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5/15/14

Scarsdale Union Free School District
2 Brewster Road
Scarsdale, NY 10583

Att: Linda Purvis, Assistant Superintendent for Business

Re: Proposed Fitness Center at Scarsdale High School

Greetings:

We are writing to comment on the concept to locate a fitness center under the new gym at Scarsdale High School. This space was clearly left unfinished at the conclusion of this recently constructed wing of the school with the intention of being built out at some point in the future. It has a full exterior wall (88' long) of windows and doors that exit directly to grade. The underside of the structural deck is at 10'-0" above the floor, the bottom of the structural beams are at approximately 9'-2" above the floor and it is expected that the ceiling height above most active areas will be approximately 9'-0". The space is ideally located adjacent to locker rooms, gymnasium spaces and easily accessible to playing fields.

There has been some concern expressed relative to the available ceiling height in the space for Scarsdale High School with specific reference to an excerpt from the Whole Building Design Guide (WBDG) distributed by the National Institute of Building Sciences (NIBS). This document (copy attached) is a general guideline only, not a building code, and specifically references publications related to physical fitness and exercise rooms that are designed for the US Military. It is also important to note that it does say that the space should be designed around the requirements of the necessary equipment. The type of space described also includes general exercise, which may include calisthenics and some gymnastic activity.

We consulted a reference standard on Human Dimension and Interior Space that does recommend the 12'-0" ceiling height similar to the WBDG but only for dance or exercise practice rooms, not for standing exercises or use of fitness equipment (copies attached).

The space for Scarsdale is designed for cardio equipment, weight training and stretching and it is not anticipated that any calisthenics, dance or gymnastics will take place at this facility. Our firm has designed this type of space for educational institutions and commercial fitness centers. The largest type of equipment anticipated for this space are elliptical trainers and treadmills. We do not anticipate the installation of a stair climber or other climbing apparatus. We have found that 9'-0" is

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Scarsdale Public Schools
SHS Fitness Center comment
05/15/14 – page 2



an acceptable ceiling height for this type of equipment and clients of a recently completed facility at an area private school with this same ceiling height are satisfied with the space. It is also typical to find fitness facilities at hotels with 8'-0" or 9'-0" ceiling heights. We have also spoken to major manufacturers of treadmills and elliptical training equipment and they have confirmed that the 9'-0" height is acceptable.

The balance of the space will accommodate equipment that is lower and even full free weight activity will be able to be accommodated within the 9'-0" ceiling height. While more height for this facility would be preferable, this space is ideally located and can be developed into a code compliant, attractive and functional fitness center that fully complements a High School physical education program.

We hope this information is helpful and please let us know if you have any additional questions.

Sincerely:

KAEYER, GARMENT & DAVIDSON ARCHITECTS & ENGINEERS PC

A handwritten signature in blue ink, reading 'Russell Davidson', written in a cursive style.

Russell A. Davidson, FAIA
President

Enc.

Physical Fitness (Exercise Room)

by WBDG Staff

Last updated: 06-02-2009

OVERVIEW

The Physical Fitness (Exercise Room) space type is a space specifically designated for exercise, fitness training, and physical wellness activities. Also included are [toilets/private_toilet.php](#), [office/office_st.php](#), and [general storage/gen_storage.php](#) normally found in a Physical Fitness (Exercise Room) space to meet codes and regulations.

Fitness space types do not include: high bay court games (basketball, racquetball), saunas, hot tubs, steam rooms, swimming pools, [food preparation, and service/food_service.php](#) or sporting goods retail.

SPACE ATTRIBUTES

The Physical Fitness (Exercise Room) space types provide a comprehensive, varied program of physical activities to meet the individual training regimens of its occupants. Indoor fitness programs can typically be divided into four categories of exercise: warm-up/cool down, free weight, circuit training, and cardiovascular. Each area that houses a particular exercise category should be designed around the requirements of the necessary equipment, including spatial, utility, and HVAC requirements, as well as circulation and control. Also important to the design of this space type is the durability of finishes, [flexibility of space \(plan_flexibility.php\)](#), and acoustical control. Typical features of physical fitness space types include the list of applicable design objectives elements as outlined below. For a complete list and definitions of the design objectives within the context of whole building design, click on the titles below.

Functional / Operational([func_oper.php](#))

- Spatial Requirements of Equipment and Exercise Activities:** A minimum 12' ceiling height is generally required in this space type to accommodate the clearances needed for daily equipment usage. Special surfaces are also required for many athletic activities such as cushioned training surfaces, mirror walls, or impact-resistant walls. Anticipate circulation, in particular controlled circulation, using a flow diagram at the beginning of the design process.
- Durability of Structure and Finishes:** Increased structural steel is typically provided to reduce vibration transmission. Exercise and weight rooms, including equipment storage rooms, should be designed for a 150 LB/SF live load. Finishes should be durable and easy to maintain in anticipation of maximum use. See also WBDG—[Wall Systems\(env_wall.php\)](#).
- Acoustical Control:** Reduce noise impact generated by physical activity, by including sound baffles at all acoustically rated partitions, in particular exercise and weight rooms and tenant demising partitions.
- Occupancy:** Occupancy Group Classification is Business Occupancy B, with [sprinklered protected construction/fire_protection.php](#) and GSA Acoustical Class X space where noisy operations are located.

Sustainable([sustainable.php](#))

- Special HVAC([resources/hvac.php?r=physical_fit](#)):** Employ measures to reduce moisture([resources/moisturedynamics.php?r=physical_fit](#)) and odor migration to other spaces—assume this space type requires a 20% increase in cooling capacity above the overall building shell and core. Provide a separate AHU for exercise areas. Fitness centers will typically have negative air pressure relative to other areas of the building.

Example Program

The following building program is representative of the Physical Fitness space type.

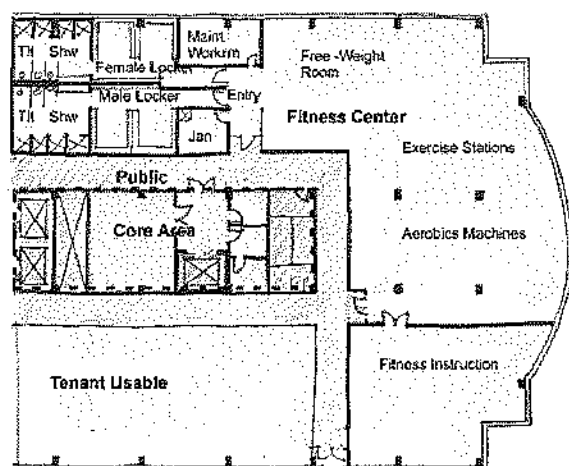
PHYSICAL FITNESS

| Description | Qty. | SF Each | Total SF | Sum Actual SF | Tenant Usable Factor | Tenant USF |
|--------------------------------|------|---------|----------|---------------|----------------------|------------|
| Tenant Occupiable Areas | | | | | | |
| Front Lobby | | | | 80 | | |
| Entry Lobby | 1 | 80 | 80 | | | |
| Lockers | | | | 1,400 | | |
| Male Lockers (70 lockers) | 1 | 490 | 490 | | | |
| Male Toilets (3 stalls) | 1 | 180 | 180 | | | |
| Male Showers (4 showers) | 1 | 100 | 100 | | | |
| Female Lockers (50 lockers) | 1 | 350 | 350 | | | |
| Female Toilets (3 stalls) | 1 | 180 | 180 | | | |
| Female Showers (4 showers) | 1 | 100 | 100 | | | |
| Exercise Facilities | | | | 4,320 | | |
| Free Weight Room | 1 | 960 | 960 | | | |
| Exercise Station Room | 1 | 960 | 960 | | | |
| Aerobics Machine Room | 1 | 1,200 | 1,200 | | | |
| Fitness Instruction | 1 | 1,200 | 1,200 | | | |

| | | | | | | |
|----------------------------|---|-----|-------|-------|------|-------|
| Support Spaces | | | | 320 | | |
| Equipment Repair/Storage | 1 | 200 | 200 | | | |
| Housekeeping | 1 | 120 | 120 | | | |
| Tenant Suite | | | 6,120 | 6,120 | 1.16 | 7,076 |
| Tenant Usable Areas | | | | | | 7,076 |

Example Plans

The following diagram is representative of typical tenant plans.



Fitness Center Space Type

0 10'-0" 20'-0" 40'-0"

Example Construction Criteria

For GSA, the unit costs for physical fitness space types are based on the construction quality and design features in the following [table](#) ([/pdfs/gsa_constr_criteria_physical.pdf](#)) (PDF 54 KB 5 pgs). This information is based on GSA's benchmark interpretation and could be different for other owners.

RELEVANT CODES AND STANDARDS

The following agencies and organizations have developed codes and standards affecting the design of physical fitness spaces types. Note that the codes and standards are minimum requirements. Architects, engineers, and consultants should consider exceeding the applicable requirements whenever possible:

- [P-100, Facilities Standards for the Public Buildings Service](#) ([/ccb/browse_doc.php?d=5086](#)), GSA
- [Fitness Center Design Guide](#) ([/ccb/browse_doc.php?d=18](#)), Air Force
- [International Building Code](#) ([/references/ibc_l.php?d=icc%20ibc](#))
- [UFC 4-740-02 Fitness Centers](#) ([/ccb/browse_doc.php?d=2879](#))

MAJOR RESOURCES

WBDG

Building Types

[Health Care Facilities](#) ([health_care.php](#)), [Office Building](#) ([office.php](#)), [Research Facilities](#) ([research.php](#))

Design Objectives

[Accessible—Plan for Flexibility: Be Proactive](#) ([plan_flexibility.php](#)), [Functional / Operational—Account for Functional Needs](#) ([account_spatial.php](#)), [Productive—Promote Health and Well-Being](#) ([promote_health.php](#)), [Safe / Secure—Ensure Occupant Safety and Health](#) ([ensure_health.php](#)), [Sustainable—Enhance Indoor Environmental Quality \(IEQ\)](#) ([ieq.php](#))

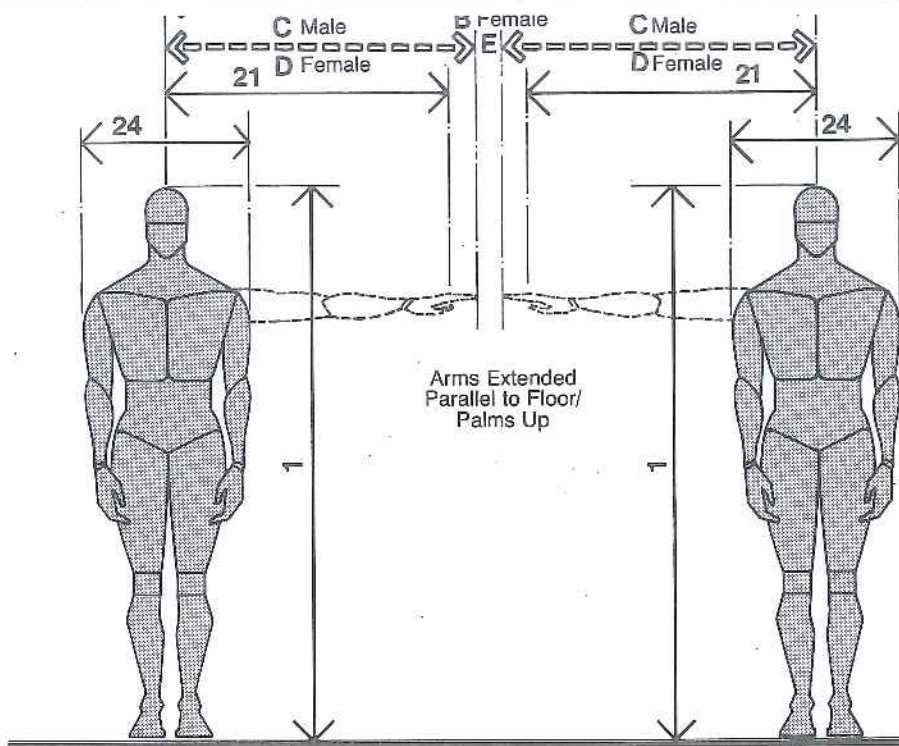
Publications

- [Architectural Graphic Standards, 11th Edition](#) ([http://www.tkgihce.com/click-2191068-10438326?url=http%3A%2F%2Fwww.wiley.com%2Fremtitle.cgi%3Fisbn%3D0471700916&cjsku=0471700916](#)) by Charles Ramsey and Harold Sleeper. New York, NY: John Wiley & Sons, Inc., 2007.

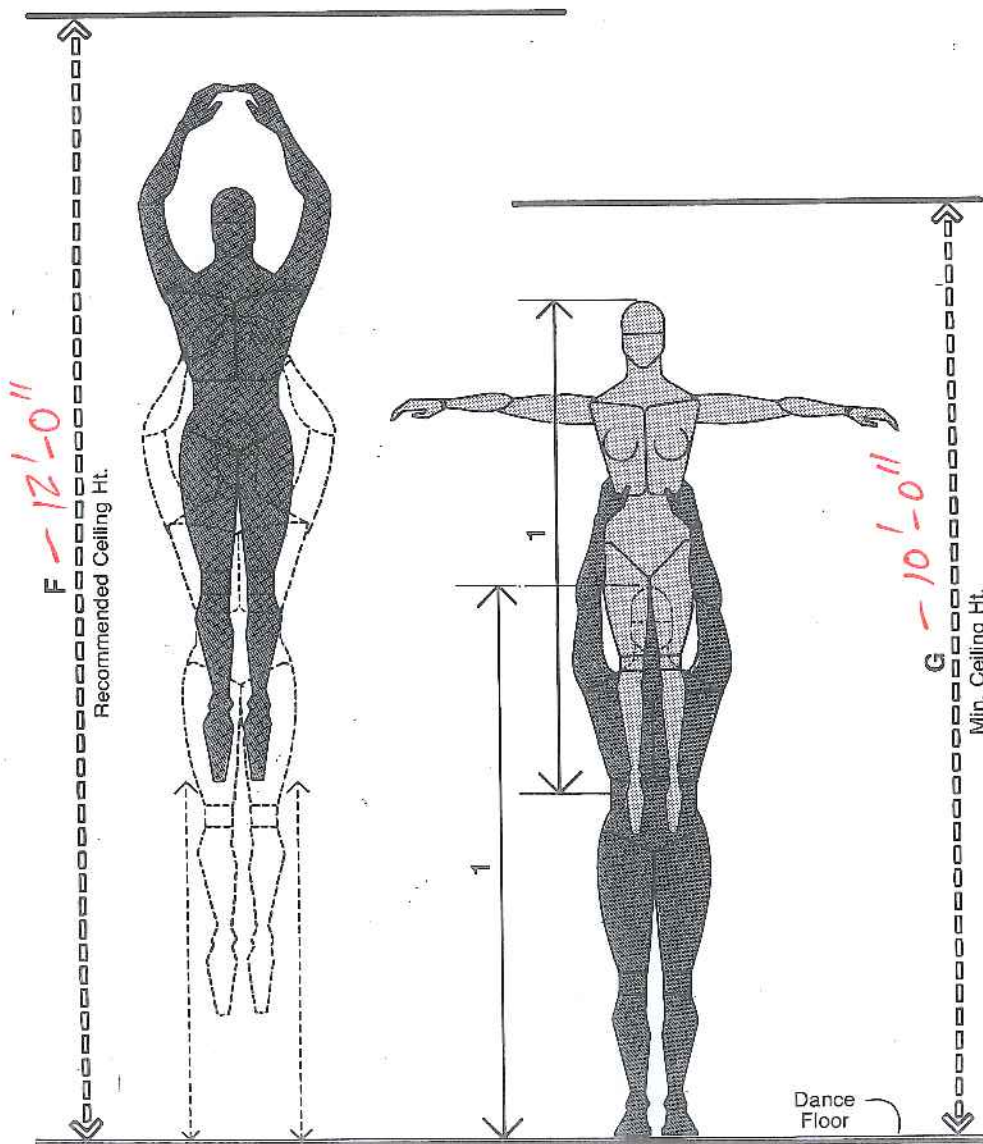
7.1 EXERCISE AREAS

The top drawing should be helpful in establishing minimum center spacing for standing exercises in place. The drawing is not intended as a standard, but rather as a base of reference for preliminary design assumptions. The nature of the particular exercise and the intensity of body movements involved should all be taken into consideration.

Certain exercises require significant head room. Dance and similar activities, for example, require considerable clearance to avoid accidents. The bottom drawing shows only two such possibilities. There are, obviously, many variations. The tables in Part B should provide the necessary data with which to establish clearances appropriate to those variations.



MINIMUM EXERCISE CLEARANCE REQUIREMENTS



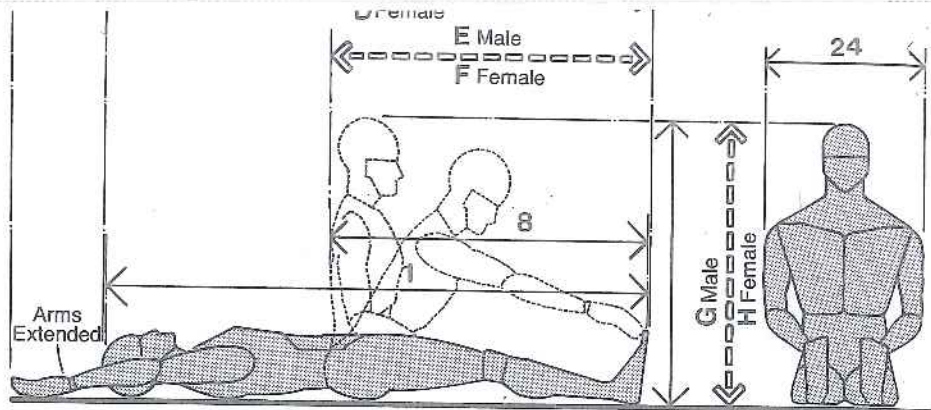
**DANCE AND EXERCISE PRACTICE ROOMS/
CEILING HEIGHT REQUIREMENTS**

| | in | cm |
|---|-------|-------------|
| A | 65-80 | 165.1-203.2 |
| B | 61-88 | 154.9-223.5 |
| C | 31-37 | 78.7-94.0 |
| D | 29-41 | 73.7-104.1 |
| E | 3-6 | 7.6-15.2 |
| F | 144 | 365.8 |
| G | 120 | 304.8 |

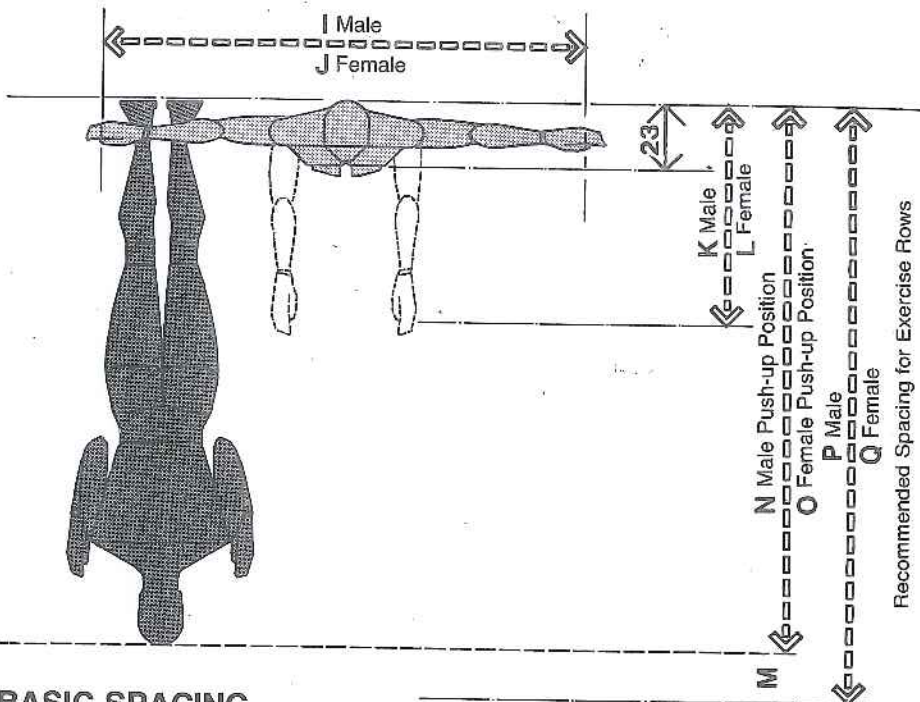
The top drawing indicates in side and front view the clearances required by the human body while engaged in sit-up exercises. Although it is recommended that in establishing clearances, the person of larger body size be used as a model, the ranges shown reflect small and large male and female data. The 5th and 95th percentile vertical grip reach measurements were used as the basis of the dimensions, with an allowance to compensate for the fact that the anthropometric measurement does not quite extend to the tip of the fingers. The authors suggest that even if the design is intended for a particular population of smaller body size, the larger measurements be used. The largest clearance required would be for the large male, and is shown as 91.5 in or 232.4 cm.

The center drawing provides the designer with the dimensional information necessary to establish basic spacing for an exercise class.

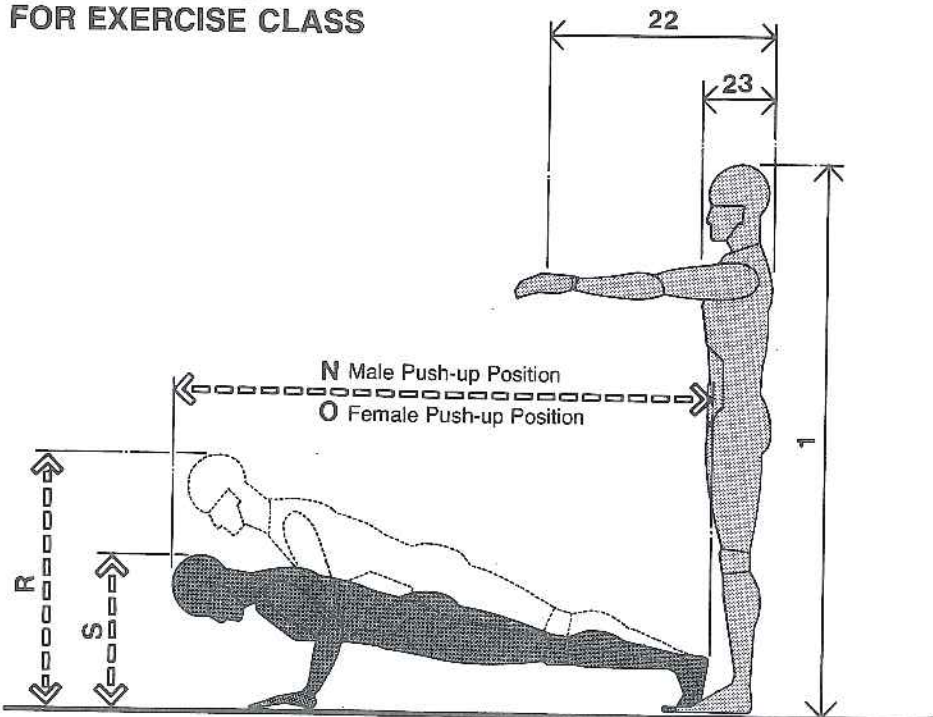
The bottom drawing shows the clearance required for push-up exercises. Stature would be the most useful anthropometric measurement to consider.



SIT-UP FLOOR EXERCISE



BASIC SPACING FOR EXERCISE CLASS



SPACE REQUIREMENTS FOR BASIC PUSH-UP POSITION

| | in | cm |
|---|-----------|-------------|
| A | 80-91.5 | 203.2-232.4 |
| B | 75-87 | 190.5-221.0 |
| C | 65-74 | 165.1-188.0 |
| D | 60-69 | 152.4-175.3 |
| E | 32-37 | 81.3-94.0 |
| F | 27-37 | 68.6-94.0 |
| G | 33.2-38.0 | 84.3-96.5 |
| H | 30.9-35.7 | 78.5-90.7 |
| I | 58-68 | 147.3-172.7 |
| J | 54-76 | 137.2-193.0 |
| K | 29.7-35.0 | 75.4-88.9 |
| L | 26.6-31.7 | 67.6-80.5 |
| M | 6-12 | 15.2-30.5 |
| N | 63-73 | 160.0-185.4 |
| O | 61-67 | 154.9-170.2 |
| P | 79-85 | 200.7-215.9 |
| Q | 73-79 | 185.4-200.7 |
| R | 23-38 | 58.4-96.5 |
| S | 10-16 | 25.4-40.6 |