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VACANT HISTORIC SCHOOL BUILDINGS DISPOSITION PLAN

City of Detroit RFP# 19BW2717

Building Envelope and Structural Assessment Report

Arthur Middle School

Basic Property Information: COD 4-Arthur-10125 King Richard

Short Name:	Arthur
Address:	10125 King Richard Street, Detroit, Michigan 48224
Year Built:	1930
Additions Built:	1941, 1948
Outbuildings:	Powerhouse
Year Vacated:	2005
Building Footprint:	180 feet x 125 feet
Square Footage:	33,652 sq. ft.
Number of Stories:	2
Building Height:	30 ft.

Current Ownership:	City of Detroit	**Structural Framing System:**	▪ Cast-in-Place Concrete ▪ Precast Concrete ▪ Brick Masonry ▪ CMU Masonry ▪ Structural Steel
City Council District:	4	**Exterior Wall System:**	▪ Brick ▪ Limestone ▪ Cast Stone
SNF District:	NA	**Window System(s):**	▪ Metal ▪ Wood
		Roofing System(s):	▪ Built-Up Roof ▪ Gutters ▪ Internal Roof Drains ▪ Stone Ballast

Assessment Summary

Assessment Date:	June 02, 2020
WJE Inspector(s):	Cheryl Early; Justin Barden
Report Date:	November 11, 2020
Building Risk Index:	**61.01**

Cost Estimate

Base Rehabilitation Cost Estimate:	$1,022,800
Preparation for Rehabilitation Work:	$900,000
Mechanical, Electrical, Plumbing, Fire Protection ($80/sq ft):	$2,692,160
Sub-Total	$4,614,960
Contingency (25%)	$1,153,740
Sub-Total	$5,768,700
Overhead and Profit (15-18%):	$865,305
Sub-Total	$6,634,005
Escalation (6% for 2 years)	$398,040
Sub-Total	$7,032,045
Architectural and Engineering Design Services (20%):	$1,406,409
TOTAL COST ESTIMATE:	$8,438,454

ASSESSMENT METHODS

Visual Survey

As requested, Wiss, Janney, Elstner Associates, Inc. (WJE) performed a visual review of the building envelopes and structures to assess the viability of the building for reuse. WJE was joined by Mr. Andrew Wald of Interboro Partners and Ms. Jennifer Ross and Mr. Garrick Landsberg of City of Detroit Planning and Development Department. During the time on site, Mr. Wald gathered information pertinent to the general building site and layout of the buildings, and Ms. Ross and Mr. Landsberg assessed the condition of the historic fabric of the buildings.

WJE performed a visual review of the building facades from grade, using binoculars as needed. Roof levels were accessed from an attic access hatch. On the interior, WJE performed a walkthrough of accessible areas of each floor of the building. The basement level is partially flooded, and thus, was minimally accessed. Access to the interior of the powerhouse outbuilding was not obtained due to secured doors at grade and the flooded basement level. The interior finishes are deteriorating, exposing the structural framing systems in isolated locations. Up-close examination of building elements and destructive inspection openings involving the removal of building finishes to review underlying conditions were generally not performed.

WJE's observations were documented with tablets and digital photography. WJE has shared our field data with Interboro Partners; City of Detroit Planning and Development representatives; and A.M. Higley Company, the cost estimator for this project. Each observed condition is documented in the field data and assessed as discussed under "Risk Characterization" below. A summary of the conditions observed is provided in the "Building Overview" section below.

Limitations of Assessment

Limited to four hours on site, WJE visually assessed the exposed portions of the building envelope and structure. Recognizing the limitations on visually detecting distress from afar and the limitations on detecting concealed internal distress, the assessment may not include all current conditions. As such, completion of this assessment is not an indication, certification, or representation that all deterioration or hazards have been observed or recorded, including underlying deterioration not evident from the building exterior or interior. Additionally, the conditions of the building elements discussed herein are exposed to further damage and deterioration due to the existing condition and unoccupied status of the property, and as such, WJE cannot state the conditions discussed herein will remain unaltered and as observed during the visual survey. However, we have performed these assessments in accordance with the requirements of applicable regulations and the applicable standard of care for architects or structural engineers performing such services.

WJE identified structural or building envelope issues that have significant impact on the viability of future reuse of the property. Items posing little risk such as regular maintenance items are not included in the assessment. The assessment was limited to within the walls of the buildings; on-grade walkways, access roads, parking lots, landscaping, play structures, or other site features were excluded from this assessment. The assessment, remediation, and identification of hazardous materials (e.g., asbestos, lead, etc.) or other environmental issues were also excluded. Based on WJE's past experience with building rehabilitation

projects, WJE has assumed existing mechanical, electrical, plumbing, interior finishes, and other building systems are anticipated be removed and replaced with future reuse of the buildings, and as such, were not included in WJE's assessment.

Document Review

WJE performed a cursory review of documentation provided by Interboro Partners to gain familiarity of the property. The documentation provided included:

- Site Plan (included with this report)
- Floor Plans (included with this report)
- Environmental Reports
- National Register of Historic Places Registration Form

Other documents, such as original construction drawings, specifications, or maintenance records, were not made available for our review.

Risk Characterization

WJE has categorized each significant area of distress, damage, or deterioration observed with a systematic methodology to provide an objective, quantitative characterization of its relative condition and associated risk, or its Condition Risk Index (CRI). The CRI is based on the primary building system affected by the condition and the condition's severity, prevalence, and the associated consequence of failure. A higher CRI score indicates that observed conditions embody relatively higher risk than conditions with a lower CRI. The CRI is the product of each of the rankings below multiplied and normalized to meet a maximum score of 100 per condition.

Specifically, the CRI assigns a numerical value to the following:

- System (Structural, Roofing, Facade, Other)
  Conditions affecting the structure are assigned a higher rating than those affecting the facade or roofing systems. Other includes items such as non-load bearing partition walls and exterior steps, and are assigned a lower rating.
- Building Performance Impact (Minor, Moderate, Advanced, Critical, Imminently Hazardous)

  This parameter addresses the severity of the impact of the observed condition on the performance of the affected building system. Imminently Hazardous is assigned the highest rating. For example, a crack in a concrete slab may be a minor distress, but a damaged prominent skylight is considered advanced distress. Imminently hazardous conditions are discussed immediately with Interboro Partners and the City of Detroit representatives.
- Size/Distribution (Isolated/Infrequent/Frequent/Widespread/Pervasive)

  In short, this parameter rates how large and/or frequent a condition is with respect to the entire affected building system/component. Pervasive is assigned the highest rating. Examples include: an isolated step crack in a masonry wall versus pervasive corrosion of metal floor decking throughout a building.

- Consequence of Failure (Low, Moderate, High)

  This parameter allows inspectors to exercise judgment regarding general risk to the public, considering the unoccupied status of the buildings. High is assigned a higher priority, and, for example, might be assigned to a condition whose failure would result in potential harm within the public right of way. Conditions rated with a high consequence of failure are discussed immediately with Interboro Partners and the City of Detroit representatives.

The CRI for each observed condition is summed to calculate a total Building Risk Index (BRI), as provided in this report. The reported BRI is therefore a numerical expression of the relative risk present at one property, as compared to other properties in the scope of this assessment.

Both the CRI and the BRI are expressions of WJE's professional opinion of the relative significance of an observed condition to other building conditions, and the collective relative risk of the structural and building enclosure elements of this property. Neither the CRI nor the BRI are an expression of actual risk or probability of occurrence of any event. The CRI for each condition is tabulated in WJE's electronic field notes. The BRI provides a numerical tool for the project team and the property owners to compare and make decisions about this property and the other properties included in this overall effort, in context with the cost estimate, market analysis and community input. Both the CRI and BRI are intended only for this assessment project. The numerical values do not have substantive meaning beyond the context of the Vacant Historic School Buildings Disposition Plan project.

Recommendations

Recommendations developed in the assessment are conceptual and are intended for budgetary and planning considerations. Recommendations are provided within the narrative below, and in the field data provided. It is not the intent or purpose of this report or the field data to direct a contractor to bid, or otherwise implement, the recommendations. Significant additional investigation by various professional disciplines is necessary to develop appropriate scopes of repair and rehabilitation efforts to enable the re-use of any facility included in this assessment.

Cost Estimating

The rehabilitation costs are opinions of probable construction cost and have been developed with the assistance of A.M. Higley Company, a contractor familiar with rehabilitation of historic buildings. The costs have been developed for evaluating the relative cost of repair of distressed conditions as well as establishment of order-of-magnitude repair budgets. They are based on national construction cost data, adjusted based on the local construction market, and our experience with similar past projects.

Understanding the rehabilitation cost may vary depending on type of future occupancy, this assessment assumes the building will be rehabilitated to a weathertight and "grey box" condition with unfinished walls, flooring and ceilings; no mechanical, electrical, plumbing or other building systems installed. The costs assume the rehabilitation work would occur in 2022 and are not inflated should the work occur in future years.

In addition to this "grey box" base rehabilitation cost, an allowance, based on percentage of costs and square footage of the building, is delineated for:

- Preparation for Rehabilitation Work
- Mechanical, Electrical, Plumbing, Fire Protection ($80/sq ft)
- Contingency (25%)
- Overhead and Profit (15-18%)
- Escalation (6% for 2 years)
- Architectural and Engineering Design Services (20%)

The preparation for rehabilitation work item includes mobilization, hazardous material abatement as well as salvaging for potential later duplication or re-installation pertinent historic interior finishes identified by the City. For the purposes of the cost estimating effort, all roofing replacement or repair work is recommended to be performed with like-kind materials; all windows are assumed to be replaced with new commercial window assemblies in lieu of restoration of existing elements, and any exterior doors are to be repaired or replaced in like-kind. Where like-kind materials may no longer be available, WJE will offer alternative materials for the cost estimating purpose. For rehabilitation design and construction efforts, further evaluation of each of these elements is recommended. All work is recommended to be performed as per the Secretary of Interior's Standards for The Treatment of Historic Properties.

The condition-based subdivision of repair recommendations used to develop the base cost estimate is not representative of how a repair program could be implemented to remediate building conditions. Moreover, the costs assume that all repairs would be remediated in the same rehabilitation project. Execution of separate repair projects, or phasing of the rehabilitation project, could result in increases in the total repair cost. Furthermore, the final scope of repair work and the actual repair costs may vary depending on underlying or concealed conditions that were not apparent during our limited assessment.

BUILDING OVERVIEW

Overall

The main building is U-shaped in plan and is two stories in height constructed over a basement level. The original school building was constructed in 1930. Additions at the east and north sides of the original building were constructed in 1941 and 1948, respectively. A stand-alone powerhouse structure is located to the west of the main school building and is connected to the main building via a basement level tunnel. A single-story rectangular, masonry enclosure is located between the main building and the powerhouse and is presumed to be a stair access to the basement tunnel between the two structures. Safe access to the interior of the rectangular enclosure or the powerhouse was not possible during this assessment.

The main building and powerhouse facades generally consist of a clay brick and stone masonry with concrete masonry unit (CMU) backup. The brick units are laid in running bond with every fourth course laid in Flemish bond (alternating stretchers and headers). Limestone and cast stone accent units, horizontal bands, window sills, and parapet copings are located throughout all facades. The main facade, which faces King Richard Street and is considered the east elevation, includes a painted cast stone horizontal band with stone accent units below, limestone surrounds at the main entrance, and limestone floral accent units at the parapet. Steel-framed doors are set within the building entrances. The windows are primarily composed of aluminum replacement windows set into the original and exposed wood frames. Original wood window framing is present at the window openings facing the courtyard with no replacement aluminum units. The low-slope roof assembly consists of a gravel surfaced, built-up roofing (BUR) system with granulated cap sheet base flashing and internal drains and perimeter gutters.

The primary structural system in the main building is composed of cast-in-place concrete beams and columns, or steel framing embedded in concrete, located within the corridor walls, and composite brick and CMU exterior walls. The roof and floor structures of the 1930 original main building consists of concrete tee joist-slab construction. The interior finishes in the 1941 east addition are primarily intact. The only area where the floor structure was visible was above the library space, where the structure appeared to consist of painted concrete deck bearing atop painted concrete, rectangular beams. At the north end of the 1941 east addition, precast concrete roof planks were observed alongside the gymnasium wall. The 1948 north addition floor and roof structure appeared to be a composed of a flat slab system with embedded wood sleepers intended for attachment of the finished ceiling. The attic plenum space in the 1948 north addition was fully plastered and a corrugated metal ceiling panel system remains in place in the gymnasium. Due to the existing finishes in the north addition, the composition of the roof framing system is unknown. The roof structure of the one-story conservatory at the southwest corner of the building is composed of metal decking spanning between steel beams and load-bearing exterior CMU walls.

In general, the building is in serviceable condition with many of the interior finishes intact. Some of the windows require replacement, and roofs require partial replacement and localized maintenance repairs. Water infiltration within the wall assemblies due to failed roof drains, missing roof flashings, and missing and deteriorated coping units has resulted in significant masonry distress and corrosion of embedded steel support elements within the facade. Many of the cast stone and limestone decorative units exhibit

distress and require replacement, especially at the entrances and window surrounds. The structure is in good condition with minimal distress noted. Further detail of the observed distress is provided below.

Facade

The facade is generally in fair condition. Corrosion of the steel lintels, due to water infiltration, was observed on the interior courtyard walls and at all of the walls on the powerhouse. The original main building parapets exhibit localized inward displacement. The parapet displacement is likely due to a combination of corrosion of the embedded steel support elements below and associated upward movement of the masonry, and deterioration of the masonry backup due to moisture infiltration through failed coping joints at roofing terminations. Vertical cracking was observed at the ends and approximately quarter points of the masonry exterior wall at the west facade of the original main building. The vertical cracking is likely due to unaccommodated thermal expansion of the masonry and to a lack of expansion joints. Rehabilitation of the building should include repair of the distressed masonry elements including deteriorated mortar joints observed in localized areas.

Some of the cast stone coping units have been removed and/or are damaged, thereby exposing the exterior masonry wall cavity to moisture penetration. Previously removed and damaged stone copings were observed in miscellaneous areas on the roof. Some of the limestone units are missing at the building entrances. Isolated spalls of stone units were observed intermittently throughout. Rehabilitation should include replacement of the missing coping units in coordination with the parapet repairs, the replacement of the missing limestone units at the building entrances, and dutchmen repair or replacement of the spalled stone units.

Most of the windows are aluminum replacement units set into the original wood frames and are intact. The windows facing the courtyard are missing or damaged with missing sashes, displaced and decayed frames, and missing glass. The wood frames and transoms at the exterior doors exhibit peeling paint and wood decay. The metal doors within these wood surrounds are typically corroded. Rehabilitation of the building should include replacement of the doors, replacement of the windows facing the courtyards, and restoration of the remaining windows currently in place.

Roofing

The roofing assembly of the main building is generally in fair-to-poor condition. Much of the deterioration is due to missing/removed rooftop mechanical units, missing drain covers, and deferred maintenance. Cracking, seam failures, ponded water, and organic growth were observed on the roof surface. The metal flashing at vertical roof terminations is generally intact; however, the sealant is typically debonded, permitting water to enter the roofing assembly. Ponded water on the entire powerhouse roof was observed from afar. Rehabilitation of the building should include removal and replacement of the existing roofing assemblies, localized parapet repairs, and replacement of the drain and drain pipe systems and deteriorated hanging gutters.

Structure

Overall, the structure is in good condition with minimal distress observed. Many of the plaster wall and ceiling finishes are extant and exhibit minimal damage, which is often indicative of the condition of the structural elements behind.

The main structural frame, which is either conventionally reinforced concrete or structural steel encased in concrete, is in good condition. The tee joist-slab system supported by the interior beams and perimeter masonry walls exhibits minor distress related to the water infiltration from the deteriorated condition of the roof system, primarily in the corridors. Scaling of the concrete is visible from the underside of the roof structure in the 1930 original main building, indicating potential freeze-thaw deterioration of the concrete in isolated locations. The exposed precast roof planks located at the north end of the 1941 addition near the gymnasium are cracked within the slab portion of the planks, similar to impact damage of the planks. These planks should be replaced with a compatible roof deck system, with repairs coordinated with roofing repairs, assuming the remaining roof planks are in serviceable condition with no deterioration of the flanges of the planks. Further assessment of the roof slab of the one-story projection at the northwest corner of the building is recommended to determine the roof deck system (concrete slab with embedded wood sleepers or nailers) and verify its condition due to observed water migrating through this roof deck. The wood nailers, if to be reused, will need to be replaced in multiple locations.

The acoustic metal ceiling in the gymnasium is visibly corroded and is related to corrosion of isolated locations of the steel box beams supporting the ceiling and roof decks above. The roof structure above the metal ceiling is recommended to be assessed to confirm the source of the moisture related to the corrosion activity. The corrosion of the box beams is recommended to be cleaned and the structural steel elements further assessed and recoated. The metal ceiling system might also be cleaned in conjunction with the assessment of the steel box beams if to remain with the new use of the building.

A steel and gypsum plank ceiling system is located above the second floor corridor throughout both 1940s era additions; batt insulation was observed above the suspended plaster ceiling of the second floor corridor in the original 1930 building. A wood plank catwalk system is located above the 1930s plaster ceiling. Both the wood plank and gypsum ceiling system are visibly wet and deteriorated in select locations. Replacement of the second-floor ceiling in full is recommended, with the new ceiling designed as a catwalk structure for maintenance access.

At the interior wall of the auditorium, a large steel plate and bolt system was observed clamped to the primary concrete (or steel encased concrete) columns. The brick masonry at these locations is of different color, indicating this was a past repair or modification. Potentially, the original column and beam system was insufficient to withstand lateral loads, and braces or kickers were added and attached to the columns with this clamped connection. Further assessment is recommended to fully understand the reason for these plates and bolts.

The lower levels of the basement were fully submerged with standing water, allowing access only to the plenum chambers of the main building. No distress was observed in the foundation walls or first floor structures where accessible. The lower levels of the basement should be dewatered allowing for assessment prior to the implementation of the recommendations stated herein.

Miscellaneous

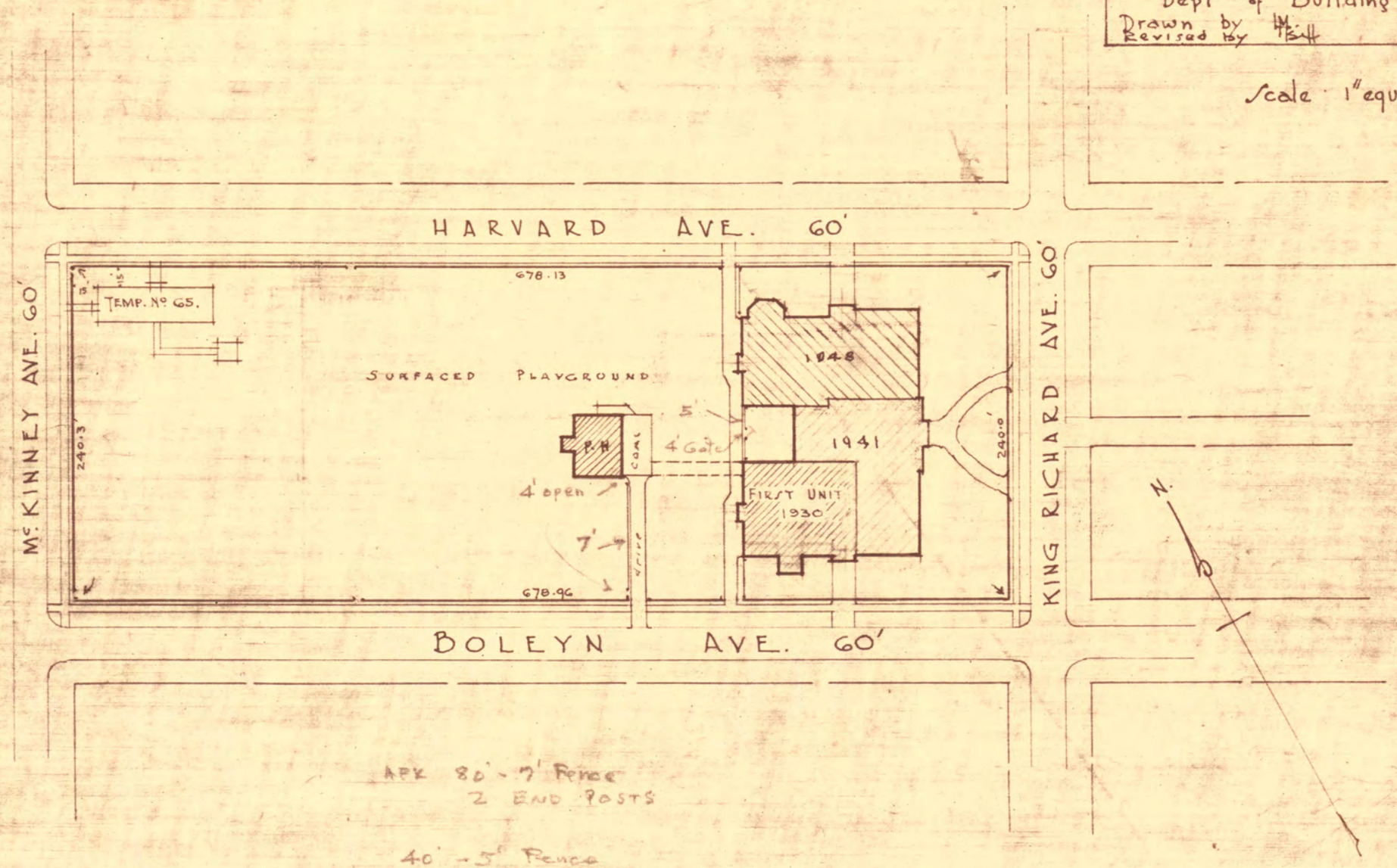
The auditorium space has been damaged by previous fires and soot is present on the surface throughout the corridor and some of the nearby classrooms. The fire damage appears to be limited to architectural finishes only.

Cracking in the plaster wall finishes and minimal cracking of exposed CMU and brick interior masonry walls is present; some of the cracks have been repaired and are re-cracked. The distress may be related to volumetric changes in the masonry walls due to the unconditioned spaces, vandalism or relative stiffness of the walls within the structural frame system of the building. These cracks may recur after rehabilitation and remain an ongoing maintenance item unless the underlying cause of the cracking is further assessed and mitigated.

Some localized masonry infill areas and partition walls are damaged from vandalism during the removal of plumbing and heating elements. Repair of these partition walls is recommended as appropriate for potential new use of the spaces.

PLOT PLAN
CLARA B. ARTHUR SCHOOL
BOARD of EDUCATION
CITY of DETROIT.
Dep't of Building & Grounds
Drawn by H.M. Sept. 27/30.
Revised by H.M. Feb 1948

Scale 1" equals 100'



APX 80' - 7' Fence
2 END POSTS

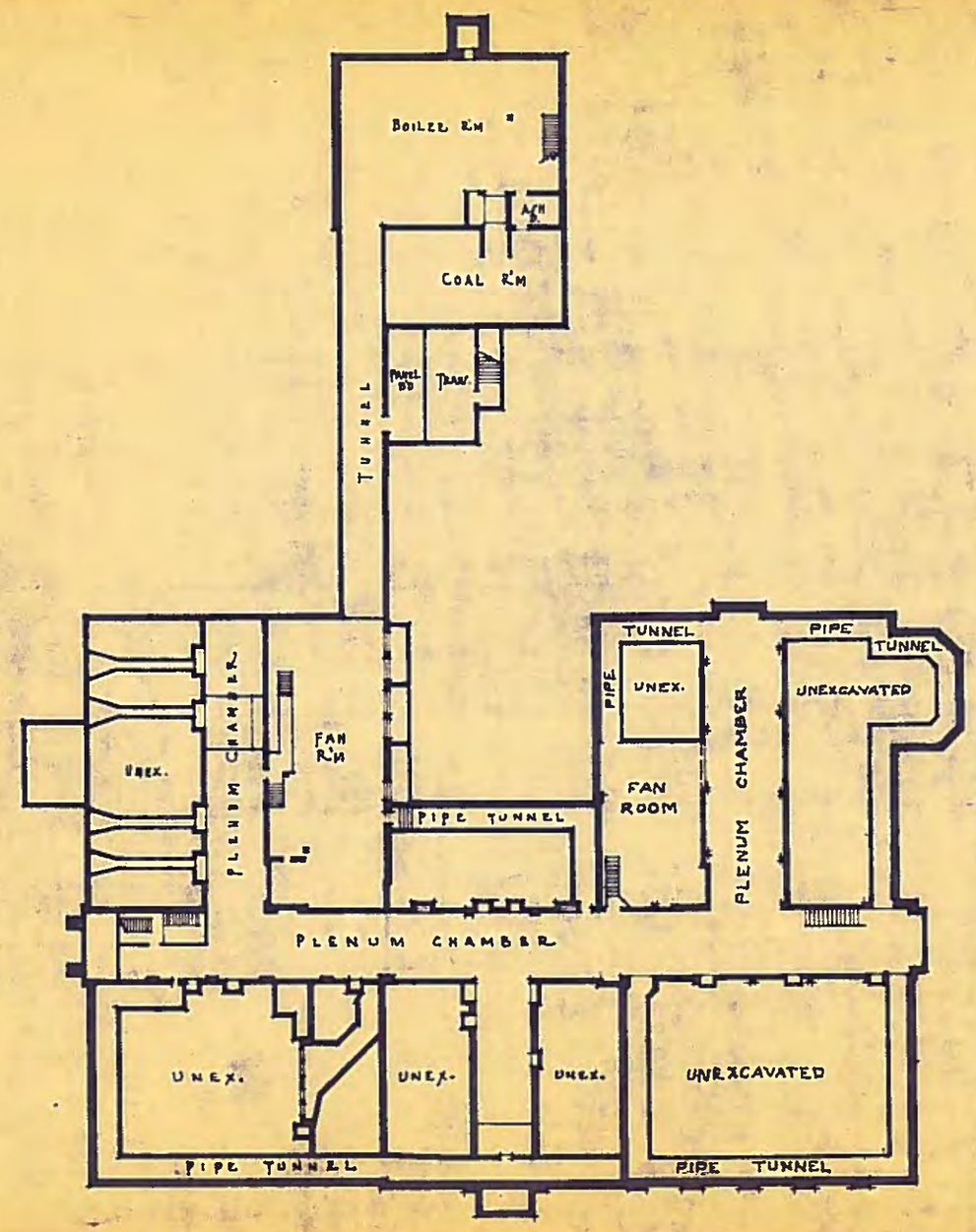
40' - 5' Fence
2 END POSTS
2 GATE "
1 4' GATE

CLARA B. ARTHUR
ELEM. SCHOOL
BASEMENT PLAN

DEPT OF BUILDINGS & GROUNDS
BOARD OF EDUCATION
DETROIT — MICH.

DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
CWS	2-9-31	M.E.S.	2-12-31		

CORRECTED - AUG. 1947

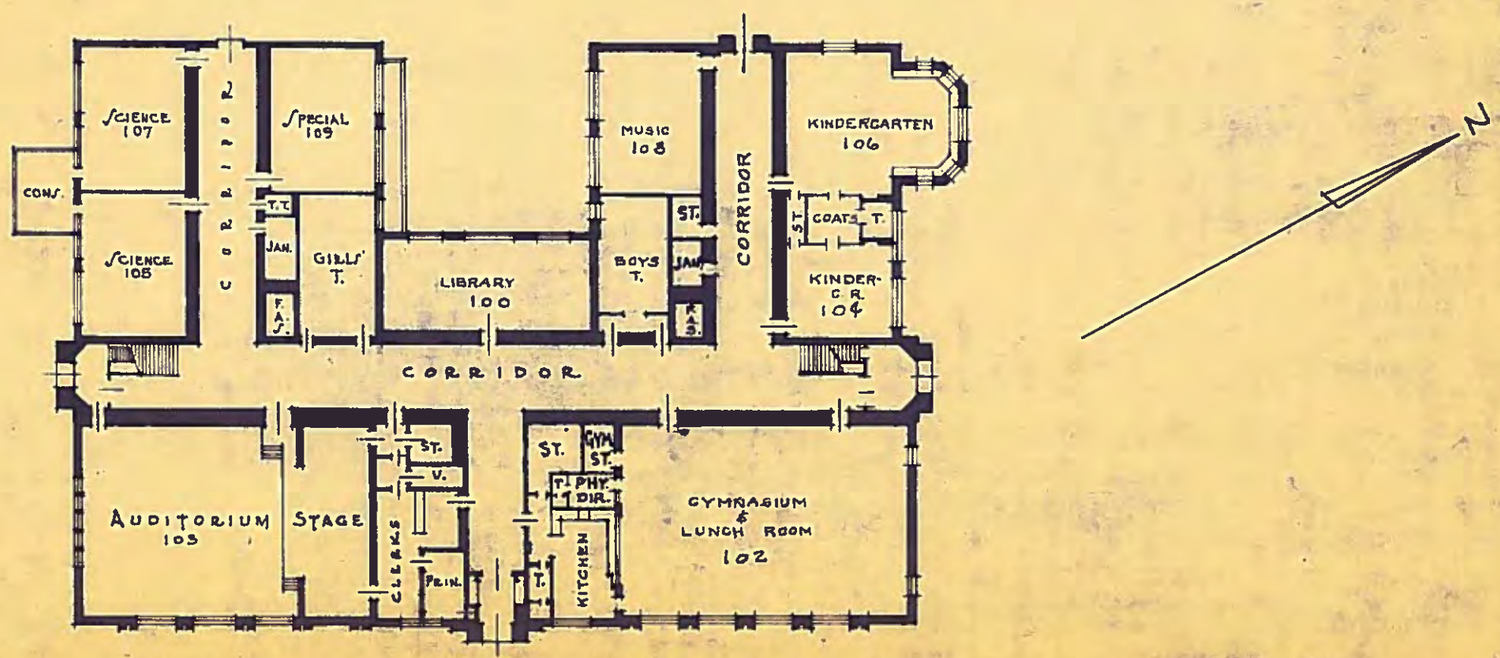


CLARA B. ARTHUR
ELEM. SCHOOL
FIRST FLOOR PLAN

DEPT OF BUILDINGS & GROUNDS
BOARD OF EDUCATION
DETROIT — MICH.

DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
CWB	2-5-31	A. L. S	2/9/31		

CORRECTED AUG. 1947



CLARA B. ARTHUR
ELEM. SCHOOL
SECOND FLOOR PLAN

DEPT OF BUILDINGS & GROUNDS
BOARD OF EDUCATION
DETROIT — MICH.

DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
CWS	2-5-31	A.S.A.	2/9/71		

CORRECTED - AUG. 1947