## Limitation on Use of Fill to Support Buildings – local technical code amendments (Part 2 building and Part 2.5 residential)

Submit draft ordinances amending the flood provisions of the building code (in <track changes>) for review well in advance of first reading to DWR\_NFIP@water.ca.gov or FEMA-NFIP-R9@fema.dhs.gov. Please put community name in subject line.

**Before you start:** Review the General Instructions for Amending the California Building Standards Code (CCR Title 24) to Adopt Higher Standards for Buildings and Development Located in Flood Hazard Areas.

**Description[[1]](#footnote-1):** Structural fill is a common method of elevating buildings in flood hazard areas not subject to wave action. However, even in floodway fringe areas, the placement of fill may reduce the ability of floodplains along riverine waterways to store and convey floodwater, sometimes increasing water levels. In areas subject to flooding from coastal sources, the placement of fill can contribute to local drainage problems. Using fill can have adverse impacts on native vegetation, wetlands, local drainage, infiltration, and water quality.

**NFIP Community Rating System Credits.** Adoption and enforcement of this higher standard may qualify for CRS points (credits). Communities should review the [*CRS Coordinators Manual*](https://www.fema.gov/media-library/assets/documents/8768)and consult with their CRS Resource Specialists. FEMA/ISO determines which provisions qualify for points.

**How NFIP and CCR Title 24 Part 2 (buildings) and Part 2.5 (residential) address fill:** The NFIP and the California building codes do not prohibit the use of fill, although both require submission of engineering analyses when fill and other encroachments are proposed in designated floodways and other riverine flood hazard areas for which BFEs are shown on FIRMs but floodways have not been designated. To prevent the adverse effects of fill, some communities elect to prohibit the use of fill to elevated buildings in flood hazard areas. Many communities that limit fill do not consider backfilled stem wall foundations to be fill, although some do limit stem wall use. Some communities require compensatory storage to offset the effects of fill (see instructions for amending Part 2 Appendix G or local ordinances).

**Compensatory storage** refers to a practice of offsetting the effects of earthen fill or other development encroaching into all or part of the SFHA by providing hydraulically equivalent, excavated floodplain storage capacity. Especially along waterways where buildings are already at‑risk, compensatory storage can minimize the impact of allowing additional development.

**INSTRUCTIONS**

Implementing limitations on the use of fill requires modification of Part 2 Section 1612 and Part 2.5 Section R322.2.3.

**Step 1. Amend Part 2 (all buildings except 1- and 2-family dwellings and townhouses less than three stories).** Add a section to the ordinance that adopts local amendments to the CBC. To make the changes discernable, maintain strikethrough and underlining.

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| *CCR Title 24, Part 2, Section 1612.2 is hereby amended as follows:*Option 1 (prohibit use of earthen fill pads): *Add new Sec. 1612.2.1 as follows:***1612.2.1 Modification of ASCE 24: Limitation on use of structural fill.** Use of structural fill to elevate buildings and foundations shall not be permitted. Option 2 (prohibit use of earthen fill pads and stem wall foundations): *Add new Sec. 1612.2.1 as follows:***1612.2.1 Modification of ASCE 24: Limitation on use of structural fill.** Use of structural fill to elevate buildings and foundations, and use of earthen-filled stem walls, shall not be permitted.  |

**Step 2.** **Amend Part 2.5 (1- and 2-family dwellings and townhouses less than three stories).** Add a section to the ordinance that adopts local amendments to the CRC. To make the changes discernable, maintain strikethrough and underlining.

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| *CCR Title 24, Part 2.5, Section R322.2.3 is hereby amended as follows:*Option 1 (prohibit use of earthen fill pads): *Modify Sec. R322.2.3 as follows:***R322.2.3 Foundation design and construction.** Use of fill to elevate buildings and foundations shall not be permitted. Foundation walls for all buildings and structures erected in flood hazard areas shall meet the requirements of Chapter 4. *(remainder unchanged)*Option 2 (prohibit use of earthen fill pads and filled stem wall foundations): *Modify Sec. R322.2.3 and Sec. R322.3.3 as follows:***R322.2.3 Foundation design and construction.** Use of fill to elevate buildings and foundations, and use of earthen-filled stem walls, shall not be permitted. Foundation walls for all buildings and structures erected in flood hazard areas shall meet the requirements of Chapter 4. *(remainder unchanged)***R322.3.3 Foundations.** Buildings and structures erected in coastal high-hazard areas and Coastal A Zones shall be supported on pilings or columns and shall be adequately anchored to such pilings or columns. The space below the elevated building shall be either free of obstruction or, if enclosed with walls, the walls shall meet the requirements of Section R322.3.5. Pilings shall have adequate soil penetrations to resist the combined wave and wind loads (lateral and uplift). Water-loading values used shall be those associated with the design flood. Wind-loading values shall be those required by this code. Pile embedment shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the piling. Pile systems design and installation shall be certified in accordance with Section R322.3.9. Spread footing, mat, raft or other foundations that support columns shall not be permitted where soil investigations that are required in accordance with Section R401.4 indicate that soil material under the spread footing, mat, raft or other foundation is subject to scour or erosion from wave-velocity flow conditions. If permitted, spread footing, mat, raft or other foundations that support columns shall be designed in accordance with ASCE 24. **~~Exception:~~** ~~In Coastal A Zones, stem wall foundations supporting a floor system above and backfilled with soil or gravel to the underside of the floor system shall be permitted provided the foundations are designed to account for wave action, debris impact, erosion and local scour. Where soils are susceptible to erosion and local scour, stem wall foundations shall have deep footings to account for the loss of soil.~~  |

1. Reference: [*Reducing Flood Losses Through the International Codes: Coordinating Building Codes and Floodplain Management Regulations*](http://www.fema.gov/media-library/assets/documents/96634)(5th Edition, 2019), International Code Council and FEMA. [↑](#footnote-ref-1)