## Compensatory Storage – local floodplain management ordinance amendments or local technical code amendments CCR Title (Part 2 building, Appendix G)

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.

**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.

**Description[[1]](#footnote-1):** The NFIP definition of “development” includes filling and grading. In some flood hazard areas, the placement of development and fill or grading that alters the shape of the land may create obstructions that affect the free flow of floodwater. Applications for grading or filling may be submitted for site development activities, even if buildings are not proposed to be supported on the filled areas.

The NFIP requires communities to prohibit encroachments, including fill and other development, in regulatory floodways unless it is demonstrated that proposed encroachments will not result in any increase in flood levels during the base flood. Because FEMA’s mapping rules for delineating floodways allow as much as a one foot increase in BFE, authorizing fill and development in the floodway fringe can, over time, result in increasing the BFEs shown on the FIRM. By itself, the basic floodway requirement is not a “higher standard.”

The placement of fill in Zone A/AE areas, especially riverine waterways and ponded areas, can reduce floodplain storage capacity that may result in increased flood depths or changes in flow direction and erosion potential. Placement of fill in Zone A/AE areas inland of Zone V may create local drainage problems, but is not expected to contribute to a general increase in flood elevations. Filling and grading in flood hazard areas can adversely affect vegetation, wetlands, drainage, and water quality.

To prevent the adverse effects of fill, some communities elect to prohibit fill in flood hazard areas, while others require applicants to minimize the effects of their development proposals.

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 riverine waterways where buildings are already at risk, compensatory storage can minimize the impact of allowing additional development. Most communities that require compensatory storage do not require compensation when buildings are elevated on columns or pilings although some do require compensation for perimeter wall (crawlspace) foundations and backfilled stem wall foundations. Requiring the creation of floodplain storage capacity can compensate for proposed encroachments, but there may be environmental impacts caused by the excavation itself.

The concept of “hydraulically equivalent” is important. It means that with offsetting excavation, the encroachment of development in a flood hazard area will not adversely affect the BFE. To be considered hydraulically equivalent, compensatory storage is usually provided at a ratio of 1 to 1 (i.e., 1 cubic yard of excavation for every cubic yard of fill or development). However, it takes more than simply excavating an equal volume to be hydraulically equivalent: engineering analyses are needed to ensure the excavation is correctly located to actually offset the hydraulic impact of the development or fill.

**How Local Floodplain Management Regulations and Part 2 (buildings) and Part 2.5 (residential) address encroachments:** The DWR model ordinance and Part 2 and Part 2.5 do not prohibit the use of fill to elevate buildings, although submission of engineering analyses is required when fill and other encroachments are proposed in designated floodways and riverine flood hazard areas for which BFEs are shown on FIRMs but floodways have not been designated.

**INSTRUCTIONS**

**Use this amendment to require compensatory storage.** The amendment shown is just one example out of many options. Similar phrasing can be used to modify local floodplain management regulations. Some communities may handle compensatory storage under drainage or stormwater regulations. Communities may modify the phrasing to describe the specifics of their current or proposed requirements. For example, some communities require compensatory storage only for fill and grading; some do not require engineering analyses; and some specify the ratio of excavation to added fill (e.g., 1.5 or 2 to 1).

**Modify Local Regulations.**

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| *Add to Article 104 Permits for Floodplain Development:***Sec. 104-2. - Application for permit.** The applicant shall file an application in writing on a form furnished by the Floodplain Administrator. The information provided shall:1. Identify and describe the development to be covered by the permit.
2. Describe the land on which the proposed development is to be conducted by legal description, street address or similar description that will readily identify and definitely locate the site.
3. Indicate the use and occupancy for which the proposed development is intended.
4. Be accompanied by a site plan and construction documents as specified in Article 105 of these regulations, including grading, excavation and filling plans, plans and engineering analyses to document compensatory storage, and other information deemed appropriate by the Floodplain Administrator.
5. State the valuation of the proposed work.
6. Be signed by the applicant or the applicant's authorized agent.
7. Include such other data and information required by the Floodplain Administrator to demonstrate compliance with these regulations.

*Add to Definitions:***COMPENSATORY STORAGE.** Excavation within or directly contiguous to a flood hazard area, above the seasonal high groundwater table elevation and below the design flood elevation, of a hydraulically-equivalent volume provided to balance the effects of proposed fill and development on the flood hazard area (no net loss of floodplain storage volume). Areas excavated for compensatory storage shall become part of the flood hazard area and not be separated from the flood hazard area by an open channel or closed conduit or culvert.*Add to Article 303 Site Improvements, Utilities and Limitations (and renumber):***Sec. 303-6. - Requirement for compensatory storage.** Fill and development (other than temporary structures and temporary storage) are permitted in flood hazard areas outside of floodways if compensatory storage is provided. Engineering analyses prepared by a qualified professional shall be submitted to demonstrate the compensatory storage hydraulically balances the proposed development or fill. The Floodplain Administrator shall be permitted to waive the requirement for compensatory storage if the applicant demonstrates that the fill or development will not increase the base flood elevation on adjacent properties. ***Note:*** *To require compensatory storage only for fill and not for other development (e.g., not for buildings), modify as shown above, but remove and development in three places shown shaded.*  |

**Modify Part 2 Appendix G**.

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| *CCR Title 24, Part 2 Appendix G Section G104.2 is hereby amended as follows:***G104.2 Application for permit.** The applicant shall file an application in writing on a form furnished by the building official. Such application shall: *[only pertinent item shown]*1. Be accompanied by construction documents, grading and filling plans, plans and engineering analyses to document compensatory storage, and other information deemed appropriate by the building official.

*CCR Title 24, Part 2 Appendix G Section G202 is hereby amended by adding a new definitions as follows:***COMPENSATORY STORAGE.** Excavation within or directly contiguous to a flood hazard area, above the seasonal high groundwater table elevation and below the design flood elevation, of a hydraulically-equivalent volume provided to balance the effects of proposed fill and development on the flood hazard area (no net loss of floodplain storage volume). Areas excavated for compensatory storage shall become part of the flood hazard area and not be separated from the flood hazard area by an open channel or closed conduit or culvert.*CCR Title 24, Part 2 Appendix G Section G401 is hereby amended by adding a new subsection as follows:***G401.7 Requirement for compensatory storage.** Fill and development (other than temporary structures and temporary storage) are permitted in flood hazard areas outside of floodways if compensatory storage is provided. Engineering analyses prepared by a qualified professional shall be submitted to demonstrate the compensatory storage hydraulically balances the proposed development or fill. The Floodplain Administrator shall be permitted to waive the requirement for compensatory storage if the applicant demonstrates that the fill or development will not increase the base flood elevation on adjacent properties. ***Note:*** *To require compensatory storage only for fill and not for other development (e.g., not for buildings), modify as shown above, but remove and development in three places shown shaded.* |

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)