

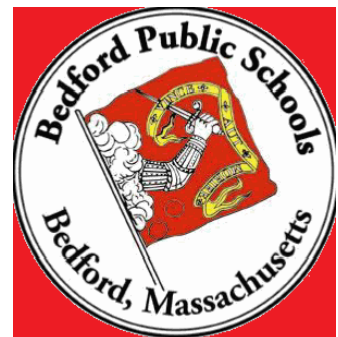
Lieutenant Job Lane Elementary School Expansion & Renovation Feasibility Study

66 Sweetwater Avenue, Bedford, MA 02420



February 19, 2016

Prepared for:
Town of Bedford
Bedford Public Schools
97 McMahon Road
Bedford, MA 01730



Lieutenant Job Lane Elementary School Expansion & Renovation Feasibility Study

**Existing Conditions and Utilization Analysis
February 19, 2016**

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1. Introduction

Project Name and Building Address:

Lt. Job Lane Elementary School – Expansion & Renovation Feasibility Study
66 Sweetwater Avenue, Bedford, MA 02420

Description of Scope:

TBA Architects was engaged by the Town of Bedford Public Schools, to review the current space use and utilization of the Lane School (grades 3-5) and prepare a feasibility analysis for the potential interior reconfigurations and additions to accommodate enrollment projections through the 2020-2021 school year. The analysis is to facilitate the development of conceptual design options for the reconfiguration and expansion and the further development of a single option for presentation to Town Meeting for construction funding. This report contains some discussion of conceptual options but development will separately.

Project Team:

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Site Visits:

2/9/16 – TBA staff met with Principal Ackerman to kickoff the project and discuss space needs based on existing and anticipated enrollment and space needs. TBA staff toured the building interior to observe the existing space use and circulation and visually confirm the layout. Notes were taken on existing layout; photographs were taken of existing conditions.

2/11/16 – TBA staff toured the building interior with Mr. Alani to observe the existing conditions of utilities and infrastructure. Notes were taken on existing conditions; photographs were taken of existing conditions.

2/18/16 – Anticipated meeting to discuss preliminary feasibility findings.

TBA has collected and is reviewing construction and as-built documents for the original 1962 building, 1994 classroom addition, and 1999 additions to the Lane (formerly North Road) school. Other documents include a 2015 NESDEC Enrollment Study; a May 2010 K-8 Educational Facilities Planning prepared by Frank Locker Educational Planning; and, a Space Needs Task Force Report, dated January 2, 2016.

Thank you to the staff and administration for your patience and assistance during our visits.

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2. Executive Summary

This feasibility study was prepared at the request of the Town of Bedford Public Schools. Included is a review of the existing space use and utilization, a code analysis of the existing building (for use in determining work that may be required in an eventual reconfiguration and expansion of classroom space), an analysis of the space needs based on the information given by the school department and our observations, statements as to the existing infrastructure and the various systems' capacity for reconfiguration and expansion, and an initial discussion of the potential options. Conceptual options (to follow) will include expansion of the school and of areas of possible interior reconfiguration.

The existing building is a split level, two-storey brick and concrete block wall, steel and concrete frame structure with steel and concrete floor/roof systems as well as a concrete pan structure floor/roof system. Originally designed in 1962 as the North Road School, it has since been renamed the Lt. Job Lane Elementary School and expanded in 1994 and 1999 with new classrooms and a gymnasium. The majority of the homeroom classrooms are housed in the original structure, along a double loaded corridor at the north of the building with windows facing east and west. The remaining homerooms and art room are in the 1999 addition to the west end of the building along a splayed double loaded corridor with windows facing north and south. The end of this corridor has a window wall looking into the forest beyond. The gymnasium is in the east wing added in the 1999 addition and has a parking lot to the south and playground to the east and north. Cafeteria and music rooms are in the south wing and are part of the 1962 construction. It appears that many original spaces were updated and/or reconfigured in the 1999 project. The school has a drop off loop and parking lots running along the entire southern edge of the building.

Analysis of the current use of the building and of the enrollment projections support the need for a minimum of four additional classrooms by the 2018-2019 school year. While the building currently has 25 full sized classrooms, 24 of them are used for homerooms and the 25th as a needed special education space. Enrollment projections indicate the requirement for three additional homerooms to accommodate the 114 potential additional students and keeping the classroom size to 22-23 students as the goal set by the school committee for the district. The MSBA analysis would recommend four additional classrooms. Further, the SAIL program, requiring a full-sized classroom to service the needs of the cohort, is expected to join the school in 2017. Further, the Locker Planning Study also stated the need for additional space within five years.

Comparison of the current use and of the future enrollment to MSBA standards also supports the need for four additional classrooms. Our review of existing space use found two areas currently used by special education programs that could be repurposed to create full sized classrooms within the existing structure, but would require further reconfiguration of other small pockets of the school to accommodate the displaced program areas. Final determination of scope of work is based primarily in the district's program goals and pedagogy.

Egress capacity and restroom facilities are both effected by the increase in student population and resultant additional classrooms. These are calculated on the student population that is accommodated by the classroom area provided. Occupancy of the current facility is 1015 occupants at 1 per 20 nsf of classroom area. Egress from the second floor is insufficient for the 490 occupants of the classroom wings; the stair added in the 1999 addition is 1" too narrow according to the current building code (780 CMR, 8th Edition).

Any classroom expansion to the second floor would require either the addition of another egress stair or reconfiguration of the corridor split-level stair.

Toilet facilities are too few for the current building per the current plumbing code (248 CMR). A table is attached to the code discussion portion of the report. Expansion of the building would only exacerbate the deficiency. While new facilities could be added, their number would be substantial and add considerable cost to any project. TBA would recommend a discussion with the code officials to determine to what extent, if any, new facilities would be required.

Systems were all upgraded in 1999 and all have the capacity to be expanded and/or reconfigured. The former septic fields have been abandoned and the building is connected to a municipal sewer service to the east. The extent and cost of any change to the existing systems is based on where the additions are made.

Space exists on site for expansion of parking lots in a few locations and require the clearing primarily of brush and small plantings. Expansion of parking can be made regardless of the scope of building expansion and reconfiguration.

Five initial locations have been identified for expansion possibilities, three areas for reconfiguration, and a few other requested changes.

- Expansion Area 1 – continue the west wing toward the west. Classrooms currently exist in this wing and so new classrooms would be within close proximity. The expansion area is limited only by the clearing of trees and extension of the ground area to provide full perimeter access. Classrooms would be adjacent to others and begin to create a second classroom wing to balance the demand on the north wing.
- Expansion Area 2 – expansion to the east and/or west at the north end of the north classroom wing. The corridor can be extended, creating an “L” or “T” shape to the end of the building and adding classrooms at either or both sides. New windows would face to the north and the windows in the existing end classrooms would be reoriented to the north as well. Existing sewer service exiting to the east would require reconfiguration. This expansion creates an even more distant walk to the specialized spaces, but keeps classrooms adjacent to one another and allows for flexibility in grade configuration.
- Expansion Area 3 – expansion north of the north classroom wing. The existing 1994 classrooms would be reconfigured to allow the corridor to continue to the north and extend to new classrooms effectively extending the length of the north wing. Classrooms would be oriented east and west. This expansion creates an even more distant walk to the specialized spaces, but keeps classrooms adjacent to one another and allows for flexibility in grade configuration.
- Expansion Area 4 – creation of classrooms in the current multipurpose room and construction of a new multipurpose room to the east. The multipurpose room would yield two classrooms necessitating either construction of new classrooms to the east or at another area noted in Areas 1-3 or the recovery of classrooms in the existing building. New classrooms in this area would be equidistant to the specialized spaces as in other existing classroom wings and would alleviate the demand on the center split-level stair.
- Expansion Area 5 – creation of classrooms to the west of the computer lab. This expansion requires reconfiguration of the lab and the creation of a new access corridor. This expansion

would be a single storey or the installation of second elevator to access an upper storey. The expansion would create a new court yard with the adjacent existing west wing. These classrooms would be somewhat remote from the existing classroom wings. New classrooms in this area would alleviate increased demand on the center split-level stair.

- Space Mining 1 – insertion of a second floor in the art room. The current art room is a two-storey space. If a floor were inserted and skylights or a monitor added through the roof, the art room could be created on the second floor and a new classroom found on the first floor.
- Space Mining 2 – reclaim two classrooms in the north wing that are currently used for special education spaces.
- Space Mining 3 – reconfiguration of the corridor between the library and the computer lab and closets and conference room on either side. This area could house some of the small group areas displaced in the reclamation of classroom space.
- Areas noted for potential to improve functionality –
 - Expansion or reconfiguration of the central split level staircase. The current staircase width does not allow it to be considered part of the egress system. The minimum width required would be 6' as it is part of a corridor and not an enclosed egress stair. Egress width cannot be reduced on in the direction of egress, so the current 5' stair is an obstruction. It appears from observation, that the stair creates a pinch point and hinders flow of students as they move from classrooms to specialized spaces throughout the day. The expansion of this stair would improve day to day use as well as allow it to be used as part of the egress system and possibly eliminate the need for a new egress stair in an expansion scenario.
 - Addition of space and a door from the main office to the north. The additional space would be for conference and right sized office space. The additional door would allow office and nurse staff to access play areas more efficiently.
 - Additional cafeteria space is needed to accommodate the current lunch period load and the future load. Expansion could be achieved as simply as expanding the current glass wall and roof structure further to the east.
 - More space and better sound separation is needed for the two foreign language classrooms. They currently are held in a subdivided classroom equivalent by a demountable or moveable partition that does not prohibit the transmission of sound.

The data reported by NESDEC projected enrollment increases, the 2010 Locker Report, the recommendations by the Space Needs Task Force, and the MSBA comparison and utilization analysis done by TBA as part of this feasibility study all support the need for a minimum of 4 additional classroom spaces – three homeroom classrooms (one for each grade) and one for the SAIL program. The peak enrollment of 648 students in the year 2018-2019 would require a minimum of 27 classrooms, but with 24 students per classroom. TBA would recommend adding 4 additional homeroom classrooms to keep the class sizes closer to the 22 student goal set by the school committee. Additionally, TBA would recommend creating another full sized classroom for the foreign language programs (given the class sizes of 20 to 32 students and high utilization of the current spaces) allowing the subdivided classroom shared currently to be recombined to one classroom. We recommend exploring options for a total of six classrooms; 1 for the SAIL program; 1 additional foreign language space; and, 4 new homeroom classrooms.

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3. Existing Building Analysis

About the Study

In commissioning this study, the goals of the Bedford Public Schools were to confirm the expected need for additional classroom space and to determine whether interior reconfiguration or expansion or both were required to meet the expected needs. In order to determine the best way of accomplishing these goals, space must be considered inside the existing facilities before making a determination about constructing additional new space. A thorough look at space use and efficiency is necessary to making the case for improvements. Regardless of whether space is able to be found within the existing buildings or not, if the process reveals that space is not available for all needs then it supports the need for additional space. This elementary school utilization study for the Lt. Job Lane Elementary School provides analysis of the school which includes grades three to five. Utilization metrics include both time and space: the actual percentage of time a room is in use and the space allocation for the intended use. The Massachusetts School Building Authority recommendations as to space allotment for use types were used as the basis for spatial utilization analysis. The number of periods a week a space or room was used by the schools' inhabitants as a percentage of periods available during the school week is the basis for time utilization analysis.

These two measures occasionally reveal a room that is both over utilized as to time and underutilized as to space. A prime example of this type of space is the multi-purpose room which simultaneously is an unprogrammed large space, but houses special education coordinators and teaching spaces that have no home elsewhere. Where underutilization exists, this condition may offer space planning opportunities for more efficient reconfiguration.

The study presents space allocation analysis in a spreadsheet for the school with side by side comparisons with the MSBA standard for K-5 schools adjusted for the 3-5 configuration found in Bedford. The spreadsheet analysis is broken down into groupings determined by the MSBA with the following areas represented:

- Core Academic Areas
- Special Education
- Art and Music
- Health and Physical Education:
- Media Center
- Dining & Food Service
- Medical
- Administration and Guidance
- Custodial and Maintenance
- Other

These areas for each school are indicated on plan drawings with a color code legend for each grouping. Core academic areas (classrooms) are further defined by an overlay hatch indicating grade level. These functional plans were developed to give an overview as to the plan organization and functional adjacencies of the school.

A second set of plans for the school depict the utilization of each room by a simple color coding of green, red and yellow.

Green - Rooms with the color green are rooms utilized fully for time (approximately 75 to 95 % of the time for their intended use) and/or within 80 to 105% of their recommended MSBA size.

Red - Rooms depicted in red are undersized by MSBA standards or have additional uses outside of the intended use which interfere with the efficient use of the space. Examples of this overutilization are special education spaces such Reading and Title 1 that are sharing rooms creating space that is both undersized in that each is below the size recommended by MSBA and is used by programs of conflicting needs.

Yellow - Rooms illustrated in yellow are underutilized either by time or space allocation. Underutilization appears primarily in the multi-purpose and gymnasium spaces that are larger than recommended.

Space Utilization Analysis

The following pages include analysis of the school with observations followed by existing space summary spreadsheets, existing space use plans, and utilization plans for each school. Analysis is organized by topic following those listed in the MSBA spreadsheet to allow reference for details on specific spaces.

Following the existing use analysis are initial space mining possibilities and areas for expansion. Potential for efficiencies have been found and may be undertaken on their own or in conjunction with one of the options for expansion. The possibilities discussed can be studied further in the next phase along with one or more of the options.

The Lt. Job Elementary School is 109% of Total Building Net Floor Area (NFA) per MSBA Standard for a 534 pupil elementary school. This puts the current building as a whole in the appropriately sized, or green category.

The School is comprised of four wings with a single storey administration hub; the south wing is a single story cafeteria and service wing; a single storey gymnasium and multipurpose wing to the east; a two storey classroom wing to the north served by a single split-level stair in the corridor making each level of classrooms a half level higher or lower than the administration hub; and a two storey classroom and art wing to the west which is fed off of the same split level stair. As a multilevel school, the Lane had an elevator retrofitted in 1994 to provide access to all levels. The elevator is accessed via a vestibule off the main corridor which also houses some staff copying functions.

Lane School contains 24 grade 3-5 classrooms (8 grade three, 8 grade four, and 8 grade five) and another full sized classroom dedicated to special education programs. Classrooms range in size from 875 nsf to 1045 nsf for a total of 22,490 nsf for purposes of MSBA comparison. Twelve of these classrooms are located on the second floor and thirteen on the first floor. It appears that the egress (when calculated at the

code required 20 nsf per occupant) is inadequate for the current load on the second floor. A discussion of code considerations follows later in this report. The current school has few over-utilized spaces, many adequately utilized spaces and all of the core classrooms are of adequate size and use. However, many of its special education programs and administrative offices are located in spaces that are shared, too small, or inappropriate for their use.

Overall the elementary school has classrooms of adequate size (according to MSBA standards). The current utilization also appears to be adequate. However, the school is not capable of housing the additional 114 potential students and the anticipated SAIL program entirely within the existing perimeter. About half of the anticipated increase could be housed in the existing school by the MSBA standards, however many of the smaller spaces required to fulfill the district's programmatic goals would suffer space loss or overutilization. In order to have sufficient classroom space, some specialists' offices, SPED, and various office spaces are sharing storage rooms, interior (windowless) spaces and corridors. The copy room has been repurposed as a conference room and copiers placed in the adjacent vestibule. As indicated in the attached space use and utilization drawings and spreadsheets, there are a sufficient number of spaces but most are smaller than is needed for the given function.

There are 38 periods per week. There are three lunch seatings with some students eating separately due to scheduling conflicts with other specials. Each class in each grade has, art, music, library and media, and health, and foreign language once per week, gym twice per week, and several students taking part in band and orchestra. Specialist spaces are utilized throughout the day for various programs. Spaces that are dedicated to specials are utilized more than half the time which would not allow for more than one period per class per week without complex scheduling. Further, the two foreign language classes are held next door to each other in a single classroom equivalent divided by an insufficient sound partition.

Space needs, as identified in the Space Needs Task Force Report dated January 2, 2016, include not only addressing the classroom needs for future growth but identify the need for up to 16 additional spaces for various special education programs. We see a number of spaces dedicated to special education throughout the school and while several are very small and interior spaces, the total number of spaces (22 provided vs. 12 recommended) and area (117% of recommended) is significantly more than recommended by the MSBA. A further exploration and understanding of the various special education programs' needs would be required to determine the right sizes, locations, and number of rooms for this school.

Core Academic Areas

There are 24 classrooms dedicated to core academic use and one other dedicated to special education program. The total area of these classrooms is 22,490 nsf or 103% of the area recommended by the Massachusetts School Building Authority (MSBA) guideline of 21,850 nsf at 950 square feet per classroom. All of the classrooms meet the standards for standard recommended area ranging from 92% to 110% of the 950 sf per classroom. Guidelines set aside some 35 square feet per child in third through fifth grades. If

classrooms were filled with the maximum of 25 students set by district guidelines then classrooms would provide on average, 37 square feet per student.

All 24 of the classrooms are fully utilized with either class in session or teacher preparatory use (while students are enjoying specialty classes in gym, music, art or foreign language). The actual utilization of these classrooms is thus at the maximum possible with current scheduling. This represents approximately 66% of possible use per day.

A minimum of three regular education classrooms will be required by 2018 to meet the enrollment projections. Another classroom is required for the SAIL program anticipated to join the school in 2017. Some classroom space can be found within the building's perimeter to keep classrooms adjacent to one another, but would still necessitate additional space to accommodate displaced programs.

Special Education

The Lane School has 22 rooms dedicated to special education and has 117% of the area recommended. The MSBA recommended area is based on a K-5 school. Interviews with the Principal indicate that the facilities provided are utilized on an as-needed basis according to their current methods of servicing their students. Many spaces are intended for use by small groups but are internal and undersized. Other areas are utilized more regularly by more than one staff and groups of students. Both Title 1 and the math coordinator are in spaces shared with dissimilar uses. Relocation of these two to dedicated space should be considered. Full sized classroom spaces have been subdivided both permanently and with temporary partitions to accommodate the various groups. Although some spaces are small the number and distribution appears adequate for the current methods of servicing students. There is a full sized separate classroom available for substantially separate instruction, but is not utilized full time as such; instead services are provided in the classrooms with the dedicated space used for pull-out activities. The manner in which the spaces are used changes with the needs of the individual students throughout the year. The school has several reading program rooms, an occupational therapy room, the Bridge program (which is undersized) and houses the district's Crossroads program. Even with the projected increase in population space dedicated to special education is 93% of recommended area.

The principal indicates that the district's SAIL program will join the school in 2017 requiring a full sized classroom built to service the needs of this cohort. Further programming discussions are needed to determine whether this space can be found or created in the school or would need to be part of the new construction.

Art and Music

Facilities for art and music are adequate for the current enrollment and schedule. Each program has its own dedicated space(s) and the total area of the two programs is within 5% of the recommended MSBA area. The art room is 51% of the area recommended which is based on MSBA guideline of two periods per week per class and two separate spaces totaling 2,200 square feet. Given the single art period per week in

the Lane School schedule, the art room meets the area recommended. The Music and Art rooms both have a utilization rate of 63% at the present 1 period scheduling. Additional teaching space would be required to accommodate two periods of art and music per week given the current utilization. There are two large music practice rooms used by band and orchestra, but no small practice rooms. The total practice area is more than recommended by MSBA but is utilized by the school regularly. Additionally, the Title 1 program utilizes part of the band practice room with no auditory or visual separation. The band and orchestra also make use of the multi-purpose room (which is outside of the MSBA recommended spaces).

Overall the music area is adequate, however, the entire area is large enough to reconfigure in the future to meet changing needs of the school. The art room is a two storey space and is adjacent to both the first and second floor corridors. Its configuration would allow for the insertion of a level at the second floor which would create either a second art room or another full sized classroom space and possible small group rooms. If done, the art room could be moved to the second floor and either skylights or a clerestory added to create more height and bring more light into the space.

Health and Physical Education

The gymnasium is approximately 8,700 square feet, 145% the size recommended by MSBA. The store room and the Physical Education office are more than adequately sized. Utilization of the gym is average at 74% and occurs twice per week per class. It is designed to be used by two classes at one time and appears that for half of the gym periods is used so. The gymnasium was added in 1999 and it along with a lobby and restrooms is designed with a firewall (to create two separate buildings by code) and separate entrances for use after school hours without needing to access the academic corridors. There is an adjacent multi-purpose room that is used by the music program and for school assemblies which is part of the separated area as well.

In one of the expansion scenarios we discuss the possibility of creating classroom and small group or office spaces and extended a corridor out to a new multi-purpose room addition. It is discussed because the room is currently swing space that, while utilized, is not regularly programmed.

Media Center

The library serves each class one period per week and serves as a media center and maker space in support of the schools implementation of “STEM” curricula. At 2,610 nsf, it is 85% of the recommended size and straddles the original 1962 building and the 1999 addition, further reducing the available area due to the stairs and ramp required for the split level school configuration. Its utilization is average for the single period per week usage at 63%. There is a separate computer media space that is linked via corridor which is not regularly programmed, but used “on demand” as a tool for assignments in other classes. The computer room is needed in support of the curriculum goals. The additional spatial capacity of the computer lab (not listed in MSBA guidelines) brings the media center to 129% of its basic spatial needs.

The stairs and ramp in the library create inefficiency and dedicate needed usable square footage to circulation. There is potential to either relevel the floors; make use of the corridor and adjacent spaces between the library and computer lab; and/or, use some library space to reconfigure the split-level stair in the corridor to improve circulation throughout the building. In one expansion scenario we discuss the possibility of using some of the computer lab space or conference space between the library and computer lab to create a corridor to a new classroom wing and reconfiguration of interior spaces for conference and small group areas.

Dining & Food Service

The cafeteria is 73% the standard size for a school population of 534. The kitchen is 95% of the size recommended. At 15 square feet per student as required by the building code, the cafeteria can accommodate a maximum of 194 students at a time. The minimum number of seatings is thus three and the school has chosen three seatings – one per grade. The cafeteria is adequately utilized by the school's chosen seatings by grade and the occupancy (per code and MSBA) held at each seating. Some difficulties in seating are created in accommodating the band and orchestra period as these specials can only be held during lunch and recess time blocks. It is used 40% of the time available in the schedule. The walk-in freezer is also located in a corner of the cafeteria.

The cafeteria is also the auditorium seating area. For assemblies and performances tables need to be stored in the corridor as there is no separate table storage space. The stage is not used regularly but for special assemblies and a few annual performances. The stages are elevated and have stairs and a lift.

During our tour it was mentioned that the space is tight at lunch and they cannot add another lunch period. When the population increases the current cafeteria will be 60% of MSBA recommended size and by code would require more than three seatings to not be over 194 occupants at any one seating. More seatings would cause further strain on an already complex scheduling. The east wall of the space is a greenhouse-like extension which could easily be extended farther to enlarge the room to meet the code required area.

Medical

The medical suite is inadequate to the number of students at 52% of MSBA guidelines overall and with the toilet room, office and waiting room and exam rooms all being below their recommended sizes and numbers. It is accessed through the main office with no separate access to the corridor.

Possible expansion of the administrative suite to the north would provide opportunity for enlarging or reconfiguring the health suite.

Administration and Guidance

The administrative areas of the school are undersized at 72% of guideline requirements. The Main office is 100% of the recommended size with two staff sharing the space and much given over to circulation to the various offices and health suite. The principal's office is far below standard at 25% with no space for

conference and no direct access to a separate conference room. The staff work and copy room has been made into a conference room with no direct access to the main office. Its size is sufficient for the school's population. The lack of a teacher's work room is a notable deficiency with functions scattered between the lounge, main office, vestibule areas and elevator vestibule. The administrative area currently has an assistant principal's office which is not in the recommended area for the current population, but would be in the projected population. Guidance and behavior specialist share an office but are sufficient in size at 142% of the recommended area. They are located at the far end of the second floor classroom corridor.

Possible expansion of the administrative suite to the north would provide opportunity for enlarging the main office and principal's office as well as making a more efficient circulation system.

Custodial and Maintenance

The custodial areas are small for a school of this size at 73% of the standard area while owing mostly to the single oversized storage room. Office space is small (43% of recommended area) and a dedicated workshop was not observed. Other dedicated trash and supply rooms were also not observed but are recommended by the MSBA. Receiving area appears to be through the corridor.

Other

In addition to other specials the school also offers foreign language courses. The French and Spanish two courses share a bisected classroom, each having around 530 and 460 sf, respectively. As the spaces are used by an entire homeroom class, the area dedicated to each should be that of a homeroom size, or around 950 square feet. The room is split by a movable or demountable partition that does not provide auditory separation that is needed when two classes are operating simultaneously.

There is also a multi-purpose room of 1420 sf, discussed earlier, that is not anticipated by MSBA. The school does make use of it for school-wide assemblies and for band and orchestra practice. Its location adjacent to the gymnasium and off of the dedicated separate lobby allows it to be used after school hours without accessing the academic corridors.

Consideration should be given to separate full classrooms for the foreign language programs. Short of that, a sound attenuated permanent partition should be built in place of the demountable partition. The size of the current spaces does accommodate the average class size at the code required 20 nsf per occupant but is well below the MSBA guideline of 35 sf per occupant.

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Building Systems Analysis

Architecture:

Overall the building appears in good condition with most of it having been renovated in 1999 with the last round of additions. No major deficiencies were reported during our visits and we noted failures of the flooring in several locations which appear to be related to methods of construction in past modifications to the structure. TBA did not do an analysis of the condition of the building enclosure, frame, or interior finishes beyond some visual observation to facilitate the focus of this study – the current and future spatial use of the building. Notations of wall types and configurations were made to determine the scope of modifications necessary to make future changes.

The construction type and existing materials are typical of school buildings and do not present unusual challenges to expansion or reconfiguration. Materials can be matched or complemented. Openings can be made in walls to extend corridors and allow for tying in of interior finishes and exterior enclosure using conventional detailing and with systems meeting the current codes, both building and energy. The building was abated of hazardous materials during previous renovations, though testing would be done to confirm based on the chosen scope of work.

The current 8th edition of the building code has been used for this report, however Massachusetts has stated that the 9th edition will be issued and enacted at some point in 2016 which may trigger the need to review some of the decisions and calculations made in the coming design of the expansion. Areas that could be effected by the code change include roof snow loading, wind loading, egress requirements, and extent of changes to existing systems required by the existing buildings chapter among others. Changes could be needed even at the time of permitting if the code change happens prior to permitting.

Landscape and Site:

Hammer+Walsh reviewed the existing site data supplied by the town and photography available online and found no apparent physical limitations to expanding parking and related site amenities at the Lt Job Lane Elementary School site in Bedford, MA.

Such additions to the site program may result in the loss of some sections of existing vegetation as well as the reconfiguration of some existing grades.

HVAC:

Norian-Siani Engineering reviewed the existing core HVAC, Plumbing and Fire Suppression systems at the Lt. Job Lane School to determine if they could support the proposed 5,000 square foot addition containing four to five classrooms. It seems feasible that the existing systems could be expanded to serve the relatively small expansion that would enlarge the building by approximately 6% of floor area.

Assuming that the addition will have unit ventilators, or another form of hot water heating, the two hot water boilers have sufficient spare capacity to handle the additional load. It has been reported that typically only one boiler is necessary to handle the full heating load, and that the second boiler is essentially a spare. The two main system circulators operate using variable speed drives. The variable speed drives are currently operating at a maximum of approximately 30Hz (out of 60Hz) indicating that there is spare pumping capacity. The exact location of the addition is yet to be determined however if the build out occurs on the end furthest from the boiler room pumps, it will likely result in greater work and energy consumption for the pumps.

The existing Building Management System could be expanded to accommodate additional HVAC equipment and zones.

It is assumed that the new classrooms will have new independent forms of outside air for ventilation and exhaust, and not rely on connections to existing central systems.

There are no centralized systems that could provide air conditioning for the proposed classrooms.

Plumbing:

There is one existing 100 gallon water heater that reportedly satisfies the building domestic hot water (DHW) demands. A second tank has been proposed for redundancy and spare capacity. Once installed the two tanks should have ample capacity to satisfy a the small increase in DHW load from the new classrooms.

The architect is performing a review of the plumbing fixtures to determine if additional bathrooms are required. The waste piping is buried beneath the slab on grade floor and exits the building in the vicinity of the 1994 addition. The exact location of the addition is yet to be determined however it seems feasible that the existing piping can be located and intercepted for connection of new fixtures. A gravity drain is the most feasible at the north end of the building where the existing building drain is lowest. A review of the existing waste inverts is required for new bathrooms that may be proposed in the West, South and/or East ends of the building to ensure gravity drainage is possible.

Fire Suppression:

The building appears to be fully sprinkled. It is feasible that the existing system could be extended to serve the proposed classrooms. The exact location of the addition is yet to be determined however if the build out occurs on the end furthest from the sprinkler water service entry in the boiler room it will likely be the most remote area on the system and hydraulic calculations must be performed to determine adequate protection is provided.

It is assumed that there is sufficient city water pressure since the building does not contain a fire pump.

Electrical:

VGNA reviewed the existing electrical, fire alarm, and sound and clock systems at the Lane School.

The existing building service is 120/208 volt, three phase, four wire rated at 1600 amperes. According to the electrical demand information provided by Eversource, the maximum electrical demand of 194.4kw or 540 amperes.

In accordance with the National Electric Code, the spare capacity on the main electric service is as follows:

Maximum electrical demand = 194.4kw

X 1.25

243.0 kw or 675 amperes

Remaining capacity on the existing electric service is 925 amperes.

Based on this information, the existing building electric service would be more than adequate to meet the requirements for a 5000 square foot addition.

Fire Alarm:

The existing building fire alarm system is an addressable Fire Control Instruments FCI-7200 fire alarm control panel. It has yet to be determined if there are any spare points available on the existing fire alarm system. We have been talking with the fire alarm maintenance contractor and they have yet to determine the specifics of the existing fire alarm system.

Sound and Clocks:

The existing sound system and clock and program system was manufactured by Dukane and should be capable of supporting the additional classroom speakers and clocks for the four or five classroom expansion. This will need to be verified by the system maintenance contractor.

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ENROLLMENT	Current Year	Peak Year	Difference
	2015-16	2018-19	
Grade 3	183	222	+39
Grade 4	174	208	+34
Grade 5	177	218	+41

UTILIZATION	# Periods/ week	% Used
Total Periods	38	
Gym	28	74%
Art	24	63%
Music	24	63%
Library	24	63%
Cafeteria	15	40%
Core Classroom	25	66%

SPACE LEGEND

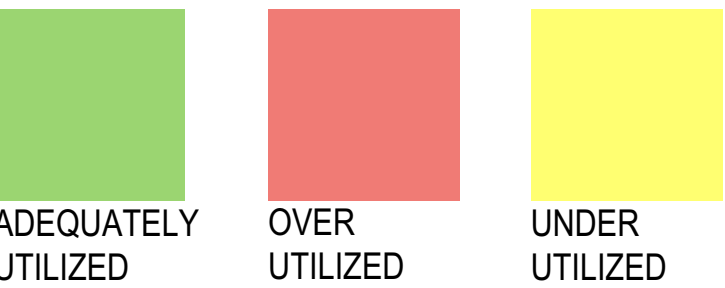




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UTILIZATION LEGEND
DETERMINED BY TIME (NUMBER OF PERIODS / WEEK) USED AND/OR BY
ROOM SIZE (SQUARE FOOTAGE).

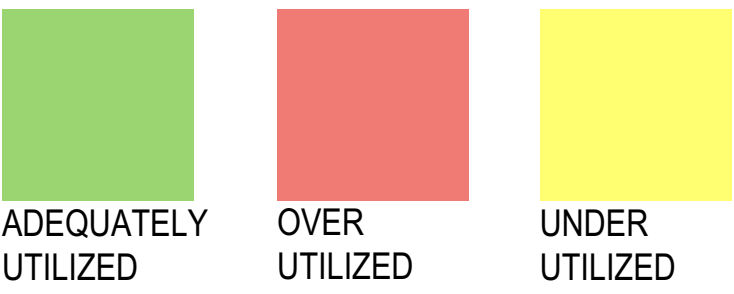




ENROLLMENT			
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Core Classroom	25	66%

UTILIZATION LEGEND
DETERMINED BY TIME (NUMBER OF PERIODS / WEEK) USED AND/OR BY ROOM SIZE (SQUARE FOOTAGE).



Existing Space Summary

Lt. Job Lane Elementary School	Existing Conditions				
ROOM TYPE	ROOM NFA ¹	# OF RMS		Variance from MSBA	area totals
CORE ACADEMIC SPACES		24		103%	22,490
(List classrooms of different sizes separately)					
General Classrooms - Grade 3-5					0
	1,045	4		110%	4,180
	1,020	1		107%	1,020
	1,005	2		106%	2,010
	1,000	2		105%	2,000
	925	1		97%	925
	905	1		95%	905
	900	3		95%	2,700
	875	10		92%	8,750
SPECIAL EDUCATION		22		117%	7,040
(List rooms of different sizes separately)					
Self-Contained SPED	875	1		23%	875
Self-Contained SPED - toilet	0	0			0
Resource Room	470	1		94%	470
Resource Room	455	1		91%	455
Resource Room	430	1		86%	430
Resource Room	425	1		85%	425
Small Group / Reading	480	1		96%	480
Reading	465	1		93%	465
Reading	425	1		85%	425
Small Group	180	2			360
Small Group	95	1			95
Small Group	65	1			65
Testing	40	1			40
BRIDGE	700	1			700
BRIDGE Counselor	60	1			60
Speech/ Language	180	1			180
ELL	315	1			315
ELL	180	1			180
Title 1 Math	145	1			145
OT	150	1			150
SPED Chair	270	1			270
Math Coord./ ELA Coord./ Gifted & Talented	455	1			455
ART & MUSIC		4		95%	3,605
Art Classroom - 25 seats	1,025	1		51%	1,025
Art Workroom w/ Storage & kiln	385	1		128%	385
Music Classroom / Large Group - 25-50 seats	1,345	1		112%	1,345
Music Practice / Ensemble	500	1		667%	500
Music Practice / Ensemble	350	1		467%	350
HEALTH & PHYSICAL EDUCATION		3		150%	9,445
Gymnasium	8,700	1		145%	8,700
Gym Storeroom	385	1		257%	385
Health Instructor's Office w/ Shower & Toilet	360	1		240%	360
MEDIA CENTER		1		129%	3,960
Media Center / Reading Room	2,610	1		85%	2,610
Computer Lab	1,250	1			1,250
Computer Work Area	50	2			100
DINING & FOOD SERVICE		4		81%	6,005
Cafeteria / Dining	2,910	1		73%	2,910
Stage	810	1		81%	810
Chair / Table / Equipment Storage	0	0			0
Kitchen	1,750	1		95%	1,750
Staff Lunch Room	535	1		229%	535
MEDICAL		3		52%	320
Medical Suite Toilet	45	1		75%	45
Nurses' Office / Waiting Room	230	1		92%	230
Examination Room / Resting	45	1		15%	45
ADMINISTRATION & GUIDANCE		9		72%	1,735
General Office / Waiting Room / Toilet	415	1		100%	415
Teachers' Mail and Time Room	0	0			0
Duplicating Room	90	2		120%	180
Records Room	45	1		41%	45
Principal's Office w/ Conference Area	95	1		25%	95
Principal's Secretary / Waiting	0	0			0
Assistant Principal's Office	95	1			95
Supervisory / Spare Office	0	0			0
Conference Room	240	1		96%	240
Counselor/ Behavioral Specialist	425	1		142%	425
Guidance Storeroom	0	0			0
Teachers' Work Room	240	1		58%	240

[illegible]

Existing Space Summary

Lt. Job Lane Elementary School	Existing Conditions				
ROOM TYPE	ROOM NFA ¹	# OF RMS		Variance from MSBA	area totals
CUSTODIAL & MAINTENANCE		6		73%	1,560
Custodian's Office	65	1		43%	65
Custodian's Workshop	0	0			0
Custodian's Storage	190	1		51%	190
Recycling Room / Trash	0	0			0
Receiving and General Supply	0	1		0%	0
Storeroom	1,070	1		300%	1,070
Network/ Telecom Room	155	1		78%	155
Control Room	80	1			80
OTHER					2,154
Other (specify)					
French Classroom	530	1		56%	530
Spanish Classroom	460	1		48%	460
Multi-Purpose Room	1,420	1			1,164
Total Building Net Floor Area (NFA)				109%	58,314
Existing Student Capacity / Enrollment				534	
Total Building Gross Floor Area (GFA) ²				103%	84,336
Grossing factor (GFA/NFA)				95%	1.45

MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM NFA ¹	# OF RMS	area totals	Comments
	7	2,134	
150	1	150	
375	1	375	
375	1	375	
400	1	400	
278	1	278	
356	1	356	
200	1	200	
		0	
950			900 SF min - 1,000 SF max
950			900 SF min - 1,000 SF max
		-	
		53,656	
		534	
		81,542	
		1.52	

¹ Individual Room Net Floor Area (NFA)

Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

² Total Building Gross Floor Area (GFA)

Includes the entire building gross square footage measured from the outside face of exterior walls

Architect Certification

I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts

Name of Architect Firm:

Name of Principal Architect:

Signature of Principal Architect:

Date:

Projected Space Summary

Lt. Job Lane Elementary School	Existing Conditions				
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	900	3		95%	2,700
	875	10		92%	8,750
SPECIAL EDUCATION		22		93%	7,040
(List rooms of different sizes separately)					
Self-Contained SPED	875	1		18%	875
Self-Contained SPED - toilet	0	0			0
Resource Room	470	1		94%	470
Resource Room	455	1		91%	455
Resource Room	430	1		86%	430
Resource Room	425	1		85%	425
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Small Group	95	1			95
Small Group	65	1			65
Testing	40	1			40
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BRIDGE Counselor	60	1			60
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ELL	180	1			180
Title 1 Math	145	1			145
OT	150	1			150
SPED Chair	270	1			270
Math Coord./ ELA Coord./ Gifted & Talented	455	1			455
ART & MUSIC		4		72%	3,605
Art Classroom - 25 seats	1,025	1		51%	1,025
Art Workroom w/ Storage & kiln	385	1		128%	385
Music Classroom / Large Group - 25-50 seats	1,345	1		56%	1,345
Music Practice / Ensemble	500	1		667%	500
Music Practice / Ensemble	350	1		467%	350
HEALTH & PHYSICAL EDUCATION		3		150%	9,445
Gymnasium	8,700	1		145%	8,700
Gym Storeroom	385	1		257%	385
Health Instructor's Office w/ Shower & Toilet	360	1		240%	360
MEDIA CENTER		1		110%	3,960
Media Center / Reading Room	2,610	1		73%	2,610
Computer Lab	1,250	1			1,250
Computer Work Area	50	2			100
DINING & FOOD SERVICE		4		71%	6,005
Cafeteria / Dining	2,910	1		60%	2,910
Stage	810	1		81%	810
Chair / Table / Equipment Storage	0	0			0
Kitchen	1,750	1		90%	1,750
Staff Lunch Room	535	1		204%	535
MEDICAL		3		52%	320
Medical Suite Toilet	45	1		75%	45
Nurses' Office / Waiting Room	230	1		92%	230
Examination Room / Resting	45	1		15%	45
ADMINISTRATION & GUIDANCE		9		66%	1,735
General Office / Waiting Room / Toilet	415	1		88%	415
Teachers' Mail and Time Room	0	0			0
Duplicating Room	90	2		120%	180
Records Room	45	1		41%	45
Principal's Office w/ Conference Area	95	1		25%	95
Principal's Secretary / Waiting	0	0			0
Assistant Principal's Office	95	1		79%	95
Supervisory / Spare Office	0	0			0
Conference Room	240	1		96%	240
Counselor/ Behavioral Specialist	425	1		142%	425
Guidance Storeroom	0	0			0
Teachers' Work Room	240	1		51%	240

MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM NFA ¹	# OF RMS	area totals	Comments
	28	26,600	
950	28	26,600	900 SF min - 1,000 SF max
	15	7,550	
950	5	4,750	8% of pop. in self-contained SPED
60	5	300	
500	3	1,500	1/2 size Genl. Clrm.
			1/2 size Genl. Clrm.
			1/2 size Genl. Clrm.
			1/2 size Genl. Clrm.
500	2	1,000	1/2 size Genl. Clrm.
500			1/2 size Genl. Clrm.
500			1/2 size Genl. Clrm.
	10	5,000	
1,000	2	2,000	assumed schedule 2 times / week / student
150	2	300	
1,200	2	2,400	assumed schedule 2 times / week / student
75	4	300	
	3	6,300	
6,000	1	6,000	6000 SF Min. Size
150	1	150	
150	1	150	
	1	3,586	
3,586	1	3,586	
	5	8,486	
4,860	1	4,860	2 seatings - 15SF per seat
1,000	1	1,000	
416	1	416	
1,948	1	1,948	1600 SF for first 300 + 1 SF/student Add'l
262	1	262	20 SF/Occupant
	5	610	
60	1	60	
250	1	250	
100	3	300	
	13	2,633	
474	1	474	
100	1	100	
150	1	150	
110	1	110	
375	1	375	
125	1	125	
120	1	120	
120	1	120	
250	1	250	
150	2	300	
35	1	35	
474	1	474	

Projected Space Summary

Lt. Job Lane Elementary School	Existing Conditions				
ROOM TYPE	ROOM NFA ¹	# OF RMS		Variance from MSBA	area totals
CUSTODIAL & MAINTENANCE		6		69%	1,560
Custodian's Office	65	1		43%	65
Custodian's Workshop	0	0			0
Custodian's Storage	190	1		51%	190
Recycling Room / Trash	0	0			0
Receiving and General Supply	0	1		0%	0
Storeroom	1,070	1		248%	1,070
Network/ Telecom Room	155	1		78%	155
Control Room	80	1			80
OTHER					2,154
Other (specify)					
French Classroom	530	1		56%	530
Spanish Classroom	460	1		48%	460
Multi-Purpose Room	1,420	1			1,164
Total Building Net Floor Area (NFA)				93%	58,314
Projected Student Capacity / Enrollment				648	
Total Building Gross Floor Area (GFA) ²				90%	84,336
Grossing factor (GFA/NFA)				97%	1.45

MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM NFA ¹	# OF RMS	area totals	Comments
	7	2,248	
150	1	150	
375	1	375	
375	1	375	
400	1	400	
316	1	316	
432	1	432	
200	1	200	
		0	
950			900 SF min - 1,000 SF max
950			900 SF min - 1,000 SF max
		-	
		63,013	
		648	
		93,960	
		1.49	

¹ Individual Room Net Floor Area (NFA)	Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.
² Total Building Gross Floor Area (GFA)	Includes the entire building gross square footage measured from the outside face of exterior walls
Architect Certification	<div>I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts</div> <div>Name of Architect Firm: _____</div> <div>Name of Principal Architect: _____</div> <div>Signature of Principal Architect: _____</div> <div>Date: _____</div>

Existing Conditions Photographs



1. Main Entrance & Gym Entrance



2. Existing West Wing & Classroom Wing Facades



3. Classroom Wing East Façade



4. Classroom Wing North Façade



5. Gymnasium



6. Multi-purpose room (Math Coord beyond)



7. Music Room ceiling & wall to entrance



8. Music Room



9. North wing classroom corridor



10. Library stack area



11. Library looking toward entrance



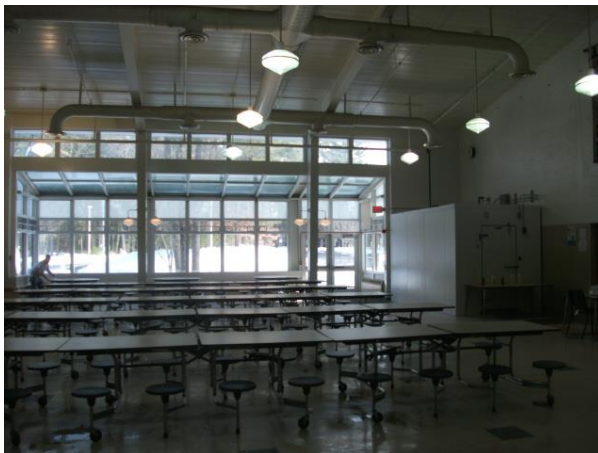
12. Library window wall



13. Computer Lab, seminar area



14. Computer lab, computer stations



15. Cafeteria (freezer in corner)



16. Cafeteria (stage to left)



17. Art room clerestory to 2nd floor corridor



18. Art room north exterior wall



19. Special education classroom



20. Spanish classroom



21. Special education classroom



22. Computer area in west wing corridor



23. Homeroom classroom



24. Health Office

4. Code Summary

What follows in this section is a summary of the salient chapters of the code effecting the pre-design feasibility of expanded or modifying the Lane School. TBA looked primarily at the construction type of the building (to determine allowable areas and heights) egress and restroom facility capacities. Further code research will be done as the design develops, but these three areas effect greatly the planning and cost of future work. *We used the current building code, 780 CMR 8th edition for our review, but note two things: 1) the last addition and renovation were done under the 780 CMR 6th edition, and 2) Massachusetts has stated that the next edition, 780 CMR 9th edition is slated to be issued this year (likely July 2016) and there will be no concurrency period with the current code. The expansion work may be permitted after the latest edition is issued and would be required to conform to it.*

Building Name and Location

Lt. Job Lane Elementary School – Expansion & Renovation Feasibility Study
66 Sweetwater Avenue, Bedford, MA 02420

Applicable Codes

Zoning: No (not reviewed at feasibility)

Building: Yes, IBC – International Building Code and MA amendments to that volume; for Ch 34 – MA amendments refer to IEBC – International Existing Building Code and **MA amendments to that volume as issued on 6/14.**

Energy: As required by the IEBC, IECC – International Energy Conservation Code

ADA/MAAB: Yes, 521 CMR Rules and Regulations of the Massachusetts Architectural Access Board

Use Group(s): Education (E); 69,876 SF; 83% of occupied spaces
Assembly (A-3); 14,460 SF; 17% of occupied spaces

Construction Types(s): Type IIB, non-combustible, unprotected

Construction Materials (observed and noted by received documents):

Exterior: Brick and concrete block walls, concrete parapet block and fascia, aluminum fascia and trim, concrete pan/waffle slab floors and roof (1962), steel columns, beams, joists and deck (1994 and 1999), wood bent and steel bent rigid framing in music, cafetorium and multi-purpose rooms, asphaltic shingle roof at gymnasium, EPDM membrane roof (flat and pitched), aluminum windows with insulating glass, steel doors and frames, aluminum doors and frames.

Interior: carpet, VCT, porcelain tile floors, ceramic tile and drywall walls, drywall and lay-in tile with exposed grid ceilings, flush wood doors and wood frames, and steel doors and frames.

780 CMR Ch 5 Building Heights & Areas

The building is a type IIB (Table 601), non-combustible, unprotected building. A rating is not required on exterior walls (unless required by distance from adjacent structures), structure or bearing walls (Ch 6). Corridor wall fire ratings are also allowed to be 0 hours per 1018.1 in a fully sprinklered building. It is fully sprinklered and has access around the full perimeter which allows for full increases in per storey floor area

and building height when calculated per Chapter 5 of the IBC. The two uses are separate by a fire wall effectively creating two buildings per the code.

This study anticipates an addition to the education use portion of the building. However, both uses were calculated for maximum allowable area and height (Ch 5). The maximum allowable per storey floor area of a type IIB and Educational use building is 68,875 gross square feet for up to 3 storeys and the current building first storey is 46,231 gross square feet. Expansion of up to 22,000 square feet on the first storey alone would be allowed. The maximum allowable per storey floor area of a type IIB and Assembly-3 use building is 45,125 gross square feet for up to 3 storeys and the current building first storey is 14,460 gross square feet. Expansion of up to 31,000 square feet on the first storey alone would be allowed.

		E		A-3	Bldg.
Construction Type		IIB		IIB	
Sprinklered		Yes		Yes	
Max Height in Feet (20 feet increase if sprinklered)	55	75	55	75	
Max Height in Stories (1 story increase if sprinklered)	2	3	2	3	
Area A = allowable building per storey in sf		54,375		45,125	
Area T = tabular building area per storey in accordance with table 503 in sf		14,500		9,500	
Increase F = area increase factor due to frontage in accordance with Section 506.2					
Increase S = area increase factor due to sprinkler protection in accordance with Section 506.3		2		3	
F = building perimeter that fronts on a public way or open space having 20 ft open minimum width in feet		1431		492	
P = perimeter of entire building in feet		1431		492	
W = width of public way or open space in feet in accordance with Section 506.2.1		30		30	
Increase F = $[F/P - 0.25]W/30$		0.75		0.75	
Area A = $\{AT + [AT \cdot IF] + [AT \cdot IS]\}$		54,375		45,125	
Total Building Area		83%		17%	84,336
As-built Area		69,876		14,460	
First Floor		46,231		14,460	60,691
Second Floor		23,645			23,645

780 CMR Ch 10 Occupancy Load and Egress

The safe egress through and out of the building is of primary concern. The current and maximum projected occupancies were calculated per Chapter 10 of the IBC. Total Occupancy load of the building and floors within buildings is calculated at 1 occupant per 20 net square feet of classroom space. Other ratios are used when calculating the egress from certain specialized spaces within an educational building, but because it is anticipated that rooms such as cafeterias, gyms, music rooms, and other special spaces are utilized by the same population held within the classrooms the load need not be double counted. Further, section 303.1, exception 4 of the IBC states that assembly areas accessory to an “E” occupancy are not considered separate occupancies except for Chapter 11, Accessible Egress. Based on this interpretation we calculate the total occupancy of the building to be 1015 persons with a second floor load of 490 persons and a first floor occupancy of 525 persons.

The required egress from the building is determined by Ch 10 as well and is calculated at 0.2” of width per person for stairs and 0.15” of width per person for doors, ramps and corridors in a fully sprinklered building (per MA amendments). A minimum of 72” width is required in corridors serving over 100 occupants in an educational use and egress must not be obstructed or reduced in the direction of egress. The corridors at the Lane are 108” wide, but the existing split level stair is only 60” wide and is considered an obstruction and narrows the path of egress, so cannot be considered part of the egress from the second floor. Two stairs are provided from the second floor, one in the 1962 wing at 60” and the other in the 1999 wing at 48”. The correct number of stairs is provided based on the current occupancy but if another classroom were added at this level then either another stair would need to be provided or the corridor split-level stair would need to be reconfigured to provide the minimum egress width of the corridor. As there are only two means of egress from the second floor, the 48” wide stair is also not current code compliant with section 1005.1 which states that if any one of the means of egress is compromised then the remaining cannot be reduced by more than ½ the total load. Half of the total load of the second floor would require 49” of width on the stair, 1” more than currently provided.

Reconfiguring the corridor stair to comply with current egress codes would not only allow it to be considered part of the building egress system, but would improve a hindrance to everyday flow of students between classrooms and the main entrance and special spaces.

Occupancy calculations are based on the current classroom net area per the IBC. The net area used by the code is different from the net area used by MSBA as it counts available floor area only and deducts the space dedicated to fixed cabinetry and counter. The chart below shows sixteen classrooms from the original construction at 783 nsf each, the four 1994 classrooms at 840 nsf each, and the five 1999 classrooms at 882 nsf each, each with similar proportions. The classroom currently used for special education is not counted as it is not substantially separate and is used by the students pulled from other homeroom classes.

Year Built Dimensions (WxL) Net CR area CRO @ 20 net	1962		1994		1999		Totals		Egress Required	
	27	29	28	30	28	31.5			Corridor	Stairs
									0.15	0.2
	783		840		882					
	39		42		44					
							CR	Occ		
Second Floor										
# of CR	7		2		3		12			
Floor Occupancy		274.1		84.0		132.3		490.4	73.6	98.1
First Floor										
# of CR	9		2		2		13			
Floor Occupancy		352.4		84.0		88.2		524.6	78.7	104.9
Total Occupancy							25.0	1014.9		

*Classroom addition at second floor would require reworking of existing corridor stair or new egress stair.

**Section 1021.1 Requires 3 exits from floors or spaces with greater than 500 occupants.

***Section 1005.1 requires that loss of one egress does not decrease available by more than 1/2.

248 CMR Plumbing Fixtures

TBA calculated the restroom facilities required for the current and expanded Lane School per 248 CMR, Section 10.10.18.h, Table 1. The table sets number of fixtures per occupants for male and female students and staff separately. The total occupant load is calculated by Ch 10 of the IBC, then divided in half, assuming half males and half females.

The current number of fixtures were counted using the as-built plans from the 1999 expansion. The charts included illustrate better than words the deficiency for student restroom fixtures in the current building and further the increase deficiency with an additional four classrooms. The number of fixtures appears to be deficient, however we don't know if another logic was used in determining the current number. Discussion with the authorities having jurisdiction will be necessary to determine to what extent the expansion of the Lane School will be required to provide for or rectify the current deficiency in facilities. It should be assumed that the expansion would need to provide fixtures for the increased number of students at a minimum.

The first chart illustrates the current required fixtures versus the current provided fixtures and the second the same information with the additional four classrooms. All calculations are made using ratios stated in Section 10.10.18.h, Table 1.

Current Occupant Load

Classroom Area	# occup.	WT	MT	U	WL	ML	DF	W Staff T	M Staff T	M Staff U	L
	20	30	60	60	60	60	75	20	25	33%	40
Classroom Area - 1/20 sf	20298						13.5				
Per MA 248 CMR	507.45	16.9	8.5	8.5	8.5	8.5					
Staff Occupancy	87										
	43.5							2.2	1.7	0.6	1.1
Provided		12.0	6.0	13.0	9.0	7.0		5.0	5.0		10.0
Delta		-4.9	-2.5	4.5	0.5	-1.5		2.8	3.3	-0.6	8.9

Projected Occupant Load

Classroom Area	# occup.	WT	MT	U	WL	ML	DF	W Staff T	M Staff T	M Staff U	L
	20	30	60	60	60	60	75	20	25	33%	40
Classroom Area - 1/20 sf	20298						14.5				
New Classroom	3840										
Per MA 248 CMR	639.45	21.3	10.7	10.7	10.7	10.7					
Staff Occupancy	95										
	47.5							2.4	1.9	0.6	1.2
Provided		12.0	6.0	13.0	9.0	7.0		5.0	5.0	0.0	10.0
Delta		-9.3	-4.7	2.3	-1.7	-3.7	0.0	2.6	3.1	-0.6	8.8

5. Considerations in Preparation of Options

The next phase will be the creation of three conceptual options for expansion. Study of the existing conditions and confirming the need for additional classrooms revealed several locations for expansion and opportunities for improving the efficiency and functionality of the school. The following are items for discussion in an effort to compile some of the data in this report and identify the most feasible options and make decisions about the scope of the project.

We have identified five areas that have expansion potential and outline below the scope to be considered in each. These are indicated on the site plan included in this report. All expansions to the second floor require egress modifications – namely the need for a third egress stair. The placement of existing stairs and the existing pinch point at the corridor split-level stair make reconfiguration of this stair a compelling option.

- Expansion Area 1 – A two storey addition could be added to the the west classroom wing by either extending the double loaded corridor or capping the end of the corridor similar to the classrooms at the end of the north wing. The new classrooms would be within close proximity to other existing classrooms. Egress routes need to be considered as a third stair would be required from the second floor or improvements made to the corridor stair. Bathrooms facilities would need to be added as well. The expansion area would require clearing of trees and extension of the ground area to provide full perimeter access. Added classrooms in this wing would be closer in proximity to the special spaces and main office than an extension of the north wing.
- Expansion Area 2 – The north wing could be expanded to the east and/or west by extending the corridor through the spaces adjacent to the last classrooms. The corridor can be extended, creating an “L” or “T” shape to the end of the building and adding classrooms to one or both sides. New windows would face to the north and the windows in the existing end classrooms would be reoriented to the north as well. Existing sewer service exiting to the east would require reconfiguration. This expansion creates an even more distant walk to the specialized spaces, but keeps classrooms adjacent to one another and allows for flexibility in grade configuration. As with any second storey expansion the egress needs to be considered. Bathrooms should also be added in the expansion area given the distance from existing facilities. Further analysis of the sprinkler system is needed to determine to what extent the piping would need to be modified to accommodate the distance from the sprinkler service.
- Expansion Area 3 – expansion north of the north classroom wing. The existing 1994 classrooms would be require reorientation to allow the existing corridor to continue to the north and extend to new classrooms. Classrooms would be oriented east and west. The geometry of the building would remain the same and it does not appear that much of the established site structures or functions would be impacted to a great degree. Further expansion to the north does lengthen an already distant walk to the specialized spaces, but keeps classrooms adjacent to one another and allows for flexibility in grade configuration. Sprinkler and restroom commentary is the same as with Area 2.
- Expansion Area 4 – This area is noted because the space use analysis revealed the multi-purpose room as a space not regularly programmed, though put to good use by the school. The multi-purpose room could be renovated into two classrooms and a corridor to be extended to the east for an expansion that would either replace the multi-purpose room or add further classrooms. This option would yield two classrooms out of the multi-purpose room which would necessitate either construction of new classrooms to the east or at another area noted in Areas 1-3 or the recovery of

classrooms in the existing building. New classrooms in this area would be equidistant to the specialized spaces as in other existing classroom wings and would alleviate the demand on the center split-level stair. All work would be at the first floor which would not require changes to the egress from the second floor. It would, however, violate the current clear subdivision of the building that allows the gymnasium area to be utilized without accessing the academic wings. Bathrooms would need consideration. The expansion would be limited by the parking lot to the east and south.

- Expansion Area 5 – A new classroom wing can be created to the west extending from the main corridor through the computer lab or adjacent spaces. This requires reconfiguration of the lab and the creation of a new access corridor. It would be a single storey, unless two storeys are desired, which would require the installation of second elevator to access an upper storey. The expansion would create a new court yard with the adjacent existing west wing. These classrooms would be somewhat remote from the existing classroom wings, but not farther from the special areas or main office than any of the current classrooms. New classrooms in this area would alleviate increased demand on the center split-level stair. Bathrooms added in the area would be convenient to the cafeteria, library and music rooms.

Three areas within the existing perimeter were identified as having potential for creating new or more efficient space. These areas could be considered individually or in combination with one another and/or one of the expansion scenarios.

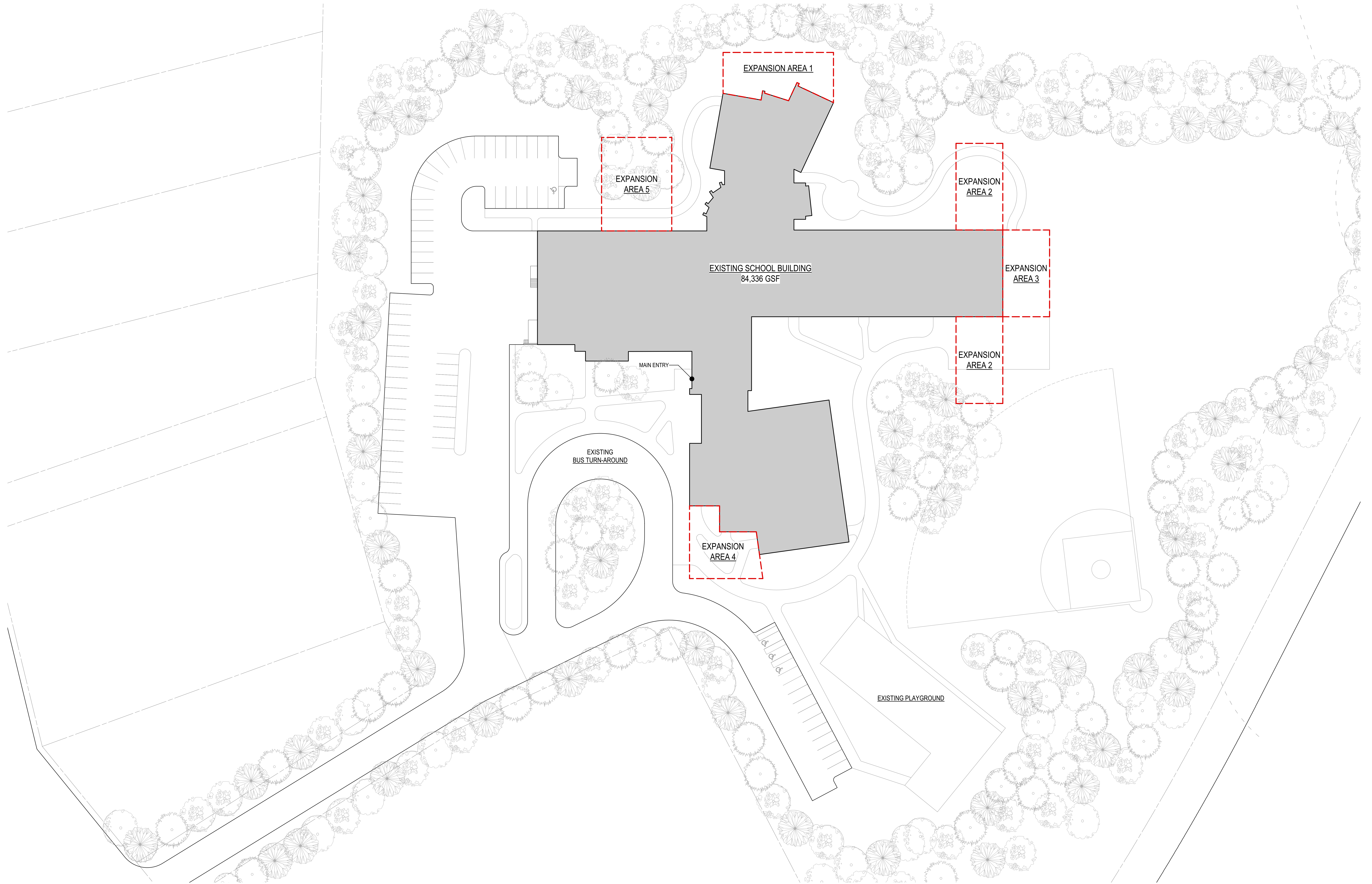
- Space Mining 1 – A second floor could be inserted in the two storey art room. If a floor were inserted and skylights or a monitor added through the roof, the art room could be created on the second floor and a new classroom found on the first floor. The art room on the second floor would not necessarily trigger the need for a third egress stair. Analysis of the structure to determine if a new floor could be supported or if retrofitting is necessary would need to be done. Sprinkler, HVAC and electrical modifications would be part of this scope of work.
- Space Mining 2 – There are currently two classroom equivalent spaces that are used by special education programs on the second floor of the north wing. These rooms could be reclaimed – one is a whole classroom and the other has been subdivided – and two homeroom classrooms created. The displaced special education spaces would need to be created elsewhere, be it in an expansion or another reconfigured area. As with other scenarios involving classroom increases on the second floor, egress and bathroom modifications are required. All services exist in these rooms, but some minor modifications would be needed in the subdivided room.
- Space Mining 3 – There is currently a corridor connecting the library and computer lab with underutilized or ill-appropriated spaces on either side. Space could be found by reconfiguration of the corridor and closets and conference room on either side of it and connecting to the main north-south corridor. This area could house some of the small group areas displaced in the reclamation of classroom space.

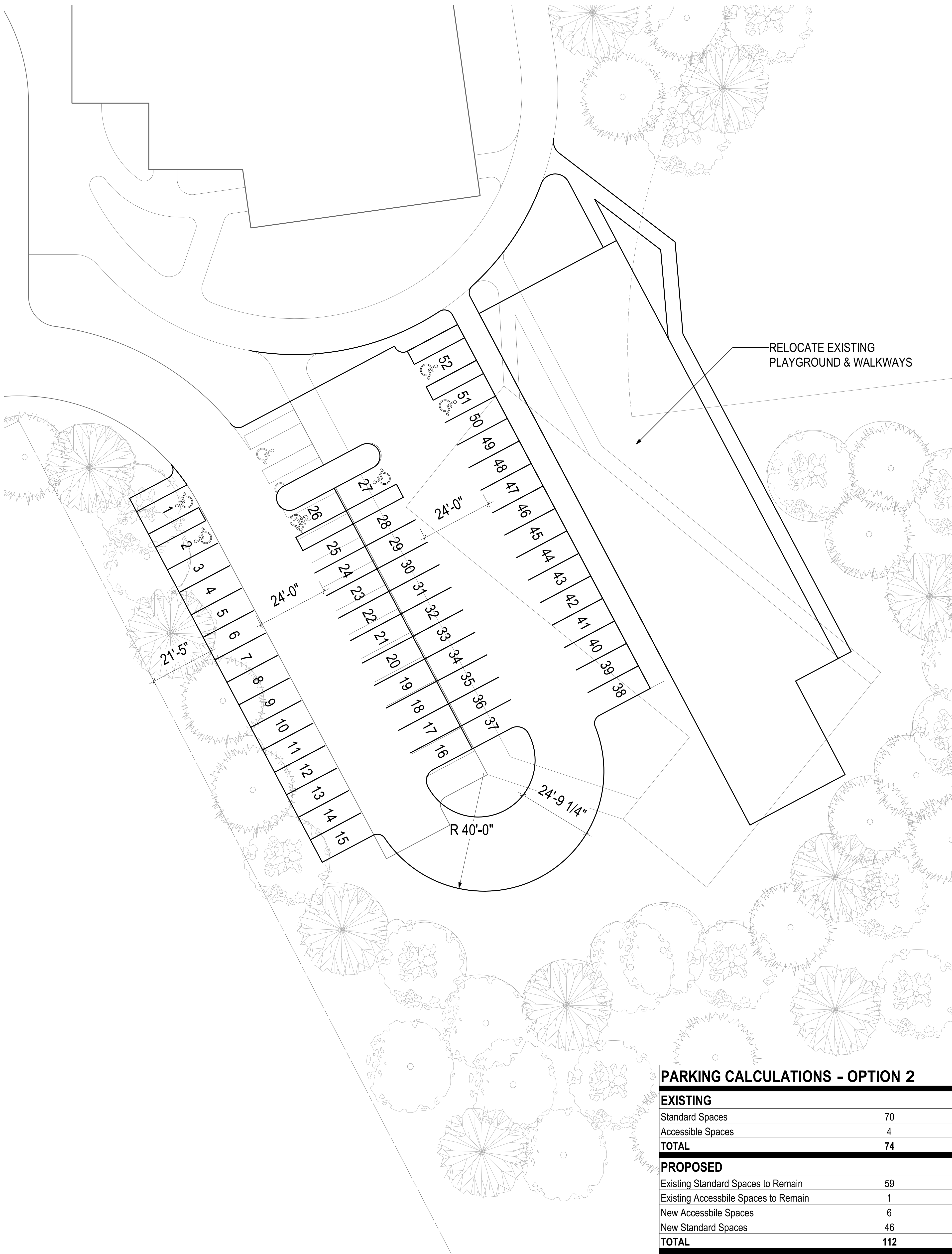
During our tour and interview with the principal some other areas were pointed to as needing or wanting to be addressed. The first of these is compelling as a way of accommodating expansion of the classroom wings while also improving a poor functioning condition. The other three are discrete projects that could be done alone or as part of a holistic addressing of the projected increase in enrollment.

- Expansion or reconfiguration of the central split level staircase. The current staircase width does not allow it to be considered part of the egress system. The minimum width required would be 6' as it is part of a corridor and not an enclosed egress stair. Egress width cannot be reduced on in the direction of egress, so the current 5' stair is an obstruction. It appears from observation, that the stair creates a pinch point and hinders flow of students as they move from classrooms to specialized spaces throughout the day. The expansion of this stair would improve day to day use as well as allow it to be used as part of the egress system and possibly eliminate the need for a new egress stair in an expansion scenario.
- Addition of space and a door from the main office to the north. The additional space would be for conference and right sized office space. The additional door would allow office and nurse staff to access play areas more efficiently.
- Additional cafeteria space is needed to accommodate the current lunch period load and the future load. Expansion could be achieved as simply as expanding the current glass wall and roof structure further to the east.
- More space and better sound separation is needed for the two foreign language classrooms. They currently are held in a subdivided classroom equivalent by a demountable or moveable partition that does not prohibit the transmission of sound.

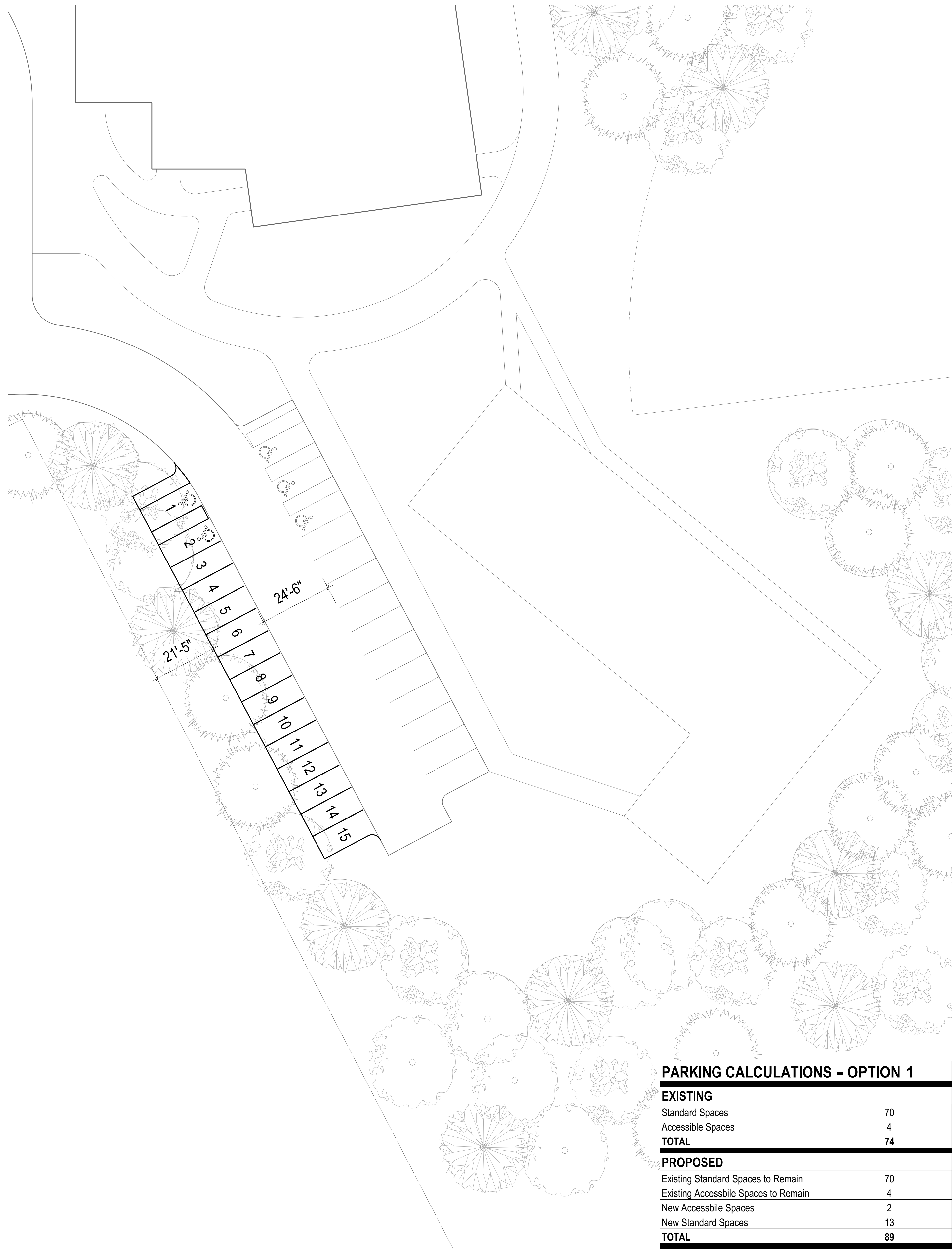
Conceptual options will be considered that will likely be a combination of expansion and space mining scenarios. Consideration will also be given to expanding and/or renovating some of the spaces that would be undersized or overutilized by the projected enrollment increases.

Parking and circulation at pick-up and drop-off were also noted as areas of concern as the current lots are frequently full. Expansion of the building will bring new staff as well and will likely put the lots beyond their capacity. Two options for expansion of the parking lot are included as part of this study. Option 1 shows an additional 16 spaces created by clearing brush and undergrowth and making the east lot double loaded. Option 2 illustrates the possibility of creating 40 additional spaces by relocating the play structure to the north of the east lot and doubling the size of the east lot.





PARKING CALCULATIONS - OPTION 2	
EXISTING	
Standard Spaces	70
Accessible Spaces	4
TOTAL	74
PROPOSED	
Existing Standard Spaces to Remain	59
Existing Accessible Spaces to Remain	1
New Accessible Spaces	6
New Standard Spaces	46
TOTAL	112



PARKING CALCULATIONS - OPTION 1	
EXISTING	
Standard Spaces	70
Accessible Spaces	4
TOTAL	74
PROPOSED	
Existing Standard Spaces to Remain	70
Existing Accessible Spaces to Remain	4
New Accessible Spaces	2
New Standard Spaces	13
TOTAL	89

