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 the equator
  - North America is positive

- **Longitude**
  - Measured positive east of Greenwich
  - North America is negative
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
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