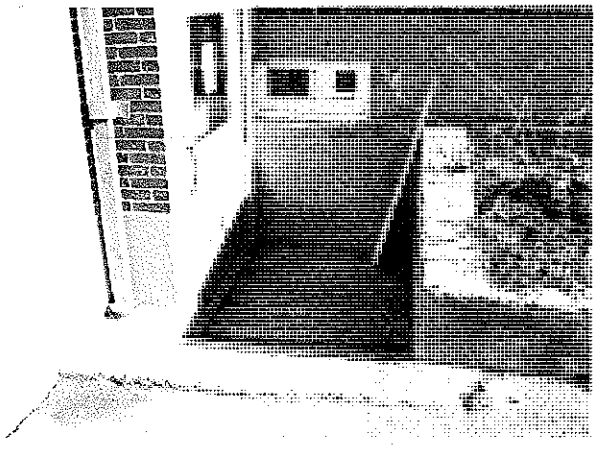


Photo 10

Door A3 accesses the cafeteria see Photo 11. This door is at grade and TFM was told is used as an alternative ADA access in winter conditions Like door A2 this is not covered to the weather. If used as an alternative ADA access it lacks an automated door opener and ADA parking is over 100 feet away see Figure 2

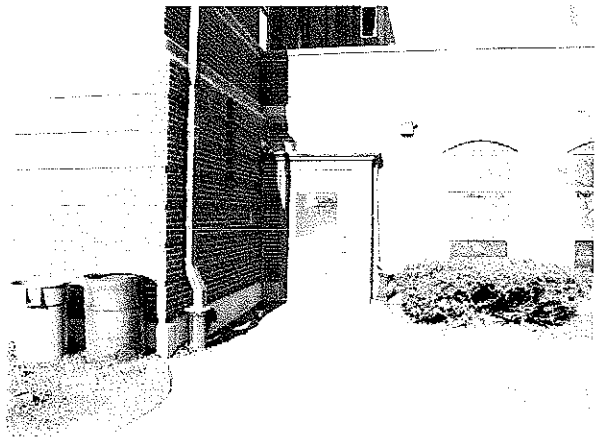


Photo 11

Door A4 is the main entrance to the School. It consists of a large concrete stairway leading from the main drive. The first riser has variations in height, which can cause a trip hazard, see Photo 12. The pavement in this area is the landing for the stairway. The stairs are uncovered and due to the sloped roof three-plus stories above, are likely to be covered by snow and ice as well as rain in stormy situations. Stair surfaces did not have any special treatment to reduce slipping.

Photo 12

Door A5, which is below the stairway of A4 is the ADA access to the school. To access A5, there is a ramp that is entered to the left of the stairway for A4. The ramp is made up of pavement and concrete and is separated by a landing where the ramp changes directions. The ramp has many uneven surfaces that would cause issues with a wheelchair as shown on Photo 13. Like A4, door A5 and the associated ramp is not covered to the weather conditions and did not have a treatment that would reduce slipping. The ADA parking area is located opposite this access, which consists of four striped spaces. These spaces lacked space for a van.

Photo 13

Door B1 services the custodial space. It accesses at grade and is covered by a small roof. The door accesses directly to the main driveway and is located next to the covered, outside, above -grade fuel tanks.

Door C1 and C2 are entrances in the rear of the building that are to grade and have protection from the weather. TFM was told that door C1 is used for access to and from the buses. The area along the rear of the building is paved up to the building. See Photo's 14 and 15 for C1 and Photo 16 for C2.

Photo 14

Photo 15

Photo 16

Door C3, which is the main access to the gymnasium is at grade, See Photo 17 below. There is no roof cover for this door. Like door C1 and C2 the pavement abuts the building.

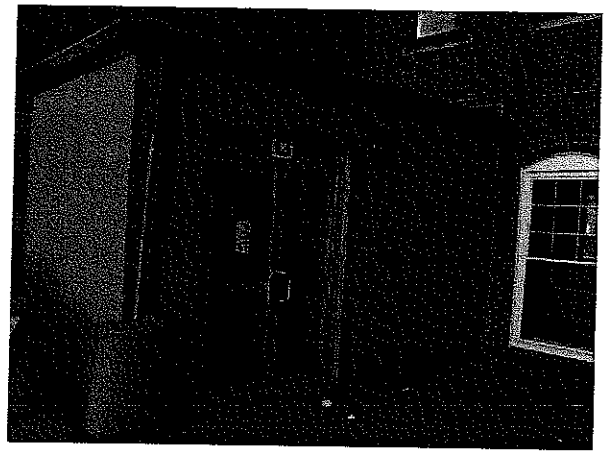


Photo 17

Door C4 and C5 appear to be emergency exits for the gymnasium. See Photo's 18 and 19 below. The doorways are small, flat roof block structures that are attached to the building. Both doorways are one step above grade and access outside to a concrete landing, which connects to a paved walkway leading to the rear pavement area.

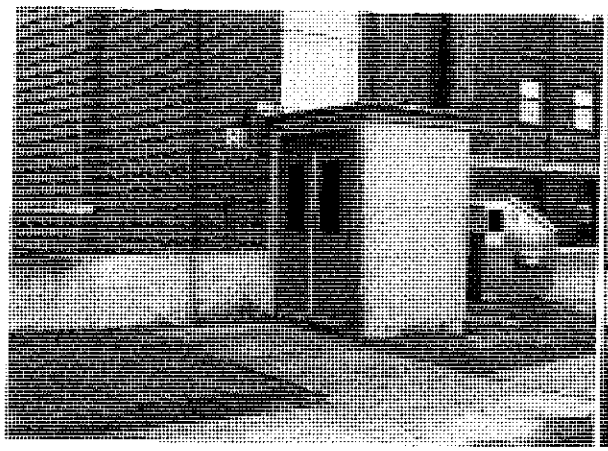


Photo 18

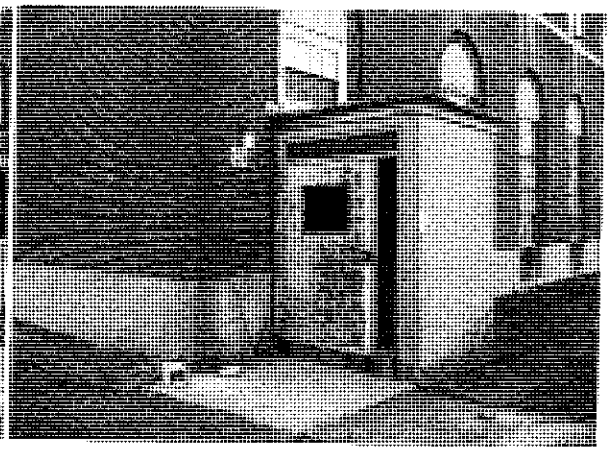


Photo 19

The unnumbered door, shown in Photo 20, located on the east side of the gymnasium is approximately 4 feet above grade There is a concrete landing which is also 4 feet above grade that has no railing protection. It is surrounded by grass and does not look to be used. There are no outside stairs that access this landing

Photo 20

Door D1 appears to service the lower level that The Children's Castle occupies. There is an areaway access of four concrete steps surrounded by a concrete foundation with a concrete landing and steel rails. A small drain is located in the landing. There is no protection from the weather. The concrete foundation extends above grade, which requires someone to step over to access the first step. This directly accesses to a grass surface with no walkway. See Photo 21.

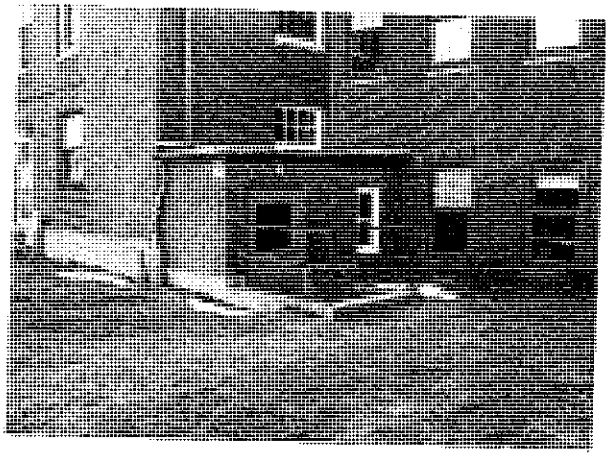


Photo 21

Door D2, like doors D1 and A1, services The Children's Castle. It accesses the same floor as A1 and is entered by wooden stairs with a wooden handrail. Rubber treads are affixed to the stairs to prevent slipping. It is not protected from the weather. This stairway accesses a flagstone path that services the outside play area as shown in Photo 22.

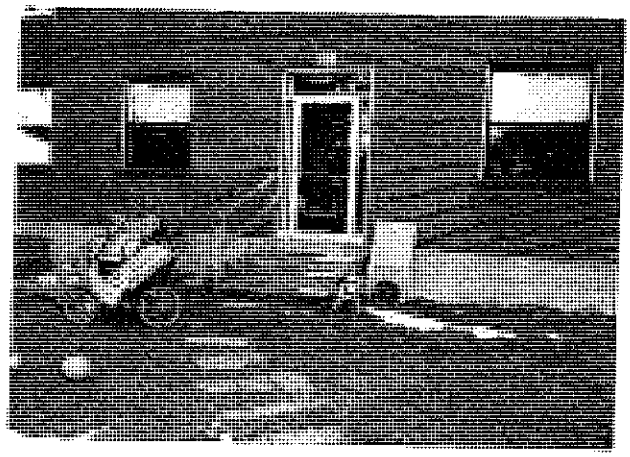


Photo 22

Site Lighting

A general overview of the School grounds revealed very little site lighting. The main access drive appeared to have no lighting until a building mount light located above door A1 of The Children's Castle building. This is also the same light that illuminates the parking and student drop off area and secondary exit drive, see Photo 23. A large area light, located on a wooden pole west of the ADA parking spaces, is directed toward the main entrance and appears to be the main light source for the upper parking area and access drive, which is shown in Photo 24. Another streetlight-type light is mounted on the "Recreation Building", shown on Photo 25, appears to provide lighting for the west side of the building and access drive. Three (3) building mount lights light the rear of the school. One of these lights can be seen in Photo 26. All doorway accesses with the exception of B1 and D2 have lights. A sample light at doorway A3 is shown in Photo 27. The operability or level of illumination of these lights was not observed by TFM.

Photo 23

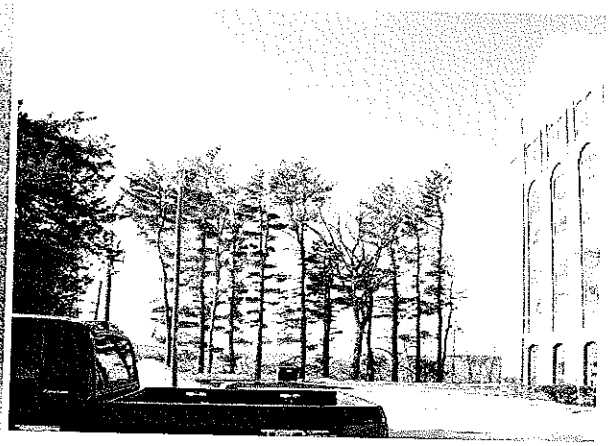


Photo 24

Photo 25

Photo 26

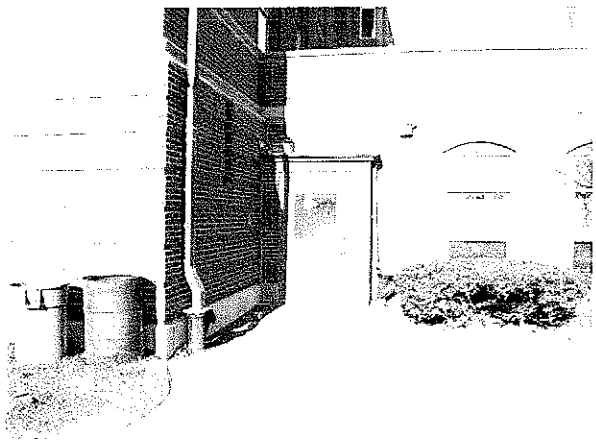


Photo 27

General Site

The items contained within this section are general site related items that appear throughout the School property that were observed during TFM's site walk. Signage, play grounds, dumpsters, guard rails, outside fuel enclosure, flag pole, abandoned equipment, miscellaneous retaining walls and sports field items will be discussed.

Signage on the School grounds consists mainly of directional signage in various conditions. At the main access drive two identification signs welcome visitors to the school. See Photo 28 below, which shows the sign located on the east side of the access drive. These signs appear to be in good shape and do not obstruct any sight lines for exiting traffic. There are many signs that line the access drive and elsewhere around the site that are illegible due to fading as shown on Photo 29. Other signs are damaged and are leaning into travel lanes can be seen in Photo 30. Landscape materials obstruct some of the signage at the entrance of the student drop off area, which is shown on Photo 31.

Photo 28

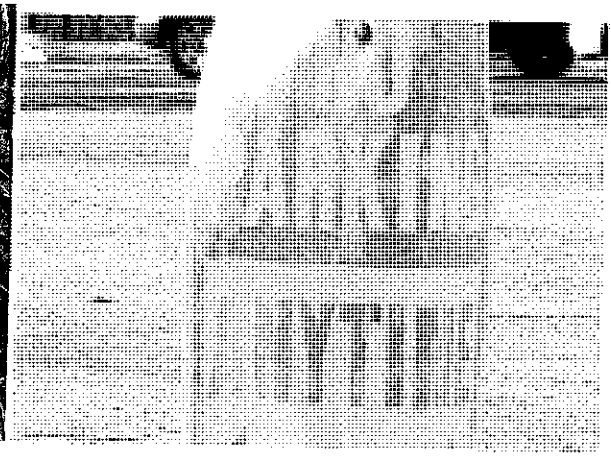


Photo 29

Photo 30

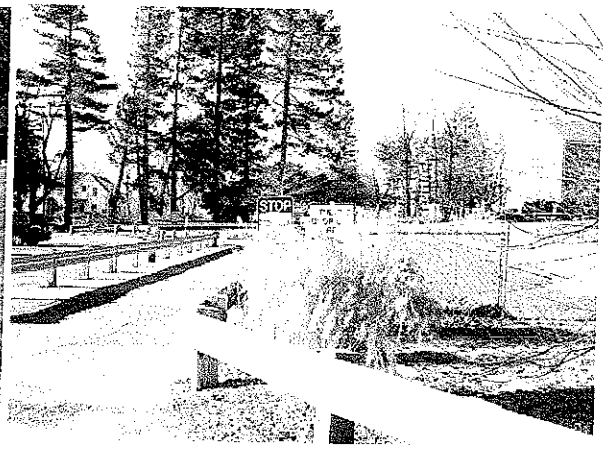


Photo 31

Multiple playgrounds are located on the school grounds. Although the condition of the playground areas themselves was reviewed, the specific equipment condition was not reviewed at this time. The first area encountered is located opposite the upper parking area next to the flagpole. This area, shown in Photo 32, was small in size and enclosed by a 4-foot high chain link fence with two gates. The lower gate was closed and locked while the upper gate located closest to the upper parking area was open. The surface was treated with woodchips. No shade structure was present. Trees are present in the surrounding area; however, TFM did not assess conditions at the time of the site investigation.

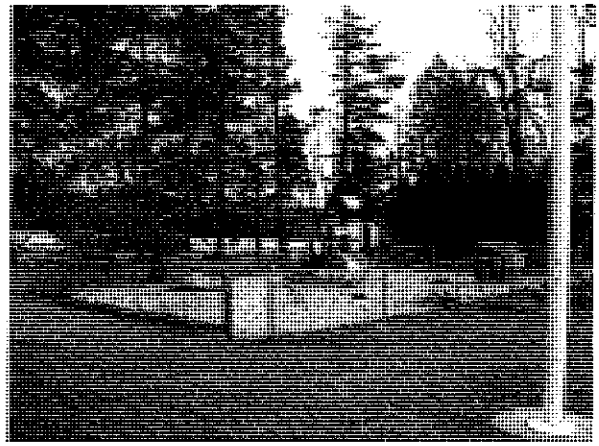


Photo 32

The next playground area is located in the rear of the school. This area consists of four exterior basketball hoops on the rear paved parking area see Photo 33. This area has no permanent protection from vehicle traffic; however, TFM has been told that this area is roped off during school recess times.

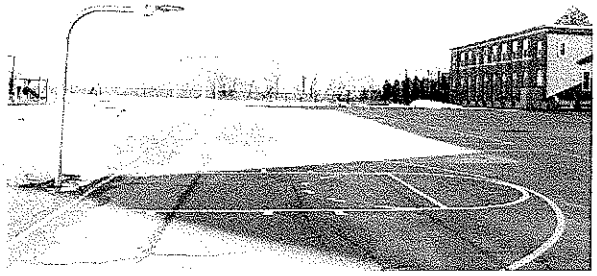


Photo 33

The next area is a play area that has a slide/climbing structure see Photo's 34 & 35 and other various equipment as well as two areas of swings shown in Photo 36. The surface was also made up of wood chips/bark mulch, which was held in place by wood timbers surrounding the areas. The area was not enclosed by any fencing however was away from the pavement. The surface area was uneven and had many puddles from the melting snow. Like the front play area, no shade structure was provided.

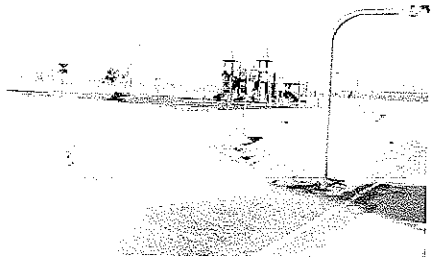


Photo 34

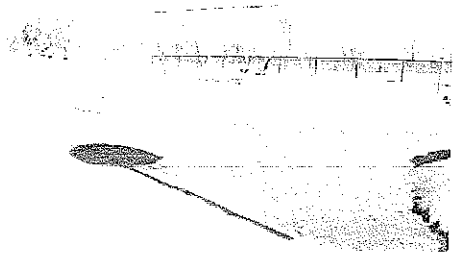


Photo 35

The next area is assumed to be play areas for The Children's Castle. These areas were fenced by 5-foot high chain link and had gates, some which were open at the time of the observation. Surface treatments for these areas were grass and bark mulch. This area has significant vegetation along the east and south edges that would supply shade as well as play structures. Photo's 36 and 37 show samples of this area.

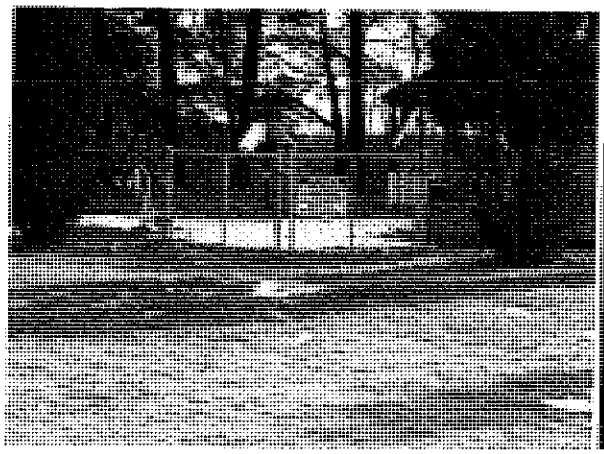


Photo 36

Photo 37

Garbage dumpsters were observed in three separate areas of the site. The first was located in the paved area between the old DPW Garage building and Recreation building. It is unclear if this is the School's or the Town's dumpster. The dumpster is in the direct line of site from the main access drive in front of the school; it is not in an enclosure or protected from vehicle traffic. See Photo 38 Trash was observed on the ground in the surrounding area.

Photo 38

The next two dumpsters observed were located between door C1 and C2, which are shown in Photo 39. It is not clear if these are permanent dumpsters for school use or only during the Christmas vacation break. If permanent, these also are not located in an enclosure or are protected from vehicle traffic. There is also a possibility that the dumpsters could cause damage to the building if pushed while being emptied.

Photo 39

The third location of dumpsters was observed outside of door C3 (side of building typical). These two dumpsters appear to service the cafeteria. Like all of the other dumpsters, they are not in an enclosure or protected from traffic and could be pushed into the building. They are also located within a few feet of the door that services the gymnasium and on top of a pavement drawing of the United States, obviously used by the students. See Photo 40.

Photo 40

The site has a few areas that utilize steel guardrails as vehicle separators within the lower parking lot. These appear to be in relatively new condition and based upon our site observation, only showed one "G"-style end unit damaged at the entrance to the student drop off area, see Photo 41. There were a few areas that TFM feels additional guard railing should be added. These areas will be discussed in our recommendations.

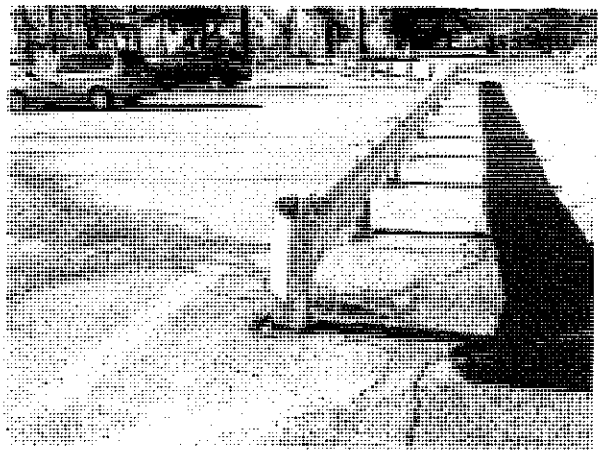


Photo 41

The outside heating fuel and propane enclosure is attached to the west end of the school building and is located on a paved surface that is a part of the access driveway. The enclosure has a metal roof and sides are made up of chain link fencing with woven slats. The enclosure does have an access gate/door that is not secured. Bollards covered with slip over plastic covers yellow in color protect the structure. See Photo 42.

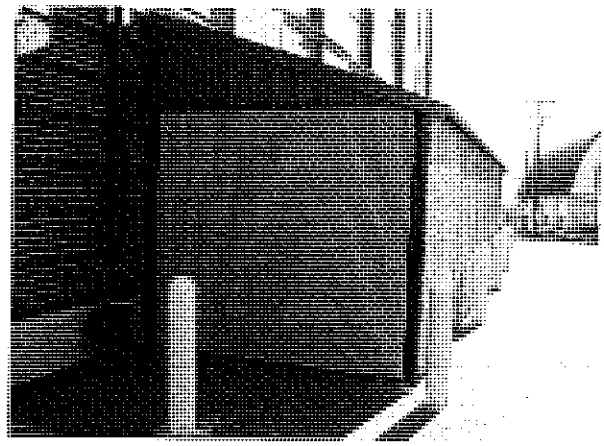


Photo 42

A flagpole was observed south of the upper parking area next to an enclosed play area and is shown in Photo 43. The pole did not appear to have a light. The pole appeared to be in excellent condition.

Photo 43

There was evidence of an old rope tow and an old ski hill behind the sports fields. The building pad, Photo 44, poles, Photo 45 and an abandoned fuel tank, Photo 46, were observed. The old pad and poles have remains of electrical wire and boxes. The pole closest to the sport field does have damage caused by vandals from chopping see Photo 47. Other poles from the top of the hill to the Indian River were also observed but were not structurally evaluated at this time.

Photo 44

Photo 45

Photo 46

Photo 47

Two types of retaining walls were observed on site. The first is a concrete stem wall that separates the paved access drive and fire lane from the slope in front of The Children's Castle. Concrete steps that access door A1 are cast in this wall along with a handrail. The wall continues along the pavement and ties into the Children's Castle building at a lower window. It continues on the other side of the window to Door A2. This wall has weep drains and no cracks were noted at the time of our visit; however, portions of the wall show signs of chipping and deterioration. See Photo 48 and 49 below for examples of this wall.

Photo 48

Photo 49

The second wall is an old brick wall that is located to the east if the Children's Castle building. This wall is decorative in style but is used to create two flat areas that seem to be used by children from the Children's Castle. These walls have loose brick and mortar. A set of steps are incorporated in a section to this wall that are in poor condition and do not have any handrail as shown in Photo 50. Other sections of the wall are approximately 1 to 2 feet above grade on one side and over 4 feet on the other side with no fencing or fall protection provided, which is indicated in Photo 51 below.

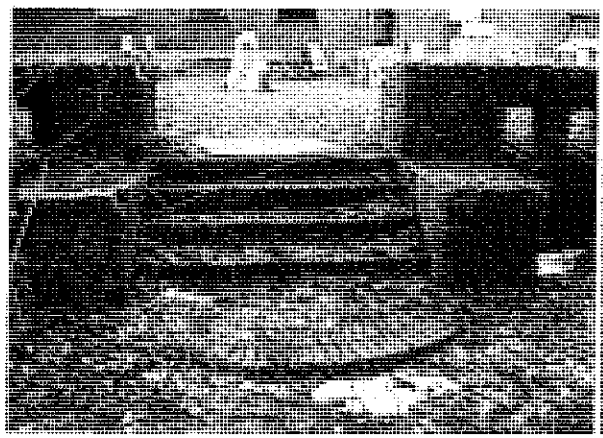


Photo 50

Photo 51

There are two sports fields in the rear of the school. These fields appear to have up to date fencing and benches. See Photo's 52, 53 and 54 for examples. The fields appear to be graded to allow surface water to runoff. A small storage shed, shown in Photo 55, is present north of the recreation building behind the western most sports field. No lights were observed that would allow for nighttime activities. TFM observed irrigation equipment around the perimeter of the fields, which would indicate that they have irrigation. TFM did not analyze the irrigation system during the site inspection due to snow cover and wintertime conditions.

Photo 52

Photo 53

Photo 54

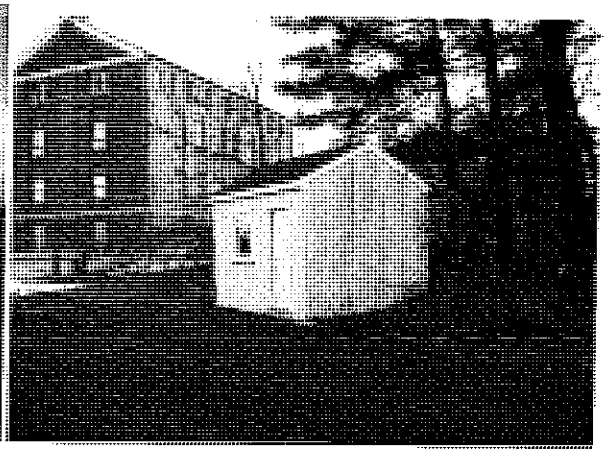


Photo 55

Utilities

The site utilities were difficult to assess as no design or as-built plans were available at the time of the observation with the exception of the septic system plans. The discussion below will talk about observations made with regards to electrical/telephone/cable, water/fire protection, drainage and sewer.

Electrical/Telephone/Cable

The electrical/telephone/cable services are fed via overhead lines through other land of the Town to a pole located off the northeast corner of the old DPW building. The electrical service appears to feed down the pole through underground conduits to the southwest corner of the school building. These connections are shown on Photo's 56 and 57. Telephone and cable lines appear to be fed overhead to the same locations. Undetermined lines do feed from the school building to the Recreation Building. The underground electrical conduits that feed into the school come up from the ground and attach to the face of the building before entering the building a few feet above grade. This is located in a small landscaped area just off the main access drive. There was not any protection of these connections visible at the time of the observation.

Photo 56

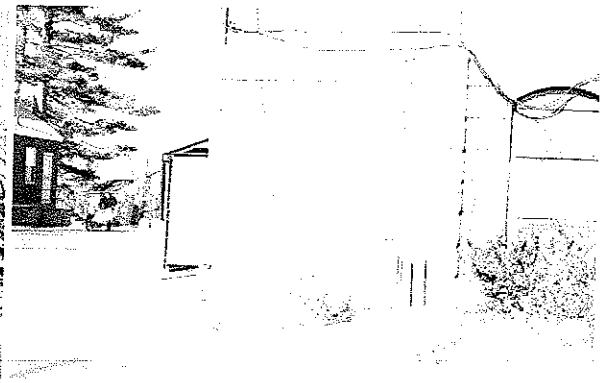


Photo 57

Water

The school is serviced by the Town of West Newbury Water Department. A large water tank is located north of the main access drive along the eastern property boundary, which is shown in Photo 58. No plans were available that indicates the current water line piping on the site other than service lines that appear on the septic design plans by Charles B. Scott PE dated 08-16-91, see Attachment A. These plans indicate that a 4" water service feeds the southeast corner of the old Administration Building now used for The Children's Castle. It is fed from a connection from Route 113 and runs through the old section of the lower parking lot. A 1" feed branches off of the 4" line in the lower parking lot and feeds the Elderly Housing Building. A separate 1" line feeds from the northwest corner of the Elderly Housing that parallels the drive between the Elderly Housing and DPW buildings. A ¾" line feeds into the DPW building from this 1" line, which extends north to the southwest corner of the school building. A 1" line is shown exiting the northwest side of the school building that services the Recreation Building. A fire service line is shown from the administration building to the fire hydrant located between doors A2 and A3 and is shown in Photo 59.

Photo 58

Photo 59

A second hydrant, shown in Photo 60, was observed located off the edge of the rear paved area northeast of the recreation building. It is unclear how this is fed. The two bollards that protect this

hydrant are leaning and appear to have been disturbed, likely by vehicles. A third fire hydrant was observed along the east edge of the access drive, which appears to be fed from the water tank as seen previously in Photo 58. A post indicator valve (PIV) see Photo 61 is located behind the gymnasium. It was leaning and appeared to have been damaged. The valve indicated it was open. It is unclear what this PIV controls. Portions of the school building has a fire sprinkler system, which has a connection that is located outside of doorway C1 for the Fire Department. This can be seen in Photo 62 See Plumbing and Fire Protection Section of this report for further information on these systems.

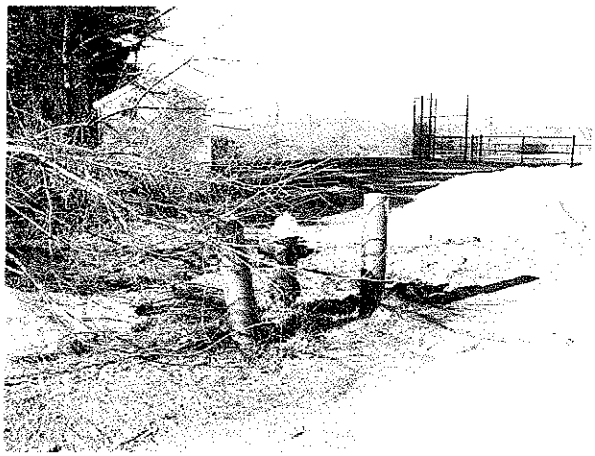


Photo 60

Photo 61

Photo 62

Drainage

The school is situated on top of hill and generates surface runoff over in all directions. There are four enclosed drainage areas that were observed over the school site. The building has a roof gutter system that drains into an underground collection system. These downspouts appear to tie into three enclosed systems. It was not determined how these drains were separated. The first drains are located at the base of the entrance road on each side. A roadside ditch extends along both sides of the access drive to a point where the entrance to the lower parking lot is. These swales are grass lined with small diameter stone just above the catch basins. This system feeds into the Route 113 drainage system. See Photo's 63 and 64 for examples.

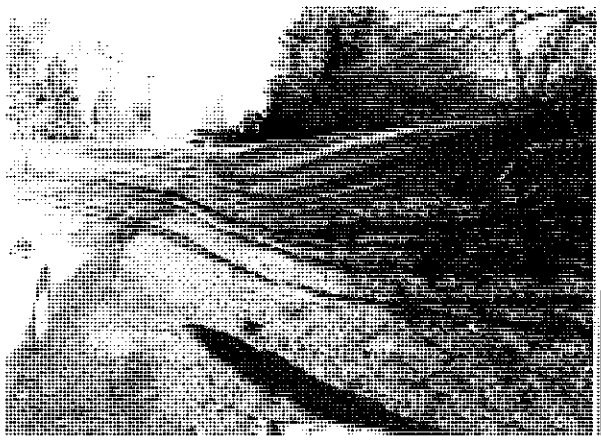


Photo 63

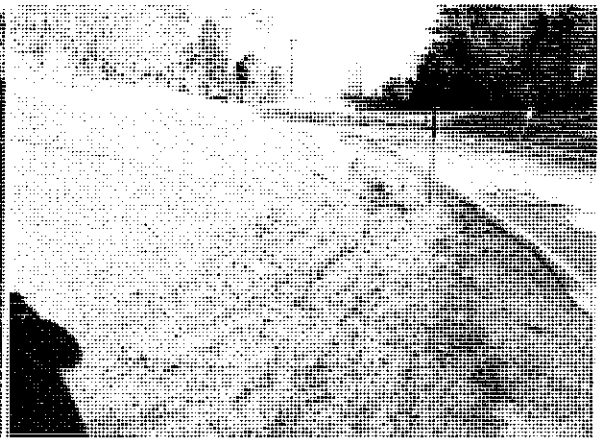


Photo 64

The second system starts out with a drain manhole located in the main access drive near the cafeteria door entrance. It feeds into a catch basin located opposite the stairs at the student drop off and continues south to the corner of the secondary exit of the lower parking area. It feeds into two more catch basins on each side of the Elderly Housing access road, which feed into the Route 113 drainage system. No treatment of storm water appears to be present in this system.

The third area is made up of three catch basins located in the rear-paved area. Roof drains from a portion of the rear roof feed into a catch basin centered in the rear-paved area, which connect to the two basins along the edge of pavement along the west edge by the sports field and fire hydrant. See Photo's 65 and 66 below.

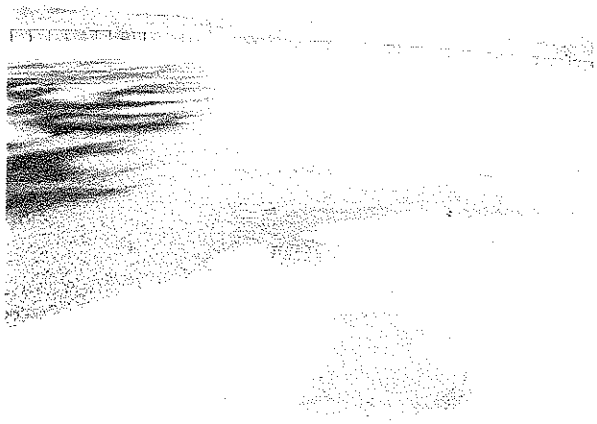


Photo 65

Photo 66

They run to another catch basin located north of the old DPW building. A portion of the front roof feeds into this catch basin, which drains off towards the west over the slope into the old pasture as located on Figure 3. This outlet has significant erosion associated with the runoff and can be seen in Photo's 67 and 68.

Photo 67

Photo 68

The fourth area has a little more uncertainty to its makeup. A manhole exists off the northeast corner of the gymnasium. The cover was unable to be removed for verification. A number of roof downspouts in that area are assumed to flow into the manhole. An outlet was observed northeast of right field on the northerly ball field over the slope, which is shown on Figure 3. The pipe appeared to be vitrified clay and was deteriorated. The area surrounding the headwall was severely eroded causing the headwall to break away from the culvert this is shown in Photo's 69 and 70. Significant water was flowing at the time of the observation assumed to be from snow melt from the flat roof of the Gymnasium.

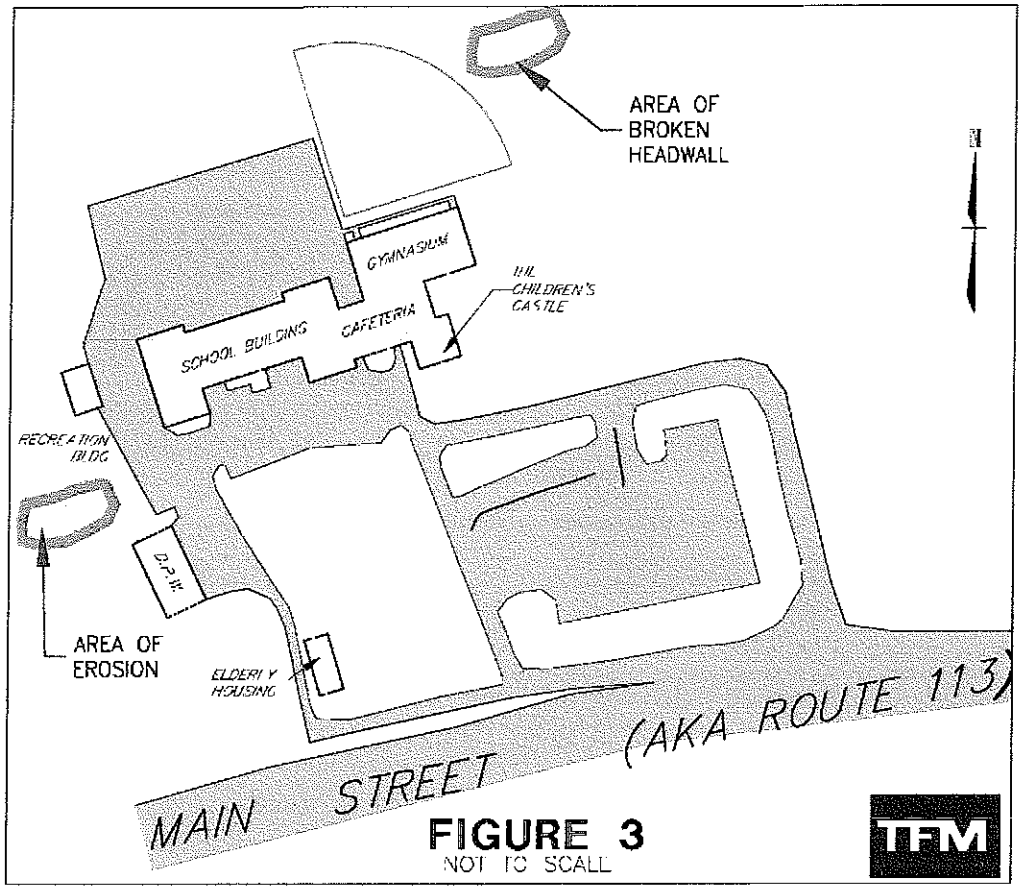


FIGURE 3
NOT TO SCALE

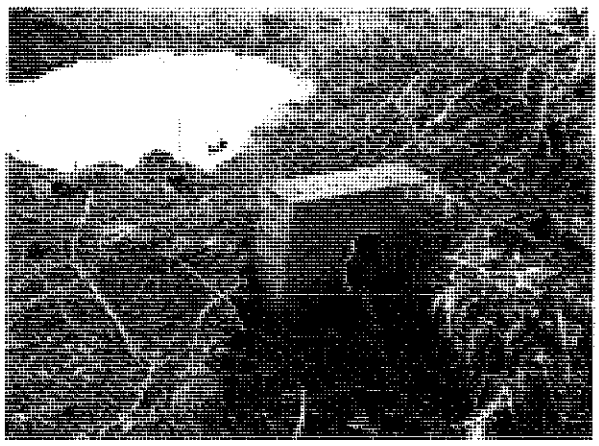


Photo 69

Photo 70

The roof drain collection system at the ground surface had many places where the connections were broken, dismantled and had open covers. See Photo's 71 thru 75 below for samples.

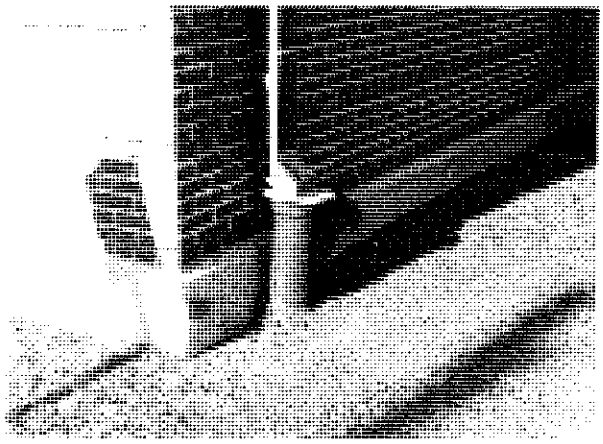


Photo 71

Photo 72

Photo 73

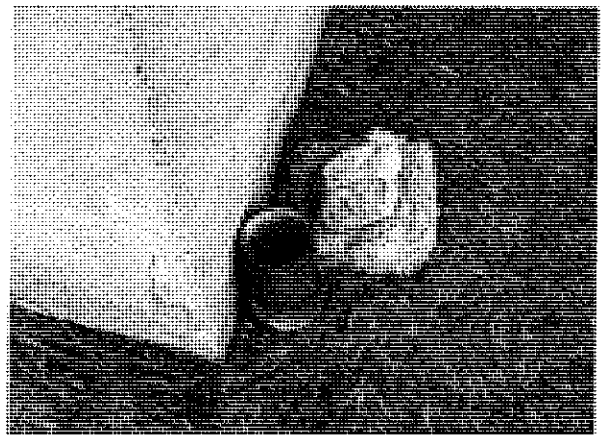


Photo 74

The lower parking area does not have any enclosed drainage structures and is assumed that the runoff sheet flows to surrounding areas. Pockets of water from recent snowmelt were observed within this area. A sample of one pocket is shown in Photo 75 below.

Photo 75

Sewer

The school is serviced by an on-site septic system that is quite complex. Design plans are on file and were provided to TFM. The system services the entire school as well as the old DPW building and Recreation building. During the site walk it was noticed that an open cover, as shown on Photo 76, was found behind the Recreation building that may possibly be where the recreation service line ties into the old DPW building line. This line connects into a manhole structure that also received effluent flow from the School. This then flows into a 32,000 gallon septic tank, into a dosing chamber that feeds 8 filtrations beds. The filtrated effluent then flows out of the filtration beds to another dosing chamber, through the old nonfunctioning chlorination tank out through a sewer line to four leaching trench systems. The old discharge pipe into the Indian River still exists see Photo 77 but has been cut off at a lower sewer manhole and left in place. For clarification of the above comments, please refer to the design plans, Attachment A.

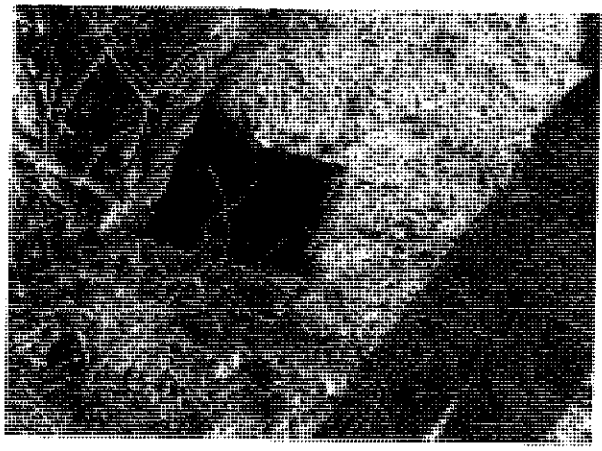


Photo 76

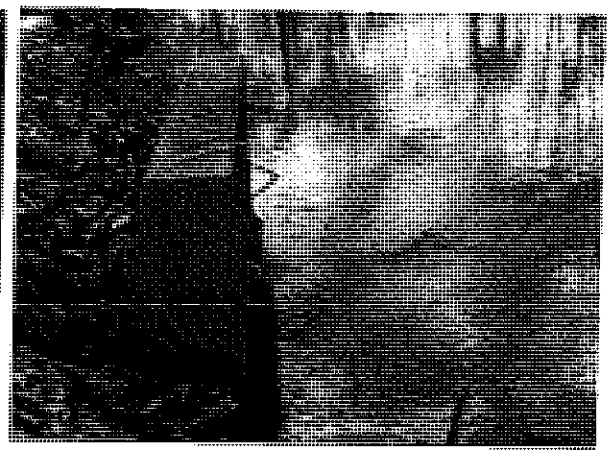


Photo 77

TFM noted trees growing over the sewer lines, tanks and dosing chambers, examples are shown on Photo's 78 and 79 below. The cleanout manhole covers have grass and soil over most of the cover making them hard to locate and remove for inspections.

Photo 78

Photo 79

A vent on one of the filtration beds has been damaged see Photo 80.

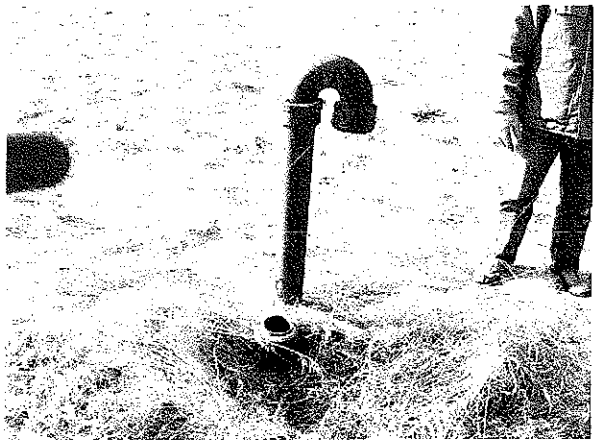


Photo 80

Trees and grass have been mowed over both leach field areas, which is necessary to keep root growth out of the bed areas. Example Photo's 81, filtration bed area and 82, the trench system area, depict this has been performed recently. At the time of the observation, the system between the building and septic tank was backing up and the septic tank appeared to be full. The tank had actually had backed up over the top of the tank into the service manholes. This issue was due to be serviced the following day.

Photo 81

Photo 82

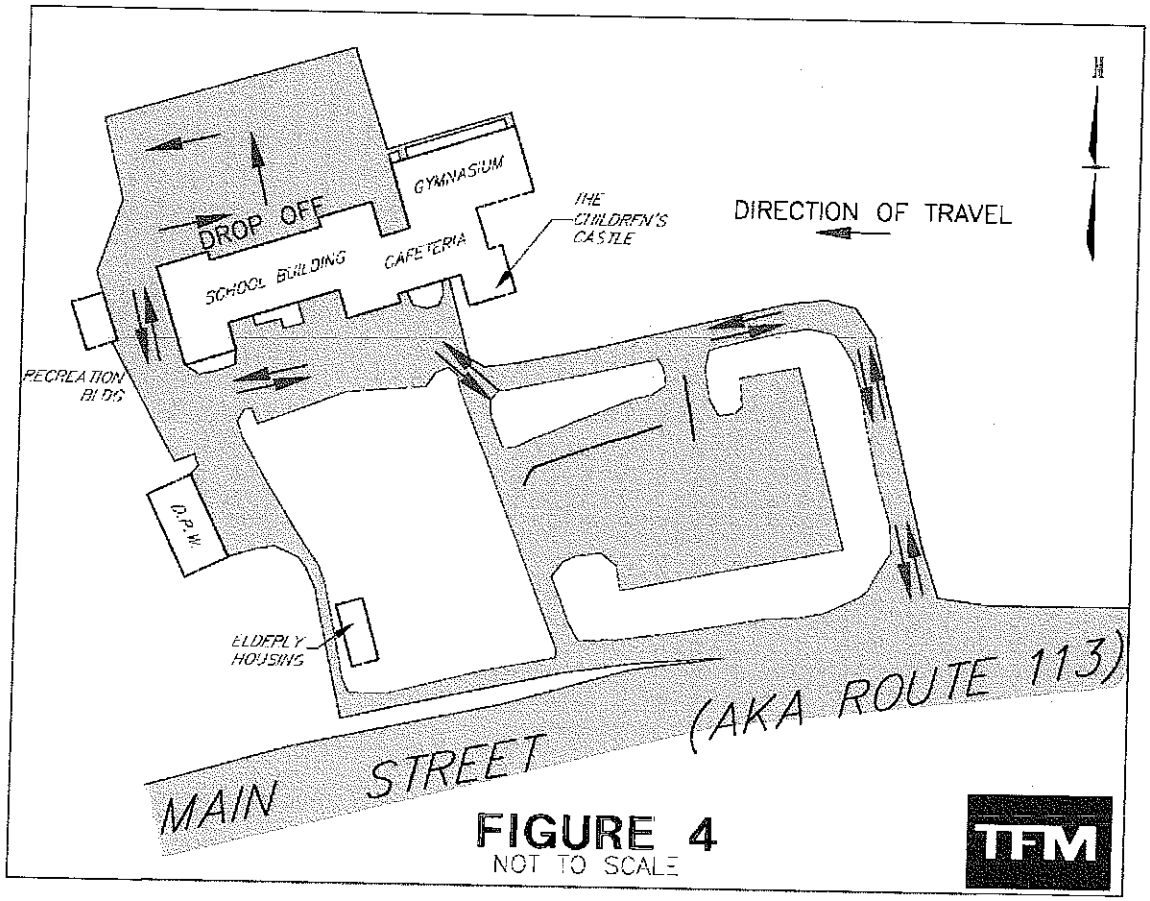
Circulation

This section will discuss the circulation of vehicles and pedestrians around the school grounds. TFM was not present during day-to-day operations of the school and we are basing this assessment of the use of existing signage, driveways, and crosswalks on information provided by the Architect.

Vehicle Circulation

The main access to the site is a two-lane drive that handles most of the daily traffic to and from the school as well as the private operation of The Children's Castle that is for toddlers through kindergarten as well as before and after school programs for 5 and 6 year olds. The School has three methods of vehicle circulation for student and faculty:

The first is bus transportation for students. The buses arrive using the main access drive and proceed to the rear of the school to drop off and pick up the students. They exit the same driveway in the opposite way they arrived see Figure 4.



The second is a parent drop off lane located within the lower parking lot. This is separated within the lot by a steel guardrail. These vehicles enter the same main access drive and proceed to the lower parking lot entrance. It appears that there is approximately room for 4 to 5 vehicles at the drop off with another 2 or 3 for stacking before interfering with the main access drive and bus traffic. The vehicles appear to have two options for exiting this drop off lane. The first is to leave through the lower parking lot and the second is to use a secondary exit drive that ties into the Elderly Housing's access driveway, which exits onto Route 113 approximately 100 feet west of the main access drive. See Figure 5.

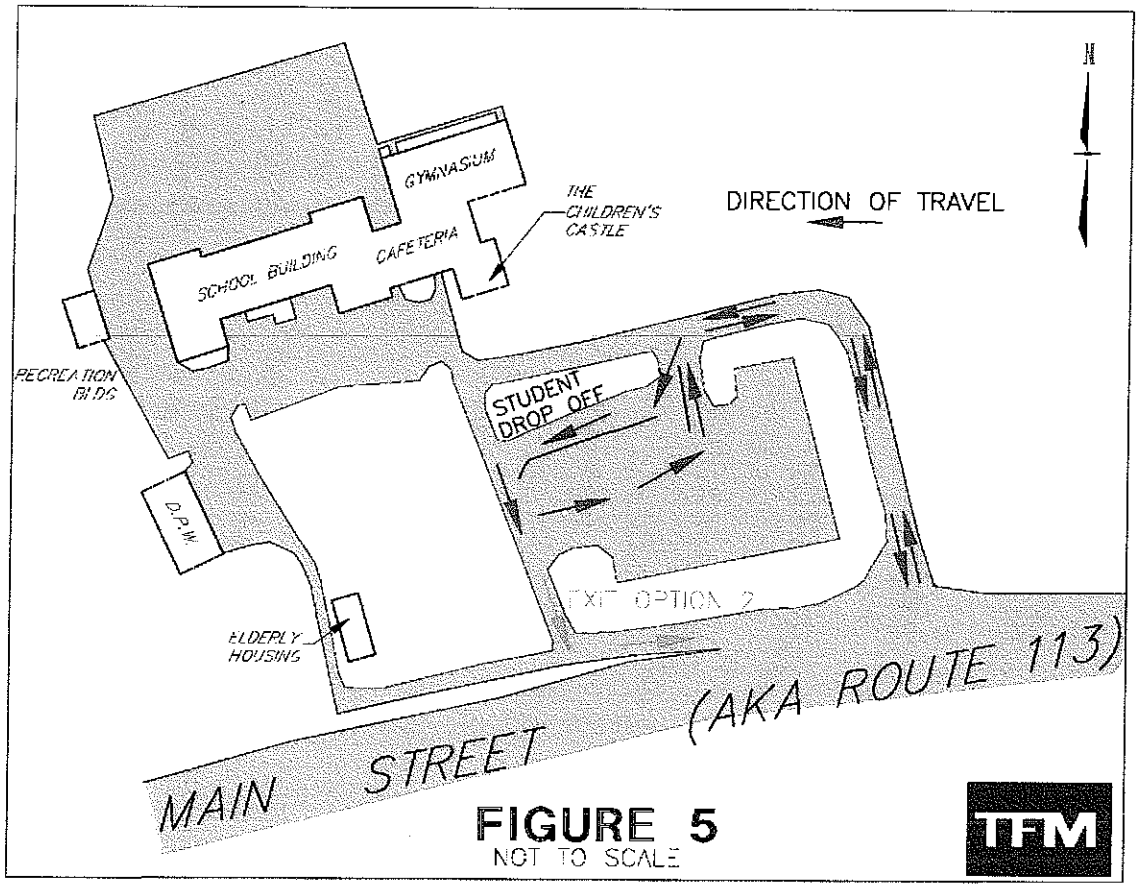
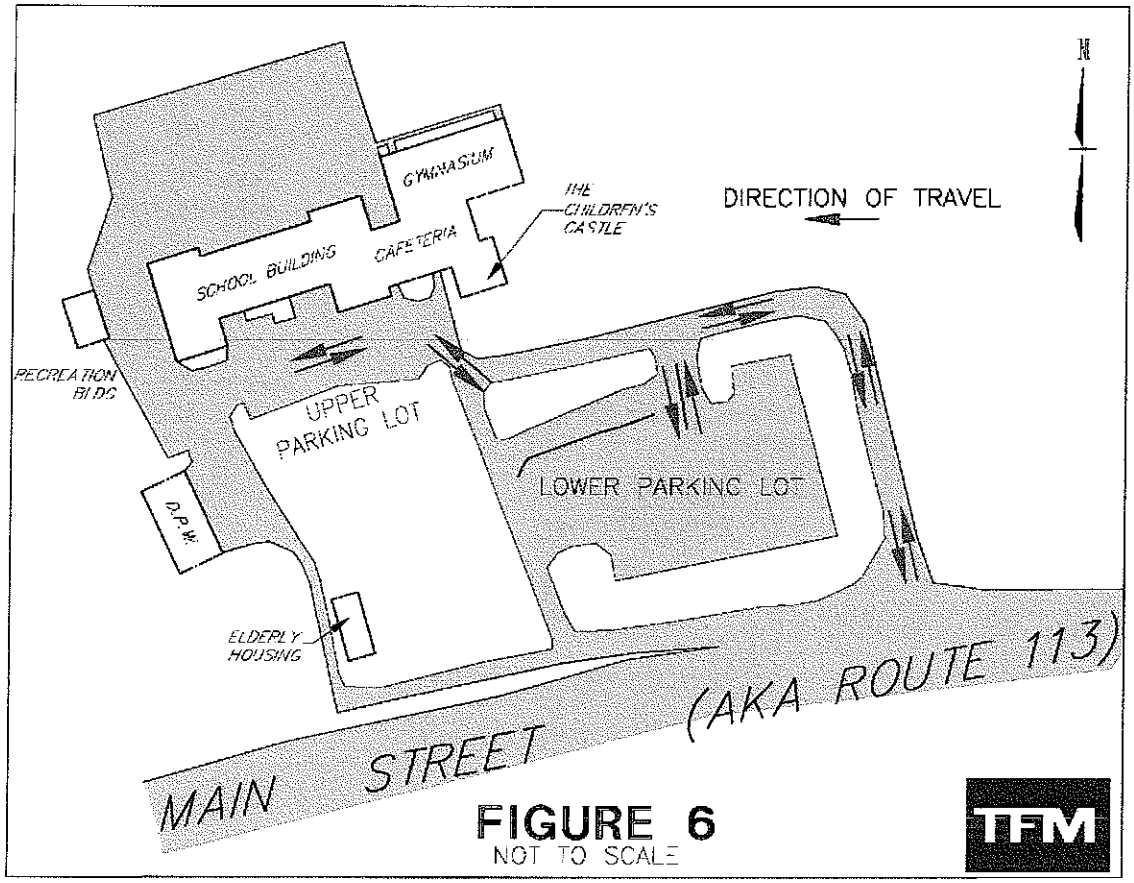


FIGURE 5
NOT TO SCALE

The third is by parking in a marked space, whether for the entire school day or a short time. All parking is located off of the main access drive. The lower parking lot is the largest lot, which is used by the majority of the faculty and The Children's Castle operation. It is TFM's understandings are that The Children's Castle parent's park in the lower lot and walk the children into the facility. Other faculty and people with disabilities utilize additional parking in the upper lot in front of the school. No other parking spaces were observed. See Figure 6.



Pedestrian Circulation

Most of the pedestrian circulation is generated from the lower parking lot, whether it is from the student drop off area, faculty parking, or The Children's Castle operation. The student drop off area has a concrete drop off pad where students proceed up a small set of concrete stairs cross the secondary exit drive with a marked crosswalk where it intersects another crosswalk that crosses the main access drive. From that point students have to follow the crosswalk that runs parallel with the building to the main entrance. The lower parking lot has a separate crosswalk where it crosses lower on the secondary exit drive and runs parallel to the same point of the student drop off walk. From the upper parking lot, a crosswalk located at the beginning of the ADA parking spaces accesses the building. This crosswalk terminates at the main entry of the school. Students that use the play area in front of the school also use this crosswalk. There is no clearly defined pedestrian walkway located in the rear-paved area with the exception of the paved walk that accesses the emergency exit doors of the gymnasium. The main access drive and Route 113 do not have sidewalks. See Figure 7.

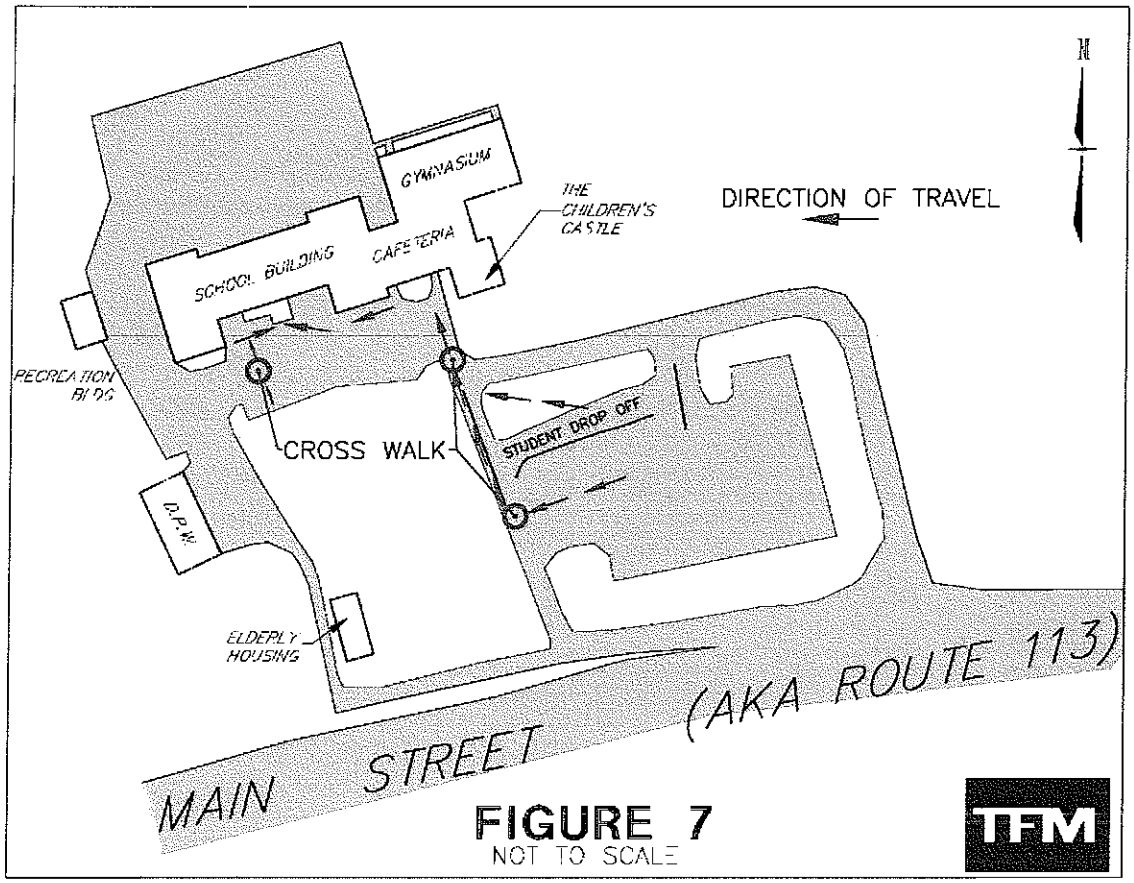


FIGURE 7
NOT TO SCALE

Conclusions

A few general observations can be made in summary of the above specific observations:

The original site was developed many years ago, and along the way site improvements seem to have been patched together as they were needed without the benefit of an overall master plan. As a result, bus, car, and pedestrian circulation are awkward in some locations.

The overall condition of the pavement is fair to poor and shows multiple areas of pavement failure, most likely caused by a combination of deferred patching, poor base and sub-base materials, and a high water table or inadequate drainage.

The building access points in many cases lack overhead protection of individuals from adverse weather conditions and have multiple areas that may cause personal injury due to trip hazards.

The overall site lighting levels seem low and inconsistent for both vehicle and pedestrian areas.

Current signage condition is poor in many cases, which may make it difficult for vehicles and pedestrians to maneuver through the school property.

Play areas need minor maintenance to assure student safety.

Dumpster locations are haphazard and un-enclosed and are susceptible to damage to themselves and adjacent buildings as well as vandalism.

The retaining walls on-site are necessary and need to be maintained, protected or replaced. Further studies will need to be assessed.

Most of the utilities seem functional and appear to be adequate for the school's operation. Refer to assessments of other disciplines for utility adequacy within the school building. A study of each specific utility with regards to the schools requirements for future needs should be considered.

Recommendations

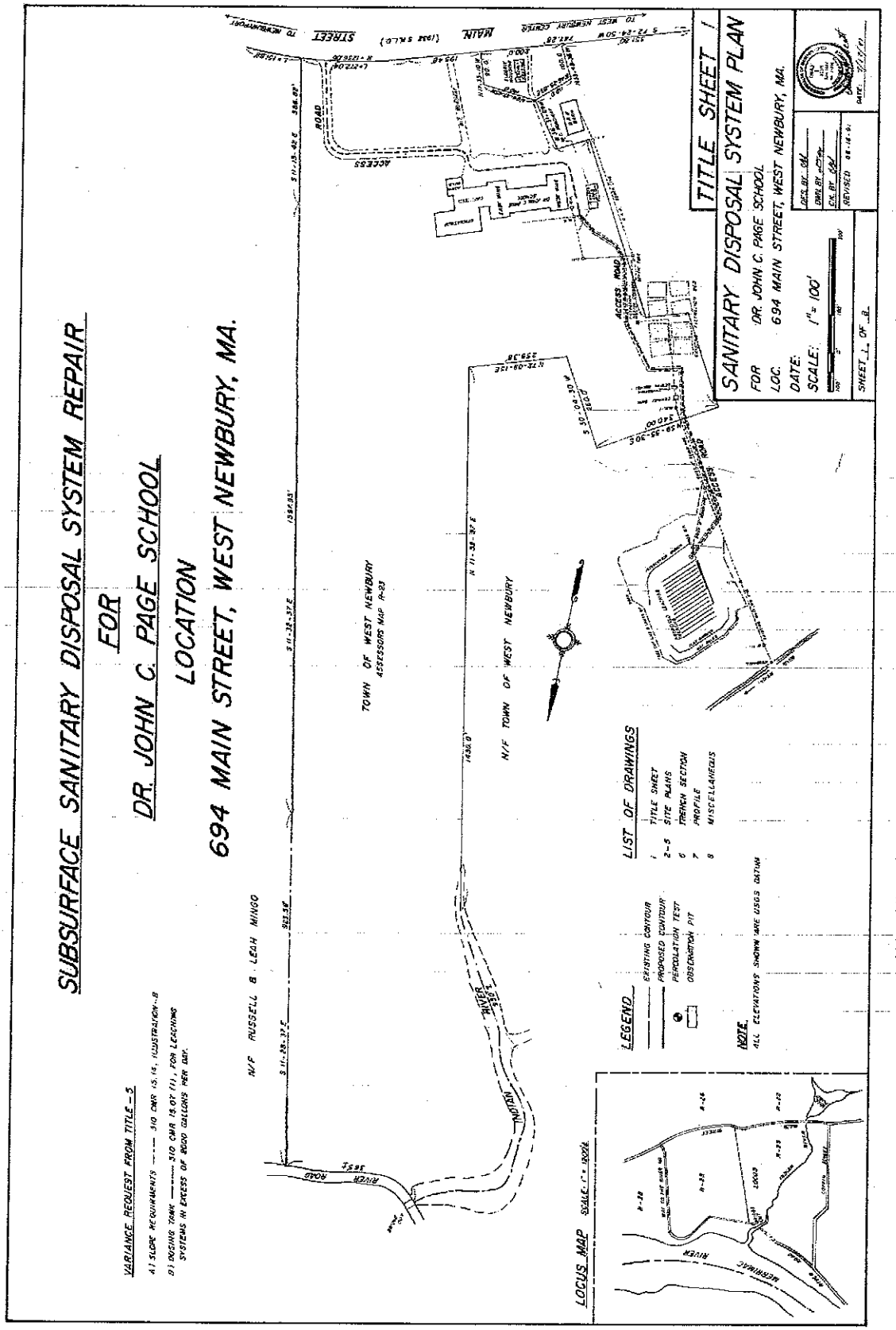
Below TFM has provided its recommendations for site improvements on the Dr. John C. Page Elementary School grounds;

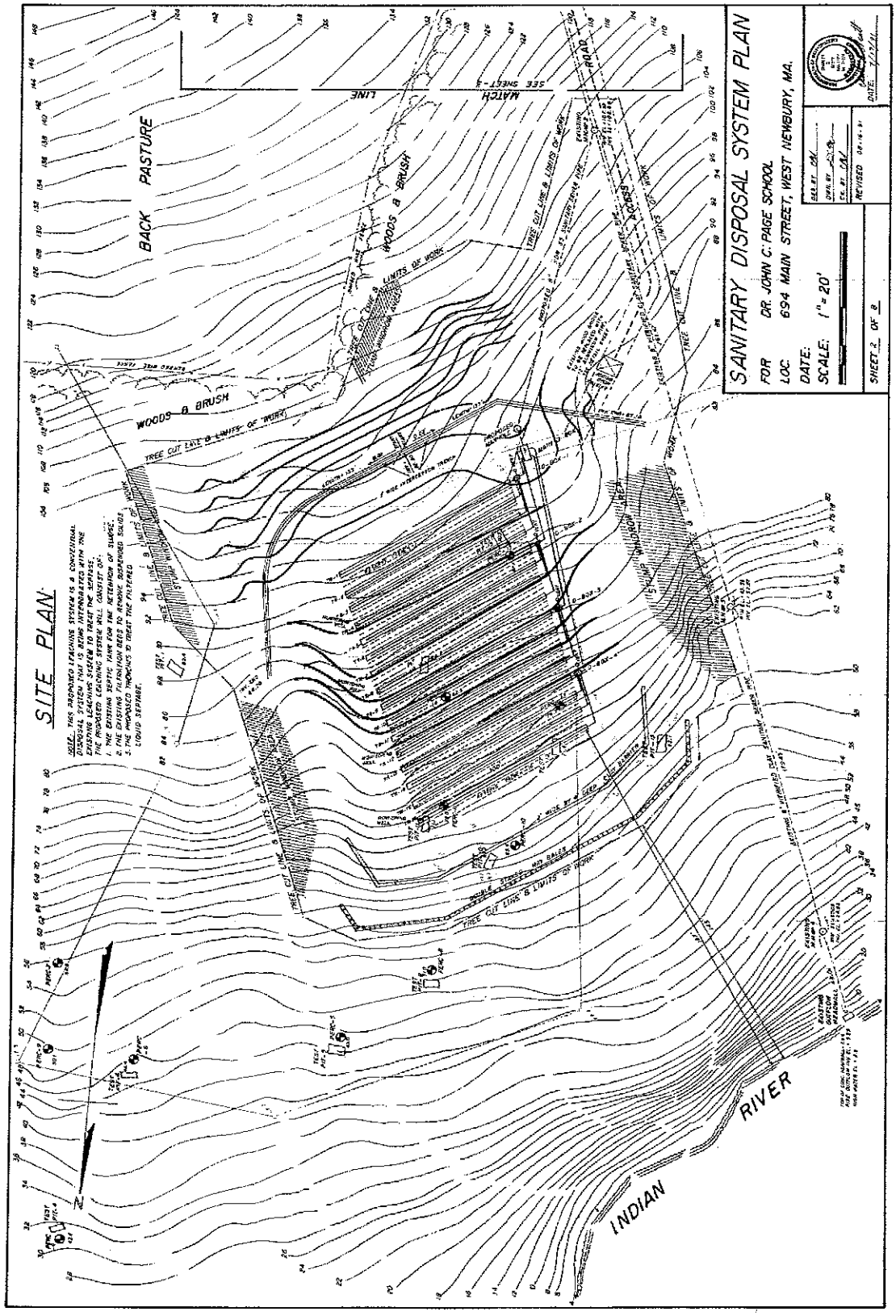
- Have an Existing Conditions Survey of the property and internal property (or usage) lines prepared.
- Conduct a pavement inspection and prepare a phasing plan for repairs and or replacement.
- Install additional guardrail in areas that pavement abuts slopes greater than a 3 to 1 slope or exceed a 4-foot vertical drop.
- Address immediate areas of concern for improvements to building access ways with regards to pedestrian/vehicle circulation improvements, weather related building improvements and repairs to pavement areas.
- Review lighting levels versus acceptable design criteria and install new lighting fixtures.
- Replace faded and damaged signs, reset signposts, and add additional directional signs where missing.
- Review play ground areas for safety and provide shade blocks as needed.
- Provide dumpster enclosures for all dumpster locations.
- Repair minor damage to all guardrail sections.
- Remove all Rope Tow equipment, poles, slabs and fuel tank from grounds used by the School or renovate the ski slope.
- Provide bollards to protect underground electrical conduits where they enter the school above grade.
- Coordinate with the School, Water Department and Mechanical Engineer to determine if the PIV is functional and identify what it services.
- Clean all catch basins, drainage manholes, roof downspouts, fix eroded outlet north of old DPW building and repair/replace outlet headwall northeast of the northerly ball field.
- Clean all sewer manholes, tanks, dosing chambers and distribution boxes. Expose all access covers to grade on filtration beds and install manhole covers to grade on D-boxes

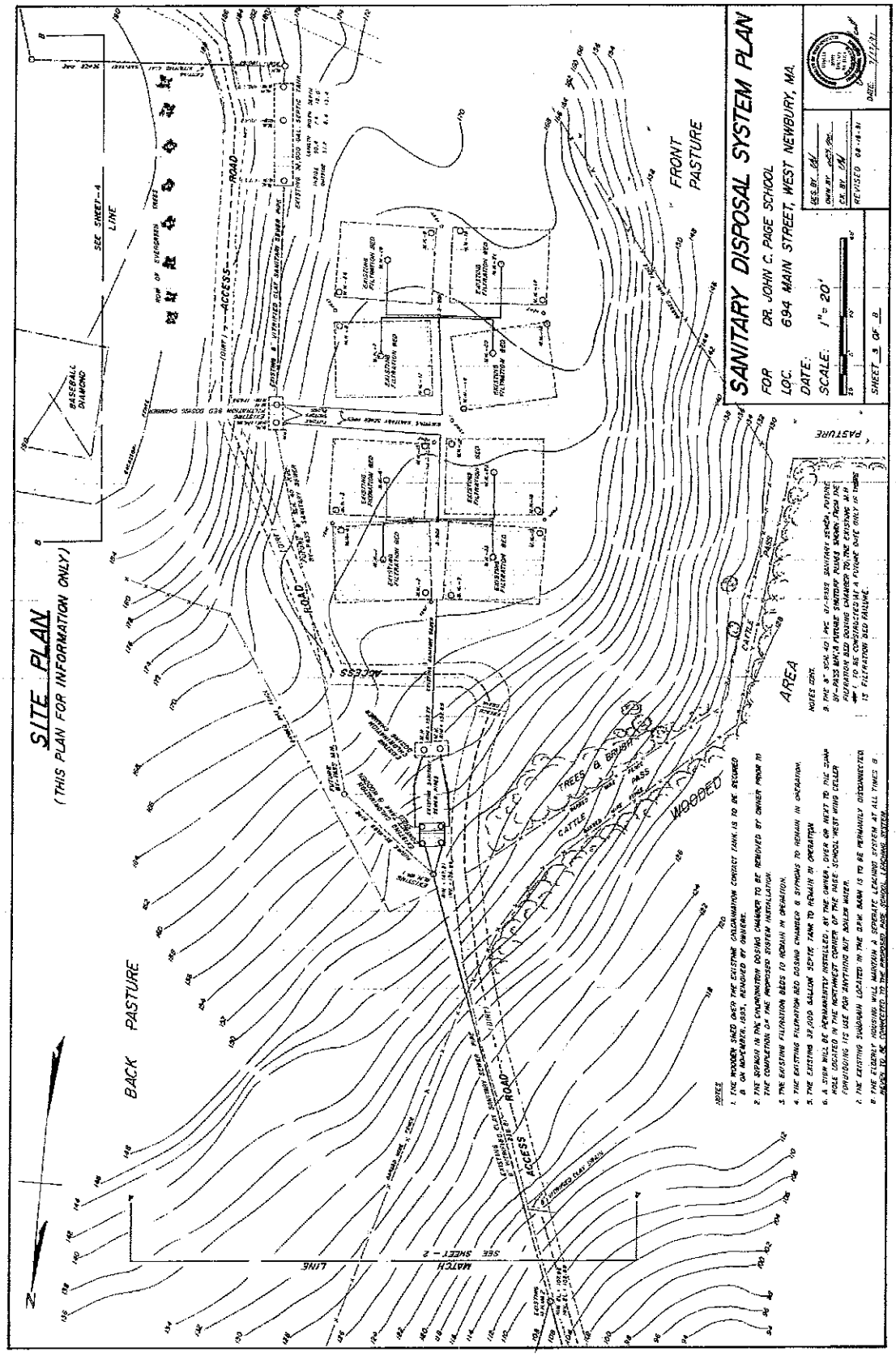
on the trench system. Clear all trees over all components and lines of the sewer lines and structures. A full Title 5 inspection should be conducted on this system.

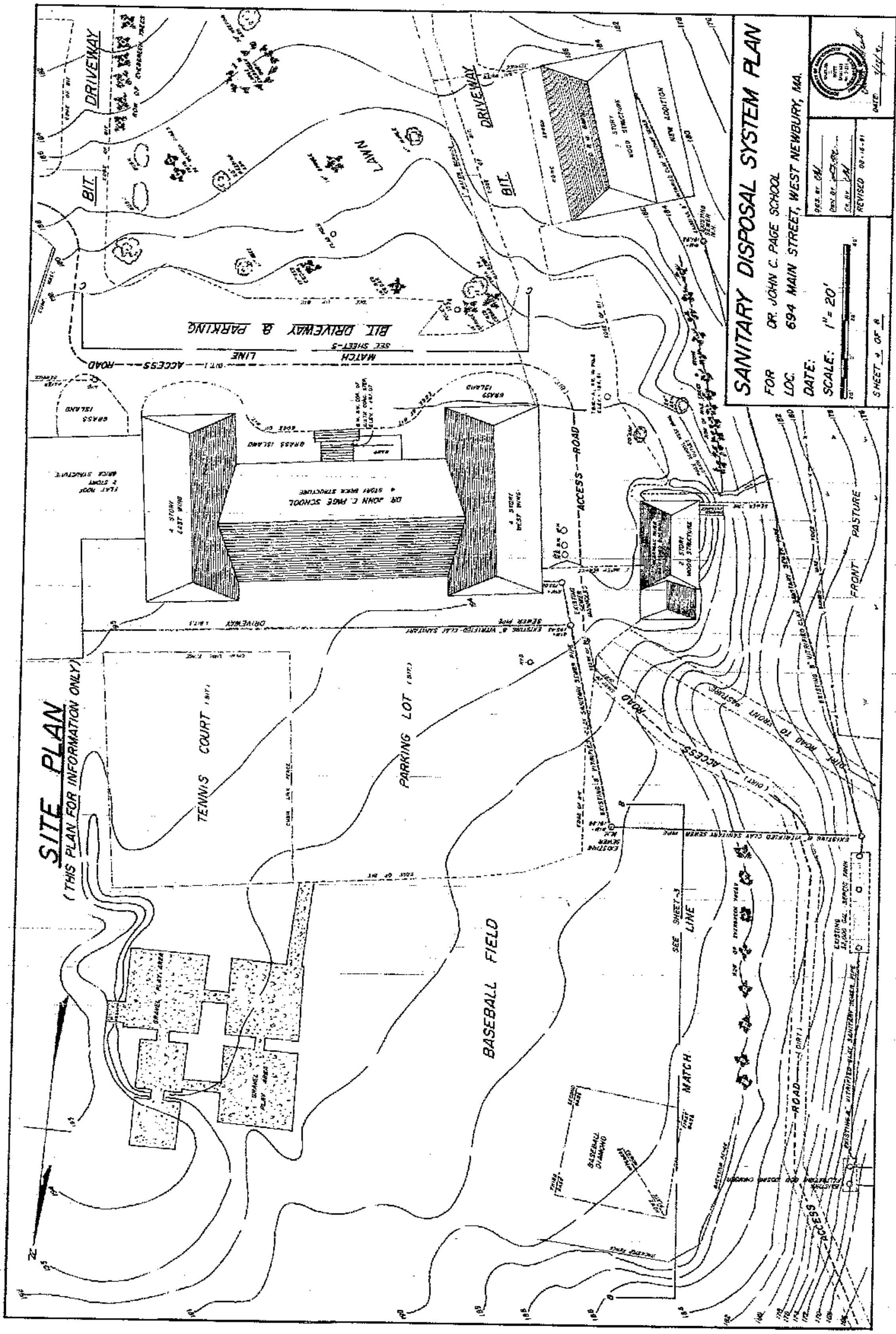
- Conduct a quantitative traffic/pedestrian circulation study and prepare plans and a report for improvements.

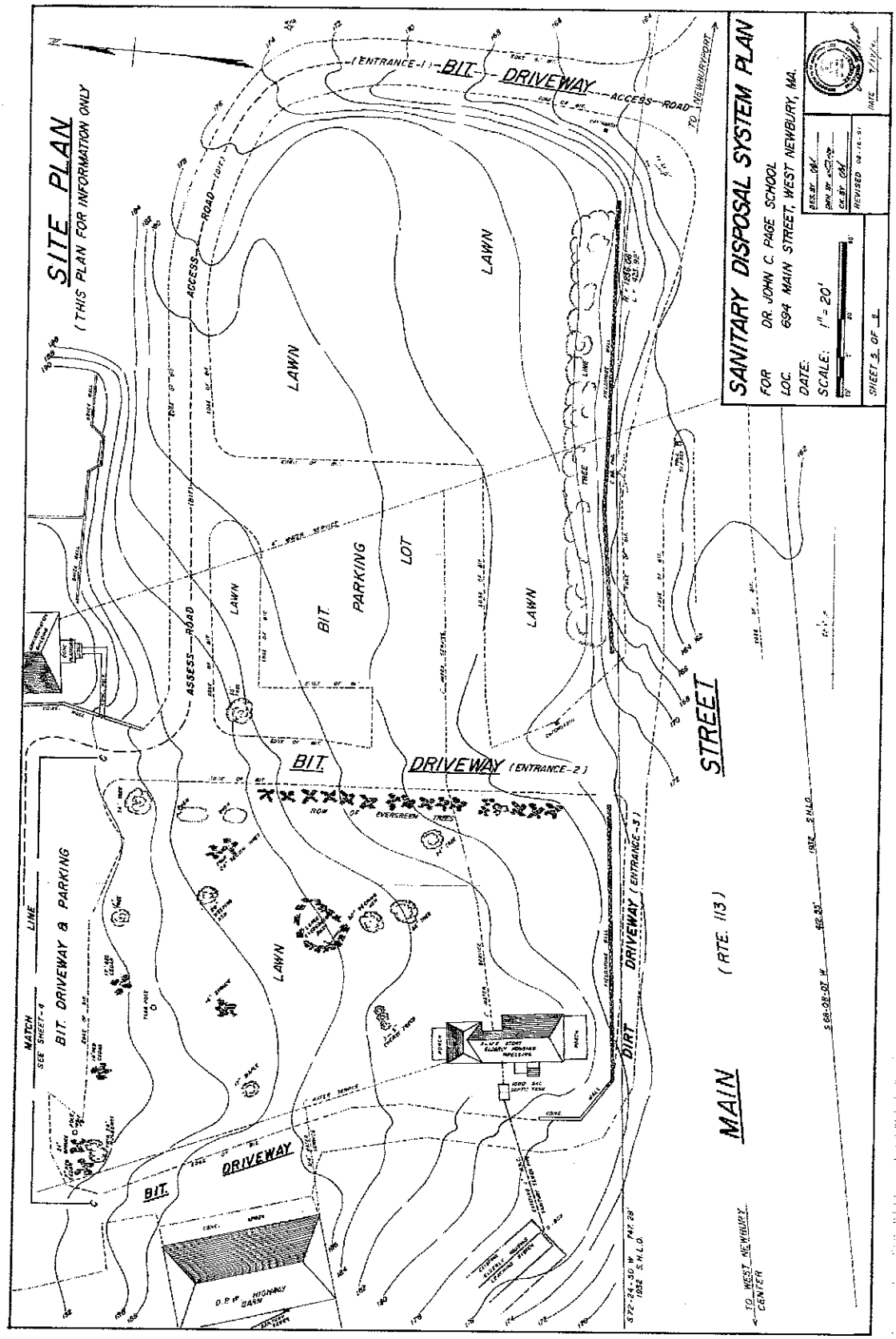
CIVIL ENGINEERING ASSESSMENT
ATTACHMENT A

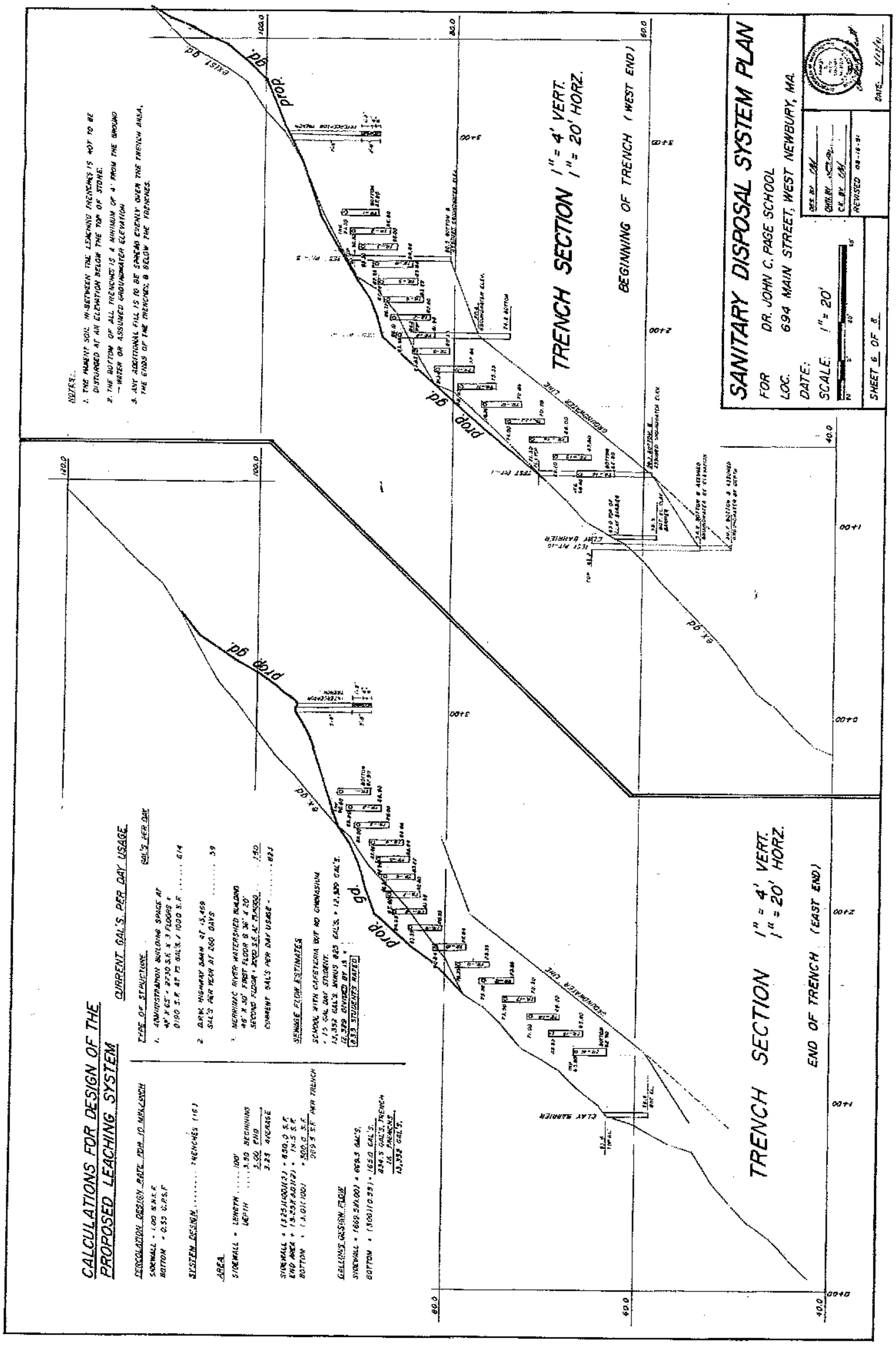

SUBSURFACE SANITARY DISPOSAL SYSTEM REPAIR
FOR
DR. JOHN C. PAGE SCHOOL
LOCATION
694 MAIN STREET, WEST NEWBURY, MA.
VARIANCE REQUEST FROM TITLE - 5
A) SLOPE REQUIREMENTS ---- 310 CMR 15.14, ILLUSTRATION-8
B) DIGGING TOWN ---- 310 CMR 15.01 (11), FOR LEACHING SYSTEMS IN EXCESS OF 8000 GALLONS PER DAY.
N/F RUSSELL & LEAH MINOD
TOWN OF WEST NEWBURY
ASSESSORS MAP R-23
N/F TOWN OF WEST NEWBURY
MAIN STREET (ROUTE 113)
ACCESS ROAD
RIVER ROAD
INDIAN
LEGEND
EXISTING CONTOUR
PROPOSED CONTOUR
PERCOLATION TEST
OBSERVATION PIT
LIST OF DRAWINGS
1 TITLE SHEET
2-5 SITE PLANS
6 TRENCH SECTION
7 PROFILE
8 MISCELLANEOUS
NOTE
ALL ELEVATIONS SHOWN ARE USGS DATUM
LOCUS MAP
TITLE SHEET
SANITARY DISPOSAL SYSTEM PLAN
FOR DR. JOHN C. PAGE SCHOOL
LOC. 694 MAIN STREET, WEST NEWBURY, MA.
DATE:
SCALE: 1" = 100'
SHEET 1 OF 8
DES. BY: DM
DWN. BY:
CK. BY: MJ
REVISED 05-14-91
DATE: 2/27/91

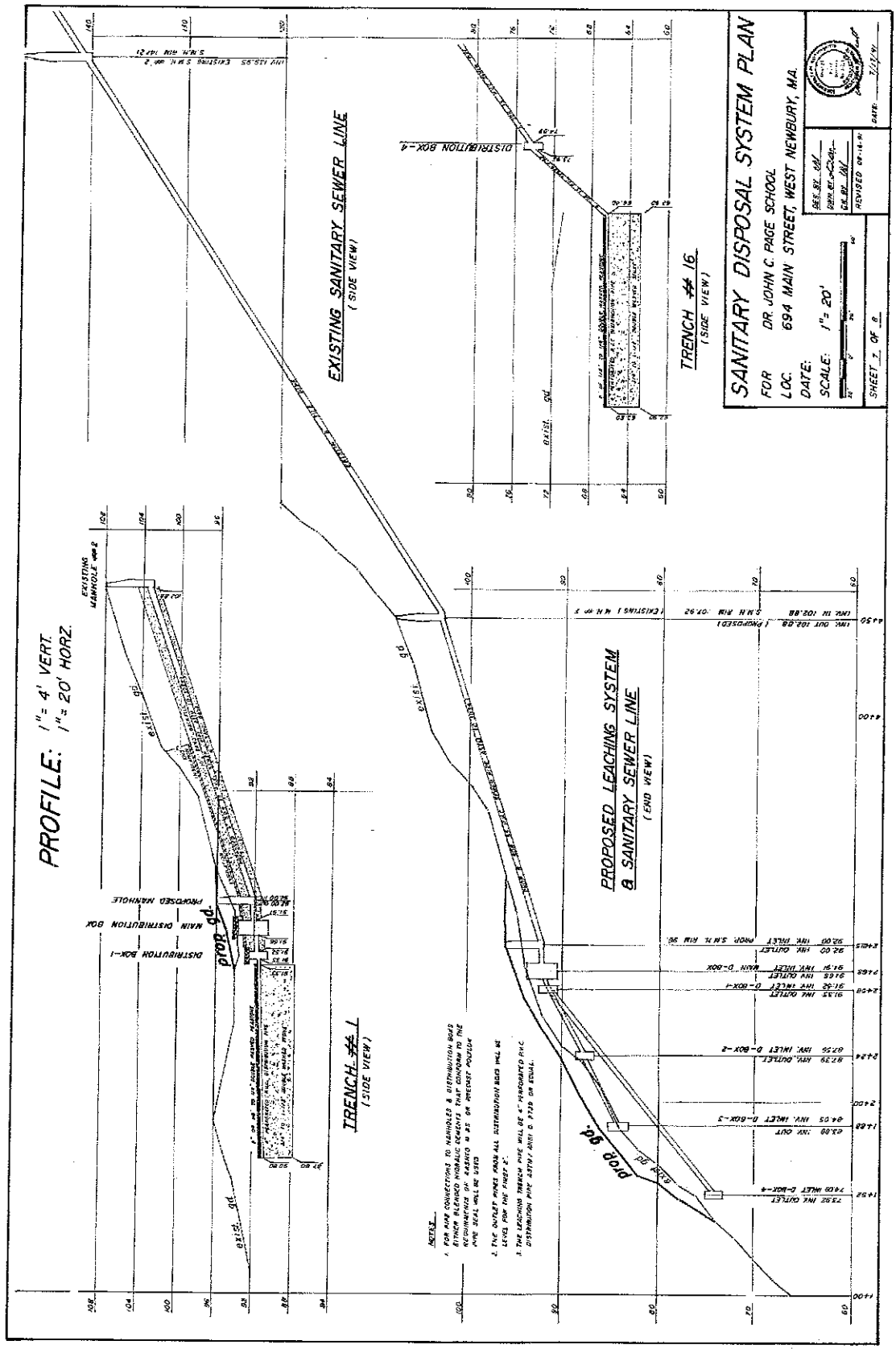

SANITARY DISPOSAL SYSTEM PLAN
FOR DR. JOHN C. PAGE SCHOOL
LOC 694 MAIN STREET, WEST NEWBURY, MA.
DATE:
SCALE: 1" = 20'
SHEET 2 OF 8
REVISED
SITE PLAN
BACK PASTURE
WOODS & BRUSH
TREE CUT LINE & LIMITS OF WORK
ROAD
MATCH LINE
SEE SHEET-1
INDIAN
RIVER

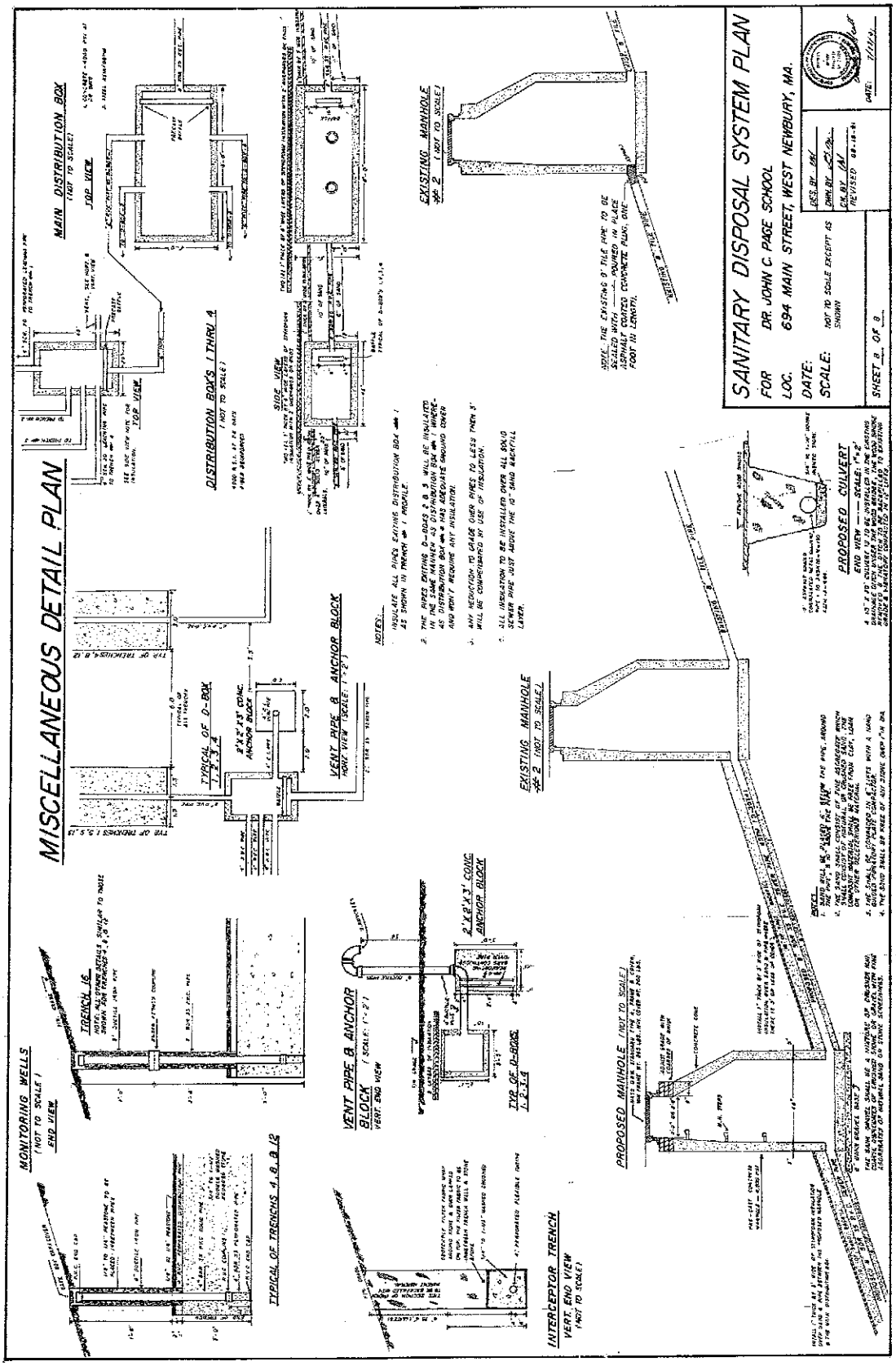

SITE PLAN
(THIS PLAN FOR INFORMATION ONLY)
SANITARY DISPOSAL SYSTEM PLAN
FOR DR. JOHN C. PAGE SCHOOL
LOC. 694 MAIN STREET, WEST NEWBURY, MA.
DATE:
SCALE: 1" = 20'
SHEET 3 OF 8
REVISED 04-18-91
BACK PASTURE
FRONT PASTURE
ACCESS ROAD
BASEBALL DIAMOND
SEE SHEET-4 LINE
MATCH LINE
SEE SHEET - 2
WOODED AREA
TREES & BRUSH
CATTLE PASS
NOTES
NOTES CONT.


SITE PLAN
(THIS PLAN FOR INFORMATION ONLY)
SANITARY DISPOSAL SYSTEM PLAN
FOR DR. JOHN C. PAGE SCHOOL
LOC. 694 MAIN STREET, WEST NEWBURY, MA.
DATE:
SCALE: 1" = 20'
DRIVEWAY
LAWN
BIT.
BIT. DRIVEWAY & PARKING
MATCH LINE
SEE SHEET-5
ACCESS ROAD
TENNIS COURT
PARKING LOT
BASEBALL FIELD
SEE SHEET-3
MATCH LINE
FRONT PASTURE
ROAD

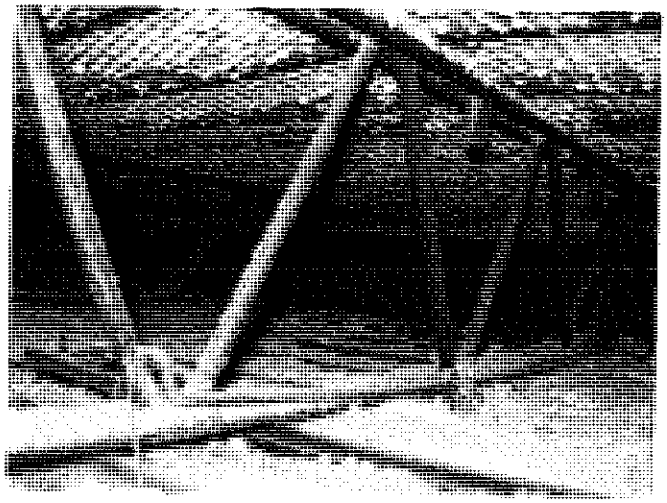

SITE PLAN
(THIS PLAN FOR INFORMATION ONLY)
SANITARY DISPOSAL SYSTEM PLAN
FOR DR. JOHN C. PAGE SCHOOL
LOC. 694 MAIN STREET, WEST NEWBURY, MA.
DATE:
SCALE: 1" = 20'
SHEET 1 OF 1
REVISED 04-16-91
(ENTRANCE-1) BIT. DRIVEWAY
ACCESS ROAD
TO NEWBURYPORT
LAWN
BIT. PARKING LOT
BIT. DRIVEWAY (ENTRANCE-2)
BIT. DRIVEWAY & PARKING
MATCH LINE SEE SHEET-4
DRIVEWAY (ENTRANCE-3)
DIRT
STREET
MAIN
(RTE. 113)
TO WEST NEWBURY CENTER
TO NEWBURY
1000 GAL. SEPTIC TANK
D.P.W. HIGHWAY BARN


SANITARY DISPOSAL SYSTEM PLAN
FOR DR. JOHN C. PAGE SCHOOL
LOC. 694 MAIN STREET, WEST NEWBURY, MA.
TRENCH SECTION 1" = 4' VERT. 1" = 20' HORZ.
BEGINNING OF TRENCH (WEST END)
END OF TRENCH (EAST END)
CALCULATIONS FOR DESIGN OF THE PROPOSED LEACHING SYSTEM
CURRENT GAL'S. PER DAY USAGE


SANITARY DISPOSAL SYSTEM PLAN
FOR DR. JOHN C. PAGE SCHOOL
LOC. 694 MAIN STREET, WEST NEWBURY, MA.
DATE:
SCALE: 1"= 20'
SHEET 7 OF 8
REVISED
PROFILE: 1"= 4' VERT. 1"= 20' HORZ.
EXISTING SANITARY SEWER LINE
(SIDE VIEW)
DISTRIBUTION BOX-4
TRENCH #6
(SIDE VIEW)
PROPOSED LEACHING SYSTEM & SANITARY SEWER LINE
(END VIEW)
TRENCH #1
(SIDE VIEW)
EXISTING MANHOLE #2
PROPOSED MANHOLE
MAIN DISTRIBUTION BOX
DISTRIBUTION BOX-1
NOTES:


MISCELLANEOUS DETAIL PLAN
MAIN DISTRIBUTION BOX
DISTRIBUTION BOXES 1 THRU 4
EXISTING MANHOLE
VENT PIPE & ANCHOR BLOCK
TYPICAL OF D-BOX
MONITORING WELLS
VENT PIPE & ANCHOR BLOCK
EXISTING MANHOLE
PROPOSED CULVERT
PROPOSED MANHOLE
INTERCEPTOR TRENCH
TYPICAL OF TRENCHES
SANITARY DISPOSAL SYSTEM PLAN
FOR DR. JOHN C. PAGE SCHOOL
LOC. 694 MAIN STREET, WEST NEWBURY, MA.
DATE:
SCALE: NOT TO SCALE EXCEPT AS SHOWN
SHEET 8 OF 8

Section 3.2
Structural Assessment



STRUCTURAL ASSESSMENT

Dr. John C. Page Elementary School

Purpose

The purpose of this report is to describe, in broad terms, the structure of the existing building, to comment on the existing structure, to comment on the structural integrity of the building with particular emphasis on the floor system of the original building, to comment on the structural code issues related to the future renovation and expansion of the existing building and provide estimated costs of possible structural upgrades to the building

Scope

1. Description of the existing structure
2. Evaluation of the structural integrity of the building with particular emphasis on the floor system of the original building.
3. Comments on the existing condition.
4 Discussion of primary structural code issues that would influence the renovations and design of new additions to the school.
5 Costs of structural upgrade.

Basis of the Report

This report is based on visual observations during our initial site visit on December 15, 2008, a follow-up visit on January 5, 2009 when ceilings had been opened up at various locations for evaluation of the existing floor system, the review of the available drawings of the existing building dated February 8, 1985 prepared by The Design Partnership of Cambridge and a review of the reports prepared by McBrie Consulting Engineers dated January 30, 2003 and various reports prepared by Smith and Wessel Associates for evaluation of hazardous material in the building and monitoring of air quality.

During our visit on January 5, 2009, Port City Builders opened up ceilings at predetermined locations based on plans created by our office. See attached plans in Appendix B which show locations of the ceilings of the lower, first and second floors that were opened up for observation of the existing framing.

Building Description

The school is located on Main Street (Route 113) in West Newbury, Massachusetts. The original school, constructed in 1926, is a four story, 'H' shaped structure. A three story addition was constructed on the east side of the original school in 1973.

Original School

The original structure currently houses the classrooms, administrative areas, cafeteria and the mechanical rooms. The ground floor of the entire structure is concrete slab-on-grade construction The first, second and third floors are 2 ½" poured gypsum slab on expanded wire mesh spanning approximately 2'-0" between metal bar joists (refer to Photo 1 in Appendix A) The middle wing is a three bay structure with 13" deep steel joists spanning twenty-two feet between exterior load bearing masonry walls and interior wide flange steel beams along the corridor walls. The corridor bay is framed with 8" deep metal joists spanning ten feet between steel beams The steel beams span approximately sixteen feet between wide flange steel columns The two end wings are framed with 8" deep steel joists spanning ten feet between steel beams which in turn span approximately forty-five feet between the two exterior masonry walls The roof is framed with structural steel trusses clear spanning between the exterior masonry walls with steel purlins and wood planking spanning between them The foundations are most likely concrete spread and strip footings supported on soil.

1973 Addition

The 1973 addition is essentially a three story structure. It houses the double story gymnasium at the ground level and reading room/library right above it at the second floor. The space adjacent to the gymnasium houses the kitchen, art room, music room and a classroom. We did not conduct an extensive investigation of this addition. From our limited investigation, we understand that the ground floor is a concrete slab-on-grade. The first floor construction is a combination of cast-in-place concrete beams supporting one way concrete slab and a composite steel/metal deck floor The library floor is a composite metal deck floor supported on long span steel beams and steel columns. The roof structure is a typical corrugated metal deck on steel beams. The foundations are most likely concrete spread and strip footings supported on soil.

Investigation

In order to evaluate the structural framing and the structural integrity of the building, a detailed investigation was required This involved cutting openings in the lathe and plaster ceiling at various locations and removal of face brick at five locations

We prepared plans indicating the locations that we were proposing to make openings in on the ground, first and second floor ceilings exposing the framing and the bearing locations of joists and beams at the exterior walls. In all, we proposed 64 locations for openings in the ceiling. We also proposed removing the exterior face brick at five locations to observe any sign of water infiltration and the condition of the existing wall. We were assisted by Port City Builders in making these openings and patching them up at the conclusion of the investigation Refer to Appendix B for detailed plans showing the proposed locations of the openings and observations made during the investigation

Existing Conditions

Based on our observations, the original structure is performing satisfactorily for its age and 1920's construction The 1973 addition is also performing well

Most of the exterior façade appears to be in good repair except for a few cracks at various locations in the original building. One of the reasons for the cracks could be the lack of control joints in the façade We did observe areas of repair of the façade where brick has been replaced. From our observations, where the face brick was removed at five locations during the investigation there did not appear to be any moisture infiltration into the inner course of masonry at the original building. This does not rule out moisture related issues in the structure. Evidence of past moisture infiltration in the structure can be seen at various locations in the school. The detail for the cavity wall system in the façade of the 1973 addition was appropriate and functioning well. We did observe some signs of water leakage in the original building from the exterior walls at the upper levels. Please note that this investigation was not exhaustive, it was conducted to understand the exterior details for the existing building and the addition. We observed some cracks in the interior masonry walls (refer to Photo 2 in Appendix A) and observed some spalling of concrete at the foundation walls (refer to Photo 3 in Appendix A) No apparent signs of foundation settlement were observed

Based on our more detailed investigation of the floor system of the original building, we found that the existing building may not have been constructed as per the detail intent of the original designer The following are some of the deficiencies we observed in the original construction:

1. The joists did not have full bearing at various locations on the exterior masonry wall (refer to Photo 4 in Appendix A) We also observed that some joist seats were not concreted in their pockets at the third floor.
2. The connections for the joist to steel beams were not provided at various locations. Typically joists were connected to steel beams at their bearing locations with a mechanical connection instead of a bolt or a weld (refer to Photo 5 in Appendix A).
3. The expanded wire mesh supporting the poured gypsum floor was not adequately connected to the steel joists at various locations (refer to Photo 6 in Appendix B) and the raised ribs within the expanded mesh had been cut for pipe penetrations through the floor or had been damaged during original construction thereby leading to bulges in the bottom of the slab at various locations.
4. Slab failure and subsequent repairs from the time of the original construction were evident at various locations (refer to Photos 7 and 8 in Appendix A).
5. Various cracks and unevenness in the floor finishes, especially in the classroom above the boiler room were observed (refer to Photo 9 in Appendix B). We investigated to identify the probable cause of the cracks in the floor finishes in the classroom above the boiler room. From our observations of the underside of the floor in a limited area in the boiler room, we concluded that this crack was caused at the time of the original construction. The expanded mesh supporting the formed gypsum floor was not adequately connected to the joist; no signs of any new displacement were visible. This may be a likely cause of the cracks and waviness in the floor slab. The waviness is quite evident in the corridor of the third floor
6. The existing floor construction is fairly flexible and we could perceive floor vibrations due to foot fall, especially in the corridor at the third floor where the corridor is wider than at the lower levels. The corridor walls at the lower levels assist in damping some of the vibrations.
7. Some slab areas above the boiler room have failed in the past and some repairs were made to fill in the floor areas that had failed (refer to Photos 10, 11, 12 and 13 in Appendix A). It did

not appear that these repairs were performing well and we would recommend these areas be repaired again under the direction of a structural engineer The joists in these areas have a substantial amount of rust; therefore, it is possible that some of the framing in these areas may have to be replaced

Comment

As we have previously noted, there are numerous deficiencies in the structure, some from the time it was originally constructed and a number of deficiencies due to normal wear and tear and everyday use during the life of the structure In spite of these deficiencies, and the numerous repairs and renovations to the structure in the past, the structure has performed well beyond the design life of the structure

Design and serviceability criteria have changed from the time the structure was originally designed. Today, structures are designed with particular attention to their ability to resist lateral loads (wind and seismic), in addition to gravity loads Today's structures are designed and detailed such that they would perform well under lateral loads, and, are designed with particular sensitivity to deflections and vibrations for the comfort of the occupants. Thus, even though the structures may have been well designed, based on 1920's criteria, they cannot be expected to meet the design and serviceability criteria of modern codes.

It would be difficult and relatively expensive to upgrade the older structures to meet today's codes for new construction, but, the structure can be upgraded and structural deficiencies can be repaired to comply with the requirements for existing structures in the Massachusetts State Building Code. The cost benefit of this decision will need to be compared to other options being considered.

Primary Structural Code Issues Related to the Existing Structure

If any repairs, renovations or additions are made to the structure, a check for compliance with 780 CMR, Chapter 34 "Existing Structures" of The Massachusetts State Building Code is required. The intent of 780 CMR, Chapter 34 is to permit repairs, alterations, additions and/or a change of use without requiring full compliance with the code for new construction

Assuming no major structural renovations are made to the existing building and the additions are structurally separated from the existing building, and the extent of the renovations to the existing building are limited to architectural renovations, such as removal and replacement of ceilings, partitions, interior facing of exterior walls, finishes, etc and upgrade or replacement of HVAC and electrical systems and since the renovations will exceed 20,000 square feet or 50% of total floor area of the building, the level of work on the existing building would be classified as LEVEL 2 WORK as defined in Chapter 34 of The Massachusetts State Building Code Relative to LEVEL 2 WORK, the following structural issues have to be addressed for the existing building:

1. Identify load path (or lack thereof) to the foundation for gravity and lateral loads

2. Evaluate isolated areas of failure mentioned above and determine which existing structural elements or systems are in need of repair or other remedial action and determine the character and extent of the repairs or remedial action.
3. Determine the net service live load capacity at areas where there are structural changes to floors or roofs.
4. Determine the lateral load capacity of the existing building relative to lateral load resistance required for the level of work to be performed, and, determine what is needed to provide the required lateral load resistance.
5. Determine and evaluate the connectivity of the various structural elements.
6. Determine the existence of anchors connecting floor and roof decks to concrete or masonry walls, and, if they exist, evaluate their ability to provide lateral support to walls and transfer in-place shear from decks to the plane of the walls.
7. Determine the lateral supports of all structural and non-structural masonry walls and provide details.
8. Evaluate existence of brittle connections of precast concrete cladding components.

Any deficiencies noted after evaluation of the items noted above would have to be rectified in the case of the building being renovated.

Specifically, in this case, and from our investigation and study, we have determined the following relative to the 8 points listed above:

1. The load path for gravity loads has been determined and is described under Building Description. There is no explicit load path for lateral loads; the only possible path that the lateral loads can be resisted is through the exterior bearing walls.
2. We were not able to identify all areas that may be in need of repair, and, due to the limited size of the openings in the ceilings, some of the areas that we observed would require a further investigation Some sections of the first floor, above the boiler room, have to be repaired Once the scope of renovations of the structure is determined, the extent of the repairs to the floor construction can be established
3. We have assumed that the future renovations would not require any structural changes in the existing building and thus, evaluation of the live load capacity of the floor framing is not required Assuming that the designers of the original building used appropriate live loading which is comparable to the live load capacity used in schools today, this loading should be acceptable. There is no easy way to determine the live load capacity of the floor joists, a load test at the time of the renovations may be required to verify the capacity of the floor system
4. An in-depth analysis would be required to determine the lateral load capacity of the structure and this can be conducted at the time of renovations to the school It is possible that new shear walls or braced frames may be required; this depends on the scope and extent of the renovations to the structure.
5. From our investigation, it was determined that the floor joists are not anchored to the exterior masonry walls. The connections of the joists to the beams are not provided at a few locations All the joists will have to be connected to the exterior masonry walls and connections for joists to beams would have to be provided at the missing locations at the time of the renovations to the school

6 There is no anchorage from the floor framing to the load bearing masonry walls The exterior walls would require positive anchorage to provide lateral support to the walls and transfer in-place shear load from the floors and roofs to the plane of the walls This can be accomplished by providing a continuous angle along the perimeter of the structure that is bolted to the existing walls and welded to the underside of the top chord of the joists.

7 The interior masonry walls typically stop at the ceiling elevations and are not braced by or connected to the structure All of the interior masonry walls would have to be anchored to the structure or replaced with new walls.

8. There are no major, precast, concrete cladding components on the façade other than precast, concrete lintels, banding, medallions and some ornamental precast concrete components. These are typically detailed and connected similar to masonry façade elements, thus, no further evaluation of connections is required.

Comment

Even though the investigation was extensive, it was not exhaustive. When the scope of the renovation and design is determined, the level of structural remediation will need to be determined at that time

It should be noted, that if the scope of renovations to the school includes significant structural work in the existing building, improvements may be required to meet LEVEL 3, 4 OR 5 WORK, per Chapter 34 of the Massachusetts State Building Code, which would bring the building closer to conforming with the code for new construction.

Costs of Structural Upgrade

Assuming the level of work (as defined in Chapter 34 of the Massachusetts State Building Code) for the project is classified as LEVEL 2 WORK, it is likely the minimum structural scope associated with upgrading the structure would be:

1. Elimination of seismic hazard and connectivity of various structural elements. This would require welding all the floor joists to a continuous steel angle that is bolted to the exterior masonry walls and all interior masonry walls would have to be braced to the floor or roof structure with clip angles or struts

   Based on our experience in renovating structures with similar proposed details, an allowance of $7/sq. ft. should be provided in the cost estimate. This cost does not include any costs related to removal or replacement of ceilings.

2. Addition of reinforced masonry shear walls We have not conducted any analysis to determine the scope or the requirement for the masonry shear walls Based on our experience, an allowance for one hundred and eighty feet of full height (lower level to underside of third floor) reinforced, masonry walls should be provided in the estimate Allow for $30/sq. ft for the construction cost of the walls which includes the cost of foundations

Please note that the scope described above does not include any structural scope associated with other structural repairs that may be required such as repairing cracks in the façade, repairs to the floor slab and framing, etc., or, any other scope that may be associated with proposed architectural, mechanical, electrical and plumbing renovations

Summary

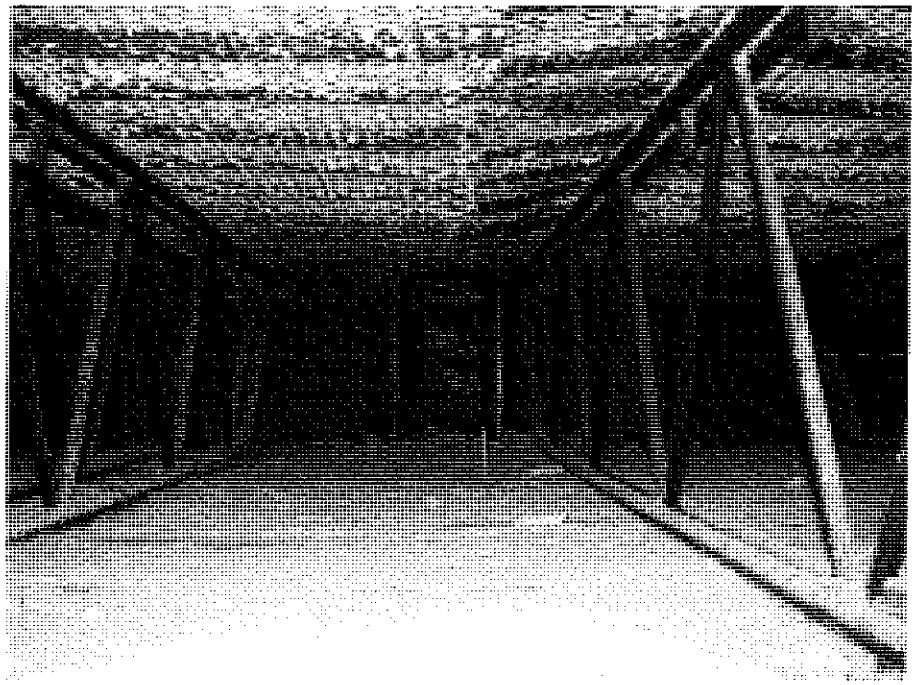
The existing structures are in sound condition with some localized areas of failure and distress The floor system of the original building may require repairs locally as the distressed areas are identified The façade of the original building is a solid masonry wall and there is no easy way to prevent moisture from infiltrating into the building Even though the structure is performing well and was designed per the codes at the time of the original construction, the codes and serviceability criteria have changed from the time of the original design The existing structure would not be capable of resisting all of the lateral load mandated by the code for new construction, but, it can be upgraded to comply with the requirements for existing structures in the Massachusetts State Building Code

No structural upgrades to the existing structure are required other than structural remedial work to known deficiencies at the present time At the time of renovations or upgrade to the school, the structure of the school would have to be upgraded depending on the type of renovations If the proposed renovations are architectural in nature or involve upgrade or replacement of mechanical or electrical systems, the structure would also have to be upgraded Please note, that even though these structural upgrades would be relatively extensive and expensive, it would not bring the structure up to compliance with code for new construction It would not be capable of resisting earthquake or wind loads adequately, as would be expected of modern structures, but, it would comply with the requirements of "Existing Structures", Chapter 34 of the Massachusetts State Building Code that permits repairs and alterations to the existing structure without requiring full compliance with the code for new construction

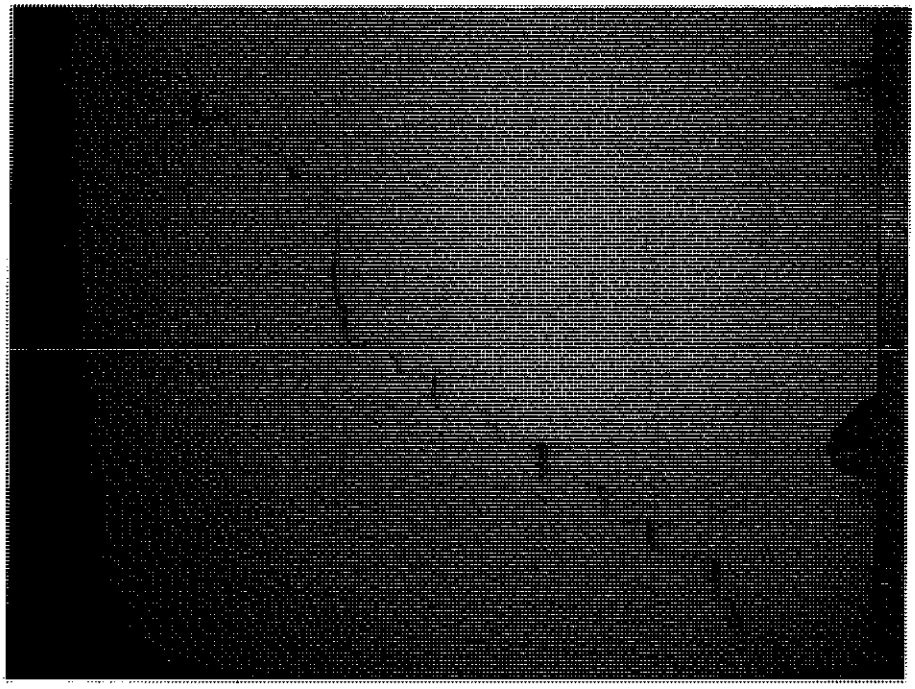
If the proposed renovations involve any major reconfiguration to the existing structure, these renovations would trigger the upgrading of other portions of the structure and this could become cost prohibitive We would recommend that any proposed addition be kept structurally separate from the existing buildings

APPENDIX A

Photographs

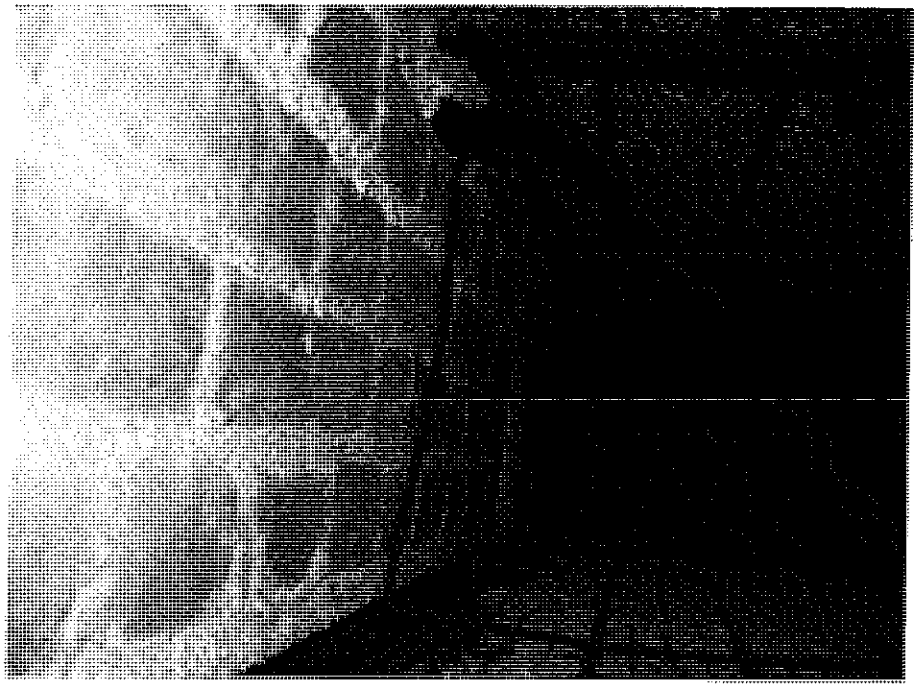


Photograph 1: Typical Floor Construction.

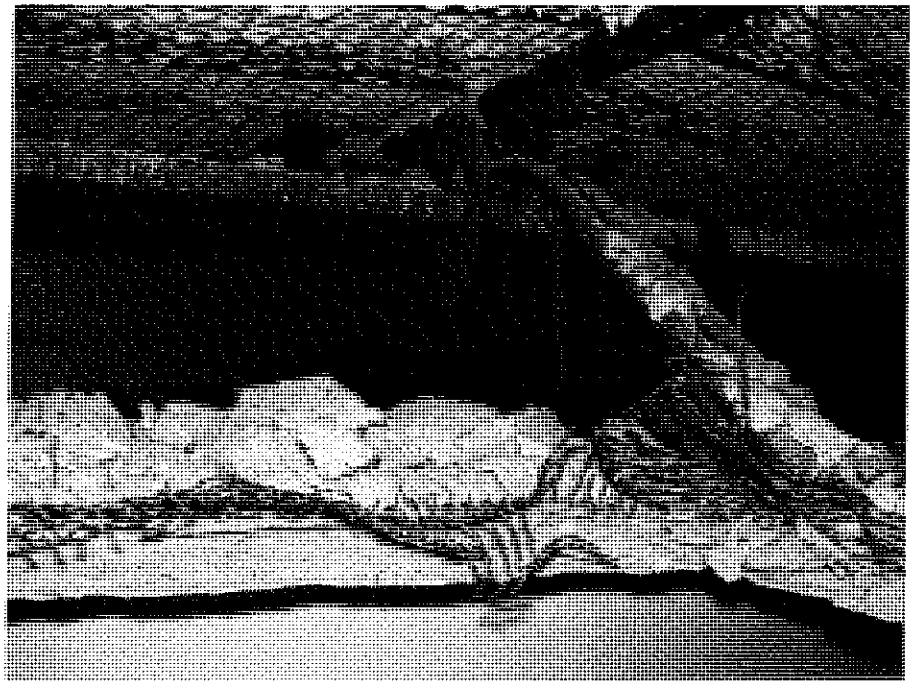


Photograph 2: Example of masonry cracks in interior walls.

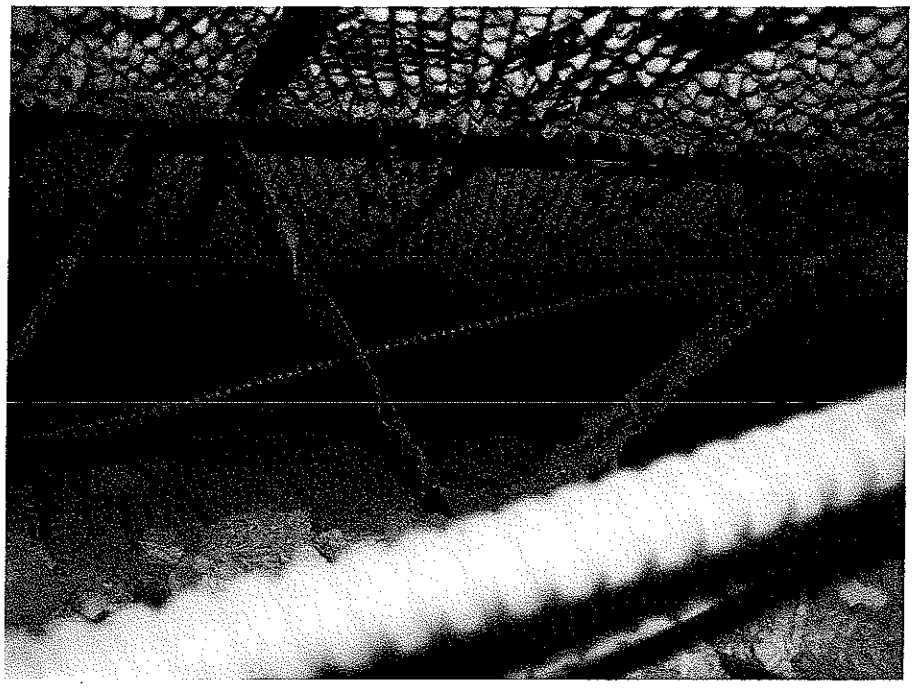
Photograph 3: Example of spalled concrete at the foundation walls.



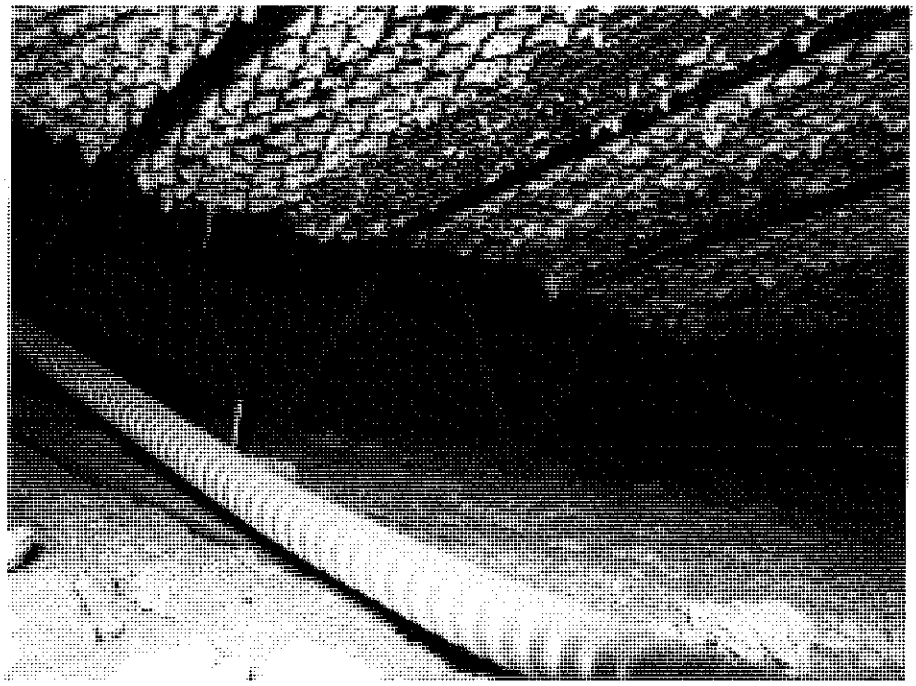
Photograph 4: Example of joist bearing on exterior masonry walls.



Photograph 5: Typical connector for joist to steel beam connection.

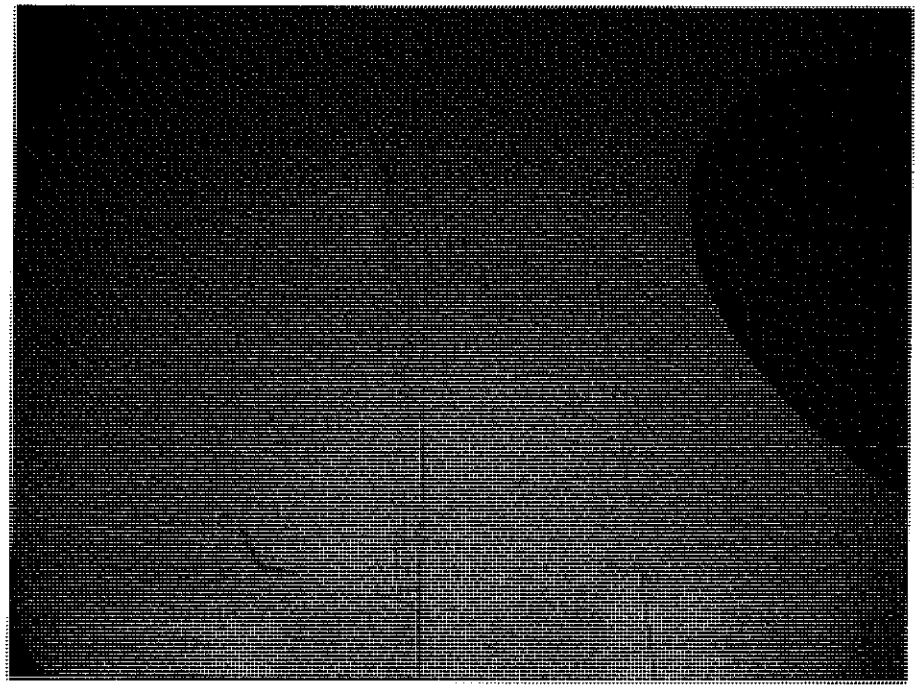


Photograph 6: Example of sagging gypsum at locations with inadequate connection of wire mesh to joists.

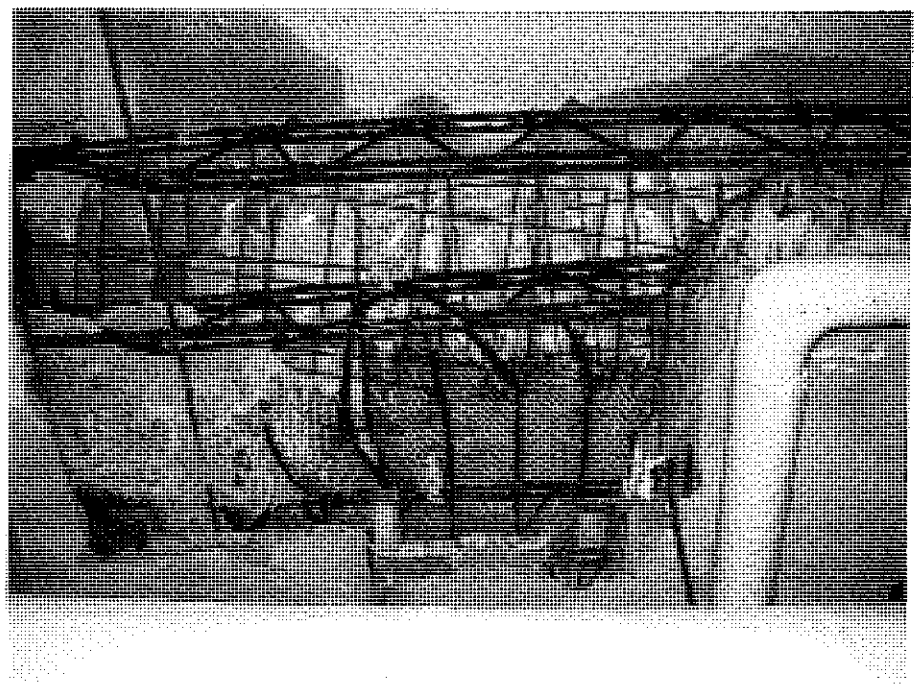


Photograph 7: Example of slab failure and subsequent repairs at the time of original construction.

Photograph 8: Example of slab failure and subsequent repairs at the time of original construction.

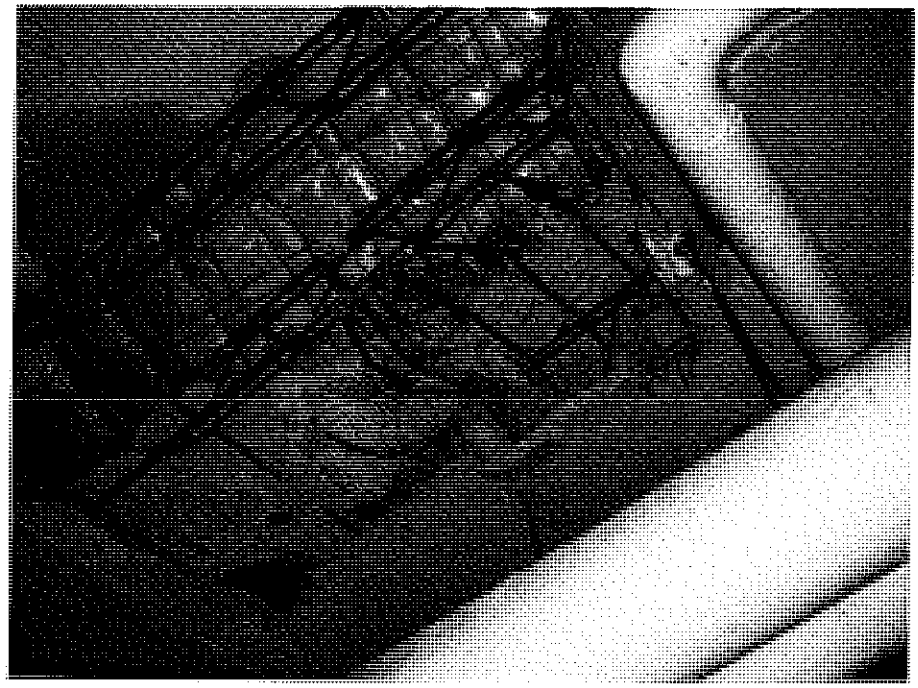


Photograph 9: Cracks through floor finishes in classroom above the boiler room.

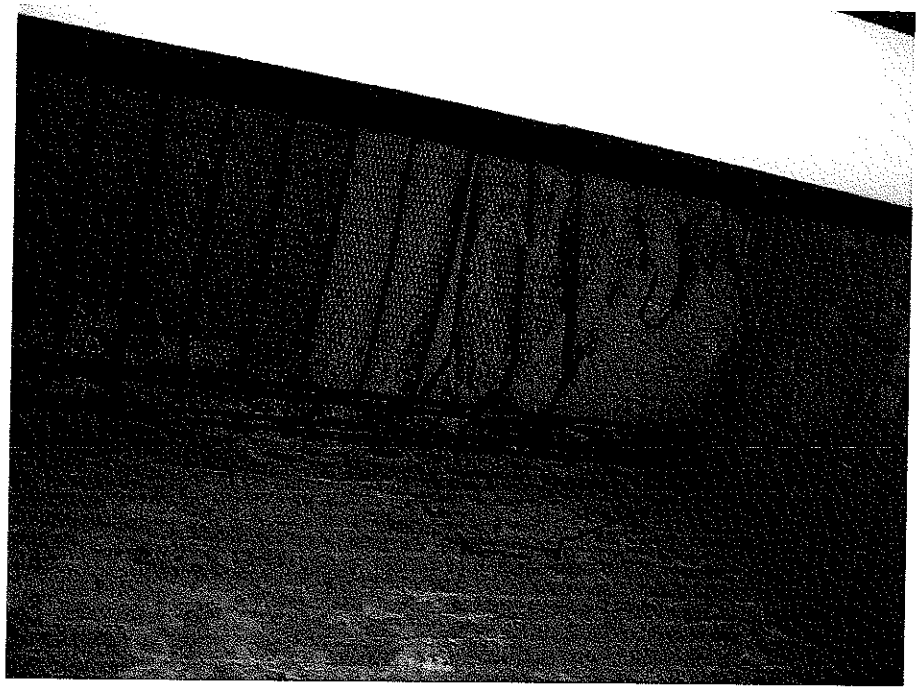


Photograph 10: Example of inadequate repairs to floor slab above the boiler room.

Photograph 11: Example of inadequate repairs to floor slab above the boiler room.



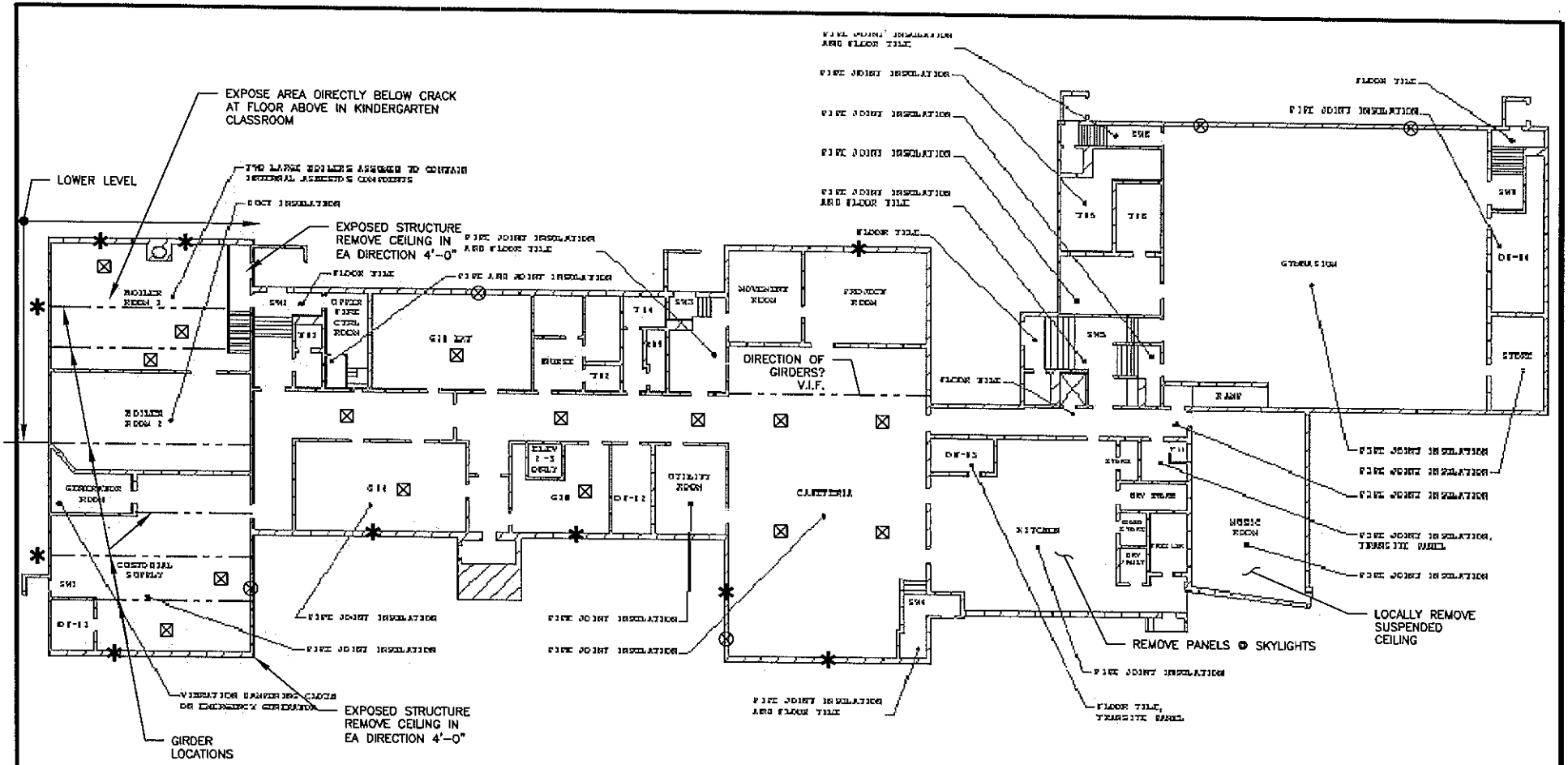
Photograph 12: Example of inadequate repairs to floor slab above the boiler room.



Photograph 13: Example of inadequate repairs to floor slab above the boiler room.

APPENDIX B

Floor Plans



⊠ INOICATES LOCATIONS OF LOCALIZED CEILING REMOVAL ABOVE.

✳ INDICATES EXPOSE STEEL JOISTS OR BEAM AT MASONRY BEARING.

⊗ INDICATES ACCESS TO EXTERIOR WALL RELATING TO MOISTURE ISSUE.

TITLE:

PROPOSED LOCATION OF WORK AT CEILING ABOVE LOWER LEVEL FOR STRUCTURAL INSPECTION

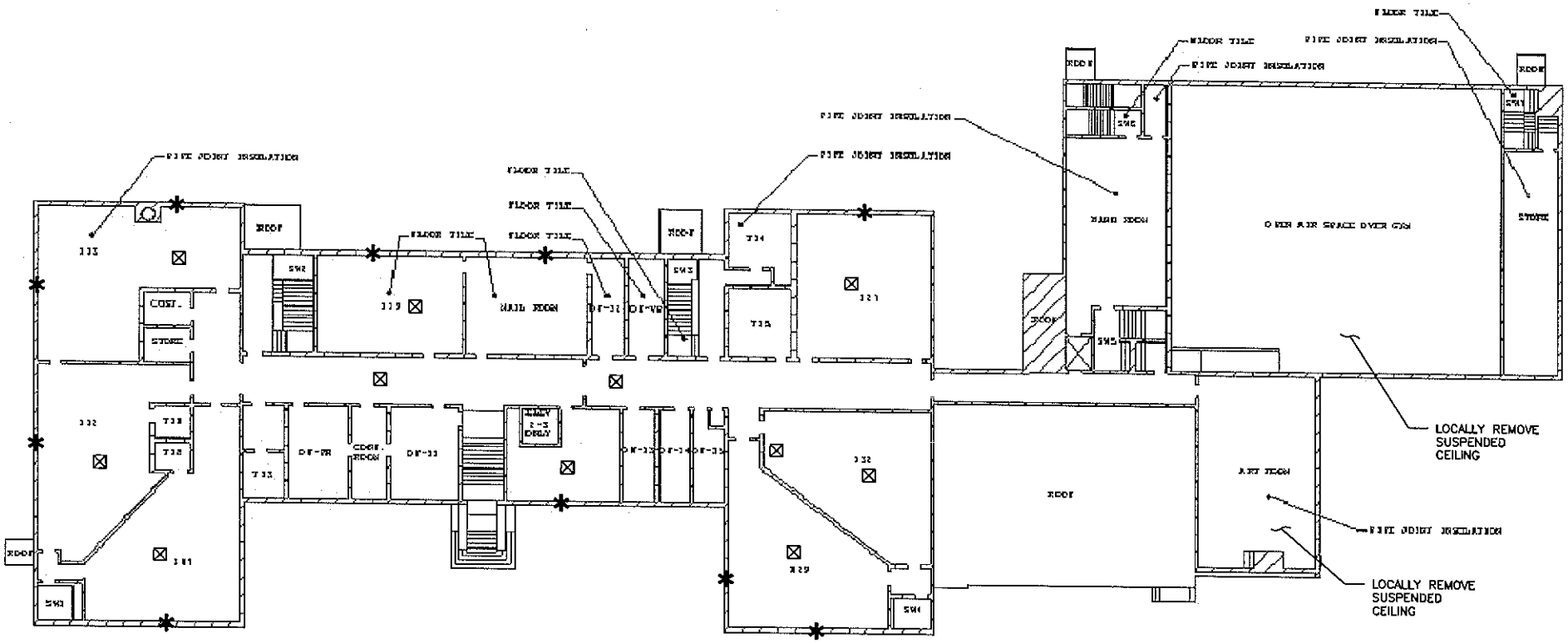
EDG
Engineers Design Group Inc.
Structural Engineers
10 Cabot Road, Suite 210
Medford, MA 02155
(781) 396-9007 Phone
(781) 396-9008 Fax

PROJECT:
Page Elementary
of the
Pentucket Regional School District

SIZE: B

DWG. TITLE:
Lower Levels

Date Issued: Jan 16, 2009



☒ INDICATES LOCATIONS OF LOCALIZED CEILING REMOVAL ABOVE.

✱ INDICATES EXPOSE STEEL JOISTS OR BEAM AT MASONRY BEARING.

TITLE:

PROPOSED LOCATION OF WORK AT CEILING ABOVE FIRST FLOOR FOR STRUCTURAL INSPECTION

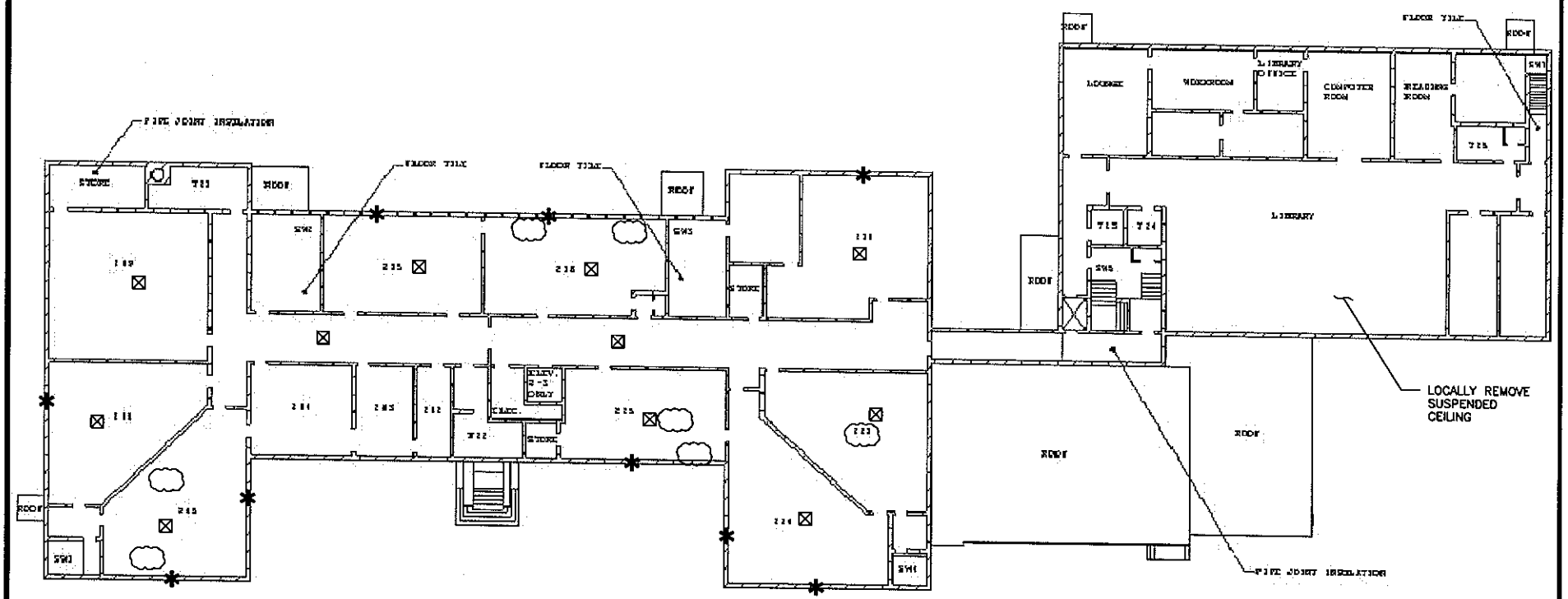
EDG
Engineers Design Group Inc.
Structural Engineers
10 Cabot Road, Suite 210
Medford, MA 02155
(781) 396-9007 Phone
(781) 396-9006 Fax

TITLE:
Page Elementary
of the
Pentucket Regional School District

SIZE: B

SHEET NAME: FIRST FLOOR

Date Issued: Jan 16, 2009



⊠ INDICATES LOCATIONS OF LOCALIZED CEILING REMOVAL ABOVE.

✳ INDICATES EXPOSE STEEL JOISTS OR BEAM AT MASONRY BEARING.

INDICATES AREAS OBSERVED THAT WERE DAMAGED AND SUBSEQUENTLY REPAIRED AT TIME OF ORIGINAL CONSTRUCTION

TITLE:

PROPOSED LOCATION OF WORK AT CEILING ABOVE SECOND FLOOR FOR STRUCTURAL INSPECTION

EDG
Engineers Design Group Inc.
Structural Engineers
10 Cabot Road, Suite 210
Medford, MA 02155
(781) 395-9007 Phone
(781) 396-9008 Fax

TITLE:
Page Elementary
of the
Pentucket Regional School District

SHEET: S
DWG. NAME: Second Floor

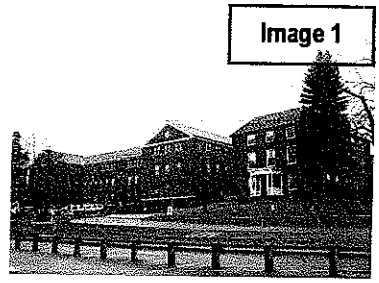
Date Issued: Jan 16, 2009

Section 3.3
Architectural Assessment

ARCHITECTURAL ASSESSMENT
Dr. John C. Page Elementary School

Introduction

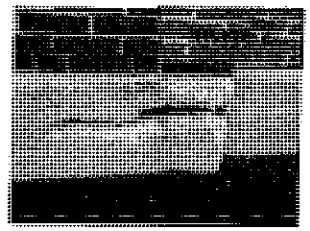
Representatives of Dore & Whittier Architects, Inc. visited the Dr John C. Page Elementary School on December 15 2008 and made follow-up visits through January of 2009 to assess the facilities and conditions of the building and site. The following report is based on observations made at the facility, information derived from drawings and report from various projects and studies conducted at the facility, and discussions with faculty, staff and town personnel

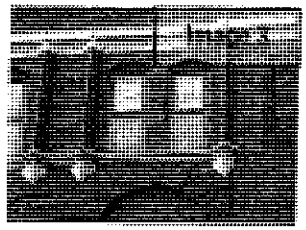


Exterior Envelope

Foundation

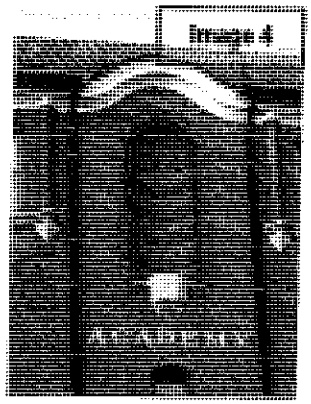
The foundation walls of the original building are brick on with a visible base of pre-cast concrete at grade on the exterior It is likely that the pre-cast is an aesthetic piece supported by a larger brick foundation wall beneath, there was a notably damaged corner; this damage is likely the result of a plow blade, or other vehicle, rather than building failure (image 2). The visible portions of the walls are in very good condition, although there are a number of locations displaying severe moisture infiltration at the interior. The infiltration is most evident at the boiler room and at the custodial shop; in these locations there have been failures of the ceilings and partial failure of the floor structure (refer to the structural assessment portion of this report for further detail regarding these situations). Despite the apparent moisture issues on the interior of the building investigations of the masonry walls themselves revealed no sign of moisture within the multi-wythe masonry.



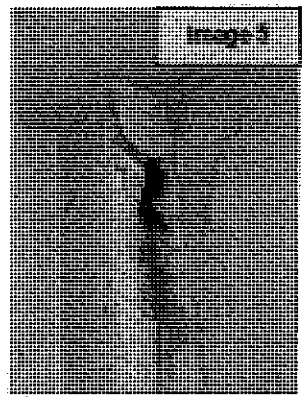


Walls

The original building is built of solid brick masonry exterior bearing walls. At grade these walls are typically four (4) wythe, or four (4) bricks thick, tapering to two (2) wythe at the upper two (2) levels of the structure. The brick work is highly elaborate and is accented with bands of pre-cast concrete at floor levels as well as medallions and window sills (images 3 & 4) Many spaces at lowest level have exposed brick on the interior which is painted. Typically on the remaining floors there is a painted plaster finish on the interior. There is some ongoing moisture infiltration on the East exposures of the building causing the paint, and in some cases, the plaster to peel and chip on the interior. In one location we observed damaged which we suspect to be the result water at a column enclosure (image 5). According to staff these walls are painted regularly and the masonry receives a water sealer periodically. These measures may mitigate the issue to some degree, but further investigations would be

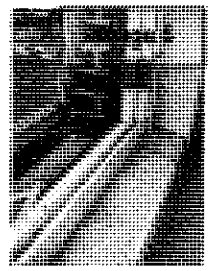


necessary to find a long term solution to create moisture barrier and possibly improve the thermal performance of these walls.



The kitchen, gymnasium, library addition is primarily constructed of masonry veneer with a CMU backup wall. There is a small air space behind the brick and metal lath and building paper on the face of the CMU, we were not able to determine whether or not there was any form of insulation in these walls. There is also connecting corridor for the upper floors of the addition to the original building which is clad in metal siding, also with CMU backup

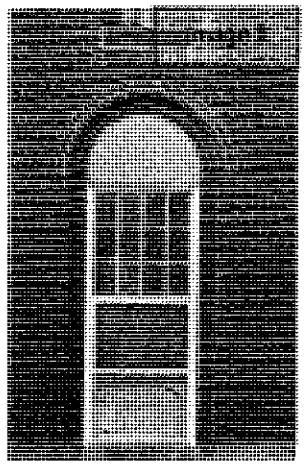
The heating system consists of wall mounted finned tube heat with painted steel covers these units cover large sections of exterior wall in most of the spaces in the building, the faculty reported that the heat is inconsistent and that the units consume valuable wall space which could be better utilized for classroom storage and activities



The masonry is in very good condition and has undergone repairs and replacement over the years including; a large portion of brick at the east wing of the original building and a large amount of re-pointing done as part of the 1992 renovations.

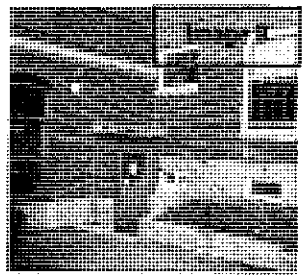
Windows

The windows throughout the building have operable awning sashes (image 6) with fixed panes above. The original windows in both the original building and in the addition were single pane non thermal wood windows. According to documents from the 1986 renovation project the windows on three (3) sides (North, West, East) of the original building were to be replaced with double pane insulated wood windows with aluminum cladding on the exterior as part of the 1986 renovations. The specifications from this project indicate Dura-Sheath windows by Eagle, however we were not able to determine the actual manufacturer by visual inspection of the installed windows. According to one faculty member some classroom windows leak at the horizontal mullion above the operable sash. The remaining windows; on the south (or main entry side) of the original building and most of the windows in the addition were scheduled to receive fixed storm windows and new sealants. It appears after visiting the facility that ALL windows with the exception of those around the gymnasium and library were replaced and that the storm windows were either not installed or subsequently removed. Since this renovation some of the windows on the East side of the gymnasium have been replaced with insulated vinyl windows. Another effect of the 1986 renovation was that acoustical ceilings were added to nearly the entire school (see ceiling notes below). On the ground, first and second floors these ceilings were installed well below the heads of the windows in the original building on the third floor the ceiling was installed just above the head, mainly due to the fact that these windows, and the floor to ceiling heights were shorter. The replacement windows were fitted with solid panels or in some cases louvers (see the HVAC section of this report for further information) and a mullion at the height of the new ceiling (Images



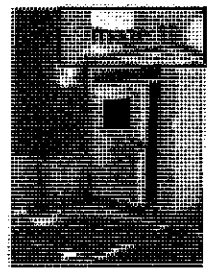
7 & 8). This solution fit into the design of the renovations, but it has significantly reduced the amount of natural light in the building

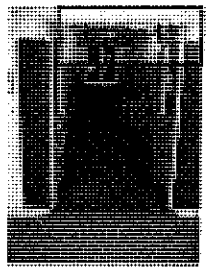
According to staff interviewed during our visit further perimeter sealant work has been done in recent years. While there has been ongoing maintenance and replacement of windows the current windows do not meet today's standards of windows for energy efficiency.

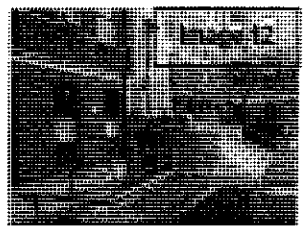


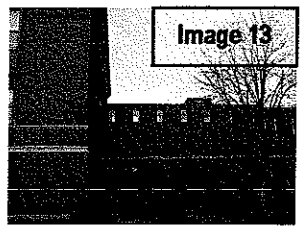
Doors

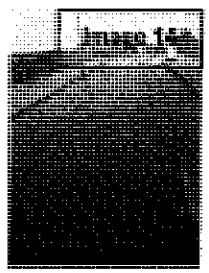
The exterior doors vary based on their use. The four (4) primary access points to the building have aluminum storefront doors with panic hardware. There are two at the front (South) of the building one (1) accessed by a stair to the first level of the building and one (1) accessed by a ramp to the lower level of the building (image 12). These entry points will be further discussed in the handicapped accessibility and health and safety sections of this assessment. The main front entry to the first level is equipped with an intercom for visitors (refer to the Technology section of this assessment for further detail about this system) The other two (2) are on the North side, these both enter the building at grade. The westerly door (C1) enters to the lower level and serves bus drop and pick-up The easterly door (C2) enters at a landing and a short stair to a landing the lower level, adjacent to the cafeteria, and another short stair to the gymnasium (image 11). Secondary entry doors are hollow metal with varying configurations of wireglass lights These doors are also equipped with panic hardware on the interior and a single pull on the active leaf on the exterior. The doors themselves are in fair to poor condition and should be replaced (images 9 & 10). One of these secondary access points becomes a primary access point during and after winter snow events (image 13); this door accesses the cafeteria at the lower level, by way of a portable metal ramp and stair system This door is used because it becomes unsafe to use the main entry due to snow falling from the roof (see the health and safety section of this report)









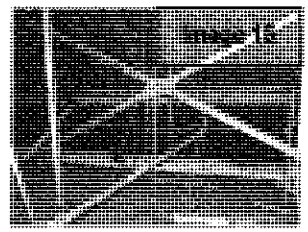


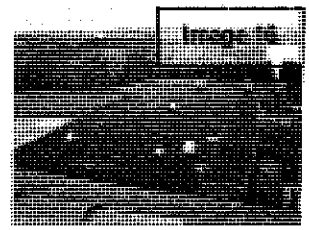
Roof

The original building has a partial sloped roof (image 18) with a nearly flat section at the center (image 14). This roof is over an attic space built of wood plank sheathing over lightweight steel trusses (image 15). The flat section has a mechanically fastened membrane, by The Carlise Company, which slopes to the corners and drains to the valleys of the sloped roofs (image 17). The sloped roofs are finished with terra cotta tiles; the tiles appear to be in excellent condition. The membrane appears to be in good condition although there were some patches observed, as well as one area of standing water. The North and South sides of the building have long eaves which have been equipped with snow guards installed in 1992. These fail to hold snow but do break and spread it as it cascades off the roof (see health and safety for further detail). There are four (4) valleys at the corners of the center portion of the building. These feed into a gutter and downspout system which is tied into underground drainage this system was updated in 1992. The valleys are flashed with lead coated

copper, the gutters are half round copper and the downspouts are square copper feeding into cast iron boots at grade. The gutters and downspouts are in good condition, there are a few locations where grade boots are missing or have been undermined due to a lack of foundation beneath them.

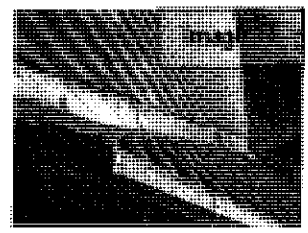
The roofs of the additions are flat roof with fully adhered membrane roofing over rigid insulation (image 16) The roof edges are terminated with gravel stops; there are no parapets on the building. These roofs are constructed of steel decking over steel bar joists (image 22) and a small section of concrete frame at the art classroom. The membranes appear to be in good condition. These roofs drain to internal drains; there are no reports or evidence of leaks in these systems, there was on area of standing water on the roof of the corridor connecting the classroom building to the music room and library.



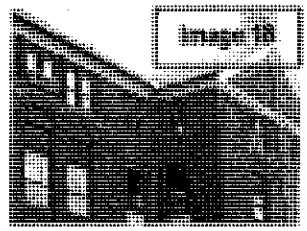


Misc. Site Comments

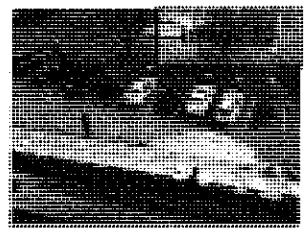
Below are some basic comments as to our impression of the conditions of the site Please refer to the site/civil section of this report for a more detailed assessment of the facilities.



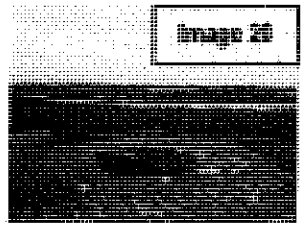
Parking on the site is located at on three sides of the building as well as an auxiliary lot known as the "lower lot" the bulk of the daily parking is in the lower lot with only a few vehicles utilizing parking directly in front of the building or on the West side. The parking in the front of the building is designated as handicapped or is reserved for individuals in school administration (image 19) There are some spaces on the West side of the building are for teacher parking but there are far fewer spaces than teachers so most park in the lower lot. All visitors including parents dropping off/picking up (at Page School or at Children's Castle) park in the lower lot and walk up to the school The total number of spaces appears to be adequate; the lots are in fair condition with proper space markings.



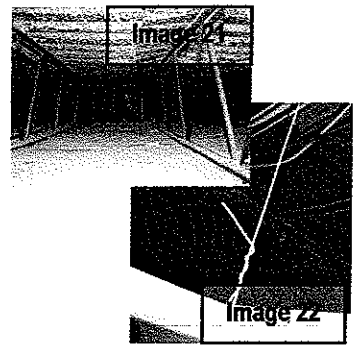
Traffic on site is controlled by not allowing vehicles to enter the upper lots of the school, as visitors and many teachers use the lower lot. There is a crossing guard stationed daily just beyond the lower lot to control access to the areas around the school. Bus drop off/pick up occurs in the rear (North) of the building. Busses park on the paved area used for recess and children are released from the building in groups. The flow of traffic in and out of the site is ongoing but the systems in place appear to function adequately.



Playgrounds on the site are located in different areas. There is a playground across the front of the building dedicated for Page school Pre-K. One must cross the parking lot to gain access to the fenced in area The equipment is small and age appropriate. There is a large paved area in the rear of the building which is by all other grades for recess (image 20). This area is roped off to vehicles while children are outside. Beyond the pavement there are two little league/softball fields and an area of playground equipment. The equipment appears to be in good condition and the fields well maintained.



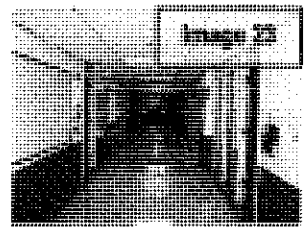
Lighting on the site is minimal, coverage is not complete and light levels are not adequate throughout the site. Refer to the Site and Civil section of this report for more information.



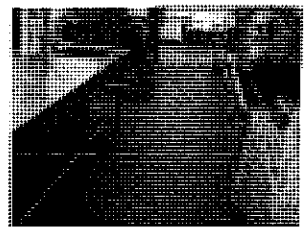
Interior

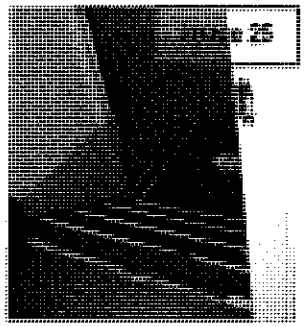
Flooring

This building's spaces are on four levels including a basement. In the original building the basement floor is concrete slab and elevated floors are gypsum cement slabs over small steel joists set on steel girder beams (image 21). The kitchen is a single story with a concrete slab on grade. The gymnasium is a slab on grade with a concrete slab and long-span steel joists separating it from the library above. The band room is located on the lower level in a slab on grade condition and a concrete frame floor/ceiling assembly separating it from the art room above. Refer the structural portion of this report for further information about the building structure.



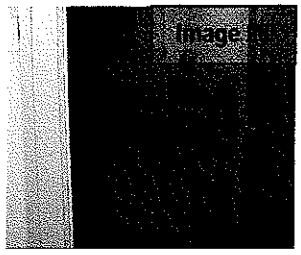
The corridors throughout the building are finished with vinyl composite tile (VCT). The tile on the lower level was replaced in the 1986 renovations. The corridors on the upper floors were carpeted until 2007 when they were replaced with VCT (image 23). According to school records and reports these carpets were having a negative effect on the indoor air quality of the building. The existing tiles are in good condition. There are areas where waves can be seen in the floors but this is due to the age of the building and has minimal effect on the finished floor itself, refer to the structural section of this report for detailed information about the flooring system(s). There are a number of locations in the building where small ramps or raised thresholds occur in doorways. It is likely that floor differential has been created through the changing, adding and removing of floor finishes (see notes about toilet rooms below). These differentials can cause issues with accessibility of the spaces. Thresholds are permitted to a height of 1/2 inch, and ramps can pitch no more than 1 inch in 1 foot, examples of this type of situation can be seen at the nurse's suite and a toilet rooms on upper floors.





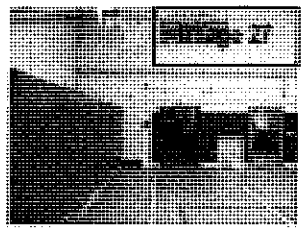
The commercial kitchen has a quarry tile floor. This floor was not part of the scope of work in the 1986 renovation and no documents were available to verify the age of this floor. The floor is in good condition and show little sign of wear (image 24)

Stair treads and risers throughout are rubber. There are molded rubber nosings with raised radial rubber discs (image 25). The treads are showing significant wear in sections and most are in need of replacement. Replacement tread should have radial rubber discs on the entire tread rather than only the nosing and they should be one piece to extend life expectancy.

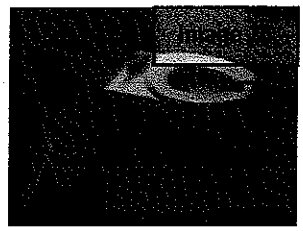


"Slippery stairs" has been sited as an issue at the facility, particularly in the winter months. This issue is partly due to the condition of the treads, but also due to a lack of proper matting inside the entry doors to remove

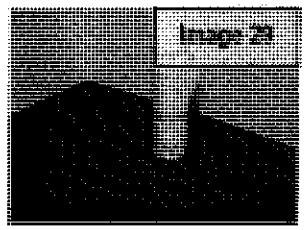
debris and dry water from shoes prior to climbing of the stair, recommendation is to have 30 feet of matting at any primary entry to a public building.



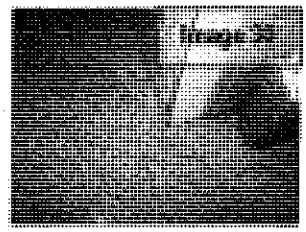
The office conference room area floors consist of low profile carpet. These carpets were replaced in the 1986 renovations and are now beginning to show significant wear. No tears were observed though the pile is crushed and worn to a point that the fibers could begin to cause a negative effect on indoor air quality (Image 26).



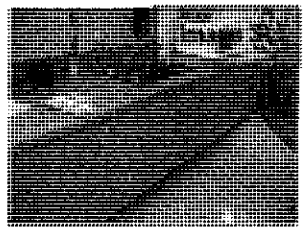
The library, library office and computer room have similar carpet to the office areas, also installed as part of the 1986 renovations. These areas are not showing as much wear as the offices, perhaps due to more sporadic use verses the constant use of offices. Even so these carpets are over twenty years old and it would be recommended that they be replaced as part of any major project at the facility.



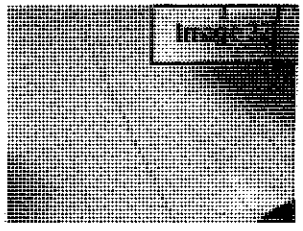
The gymnasium floor is a loose laid rubber floor installed over the existing floor in 1992 (image 27). According to the documents from this installation the system is 3/8 inch deep consisting of two parts; a 1/8 inch finish layer and 1/2 inch resilient layer, though no specifications were found or samples were taken to verify this. There are some seams which are telegraphing, though there are no locations where seams have separated. There is a small area along the west end of the gym where the flooring is a bit wrinkled indicating some degree of movement in the system possibly due to moisture. The floor shows undulation of the slab or the existing flooring left beneath the rubber flooring. The floor is in good condition and is useable and should remain so for the foreseeable future. Based on visual inspection alone it is unclear how effective the flooring system is in terms of playability or the health and safety of athletes utilizing the space. It is recommended that further investigation of this flooring be a part of any plans for renovations at the facility.



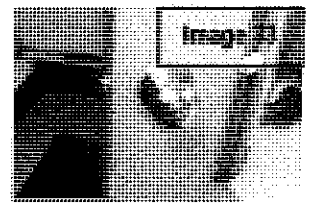
The toilet room floors vary between quarry tile (image 28) and poured epoxy flooring (image 29) with one exception. These floors were installed as part of the 1986 renovations and are in excellent condition. Notes on documents for the renovations indicate that many of the toilet room floors required leveling which was likely achieved using a lightweight concrete leveling product. By adding the leveling product to the floors a differential was created from the adjacent corridors which necessitated the use of small ramps or high thresholds at these locations (see notes on handicapped accessibility). The exception is the toilet room dedicated to the main office which has a terrazzo floor (image 30) which is likely original to the building, this floor is also in excellent condition.



The classrooms are mostly carpeted with small areas of vinyl tile near the sink area (image 31). These floors were installed as part of the 1986 renovations. All of the carpets are showing signs of wear and some are torn or frayed. The classroom located directly above the boiler room on the first floor has been converted entirely to VCT and there is a large crack in the tile which has reportedly been growing larger (image 32). This crack is occurring directly along a main steel girder; this area has

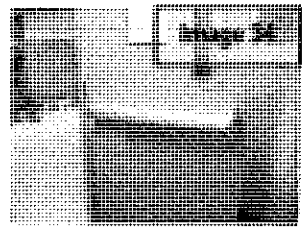


been a concern in the past and has been evaluated structurally on more than one occasion Refer to the structural section of this report as well as previous reports attached in the appendices for further information



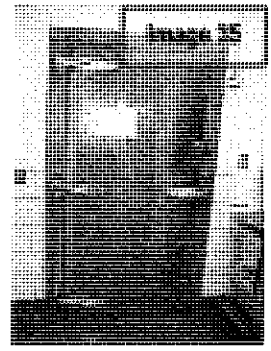
Walls

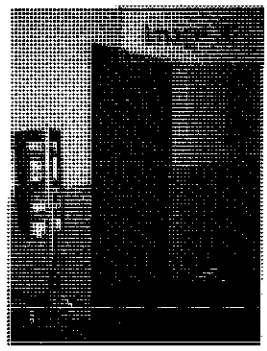
The partitions on the interior of the building are a mixture of masonry and stud framing as well as a few movable partitions between classrooms. Many partitions were affected by the renovations in 1986. Partitions were removed to create larger rooms, added to create new spaces such toilet rooms, storage and to create the enclosure for the addition of an elevator within the original building The walls are generally in good condition. There are many areas of tack board and white/chalk board throughout the building, there are few built in cabinets but many loose pieces of storage furniture in classrooms and offices. Faculty and staff noted that there is a desire for more electrical and network outlets throughout the building, as well as built-in storage (see built-ins fixtures and equipment below).



Doors

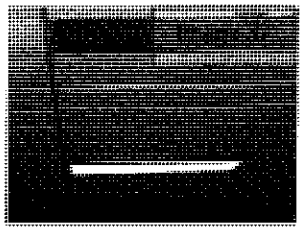
There are a number of differing conditions of interior doors in the facility The doors and hardware are in good condition, and are in good working order, with few exceptions. Door frames are a mix of wood and hollow metal, the wood frames are located in the original building; there does not seem to be a pattern to the locations indicating that frames have been replaced as necessary, including the scope of the work completed in 1986. Classrooms and offices have solid wood door with small wireglass lites; some are equipped with lever handles but many have knob style hardware (image 33) (see notes regarding handicapped accessibility) Storage and Utility areas have a mix of wood and hollow metal doors and generally have knob style hardware with a few locations equipped with lever handles. Corridors and stairs have hollow metal doors with small wireglass lites (image 34) These doors are generally equipped with appropriate egress hardware The primary egress stairs as well as the corridor communicating doors are equipped with magnetic hold-opens connected to the fire alarm system. These doors will release and close automatically in and emergency situation. See the health and life safety section of this report for more detail. The kitchen is equipped with a number of specialty doors including wood doors at the cooler and freezer (Image 35) and sliding metal doors at the servery to the cafeteria (image 36).



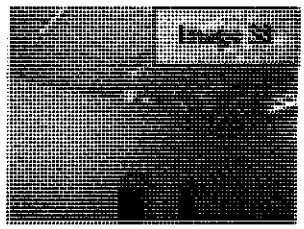


Ceilings

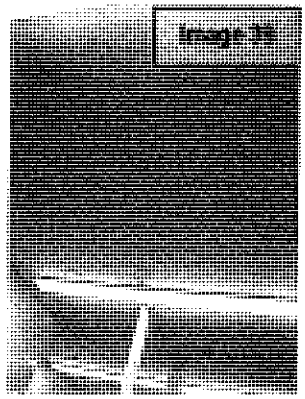
Nearly all spaces in the building have hung acoustical tile ceilings varying from 8 feet to nearly 10 feet above the floor (image 37). Most of these ceilings were installed as part of the 1986 renovations. It was noted at the time of our visit that sprinkler head escutcheons were missing in a number of locations, as well as locations where heads were not adjusted properly to the ceiling height. The original ceilings are plaster over metal lathe applied to the underside of the floor joists which were left in place creating



a plenum space where the new ventilation, fire suppression, electrical, and other systems were run during the renovations (refer to other sections of this report for further information). Existing exposed systems were mainly abandoned in place within this new plenum space. The acoustical ceilings are generally in good condition, though there were a few locations on the lower level where broken or stained tiles were noted. Tiles are replaced as needed as part of the ongoing maintenance of the building



Storage areas typically have the original plaster ceilings left exposed. In areas near exterior walls many of these spaces have significant issues with peeling paint due to moisture from the exterior (see the notes above regarding exterior walls).

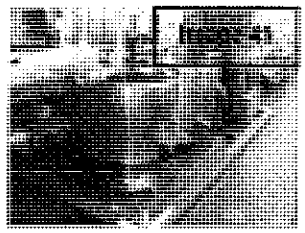


Utility areas also have the original plaster ceilings (image 38); there are few a areas in the boiler rooms and electrical/custodial area which have failed (see the structural portion of this report for further information)

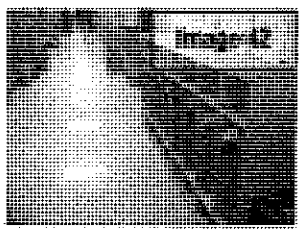
The Gymnasium has an applied 1 inch tectum ceiling panel system between the large steel joists, which was installed in 1992. This system would have been employed to deaden the sound within the space reducing echoes. The panels have pulled away from the floor deck above. Maintenance is difficult due to the height of the space. It is recommended that all panels be checked and secured in order to insure the safety of all occupants of the school.

The kitchen has a 12 inch by 12 inch tile ceiling applied to a concealed grid set at 12 feet 7 inches above the floor (image 39) This ceiling appears to be original to the space. There are water stains which we were informed were old, and that there are no current leaks. We have been lead to believe that this ceiling has some asbestos containing material and therefore was left only to visual inspection.

Lighting
Nearly all of the interior lighting is 2x4 lay in florescent fixtures (troffers) with parabolic lenses integrated into the acoustical ceilings. Most storage and utility areas have surface mounted fluorescent fixtures on plaster ceilings with exposed tubes; however some have original incandescent fixtures. The boiler rooms have incandescent bare bulb pendent fixtures. The gymnasium has high bay fluorescent pendent fixtures mounted between the joists of the exposed structure. The band room has surface mounted fluorescent fixtures on the plaster ceiling between the beams which are also enclosed in plaster box outs. Refer to the electrical section of this report for more information and recommendations.



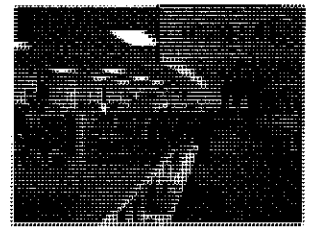
Built-Ins, Fixtures and Equipment



Based on our visual inspection of the facilities we have compiled the following summary of the fixtures and equipment.

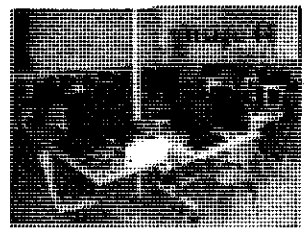
The building has a fully equipped kitchen and serving area adjacent to the cafeteria. The equipment all appears to be in good condition and well

maintained (images 40 & 41). According to the staff some of the cooking equipment has been recently updated, and one of the kettles is a steam kettle which is run directly from one of the boilers (image 41).

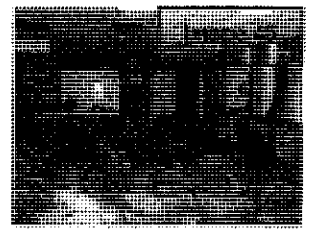


The cafeteria tables consist of loose tables with integral seats on casters which fold and roll away for storage; these tables are stored within the space. These appear to be in good condition

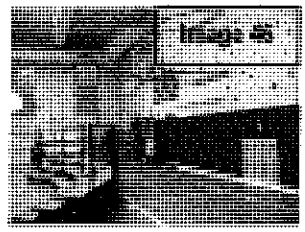
Many corridors have tack boards covered with notices, student art, etc mounted on the walls in various locations and sizes. Current life safety code dictates that flammable materials shall not occupy more than 20 percent of the overall wall space in a facility WITHOUT an automatic fire suppression system or 50 percent of the overall wall space in a facility With an automatic fire suppression system. Further investigation would be necessary to determine if there are areas in violation of this code. There are also shelves and hooks intended for student coats and other belongings in corridors. These hooks and shelves are not used but rather student belongings are kept in classrooms, in some cases on floors sue to lack of any other storage facilities



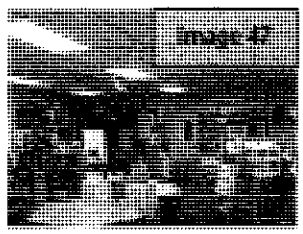
The library is furnished with small tables and loose chairs. The book cases are loose metal units which are both against walls and free standing within the space There are five (5) research computers in different locations. The adjacent work room and office are equipped with computers and loose file cabinets (image 43).



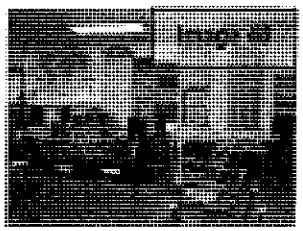
There is a single computer lab located adjacent to the library The room is separated from the library space by an aluminum and glass storefront system. There are 24 workstations (Dell optiplex GX 260) which line the walls as well as being grouped in the center of the space on loose tables (image 44).



The music program utilizes multiple spaces in the building. On the lower level there is a space equipped with a set of portable risers and the walls are lined with instrument storage facilities. At a subsequent visit the risers were viewed in the gymnasium. Another space on the first level is furnished with music stands and loose metal chairs, there were also a few instruments located in this space (image 45) Music lessons are held in two other classroom spaces in the building (see space utilization section for more information)



The gymnasium is equipped with six (6) basketball goals which create a competition court (on the long axis of the gym), and two (2) practice courts (on the short axis of the gym). The goals appear to be fixed style, which have replaced folding goals. The goals are in good condition. On walls beneath competition basketball goals the walls are padded. There is also padding beneath the goal above the handicapped ramp access (see health and life safety for further information). There are two (2) sections of climbing wall built on the East wall of the gymnasium the hand/foot holds begin above the wall padding approximately seven (7) feet above the floor. The securing method of the holds could not be determined by visual inspection. There is a cargo net and two (2) rope ladders hung from the ceiling joists in the center of the gymnasium The ropes all appear to be in

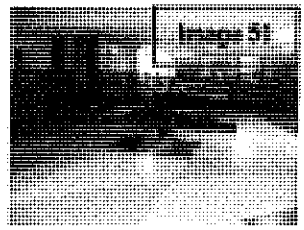


good condition and are mounted on heavy steel mounts which appear to be sized appropriately (image 46).

Desks and chairs vary by grade level. The younger levels have tables for four (4) to six (6) students (image 47) and older grades (4th through 6th grade) have single student desks (image 48). All chairs are loose rather than being integrated with the desks. The desks and chairs appear in general to be old but are in reasonably good condition. Teacher stations are varied, generally consisting of multiple small desks (images 49 & 50). Classrooms are equipped with a computer at the teacher's station, and in some cases, another for student use. There are lap top carts available for teachers to schedule for classes.

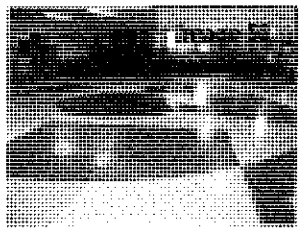
Conference and office spaces appear to be furnished with appropriate tables desks and filing cabinets which are in reasonably good condition

We recommend that an inventory of existing equipment be conducted to evaluate which furnishings could be repaired and/or re-used and which should be replaced. Once furnishings reach a certain deteriorated state, they are no longer perform well and often are not treated well by the students and rapidly become unserviceable



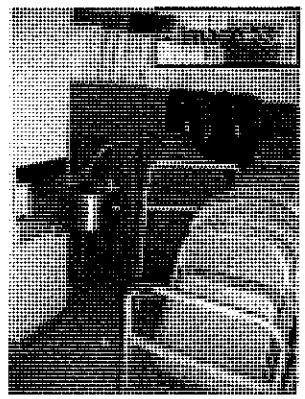
Space Utilization

We have compiled the following assessment of the current utilization of space:



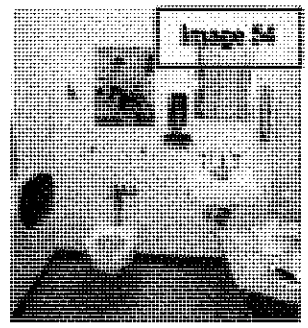
The school has a kitchen and food service area, which has ample storage space, there is direct exterior access for deliveries and waste disposal, but the access is a single man door two steps down from grade and no adjacent parking, refer to the site/civil section of this report for further information. The food preparation space is of a good size and the overall kitchen is laid out in a way that appears well defined and sensibly arranged. There is no dish washing or return as disposable utensils, plates and bowls are used

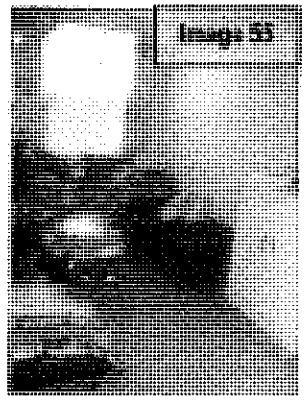
The cafeteria is directly adjacent to the kitchen; at over 3000 sf it has a seating capacity of approximately 216, which will seat the current enrollment in three (3) seatings. However there is a portable stair and ramp for handicapped access from outdoors and multiple doors out of the space. These elements restrict the usable seating area to approximately 2150 sf for a seating capacity of 143 requiring five (5) seatings. State guidelines recommend two (2) seating for elementary grade level. This space has a specialized floor which is laid out for various games such as hopscotch and four square (images 51 & 52) making it well suited to multiple uses.



The school has a gymnasium (including the office and storage) which is approximately 5300 sf which is far below the state guideline of 6300 sf. The space is also reduced by a ramp which provides handicapped access (see handicapped access and health and safety for more information). The gymnasium is also used for town athletics and after school programs

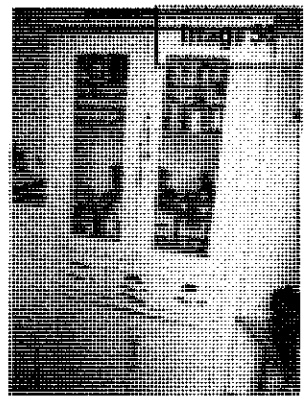
in addition daily to school use. There are multi-fixture toilet rooms adjacent to the gym and an abandoned shower room which is used for chair storage (image 53). As noted above, the music risers can be moved from one of the music rooms to the gymnasium creating an opportunity for performance, there is no stage or platform in the building.



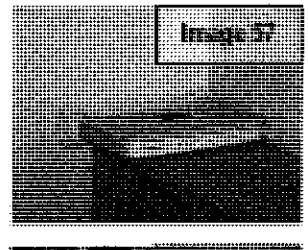


Reception and administration are located adjacent to the main entrance. There is no lobby to speak of. This area does, at least, create a well defined core for the school including near by conference space, offices, storage and a teacher's lounge. The Principal's office is located adjacent to the reception area, and both are located with views to the front parking and entry area as well having doors to the main corridor creating a good means of monitoring people coming and going from the building. Unfortunately the main entry is not handicapped accessible in the winter and an entirely separate entry is often used due to snow falling from the roof.

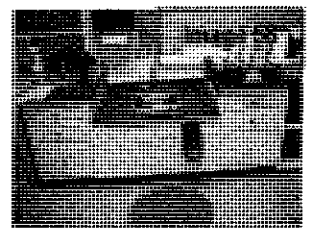
There is a health suite in the lower level comprised of an office two rest/exam rooms and a toilet (images 54 – 56). The spaces are organized well and provide approximately 420 sf of space, which is close to the state guideline of 510 sf. The toilet is small and does not provide complete handicapped accessibility.



The school library is located above the gymnasium in the 1973 addition. The library is not centrally located and is difficult to reach as one passes out of the classroom building and through a number corridors and stairs, or up a stair from the gymnasium to get there. The library space, at approximately 2500sf is less than the State guidelines of 3310sf for a school having a population of 600. Even so the space does not feel small and is laid out efficiently. There are work rooms and an office adjacent to the library providing storage and work space for the librarian and for staff. Given the location these spaces may be out of the way for use by many teachers for regular lesson planning.



The one dedicated Computer lab is located adjacent to the library, which is appropriate, but as previously mentioned, it is quite remote from the rest of the educational spaces in the facility. The lab is approximately 540 sf and has 24 workstations. The stations are very close together and would present a difficult work environment if used at full capacity. The building code would dictate this space not to be occupied by more than 27 given its size and use. The technology storage and technology office are located adjacent to the computer lab providing a workspace for the resident I.T. manager. There is central hub room for the local network located in the lower level of the original building and distribution closets on each floor of the classroom building. This arrangement reduces the necessary wire runs to reach the entire facility increasing the efficiency of the systems. There is also a wireless network in the building (image 58) (see the technology section of this report for more information on these systems).



Classrooms are located on four levels. Grade levels are grouped together with the youngest students (pre-kindergarten) on the lower level and the

oldest (grade 6) on the third floor All but three of the classrooms have a sink and counter area.

There are three pre-k classrooms ranging from 500 to 960 sf (with no integral toilet rooms) (images 58 & 59) and three Kindergarten classrooms all around 1250 sf; two of the three have integral toilet rooms). The state guidelines suggest that pre-k and kindergarten classrooms be 1200 sf including a toilet. The deficiency of the Pre-k classrooms and kindergarten classroom should be addressed as soon as possible.

There are 22-24 elementary (grade 1-6) classrooms, mostly sized at around 900 sf; and five between 1000 and 1550 sf. The state guidelines suggest that an elementary classroom be 950 sf. The classrooms which are below the guideline are not far below the State guideline, although some of them have angled walls creating odd shaped spaces which may not be ideal. The larger classrooms are well in excess of the guidelines and could present opportunities for alternative uses if renovations to the building were to be considered.

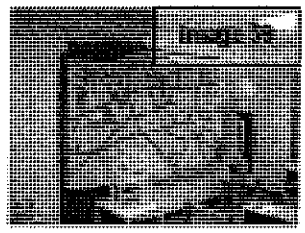
There are no designated science classrooms in the building. Some materials used for earth science must be removed from the building following use because they cannot be discarded in the school sink drains. A renovation project at this facility could include a conversion of the large classrooms to science labs, these spaces are located on each floor and they are stacked creating a natural efficiency of design and distribution.

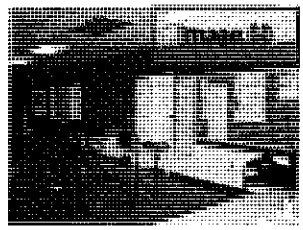
The music program is conducted in several spaces. There are two music classrooms. Instruments and the choral risers are stored in, the space on the ground level, and the other music room is set with music stands and chairs for band practice located on the first floor (image 60). There is direct elevator access to the first floor band room There are also two classrooms (one on the first floor and one on the third floor) which are used for music lessons. The remoteness of the spaces seems contrary to such a specialized and equipment dependent program. The spaces being used may be partly out of necessity. Consolidation of the location of the music program could have many benefits including more efficient class setup, less stress on the equipment, and disruption of other programs by having music lessons in neighboring classrooms.

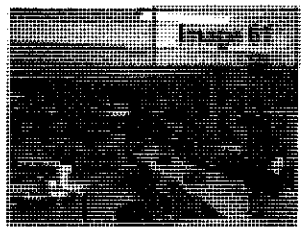
There is one art classroom located on the first floor adjacent to the gym and the band room. This space is 1100 sf which is close to the state guideline of 1150 sf, however, the student population would suggest two spaces of this size would be required. The space has many open shelves for storage of projects as well as supplies (image 61 & 62) The shelves are overfilled and there are items nearly blocking a small exit stair within the space (image 63) (see notes on health and safety)

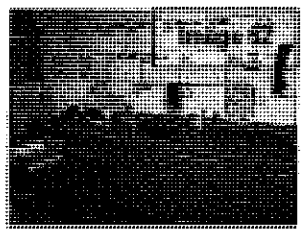
Special Education

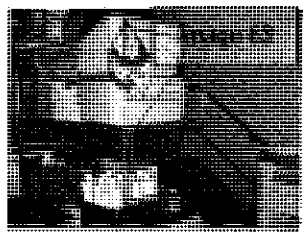
There are several resource and reading rooms distributed throughout the facility. The resource rooms vary from 200 to 600 sf and are distributed well amongst the classroom wing as well as one adjacent to the library The two reading rooms are 240 and 330 sf respectively and are also located adjacent to the library. Additionally there is an OT/PT space on

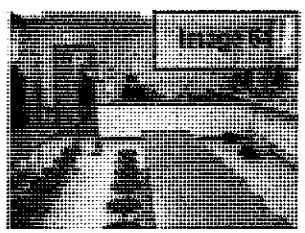












the lower level adjacent to the "project room" used for before and after school program (see other educational spaces below). While some of the resource rooms are below state guidelines they are intended for use by small groups of students

Other education spaces
The page school has a before and after school program which is conducted in a space adjacent to the cafeteria (image 64), and utilizes the cafeteria for part of the program, this adds to the utilization of the cafeteria space as well as expanding the benefits of the school to the town.

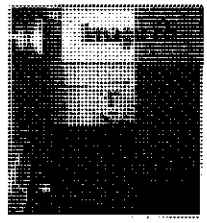
Toilet Rooms (images 65 – 68)
There are central multi-fixture toilet rooms for boys and girls on all levels of the classroom wing. There are small toilet rooms for each sex on the lower level, adjacent to the cafeteria. There are also toilets integrated into two of the three kindergarten rooms. These spaces appear to have an appropriate number of fixtures for the grade school enrollment. There are few staff toilets in the building and none on the second floor. The kitchen has one staff toilet room within the adjacent staff room. Separate rooms for each sex are required by state plumbing code for kitchen staff space. Refer to the handicapped accessibility section of this assessment for further information about these spaces.

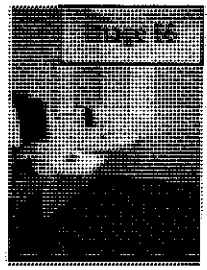
Storage
Educational facilities of this vintage typically do not have enough or well designed storage. This building has many storage spaces, not all of these are well utilized, partly due to location.

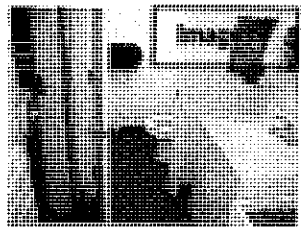
General storage areas are located in the electrical/custodial room and adjacent to the gymnasium. These spaces are disorganized and overcrowded (image 70). The areas in the Electrical/Custodial room are not intended for storage (image 69).

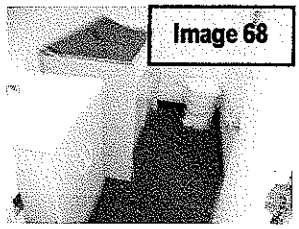
There are a few classrooms (at corners of the original building which have large storage rooms. The location of these spaces is unfortunate as they utilize an exterior wall which could otherwise bring light into the classroom. These spaces are also underutilized because they are used by only the adjacent classroom and there is little in the way of shelving. The other classrooms in the building have no storage aside from small loose shelves. Teachers use plastic bins, window sills, desks as well as floor space to organize their teaching materials. This situation can create a disorderly feel to the classroom, which may negatively effect on the learning environment.

There are other spaces that at improperly being used for storage including: stairwells, electrical closets, custodial closets and toilet rooms. A full evaluation of the storage facilities and effective use of these spaces should be a priority of the school to ensure a safe and effective learning environment for the students.









Handicap Accessibility

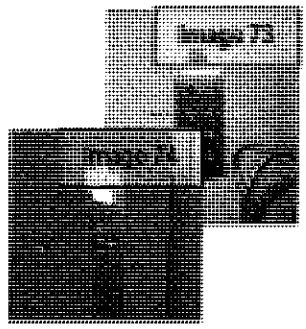
Based on ADA regulations, we have noted the following items concerning access to the disabled:

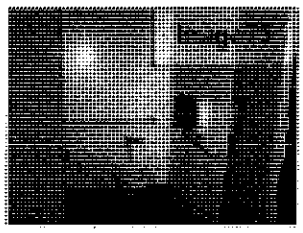
1 The building has multiple levels; the lower level is accessible at multiple points from outside. Door C1, which is used for bus drop and pick-up at the rear of the building; this door enters at a landing of a stair between the lower level and first floor level. The other two handicapped entrances are on the front of the building, both are equipped with ramps again accessing the lower level; door A2 with an exterior concrete ramp system (image 71) (see civil section of this report for further information), and door A3 with a portable ramp within the cafeteria (image 72) The floor levels of the original 1926 building and the 1973 addition do not line up on all levels. Horizontal access across these levels is provided by stair and by ramp.

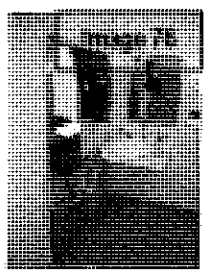
2 There are two elevators in the facility. In both cases the car and controls (images 73 & 74) are original to the installation and do not meet all current criteria for this application. One of these was built as part of the 1973 addition and has five stops accessing all levels of this portion of the building. The other elevator is located in the original building and was installed as part of the 1986 renovation project. This unit has only two stops at the 2nd and 3rd floors. In order to access this elevator and the 3rd floor of the classroom wing one must enter at into the lower level of the classroom building, travel to the top of the elevator near the gymnasium, enter back onto the classroom building on the second floor and travel up the other elevator. This situation does not fully meet the needs of handicapped users or provide equal access to all areas of the building.

3 There have been some upgrades in toilet rooms in an effort to provide accessibility (image 75) In most toilet rooms there is at least one accessible sink and in gang toilets modifications have been made to create one accessible toilet stall. Not all of the upgrades comply completely with current regulations, in one case at the boys' toilets adjacent to the gymnasium the toilet paper holder interferes with handicapped access to the water closet (image 76). There are other deficiencies throughout the facility such as: in the nurse suite there are no grab bars, and the staff toilet room on the third floor is not large enough to be made fully accessible.

4. Most doors in the building appear to provide the required width however there were isolated instances such as the corridor access to the sprinkler pump room, which did not meet the required 32" clear space. This space has another entry point and is accessed by a spiral stair (image 78) This particular door should be locked and labeled for the safety of all users. There are also a few instances where doors are not provided with any notable clearance on the latch side of the door. Current regulations require minimums of 12" on the push side and 18" on the pull side of the door for operation from a

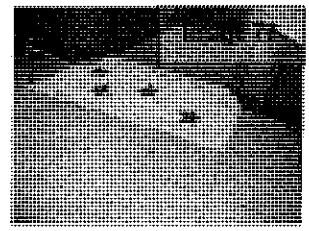


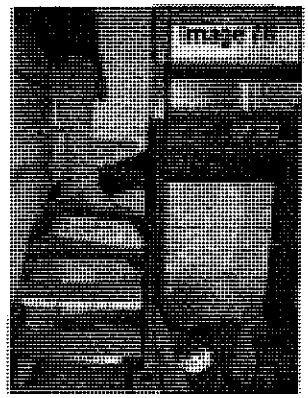




wheelchair Nearly all doors in the facility are equipped with knob style hardware, rather than the required lever hardware.

5 Some floors in toilet rooms, the nurse suite, and a few storage areas received tile floors during the 1986 renovations; in some cases these floors required leveling and other subflooring work creating a differential from adjacent corridors. These rooms have large thresholds and/or ramps which do not meet current regulations for barrier free access (image 77)



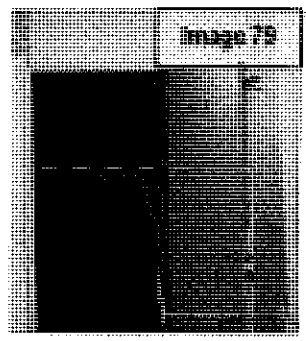


Health and Life Safety

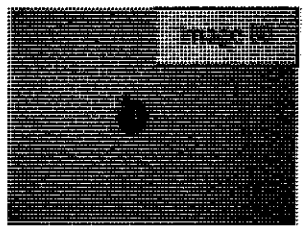
There are many issues affecting the health, welfare, and safety of students and staff and visitors. From a building environment standpoint we have observed the following:

1. The administration and reception areas provide an excellent vantage point for monitoring visitor and student arrival and entry.

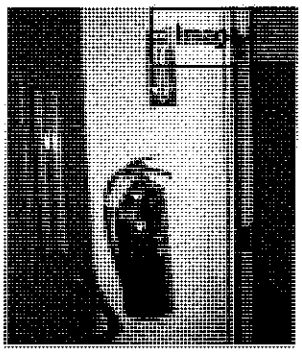
2. The sloped tile roofs were equipped with three bar snow guards as part of the renovations in 1986. The guards break up the snow but do not stop it from cascading off of the roofs The eaves of these roofs on the South and North sides of the building are of particular concern due to primary entry points to the building. The main ceremonial entry to the first floor and the handicapped ramp to the lower level corridor are often barricaded during the winter months to prevent injury to people entering and existing the building. The alternate entry on the front of the building is a side door to the cafeteria by way of a portable ramp. Using this access removes the security of entering at the location of the main office and reception Protection of this area must be a priority of any planned renovations at the facility. In the near term a more permanent solution should be instituted to avoid accidents due to failure to obey the signage warning against use of these entrances.



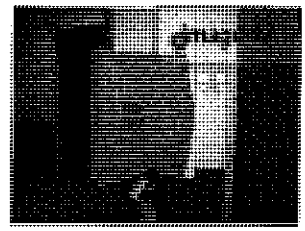
3 The building is partially protected by an automatic fire suppression system. The system is combination of wet and dry sprinkler systems throughout the original 1926 building. In numerous locations it was noted that sprinkler heads were either missing escutcheons or were not adjusted properly with the ceiling height (image 81) This creates a situation in which these heads may not function properly, or may not produce proper coverage. There is no automatic fire suppression in the 1973 addition including the commercial kitchen Fire extinguishers (image 81) were observed in various locations in the building including a Type 'K' extinguisher adjacent to the cooktops and exhaust hood in the kitchen.



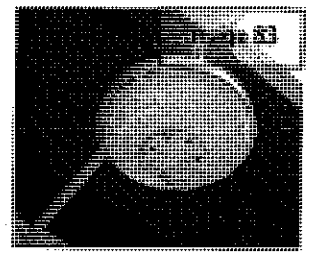
4. The building is equipped with a standpipe system. Fire hoses were observed in corridors near to the egress stairs. These hoses are covered with orange bags indicating the location of the hose (image 82)



5 Lighted exit signs were observed throughout the building with noted exceptions in the boiler room where one was missing and misplaced exit notations on communicating doors and folding partition openings between classrooms (image 79). Any situation on which an exit sign is misplaced or none is evident along a path of egress creates a potential hazard to all users of the facility, and should be addressed as soon as possible. See the electrical portion of this report for more information.



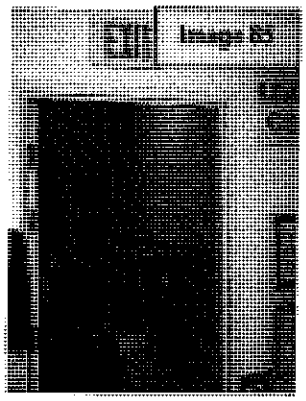
6 The fire alarm system devices were observed throughout the building (image 83), while the coverage of the system is building wide, upgrades to current regulations may be necessary as part of a major renovation, refer to the electrical portion of this report for more information.



7 There are known instances of finishes, adhesives, insulations and other items containing asbestos lead and other hazardous materials, which were used at the time the original building was built. Some remediation and/or encapsulation methods have been employed while others, known and likely unknown remain in the building today These materials are considered to be a health hazard, and are no longer permitted for use in buildings. It is recommended that, as part of any renovations planned for this facility, a licensed environmental hygienist survey the building for the existence and abatement of such materials. Refer to the hazardous materials portion of this report for more information.

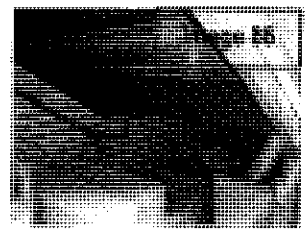
8. The ramp access to the gymnasium is located under one of the basketball goals The wall enclosing the ramp is almost in line with the backboard of the goal and is very close to the sideline of the competition court The wall is equipped with padding, but creates an elevated possibility of injury to athletes (image 27, page 6).

9 Egress stair halls in the original 1926 building are not separated from the corridors with fire rated assemblies. The stairs in this portion of the have varying handrail details (image 84). In some cases handrails and guardrails at floor levels this been altered to include a rail at required guardrail height. The risers and treads are varied dimensions. In certain cases the risers are outside the tolerance of current code. In some locations there is too much variation in the riser height in one flight of stairs, this differential is restricted to a tolerance of 3/8".

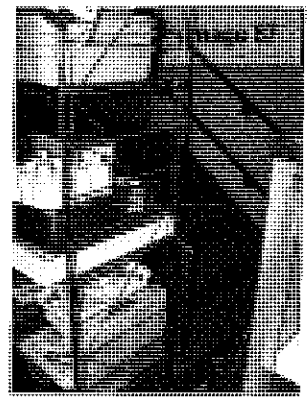


10. There are a number of classrooms within the original 1926 building in excess of 1000 sf. These classrooms are located at the corners of the building. Due to the size and allowable occupancy of these classrooms they are required to have two means of egress. The doors from these classrooms are required to swing out in the path of egress corridor and both doors out of the space are required to have lighted exit signs. There are stairs on the southeast and southwest corners of the original building. These stairs provide access directly to the adjacent classrooms at this location on each floor as the

second means of egress, however the doors and exit signage does not meet the regulations noted above. The large classrooms on the northeast and northwest corners of the building have only one means of egress and again the doors and exist signage do not comply with current code.

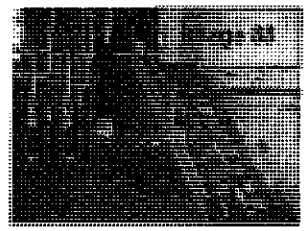


11. Many of the vestibules and landings of egress stairs throughout the facility are being used for other purposes (image 85). Those adjacent to classrooms or the gymnasium are being used for storage (image 86). The primary egress stairs from the classroom wing have large landings with in the stair enclosure which are utilized for photocopiers or as educational space (tutoring). The area within an egress stair enclosure is not to be utilized for any other purpose without additional fire rated separation of the spaces, and this must not interfere with the path of travel required for the egress of the building.



12. There is a short stair in the art classroom, which accesses the adjacent Children's Castle facility. There are boxes, shelves and loose supplies around this stair leaving only a very small path to access this stair. While this stair is not utilized for daily use it is a means of egress and the path of travel must be kept clear equal to the full width of the stair (image 87).

13. There is, reportedly, and corridor door on the second floor which locks from one side when closed. If this door is locked, one must to go through a classroom and use the connecting door to pass down the corridor; we were not able to test this condition. The door is equipped with a magnetic hold open device and closes only in an emergency event or loss of power event. This corridor is a means of egress and must be passable in an emergency.



14. There are a number of life safety concerns with regard to the boiler room. The room itself is in an area accessible to the general population of the school including students. This door should be locked at all times. There are known hazardous materials in the boiler room (see the hazardous materials section of this report for further information). The boiler room is accessed by a single door and a metal stair (image 88), this space is not required to be handicapped accessible, but based on its size, is required to have two means of egress. And presently only one exists.

Conclusions and Recommendations

Exterior:

- Foundation and exterior wall investigations should be conducted as discussed in the structural portion this report
- Maintenance and replacement of exterior masonry should continue as necessary
- Any renovation project plans should include examination of possible interior furring of the existing masonry walls to create a more effective moisture barrier a more thermally efficient envelope and
- A full window replacement should be considered as part of any major renovation project Current windows should be replaced with thermally broken high performance windows fitted with a 1" low-e insulated glazing system
- A full exterior door replacement should be considered as part of any major renovation project Current doors should be replaced with thermally broken insulated hollow metal doors and frames or thermally broken aluminum doors fitted with a 1" low-e insulated glazing system
- Any existing areas of the flat roofs which retain standing water should be addressed immediately. The tile roofs should be monitored for loose tiles and the flashings should be checked periodically The gutter and downspout system should be monitored regularly and kept clear of any debris which would impede the flow of water through the system.
- Refer to the Site/Civil section of this report for recommendations and conclusions regarding the surrounding site.

Interior:

- It is likely that any renovation project would include replacement of most of the existing flooring, with the exception of existing quarry tile, existing terrazzo, and the decorative floor in the cafeteria.
    - Current damaged and deteriorated VCT flooring should be repaired or replaced including classroom 113 above the boiler room, which may require flash patching or leveling compound.
    - All stair treads and risers should be replaced as part of any renovations planned for this facility
    - Where ever possible walk-off matting should be installed at primary entry points to the facility.
    - An inventory of all carpeting should be made to determine the remaining life expectancy of the existing carpet
    - The gymnasium flooring should be further investigated to determine the cause of the areas of lifting and to determine it remaining life expectancy
- A full inventory of existing acoustic ceiling tiles should be made and all broken or stained tiles replaced
- A full inventory of existing acoustic ceiling tile framing should be made and all damaged or displaced runners should be repaired or replaced.
- The existing kitchen ceiling should be evaluated for hazardous materials.
- All interior lighting should be evaluated as part of any renovation plans for the facility; see the electrical section of this report for more detail and recommendations

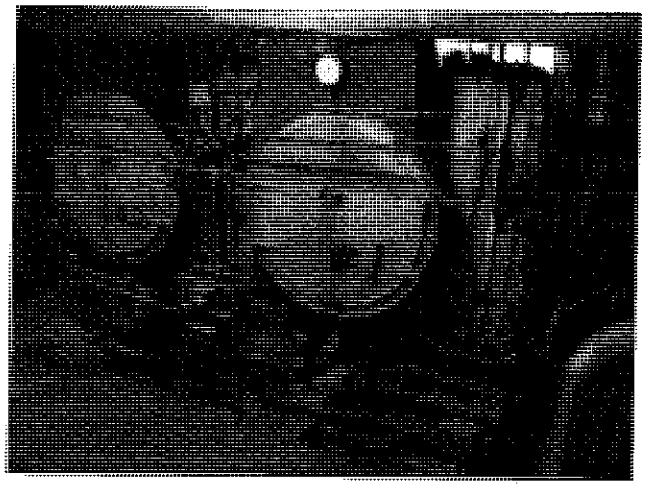
Handicap Accessibility:

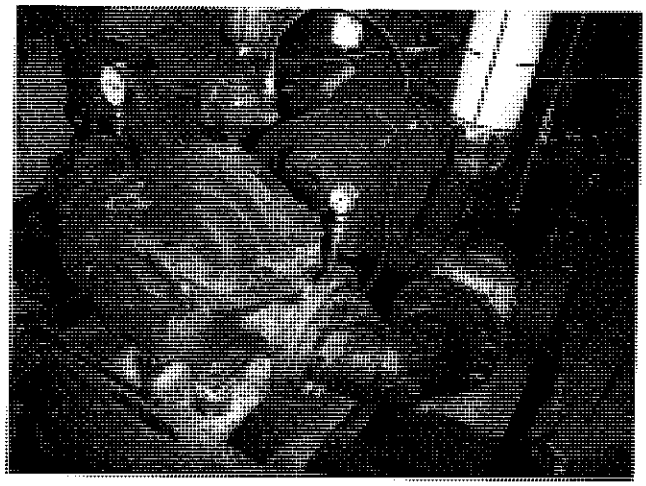
- The configuration of the elevators should be reconfigured to create equal access to all areas of the facility.
- All toilet rooms should examined to removed all possible existing barriers to accessibility; and any renovation plans should include creating completely barrier free toilet rooms throughout the facility.
- All doors should be made to minimum standards of 32" clear for accessible route throughout the building. Doors to all interior spaces should be changed to include lever handles
- All spaces with floor differential from the adjacent corridor should be examined, and any barriers to accessible route removed

Health and Life Safety:

- The conditions at the front and rear sloped roofs should be examined to determine a more effective means of mitigating the effects of snow and ice from falling on to areas used for access to the building
- The front entry stair and ramp should be protected from snow and ice falling during winter storms and the snow falling from the sloped roofs above them.
- The Automatic fire suppression system must be extended to include the kitchen, gymnasium and library area of the building. The kitchen hood should be equipped with an Ansul system designed for fire suppression at commercial cooking equipment. All sprinkler heads and equipment in the existing system should be evaluated and repaired or replaced as necessary (see the Fire Protection section of this report for more detailed recommendations and conclusions
- All stand pipe hoses should be located is secure cabinets, available in an emergency situation.
- All exit signs should be lighted with directional indicators, equipped with battery or wired emergency power.
- Monitoring and maintenance of known hazardous materials should continue Any renovation project should include a comprehensive plan for abatement under the supervision of a licensed environmental hygienist
- Egress issues including: Stair railings and guardrails, fire separation, location and number of exits should be corrected as part of any renovation plans for the facility
- Stairs and utility rooms should not continue to be used for storage.
- All egress routes should be kept clear of impediments for the full with of the required egress.
- The boiler room stair should be evaluated for safety and an additional egress from this space should be created.

Section 3.4
MEP/FP Assessment





MEP/FP ASSESSMENT

Dr. John C. Page Elementary School

Heating, Ventilating and Air-conditioning Systems Descriptions and Comments

The heating plant for the original building (c. 1926) consisted of two Hurst oil fired boilers. In 1977 there was an addition of a gym, kitchen and library and a Kewanee M Series packaged firebox 150 horsepower oil fired low pressure steam boiler was added to the heating plant. In 1992 a Weil McLain Series 94 cast iron 150 horsepower oil fired low pressure steam boiler was added to the heating plant and the Hurst boilers were decommissioned and removed from service. Facilities maintenance reports that one 150 horsepower boiler can satisfy building heating needs in all but the coldest weather. Fuel oil storage is provided by a 4000 gallon, above ground, double wall fuel oil tank.

The building is heated by a combination of low pressure steam and hot water systems. A second steam to hot water converter was added in the 1986 renovation.

There was a major heating and ventilating renovation in 1986 that encompassed all building areas except the kitchen and gymnasium. Mechanical ventilation units for occupied spaces were installed to provide outside ventilation air, tempered in winter. It appears from the 1985 BR+A drawings that ventilation rates were 5-10 cubic feet per minute (CFM) of outside air per person. Facilities maintenance reports that the heating and ventilating units are not used and have not been used for some time. This was verified on our walk through where we noted that all motor starters for the units were in the OFF position. There have been occupant complaints of noise and temperature control. Toilet exhaust systems were also installed during the 1986 renovation. Again, maintenance reports that many of these systems are not working. Exhaust rates are generally 30 to 50 CFM per water closet/urinal. Space heating is provided by fin tube radiation located along exterior walls. Much of the steam radiation on the ground and first floors was replaced during the 85-86 renovation with hot water radiation. The existing hot radiation remained on the second and third floors, however new controls were installed.

The heating and ventilating systems for the gym and cafeteria are original to the 1973 addition. No drawings were available depicting this addition and, therefore, equipment capacity is not known. A central station type air handler with steam heating coil provides heating and ventilation for the gymnasium. The unit is located in storage room above the gym office. The unit was not running. At the other end of the gymnasium there is a blower coil unit with steam heating coil located in a mechanical space under the stairs. This unit serves the boys and girls toilet rooms. The unit was not running. There is a roof exhaust fan for the kitchen hood and a second roof exhaust fan for general kitchen exhaust. Neither appeared to be used on a regular basis (snow was mounded up over the fans). The kitchen does not have a mechanical make up air system for the exhaust fans.

There is no central mechanical cooling (air-conditioning). Window air-conditioning units are installed in many rooms.

Building automatic temperature controls were replaced during the 1986 renovation with the exception of the gymnasium and kitchen which are original. Controls are pneumatic type. System provides occupied/unoccupied control for unit shutdown and night temperature setback.

Heating, Ventilating and Air-conditioning Conclusions/Recommendations

There are three main concerns regarding HVAC equipment

- Age of equipment
- Ventilation equipment undersized
- Equipment not operating or not operating properly

With the exception of the Weil McLain cast iron boiler the HVAC systems are at or near there estimated service life The following table lists the lists the average (median) estimated service life in years according to the American Society of Heating, Refrigeration and Air-Conditioning Engineers 2007 Fundamentals Handbook

EQUIPMENT DESCRIPTION	MEDIAN YEARS	EXISTING EQUIPMENT AGE (YEARS)
Window Air Conditioner	10	Unknown
Boilers, Fire Tube	25	32
Boilers, Cast Iron	35	17
Boiler Burner	21	32 (1) 17 (2)
Heating and Ventilating Units	25	36 & 23 (3)
Exhaust Fans	25	36 & 23 (3)
Pumps, Base Mounted	20	36 & 23 (3)
Steam to Hot Water Converter	24	36 & 23 (3)
Electric Motors	18	36 & 23 (3)
Motor Starters	17	23

(1) Kewanee Boiler

(2) Weil McLain Boiler

(3) Installed during 1973 Addition and 1986 MEP renovations

In addition to the issue of their age, the heating and ventilating units have inadequate ventilation capacity according to today's Codes. The following table list Code required ventilation rates for various spaces.

SPACE	CODE CFM/PERSON	EXISTING CFM/PERSON
Classrooms	15	5 - 10
Gymnasium	15	5 - 10
Cafeteria	20	5 - 10
Office	20	5 - 10

Code required exhaust rate for toilet rooms is 75 CFM/water closet or urinal. The 1986 design rate is 30-50 CFM per water closet/urinal

Given the age of the equipment and the ventilation issues it is recommended that a comprehensive replacement plan be implemented as the existing units have inadequate heating and ventilation capacity for the spaces served Several pieces of equipment and/or systems were not operating or not operating properly The replacement plan could include reuse of existing heating and ventilating units to serve smaller spaces assuming it is cost effective to refurbish the existing units New units could then be added to supplement existing. The Kewanee boiler was down for service and facilities maintenance expressed concern with its reliability given past problems. Priority should be given to the Kewanee boiler and then to the heating and ventilating units and exhaust fans New units would have capacities to meet current Code requirements. An evaluation of kitchen exhaust requirements should be conducted and new exhaust and make up air systems installed to meet the requirements If the replacement plan is to be implemented in phases the existing heating and ventilating equipment and exhaust fans which are not replaced, should be put back on line and recommissioned Recommissioning would include physical inspection of all units, complete testing and recalibration of controls, and adjustments to original design parameters.

Plumbing Systems Descriptions and Comments

The existing Page Elementary School had a major building renovation in 1986 where a significant amount of the plumbing systems were updated.

A 4-inch municipal domestic water service enters the facility at the basement of the Children's Castle The water service is provided with a 2-inch meter and a flow switch No backflow prevention device is provided. It is reported the school has poor domestic water pressure.

Mr. Michael Gootee, the West Newbury Water Department Superintendent was contacted to discuss the water distribution on the site It was stated the water tower located adjacent to the school does not directly supply the domestic water system The municipal water system is provided with a pumping station located across the street from Page School The outlet of the pumping station can exceed water pressures of 80 psi. The water mains located on Main Street are flushed twice a year

Sanitary waste stacks collect waste from the domestic plumbing fixtures and exit the building by gravity A backwater valve was observed on one of the sanitary sewers at the ground level Multiple sanitary sewers exit the building at different locations and discharge to an on site sewage disposal system Refer to the civil assessment for additional information

The storm water collected over the original building is discharged from the roofs by the use of gutters and downspouts The downspouts discharge into an exterior perimeter drainage system Roof drains are located on the roof of the 1973 addition which are piped through the building and discharge to the storm sewer by gravity Refer to the civil assessment for additional information

Plumbing fixtures throughout most of the building include wall mounted flush valve water closets (3 5 gpf), and wall mounted vitreous china lavatories Urinals are wall mounted fixtures with 1 5 gpf flush valves ADA accessible fixtures are provided Toilet rooms are provided with floor drains and hose bibs Some flush tank water closets are located on the ground level Drinking fountains are provided in the corridors and are ADA accessible Janitors sinks are floor mounted fixtures with wall mounted faucets

The existing kitchen is provided with a 35 gpm grease interceptor serving the triple bowl pot sink No other kitchen equipment is provided with a grease interceptor including the tilting kettles There is no exterior grease interceptor Natural gas is not provided for the kitchen equipment There is no dishwashing equipment

Domestic hot water is generated from duplex oil fired water heaters located in the ground level mechanical room of the original building The water heaters manufactured by Bock have 68 gallons of storage and 215 gph recovery each One heater was installed 11-14-2001 and the other was installed 11-29-2004 Hot water is stored at 140° F and provided with a Leonard thermostatic mixing valve located in a stainless steel cabinet and is set at 115° F The 140° F water is piped to equipment located in the kitchen and the 115° F water is piped to the domestic plumbing fixtures located throughout the building Both water systems are fully circulated back to the water heaters with the use of Taco cartridge circulators An electric water heater is provided adjacent to Boys Room 243 in the library to supply hot water to fixtures located in the general vicinity

A propane cylinder is located outdoors on the west side of the building The gas is piped into the boiler room and is used to operate the pilot on one of the boilers

The water distribution piping observed appeared to be Type L copper with fiberglass insulation Some brass piping did appear to be abandoned

Plumbing Conclusions/Recommendations

Water conserving fixtures should be installed in conformance with the Massachusetts State Plumbing Code Water closets should be replaced with 1 6 gpf fixtures and urinals shall be replaced with 1 0 gpf fixtures Insulation kits should be installed on the p-trap, tailpiece, water supplies and stops on all ADA compliant lavatories

The West Newbury Water Department has recently requested the Page School provide a reduced pressure backflow preventor on the domestic water service The school reportedly looses water on the third floor of the building when the town flushes the water mains The backflow preventor will prevent

back-siphonage and shall be provided and installed by the school The backflow preventor will also reduce the incoming available water pressure in the building.

The poor water pressure in the school can be attributed to a number of factors The 2-inch water meter and service is undersized for the quantity of fixtures located in the building The existing buried 4-inch water service could be corroded or have a partially closed isolation valve The overall elevation of the building should be compared to the water pressure available in the street to determine the maximum usable pressure.

An interior grease interceptor should be provided in the kitchen in accordance with the Massachusetts State Plumbing Code All fixtures that generate grease laden waste including pot sinks, scullery sinks, soup kettles or similar devices should be piped through an interior grease interceptor. The discharge from these devices should be piped independently to an exterior grease interceptor in conformance with the local sewer authority requirements.

Floor drains located in the toilet rooms should be provided with automatic trap priming devices to maintain the trap seal and prevent the escape of sewer gases into the building.

All domestic water piping, including all piping located in the ground level mechanical room, should be provided with insulation

It is recommended the existing below slab horizontal sanitary and storm piping be inspected with a video camera The video inspection will help determine the condition of the existing sanitary piping including the identification of any piping cracks, broken section of piping, failed fittings or the discovery of any low spots Repairs should be made accordingly.

Fire Protection Systems Descriptions and Comments

The existing Page Elementary school is provided with 1½" fire department valves throughout the building and a partial automatic sprinkler system An 8-inch fire service enters the building below Stair #3 on the west side of the building and is provided with an Ames 8-inch double check valve assembly A 1,000 gpm diesel fire pump is provided. The Aurora fire pump was manufactured in 1984. A post indicating valve is located behind the east wing adjacent to the playing fields This valve does not appear to control the fire service and its use should be confirmed with the school district.

It is reported by Mr. Gary Bill, Superintendent of the Highway Department, that the existing fire pump is misaligned and is subsequently shearing couplings between the pump and motor Coupling failure randomly occurs when the pump is being tested.

Mr. Michael Gootee, the West Newbury Water Department Superintendent was contacted to discuss the water distribution on the site It was stated the water tower located adjacent to the school does have a dedicated line serving the building fire service and two of the three hydrants located on the site The line is provided with a post indicating valve which is located behind the east wing and adjacent to the playing fields.

The automatic sprinkler system consists of a wet pipe system and a dry pipe system The wet pipe system is supplied through a 6-inch Hodgeman Model B wet alarm check valve manufactured in 1928 The system piping is black steel This system serves the original building on the ground, first, second

and third floors Automatic sprinklers were never installed in the 1973 addition, including the kitchen, gymnasium or library. The last system test was dated 9-15-2006

The dry pipe system is supplied through a 6" Hodgeman Model A dry pipe valve manufactured in 1927. The system piping is black steel The dry pipe system serves the automatic sprinkler system located in the unheated attic of the original building. The last system test was dated 9-15-2006 The dry system did not appear to be operational when observed

Fire department valves are provided with 1½" valves and hose. Valves located in the original structure are typically in the egress corridors adjacent to stairway access Hose assemblies are located in the 1973 addition at the library The fire hose valves in the library are connected to the domestic water system according to the 1986 renovation drawings.

The exhaust hood located in the kitchen is not provided with a chemical suppression system

Fire Protection Conclusions/Recommendations

Automatic sprinklers shall be provided in accordance with the Massachusetts State Building Code, 780 CMR, and 7th Edition Section 903 2 3 if the building is to undergo renovation. Automatic sprinklers shall be provided in Group E occupancies where the aggregate floor area is greater than 12,000 square feet and throughout every portion of educational buildings below the level of exit discharge.

The alignment of the existing fire pump will need to be addressed. NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, 2007 Edition, Section A 6 5 addresses the two types of misalignment, angular and parallel, and provides recommended methods for correction. Once the pump and motor are aligned, a steel grid locking coupling should be provided The cause of the misalignment should be reviewed by a qualified fire pump technician It was suggested by technical support at Aurora Pump that all of the basics be reviewed including verifying the system is level, remove any pipe strain, eliminate any torque in the assembly and realign the system A separate issue with the installation of the fire pump is the suction side is not in conformance with NFPA 20 Section 5 14 6 3 2 states the distance between the flanges of the pump suction intake and the elbow shall be greater than 10 times the suction pipe diameter This may be creating turbulent flow at the inlet of the pump.

A Class III standpipe system shall be provided in conformance with 780 CMR Section 905 3 1 if the building is to undergo renovation. The standpipe system shall be installed in conformance with NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*. The 2 ½" fire department valves shall be installed at each primary landing of all required exit stairways and at all horizontal egress paths. 1 ½" hoses valves shall be located so that all portions of the building are within 30 feet of a nozzle attached to 100 feet of hose

The building shall be maintained in accordance with NFPA 25, *Inspection, Testing and Maintenance of Water-Based Fire Protection Systems* The requirements of NFPA 25 shall be maintained for all occupied structures with a water based fire protection system. NFPA 25, Table 5.1 Summary of Sprinkler System Inspection, Testing and Maintenance provides an overview of the requirements of the building owner The following are some of the items in the table:

- Inspection of gauges weekly to ensure air pressures are being maintained.
- Inspection of water flow devices quarterly.
- Inspection of valve supervisory devices quarterly
- Inspection of sprinklers, pipe, fittings, and hangers annually
- Test water flow devices quarterly or semi-annually depending on type
- Test supervisory devices semi-annually
- Test sprinklers at 50 years and every 10 years thereafter.
- Maintenance valves annually.

NFPA 25 identifies the testing requirements for existing sprinkler heads. Section 5.3.1.1 states: "When sprinklers have been in service for 50 years, they shall be replaced or representative samples from one or more sample areas shall be tested. Test procedures shall be repeated at 10 year intervals." Section 5.3.1.1.4 continues to state: "When sprinklers have been in service for 75 years, they shall be replaced or representative samples from one or more sample areas shall be submitted to a recognized testing laboratory acceptable to the authority having jurisdiction for field service testing. Test procedures shall be repeated at 5-year intervals." Sprinkler heads located in the attic and stairwells should be tested in conformance with this standard. Sprinkler heads should also be replaced if painted, corroded, damaged, or in the improper orientation. Several sprinkler heads were observed to have been painted.

Existing ¾" sprinkler piping, especially in the stairwells, should be replaced with 1" pipe.

The quality of the dry pipe sprinkler system should be reviewed and evaluated for corrosion. The use of black steel pipe in a dry pipe system is subject to internal pipe scale generated from moisture located in the piping system. According to NFPA 13, *Automatic Sprinkler Systems*, the water velocities experienced when the dry pipe valve opens are likely to dislodge the pipe scale and carry it to the open sprinklers, preventing the sprinklers from adequately discharging the water.

Electrical Distribution System Description and Comments

The Page Elementary School building is currently served by a Main Switchboard in the Custodial Supply Room on the ground floor. Normal Utility Power is provided from a set of (3) 50KVA pole-mounted transformers. 3 runs of 4"C w/4 No 500MCM conductors extend underground from the pole to the Main Switchboard.

The Main Switchboard is 208Y/120V, 3-phase, 4-wire, with a 1200A main switch. It was installed in 1973. Power is distributed from the switchboard to the following:

Panel 'DPA' (400A) – this panel is in the ground floor Custodial Supply Room. It provides 175A feeders to Lighting Panels 'LP1A', 'LP2A', and 'LP3A', on the first, second and third floors, respectively. These panels were installed during the 1985/6 renovation.

Panel 'DPB' (400A) – this panel is also in the ground floor Custodial Supply Room It provides a 175A feeder to Panel 'PP1' (first floor), 150A to Panel 'LPG' (ground floor), and 200A to the Auto Transfer Switch in the Generator Room These panels were installed during the 1985/6 renovation

Panel 'P-1' (150A) – this panel is also in the ground floor Custodial Supply Room. It was installed during the 1985/6 renovation.

(2) Elevators (125A and 150A) – the larger elevator was installed in 1973, the smaller in 1985/6

Motor Control Center 'MCC-3' (150A) – the motor control center is located on the third floor, behind the elevator shaft It serves multiple 120V and 208V/3ph fans, ranging in size from 1/3hp to 3hp. These fans are currently not in use 'MCC-3' was installed in 1985/6

Old Service Panels 'A' and 'B' (600A) – these are 1st and 2nd sections of the original 2-section Main Distribution Panel, located in the ground floor Custodial Office It provides a 100A feeder to the Boiler Room Panel, and a 200A feeder to Distribution Panel 'D' Panel 'D' serves subpanels in the Kitchen, Gym, and Compressor Room Panels 'A' and 'B' and the Boiler Room Panel predate the 1973 expansion The existing Panel 'D' was installed in 2003, having replaced an older panel; its subpanels were installed in 1973 or earlier

The Emergency Power Distribution System is located in the Generator Room on the ground floor Normal power is provided by a 200A feeder from Panel 'DPB' to the Automatic Transfer Switch, as noted above Emergency Power is provided by a Kohler 45kW/56 25KVA Standby Diesel Generator. Power is provided through the transfer switch to Distribution Panel 'DPE':

Panel 'DPE' provides 120V, 20A circuits for Intercom, Generator Room lighting, and the Fire Alarm System It provides 100A feeders to Panels 'LE-1' and 'PE-2' and a 50A feeder to a Heating Pump

The generator was installed in 1973. Panel 'DPE' and its subpanels appear to have been installed in 1985/6 The ATS is newer, having been installed in 2001

Electrical Distribution System Conclusions/Recommendations

It appears that the existing electrical gear is operating properly, so there should not be any panels that require immediate replacement. However, much of the equipment is at or beyond its reliable service life (typically 40 years)

Two-Section Panel 'D' in the Kitchen Office is only about 5 years old, and thus should have plenty of reliable operational life left in it

The panels installed in the 1985/86 renovation are approaching 25 years. They appear to be in good condition for their age If further inspection verifies their condition, these panels may be retained when another renovation of the school is undertaken (assuming it is done in the near future) The panels should be thoroughly cleaned and refurbished at this point. This would presumably extend their use for up to 15 years, after which they should be replaced. However, the longer a renovation is delayed, the less service life will remain for these panels; at some point, it will not be an economical choice to keep the panels, if the remaining service life is too short

The Main Switchboard and other panels installed during the 1973 expansion, while in generally fair to good condition for their age are near the end of their service life. All other panels, installed prior to 1973, are beyond their service life All of this equipment should be replaced in the near future.

The service feeder, distribution feeders and branch circuits should also be replaced at the same time as their associated panels.

If the facility is renovated, the Emergency Power System will require reconfiguration to comply with current Codes. Life Safety loads (including egress/exit lighting, fire alarm system, and intercom) will have to be separated from other Equipment loads (such as optional lighting, telecomm, and emergency heat) All life safety panels must be located in dedicated 2-hour fire-rated spaces, and their feeders must be 2-hour rated as well (either being installed in a 2-hour rated space, or be constructed as a 2-hour rated system) The Life Safety and Equipment branches will each require its own transfer switch. The existing generator should be replaced The existing automatic transfer switch, being less than 10 years old, may remain

Lighting, Receptacles and Branch Circuits – Description and Comments

Standard recessed 2x4 fluorescent troffers are used in most locations, along with some wraparound type fluorescents. The Gym has high-bay fluorescent fixtures with wire guards, having replaced the original metal halide high bays. Some of the utility spaces have original incandescent fixtures.

The original fluorescent fixtures installed in the 1985/6 renovation utilized magnetic ballasts with 40W T12 lamps. However, most have been replaced over time with newer fixtures, using energy-saving ballasts and 34W T12 lamps, or electronic ballasts and 32W T8 lamps These fixtures are generally to be in good condition

Lighting levels appear to be adequate in most spaces. The gym lighting is hampered by deep beams between which lights are installed, not allowing walls to be properly illuminated, creating a "cavern" effect.

The drawings for the 1985/86 renovation indicate that a daylighting system was to be installed in the classrooms. It was not apparent whether this system was installed, and if so, if it is still operational. It was noted that several spaces had occupancy sensors

Emergency lighting is controlled by an Area Protection Relay cabinet, located next to the auto transfer switch in the generator room. It appears to have been installed in or before 1973 This allows lighting in the corridors, stairs, gym, and cafeteria to be switched on and off while on normal power. If normal power is lost, these lights switch over to emergency power, and switch on automatically for egress lighting, regardless of whether they were on or off before Wall-mounted emergency floodlights are also turned on in this event Exit lights are illuminated continuously. The emergency floodlights consist of twin PAR lamps on a socket base, some with wire guards. The exit lights are A/C only, polycarbonate, LED type

It appears that the emergency lighting should be adequate in illuminating the main interior egress paths, and the exit lights are properly placed. However, some spaces that may benefit from emergency lighting do not have any Also, there does not appear to be any exterior emergency fixtures at egress exits

Site Lighting is minimal A pair of pole-mounted utility floodlights are located in front of the building, near the main entrance. There are also floodlights mounted on the rear of the facility, and smaller wallpacks above some doorways. There is no lighting for the lower parking area or the entrance drive.

Receptacles are generally surface-mounted on walls, with exposed metal conduit raceways to above the ceiling. It appears that most classrooms have one receptacle on each wall (with some exceptions), but given the presence of extension cords in some spaces, these rooms may benefit from the installation of additional outlets

A spot check of wiring devices indicated varying conditions Light switches and receptacles were generally in fair shape, although many were older and showing wear. Some had been painted over on their faces Although receptacles appeared to be properly grounded, it was noted that some light switches were not.

Branch circuit wiring is typically installed in rigid conduit. Older circuits may utilize conductors with insulation that is worn and may be degraded.

It was reported that attempts to provide window unit air conditioning in the classrooms were not successful. The existing receptacle branch circuits are not designed to support the additional load from these window units

Lighting, Receptacles and Branch Circuits – Conclusions/Recommendations

A renovation of the facility should include an upgrade of the lighting to eliminate fluorescent fixtures using magnetic ballasts and 40W T12 lamps (if any remain) New fixtures provided should have electronic ballasts and 32W T8 lamps. Existing fixtures with energy-saving ballasts and 34W T12 lamps may remain. Existing fixtures to be reused should have lamps, lenses and ballasts replaced as required Since the lighting quality of the T8 and T12 lamps is apparent when observed together, fixtures should be installed/reinstalled so as not to mix the two types in the same space All existing incandescent fixtures should be replaced with fluorescents.

The gym lighting should be reinstalled or supplemented in a manner that would address the existing cavern effect.

Lighting in all spaces should be reviewed to ensure adequate levels are provided. Occupancy sensors must be provided to comply with current energy conservation requirements. A new daylighting controls system may be provided in applicable spaces; although not required by code, it may offer additional energy savings

Emergency lighting should be upgraded and placed on the life safety branch of the emergency generator system, when renovated. The existing Area Protection Relay system is antiquated and should be replaced with a new system, with relays dispersed throughout the facility at the branch circuits, or centralized as is now The existing PAR lamps utilized for emergency lighting should be replaced with fluorescents Exterior egress lighting should be added to comply with Codes.

If desired, site lighting may be supplemented by providing additional fixtures on the building front, and adding pole-mounted fixtures in the parking areas and entrance way.

Light switches, receptacles should be replaced where old, worn or damaged Additional receptacles can be added in spaces that would benefit. Existing branch circuits should be replaced if they include old wiring, or are not properly grounded. Additional branch circuits for room air conditioning and other loads may be needed

Fire Alarm System

The existing fire alarm system is a surface mounted Fire Control Instruments 32 zone conventional fire alarm control panel with surface mounted battery cabinet and power supply. The system was installed in 1992 and still in good working order.

The panel is located in the lower level fire control room across from the boiler room and serves the elementary school building, the Civil Defense building, and the Castle building.

A surface mounted zone light led annunciator panel is located in the entry stairwell on the first floor.

The fire department master box is located at the front entrance on the exterior of the building and the cable routes overhead from the utility pole near the civil defense building to the master box via a surface mounted conduit

Existing fire alarm cable is distributed in conduit and exposed.

The panel is nearing its expected service life and space for expansion is very limited Spare parts for the system are available, but are no longer in production.

Alarm Detecting and Initiating Devices

Smoke detectors are present in most emergency egress paths. Heat detectors are present in most storage spaces, mechanical spaces and kitchens. The devices are nearing their expected service life, and have been failing as of late.

Pull stations are located at most exits. Most pull stations are typically mounted around 60 inches above finished floor This mounting height does not comply with 780 CMR, 7th Edition

Alarm Notification Devices

Horn/lights are installed in corridors and some common spaces to provide alarm notification to occupants The devices type and coverage does not comply with the 780 CMR, 7th Edition and ADA. Clear strobes are required by current codes.

Fire Alarm System Conclusions/Recommendations

Based on the age, condition and expansion possibilities for the existing system, a new system would be required for any large scale renovation. The system shall be provided in accordance with the Massachusetts State Building Code, 780 CMR 7th Edition

The new system would include the installation of carbon monoxide detectors; replacement of smoke and heat detectors and pull stations mounted at all exterior doors per the CMR and ADA guidelines Additionally new notification appliances would be provided for complete coverage of all classrooms,

common areas and egress paths. Due to assembly spaces in the building, a speaker type system would be preferred for transmitting voice announcements in the event of an alarm. The new system would incorporate elevator recall functionality to return the elevators to a safe floor in the event of an alarm

Section 3.5
Hazardous Materials Assessment

HAZARDOUS MATERIALS ASSESSMENT

Dr. John C. Page Elementary School

Outlined below is a summary of ATC's findings:

I. Site Background

The school building was originally constructed in 1926 with an addition of a Gym, Kitchen and Library in 1973. Renovations to the building were also performed in 1986, 1991 and 1992.

II. Lead Paint Materials

Based upon the original construction date of 1926, the original portion of the building most likely contains lead paint This is based upon the fact that the Consumer Product Safety Commission (CPSC) did not ban the sale of commercial paint that contained greater than 0 006% lead until 1976

The Occupational Safety and Health Administration (OSHA) under their 29 CFR 1926 62 Regulation, consider elemental lead (i.e. >0 0) to be considered lead containing and subject to their worker protection regulations. Therefore, ATC recommends that appropriate lead testing be performed within the building and all results disclosed to the Contractor as part of the Bid Documents for any renovation project

The building is not considered a residence where children under the age of six (6) would reside, therefore abatement of lead-containing components will not be required as per Massachusetts Department of Public Health (DPH) "Child Lead Poisoning and Prevention Regulations.

In addition, any building components that are found to contain any detectable lead will also be subject to federal Resource Conservation and Recovery Act (RCRA) regulations with regards to disposal. Appropriate Toxicity Characteristic Leaching Procedure (TCLP) sampling shall be required of the waste streams to determine if the material is considered hazardous waste for lead ATC recommends that representative TCLP samples be collected of the building components subject to disposal and the results be provided to the Contractor as part of the Bid Documents for any renovation project

III. Asbestos Materials

ATC performed a cursory review for suspect asbestos-containing materials (ACM) located in accessible areas of the building The school's original Asbestos Emergency Response Act (AHERA) plan developed by Universal Engineering Corporation dated September 28, 1989 was available for review at the time of inspection. In addition, the schools most recent three-(3) year reinspection developed by Smith & Wessel Associates, Inc, dated April 8, 2005 was available for review. The results of the original AHERA Plan and most recent (3) year Reinspection indicated the following asbestos-containing materials to be present at the school and require in-place management:

- Pipe and Fitting Insulation
- Duct Insulation (Boiler Room #2)
- Vinyl Asbestos Floor Tile (VAT)
- Fire Door (Generator Room)
- Transite Access Panel (Kitchen)

Note: The AHERA plan also included updated records of completed response or abatement actions performed at the school which included removal of pipe insulation, vinyl asbestos tile and linoleum from select areas as well as the tank insulation and boiler debris from the Boiler Room.

In addition to the materials listed under the original AHERA Plan and current 3-Year Reinspection Report, several additional suspect asbestos-materials were observed by ATC at the school that would require testing if renovation activities were to take place Those materials include:

- 12" x 12" Floor Tile and Mastic
- Window Glazing Compound (Interior/Exterior)
- Adhesive Behind Chalkboards/Wallboards
- Sink Coating
- Sheetrock
- Joint Compound
- Ceramic Tile Grout
- 12" x 12" Spline Ceiling Tiles/Glue Daubs
- Vinyl Tread Mastic/Glue
- Carpet Mastic
- Boiler Unit (Interior ACM)
- Pipe Insulation behind Walls/Ceilings
- Mastic behind Unit Vents
- Perimeter Wall Mastic
- Blown-In Insulation (Attic)
- Door Caulking
- Skim Coat on Concrete

- Plaster on Exposed Ceiling Beams
- Cove Base and Mastic
- Exterior Vent Caulking

In accordance with federal Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) Regulations, materials found to be asbestos-containing in the building must be abated prior to renovation/demolition activities. Therefore, ATC recommends that a comprehensive survey be performed in the school building that will (1) identify all suspect ACM subject to potential impact by forthcoming renovation activities which will comply with NESHAP Regulations; and (2) update the overall current AHERA plan for the school

IV. Underground Storage Tanks (UST's), Oil & Hazardous Materials

ATC performed an assessment as to the presence and locations of UST's and oil and other hazardous materials (OHM) at the site. ATC's review included a preliminary site investigation as well as discussions with school personnel on past practices and handling of OHM at the site.

The following is a summary of ATC's findings:

1 According to school personnel, one 5,000-gallon No. 2 fuel oil Underground Storage Tank (UST) was removed from the site in August 2007. A report was issued by New England Environmental Technologies Corporation (NEET) documenting the UST removal on August 23, 2007. NEET's report indicated that there was no evidence of reportable release(s) or threat(s) of release of oil or hazardous materials and that the removal project was in compliance with applicable Massachusetts Contingency Plan (MCP) requirements.

2 One 4,000-gallon Above Ground Storage Tank (AST) was installed at the site and is currently in use. The tank is a double wall tank on a concrete pad enclosed by a fence and shed roof

3. There are two Boiler Rooms at the site located directly adjacent to one another. Boiler Room No. 1 contains a Weil McClain and Kewanee Boiler. Boiler Room No. 2 contains (2) large side-by-side Scannel (Spencer) boiler units. Within both rooms, the oil pumps are leaking and staining to the floor is present. There was also a 55 gallon drum of waste oil present at the rear section of Boiler Room No. 2.

4 Miscellaneous hazardous materials (including cleaners and maintenance materials) are present in Boiler Rooms that will require proper removal and disposal if to be discarded.

5 Interior soot/ash/brick within the Boiler Units and Chimney may require disposal as hazardous materials. Recommend testing ash and bricks if disposal is required

6 Some old light fixtures were observed in select areas of the building which may contain PCB oil. If leaking ballasts are identified in the future or ballasts are removed during

renovations, recommend proper disposal. However, it is not known if all the light ballast's in the building are original or have been replaced. Recommend further discussion with school personnel.

7. Miscellaneous hazardous wastes (in small quantities) are generated on-site as a result of general maintenance activities. ATC recommends that proper disposal of hazardous wastes and any unused hazardous materials take place as part of normal school operations.

The aforementioned information represents ATC's preliminary site investigation work relating to the feasibility study. As noted, additional sampling and investigation may be required in some instances to further determine the extent of the remediation activities required for renovation work.

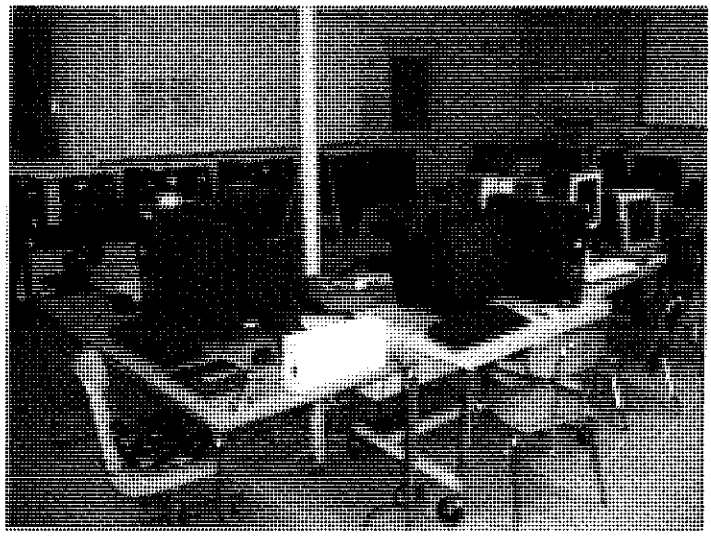
If you have any questions regarding this information, please feel free to call me directly at (413) 781-0070.

Sincerely,

ATC Associates Inc

Derrick Wissman
Senior Project Manager

Section 3.6
Technology Assessment



VOICE, DATA AND VIDEO ASSESSMENT
Dr. John C. Page Elementary School

Introduction:

This document represents a report on the existing voice, data and video technology infrastructure at the Dr John C. Page Elementary School in West Newbury, Massachusetts. Information in this report was derived from a thorough review of the facility with the rest of the architectural team

Services:

The trunk lines from the telephone service provider enter the facility in the Maintenance Office. All pairs are terminated at this location and extended via multi-pair riser backbone to the location of the telephone system

CATV enters the facility at the same location as the telephone service It then branches into several directions, providing service to many spaces in the school.

Data services are extend from the same location to the data head end, which is located in a closet under the stairs adjacent to the Cafeteria.

Public Address and Telephone Systems

The existing public address system is a Bogen MCP 35A. The main equipment cablinet is located in the main office There are public address speakers in the hallways in classrooms The system has paging capability to every classroom as well as an all-call feature for school-wide announcements. Classrooms are equipped with a wall-mounted call switch to initiate communication with the main office Multiple classrooms can also be selected for group paging. The system is currently configured to capacity with no room left for expansion.

There are several different clocks installed in the school Accutrex clocks are installed in most classrooms. There are also some Simplex clocks in classrooms and Sapling clocks found elsewhere

The telephone system is a relatively new Comdial Impact system with a Keyvoice voicemail system. The main equipment is located in the kitchen area and connected to a UPS. There are digital telephones in the administrative areas. The classrooms are not equipped with telephones

A video phone (Aiphone) is used for communicating from the office to the front door and the cafeteria door. The lower door has a call button, but does not have video monitor capability.

Cabling Systems

The typical classrooms consist of two data outlets, a secondary clock, a public address speaker, and a call switch for the public address system Some classrooms are also equipped with a cable drop for CATV. Each administrative office workstation is equipment with at least one data outlet and a digital telephone Cabling in classrooms in primarily installed in surface mounted EMT. Much of the cabling in the administrative areas is

exposed. Mini-hubs are also being used to increase connectivity in certain areas. The school is also served by a wireless network (PRSDW)

Main Technology Room

The Main Technology Room (MDF) is located in a closet under the stairs near the Cafeteria. The fiber backbone cabling for data is a multi-mode 62.5/125. Data cabling is Category5 and 5E, connected to Category 5 patch panels. The nertwork electronics consist of HP Procurve. The school is serviced by a Comast Internet Router and has enterprise threat management through an Astaro security gateway

Recommendations

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. Telephones have become a necessary and frequent tool in the classroom to communicate with administrative, educational and parental resources. The existing telephone system is used primarily for administrative purposes (receiving outside calls, forwarding calls to the appropriate user, etc.). There is some concern on the part of administrative staff regarding some of the features and functions available to them with the present system. In the short term, we recommend that additional training be scheduled with the system vendor/installer. In the long term, the school might consider upgrading the existing system to allow use of telephones and/or voice mail for the teaching staff. The existing paging system is at its capacity. Any construction project should include the installation of a new system that can be interfaced with the phone system and allow the school to expand in the future.

Data Systems
Computer technology was once isolated to specialized locations within a school where the technology could be used. Computer technology at the Page Elementary School is driven by many aspects of the curriculum. Technology has slowly migrated into the classrooms as a tool in the educational process resulting in all educational spaces within the School requiring access to computer technology. Because of these requirements, the wireless and structured data system should be expanded. Wireless networking technology should play an integral role in any future project

Video Systems
We recommend an upgrade to the audio/visual equipment in the classrooms. The right system can greatly enhance the overall experience for both teacher and student and improve retention. Every classroom and learning space should be equipped with infrastructure to support technologies such as LCD projection, audio reinforcement, and the use of Interactive White Boards or similar products.

Horizontal and Backbone Cabling
Any construction project should involve the installation of data and voice horizontal cabling consisting of a minimum of Category 6 configured in a star-topology. We would also recommend a data backbone consisting of multi-mode and single mode fiber optic cable. The school should also consider the fact that most of the cabling currently installed is riser-rated, and not approved for use in return-air plenums (the existing mechanical application). The existing cabling should be replaced with plenum-rated cable. The video backbone should will consist of 0.5" hard-line coaxial cable, with the horizontal consisting of RG-6 or RG-11 quad shield coaxial

cable Distributing video over IP is something we would recommend for consideration within the context of any future project.

General

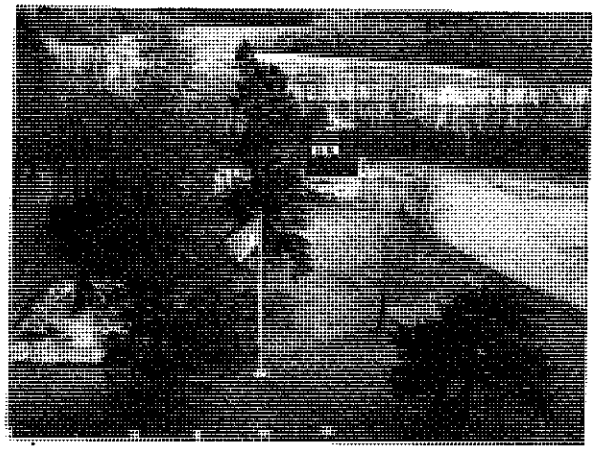
We recommend that all Classrooms be outfitted with voice, data and video technologies for student and teacher use. Every classroom should have a "teacher's workstation" that would act as the central hub for all instructor technology-related activities. The teacher workstation area would allow the teachers to present information to the entire classroom via projector, input video sources to the projector, and communicate with administrative, parental and educational resources. The teacher's computer would connect to a ceiling-mounted LCD projector for group instruction and presentations. The audio from the teacher workstation equipment would be connected to ceiling speakers for improved sound quality and room coverage. The teacher's computer would be "hard-wired" as opposed to connected to the local area network via wireless technology. The teacher's workstation would connect to the teacher's outlet to achieve all required data and voice access and audio-visual connection requirements.

Computer Labs should have the same audio/visual components as Academic Classrooms, but with several additional features. There would be a switcher at the Teacher's Workstation. The switcher would control all audio/visual components available to the instructor. The audio would be enhanced by four ceiling speakers due the larger size of the space typically. Wireless microphones could also be used in the type of space. Structured cabling should accommodate all student workstations with several extra for peripherals.

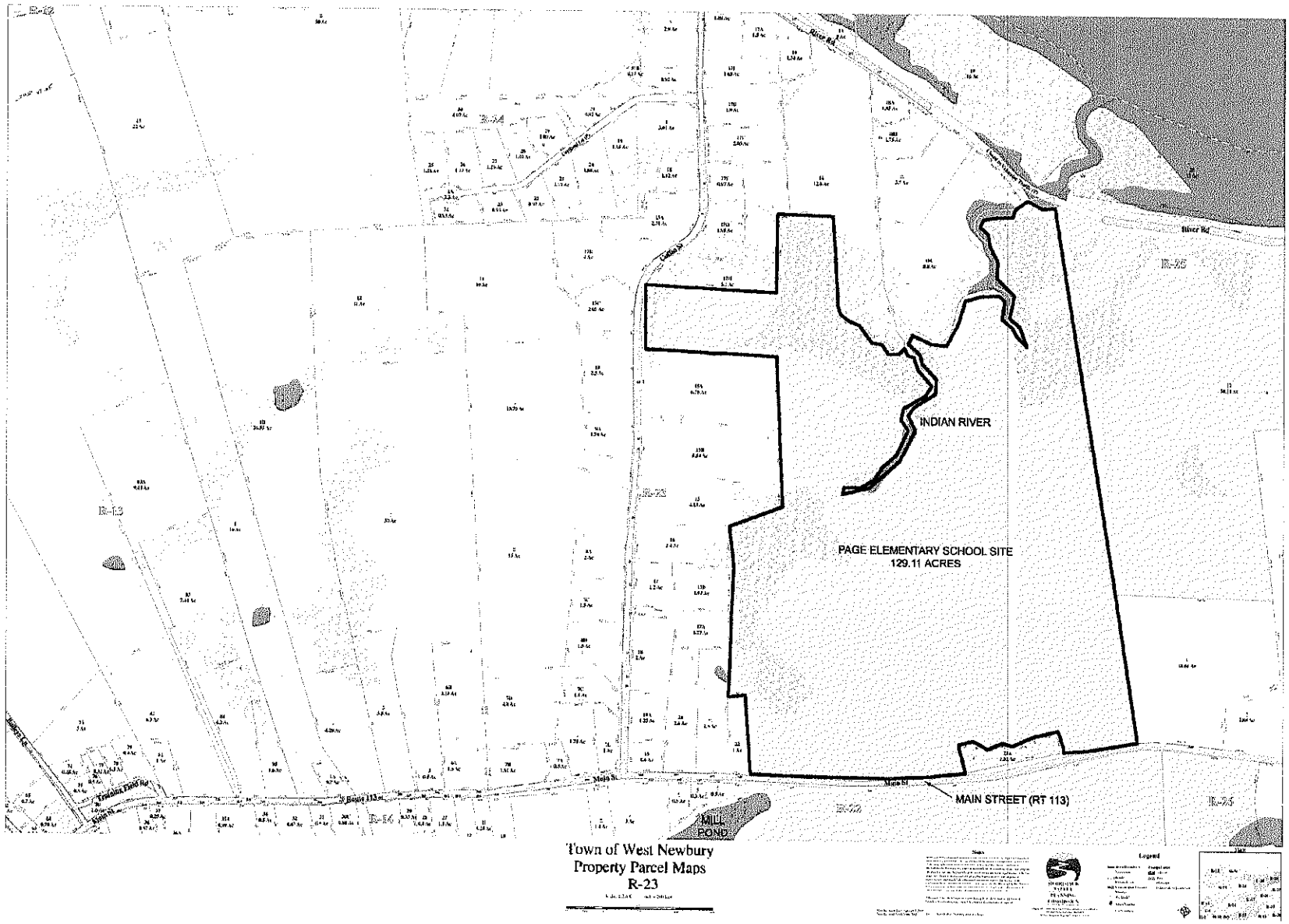
The Media Center should have hard-wired computers for electronic card catalogue use and research. It should also have a group of hardwired computers for general use. The Media Center Specialist will have a hardwired computer and a telephone at the circulation desk. The Media Center is also a perfect application for the use of wireless technology.

All administrative workstations should be equipped with two data outlets and one telephone outlet for a desk phone. Additional data and voice outlets should be provided for shared resources, such as printers and fax machines.

Section IV
Appendecies

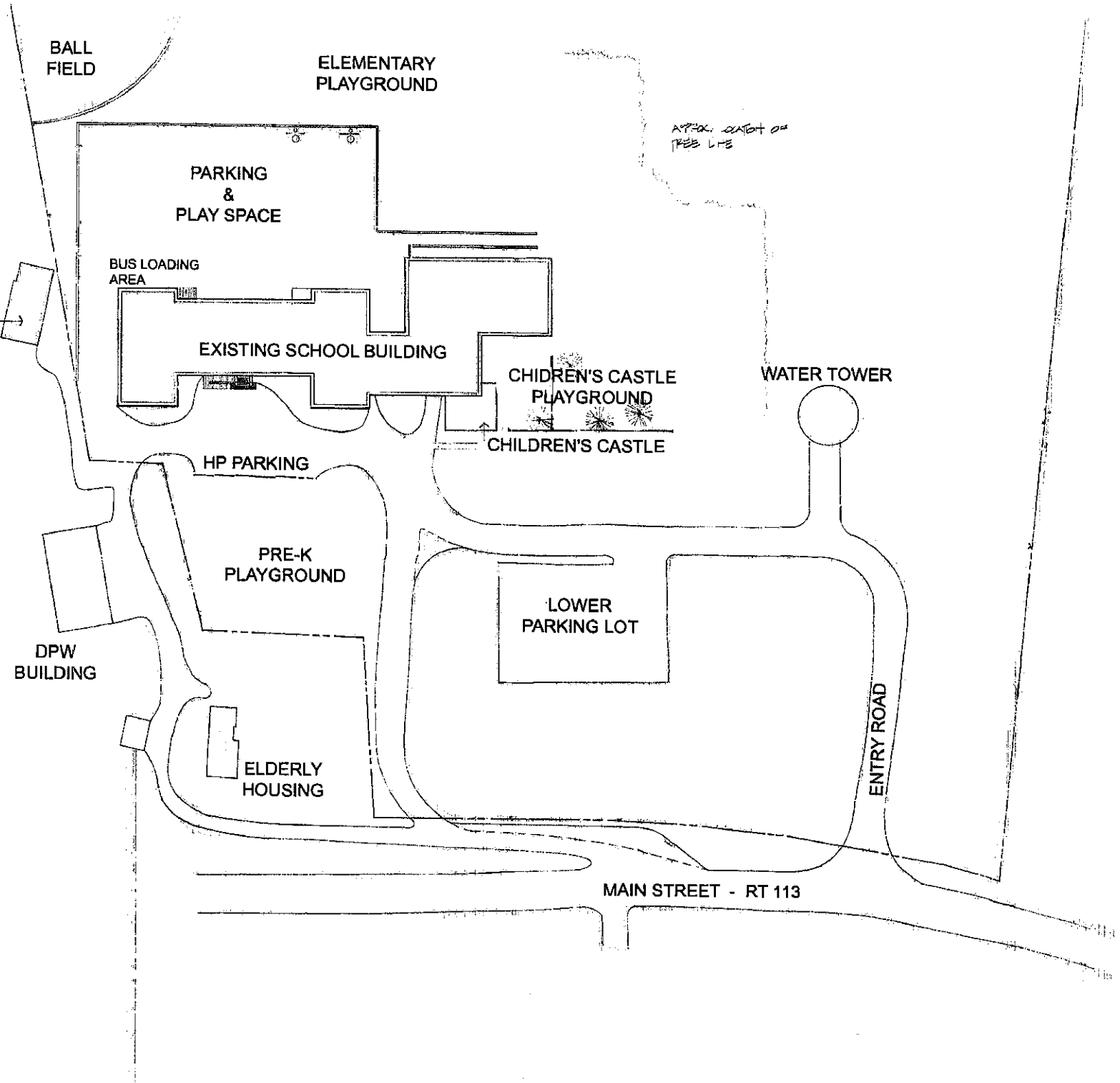


Appendix A
Assessor's Locus Map



APPENDX A - TAX ASESSOR'S PROPERTY MAP

Appendix B
Site Plan



SITE PLAN

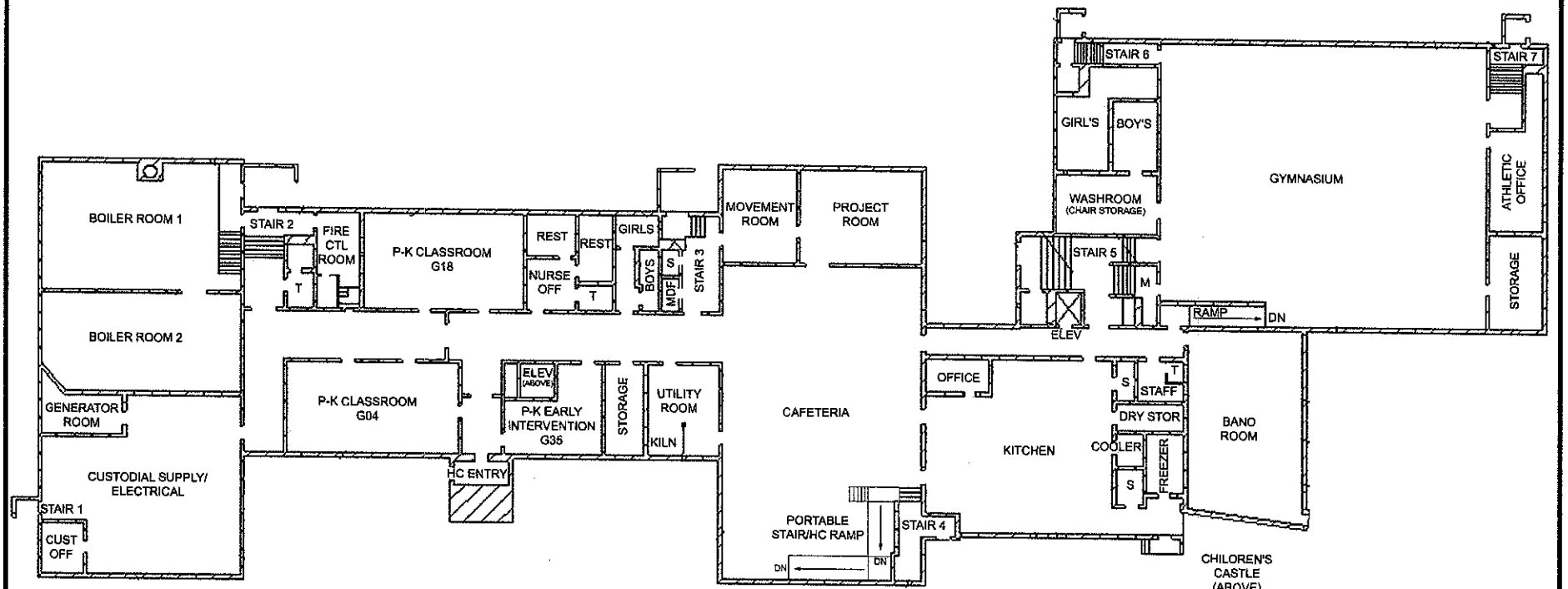
DR. JOHN C., PAGE SCHOOL
694 MAIN STREET
WEST NEWBURY, MA

NOT TO SCALE

260 Merrimac St. Bdg 7
Newburyport, MA 01950
(P) 978.499.2999
(F) 978.499.2944

DORE & WHITTIER
ARCHITECTS, INC. www.doreandwhittier.com

Appendix C
Building Floor Plans



LEGEND

S - STORAGE
STO - STORAGE
T - TOILET
M - MECHANICAL
MDC - MAIN DISTRIBUTION CLOSET
IDC - INTERMEDIATE DISTRIBUTION CLOSET
ELEV - ELEVATOR

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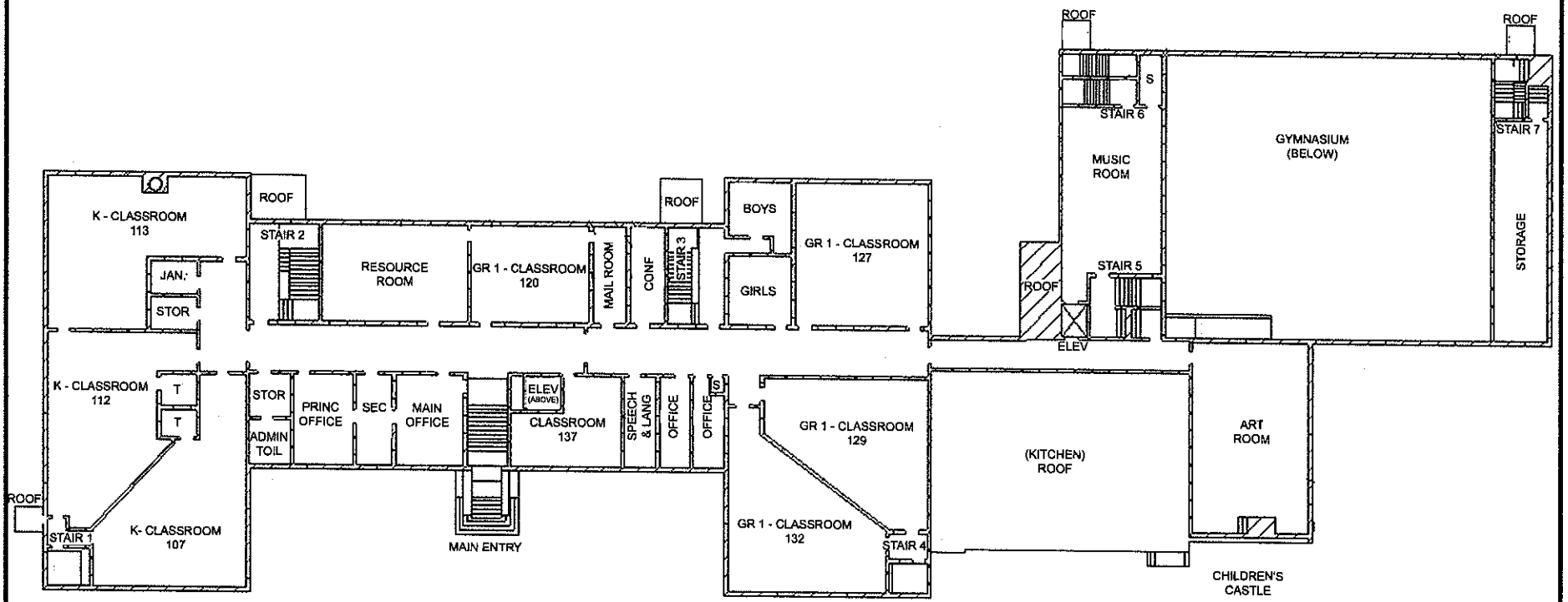
TITLE:

DR. JOHN C. PAGE
ELEMENTARY SCHOOL

LOWER LEVEL

NOT TO SCALE | 2 FEBRUARY2009



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TITLE:

DR. JOHN C. PAGE
ELEMENTARY SCHOOL

FIRST FLOOR

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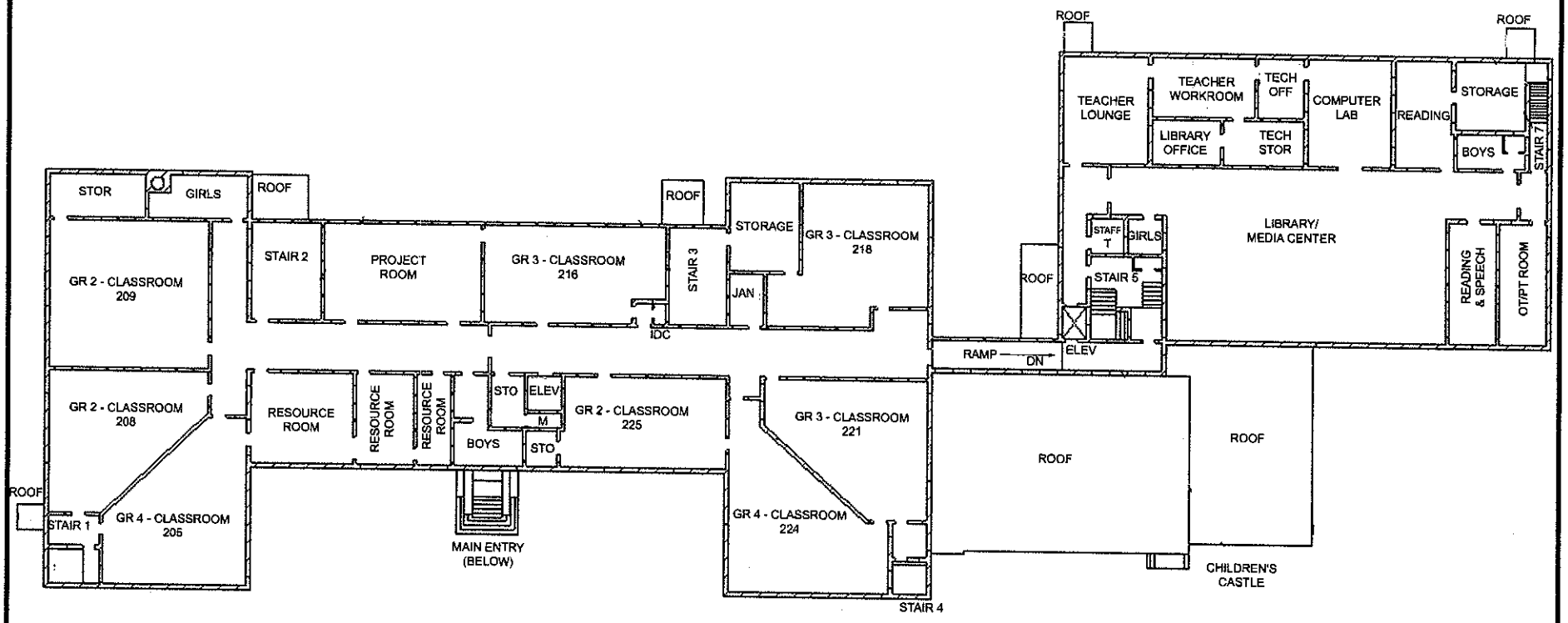
2 FEBRUARY2009



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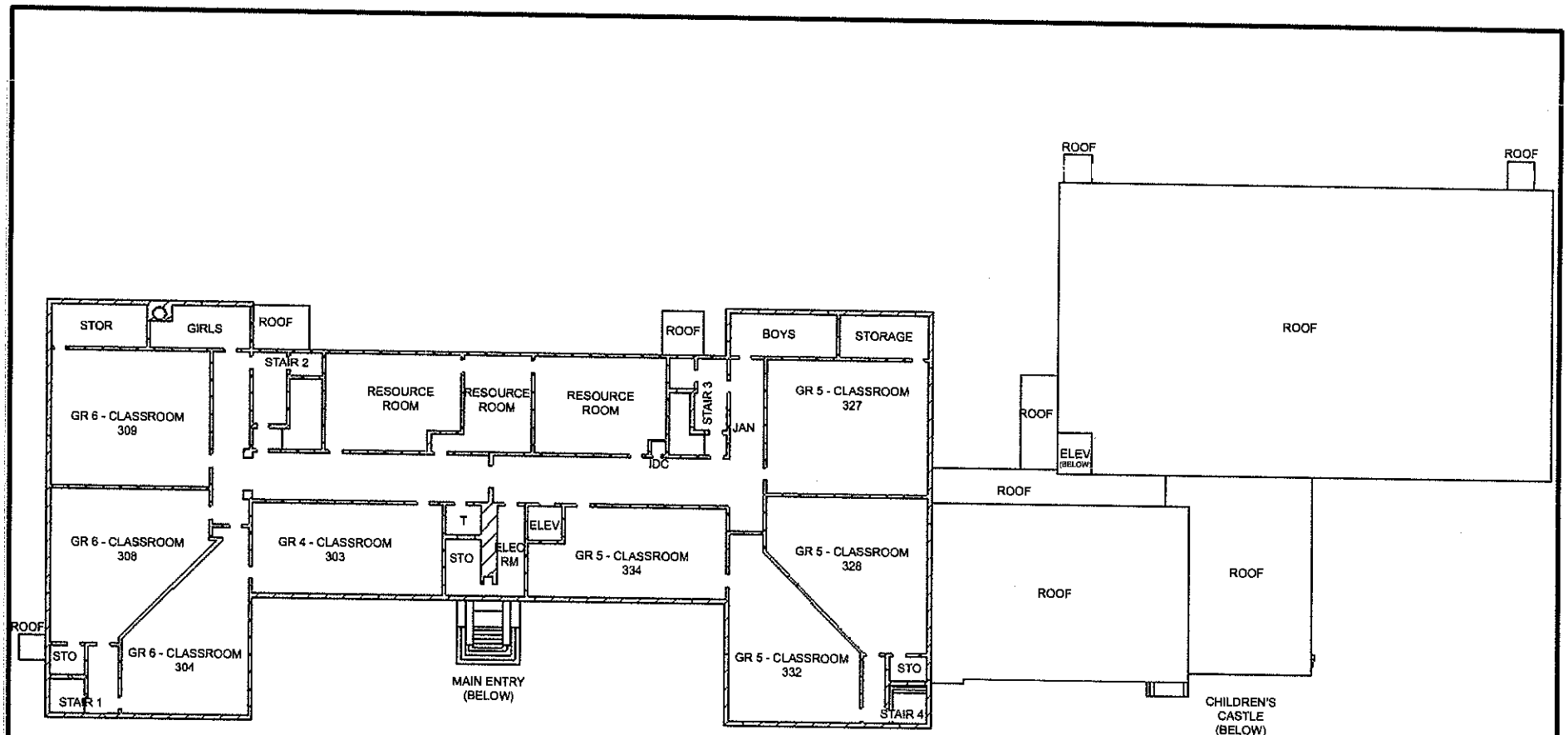
DR. JOHN C. PAGE
ELEMENTARY SCHOOL

SECOND FLOOR

NOT TO SCALE

2 FEBRUARY2009



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DR. JOHN C. PAGE
ELEMENTARY SCHOOL

THIRD FLOOR

NOT TO SCALE

2 FEBRUARY2009

Appendix D
2003 Structural Reoport
(McBrie, LLC)

McBrie, LLC
CONSULTING ENGINEERS

160 Sylvan Street
Danvers, MA 01923-3562
www.mcbrie.com

Phone 978-646-0097
Fax: 978-646-0087
Cell: 978-804-8682

January 30, 2003

Mr. Doug Gelina
c/o Pentucket Regional School District
Dr. John C. Page School
694 Main Street
West Newbury, MA 01985

RE: Visual Structural Inspection
Deteriorated 2nd Floor Slab at the Top of the Middle Stairway
Dr. John C. Page School
694 Main Street
West Newbury, MA 01985
P.O. # 295-03 (McBrie, LLC Job #3-007)

Dear Mr. Doug Gelina:

Per your request, McBrie, LLC performed a visual inspection of the deteriorated 2nd floor slab at the top of the middle stairway of the above reference site on December 30, 2002. The inspection was performed to evaluate the floor slabs condition, possible reason for deterioration, and to provide recommendations for repairs. Directions indicated throughout this report assume the building is viewed from Main Street.

EXISTING CONDITIONS

The second floor's hallway floor construction consists of a gypsum concrete floor slab (approximately 2½" thick) reinforced with expanded wire mesh. The slab is supported by 8" deep steel bar joists spaced at 24" on center (see Figure 1). The joists span between the hallway load bearing walls that run left to right. As previously noted, the reinforcement for the floor slab that spans between the bar joists consists of an expanded wire mesh with raised ribs at approximately 5" on center (see Figure 5). The remainder of the floor area (classrooms) appears to be constructed in a similar manner (see Figure 2).

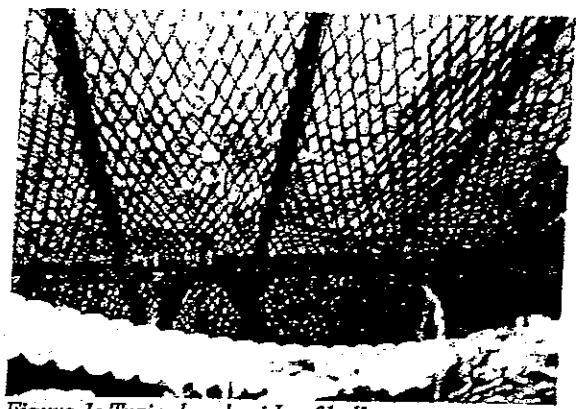


Figure 1: Typical underside of hallway

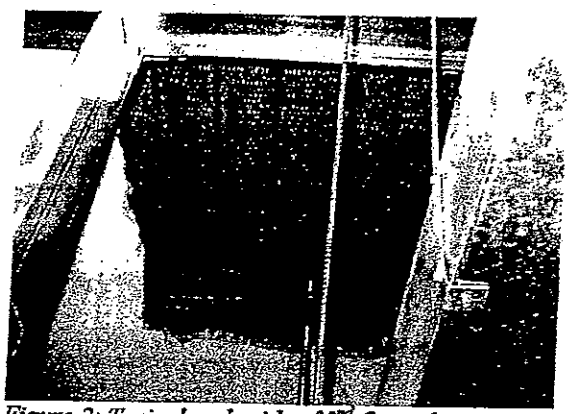


Figure 2: Typical underside of 2nd floor classroom

The deteriorated slab area is approximately 22" wide (deep) x 24" wide (see Figure 3) and is located at the top of the middle stairway as you enter the second floor hallway (see Figure 4). We observed a 100% section loss of the gypsum concrete floor diaphragm (see Figures 5 & 6). The wire mesh was also loose at the seem/splice over the bar joist centered under the deteriorated area.

Figure 3: Deteriorated area - overall

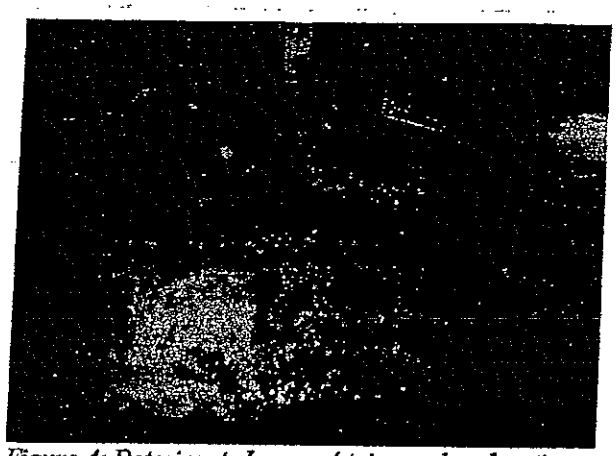


Figure 4: Deteriorated area w/stairway door location

Figure 5: Typical expanded wire mesh rib spacing

Figure 6: Existing patch of boy's bathroom floor

We also reviewed the condition of the boy's second floor bathroom at the right end of the corridor. Per our observations of the localized exposed areas of concrete, the bathroom floor appears structurally sound. It was sounded with a hammer and appeared solid.

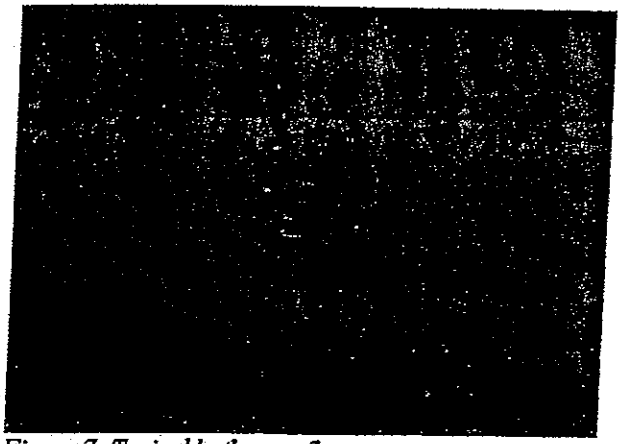


Figure 7: Typical bathroom floor

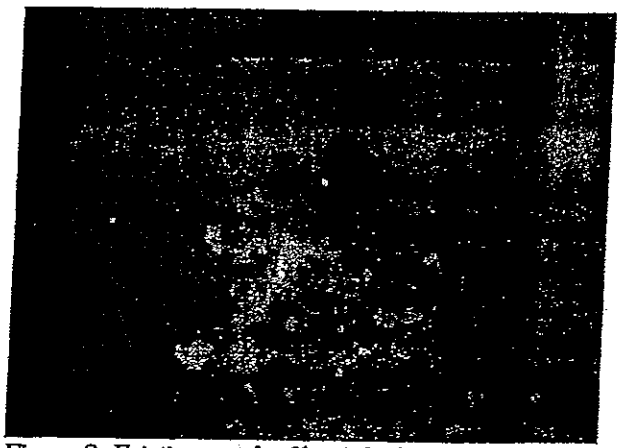


Figure 8: Existing patch of boy's bathroom floor

EVALUATION OF FLOOR CONSTRUCTION

Mr. Steven Stokowski, President, Stone Products Consultants was contacted to perform a chemical analysis of the floor slab concrete. We needed to determine if the deterioration was due to deterioration of the cement (determined to be gypsum) or possibly a chemical reaction between the aggregate and the cement. Based upon Mr. Stokowski report (included in Appendix A), the floor concrete is stable and of the same chemical composition as the day it was cast.

The existing Page School floor construction type is uncommon for this area. We reviewed the floor construction type with several local engineers and architects and with the help of Mr. Stokowski; we were able to locate Mr. Robert Wilkin, P.E. of CBI Consulting, Inc, an engineer with experience in evaluating this type floor construction. Mr. Robert Wilkin, P.E. has evaluated this construction type in numerous buildings – typically schools & apartment buildings built in the 1920's (Doug Gelina noted the school was built in approximately 1926 +/-). We requested that Mr. Robert Wilkin, P.E. perform a review based on seeing photographs from the Page School in conjunction with conversations with McBrie, LLC and Steven Stokowski, President, Stone Products Consultants. Upon completing his review, Mr. Wilkin prepared a letter stating that it is possible to repair the deteriorated area and meet the loading capacity of the adjacent slab's live load capacity. His letter is included in Appendix B of this report.

RECOMMENDED REPAIRS

Based upon our observations and the reports contained in Appendices A and B, it is our opinion that the above noted conditions indicate that the second floor hallway can remain in service following repair of the deteriorate area. We have prepared sketches for the proposed repairs that are included in appendix C. The repair will consist of:

1. Removal of all deteriorated, loose mortar/grout/concrete in the reference area. McBrie, LLC, should determine the final limits of removal.
2. The existing mesh should be wire brushed to remove all loose rust.
3. The mesh should be pulled tight and tied over the existing bar joist at the spice in the mesh. The mesh and concrete perimeter of the existing slab should be primed with an epoxy-bonding compound. McBrie, LLC prior to the installation of the new concrete, should inspect this step.
4. Install a 4000psi; 3/8" stone concrete mix to replace the deteriorate/removed gypsum concrete.
5. Wet cure the slab for a minimum of 7 days (3 days if high-early concrete mix is used).
6. We recommend that access panels be installed in the rigid ceilings to allow access to the underside of the hallway slabs at the stairway entrances and the bathrooms. This would allow inspection of the floor slab in the areas that are susceptible to moisture penetration. Experienced personnel on a bi-annual basis should perform inspections. The design/installation of the access panels should be under the direction of a registered architect or registered fire protection engineer.

In addition, consideration should be given to replacement of the existing membrane floor coating of the second floor bathrooms with an epoxy-watertight wearing surface.

In conclusion, based upon our observations and the reports contained in Appendices A and B, it is our opinion that the above noted conditions indicate that the second floor hallway slab is chemically stable and can be repaired as indicated in Appendix C.

If you require additional information, please to not hesitate to contact our office.

Sincerely,

Michael Perham, PE
Structural Engineer / Managing Member

Appendix A

Letter prepared by
Robert G. Wilkin, P.E. – CBI Consulting, Inc.

CBI
Consulting Inc

January 27, 2003

FAX SENT
JAN 27 2003
BY: GJ MG JGS 2

Michael Perham, PE
McBrie, LLC Consulting Engineers
160 Sylvan Street
Danvers, MA 01923-3562

Principals
Craig E Barnes
Michael S Teller
Wayne R Lawson

Tel. No.: 978-646-0097
Fax No.: 978-646-0087

RE: Page School, West Newbury, MA
Subj.: Experience with Gypsum Floor Systems

CBI Job No.: 03008

Dear Mr. Perham,

While working for The Thompson & Lichtner Co. the undersigned evaluated and performed several load tests on gypsum floor systems similar to the one you encountered at the referenced school. We also performed a load test on another building with CBI.

These building included the following:

Weeks School Housing, Newton, MA
Apartment building turned Dormitory for Wentworth Institute
Roslindale Elementary School Housing

All of these building were constructed in the 1920's.

A similar system has been used for roofing decks using a lighter gage mesh. We have evaluated several of these gypsum roof deck systems as well, that were installed through the 1970's and later.

Gypsum is a reasonably good floor system when protected. It is relatively dense with a compressive strength above 1,000psi. It can be damaged from wear and heavy traffic. Water will soften the gypsum over time. It can get wet several times without excessive deterioration but will swell and soften when wet often or continuously.

Gypsum has a neutral pH and can offer no protection of the reinforcement against rusting like new Portland cement concrete can. This can be a problem with wet areas,

250 Dorchester Avenue
Boston, Massachusetts
02127

t 617 268 8977
f 617 464 2971

cbi1984.com

CBI Consulting Inc

especially leaking roofs with thin mesh reinforcing that can rust out quickly. If the mesh rusts out, the gypsum acts as a flat arch spanning between supports rather than as a continuous beam.

The system tested at the Roslindale school building supported a 200psf test load, applied with a +/- 6 x 10' pool of water.

From the photos, your system seems to be supported by metal bars spanning between the trusses. The mesh appears to be relatively thick and the spans are not too great. If the mesh is still in satisfactory condition, the deteriorated gypsum can be cleaned out, any rusted mesh primed or replaced, and new gypsum placed on the mesh. If this area is an area that can be deteriorated again or if it is to thin to resist bending, the gypsum can be replaced with concrete.

Please call with any questions.

Very truly yours,
CBI Consulting Inc.

Robert G. Wilkin, P.E.
Associate
rwilkin@cbi1984.com

RGW

Appendix B

Report prepared by
Steven Stokowski, President, Stone Products Consultants

STONE PRODUCTS
CONSULTANTS

Exploration Petrography Research

10 Clark St., Suite A, Ashland, MA. 01721-2145 (508) 881-6364 (phone & fax)
crushstone@aol.com, spcpetro@aol.com

January 28, 2003
SPC Project 202140

PETROGRAPHIC ANALYSES, Second Floor Concrete and Sand Mixes, Dr. John C. Page School, 694 Main St., West Newbury, Massachusetts

SAMPLE ID:

Core samples of concrete from the second floor of the Dr. John C. Page School, West Newbury, Massachusetts. Six total cores were taken from four areas representing potentially different conditions. The concrete slab was placed were constructed c. 1926. Stone Products Project No. 202140. Samples taken by Geotechnical Services, Inc., Haverhill, MA at locations specified by S. Stokowski of Stone Products Consultants, Ashland, MA.

SUMMARY

A rubbled, approximately 3 feet in diameter, area of the floor slab is present under carpeting and underlayment at the entry from the stairwell to the second floor hallway. The rubble rests upon expanded metal lath that rests upon steel bar joists. The rubble consists of broken gypsum gravel concrete, gypsum sand bed, and a white gypsum-based material (Gypcrete?). At one time, probably soon after placement of the gypsum gravel concrete layer, a hole developed in the concrete. This hole was repaired with filling with the gypsum sand bed material used to level the top of the floor. The repair was done without properly cleaning the rubble out of the hole, cutting back the failure to sound material, or bonding with adjacent concrete. Later, another hole developed adjacent to the repaired area. This was repaired with Gypcrete, possibly by the installers of the carpeting. This repair was also not done properly. Now, a third hole has developed; this hole encompasses the two previous failures.

The floor is composed of gypsum gravel concrete overlain by a gypsum sand bed. The gypsum gravel concrete, approximately 2.6 inches thick, consists of a gypsum plaster binder, natural gravel, and natural sand. The observed nominal coarse aggregate size is 0.75". The plaster, now gypsum with a calcite marble filler, originally consisted of calcium hemi-hydrate (Plaster of Paris), and calcite marble filler. The w/g ratio of the concrete the cores is relatively high (0.65-0.75), with the slightly greater value at the failed area. The gypsum gravel concrete did not deteriorate because of a water spill, flooding, or other abnormal event.

The sand bed material is composed of a mixture of gypsum plaster and sand. A sand bed is typically used as a leveling material under terrazzo, stone tile, ceramic tile; these materials are not currently present.

PROCEDURES:

Stone Products Consultants examined the samples in accordance with ASTM C 856 (Petrographic Examination of Hardened Concrete) and in general accordance with ASTM C 1324-96 (Standard Test Method for Examination and Analysis of Hardened Masonry Mortar), using ASTM C 457 (Microscopic Determination of Air-Void Content and Parameters of the Air-Void System in Hardened Concrete). Data in the specifications ASTM C317/C317M-00 Standard Specification for Gypsum Concrete and ASTM C35-01 Standard Specification for Inorganic Aggregates for Use in Gypsum Plaster

Thin sections were prepared from representative portions of the samples. Section 3 (50 x 75 mm, 30μm thick) was prepared from Core 3. Section 4 (50 x 75 mm, 30μm thick) was prepared from Core 4 and 4T (50 x 75 mm, 30μm thick) was prepared from the sand-bed at the top of Core 4. Section 5 (50 x 75 mm, 30μm thick) was prepared from Core 5. Section 6 (50 x 75 mm, 30μm thick) was prepared from Core 6; it also included the sand bed material at the top. Mineral Optics Lab, of Wilder, VT prepared the sections with blue-dyed epoxy to preserve any delicate features. Stone Products Consultants (S. Stokowski and P. Kelly) analyzed the sections.

SAMPLE CHARACTERISTICS & DISCUSSION:

In late 2002, Mr. Doug Gelina (West Newbury School System) noted a sponginess in the floor of the second floor aisle in front of the entry to a main stairway. An excavation by Mr. Gelina and Mr. Michael Perham of McBrie, LLC revealed that this floor consisted of repaired and rubbled concrete on top of expanded metal lath draped upon steel bar joists (Figures 1 and 2). The floor was repaired twice. The first repair occurred at the time when a sand bed was placed on top of the gravel concrete. At that time, probably during the construction of the building, some of the gravel concrete was broken and removed to the underlying wire mesh. The hole in the floor was repaired with a sand bed material to the level of, and probably continuous with, a layer of sand bed on the top of the gravel concrete. This sand bed fill contains broken pieces of gravel concrete (and a wood screw) at the interface with the underlying mesh (Figure 4). Therefore, the hole was not properly cleaned out before placement of the gypsum sand bed. The edges of the hole were also not cut back to sound material, nor was the repair bonded or mechanically attached to the adjacent concrete. The floor apparently failed again at a much later time, and was repaired with a white, sanded gypsum product, probably Gypcrete (see Figures 1, 2, and 5). This repaired area incorporates fragments of the gravel concrete and the sand bed along the edges, but there is almost no broken material at the base of the Gypcrete over the wire mesh. Whoever repaired the hole did not cut the edges back to sound material, but did clean out the hole. This repair probably occurred when the carpeting and board underlayment was installed (about 20 years ago).

The samples are 6 concrete cores (Cores 1 thru 6) from the second floor of the Page school in West Newbury, MA. Figure 3 is a sketch of the core locations. Cores 1 and 5 and 2 and 4 are duplicate cores taken at the same location. The additional samples were taken to replace material damaged during the coring operation. We sampled the complete thickness of the

floor. The top surfaces of the samples (consisting of sand bed) were slightly abraded or damaged because of the long history of the concrete. The bottom surfaces contained impressions of the expanded metal used as the casting form. Cores 2 and 4 were the closest possible samples to the damaged area of the floor. Core 4 of this pair was analyzed. Cores 1 and 5 were taken to determine if the damaged material extends to one side of the hall. Core 5 of this pair was analyzed. Core 3 was taken to determine if the damaged concrete extends to the other side of the hall. Core 6 was taken about 50 feet from the other cores to see if the damaged concrete extends down the length of the hall.

The diameter of the cores is approximately 1.85". Core 1 is approximately 3.1" long, Core 2 is approximately 3.5" long, Core 3 is approximately 2.6" long, Core 4 is approximately 3.4" long, Core 5 is approximately 3.2" long, and Core 6 is approximately 2.9" long. For a description of the dimensions of the cores, see Attachment 1, "Concrete Core Logs".

The cores did not intersect embedded reinforcing steel.

Gypsum Gravel Concrete:

Most of the cores consist of gypsum gravel concrete. The cement consists of gypsum and ground marble filler. Gypsum is present as a fine matrix and also in a coarser, recrystallized phase that partially or completely fills voids (Figures 6, 8, 9, and 11). Some of these voids may be from plastic shrinkage; some are air voids. The calcite marble filler has a fine grain size, as is typical for the mineral filler in calcium hemi-hydrate products.

Efflorescence deposits did not form on the prepared surface of the specimens. The concrete does not contain extremely large quantities of NaCl, $CaCl_2$, silica gel, etc., nor has it been saturated with water since placement.

The mortar phase of the gypsum gravel concrete in the cores is approximately white (Munsell 10 YR 8/1) when dry and gray (Munsell 10 YR 6/1) when wet.

The coarse aggregate in the concrete portion of the cores is natural gravel. The observed maximum particle size of the coarse aggregate in the cores is 0.75". The gravel is durable and only slightly weathered. The predominant rock types are granite and biotite schist; they suggest a Merrimack River source for the gravel.

The fine aggregate in the gypsum gravel concrete is natural sand composed of subrounded particles of quartz, feldspar, and schist rock fragments. Sand with a similar composition is abundant in the Merrimack River area.

The bond between the aggregate and the cement paste in both cores is normal. The aggregate is not excessively dusty.

Textures of the concrete indicate that the water/gypsum binder ratios are high in the cores. Paste in the thin sections absorbs blue-dyed epoxy in a manner similar to reference thin sections at known w/c ratios. The water/gypsum binder ratios are similar and approximately 0.65 for cores

3, 5, and 6. Core 4, from the edge of the current failure, has a higher, approximately 0.75, water/gypsum binder ratio. This area would be slightly weaker than the concrete represented by cores 3, 5, and 6.

Gypsum Sand Bed:

The floor has a gypsum sand bed on top of the gypsum gravel concrete. This material is typically 0.25 to 0.75 inches thick, but is the full depth of the floor (4 inches) in the area of the now-failing historic repair. A sand bed is typically used as a leveling material under terrazzo, stone tile, ceramic tile; these materials are not currently present.

The mortar phase of the sand bed overlying the gypsum gravel concrete in core 4 is approximately white (Munsell 10 YR 6/1) when dry and gray (Munsell 10 YR 5/1) when wet. The mortar phase of the sand bed overlying the gypsum gravel concrete in core 6 is approximately white (Munsell 10 YR 7/1) when dry and gray (Munsell 10 YR 5/1) when wet. These colors are normal.

The solid portion of the paste is a mixture of gypsum and calcite marble powder (Figures 7 and 10). This is the typical composition of commercial Plaster-of-Paris based gypsum plasters.

The composition of the sand in the sand bed is different in the sand bed sample taken in the area of the failure and the sample from the floor further down the hall. Sand from the sand bed of Core 4 (taken from the area of failing floor) has a mineral make-up of feldspars, granite, and muscovite schists as is typical in southern New Hampshire. Sand from the sand bed of Core 6 (about 50 feet from Core 4) consists of quartzite, biotite schist, vein quartz, feldspar, and granite, as is typical from the Merrimack River area. The composition is similar to that of the underlying gravel gypsum concrete. The difference in composition of the sand suggests that the sand bed was field mixed, as opposed to a prepackaged, product. The reason for this difference in sand composition is not known, but may reflect one or two periods of installation of the sand bed, with either a sand supplier with pits in two areas or two different contractors with different sand sources.

We quantitatively determined the compositions of the sand bed in the core 4 and 6 samples (Tables 1 and 2). The proportions were similar. This similarity suggests that a single contractor using two different sources of sand mixed and placed the gypsum sand bed.

Table 1. Results of ASTM C-457 Analysis, Sand Bed Sample 4T
Dr. John C. Page School, 694 Main St., West Newbury, Massachusetts

COMPONENT	Vol. %
Sand	54.1
Gypsum Paste	27.9
Total Air	18.0

W/Gp Ratio	Ratio, S/Gp	Sand Proportion
0.49	2.61	Normal
Ψ 0.53	**2.72**	**Normal**
0.60	2.92	Normal

Assumptions: Gypsum plaster = 53#/ft.^{3} & 2.35 Sp. Gr.; Sand = 95#/ft.^{3} & 2.63 Sp. Gr.
Ψ Estimated water/Gyp. plaster ratio
Number of points counted = 400

Table 1. Results of ASTM C-457 Analysis, Sand Bed Sample 6
Dr. John C. Page School, 694 Main St., West Newbury, Massachusetts

COMPONENT	Vol. %
Sand	54.8
Gypsum Paste	28.7
Total Air	16.5

W/Gp Ratio	Ratio, S/Gp	Sand Proportion
0.49	2.56	Normal
Ψ 0.53	**2.67**	**Normal**
0.60	2.87	Normal

Assumptions: Cement = 53#/ft.^{3} & 2.35 Sp. Gr.; Sand = 95#/ft.^{3} & 2.63 Sp. Gr.
Ψ Estimated water/Gyp. plaster ratio
Number of points counted = 400

The sand bed contains a typical quantity of air (18 & 16.5%) for this material.

The texture of the sand bed indicates that it has a normal water/gypsum ratio. The water/cement ratio was approximately 0.53.

S. J. Stokowski, Jr. ** Concrete Petrographer

P. Kelly ** Geological Assistant

Figure 1. Illustrated photograph of damaged portion of second floor at Page School, West Newbury, MA. Note area of historic repair using gypsum sand bed, and more recent repair using Gypcrete.

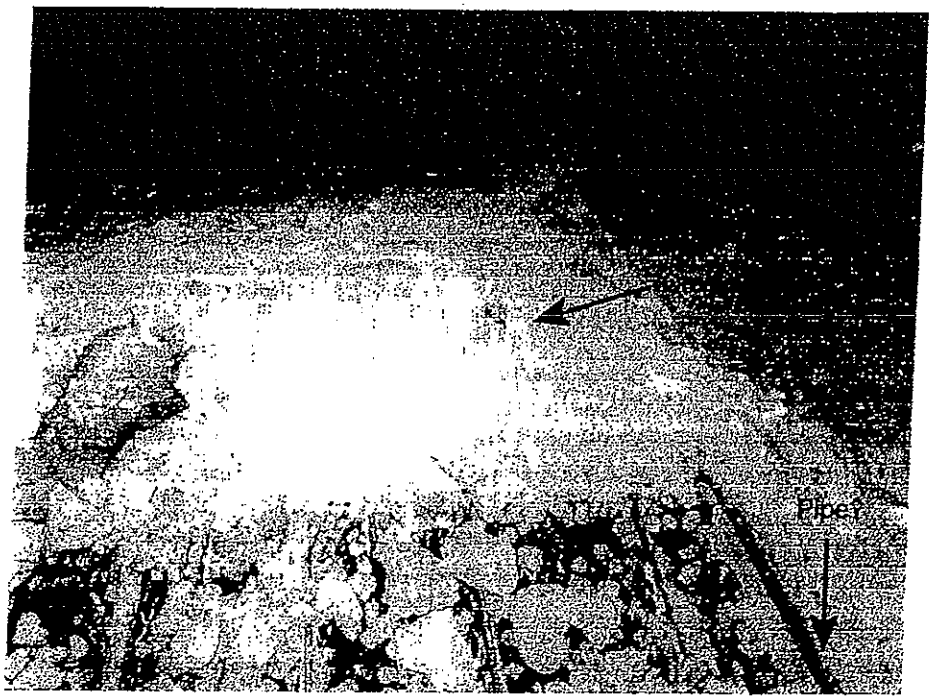


Figure 2. Illustrated photograph of damaged portion of second floor at Page School, West Newbury, MA. Note cracks in gypsum concrete and gypsum sand bed adjacent to Gypcrete repair. Also note pipe (?) avoided during sampling.

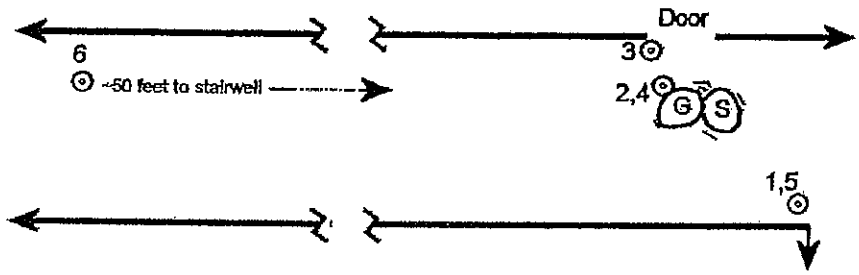


Figure 3. Sketch of damaged second floor hall outside of stairwell, Dr. John C. Page School, 694 Main St., West Newbury, MA showing locations of concrete core samples (#'s 1 - 6) and areas where the historic sand-bed (S) and more recent Gypcrete (G) floor repair materials were exposed. Not drawn to scale.

Figure 4. Photograph showing gypsum sand bed on rubble of gypsum gravel concrete in specimen removed from floor. The gypsum sand bed was used to fill an incompletely cleaned hole in gypsum gravel concrete during its first historic repair. Coin for scale.

Figure 5: Photograph of piece of Gypcrete used in second more recent repair of the gypsum gravel concrete floor. Coin for scale.

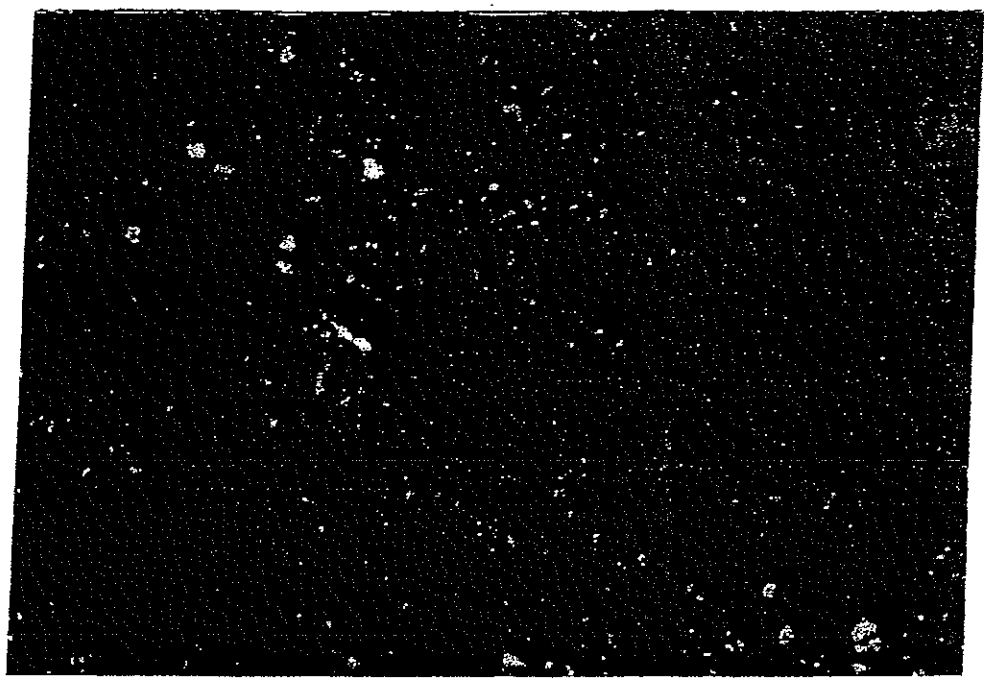


Figure 6. Photomicrograph of gypsum cement binder from Core 3. Note that the gypsum cement occurs as a fine grained matrix and also as coarser, recrystallized material partially or wholly filling void spaces. Crossed Nicols. Gypsum Plate. Field width = 1.4 mm.

Figure 7. Photomicrograph of gypsum sand bed from Core 4, sample 4T. Sub-rounded sand grains in fine gypsum cement matrix with coarser gypsum filling in void spaces. Note Carlsbad and microcline twinning in feldspathic sand grains. Crossed Nicols. Gypsum Plate. Field width = 4.8 mm.

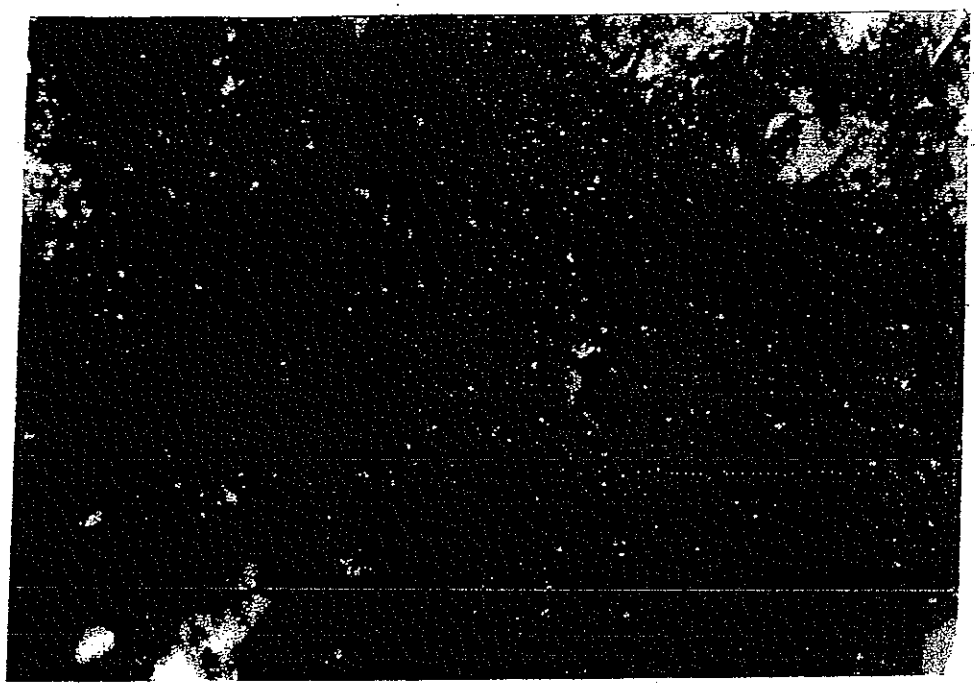


Figure 8. Photomicrograph of gypsum cement binder from Core 4, sample 4. Note that the gypsum cement occurs as a fine grained matrix and also as coarser, recrystallized material partially or wholly filling void spaces. Crossed Nicols. Gypsum Plate. Field width = 1.4 mm.

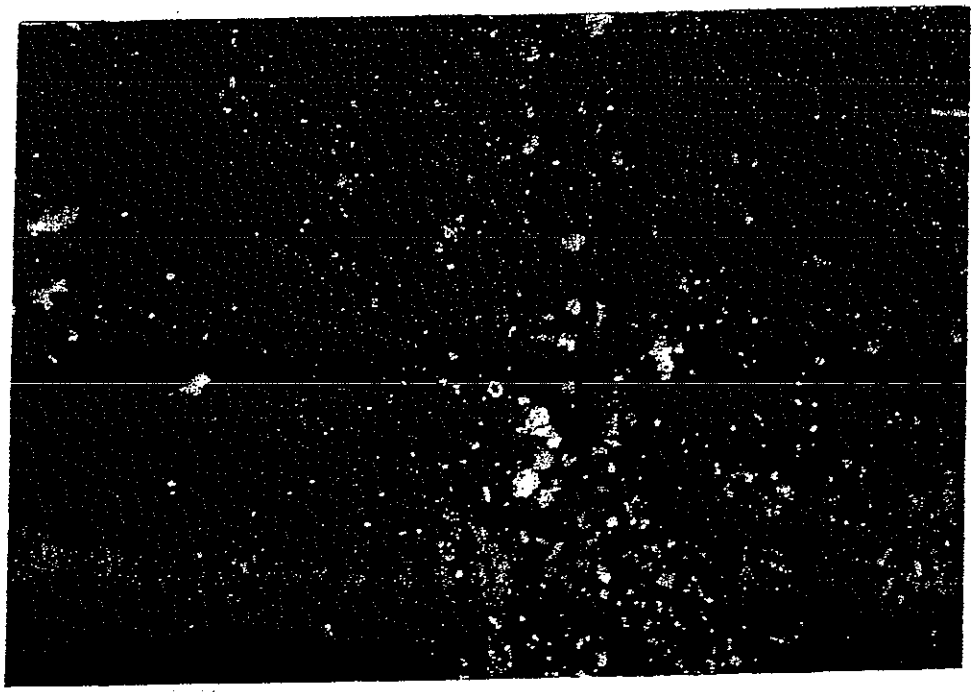


Figure 9. Photomicrograph of gypsum cement binder from Core 5. Coarse gypsum infilling void space surrounded by fine grained gypsum cement matrix. Crossed Nicols. Gypsum Plate. Field width = 1.4 mm.

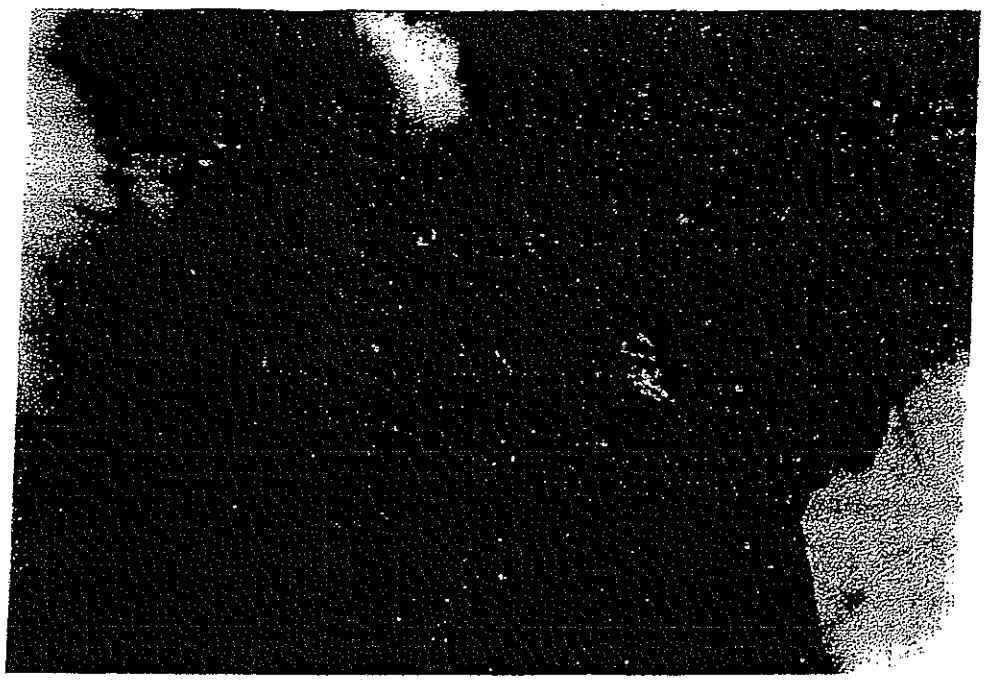


Figure 10. Photomicrograph of sand phase from Core 6. Note fine grained gypsum cement. Crossed Nicols. Gypsum Plate. Field width = 1.4 mm.

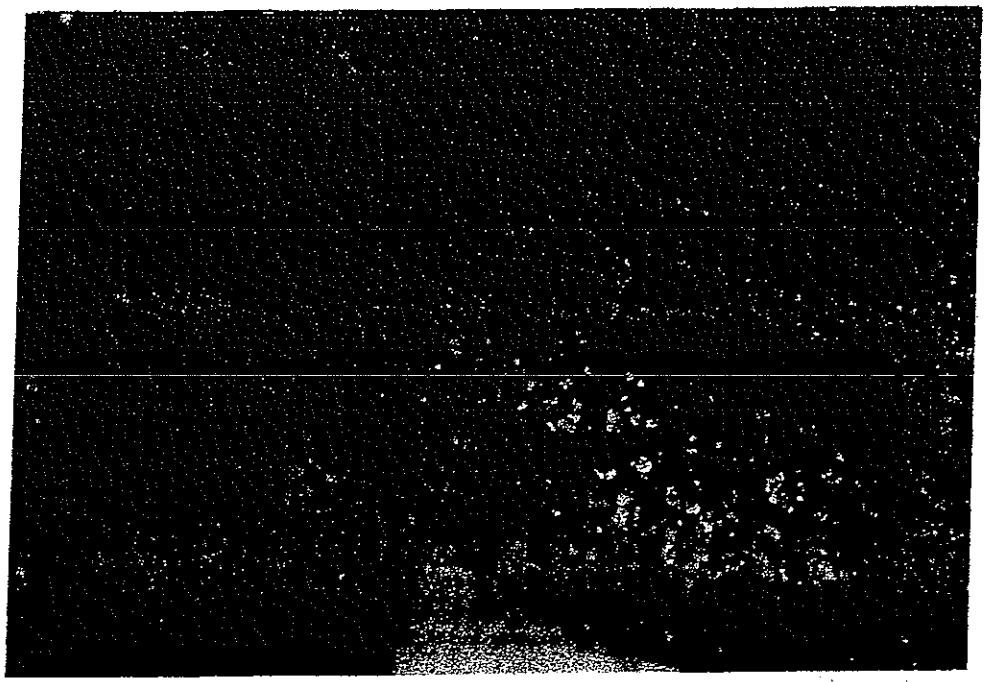


Figure 11. Photomicrograph of gypsum cement binder from gravel phase, Core 6. Coarse gypsum infilling void space surrounded by fine grained gypsum cement matrix. Crossed Nicols. Gypsum Plate. Field width = 1.4 mm.

Concrete Core Logs

GEOTECHNICAL SERVICES, INC.

♦ Geotechnical Engineering ♦ Environmental Studies ♦ Construction Monitoring ♦ Materials Testing

TRANSMITTAL FORM

To:	Mr. Steve Stokowski	**Date:**	January 2, 2003
Project:	Page School	**GSI Project #:**	202424
Company:	Stone Products Consultant 10 Clark Street, Suite A Ashland, MA 01721	**Telefax #:**	
		Submittal #:	

Transmittal of:		*Sent Via:*		*Transmitted as indicated:*			
☐	Plans	☐	Fed-Ex	☐	For Review	☐	Accepted
☐	Specifications	☐	US Mail	☐	For Approval	☐	Accepted as noted
X	Samples	☐	Courier	☐	As Requested	☐	Revised & Resubmitted
☐	Other	X	UPS	X	For Your Use	☐	Reviewed

Copies	*No.*	*Date*	*Description*
6		12/31/02	Concrete Core Samples with Concrete Core Logs

REMARKS

Prepared By: _____
Richard E. Bushnell, PE

C: file (Copy of Concrete Core Logs)

☐ 12 Rogers Road Haverhill, Massachusetts 01825 978/374/7744 fax 978/374/7799
☐ 18 Cote Ave Unit 11 Goffstown, NH 03045 603/624/2722 fax 603/624/3733
☐ 108 Whipple Street, Lewiston, ME 04240 207/282/7225 fax 207/282/9271

GEOTECHNICAL SERVICES, INC.

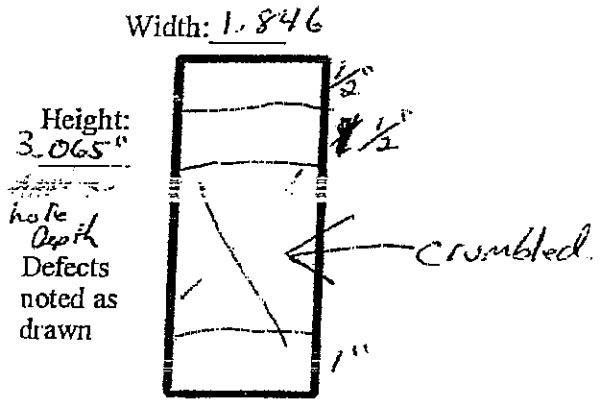
♦ Geotechnical Engineering ♦ Environmental Studies ♦ Construction Monitoring ♦ Materials Testing

CONCRETE CORE LOG

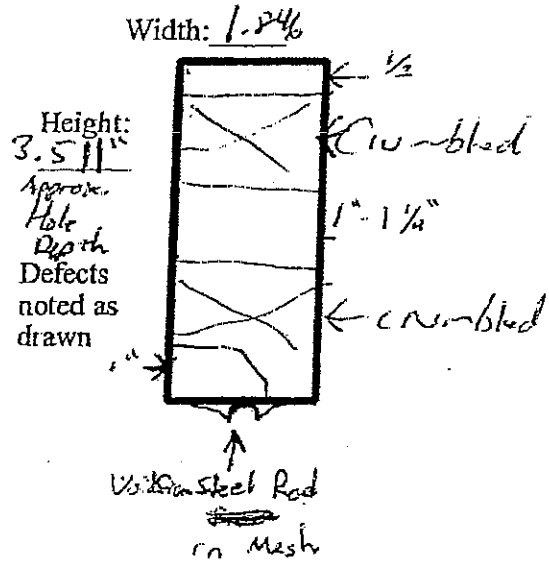
PROJECT: Page School PROJECT NO. 202-24

GSI REPRESENTATIVE: Alf Osborn DATE: 12/31/02

CORE #: 1 LOCATION: See Sketch TIME STARTED: 8:15 TIME COMPLETED: ~~8:30~~ 8:30



CORE #: 2 LOCATION: See Sketch TIME STARTED: 8:35 TIME COMPLETED: 8:45



☐ 12 Rogers Road, Haverhill, MA 01825 tel: 978/374/7744 fax: 978/374/7799
☐ 18 Cote Ave, Goffstown, NH 03045 tel: 603/624/2722 fax: 603/624/3733
☐ 108 Whipple Street, Lewiston, ME 04240 tel: 207/282/7225 fax: 207/282/9271

GEOTECHNICAL SERVICES, INC.

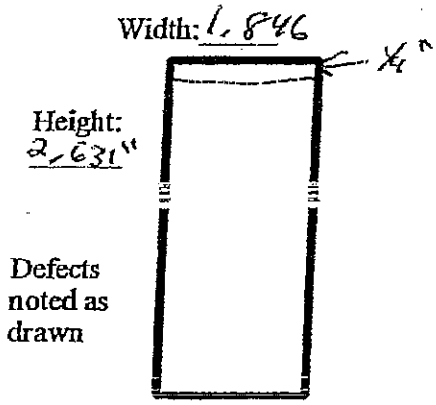
♦ Geotechnical Engineering ♦ Environmental Studies ♦ Construction Monitoring ♦ Materials Testing

CONCRETE CORE LOG

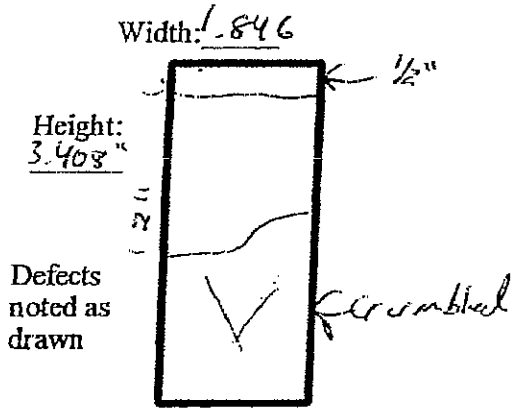
PROJECT: Page School PROJECT NO. 20424

GSI REPRESENTATIVE: AF Osborne DATE: 12/31

CORE #: 3 LOCATION: See Sketch TIME STARTED: 8.55 TIME COMPLETED: 9.05



CORE #: 4 LOCATION: See Sketch TIME STARTED: 9:15 TIME COMPLETED: 9.20



☐ 12 Rogers Road, Haverhill, MA 01825 tel: 978/374/7744 fax: 978/374/7799
☐ 18 Cote Ave, Goffstown, NH 03045 tel: 603/624/2722 fax: 603/624/3733
☐ 108 Whipple Street, Lewiston, ME 04240 tel: 207/282/7225 fax: 207/282/9271

GEOTECHNICAL SERVICES, INC.

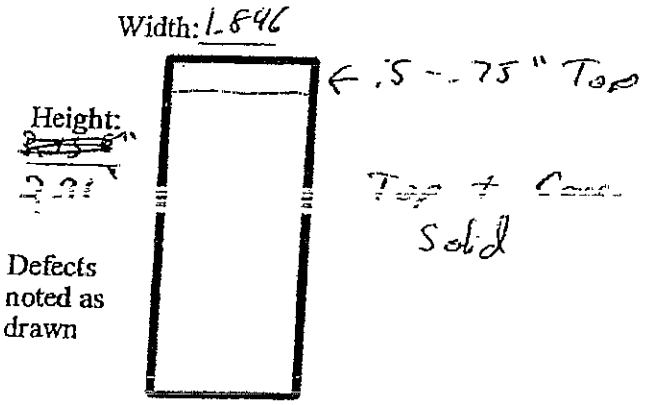
♦ Geotechnical Engineering ♦ Environmental Studies ♦ Construction Monitoring ♦ Materials Testing

CONCRETE CORE LOG

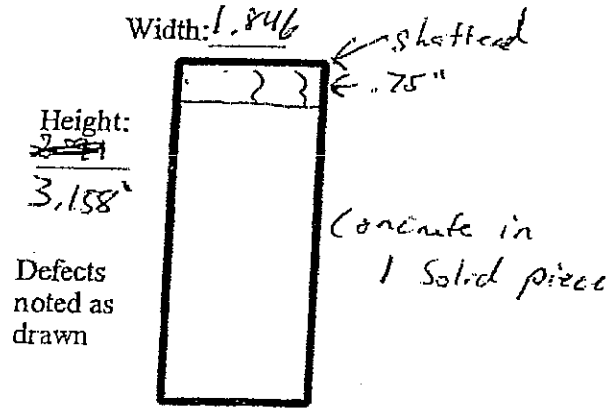
PROJECT: Page School PROJECT NO. 202474

GSI REPRESENTATIVE: Al Osborne DATE: 12/31/02

CORE #: 6 LOCATION: See Sketch TIME STARTED: 9:30 TIME COMPLETED: 9:40

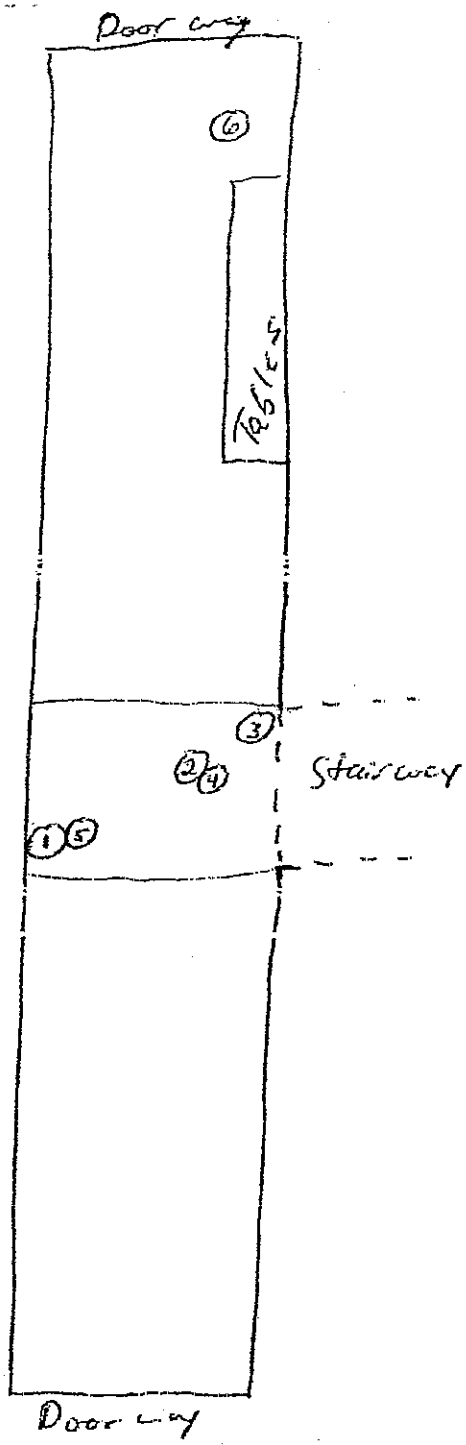


CORE #: 5 LOCATION: See Sketch TIME STARTED: 9.45 TIME COMPLETED: 9:55



☐ 12 Rogers Road, Haverhill, MA 01825 tel: 978/374/7744 fax: 978/374/7799
☐ 18 Cote Ave, Goffstown, NH 03045 tel: 603/624/2722 fax: 603/624/3733
☐ 108 Whipple Street, Lewiston, ME 04240 tel: 207/282/7225 fax: 207/282/9271

2nd Floor
Top of
Middle
Stairwell



Not to Scale

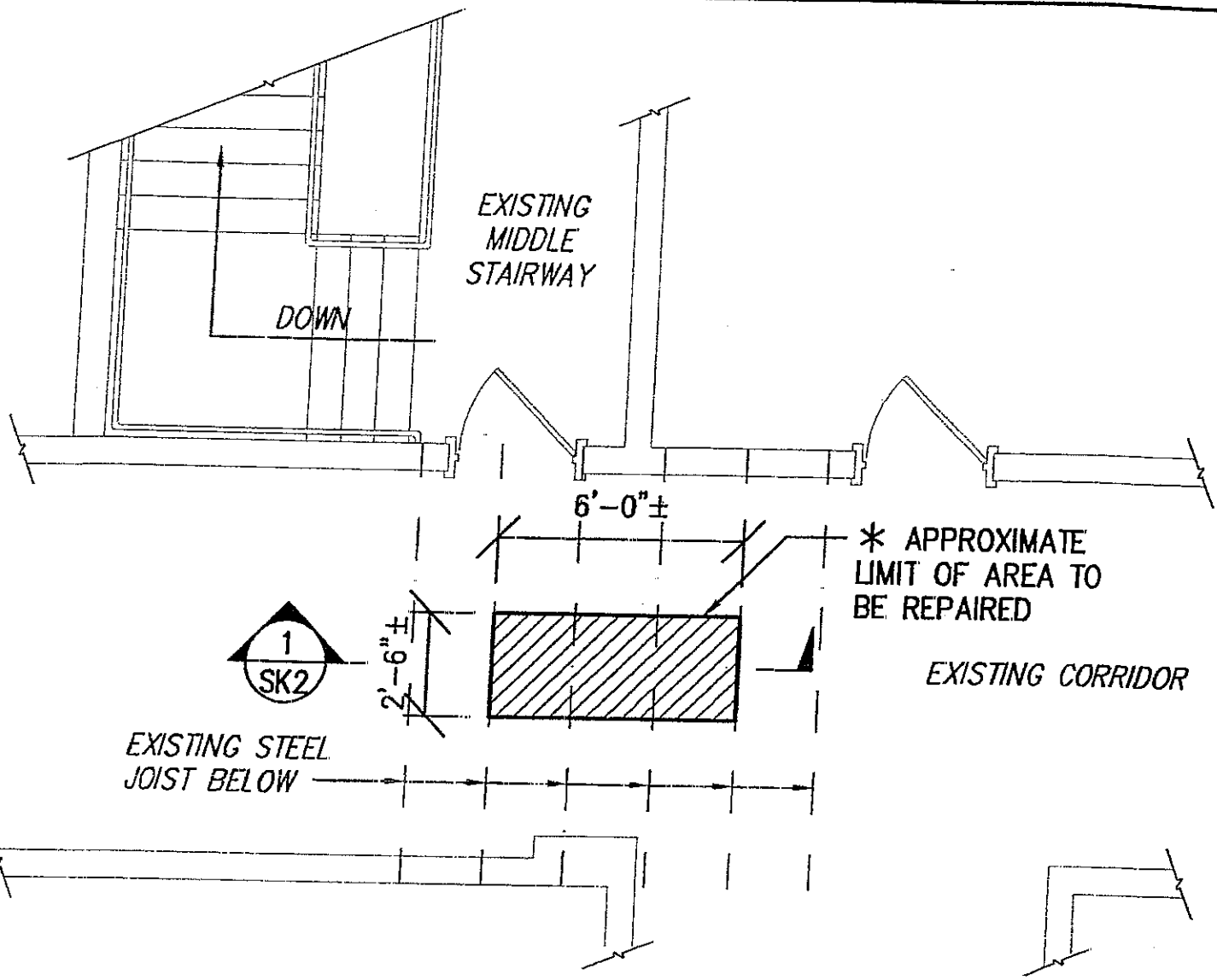
Geotechnical Services, Inc.
18 Cote Ave.
Goffstown, N.H. 03045

FIELD SKETCH

GSI PROJECT: Page School
GSI PROJECT #: 2021-24
FIELD TECHNICIAN: AS Osborne
DATE: 12/31

Appendix C

Repair sketches prepared by
Michael Perham, P.E. - McBrie, LLC Structural Engineers



ALL CONCRETE WORK SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318--02)" AND "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" (ACI 301).

ALL NEW CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.

WELDED WIRE FABRIC (WWF) SHALL BE ONE PIECE CUT TO FIT REPAIR AREA.

* FINAL LIMITS TO BE APPROVED BY STRUCTURAL ENGINEER OF RECORD.

PARTIAL SECOND FLOOR PART PLAN AT MIDDLE STAIRWELL

SCALE: 1/4" = 1'-0"

01/29/03

SK1

1 OF 2

McBrie, LLC
CONSULTING STRUCTURAL ENGINEERS
150 SYLVAN STREET
2nd FLOOR
DANVERS, MA 01923
TEL 978-646-0097
FAX 978-646-0087
WWW.MCBRIE.COM

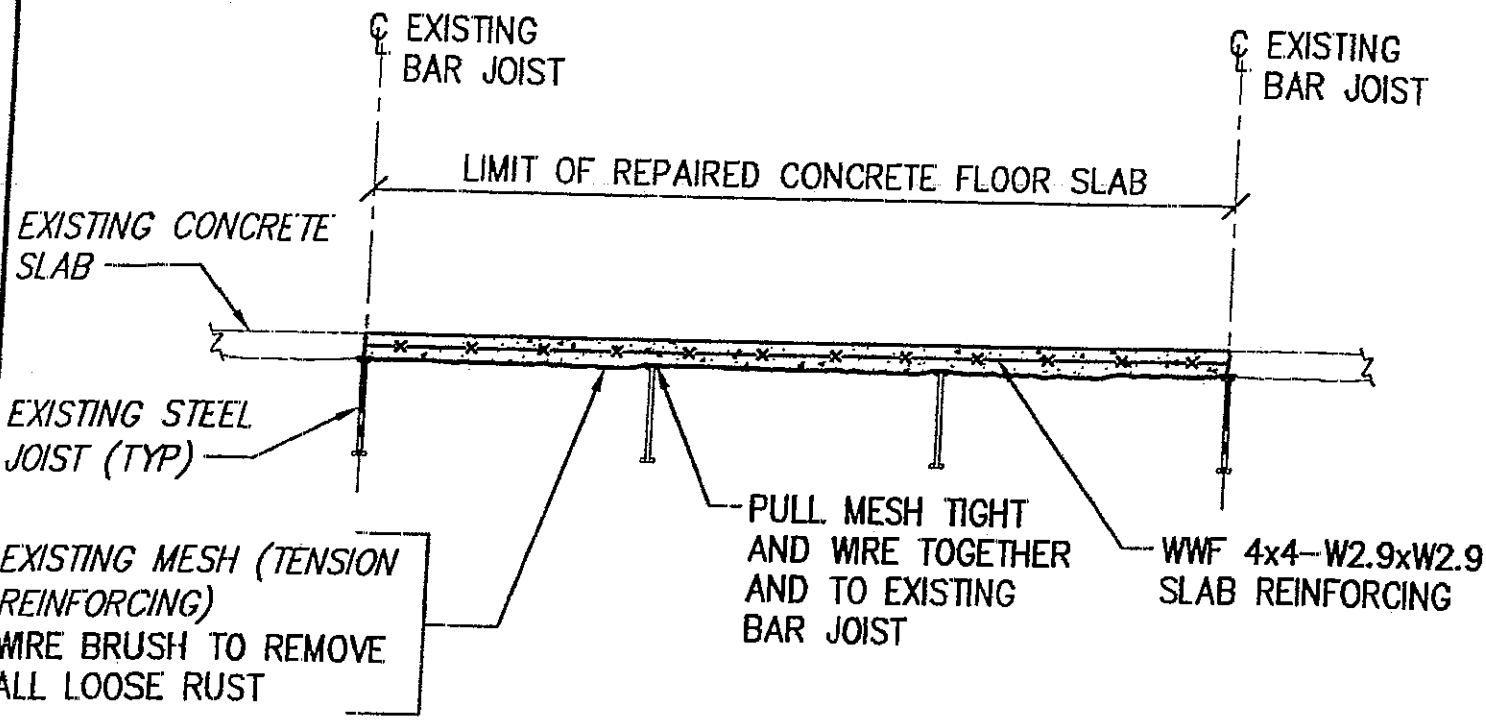
VISUAL STRUCTURAL INSPECTION
DETERIORATED 2ND FLOOR SLAB AT
THE TOP OF THE MIDDLE STAIRWAY

DR. JOHN C. PAGE SCHOOL

McBRIE, LLC JOB #3-007

PREPARED FOR

PENTUCKET REGIONAL
SCHOOL DISTRICT
22 MAIN STREET
WEST NEWBURY, MA 01985



1/SK1 SECTION REPAIR OF CONCRETE FLOOR SLAB
SCALE: 3/4" = 1'-0"

NOTES:

1. EXISTING MESH SHALL BE PULLED TIGHT AND WIRED TOGETHER AND TO THE EXISTING BAR JOIST.
2. SLAB SHALL BE WET CURED FOR SEVEN DAYS UNLESS OTHERWISE APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.

01/29/03

SK2

2 OF 2

McBrie, LLC
CONSULTING STRUCTURAL ENGINEERS
150 SYLVAN STREET
2nd FLOOR
DANVERS, MA 01923
TEL 978-646-0097
FAX 978-646-0087
WWW.MCBRIE.COM

VISUAL STRUCTURAL INSPECTION
DETERIORATED 2ND FLOOR SLAB AT THE TOP OF THE MIDDLE STAIRWAY

DR. JOHN C. PAGE SCHOOL

McBRIE, LLC JOB #3-007

PREPARED FOR

PENTUCKET REGIONAL SCHOOL DISTRICT
22 MAIN STREET
WEST NEWBURY, MA 01985

Appendix E
Conceptual Cost Estimates

Specific Project Improvements (subsumed into light, moderate or heavy renovation)				
Construction Division	**Project**	**Priority (see notes)**	**Estimated Cost Range**	**Comments**
Civil	Paving and striping of parking and roadways	3	$3sf - $12sf	Cost dependent on level of reconstruction
	Repair or Replace site signage	5	$5,000 - $7,500	
	Additional site lighting	4	$50,000 $100,000	implemented - Would most likely be performed in conjunction with repaving project
	Repair exterior stairs and ramps	1	$7,500 - $20,000	Cost dependent on level of reconstruction
	Provide dumpster pads and enclosures	3	$3,500 - $7,500	Potential safety and/or security issue - Cost dependent on level of reconstruction
Structural	Repair or replace the floor ceiling assembly above the boiler and custodial room	1	$10,000 - $20,000	
	Seismic improvements to floor structure	4	$7/sf	Tied to a larger renovation of the building
	Add interior shear walls (heavy reno only)	4	$30/lf	Tied to a larger renovation of the building

Construction Division	Project	Priority (see notes)	Estimated Cost Range	Comments
Architectural	Provide Insulation and Air Barrier at exterior walls	4	Dependent on Design	Tied to a larger renovation of the building
	Window replacement	3	$75/sf	Likely to be tied to a larger renovation of the building
	Exterior door replacement	3	$1,500 - $2,000 per unit	Likely to be tied to a larger renovation of the building
	Gutter and downspout maintenance	1	N/A	Part of ongoing maintenance
	Roof maintenance or replacement (EPDM)	2	$7sf-$8sf	
	Protection of entries from weather and snow/ice fall from roof (construction of canopies at secondary doors)	1	$50,000 - $250,000	This is a major point of safety concern at the facility - Cost is dependent on design scope and number of entries being considered
	Reconfigure main entry and protect stairs and ramp from weather and snow/ice fall from roof (lobby and or canopy)	1	$50,000 - $250,000	facility - Cost is dependent on design scope and number of entries being considered - no elevator
	upgrade/replace elevator controls	2	$30,000 - $50,000	card access preventing unauthorized use - same basic system with no change in # stops or car size
	Extend or reconfigure the elevator in the classroom building	3	Dependent on Design	Tied to a larger renovation of the building
	Replace interior door hardware (lever handles)	1	$25,000 - $40,000	Upgrade for ADA Compliance - Cost dependent on level of reconstruction
	Provide proper guardrails and restraints at all stairways and landings	1	$125lf - $150lf	This is a major point of safety concern at the facility

Construction Division	Project	Priority (see notes)	Estimated Cost Range	Comments
Architectural	Provide Fire separation doors at all fire rated spaces (stairs)	1	$2,500 - $3,000 per unit	
	Renovate toilet rooms for complete handicapped access	2	Dependent on Design	Dependent on scope of work
	Replace/Repair stair treads and provide walk off matting at entries	1	$12sf - $15sf	Safety Concern
	Replace/Repair interior finishes	4	Dependent on Design	Desired aesthetic, appearance of the facility
	Expand the cafeteria to meet needs of the enrollment	2	$350/sf	
	Expand Gymnasium to meet current state guidelines	4	$350/sf	
	Provide second means of egress from Mechanical room	1	$15,000 - $20,000	Current code requirement, and significant safety concern
	Revise interior layout as approriate to meet current curriculim and state guidelines	5	Dependent on Design	Dependent on scope of work
Mechanical	Replace Kewanee Boiler	1	$110,000 - $135,000	
	Add/modify heating and ventilating system to meet current codes	2	$2,600,00 - $3,000,000	Part of a major renovation project - additional costs for ancillary renovation not included
	Replace or recommission kitchen exhaust and add makeup air system	3	$150,000 - $175,000	Ancillary renovation costs not included

Construction Division	Project	Priority (see notes)	Estimated Cost Range	Comments
Electrical	Upgrade or replace electrical service and distribution gear	2	$225,000 - $275,000	Ancillary renovation costs not included
	Upgrade lighting & controls, site lighting, wiring devices, branch circuits, support renovated HVAC	2	$800,000 - $900,000	Tied to a larger renovation of the building - Ancillary renovation costs not included
	Upgrade or replace fire alarm system and/or panels	1	$250,000 - $275,000	Ancillary renovation costs not included
	Upgrade or replace emergency generator	1	$50,000 - $75,000	Ancillary renovation costs not included
Plumbing	Replace Plumbing Fixtures	4	$180,000 - $220,000	Ancillary renovation costs not included
	Add a reduced pressure backflow preventor on water service	3	$6,000 - $20,000	
	Provide interior and exterior grease interceptors and below slab piping	3	$30,000 - $40,000	
Fire Protection	Repair or replace the fire pump	1	Repair: $1,000 - $2,500 Replace: $50,000	
	Extend the fire protection to unsprinklered areas	1	$4.50/sf	
	Modify standpipe distribution to provide valves within stair enclosures of required exit stairs.	3	$100,000 - $125,000	

Construction Division	Project	Priority (see notes)	Estimated Cost Range	Comments
Hazardous materials	Asbestos testing and abatement	See comment		Ongoing effort as part of in place maintenance and monitoring (AHERA program)
	Testing and removal of any PCBs in existing lighting	See comment		Ongoing effort as part of in place maintenance and monitoring
Technology	Upgrade / expand telephone system	3	Dependent on Design	Dependent on scope of work
	Expand wired infrastructure (install Category 6 wire or Fiber-optics)	2	$25,000 - $100,000	Dependent on scope of work
	Expand wireless infrastructure	2	$5,000 - $50,000	Dependent on scope of work
	Provide projectors and audio systems in all educational spaces	2	$5,000 - $7,500 per room	Dependent on scope of work
	Provide an electronic card catalog in the library/media center	4	$7,500 - $15,000	Dependent on scope of work

Notes:

1. Estimates are preliminary and can vary based on the scope of work, market conditions and time
2. Specific Improvements do not include ancillary renovation costs associated with these tasks
3. When a specific improvement program is identified a more detailed estimate should be performed
4. Owner Soft Costs (design, engineering, surveys, testing, FF&E, legal, etc) can be estimated @ 20% of construction cost
5. A design contingency of 10% at this level of review is standard and should be included
6. Priority rankings are defined as follows:
   - 1 - Urgent / Immediate need (Life Safety)
   - 2 - Near term Need
   - 3 - Needed improvement (Not immediately required, but should be provided to prevent further deterioration, to provide a more appropriate educational environment.)
   - 4 - Desired improvement (Improvement would enhance the building and/or educational experience, but is not immediately required, or should be included as part of a renovation project.)
   - 5 - Not urgent