

ASSEMBLY SPACE ADJACENCIES

in Elementary and Middle Schools

INTRODUCTION

Staff have reviewed and compiled information on how school districts have organized and utilized assembly spaces and associated support spaces in new construction projects for elementary and middle schools. The arrangement of these spaces has a significant impact on the function of the school facility, and the district's ability to manage public events. The intent of this analysis is to review the advantages and disadvantages of various configurations resulting from the placement of the assembly spaces, and to provide some assistance for school staff when considering the function and programming of a future project.

Staff reviewed 33 new elementary and middle schools with a Project Scope and Budget Agreement approved by the MSBA between March 30, 2011, and November 12, 2015.

KEY TERMS

An assembly space in a school is an area used for gathering a large number of people for functions and events. A raised platform and proscenium (the opening between the stage and the seating area) located in the gymnasium or cafeteria typically serves as a focal point for an assembly space in elementary and middle schools. Less often, this function can be served by a stage located in an auditorium. Platforms and stages have different technical definitions relating to the construction requirements, fire protection, materials, and emergency egress. Both platforms and stages must be accessible for the handicapped from the audience areas and from the rear of the performance spaces. The following definitions are based on the International Building Code (IBC):

Platform – a permanent raised surface not more than 30 inches above the main floor, not more than one-third of the room floor area, and not more than 3,000 square feet in area.

Permanent platforms shall be constructed of materials as required for the type of construction of the building in which the permanent platform is located. They are permitted to be constructed of fire-retardant-treated wood for Types I, II and IV construction.

If the space beneath the platform is used for storage or any purpose other than equipment, wiring or plumbing, the floor assembly shall be not less than 1-hour fire-resistance-rated construction. Where the space beneath the permanent platform is used only for equipment, wiring or plumbing, the underside of the permanent platform need not be protected.

Stage – a raised floor that utilizes scenery drops, curtains, and other combustibles that are stored in an overhead space above the floor."

Unlike platforms, stages have characteristics that put them at greater risk for fire. As the definition indicates, stages utilize combustible materials that are stored above or adjacent to the performance area. The overhead space is defined in the IBC as the "fly gallery," but is also commonly referred to as the "fly tower" or "fly loft." The fly gallery could be at minimum 2 to 2-1/2 times the height of the proscenium. The distance between the lowest stage surface and the highest point of the roof or floor deck of the fly gallery is considered the "stage height" and has code compliance implications. When the IBC refers to the floor area of a stage, it includes the performance area as well as any backstage and support areas not separated by fire-rated construction. Therefore, the stage area can be much larger than the performance area visible from the audience seating area. Stages must include two means of egress, one on each side of the stage. Fly galleries and gridirons are also required to have at least one means of egress. Exterior doors located on the stage must have a vestibule if they are necessary for egress, or if they can be opened during the use of the theater.

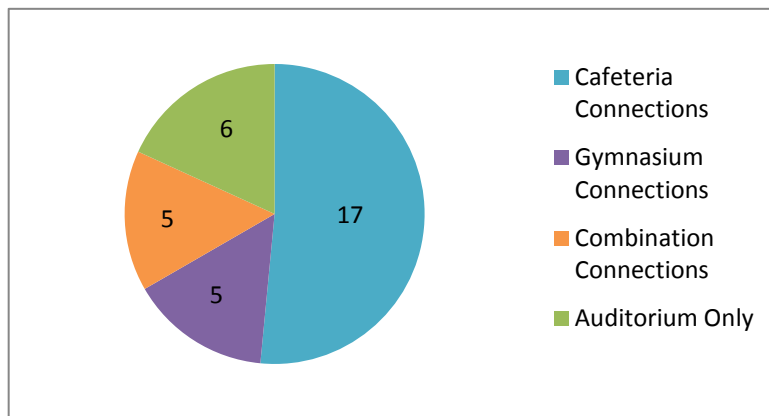
The Designer must refer to the applicable codes and confer with the authorities having jurisdiction within the school district to ensure that a particular design is in compliance with the building code.

ASSEMBLY SPACE ADJACENCIES

The typical rooms associated with the assembly area in elementary and middle schools are the cafeteria, gymnasium, music room, music storage, toilet rooms, chair/table storage, lobbies, public entrances and connecting corridors. The configuration of these related spaces and with the rest of the building is dictated by the function and security needs of the school as determined by the school district with assistance from the design team. Although the primary uses of these spaces are related to various school functions, they are often used by the public as assembly spaces during after-school hours, and should be configured in a way to limit public access to the rest of the school.

In this review, the spatial arrangements between the performance platform and associated spaces demonstrated four categories: Cafeteria Connection; Gymnasium Connection; Combination Connection; and Auditorium Only.

Of the 33 schools analyzed, 17 projects have a connection between the platform and cafeteria, five have a connection between the platform and gymnasium, five have a combination of rooms that connect to the platform and the remaining six projects have an auditorium with a stage.



The diagrams on the following pages indicate examples of the four configurations noted above. Although the school facilities are not identified, each diagram is based on one of the 33 projects reviewed. The size of each space is based on student population, the MSBA space summary guidelines, and the needs of the district. The legend (below) indicates the assembly spaces and various support spaces identified by color for purposes of clarity.

- 1. Stage/Platform
- 2. Cafeteria
- 3. Gymnasium
- 4. Auditorium
- 5. Lobby Area
- 6. Toilet Rooms
- 7. Chair/Table storage
- 8. Music/Band Room
- 9. Music Storage
- 10. Public Entrance/Exit
- 11. Secure Corridor

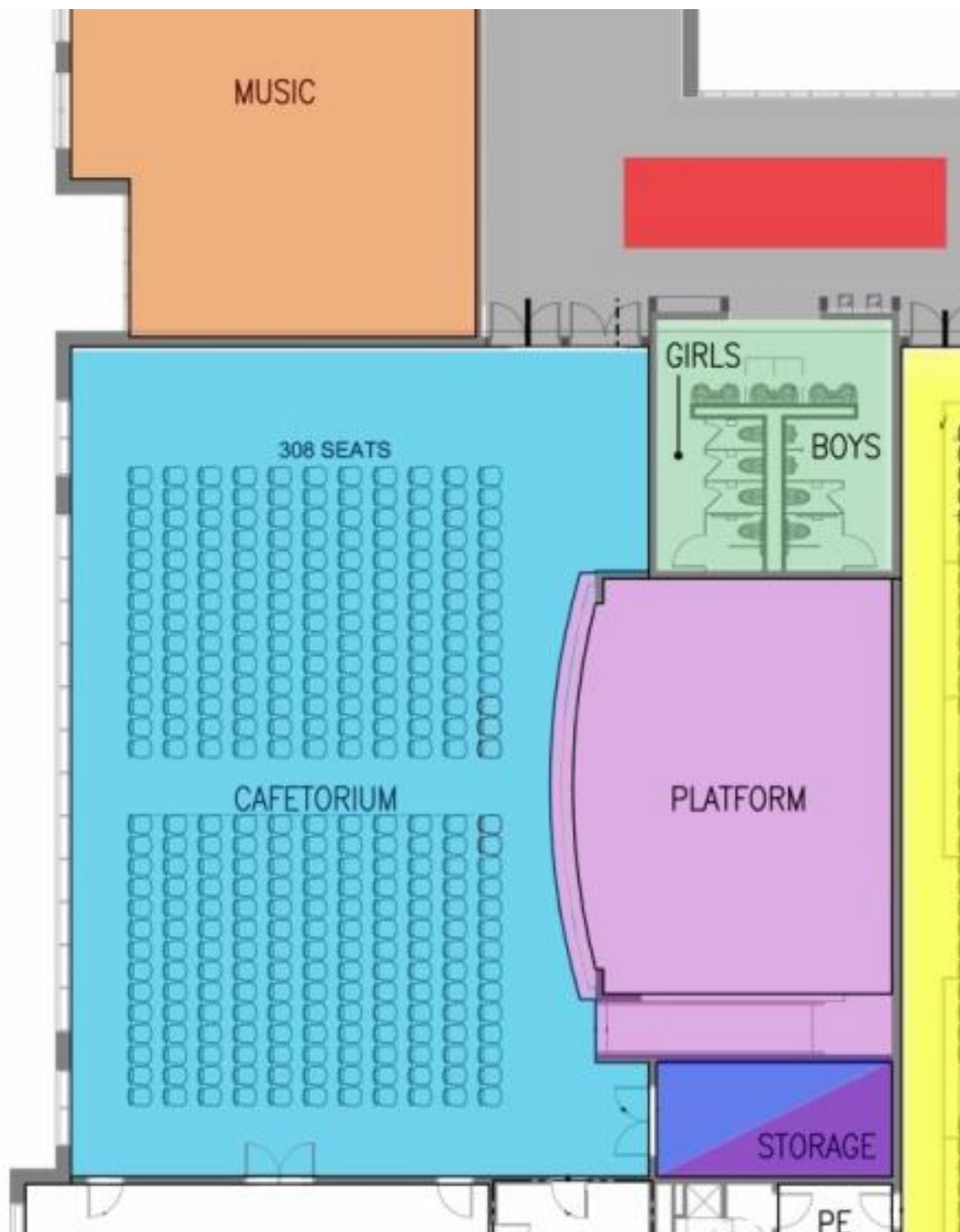
CAFETERIA CONNECTION

Advantages:

- Use of a large space that may not otherwise be used outside of lunch periods;
- Storage for tables and chairs is already provided;
- Flooring is durable and resistant to damage from water and furniture;
- The platform can be used as a music room during the school day when the cafeteria is unoccupied;
- Proximity to food / drink facilities; and,
- Proximity to toilet rooms.

Challenges:

- Large expansions of glass in the exterior wall may interfere with assembly functions;
- Kitchen serving line / point of sale equipment may interfere with assembly functions; and,
- Cafeteria is often smaller than the gymnasium in floor area.



GYMNASIUM CONNECTION

Advantages:

- Larger occupancy capacity than cafeteria;
- The gym will never be smaller than the cafeteria per MSBA standards;
- Limited glass on the exterior wall may be compatible with assembly functions; and,
- Bleachers may supplement assembly seating.

Challenges:

- Seating set-up is required for each assembly use;
- Flooring material may not be compatible with assembly function;
- Requires additional chairs and chair storage unless transporting cafeteria seats;
- Possible conflicts with gymnasium schedule and required time to set up the gym to restore it for use;
- Gym functions may interfere with use of the platform as a music room during the school day (a sound attenuated movable partition may be required);
- Lack of food / drink facilities; and,
- Potential need for additional large toilet facilities for assembly use if the gym is not located near the cafeteria toilet rooms.



COMBINATION CONNECTION

Advantages:

- Additional occupancy capacity;
- Close proximity to public toilet rooms;
- Close proximity to food / drink facilities;
- May provide additional seating capacity for lunch periods; and,
- Maximizes flexibility through multipurpose uses.

Challenges:

- Interior finishes for gymnasium and cafeteria may be inconsistent when used as a combined assembly space;
- Appropriate acoustic environment may be difficult to achieve;
- Folding partition is costly and requires training to operate and maintain;
- Possible additional chairs and chair storage requirements;
- Set up required for each performance; and,
- Appropriate sightlines may be difficult to achieve given the variety of wall and ceiling treatments.



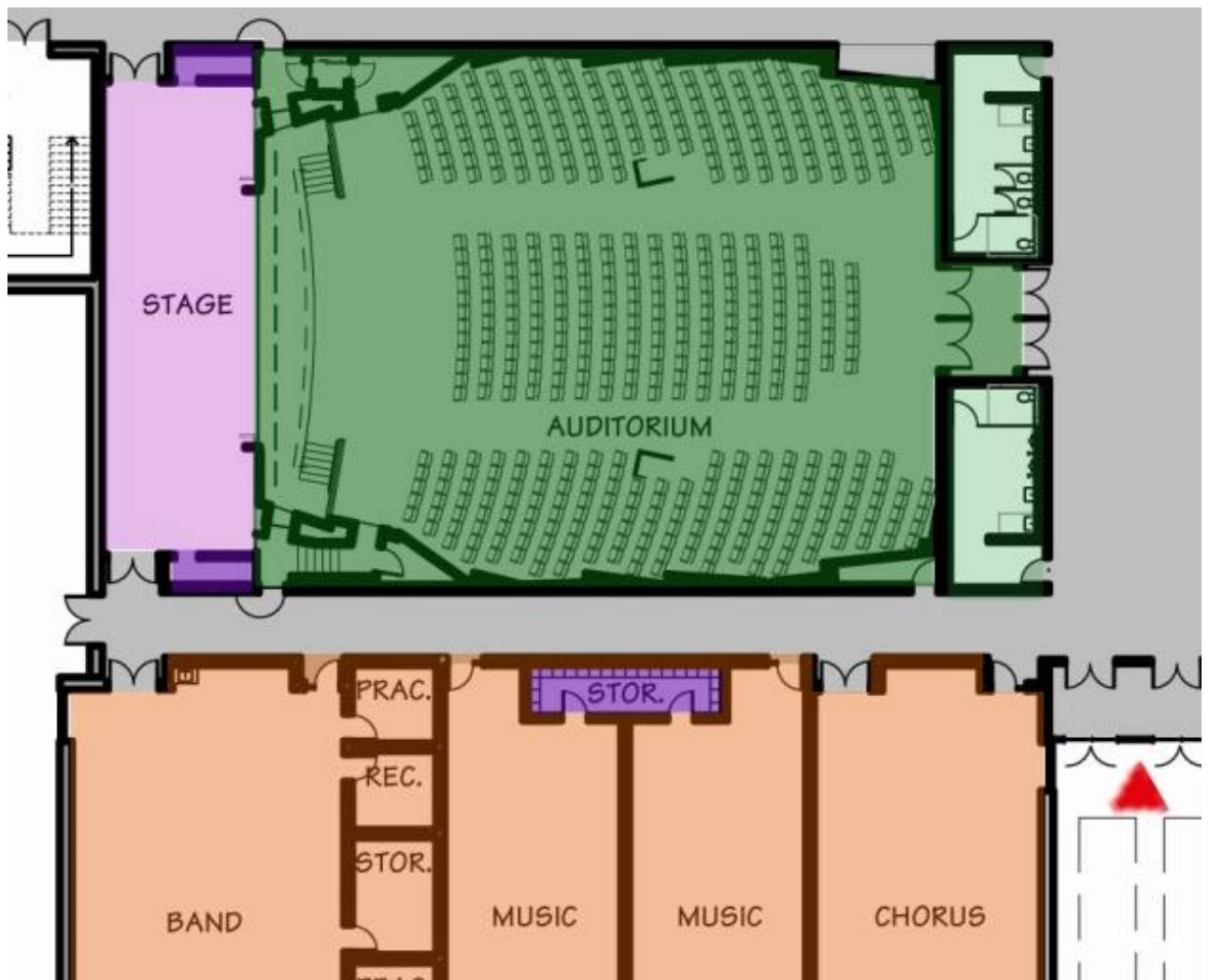
AUDITORIUM ONLY

Advantages:

- No need for chair storage for auditorium seating;
- No scheduling conflicts with the cafeteria or gymnasium ;
- No set up required;
- Stage can be used as drama/music classroom, eliminating the need for additional rooms;
- Dedicated backstage areas and exits; and,
- Good sightlines and acoustics.

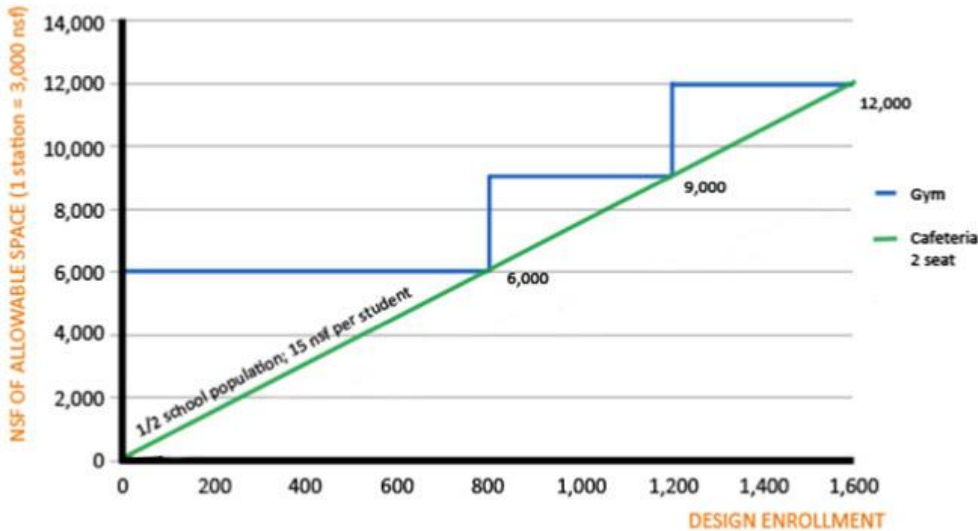
Challenges:

- High construction cost;
- Not cost-effective in smaller population schools;
- Utilization is low at all grade levels, most notably at ES/MS grades;
- Limited uses – not multifunctional;
- Typically smaller than the cafeteria and gymnasium; and,
- More stringent code requirements.



ASSEMBLY SPACE CAPACITY CHART

If maximizing assembly occupancy capacity is a priority, the district may want to place the platform in the largest space available. Based on the MSBA Space Summary Guidelines for elementary and middle schools, the largest two rooms in the school are the gymnasium and the cafeteria. The chart below shows that the gymnasium is 6,000 nsf for a design enrollment up to 799 students, and increases at 3,000 nsf increments (1 gymnasium station) for every 400 students added to the design enrollment above 800 students. The cafeteria is based on a 15 sf per student calculation, with no minimum size or large incremental increases. As a result, the gymnasium is typically larger than the cafeteria, or less frequently, the same size. The gymnasium is never smaller than the cafeteria. Therefore, regardless of student population, the gymnasium (or a combination of the gymnasium and cafeteria) would provide the greatest occupancy capacity.



CAFETERIA EXTENSION

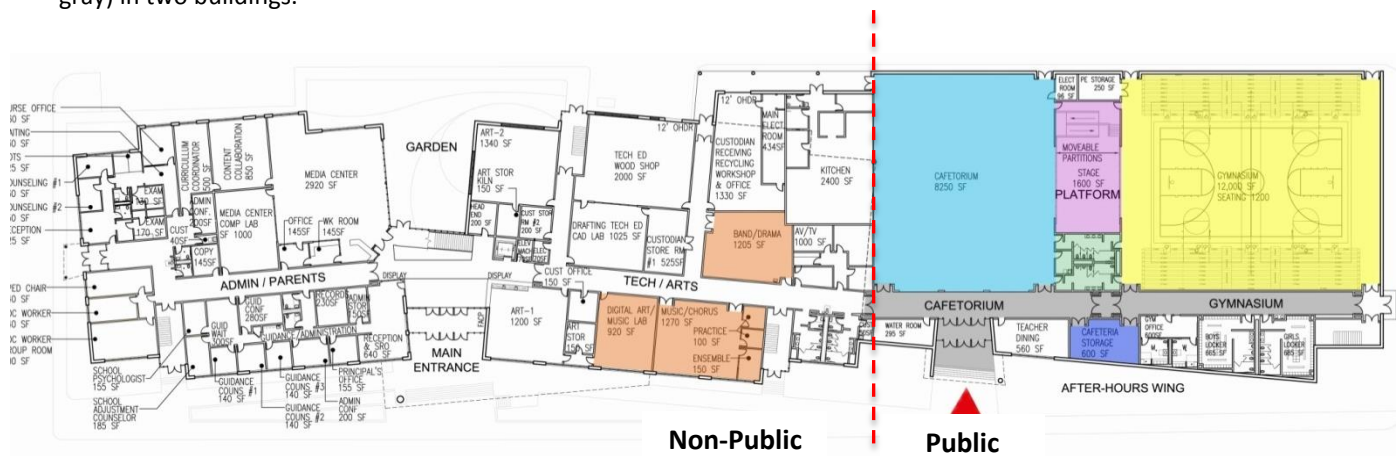
For projects where the district elects to locate the platform in the gymnasium, the MSBA still recommends sizing the cafeteria based on the standard two lunch seatings (half the student population per lunch period), even if the school schedule has three or more lunch periods. Although this may result in more seating capacity in the cafeteria than required, it will avoid excessive overcrowding in the event of fluctuations in the student enrollment. However, if the district proposes that the cafeteria is to combine with another space such as the gymnasium for assembly functions, the district could add lunch seating capacity without enlarging the cafeteria. In this case, it may be acceptable to size the cafeteria for three seatings. Flexibility of student capacity in these spaces can be accommodated with the use of a moving partition between connecting rooms. The chart below provides examples of schools that can extend their cafeteria space.

District	School Name	Design Enrollment	Cafeteria SF	Connecting Room	Connecting Room SF	Extended Student Capacity
Lexington	Joseph Estabrook ES	540	2,904	Music	1,203	274
Carver	Carver ES	750	3,750	Multipurpose	1,600	357
Weston	Field ES	355	2,763	Gymnasium	7,007	651
South Hadley	Plains ES	270	1,640	Gymnasium	6,000	509
Athol-Roylston RSD	Riverbend ES	545	4,088	Gymnasium	6,000	673
Swampscott	Hadley ES	635	4,763	Gymnasium	6,000	718
Narragansett RSD	Templeton Center ES	580	3,986	Gymnasium	5,952	663
Whitman-Hanson RSD	Maquan ES	800	6,076	Gymnasium	7,787	924
Haverhill	Hunking MS	1,005	5,025	Gymnasium	8,000	868

AFTER-HOURS SECURITY

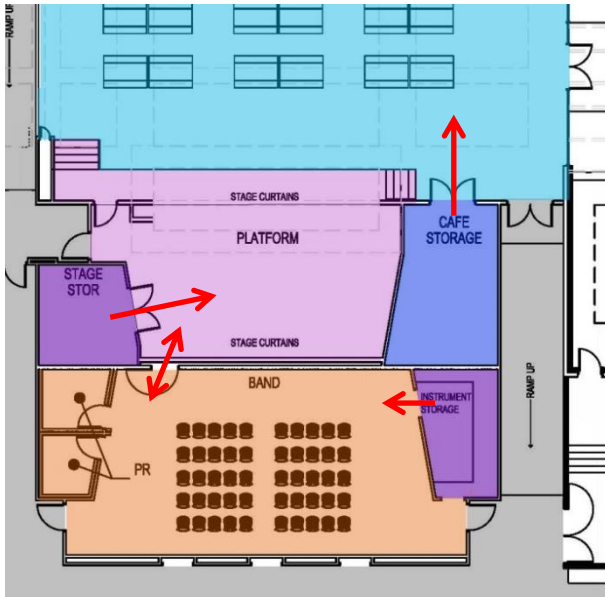
School security is important when considering community use after school hours. Districts should work with their Designers to carefully consider limiting public access within the building to the assembly spaces and other necessary support facilities. Building entrances and internal corridors should be designed and controlled in such a way to prevent the public from entering non-public areas of the building such as classroom wings, administrative areas and vocational shops during after-hours events. In multi-story buildings, careful placement of staircases and elevators will prevent access to non-public areas of the building while providing necessary public access for the handicapped in upper floor areas such as auditorium mezzanines or balconies. Exit locations must be carefully configured so as to provide required emergency egress without giving unnecessary access to non-public areas of the building. The design should also reflect the increased occupancy of the assembly space when accommodating lobby areas and to determine the number of toilet facilities provided for those spaces.

Based on the projects reviewed, some have restricted access to non-public areas while others do not. The diagrams below indicate the extent of internal corridors with public access during after-hours functions (shown in gray) in two buildings.

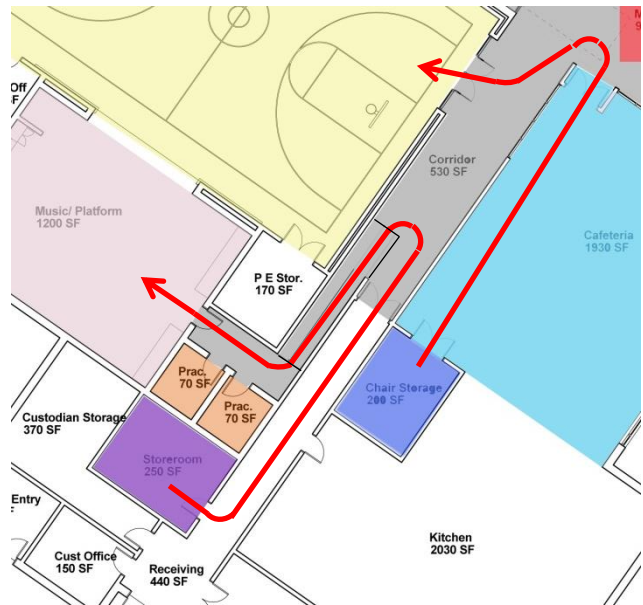


STORAGE ROOMS

Assembly spaces require storage for items related to a performance such as extra chairs/tables, stage props, equipment, and musical instruments. Careful placement of support spaces in relation to the platform and assembly area can maximize the efficiency and use of such spaces and reduce the size of a facility without affecting its use. Direct access to the room is preferable to access through public areas. Because performance spaces are usually raised above the assembly room floor, special care should be taken to locate storage rooms on the same floor elevation as the spaces they serve to avoid bringing heavy equipment or large musical instruments on ramps or stairs.



Access is direct, does not requires a ramp



Access is not direct, requires a ramp

MUSIC ROOMS

The music room's access and proximity to the platform is another element to consider. Our report shows that nine projects provide direct access from the music room to the platform through either a connecting door or operable partition. The configuration below provides performers with direct access to the performance area. These openings should have adequate width and height for props, stage performance scenery, and musical equipment. The floor should also be level to avoid any obstructions when bringing rolling equipment onto the platform.



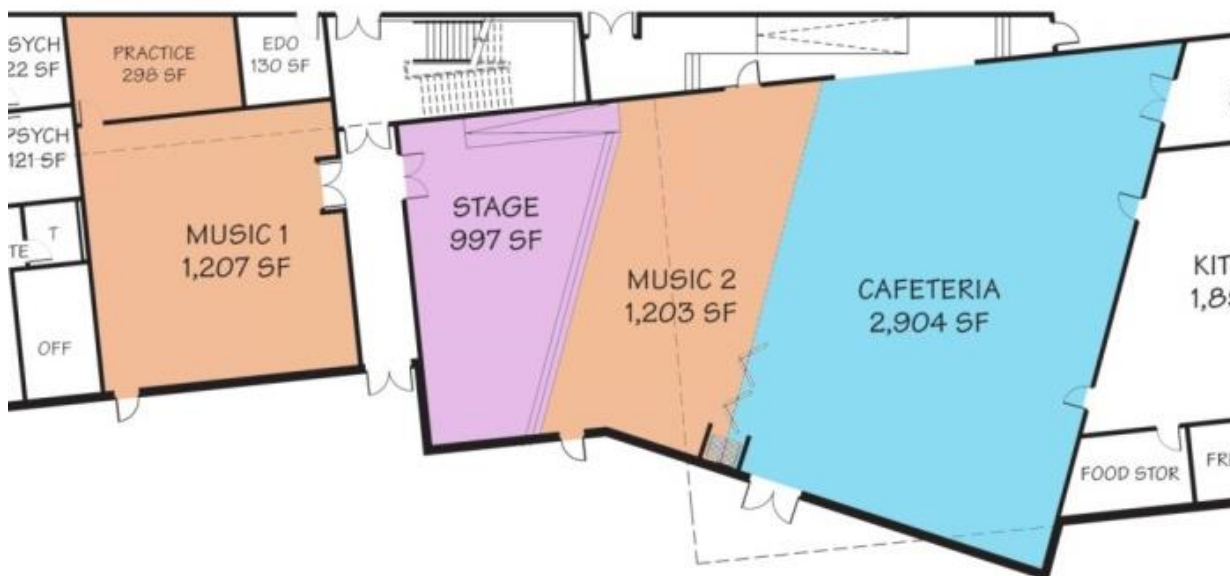
INEFFICIENT DUPLICATION OF SUPPORT SPACES

Duplication of chair/table storage rooms and toilet rooms may be required where the public facilities such as the gymnasium and cafeteria are not located in the same part of the building, or where the cafeteria and gymnasium are separated by large areas of non-public spaces. This also makes security difficult during after-hour functions. Note that this example shows no separation of non-public areas, and duplicated toilet facilities.



MULTI-PURPOSE SPACES

Both examples on this page show a combination cafeteria / music room that can function independently during school hours, and can combine with the use of a folding or moving partition when a larger space is required for after-hours assemblies. This approach also provides potential seating area for the cafeteria if needed for increasing student enrollment. Providing spaces that can serve multiple functions increases the utilization of spaces that may otherwise be under used. This can potentially reduce the overall size and cost of the building without affecting capacity and function.



SUMMARY

- The arrangement of assembly and support spaces has a significant impact on the function of the school facility and the district's ability to manage public events.
- Providing spaces that can serve multiple functions increases the utilization of spaces that may otherwise be under used.
- Building entrances and internal corridors should be designed in such a way to allow the District to limit the public from entering non-public areas of the building, in accordance with the District practices for after hour and community use.
- Locating the gymnasium and cafeteria in the same part of the building can limit duplication of chair/table storage rooms and toilet rooms, maximizing utilization of the facility, limiting overall size and facilitating the District's ability to secure the building for after-hours use.
- Flexibility of space utilization can be increased with the use of a moving partition between connecting rooms (although the cost of purchasing and maintaining moving partitions should be considered).
- Locating music rooms and storage rooms on the same floor elevation as the spaces they serve allows direct access without the use of ramps or stairs. Doors and opening dimensions should be sized to allow for movement of large equipment.