

# Appendix C

## Methods for Determining Concentrations of People



# APPENDIX C

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One criterion used in many compatibility plans is the maximum number of people per acre that can be present in a given area at any one time. If a proposed use exceeds the maximum density, it is considered inconsistent with compatibility planning policies. This appendix provides some guidance on how the people-per-acre determination can be made.

The most difficult part about making a people-per-acre determination is estimating the number of people likely to use a particular facility. There are several methods which can be utilized, depending upon the nature of the proposed use:

- **Parking Ordinance** - The number of people present in a given area can be calculated based upon the number of parking spaces provided. Some assumption regarding the number of people per vehicle needs to be developed to calculate the number of people on-site. The number of people per acre can then be calculated by dividing the number of people on-site by the size of the parcel in acres. This approach is appropriate where the use is expected to be dependent upon access by vehicles. Depending upon the specific assumptions utilized, this methodology typically results in a number in the low end of the likely intensity for a given land use.
- **Maximum Occupancy** - The Uniform or California Building Code (CBC) can be used as a standard for determining the maximum occupancy of certain uses. Table C-1 indicates the required number of square feet per occupant. The number of people on the site can be calculated by dividing the total floor area of a proposed use by the minimum square feet per occupant requirement listed in the table. The maximum occupancy can then be divided by the size of the parcel in acres to determine the people per acre. Surveys of actual occupancy levels conducted by various agencies have indicated that many retail and office uses are generally occupied at no more than 50 percent of their maximum occupancy levels, even at the busiest times of day. Therefore, the number of people calculated for office and retail uses should usually be adjusted (50 percent) to reflect the actual occupancy levels before making the final people-per-acre determination. Even with this adjustment, the CBC-based methodology typically produces intensities at the high end of the likely range.
- **Survey of Similar Uses** - Certain uses may require an estimate based upon a survey of similar uses. This approach is more difficult, but is appropriate for uses which, because of the nature of the use, cannot be reasonably estimated based upon parking or square footage.

Appendix C1 shows sample calculations.

**TABLE C-1  
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT<sup>1</sup>**

Function of Space	Occupant Load Factor <sup>2</sup>
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit Gallery and Museum	30 net
Assembly with fixed seats	See Section 1004.4 <sup>3</sup>
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Business areas	100 gross
Courtrooms	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 Fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Institutional Areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	100 gross
Kitchens, commercial	200 gross
Laboratory	
Educational	50 net
Laboratories, non-educational	100 net
Laboratory suite <sup>4</sup>	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Mall buildings – covered and open	See Section 402.8.2 <sup>5</sup>
Mercantile	
Areas on other floors	60 gross
Basement and grade floor areas	30 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

NOTES:

1. For SI: 1 square foot = 0.929 m<sup>2</sup>
2. Floor area in square feet per occupant.
3. **Section 1004.4 Fixed seating.**

For areas having fixed seats and aisles, the occupant load shall be determined by the number of fixed seats installed therein. The occupant load for areas in which fixed seating is not installed, such as waiting spaces, shall be determined in accordance with Section 1004.1.2 and added to the number of fixed seats.

The occupant load of wheelchair spaces and the associated companion seat shall be based on one occupant for each wheelchair space and one occupant for the associated companion seat provided in accordance with Section 1108.2.3.

For areas having fixed seating without dividing arms, the occupant load shall not be less than the number of seats based on the number of seats based on one person for each 18 inches (457 mm) of seating length.

The occupant load of seating booths shall be based on one person for each 24 inches (610 mm) of booth seat length measured at the backrest of the seating booth.

4. **Section 443.2 Definitions.** The following terms are defined in Chapter 2 [of the CBC]:

Laboratory suite.

[F] Liquid tight floor.

5. **Section 402.8.2 Determination of occupant load.**

The occupant load permitted in any individual tenant space in a covered or open mall building shall be determined by this code. Means of egress requirements for individual tenant spaces shall be based on the occupant load thus determined.

**402.8.2.1 Occupant formula**

In determining required means of egress of the mall, the number of occupants for whom means of egress are to be provided shall be based on gross leasable area of the covered or open mall building (excluding anchor buildings) and the occupant load factor as determined by Equation 4-1.

$$OLF = (0.00007) (GLA) + 25$$

**Equation 4-1**

where:

OLF = The occupant load factor (square feet per person)

GLA = The gross leasable area (square feet).

**Exception:** Tenant spaces attached to a covered or open mall building but with a means of egress system that is totally independent of the open mall of an open mall building or of a covered mall building shall not be considered as gross leasable area for determining the required means of egress for the mall building.

**402.8.2.2 OLF range.** The occupant load factor (OLF) is not required to be less than 30 and shall not exceed 50.

**402.8.2.3 Anchor buildings.** The occupant load of anchor buildings opening into the mall shall not be included in computing the total number of occupants for the mall.

**402.8.2.4 Food courts.** The occupant load of a food court shall be determined in accordance with Section 1004. For the purposes of determining the means of egress requirements for the mall, the food court occupant load shall be added to the occupant load of the covered or open mall building as calculated above.

SOURCE: California Building Code (2013), Table 1004.1.2 (p. 372)

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## Appendix C1 Sample People-Per-Acre Calculations

### Example 1

*Proposed Development:* Two office buildings, each two stories and containing 20,000 square feet of floor area per building. Site size is 3.0 net acres. Counting a portion of the adjacent road, the gross area of the site is 3.5± acres.

#### *A. Calculation Based on Parking Space Requirements*

For office uses, assume that a county or city parking ordinance requires 1 parking space for every 300 square feet of floor area. Data from traffic studies or other sources can be used to estimate the average vehicle occupancy. For the purposes of this example, the number of people on the property is assumed to equal 1.5 times the number of parking spaces.

The average usage intensity would therefore be calculated as follows:

- 1) 40,000 sq. ft. floor area x 1.0 parking space per 300 sq. ft. = 134 required parking spaces
- 2) 134 parking spaces x 1.5 people per space = 201 people maximum on site
- 3) 200 people / 3.5 acres gross site size = 57 people per acre average for the site

Assuming that occupancy of each building is relatively equal throughout, but that there is some separation between the buildings and outdoor uses are minimal, the usage intensity for a single acre would be estimated to be:

- 1) 20,000 sq. ft. bldg. / 2 stories = 10,000 sq. ft. bldg. footprint
- 2) 10,000 sq. ft. bldg. footprint / 43,560 sq. ft. per acre = 0.23 acre bldg. footprint
- 3) Building footprint <1.0 acre; therefore maximum people in 1 acre = bldg. occupancy = 100 people per single acre

#### *B. Calculation Based on California Building Code*

Using the CBC (Appendix C1) as the basis for estimating building occupancy yields the following results for the above example:

- 1) 40,000 sq. ft. bldg. / 100 sq. ft./occupant = 400 people max. bldg. occupancy (under UBC)
- 2) 400 max. bldg. occupancy x 50% adjustment = 200 people maximum on site
- 3) 200 people / 3.5 acres gross site size = 57 people per acre average for the site

*Conclusions:* In this instance, both methodologies give the same results. For different uses and/or different assumptions, the two methodologies are likely to produce different numbers. In most such cases, the CBC methodology will indicate a higher intensity.