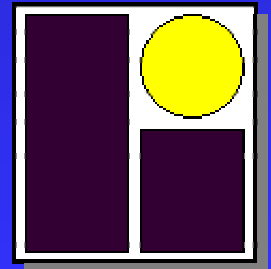


# Virtual Modeling of Tall Buildings Sun & Shadows

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# Model Requirements

- 1. Site plan
- 2. Floor plans
- 3. Elevations
- 4. Area context plan
- 5. Geographical coordinates

# 1. Site Plan

- Location of proposed building within site
- Location of site relative to surroundings
- Orientation relative to astronomic north
- Topographic relief

## 2. Floor Plans / 3. Elevations

- 3D Model
  - ◆ Massing
- 2D Model
  - ◆ Shadow Vectors

# 4. Area Context Plan

- Adjacent properties
  - ◆ Existing buildings
  - ◆ Open areas
- Impact areas
  - ◆ Outdoor amenity areas
  - ◆ Windows to living spaces
- Existing shade

# 5. Geographical Coordinates

## ■ Latitude

- ◆ Measured positive north of equator
- ◆ North America is positive

## ■ Longitude

- ◆ Measured positive east of Greenwich
- ◆ North America is negative

# Shadow Criteria

- BRE Guidelines (U.K.)
  - ◆ Emphasis on both daylight and sunlight
    - ◆ Daylight – loss of sky view
      - Established factors for LR/DR/BR
    - ◆ Sunlight – loss of direct sun
      - Established factors for windows
      - Established factors for gardens and OLA's

# Shadow Criteria

- **Boston Redevelopment Authority**
  - ◆ Emphasis on sunlight and daylight
  - ◆ Public open spaces and pedestrian areas
    - ◆ Transit stops, walkways, parks, plazas
    - ◆ and other open space areas
  - ◆ No-build, build, and as-of-right
  - ◆ 9, 12 and 3 on equinoxes & solstices
    - ◆ plus 6 pm in summer and fall



# Shadow Criteria

## ■ Oakland Design Review Manual

### ◆ Actively used outdoor area

- ◆ Gathering space with a seating area, a sunning area, a pool/fountain, planters, or other similar amenities

### ◆ Actively used indoor area

- ◆ Entertainment areas, such as living rooms, dining rooms, kitchens, family rooms, etc.
- ◆ Excludes bedrooms and bathrooms

# Shadow Criteria

## ■ Oakland (cont'd)

- ◆ Impact if shadow  $> 50\%$  on
  - ◆ Exterior wall of actively used indoor area
  - ◆ Actively used outdoor area
- ◆ On spring/fall equinox during 2 of 3
  - ◆ 9 am, 12 noon, and 3 pm

# Shadow Criteria

## ■ Central Sydney, Australia

- ◆ Emphasis on publicly accessible spaces
  - ◆ Publicly owned
  - ◆ Privately owned
- ◆ 12 noon to 2 pm, 14 April to 21 June

# Shadow Criteria

## ■ New York City CEQR Manual

- ◆ Shadow criteria applies to:
  - ◆ Publicly accessible open space
  - ◆ Historic landscape or resource
  - ◆ Important natural features, landscaping
- ◆ Mar (Sep) 21, Jun 21, May (Aug) 6, Dec 21
- ◆ Excludes streets, sidewalks, buildings
- ◆ Excludes within 1.5 hrs of sunrise/sunset