Access to Exits and Exit Separation Distance

Background

The CA Building Code as adopted by the City of Carmel-by-the-Sea prescribes requirements for the number of exits and the minimum distance between exits when multiple exits are required. In general, the number of required exits is based on the type of use and the occupant load of the building or space as determined by the building official. This Job Aid is intended to describe general requirements for exiting. For detailed requirements, consult Ch. 10 of the CA Building Code or contact the Community Planning and Building Dept.

Calculating the Occupant Load

The allowable occupant load is based on the square footage of the building or space under consideration as described in CBC Table 1004.1.2, Table 1 below, provides the required number of square feet required for each occupant in the building or space (extracted from Table 1004.1.2) for typical uses within the City of Carmel-by-the-Sea.

Table 1. Maximum Floor Area Allowances Per Occupant

Function of space	Occupant load factor[a] (Sq. Ft./occupant)	Function of space	Occupant load factor[a] (Sq. Ft./occupant)
Accessory storage areas/mechanical equipment rooms	300 gross	Library Reading rooms Stack area	50 net 100 gross
Assembly Gaming floors (keno, slots, etc.) Exhibit Gallery or Museum	 11 gross 30 net	Locker rooms	50 gross
Assembly with fixed seats	Number of approved seats	Mall buildings (covered/ open)	See Sec. 402.8.2
Assembly without fixed seats Concentrated (chairs only) Standing space Unconcentrated (tables and chairs)	 7 net 5 net 15 net	 Mercantile Storage, stock, shipping areas	 60 gross 300 gross
Business areas	100 gross	Parking garages	200 gross
Day care	35 net	Residential	200 gross
Educational Classrooms Shops/vocational room areas	 20 net 50 net	Swimming pools Pool Deck	 50 gross 15 gross
Exercise rooms	50 gross	Stages and platforms	15 net
Kitchens, Commercial	200 gross	Warehouses	500 gross

In determining the occupant load, each functional area is considered separately and assigned an occupant load based on its use and square footage. The occupant loads of the separate functional areas are combined to determine the maximum allowable occupant load for the building or space. Where the occupant load factor is determined by “gross” it means the gross square footage of the area under consideration. Where “net” is specified, the area covered by fixtures, counters, permanent displays, tables, etc. are deducted from the gross square footage to determine the square footage on which to apply the occupant load factor.

Determining the Required Number of Exits

Once the occupant load has been determined, Table 1006.2.1, extracted as Table 2 below, describes the maximum occupant loads for various uses at which a single exit is allowed. Where a space exceeds the maximum occupant load in the table, two or more exits are required as determined under Section 1006.

The maximum common path of egress travel is also factored in. The "common path of egress travel" is defined as "that portion of the exit access travel distance measured from the most remote point within a story to the point where the occupants have separate and distinct access to two exits or exit access doorways". Where the "common path" exceeds the distances stated in the table, one or more additional exits is required to comply with the number of exits requirement.

Table 2. Spaces With One Exit or Exit Access Doorway				
Occupancy (per CBC Ch. 2)	**Maximum Occupant Load of Space**	**Maximum Common Path of Egress Travel Distance (feet)**		
		Without sprinkler system (feet)		**With sprinkler system (feet)**
		Occupant Load		
		OL ≤ 30	**OL > 30**	
A,E,M	49	75	75	75
B	49	100	75	100
F	49	75	75	100
H-1, H-2, H-3	3	NP	NP	25
H-4, H-5	10	NP	NP	75
I-2, I-2.1, I-4	10	NP	NP	75
I-3	10	NP	NP	100
R-1	10	NP	NP	75
R-2	10	NP	NP	125
R-2.1	10	NP	NP	75
R-3, R-3.1	10	NP	NP	125
R-4	10	NP	NP	125
S	29	100	75	100
U	49	100	75	75
L	See CBC Sec. 453.6.1			

In the case of high occupant load buildings or spaces, additional exits are required as shown in Table 3.

Table 3. Number of Exits and Exit Access Doorways, and Exit Separation Distance			
Occupant load	**Number of Exits or Exit Access Doorways**	**Exit Separation Distance**	
		Without sprinklers	**With sprinklers**
Per Table 2	2	1/2 of the maximum diagonal dimension of the building or area served	1/3 of the maximum diagonal dimension of the building or area served
501 – 1,000	3	2 doors separated as above, third door reasonably distant to provide exit should one door be blocked	2 doors separated as above, third door reasonably distant to provide exit should one door be blocked
>1000	4	2 doors separated as above, other doors reasonably distant to provide exit should one door be blocked	2 doors separated as above, other doors reasonably distant to provide exit should one door be blocked

Access to Exits

A clearly marked exit access route is generally required from any point in the building or space to the public way serving the property. Section 1016 of the CBC prescribes the following regarding exit routes:

- In other than I-2 and I-2.1 occupancies, exit access through an enclosed elevator lobby is permitted. Access to at least one of the required exits shall be provided without travel through the enclosed elevator lobby required by Section 3006.
- Egress from a room or space shall not pass through adjoining or intervening rooms or areas, except where such rooms or areas and the area served are accessory to each other; are not a Group H occupancy; and provide a discernible path of egress travel to an exit. Exception: The means of egress is not prohibited from passing through adjoining or intervening rooms or spaces in Group H, S, or F occupancies where the adjoining or intervening room/space is of the same or a lesser hazard occupancy group.
- An exit access shall not pass through a room that can be locked to prevent egress.
- Means of egress from dwelling units or sleeping areas shall not lead through other sleeping areas, toilet rooms, or bathrooms.
- Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes. Exceptions:
    - Means of egress through a kitchen area serving adjoining rooms constituting part of the same dwelling unit or sleeping unit
    - Means of egress through stockrooms of M occupancies where all of the following conditions are met:
        - Stock is of the same hazard classification as that found in the main retail area
        - Not more than 50 percent of the exit access route is through the stockroom
        - The stockroom is not subject to locking from the egress side.
        - There is a demarcated, minimum 44-inch wide aisle defined by full or partial height fixed walls or similar construction that will maintain the required width and lead directly from the retail area to the exit without obstructions.
    - The means of egress shall not pass through any room subject to locking except in Group I-3 occupancies classified as detention facilities and psychiatric treatment areas in Group I-2 occupancies.

Exits must provide unobstructed access from the building/space to the public way or a yard providing direct, unobstructed access to the public way.

Door Size and Swing

The clear width of side swinging doors in commercial spaces is a minimum of 32 inches. Doors shall provide a minimum of 6’-8” of clear headroom. Where a building or space has an occupant load of 50 or more, doors are required to open in the direction of egress travel.

Exit Identification and Illumination

Section 1013 of the CBC requires that exits and exit access doors be marked by an approved exit sign readily visible from any direction of egress travel. Signs shall indicate the direction of egress travel in cases where the exit isn’t immediately visible to occupants. Exit sign placement shall be such that no point in an exit access corridor or passageway is more than 100 feet or the listed viewing distance of the sign, whichever is less. Exceptions include:

- Exit signs are not required in rooms or areas that require only one exit or exit access
- Main exterior exit doors or gates that are obviously and clearly identifiable as exits when approved by the building official
- Exit signs are not required in Occupancies in Group U and individual sleeping units or dwelling units in Group R-1, R-2, R-3, or R -3.1.

Required exit signs shall be internally or externally illuminated. Internally illuminated signs include electrically powered, self-luminous, and photo-luminescent signs listed and labeled in accordance with UL 924. Externally illuminated exit signs shall have the face illuminated from an external source having an intensity of not less than 5 foot candles. The light source shall be connected to an emergency power system consisting of storage batteries, unit equipment, or an on-site generator capable of illuminating the sign for a period of 90 minutes in case of primary power loss.

Exit Sign Graphics

Externally illuminated exit signs shall have plainly legible letters not less than 6 inches high with principal strokes of the letters not less than ¾ inch wide. The word "EXIT" shall have letters having a width of not less than 2 inches wide except the letter "I", and the minimum spacing between letters shall be not less than 3/8 inch. Signs larger than the minimum established by the code shall have letter widths, strokes and spacing in proportion to their height.

The word "EXIT" shall be in high contrast with the background and shall be clearly discernible when the means of exit sign illumination is or is not energized. If a chevron directional indicator is provided as part of the exit sign, the construction shall be such that the direction of the chevron directional indicator cannot be readily changed.

Floor-level Exit Signs

CBC Section 1013.7 states "Where exit signs are required, additional approved low-level exit signs which are internally or externally illuminated photo-luminescent or self-luminous, shall be provided in all interior corridors of Group A, E, I, and R2.1 occupancies and in all areas serving guest rooms of hotels in Group R, Division 1 occupancies. Exceptions:

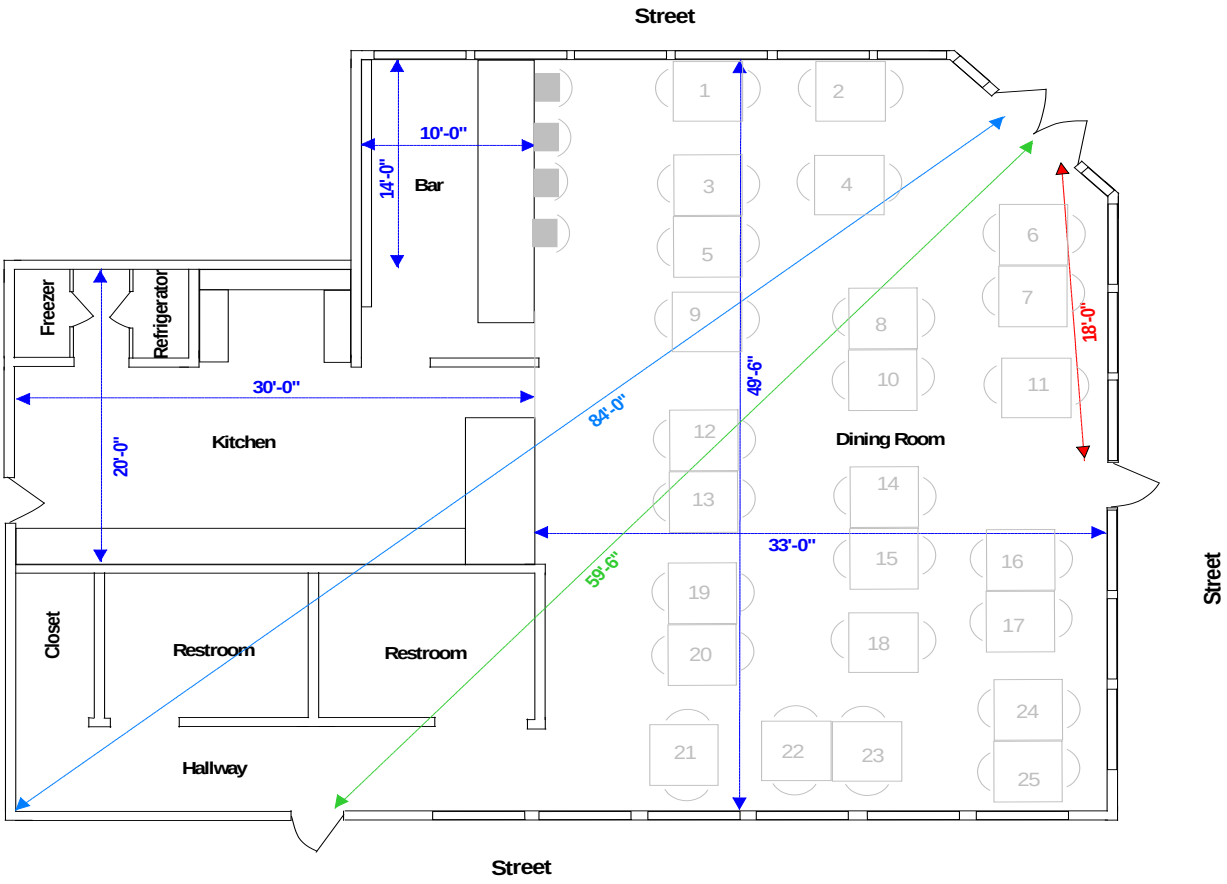
- Group A occupancies that are protected throughout by an approved, supervised fire sprinkler system
- Group E occupancies where direct exits have been provided from each classroom
- Group I and R-2.1 occupancies which are provided with smoke barriers constructed in accordance with Section 407.5
- Group I-3 occupancies

Path Markings

When exit signs are required, in addition to approved floor level exit signs, approved path markings shall be installed at or no higher than 8" above the floor level in all interior rated exit corridors of unsprinklered Group A, R-1 and R-2 occupancies. Such marking shall be continuous except as interrupted by doorways, corridors or other such architectural features in order to provide a visible delineation along the path of travel.

Determining Egress Requirements – Example

Figure 1 below illustrates a simplified procedure for determining exit requirements as described in this Job Aid. For more information on determining exiting requirements, see the CA Building Code.



Occupant Load, Number of Exits, and Exit Separation Distance Calculations

Restaurant – A-2 Occupancy on ground floor - Unsprinklered Building

Occupant load calculation:

Dining room : Occupant Load Factor (OLF – tables/chairs) 15sf/person (net) 33' x 49.5' = 1636 sf
Deduct area covered by tables/chairs = 24 sf (per table w/ 2 chairs) x 25 = - 600 sf
Dining room NET square feet = 1036 sf
Dining Room Occupant Load = 1036/15 = 69

Kitchen/Bar – OLF 200 sf/person (gross) = (30'x20') + (14'x10') = 740 sf
Kitchen/Bar Occupant Load = 740/200 = 4

Total Maximum Allowable Occupant Load = 69+4 = 73 **73>49 2 exits required**

Exit Separation Distance

Max. diagonal dimension of building or space = 84'
Required exit separation distance (unsprinklered building) = 1/2 x 84' = 42'