

**CONTRA COSTA COUNTY**  
**FINDINGS IN SUPPORT OF CHANGES, ADDITIONS, AND DELETIONS TO  
STATEWIDE BUILDING STANDARDS CODE**

The California Building Standards Commission has adopted and published the 2016 Building Standards Code, which is comprised of the 2016 California Building, Residential, Green Building Standards, Electrical, Plumbing, Mechanical and Existing Building Codes. These codes are enforced in Contra Costa County by the Building Inspection Division of the Department of Conservation and Development.

Although these codes apply statewide, Health and Safety Code sections 17958.5 and 18941.5 authorize a local jurisdiction to modify or change these codes and establish more restrictive building standards if the jurisdiction finds that the modifications and changes are reasonably necessary because of local climatic, geological or topographical conditions. For the California Green Building Standards Code, local climatic, geological, or topographical conditions include local environmental conditions.

Ordinance No. 2016-22 adopts the statewide codes and amends them to address local conditions. Pursuant to Health and Safety Code section 17958.7, the Contra Costa County Board of Supervisors finds that the more restrictive standards contained in Ordinance No. 2016-22 are reasonably necessary because of the local climatic, geological, and topographic conditions that are described below.

I. Local Conditions

A. Geological and Topographic

1. Seismicity

(a) Conditions

Contra Costa County is located in Seismic Design Categories D and E, which designates the highest risk for earthquakes in the United States. Buildings and other structures in these zones can experience major seismic damage. Contra Costa County is in close proximity to numerous earthquake faults including the San Andreas Fault and contains all or portions of the Hayward, Calaveras, Concord, Antioch, Mt. Diablo, and other lesser faults. A 4.1 earthquake with its epicenter in Concord occurred in 1958, and a 5.4 earthquake with its epicenter also in Concord occurred in 1955. The Concord and Antioch faults have a potential for a Richter 6 earthquake and the Hayward and Calaveras faults have the potential for a Richter 7 earthquake. Minor tremblers from seismic activity are not uncommon in the area. A study released in 2015 by the Working Group of California Earthquake Probabilities predicts that for the San Francisco region,

the 30 year likelihood of one or more earthquake of 6.7 or larger magnitude is 72%. The purpose of this Working Group is to develop statewide, time-dependent Earthquake Rupture Forecasts for California that use best available science, and are endorsed by the United States Geological Survey, the Southern California Earthquake Center, and the California Geological Survey. Scientists, therefore, believe that an earthquake of a magnitude 6.7 or larger is now slightly more than twice as likely to occur as to not occur in, approximately, the next 30 years.

Interstates 680, 80, 580 and State Route 4 run the length throughout Contra Costa County. These interstates and state routes divide the County into a west, south, north and east. An overpass or undercrossing collapse would significantly alter the response route and time for responding emergency equipment. This is due to limited crossings of the interstate and that in some areas there is only one surface street, which runs parallel to the interstate, which would be congested during a significant emergency.

Earthquakes of the magnitude experienced locally can cause major damage to electrical transmission facilities and to gas and electrical lines in buildings, which in turn start fires throughout the County. The occurrence of multiple fires will quickly deplete existing fire department resources; thereby reducing and/or delaying their response to any given fire.

(b) Impact

A major earthquake could severely restrict the response of all Contra Costa County Fire Districts and their capability to control fires involving buildings of wood frame construction, with ordinary roofing materials and flammable exteriors, or with large interior areas not provided with automatic smoke and fire control systems. Also, when buildings not equipped with earthquake structural support move off their foundations, gas pipes may rupture. Fires develop from line ruptures and spread from house to house, causing an extreme demand for fire protection resources. The proximity of large areas within the County to fault traces, necessitates adopting stricter structural construction standards.

More restrictive electric vehicle charging standards and construction and demolition waste recovery requirements would not negatively impact the County's infrastructure or public safety resources in the event of a major earthquake.

2. Soils

(a) Conditions

The area is replete with various soils, which are unstable, clay loam and alluvial fans

being predominant. These soil conditions are moderately to severely prone to swelling and shrinking, are plastic, and tend to liquefy.

Throughout Contra Costa County, the topography and development growth has created a network of older, narrow roads. These roads vary from gravel to asphalt surface and vary in percent of slope, many exceeding twenty (20) percent. Several of these roads extend up through the winding passageways in the hills providing access to remote, affluent housing subdivisions. The majority of these roads are private with no established maintenance program. During inclement weather, these roads are subject to rock and mudslides, as well as downed trees, obstructing all vehicle traffic. It is anticipated that during an earthquake, several of these roads would be unpassable so as to prevent fire protection resources from reaching fires caused by gas line ruptures or other sources.

### 3. Topographic

#### (a) Conditions

##### i) Vegetation

Highly combustible dry grass, weeds, and brush are common in the hilly and open space areas adjacent to built-up locations six (6) to eight (8) months of each year. Many of these areas frequently experience wildland fires, which threaten nearby buildings, particularly those with wood roofs, or sidings. This condition can be found throughout Contra Costa County, especially in those developed and developing areas of the County. Earthquake gas fires due to gas line ruptures can ignite grasslands and stress fire district resources.

##### ii) Surface Features

The arrangement and location of natural and manmade surface features, including hills, creeks, canals, freeways, housing tracts, commercial development, fire stations, streets, and roads, combine to limit feasible response routes for Fire District resources in and to District areas.

##### iii) Buildings, Landscaping, and Terrain

Many of the newer large buildings and building complexes have building access and landscaping features and designs, which preclude or greatly limit any approach or operational access to them by Fire District vehicles. In addition, the presence of security gates and roads of inadequate width and grades that are too steep for Fire District vehicles adversely affect fire suppression efforts.

When Fire District vehicles cannot gain access to buildings involved with fire, the potential for complete loss is realized. Difficulty reaching a fire site often requires that fire personnel both in numbers and in stamina. Access problems often result in severely delaying, misdirecting or making impossible fire and smoke control efforts. In existing structures where pitched roofs have been built over an existing roof, smoke detectors should be required to warn residents of smoke and fire before the arrival of fire personnel.

(b) Impact

The above local geological and topographical conditions increase the magnitude, exposure, accessibility problems, and fire hazards presented to the County fire resources. Fire following an earthquake has the potential of causing greater loss of life and damage than the earthquake itself. Most earthquake fires are created by natural gas developed from gas line ruptures. Hazardous materials, particularly toxic gases, could pose the greatest threat to the largest number, should a significant seismic event occur. Public safety resources would have to be prioritized to mitigate the greatest threat, and may likely be unavailable for smaller single dwellings that were caused by broken gas lines.

Other variables may tend to intensify the situation:

1. The extent of damage to the water system
2. The extent of isolation due to bridge and/or freeway overpass collapse.
3. The extent of roadway damage and/or amount of debris blocking the roadways.
4. Climatic condition (hot, dry weather with high winds).
5. Time of day will influence the amount of traffic on roadways and could intensify the risk to life during normal business hours.
6. The availability of timely mutual aid or military assistance.
7. The large portion of dwellings with wood shake or shingle coverings (both on the roof diaphragm and sides of the dwellings) could result in conflagrations.
8. The large number of dwellings that slip off their foundations and rupture gas lines and electrical systems resulting in further conflagrations.

More restrictive electric vehicle charging standards and construction and demolition waste recovery requirements would not impact the availability of the County's fire or public safety resources.

B. Climatic

1. Precipitation and Relative Humidity

(a) Conditions

Precipitation ranges from 15 to 24 inches per year with an average of approximately 20 inches per year. Ninety-six (96) percent falls during the months of October through April and four (4) percent from May through September. This is a dry period of at least five (5) months each year. Additionally, the area is subject to occasional drought. Relative humidity remains in the middle range most of the time. It ranges from forty-five (45) to sixty-five (65) percent during spring, summer, fall, and from sixty (60) to ninety (90) percent in the winter. It occasionally falls as low as fifteen (15) percent.

(b) Impact

Locally experienced dry periods cause extreme dryness of untreated wood shakes and shingles on buildings and non-irrigated grass, brush and weeds, which are often near buildings with wood roofs and sidings. Such dryness causes these materials to ignite very readily and burn rapidly and intensely. Gas fires due to gas line ruptures can also spark and engulf a single family residence during these dry periods.

Because of dryness, a rapidly burning gas fire or exterior building fire can quickly transfer to other buildings by means of radiation or flying brands, sparks or embers. A small fire can rapidly grow to a magnitude beyond the control capabilities of the Fire District resulting in an excessive fire loss.

2. Greenhouse Gas Emissions

(a) Conditions

The California Air Resources Board has collected information on emissions from air pollution sources since 1969. This information is periodically compiled by State and local air pollution control agencies to create regional and statewide greenhouse gas emissions inventories. The California greenhouse gas emissions inventory maintains information on various air pollution sources and identifies “mobile sources” (all on-road vehicles such as automobiles and trucks; off-road vehicles such as trains, ships, aircraft; and farm equipment) as a primary pollution source. According to the 2016 statewide inventory, the transportation sector remains the largest source of greenhouse gas emissions, accounting for 36% of the total greenhouse gas emissions. Emissions from recycling and waste, comprising of 2% of the total greenhouse gas emissions, have grown by 19% since 2000, and 94% of that amount are landfill emissions. California adopted land use and transportation policies and mandatory recycling laws to help reduce greenhouse gas emissions by promoting the use of renewable energy sources and reducing landfill disposal.

Contra Costa County also completed a local greenhouse gas emissions inventory as well

as a community-wide Climate Action Plan. The County's Climate Action Plan contains measures reducing greenhouse gas emissions pertaining to renewable fuel vehicles and reducing disposal for the purpose of reducing greenhouse gas emissions.

(b) Impact

More restrictive electric vehicle charging standards and construction and demolition waste recovery requirements would be consistent with the intent of State legislation and County requirements to aggressively implement energy and waste policies designed to ensure success in meeting their greenhouse gas emission reduction and reusable energy and recycling goals.

3. Temperature

(a) Conditions

Temperatures have been recorded as high as 114° F. Average summer highs are in the 75° to 90° range, with average maximums of 105° F in some areas of unincorporated Contra Costa County.

(b) Impact

High temperatures cause rapid fatigue and heat exhaustion of firefighters, thereby reducing their effectiveness and ability to control large building, wildland fires, and fires caused by gas line ruptures.

Another impact from high temperatures is that combustible building material and non-irrigated weeds, grass and brush are preheated, thus causing these materials to ignite more readily and burn more rapidly and intensely. Additionally, the resultant higher temperature of the atmosphere surrounding the materials reduces the effectiveness of the water being applied to the burning materials. This requires that more water be applied, which in turn requires more fire resources in order to control a fire on a hot day. High temperatures directly contribute to the rapid growth of fires to an intensity and magnitude beyond the control capabilities of the Fire Districts in Contra Costa County. The change of temperatures throughout the County between very low and extreme highs contributes to a voltage drop in conductors used for power pole lines. This necessitates that voltage drops be considered.

More restrictive electric vehicle charging standards and construction and demolition waste recovery requirements would not have a negative impact on the temperature conditions within the County.

#### 4. Winds

##### (a) Conditions

Prevailing winds in many parts of Contra Costa County are from the north or northwest in the afternoons. However, winds are experienced from virtually every direction at one time or another. Velocities can reach fourteen (14) mph to twenty-three (23) mph ranges, gusting to twenty-five (25) to thirty-five (35) mph. Forty (40) mph winds are experienced occasionally and winds up to fifty-five (55) mph have been registered locally. During the winter half of the year, strong, dry, gusty winds from the north move through the area for several days creating extremely dry conditions.

##### (b) Impact

Winds such as those experienced locally can and do exacerbate fires, both interior and exterior, to burn, and spread rapidly. Fires involving non-irrigated weeds, grass, brush, and fires caused by gas line ruptures can grow to a magnitude and be fanned to an intensity beyond the control capabilities of the fire services very quickly even by relatively moderate winds. When such fires are not controlled; they can extend to nearby buildings, particularly those with untreated wood shakes or shingles.

Winds of the type experienced locally also reduce the effectiveness of exterior water streams used by all Contra Costa County Fire Districts on fires involving large interior areas of buildings, fires which have vented through windows and roofs due to inadequate built-in fire protection and fires involving wood shake and shingle building exteriors. Local winds will continue to be a definite factor toward causing major fire losses to buildings not provided with fire resistive roof and siding materials and buildings with inadequately separated interior areas, or lacking automatic fire protection systems, or lacking proper gas shut-off devices to shut off gas when pipes are ruptured, or lacking proper electrical systems. National statistics frequently cite wind conditions, such as those experienced locally, as a major factor where conflagrations have occurred.

More restrictive electric vehicle charging standards and construction and demolition waste recovery requirements would not have a negative impact on the wind conditions within the County.

## II. Necessity of More Restrictive Standards

Because of the conditions described above, the Contra Costa County Board of Supervisors finds that there are building and fire hazards unique to Contra Costa County that require the increased fire protection and structural and design load requirements set forth in Ordinance No. 2016-22.

- The ordinance amends the 2016 California Building Code by:
  - Requiring the installation of a smoke detector in existing flat roof buildings when a pitched roof is added on top of the existing flat roof and the solid sheathing of the flat roof is not removed. (§ 74-4.002(b).)
  - Requiring most wood shakes or shingles used for exterior wall covering to be fire treated. (§ 74-4.002(c).)
  - Requiring special inspections for concrete at certain foundations to be consistent with code requirements for concrete at other locations. (§ 74-4.002(d).)
  - Addressing the poor performance of plain concrete structural elements during seismic events. (§ 74-4.002(e), § 74-4.002(g), and § 74-4.002(h).)
  - Prohibiting placement of reinforcement while the concrete is in a semifluid condition thus increasing quality control during construction. Enhanced quality control is necessary because of seismic considerations. (§ 74-4.002(f).)
  
- The ordinance amends the 2016 California Residential Code by:
  - Prohibiting in single family dwellings and accessory structures braced wall panels that use gypsum wallboard and by limiting in single family dwellings and accessory structures the use of braced wall panels that use Portland Cement Plaster to dwellings of only one story buildings, as these materials have performed poorly during recent California seismic events. (§74-4.004(c), and §74-4.004(d).)
  
- The ordinance amends the 2016 California Green Building Standards Code by:
  - Imposing more restrictive electric vehicle charging standards consistent with those presently enforced in the County, as follows:
    - For new multi-family buildings:
      - Increase the required number of Electric Vehicle Charging Spaces (“EV spaces”) to five percent of the total number of parking spaces provided, where three percent is the minimum required in the statewide code. (§ 74-4.006(c).)
      - Require a minimum of one EV space for every new multi-family building (three or more units) as opposed to statewide code which requires no EV spaces for multi-family buildings with fewer than 17 units. (§ 74-4.006(c).)
      - Require that Electric Vehicle Supply Equipment (“EVSE”) be installed for each EV space in addition to the electrical infrastructure required by the statewide code. (§ 74-4.006(c).)
    - For new non-residential buildings:
      - Required number of EV spaces in new construction shall provide fully operational EVSE as opposed to statewide code which requires electrical infrastructure only. ((§ 74-4.006(j), §74-4.006(k), and § 74-4.006(l).)



- Increase the required number of EV spaces for projects with more than nine parking spaces, and less than 201 parking spaces. (§ 74-4.006(m).)
- Imposing more restrictive construction waste reduction, disposal and recycling standards consistent with those presently enforced in the County as follows:
  - Imposing the mandatory restrictions from Chapter 4 of the 2016 CGBSC on certain projects for existing residential buildings, including:
    - Projects that increase the total combined conditioned and unconditioned building area by 5000 square feet or more. ((§ 74-4.006(a).)
    - Projects that impact 5000 square feet or more of the total combined conditioned and unconditioned building area. ((§ 74-4.006(a).)
    - Demolition projects when a demolition permit is required, except demolition projects that are necessary to abate a public nuisance. (§ 74-4.006(a), and § 74-4.006(b).)
  - Eliminating the exception from construction waste management requirements for projects solely based on their isolated location from diversion facilities. ((§ 74-4.006(d).)
  - Requiring that weight and not volume is used to measure the amount of the construction and demolition debris disposed and diverted. (§ 74-4.006(e), and § 74-4.006(q).)
  - Requiring that more comprehensive documentation for construction waste management be provided to the enforcing agency and making submittal of the same a prerequisite for scheduling final inspections. (§ 74-4.006(i), and § 74-4.006(t).)
- The amendments to the 2016 California Existing Building Code are not substantive in nature and are limited to administrative provisions for the use and enforcement of this Code, and to be consistent with the administrative provisions of the statewide codes as amended.