Milford School District
Milford Middle School (Lakeview Property)
Feasibility Study

#200-259928-19001
February 18, 2019

PRESENTED TO

Milford School District
906 Lakeview Avenue
Milford, DE 19963

PRESENTED BY

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1.0 EXECUTIVE SUMMARY

In 2018 Milford Middle School (Lakeview Property) Committee engaged with the community in a series of meetings to determine what should be done with the old Middle School Building at 612 Lakeview Avenue. These well attended community meetings indicated there is strong support from the community to bring this building/site back online for reuse as an educational facility. One continuing theme that arose from these meetings was a desire to retain, at a minimum, the original (1929) portion of the school.

As a result of these community meetings, the committee recommended the district engage an Architectural Firm to evaluate the existing property as a potential for an educational facility. After a selection process Tetra Tech has been commissioned by the Milford School District to perform this feasibility study

Our investigations included the options of renovating, demolishing and/or expanding components of the existing structure. The following areas were investigated:

- ☐ Structural Assessment and Building integrity (including any salvage opportunities) .
- ☐ Building Code Review (Local, Fire Marshal, ADA, etc.).
- ☐ Program evaluation and Department of Education (DOE) requirements as it relates to the existing building.
- ☐ Current site evaluation such as access, parking capacity, playing fields, storm water, etc.
- ☐ Historic/Cultural Considerations
- ☐ Mechanical, Electrical, Plumbing (MEP) and Safety Life Evaluation
- ☐ Architectural Considerations.

As one will ascertain from this report, the Lakeview Property is ideally suited as a location for an elementary and particularly well suited for a middle school facility. Additionally, reuse of the 1929 original high school section and large gymnasium addition, combined with the supporting educational programming in the form of new building addition(s), is a very viable and attractive option for the Milford School District and the school community.

Our analysis found that while the entire facility can be renovated and put back into service in it's current configuration, we do not feel this is the proper course of action. It is in our professional opinion that the best approach would be to renovate the 1929 portion of the building and the existing gymnasium and have additions added to support the new programmatic requirements (see attachment A for a diagram of this). The new school configuration would easily fit on the existing site and vehicular circulation can be reconfigured, following current best practices, to support this new layout.

We offer the following points to support this opinion:

Current Building Configuration: Over the years various sections were added as needed, and without the use of a master plan, or "end goal" configuration in mind. The result is a building footprint that is inefficiently organized, has many level changes and could prove challenging to manage from a security standpoint. The demands on a 21st century learning environment require that a school be laid out efficiently, be easy to navigate and simple to maintain, the current layout does not meet these demands.

Renovation vs. Replacement: The Delaware DOE generally believes that if renovating an existing school costs more than 50% of the cost of constructing a new replacement school, then the district should construct a new school. However, recently the DOE has made exceptions where the entire school, or portions of the school are historically significant (such as this one). Large portions of this building do not have historical significance and would require extensive renovation to return it to be operational. The cost to renovate these areas would be well over 50% of the cost of replacement. Selectively demolishing building areas that are not historically significant and replacing/reconfiguring them with new additions to create a new cohesive school facility provides

the ability to preserve the most important features of Milford's past without compromising on the needs of a 21st century learning environment.

2.0 STRUCTURAL ASSESSMENT

The existing school is a combination of the original 1929 building and various additions. The original building that fronts Lakeview Avenue is three-stories with a brick exterior and flat rubber roof. To the North East of the original building is the Lakeview Avenue addition that is two-stories with a brick exterior and flat rubber roof. South East of the original building is the gym addition that is a combination of gym space, locker rooms and hallways. Beyond the gym addition is a series of single story buildings with brick and CMU block exterior and flat rubber roof.

Original Building:

The exterior façade of this portion of building is constructed predominantly of brick with some limestone accent and large window openings. The original window openings have been partially infilled and contain smaller window air conditioning units. The brick and framing elements are supported over these openings using a steel lintel system supported by steel columns. At the time of our visit, the existing exterior façade appeared to be in good condition with minimal cracking through brick units and joints. It is estimated that 20% of the exterior of this portion of building would require façade repair work which would include brick repointing. The observable portions of the steel lintels above the original window openings appear to be in good condition with some surface rust present but no major deterioration. It is recommended that the exposed portions of all lintels be cleaned of rust and repainted. If during this work significant deterioration is observed those lintels would require new steel plates to repair that damage.

The roof was observed to be a flat membrane roof. At the time of our visit, portions of the membrane roof have pulled away from the vertical parapet walls. It is our understanding that this has allowed water to enter the building behind the exterior walls. This was apparent in some classrooms where large amounts of water damage could be observed. The roof framing was observed to be wood roof trusses spanning from exterior to corridor walls. In addition to replacing the roof in this area we also estimate that 20% of the existing roof trusses over this portion of building would need to be replaced due to water damage.

The first floor is composed of a combination of cast in place concrete and concrete slab on grade. The corridor walls and exterior walls support the floor and roof framing above. At the time of our visit, we did not see any major defects in the interior floors or walls.

Lakeview Avenue Addition:

The exterior façade of this portion of building is predominantly constructed of brick with some limestone accent and large window openings. The original window openings have been partially infilled and contain smaller window units. The brick and framing elements are supported over these openings using a steel lintel system supported by steel columns. At the time of our visit, the existing exterior façade appeared to be in generally good condition. However, portions of the exterior walls at this building show signs of brick damage, joint damage and potentially significant rust of the window lintels. It is estimated that 40% of the exterior of this portion of building would require façade repair work, which would include brick repointing. It is recommended that the exposed portion of all lintels be cleaned of rust and repainted. Some lintels will likely require new steel plates to repair existing portions that have significant deterioration.

The roof was observed to be flat membrane roof. At the time of our visit, portions of the membrane roof have pulled away from the vertical parapet walls. It is our understanding that this has allowed water to enter the building behind the exterior walls. This was apparent in some classrooms where large amounts of water damage could be observed. The roof framing was observed to be wood joists spanning from exterior to corridor walls.

Due to the large amount of water infiltration, most of the roof framing at this portion of building will likely need to be replaced.

The first floor is composed of a combination of cast in place concrete and concrete slab on grade. The corridor walls and exterior walls support the floor and roof framing above. The second floor framing was observed to be steel bar joists supporting concrete slab on deck. At the time of our visit, we did not see any major defects in the interior floors or walls.

Gym Addition:

The exterior façade of this portion of the building is constructed predominantly of brick. At the time of our visit, the existing exterior façade appeared to be in good condition with minimal cracking through brick units and joints. It is estimated that 20% of the exterior of this portion of building would require façade repair work, including brick repointing.

The roof framing system over the main gym was observed to be a combination of steel beams and large steel trusses supported by CMU bearing walls. The roof deck appeared to be wood planks. Some water damage was visible in the wood roof deck and may need to be replaced. The other framing elements and bearing walls appear to be in good condition. It is estimated that 30% of the wood roof deck may require replacement. Because of the deck damage and the fact that the gym could potentially be considered for reuse, any renovation/expansion project should consider the replacement of the wood decking in its entirety as well as a new roofing system.

The South corner of the gym area was observed to have issues with wood elements such as gym floor and door trim. It is our understanding that the water damage in this area has led to problems with termites. Any areas of damaged interior wood elements should be removed and replaced.

Other Additions:

The various additions beyond the gym are all one story in construction and have similar steel bar joist roof framing with wood deck planks. All of the roof framing in these areas that could be observed appeared to be in good condition. The exterior façade in this area is predominantly brick with exposed CMU block walls being used at the very rear of the building. At the time of our visit, this existing exterior façade appeared to be in good condition with minimal cracking through units and joints. It is estimated that 30% of the exterior of this portion of building would require façade repair work which would include brick and block repointing. It is recommended that the exposed portion of all lintels be cleaned of rust and repainted. Some lintels may require repair work in areas of significant deterioration.

3.0 BUILDING CODE REVIEW

It is our recommendation that any reuse of the original three-story 1929 building and the current gym consider the following: These existing spaces do not have the area necessary to fit the educational program of any traditional grade configuration, i.e. Elementary, Middle, etc., by themselves. It is therefore necessary to construct additional space to meet the programmatic needs of a school facility. Using existing building elements requires that we begin our code review by determining what steps will be necessary to bring these older portions of the building up to current code standards and then determine the most appropriate way to build an addition to create a "new" school that is both educationally functional and code compliant.

Using the 2012 International Building Code as a reference standard, the original building would be classified as Type III construction. This type of construction consists of a building where the exterior walls are constructed of noncombustible materials, and the interior building elements (walls, floors and roofs) can be constructed of any material permitted by the code. Because some of the materials permitted may be flammable, Type III construction is slightly more restrictive than the type of construction typically used for new schools, which is Type II. In Type II construction, all building elements are constructed of noncombustible materials, with limited exceptions. It is anticipated that any additions would be constructed in accordance with Type II construction requirements.

Both Type II and Type III construction have similar allowable building areas. The code sets allowable building area sizes based on the type of construction. The greater the fire resistance of the building, the larger it is allowed to be, before the code implements additional safety requirements. Due to the typical size of the new school facility, the additional safety requirement would be to separate the building into two fire areas with a three-hour-rated fire wall. The fire wall would be located to meet the requirements of the code without impacting the functionality of the school. Additionally, the school would need to be equipped throughout with an approved automatic sprinkler system and a percentage of the area around the school would require a fire lane. Automatic sprinkler systems are typically considered one of the best safety enhancements and are always recommended. Additional life safety systems including fire alarms, smoke detectors, and fire extinguishers would need to be provided as required by code.

To evacuate the students from the building and provide for appropriate circulation in and around the school, corridors and exits would need to be provided that exceed the necessary size and quantity requirements. These paths of travel would need to also provide accessible means of ingress and egress for persons with accessibility needs. These accessible paths would need to connect all spaces and floors. Additionally, counters, plumbing fixtures, switches and other operable items within the building would need to be accessible as required by code. The existing building has several different floor levels. Once a floor plan design has been determined, accessible strategies could be developed using ramps, stair lifts, or platform lifts.

The school will also meet code requirements for energy conservation, plumbing, electrical, and mechanical systems which would make both the old and new portions of this school modern and code compliant.

Tetra Tech met with Michael Andreano, the City of Milford building code official, on 01/04/19. He visited the site and his initial concern is the wood structure located in parts of the building. As discussed above, his concern is understood and will be mitigated by designating the building Type III construction and separating the building with a three-hour-rated fire wall.

Tetra Tech has also discussed this project with Dwayne Fox at the DE State Fire Marshal office in Sussex He is familiar with the building and voiced concerns that the building would need sprinkler and fire alarm systems. He also discussed the need for perimeter access, fire lanes, and hydrants. These are all standard safety features of a

new School Facility and would not pose any obstacle, from a cost standpoint or otherwise, to the development of a “new” renovated/expanded school facility.

4.0 PROGRAM EVALUATION

To test the validity of reusing of the Lakeview property as a school facility, we examined how well the property would support a program sized for the needs of an 800-900 student school. We considered the grade configurations of first thru fifth grade (elementary school) and sixth thru eighth grade (middle school) programs. It should also be noted that within the span of grades first thru eighth, there are multiple other grade level configurations or combinations possible. A high school option was not looked at because the site is well undersized to support its needs. Due to the size of the property (24 acres) and it's amenities, ie, three story classroom wing, generous gymnasium and auditorium – that are all salvageable, we felt that an 800-900 student middle school was an appropriately sized school to test the viability of a school on this property. Delaware Department of Education requires all school districts to follow the guidelines in their "State of Delaware School Construction Technical Assistance Manual" dated 2017. This document contains fifteen sections. Two of the sections are of most concern for this report. They are Section 3: "School Construction Formula" and Section 4: "Site Selection".

The School Construction Formula provides information about school types, number of students, and the associated square footage. There are three school types in the funding formula, elementary school, middle school, and high school. The square footage for an 800-student elementary school is 80,691 sq. ft. The square footage for an 800-student middle school is 110,818 sq. ft. For this report, we used the square footage for the middle school because, if the middle school building fits on the site, the smaller elementary school will also fit. We have provided the DDOE school construction chart that shows the square footage for an 800 student elementary and middle school (attachment B). Ultimately the School District will need to develop an educational specification to determine the exact program for this school, but for the purpose of this report we feel the information provided is appropriate. In examining the program information within the context of this property we found that the original (1929) school and the gymnasium could be salvaged and expanded upon in a manner that would nicely accommodate a middle school approximately sized at 110,000 square feet.

The site has had a school on it since 1929, is owned by the District and is appropriately located within the District. The DDOE's recommendation for an 800-student Middle School is 28 acres. This site is 24 acres and therefore approximately 14% smaller than the ideal DDOE site size. The DDOE discusses undersized sites in "School Sites Restricted in Size" and states the District needs to prove that the selected site accommodates the educational and civil requirements for the school. As this site has accommodated a middle school in the past, the District should easily be able to justify that the existing site is appropriately sized for the future school. There is ample space for a 110,854 square foot school building. The current site has a cinder track and two ball fields, but the future athletic field needs will have to be reviewed to ensure that all of the required programs fit on the site. Note that these existing site amenities are heavily used by the community. See attachment C for an aerial photo of the current property.

5.0 SITE EVALUATION

Based on our review of the utilities for the Milford Middle School site, we have confirmed that there is adequate sewer capacity and water pressure for any improvements that might be proposed for this location. Based on flow tests from several fire hydrants, a fire pump will not be needed for any improvements. We have also confirmed that natural gas runs down School Place and feeds the existing building. The site is relatively flat but School Place and Kent Place, which are maintained by the City of Milford, have several catch basins that can be utilized for stormwater management. Per the new DNREC stormwater management regulations, stormwater management will be needed, but a redevelopment credit will be applied to any improvements for this project which will reduce the size and number of facilities. As far as access points, DelDOT maintains Lakeview Avenue and Seabury Avenue. There are 2 access points off Lakeview Avenue that can remain or be modified with little impact to DelDOT's right-of-way. All access points along School Place and Kent Place will be through the City of Milford since they maintain these two streets.

Regarding the land use approval process, any projects requiring Land Development or Permitting approval would be coordinating with the City of Milford's Public Works Department for water, sewer, electric, and access points (School Place and Kent Place). DelDOT involvement will be minimal, based on the extent of access on Lakeview Avenue. If the access points stay in the same location, we will only need to submit for a Letter of No Contention (LONC). Our opinion is that a Traffic Impact Study will not be required based on the current and proposed uses. Submission to the State Fire Marshal's Office for review of perimeter access, site, and fire hydrant locations will also be required. Any water or sewer extensions would need to be submitted to DNREC for a wastewater construction permit and DHSS for water permit. There does not appear to be a need to extend utility mains (sewer or water) since they are adequately sized and are already tied into the existing building. Any site plans including preliminary and final would be presented to the City of Milford's Planning Commission for public hearing.

Site improvement recommendations for a new School Facility would be to replace the sanitary sewer piping, water service and gas piping from the street. The electrical service should be replaced with new lines and a transformer. Stormwater facilities for the entire site would need to be addressed, including redevelopment of vehicular circulation by separating the bus parking and drop off from the car parking and drop off and providing fire lanes and fire truck access to the building.

6.0 HISTORIC / CULTURAL CONSIDERATIONS

The original core of Milford High School (most recently known as Milford Middle School) was built in 1929, at a time when early suburbanization was transforming this regional center for the surrounding agricultural countryside. Additions in the 1940s and 1960s, accommodated the continued suburbanization, and early ex-urbanization of the post-World War II decades.

The three-story historic block retains much of the original Georgian revival exterior features: a symmetrical design, with projected pedimented bay, flat entablature atop pilasters at the entrance, a roof-line parapet, and wren windows. Masonry details include a water table, belt course, brick window lintels, quoins, and elaborate brick cornice and frieze with granite embellishments. The building also retains several original features, such as flooring, radiators, auditorium stage surround, and doors. These extant architectural features mean that much of the exterior envelope of Milford High School of the 1920s and 1940s has retained a high level of integrity, as has some of the interior fabric, making the original high school core and additions an excellent example of early to mid-twentieth century institutional architecture.

Equally important, the physical integrity allows the building to bear witness - as a historically significant resource - to a singular moment in the history of desegregation in Delaware. These events are well documented, not the least of which is a historical marker installed at the property in 2004 by the Delaware Public Archives.

As such, Milford High School is historically significant under Criteria A – as a building that possesses integrity of location, design, setting, materials, workmanship, feeling, and is associated with events that have made a significant contribution to the broad patterns of our history.

7.0 MECH. / PLUMB. / ELECTRICAL / LIFE SAFETY

HVAC System:

The building's heating source originates from two (2) boiler rooms, the boiler room behind the main building contains boilers B-1 & B-2 and the shop/classroom wing boiler room contains boilers B-3 & B-4.

The newer three (3) boilers (B-2, B-3 & B-4) were installed somewhere between 1993 & 1994 making them approximately twenty-five (25) years old and nearing the end of their useful lifespan. The fourth boiler (B-1) was installed several years earlier and making it that much older.

B-1 and B-2 are steam boilers. Steam was fed to parts of the building as the primary heating source and to a steam-to-hot water heat exchanger where it was converted to heating hot water and distributed to other parts of the building. Over the time between 1994 and until the building was closed some six (6) years ago, the steam heating devices were being replaced with heating hot water equipment.

The majority of the existing HVAC equipment is over twenty (20) years old, antiquated and inefficient by today's standards. This coupled with the fact that the systems have been shut down for approximately six (6) years, the building wasn't heated, and roof leaks are damaging the equipment, has resulted in the HVAC equipment deteriorating in-place. It would not be cost effective to clean, repair and put the existing HVAC equipment back in service.

As a result, it is recommended that the existing HVAC systems be replaced with new, efficient, state-of-the-art combination Heating, Cooling & Ventilating Systems.

Also note that there are also some abandoned boilers (three (3)) in the original sub-basement boiler room. These boilers appear to be original to the building. These boilers should be removed before they fall apart.

Electrical / Life Safety System:

Much of the existing electrical, lighting & fire alarm equipment is over twenty (20) years old, antiquated and inefficient by today's standards. This in conjunction with the fact that the systems have been shut down for approximately six (6) years, the building wasn't heated, and roof leaks are damaging the equipment has resulted in the existing electrical, lighting & fire alarm equipment deteriorating in-place. It would not be cost effective to clean, repair and put the existing electrical, lighting & fire alarm equipment back in service.

As a result, it is recommended that the existing electrical, lighting & fire alarm systems be replaced with new, efficient, state-of-the-art electrical, lighting & fire alarm systems.

Plumbing System:

The existing plumbing equipment is over twenty (20) years old, antiquated and inefficient by today's standards. Some even dates back to the original building construction. This coupled with the fact that the systems have been shut down for approximately six (6) years, the building wasn't heated and roof leaks are damaging the equipment has resulted in the existing plumbing equipment deteriorating in-place. It would not be cost effective to clean, repair and put the existing plumbing equipment back in service. The existing building is not protected by an automatic sprinkler & fire protection system.

As a result, it is recommended that the existing plumbing systems be replaced with new, efficient, state-of-the-art and code compliant plumbing systems. A new automatic sprinkler & fire protection system will be required to meet current building & fire codes.

8.0 ARCHITECTURAL RECOMMENDATIONS

Our architectural recommendations are as follows:

- Renovate the original 1929 building and the large gym with associated classrooms
- Replace existing windows and wall infill with new thermal windows
- Replace all interior finishes.
- Reconfigure interior spaces to support the new program requirements
- Replace all exterior and interior doors
- Refurnish or replace the existing elevator.
- Install ramps, stairlifts or platforms at level changes to create accessibile paths of travel throughout the building
- Develop a fire separation strategy between the existing and new building that will meet the 2012 IBC code requirements
- Construct new building spaces to support the new program requirements
- The roof over the 1929 section and the gymnasium should be repaired as quickly as possible to limit any additional damage to the interior.

LEGEND - FIRST FLOOR

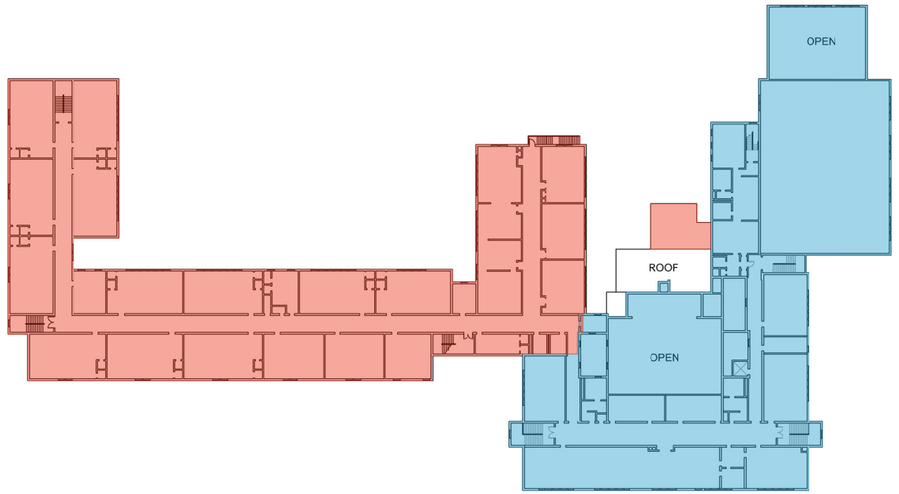
PROPOSED EXISTING TO REMAIN (28,224 SF)

PROPOSED AREA OF DEMOLITION (52,027 SF)

LEGEND - SECOND FLOOR

PROPOSED EXISTING TO REMAIN (16,851 SF)

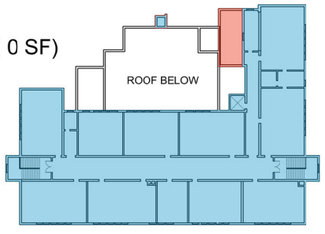
PROPOSED AREA OF DEMOLITION (25,175 SF)



LEGEND - THIRD FLOOR

PROPOSED EXISTING TO REMAIN (11,134 SF)

PROPOSED AREA OF DEMOLITION (0 SF)



N
TRUE NORTH
PROJECT NOR'H

0 16 32' 64"
SCALE: 1" = 32'-0"

TETRA TECH

SCHOOL FACILITY - 612 LAKEVIEW

MILFORD SCHOOL DISTRICT

RECOMMENDED AREAS TO DEMOLISH AND AREAS TO REMAIN

ATTACHMENT A

02/18/19

TETRA TECH

Elementary School

Item	#	800
Classrooms @ 1100	36	39,600
Gym / Cafeteria		10,000
Library / Media Center		2,600
Administration		2,400
Student. Serv. @ 10% of classrooms 150	4	600
Health / Nurse		900
Music		1,400
Art		1,200
Faculty Work Room		360
Faculty Lounge		360
Conference		300
Systems / Utilities @ 85	34	2,890
Corridors @ 252	34	8,568
Special Education 10% Capacity @ 38	72	2,736
Sub Total		**74,714**
8% Walls & Partitions		5,977
Total Square Footage		**80,691**
SF / Pupil		**100.86**

Middle School

Item	#	800
Classrooms @ 900	28	25,200
Physical Education		9,000
Cafeteria		4,900
Library / Media Center		3,370
Administration		1,900
Student Services @ 10% of classrooms	2	400
Health / Nurse/Wellness		2,200
Guidance Office		750
Tech. Educ./Exploratory		11,700
School Based Alternative		1,600
Science		5,480
Pupil Activities		900
Teacher Rooms		700
Auditorium		7,380
Computer Lab		900
Special Education 5% Capacity @ 38	40	1,520
Permanent Obstructions @ 80	60	4,800
Sub Total		**82,700**
Toilets, Walls, Storage, Corridors. Utility Rm., & Services @ 34%		28,118
Total Square Footage		**110,818**
SF / Pupil		**138.57**

Outside Storage for Elementary School 500 SF

Effective: July 18, 2017

Sources:
Tax Parcels per Sussex County
Aerial Photograph Courtesy of DEMAC

January 2019

N W E S

Milford Lakeview School

City of Milford, Sussex County, Delaware

Attachment C

0 80 160 240 Feet

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