

Section 23 - Land Subject to Flooding (Bordering and Isolated)

A. Findings.

(1) Bordering land subject to flooding.

- (a) Bordering land subject to flooding is an area which floods from a rise in a bordering waterway or water body. Such areas are presumed to be significant to flood control and storm damage prevention and protection of surrounding land and other homes or buildings. In these ways, bordering land subject to flooding is important in mitigating the negative impacts of climate change.
- (b) Bordering land subject to flooding provides a temporary storage area for floodwater which has overtopped the bank of the main channel of a creek, brook, river or stream or the basin of a pond or lake. During periods of peak runoff, floodwaters are both retained (i.e., slowly released through evaporation and percolation) and detained (slowly released through surface discharge) by bordering land subject to flooding. Over time, incremental filling of these areas causes increases in the extent and level of flooding by eliminating flood storage volume or by restricting flows, thereby causing increases in damage to public and private properties and downstream resource areas.
- (c) The hydrologic regime, plant community and structure, topography, soil, and proximity to water bodies or vegetated wetlands provide important food, shelter, migratory, and overwintering areas, and breeding for wildlife.
- (d) The hydrologic regime, surrounding plant community, topography, soil, and proximity to water bodies or vegetated wetlands make bordering land subject to flooding allow vegetation to successfully grow in these areas.

(e) The Commission has found that use of such areas or garages results in a significant or cumulative effect upon the resource area values protected by the Bylaw, and has found that these facilities can result in the uncontrolled acute or chronic release of these harmful materials into the resource areas protected by the Bylaw. The Commission has also found that using these structures for flood storage can result in the damage of vehicles and property under flooding conditions.

(2) Isolated land subject to flooding.

- (a) Isolated land subject to flooding is an isolated depression or a closed basin which serves as a ponding area for runoff or high groundwater which has risen above the ground surface. Such areas are likely to be locally significant to flood control and storm damage prevention. In this way, isolated land subject to flooding is important in mitigating the impacts of climate change. In addition, where such areas are underlain by pervious material they are likely to be significant to public or private water supply and to groundwater supply. Where such areas are underlain by pervious material covered by a mat or organic peat and muck, they are also likely to be significant to the prevention of pollution. Isolated land subject to flooding provides important breeding habitat for amphibians and some rare plants. Isolated land subject to flooding provides a temporary storage area where runoff and high groundwater pond and slowly evaporate or percolate into the substrate. Filling causes lateral

Comment [NS1]: This could/should be moved to A. Findings.

Comment [NS2]: Is this applicable to Arlington? Only one private well in town, if it still exists, and we're on MWRA.

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displacement of the ponded water onto contiguous properties, which may result in damage to said properties.

- (b) Isolated land subject to flooding, where it is underlain by pervious material, provides a point of exchange between groundwater and surface waters. Contaminants introduced into said area, such as road salts, find easy access into the groundwater. Where these conditions occur and a mat of organic peat or muck covers the substrate of the area, said mat serves to detain and remove contaminants which might otherwise enter the groundwater.

B. Definitions, critical characteristics and boundaries.

(1) Bordering land subject to flooding.

- (a) Bordering land subject to flooding is an area with low, generally flat topography adjacent to and inundated by floodwaters rising from brooks, creeks, rivers, streams, pond or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland.
- (b) The topography and location of bordering land subject to flooding specified in the foregoing Subsection B(1)(a) are critical to the protection of the interests specified in subsection A(1) above.
- (c) The boundary of bordering land subject to flooding is the estimated or observed maximum lateral extent of floodwater which will theoretically result or has resulted from the statistical 1%-annual-chance flood (also known as the one-hundred-year-frequency storm).
1. Said boundary shall be that determined by reference to the most recently available flood profile data prepared for the Town of Arlington within which the work is proposed under the National Flood Insurance Program (NFIP, currently administered by the Federal Emergency Management Agency), successor to the U.S. Department of Housing and Urban Development). Said boundary, so determined, shall be presumed accurate. This presumption may be overcome only by credible evidence from a registered professional engineer or other professional competent in such matters.
 2. Notwithstanding the foregoing, where NFIP profile data is unavailable or is determined by the Commission to be outdated, inaccurate or not reflecting current conditions, the boundary of bordering land subject to flooding shall be the maximum lateral extent of floodwater which has been observed or recorded or the Commission may require the applicant to determine the boundary of Bordering Land Subject to Flooding by engineering calculations which shall be:
 - i. based upon NOAA Atlas 14, Volume 10 (latest version) "NOAA Plus"; "NOAA Plus" ~~which~~ is the NOAA Precipitation Frequency estimates at the upper bound of the 90% confidence level. It is calculated by multiplying the NOAA Upper Confidence for the 100-year 24-hour design storm by 0.9. (Example: if NOAA 100-year 24 hour design storm is 8.16 inches and the upper bound of the 90% confidence interval is 11.5 inches, NOAA Plus would be $11.5 \times 0.9 = 10.35$ inches for the 100-year 24-hour design storm).

Comment [NS3]: That reference is out of date.

Comment [4]:

DK. Question for the Commission. Are we determining current BFE and resulting BLSF boundaries outdated? Should we/the Town develop a new overlay developed from Atlas 14 Plus, or other synthetic storm event?

Comment [NS5]: Your comment makes me wonder what rainfall data FEMA (or their contractors) use in developing the BFE.

Comment [NS6]: Style point: We should either capitalize for letter of each word in this term or leave in lower case but not have it both ways. I favor capitalizing. I noticed that most of the other RA sections are not capitalized. Hmm, I wonder who wrote that. =)

Comment [7]:

PH. DEP is recommending using NOAA Plus for its revised stormwater standards. Per DEP: NOAA Plus is said to account for larger observed storms, to incorporate risk observed in current data to reflect range of larger observed storms, to provide greater resiliency for infrastructure, requires design to address upper range and larger stormwater controls, and would expand BLSF boundaries that are regulated, reducing flood risk. NOAA Plus is an off-the shelf method that can be implemented.

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- ii. based upon the standard methodologies set forth in U.S. Soil Conservation Service Technical Release No. 55, Urban Hydrology for Small Watersheds and Section 4 of the U.S. Soil Conservation Service, National Engineering Hydrology Handbook; and
 - iii. prepared by a registered professional engineer or other professional competent in such matters.
- (2) Isolated land subject to flooding.
- (a) Isolated land subject to flooding is an isolated depression or closed basin without an inlet or an outlet. It is an area which at least once a year confines standing water. Isolated land subject to flooding may be underlain by pervious material, which in turn may be covered by a mat of peat or muck.
 - (b) The characteristics specified in the foregoing Subsection B(2)(a) are critical to the protection of the interests specified in Subsection A(2) above.
 - (c) The boundary of isolated land subject to flooding is the perimeter of the largest observed or recorded volume of water confined in said area.

C. No activity, other than the maintenance of an already existing structure which will result in the building within or upon, or removing, filling, dredging or altering of, land subject to flooding shall be conducted without written permission of the Conservation Commission.

Any proposed activity within bordering land subject to flooding shall also be governed by all regulations of the Floodplain District of the Arlington Zoning Bylaw, [the Town of Arlington Stormwater Bylaw and regulations](#), the State Wetlands Protection Act ([G.L. c. 131, sec. 40](#)), [the state Wetlands Regulations](#) (310 CMR 10.00), and the State Building Code, (780 CMR).

D. The Commission may permit activity on land subject to flooding provided it shall not result in the following:

- (1) Flood damage due to filling which causes lateral displacement of water that would otherwise be confined within said area;
- (2) Adverse effect on surface or groundwater, where said area is underlain by pervious material;
- (3) An adverse effect on the capacity of said area to prevent pollution of the groundwater, where the area is underlain by pervious material which in turn is covered by a mat of organic peat and muck.
- (4) A rise in the base flood elevation anywhere in the floodplain. This must be demonstrated through hydrologic and hydraulic analysis performed in accordance with standard engineering practice performed by a registered professional.
- (5) Reduction in the ability of the land to buffer more inland areas from flooding.
- (6) [Compensatory flood storage shall be at a 2:1 ratio, minimum, for each unit volume of flood storage lost at each elevation.](#)

The applicant shall take into consideration the impacts of climate change on the activities proposed on land subject to flooding, especially in terms of the compensatory flood storage as a

Comment [NS8]: Has anyone checked these instructions to be sure that neither recommend use of TP-40 data? Don't want to create a contradiction with the prior paragraph.

Comment [ES9]: TR-55 states that TP-40 has been superseded by NOAA Atlas 2; Chapter 4 (Storm Rainfall Depth) of the National Engineering Hydrology Handbook lists TP-40 as a published rainfall data analysis that should be used for states east of the Rockies, expect for storm durations of 60 minutes or less

Comment [10]: PH: Question for Commission: Do we want to revise this to have a minimum size which is not as big as DEP's definition, but somewhere in between a puddle and DEP's requirement to at least once a year have at least 1/4 acre foot of standing water, to an average depth of at least 6 inches.

Comment [NS11]: I have a comment in my notes, too, about whether the Commission wishes to set a minimum size. We could also exclude them if they're in a paved area.

Comment [12]: 15,000 gal ~ 0.1 AF @ 6" depth?

Comment [13]: PH note: the Massachusetts 2020 Model Floodplain Bylaw includes language that says permits are required for all proposed construction and development in the floodplain overlay district. The NFIP requirements focus on all development in the floodplain, and defines development to include "any man-made change to improved or unimproved real estate, including but not limited to building or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations." So, suggest we should have different standards for BSLF versus ISLF, e.g. minor activities in ISLF don't need permit or can be addressed in administrative review.

Comment [14]: At one point, we discussed setting minor activity or minimum flood storage displacement volume thresholds for BLSF e.g. deck footings. Perhaps consider 1:1 mitigation for these types of activities if we decide to consider any relief therefrom.

Comment [NS15]: I think this significant standard should be more visible and not buried in a long paragraph. Fine to repeat it.

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climate change resilience strategy. Any such activity shall provide compensatory flood storage for all flood storage volume that will be lost at each elevation. Compensatory flood storage shall be at a 2:1 ratio, minimum, for each unit volume of flood storage lost at each elevation.

Compensatory flood storage shall mean a volume not previously used for flood storage, shall have an unrestricted hydraulic connection to the same waterway or water body, and, with respect to waterways, shall be provided within the same reach of the river, stream, or creek. Work within Bordering Land Subject to Flooding, including that work required to provide the above specified compensatory storage, shall not restrict flows so as to cause an increase in flood stage or velocity. No new parking areas or garages shall be used as compensatory flood storage.

E. No work shall be performed within 50 feet of land subject to flooding that abuts an estimated habitat area as designated on the most current map prepared by the Massachusetts Natural Heritage and Endangered Species Program unless the Applicant can demonstrate by a preponderance of credible evidence that the work will not have any short term or long term adverse effect on the resource area values protected by the Bylaw.

Comment [NS16]: Could we move this? Seems to detract and be in the way of the requirements for compensatory storage.

Comment [NS17]: We could include this definition in Section 4 "Definitions"

Comment [ES18]: Definition added to Section 4

Comment [19]:
Question: Should we consider mitigating displacement of flood storage in pore space of soils above water table elevation? This came up in the Thorndike hearing public comments when discussing underground parking in the flood zone.