

6.2 - FLOOD DAMAGE PREVENTION

6.2.1 - Findings, Purpose, and Objectives

(1) Findings of Fact

The flood prone areas within the jurisdiction of the Town are subject to periodic inundation that results in loss of life, property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures of flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare. These flood losses are caused by the cumulative effect of obstructions in floodplains causing increases in flood heights and velocities, and by the occupancy in flood prone areas by uses vulnerable to floods or hazardous to other lands that are inadequately elevated, floodproofed, or otherwise unprotected from flood damages.

(2) Statement of Purpose

It is the purpose of this section 6.2 to promote public health, safety, and general welfare and to minimize public and private losses due to flood conditions within flood prone areas by provisions designed to:

- (A) Restrict or prohibit uses that are dangerous to health, safety, and property due to water or erosion hazards, or that result in damaging increases in erosion, flood heights or velocities;
- (B) Require that uses vulnerable to floods, including facilities that serve such uses, be protected against flood damage at the time of initial construction;
- (C) Control the alteration of natural floodplains, stream channels, and natural protective barriers that are involved in the accommodation of flood waters;
- (D) Control filling, grading, dredging, and all other development that may increase erosion or flood damage; and
- (E) Prevent or regulate the construction of flood barriers that will unnaturally divert floodwaters or that may increase flood hazards to other lands.

(3) Objectives

The objectives of this section 6.2 are:

- (A) To protect human life and health;
- (B) To minimize expenditure of public money for costly flood control projects;
- (C) To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- (D) To minimize prolonged business losses and interruptions;
- (E) To minimize damage to public facilities and utilities (i.e. water and gas mains, electric, telephone, cable and sewer lines, streets, and bridges) that are located in flood prone areas;
- (F) To minimize damage to private and public property due to flooding
- (G) To make flood insurance available to the community through the National Flood Insurance Program
- (H) To maintain the natural and beneficial functions of floodplains
- (I) To help maintain a stable tax base by providing for the sound use and development of flood prone areas in such a manner as to minimize flood blight areas; and

(J) To ensure that potential homebuyers are notified that property is in a special flood hazard area.

6.2.2 - Applicability and Legal Status

(1) Lands to Which This Article Applies

These regulations shall apply to all special flood hazard areas within the jurisdiction of the Town.

(2) Effect on Rights and Liabilities Under the Existing Flood Damage Prevention Ordinance

This section 6.2 and related sections of this Unified Development Ordinance in part comes forward by re-enactment of some of the provisions of the flood damage prevention ordinance enacted July 1, 1977, as amended, and it is not the intention to repeal but rather to re-enact and continue to enforce without interruption of such existing provisions, so that all rights and liabilities that have accrued under the earlier regulations are reserved and may be enforced. The enactment of this section 6.2 and related sections in Chapters 2 and 9 shall not affect any action, suit or proceeding instituted or pending.

(3) Effect Upon Outstanding Building Permits

Nothing in this section 6.2 or related sections of this Unified Development Ordinance shall require any change in the plans, construction, size or designated use of any development or any part thereof for which a floodplain development permit has been granted by the floodplain administrator or his authorized agents before the effective date of this Ordinance; provided, however, that when construction is not begun under such outstanding permit within a period of six (6) months subsequent to passage of this Ordinance or any revision to this Ordinance, construction or use shall be in conformity with the provisions of this Ordinance.

(4) Severability

If any section, clause, sentence, or phrase of these regulations is held to be invalid or unconstitutional by any court of competent jurisdiction, then said holding shall in no way effect the validity of the remaining portions of these regulations.

(5) Effective Date

These regulations shall become effective upon adoption.

6.2.3 - General Provisions

(1) Compliance

No structure or land shall be located, extended, converted, altered, or developed in any way without full compliance with the terms of this section 6.2 and other applicable regulations.

(2) Basis for Establishing the Special Flood Hazard Areas

The special flood hazard areas are those identified under the Cooperating Technical State (CTS) agreement between the State of North Carolina and FEMA in its FIS dated June 19, 2020, for Carteret County and associated DFIRM panels, including any digital data developed as part of the FIS, which are adopted by reference and declared a part of these regulations and all revisions thereto after January 1, 2021. Future revisions to the FIS and DFIRM panels that do not change flood hazard data within the jurisdiction authority of the Town of Emerald Isle are also adopted by reference and declared a part of these regulations. Subsequent Letter of Map Revisions (LOMRs) and /or Physical Map Revisions (PMRs) shall be adopted within 3 months.

(3) Floodplain Development Permit Required

A floodplain development permit shall be required in conformance with the provisions of section 2.4.9., Floodplain Development Permit, prior to the commencement of any development activities within special flood hazard areas as determined in section 6.2.3(2).

(4) **Variance Procedure**

The Board of Adjustment may grant a variance from the provisions of this section 6.2 pursuant to the provisions of section 2.4.17, Variances.

(5) **Abrogation and Greater Restrictions**

This section 6.2 is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this section and another conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

(6) **Interpretation**

In the interpretation and application of this section 6.2, all provisions shall be considered as minimum requirements, shall be liberally construed in favor of the governing body; and shall be deemed neither to limit nor repeal any other powers granted under state statutes.

(7) **Warning and Disclaimer of Liability**

The degree of flood protection required by this section 6.2 is considered reasonable for regulatory purposes and is based on scientific and engineering consideration. Larger floods can and will occur on rare occasions. Actual flood heights may be increased by manmade or natural causes. This section does not imply that land outside the special flood hazard areas or uses permitted within such areas will be free from flooding or flood damages. This section shall not create liability on the part of the Town or by any officer or employee of the Town for any flood damages that result from reliance on this section or any administrative decision lawfully made under this section.

6.2.4 - Provisions for Flood Hazard Prevention

(1) **General Standards**

In all special flood hazard areas the following provisions are required:

- (A) All new construction and substantial improvements shall be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure.
- (B) All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage in accordance with FEMA Technical Bulletin 2, Flood Damage-Resistant Materials Requirements.
- (C) All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damages.
- (D) All new electrical, heating, ventilation, plumbing, air conditioning equipment, and other service equipment shall be located at or above the RFPE or designed and installed to prevent water from entering or accumulating within the components during the occurrence of the base flood. These include, but are not limited to, HVAC equipment, water softener units, bath/kitchen fixtures, ductwork, electric/gas meter panels/boxes, utility/cable boxes, water heaters, and electric outlets/switches.
 - (i) Replacements part of a substantial improvement, electrical, heating, ventilation, plumbing, air conditioning equipment, and other service equipment shall also meet the above provisions.

- (ii) Replacements that are for maintenance and not part of a substantial improvement, may be installed at the original location provided the addition and/or improvements only comply with the standards for new construction consistent with the code and requirements for the original structure.
- (E) All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.
- (F) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters.
- (G) On-site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding.
- (H) Nothing in this ordinance shall prevent the repair, reconstruction, or replacement of a building or structure existing on the effective date of this ordinance and located totally or partially within the floodway, non-encroachment area, or stream setback, provided there is no additional encroachment below the Regulatory Flood Protection Elevation in the floodway, non-encroachment area, or stream setback, and provided that such repair, reconstruction, or replacement meets all of the other requirements of this ordinance. Any alteration, repair, reconstruction, or improvements to a structure that is in compliance with the provisions of this section 6.2, shall meet the requirements of "new construction" in Chapter 10.
- (I) Non-conforming structures or other development may not be enlarged, replaced, or rebuilt unless such enlargement or reconstruction is accomplished in conformance with the provisions of this section 6.2. Provided, however, nothing in this section 6.2 shall prevent the repair, reconstruction, or replacement of a building or structure existing on July 1, 1977 and located totally or partially within the floodway, non-encroachment area, or stream setback, provided that the bulk of the building or structure below the regulatory flood protection elevation in the floodway, non-encroachment area, or stream setback is not increased and provided that such repair, reconstruction, or replacement meets all of the other requirements of the flood damage prevention regulations.
- (J) New solid waste disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities shall not be permitted in special flood hazard areas. A structure or tank for chemical or fuel storage incidental to an allowed use or to the operation of a water treatment plant or wastewater treatment facility may be located in a special flood hazard area only if the structure or tank is either elevated or floodproofed to at least the regulatory flood protection elevation and certified according to section 2.4.9(3).
- (K) All subdivision proposals and other development proposals shall be consistent with the need to minimize flood damage.
- (L) All subdivision proposals and other development proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.
- (M) All subdivision proposals and other development proposals shall have adequate drainage provided to reduce exposure to flood hazards.
- (N) All subdivision proposals and other development proposals shall have received all necessary permits from those governmental agencies for which approval is required by federal or state law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334.
- (O) When a structure is partially located in a Special Flood Hazard Area, the entire structure shall meet the requirements for new construction and substantial improvements.

(P) When a structure is located in multiple flood hazard zones or in a flood hazard risk zone with multiple base flood elevations, the provisions for the more restrictive flood hazard risk zone and the highest BFE shall apply.

(2) Specific Standards

In all special flood hazard areas where base flood elevation (BFE) data has been provided, as set forth in section 6.2.3(2) or subsections 2.2.4(5)(B)(xi) and 2.2.4(5)(B)(xii), the following provisions are required:

(A) Residential Construction

New construction or substantial improvement of any residential structure (including manufactured homes) shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation, as defined in Section 10.2 of this Ordinance.

(B) Non-residential Construction

New construction or substantial improvement of any commercial, industrial, or other non-residential structure shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation, as defined in Section 10.2 of this Ordinance. Structures located in Zones A, AE, AH, AO, A99h may be floodproofed to the regulatory flood protection elevation in lieu of elevation provided that all areas of the structure below the required flood protection elevation are watertight with walls substantially impermeable to the passage of water, using structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certification shall be provided to the official as set forth in subsection 2.4.9(3).

(C) Manufactured Homes

- (i) New or replacement manufactured homes shall be elevated so that the reference level of the manufactured home is no lower than the regulatory flood protection elevation, as defined in Section 10.2 of this Ordinance.
- (ii) Manufactured homes shall be securely anchored to an adequately anchored foundation to resist flotation, collapse, and lateral movement in accordance with the State of North Carolina Regulations for Manufactured/Mobile Homes, 1995 Edition, and any revision thereto adopted by the Commissioner of Insurance pursuant to NCGS Section 143-143.15 or a certified engineered foundation. Additionally, when the elevation would be met by an elevation of the chassis thirty-six (36) inches or less above the grade at the site, the chassis shall be supported by reinforced piers or other foundation elements of at least equivalent strength. When the elevation of the chassis is above thirty-six (36) inches in height, an engineering certification is required.
- (iii) All foundation enclosures or skirting shall be in accordance with subsection 6.2.4(2)(D).
- (iv) An evacuation plan must be developed for evacuation of all residents of all new, substantially improved or substantially damaged manufactured home parks or subdivisions located within flood prone areas. This plan shall be filed with and approved by the floodplain administrator and the local emergency management coordinator.

(D) Elevated Buildings

Fully enclosed area, of new construction and substantially improved structures, which is below the lowest floor or below the lowest horizontal structural member in VE zones:

- (i) Shall not be designed or used for human habitation, but shall only be used for parking of vehicles, building access, or limited storage of maintenance equipment used in connection with the premises. Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment (standard exterior door), or entry to the living area (stairway or elevator). The interior portion of such enclosed area shall not be finished or partitioned into separate rooms, except to enclose storage areas;
- (ii) Shall not be temperature-controlled or conditioned;
- (iii) Shall be constructed entirely of flood resistant materials at least to the Regulatory Flood Protection Elevation; and
- (iv) Shall include, in Zones A, AE, AH, AO, A99 flood opening to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters. To meet this requirement the openings must either be certified by a professional engineer or architect or meet or exceed the following minimum design criteria:
 - (a) Provide a minimum of two (2) openings on different sides of each enclosed area subject to flooding.
 - (b) The total net area of all openings must be at least one (1) square inch for each square foot of each enclosed area subject to flooding.
 - (c) If a building has more than one (1) enclosed area, each area must have openings on exterior walls to allow floodwater to directly enter and exit;
 - (d) The bottom of all required openings shall be no higher than one (1) foot above the higher of the interior or exterior adjacent grade; and
 - (e) Openings may be equipped with screens, louvers, or other opening coverings or devices provided they permit the automatic flow of floodwaters in both directions.
 - (f) Enclosures mad of flexible skirting are not considered enclosures for regulatory purposes, and, therefore do not require flood openings. Masonry or wood underpinning, regardless of structural status, is considered an enclosure and requires hydrostatic openings as outlined above to comply with this section 6.2.
- (v) Shall, in Coastal High Hazard Areas (Zone VE) meet the requirements of Section 6.2.4(5) of this Ordinance.

(E) Additions/Improvements

- (i) Additions and/or improvements to pre-FIRM structures whereas the addition and/or improvements in combination with any interior modifications to the existing structure.
 - (a) Are not a substantial improvement, the addition and/or improvements must be designed to minimize flood damages and must not be any more non-conforming than the existing structure.
 - (b) Are a substantial improvement, with modifications/rehabilitations/improvements to the existing structure or the common wall is structurally modified more than installing a doorway, both the existing structure and the addition must comply with the standards for new construction.
- (ii) Additions to pre-FIRM or post-FIRM structures that are a substantial improvement with no modifications/rehabilitations/improvements to the existing structure other than a standard door in the common wall, shall require only the addition to comply with the standards for new construction.
- (iii) Additions and/or improvements to post-FIRM structures whereas the addition and/or improvements in combination with any interior modifications to the existing structure.

- (a) Are not a substantial improvement, the addition and/or improvements only must comply with the standards for new construction **consistent with the code and requirements for the original structure.**
- (b) Are a substantial improvement, both the existing structure and the addition and/or improvements must comply with the standards for new construction.
- (iv) Where a fire wall or independent perimeter load-bearing wall is provided between the addition and the existing building, the addition(s) shall be considered a separate building and only the addition must comply with the standards for new construction.
- (v) **Any combination of repair, reconstruction, rehabilitation, addition or improvement of a building or structure taking place during a one (1) year minimum period, the cumulative cost of which equals or exceeds 50 percent of the market value of the structure before the improvement or repair is started must comply with the standards for new construction. For each building or structure, the one (1) year period begins on the date of the first improvement or repair of that building or structure subsequent to the effective date of this ordinance. Substantial damage also means flood-related damage sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such flood event, on the average, equals or exceeds 25 percent of the market value of the structure before the damage occurred. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The requirement does not, however, include either:**
 - (a) **Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to assume safe living conditions.**
 - (b) **Any alteration of a historic structure provided that the alteration will not preclude the structure's continued designation as a historic structure.**

(F) Recreational Vehicles

Recreational vehicles placed on sites within a special flood hazard area shall either:

- (i) Be on site for fewer than one hundred eighty (180) consecutive days and be fully licensed and ready for highway use (a recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and has no permanently attached additions); or
- (ii) Meet all the requirements for new construction, including anchoring and elevation requirements of sections 2.4.9, 6.2.4(1), and subsection (2)6.2.4(C).

(G) Temporary Structures

Prior to the issuance of a floodplain development permit for a temporary structure, the following requirements must be met:

(i) Removal Plan

Applicants must submit to the floodplain administrator a plan for the removal of such structure(s) in the event of a hurricane or flash flood warning notification. The plan must include the following information:

- (a) A specified time period for which the temporary use will be permitted;
- (b) The name, address, and phone number of the individual responsible for the removal of the temporary structure;

- (c) The time frame prior to the event at which a structure will be removed (i.e. minimum of seventy-two (72) hours before landfall of a hurricane or immediately upon flood warning notification);
- (d) A copy of the contract or other suitable instrument with a trucking company to insure the availability of removal equipment when needed; and
- (e) Designation, accompanied by documentation, of a location outside the special flood hazard area to which the temporary structure will be moved.

(ii) **Submitted in Writing**

The above information shall be submitted in writing to the floodplain administrator for review and written approval.

(H) **Accessory Structures**

When accessory structures (sheds, detached garages, etc.) are to be placed within a special flood hazard area, the following criteria shall be met:

- (i) Accessory structures shall not be used for human habitation (including work, sleeping, living, cooking or restroom areas);
- (ii) Accessory structures shall not be temperature-controlled.
- (iii) Accessory structures shall be designed to have low flood damage potential;
- (iv) Accessory structures shall be constructed and placed on the building site so as to offer the minimum resistance to the flow of floodwaters;
- (v) Accessory structures shall be firmly anchored in accordance with subsection 6.2.4(1)(A).
- (vi) Accessory structures, regardless of their size or cost, shall not be placed below elevated buildings in V and VE zones'
- (vii) All service facilities such as electrical and heating equipment shall be installed in accordance with subsection 6.2.4(1)(D); and
- (viii) Openings to relieve hydrostatic pressure during a flood shall be provided below regulatory flood protection elevation in conformance with subsection 6.2.4(2)(D)(i).
- (ix) An accessory structure with a footprint less than one hundred fifty (150) square feet or that is a minimal investment of \$5,000 or less and satisfies the criteria outlined above does not require an elevation or floodproofing certificate. Elevation or floodproofing certifications are required for all other accessory structures in accordance with subsection 2.4.9(3).

(I) **Tanks**

When gas and liquid storage tanks are to be placed within a special flood hazard area, the following criteria shall be met:

- (i) Underground tanks. Underground tanks in flood hazard areas shall be anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty;
- (ii) Above-ground tanks, elevated. Above-ground tanks in flood hazard areas shall be elevated to or above the Regulatory Flood Protection Elevation on a supporting structure that is designed to prevent flotation, collapse or lateral movement during conditions of the design flood. Tank-supporting structures shall meet the foundation requirements of the applicable flood hazard area;

(iii) Above-ground tanks, not elevated. Above-ground tanks that do not meet the elevation requirements of Article 5, Section B (2) of this ordinance shall not be permitted in V or VE Zones. Tanks may be permitted in other flood hazard areas provided the tanks are designed, constructed, installed, and anchored to resist all flood-related and other loads, including the effects of buoyancy, during conditions of the design flood and without release of contents in the floodwaters or infiltration by floodwaters into the tanks. Tanks shall be designed, constructed, installed, and anchored to resist the potential buoyant and other flood forces acting on an empty tank during design flood conditions.

(iv) Tank inlets and vents. Tank inlets, fill openings, outlets and vents shall be:

(a) At or above the Regulatory Flood Protection Elevation or fitted with covers designed to prevent the inflow of floodwater or outflow of the contents of the tanks during conditions of the design flood; and

(b) Anchored to prevent lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

(3) Subdivisions, Manufactured Home Parks and Major Developments

All subdivision, manufactured home park and major development proposals located within special flood hazard areas shall:

- (A) Be consistent with the need to minimize flood damage;
- (B) Have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage; and
- (C) Have adequate drainage provided to reduce exposure to flood hazards;

(4) Standards for Floodplains without Established Base Flood Elevations

Within the special flood hazard areas established in section 6.2.3(2) where no base flood elevation (BFE) data has been provided, the following provisions shall apply:

(A) Encroachments

No encroachments, including fill, new construction, substantial improvements or new development shall be permitted within a distance of twenty (20) feet each side from top of bank or five (5) times the width of the stream, whichever is greater, unless certification with supporting technical data by a registered professional engineer is provided demonstrating that such encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.

(B) Elevation and Floodproofing

If subsection 6.2.4(3)(A) is satisfied and base flood elevation (BFE) data is available from other sources, all new construction and substantial improvements within such areas shall also comply with all applicable provisions of this section 6.2 and shall be elevated or floodproofed in accordance with elevations established in accordance with subsections 2.2.4(5)(B)(xi) and 2.2.4(5)(B)(xii). All subdivision, manufactured home park and other development proposals shall provide BFE data if development is greater than five (5) acres or has more than fifty (50) lots/manufactured home sites. Such base flood data shall be adopted by reference with Section 6.2.3(2) and utilized in implementing this ordinance.

When base flood elevation (BFE) data is not available from a federal, state, or other source, the reference level, including basement, shall be elevated at least two (2) feet above the highest adjacent grade.

(5) Coastal High Hazard Areas (Zone VE)

Coastal high hazard areas are special flood hazard areas established in section 6.2.3(2) and designated as Zones VE. These areas have special flood hazards associated with high velocity waters from surges and, therefore, in addition to meeting all provisions in this section 6.2, the following provisions shall apply to all new construction, substantial improvements and all other development:

(A) Location

All development shall:

- (i) Be located landward of the reach of mean high tide;
- (ii) Be located landward of the first line of stable natural vegetation; and
- (iii) Comply with all applicable CAMA setback requirements.

(B) Required Elevation

All development shall be elevated so that the bottom of the lowest supporting horizontal member (excluding pilings or columns) is located no lower than the regulatory flood protection elevation. Floodproofing may not be utilized on any structures in coastal high hazard areas to satisfy the regulatory flood protection elevation requirements.

(C) Open Construction/Breakaway Walls

All development shall have the space below the bottom of the lowest horizontal structural member of the lowest floor either be free of obstruction or constructed with breakaway walls, open wood latticework or insect screening, provided they are not part of the structural support of the building, are for aesthetic purposes only and are designed so as to breakaway, under abnormally high tides or wave action without causing damage to the elevated portion of the building or supporting foundation system or otherwise jeopardizing the structural integrity of the building. The following design specifications shall be met:

- (i) Material shall consist of open wood or plastic lattice having at least 40 percent of its area open, or
- (ii) Insect screening, or
- (iii) Breakaway wall shall meet the following design specifications:
 - (a) Breakaway walls shall have flood openings that allow for the automatic entry and exist of floodwaters to minimize damage caused by hydrostatic loads, per the North Carolina Residential Building Code.
 - (b) Design safe loading resistance shall be not less than 10 nor more than 20 pounds per square foot; or
 - (c) Breakaway walls that exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by State or local codes) shall be certified by a registered professional engineer or architect that the breakaway wall will collapse from a water load less than that which would occur during the base flood event, and the elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and non-structural). The water loading values used shall be those associated with the base flood. The wind loading values used shall be those required by the North Carolina State Building Code.

(D) Anchoring

All development shall be securely anchored on pilings or columns.

(E) Anchoring of Pilings and Columns

All pilings and columns and the attached structures shall be anchored to resist flotation, collapse, and lateral movement due to the effect of wind and water loads acting simultaneously on all building components. Water loading values shall be those associated with base flood. Wind values used shall be those required by the current edition of the North Carolina State Building Code.

(F) Certification

A registered professional engineer or architect shall certify that the design, specifications and plans for construction are in compliance with the provisions contained in section 2.4.9 and subsections 6.2.4(2)(D), 6.2.4(2)(F), and 6.2.4(2)(H).

(G) Other Development

(i) For concrete pads, including patios, decks, parking pads, walkways, driveways, pool decks, etc. the following is required:

(a) Shall be structurally independent of the primary structural foundation system of the structure and shall not adversely affect structures through redirection of floodwaters or debris; and

(b) Shall be constructed to breakaway cleanly during design flood conditions, shall be frangible, and shall not produce debris capable of causing damage to any structure. (The installation of concrete in small segments (approximately 4 feet x 4 feet) that will easily break up during the base flood event, or score concrete in 4 feet x 4 feet maximum segments is acceptable to meet this standard); and

(c) Reinforcing, including welded wire fabric, shall not be used in order to minimize the potential for concreted pads being a source of debris; and

(d) Pad thickness shall not exceed 4 inches; or

(e) Provide a Design Professional's certification stating the design and method of construction to be used meet the applicable criteria of this section.

(ii) For swimming pools and spas, the following is required:

(a) Be designed to withstand all flood-related loads and load combinations.

(b) Be elevated so that the lowest horizontal structural member is elevated above the RFPE; or

(c) Be designed and constructed to break away during design flood conditions without producing debris capable of causing damage to any structure; or

(d) Be sited to remain in the ground during design flood conditions without obstructing flow that results in damage to any structure.

(e) Registered design professionals must certify to local officials that a pool or spa beneath or near a VE Zone building will not be subject to flotation or displacement that will damage building foundations or elevated portions of the building or any nearby buildings during a coastal flood.

(f) Pool equipment shall be located above the RFPE whenever practicable. Pool equipment shall not be located beneath an elevated structure.

(iii) All elevators, vertical platform lifts, chair lifts, etc., the following is required:

(a) Elevator enclosures must be designed to resist hydrodynamic and hydrostatic forces as well as erosion, scour, and waves.

(b) Utility equipment in Coastal High Hazard Areas (VE Zones) must not be mounted on, pass through, or be located along breakaway walls.

(c) The cab, machine/equipment room, hydraulic pump, hydraulic reservoir, counter weight and roller guides, hoist cable, limit switches, electric hoist motor, electrical junction box, circuit panel, and electrical control panel are all required to be above RFPE. When this equipment cannot be located above the RFPE, it must be constructed using flood damage-resistant components.

(d) Elevator shafts/enclosures that extend below the RFPE shall be constructed of reinforced masonry block or reinforced concrete walls and located on the landward side of the building to provide increased protection from flood damage. Drainage must be provided for the elevator pit.

(e) Flood damage-resistant materials can also be used inside and outside the elevator cab to reduce flood damage. Use only stainless steel doors and door frames below the BFE. Grouting in of door frames and sills is recommended.

(f) If an elevator is designed to provide access to areas below the BFE, it shall be equipped with a float switch system that will activate during a flood and send the elevator cab to a floor above the RFPE.

(H) No Fill for Structural Support

Minor grading and the placement of minor quantities of nonstructural fill may be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways. The fill material must be similar and consistent with the natural soils in the area. The placement of site compatible, non-structural fill under or around an elevated building is limited to two (2) feet. Fill greater than two (2) feet must include an analysis prepared by a qualified registered design professional demonstrating no harmful diversion of floodwaters or wave run-up and wave reflection that would increase damage to adjacent elevated buildings and structures. Nonstructural fill with finished slopes that are steeper than five (5) units horizontal to one (1) unit vertical shall be permitted only if an analysis prepared by a qualified registered design professional demonstrates no harmful diversion of floodwaters or wave run-up and wave reflections that would increase damage to adjacent elevated buildings and structures. There shall be no fill used as structural support.

(I) No Alternation of Sand Dunes

There shall be no alteration of sand dunes or mangrove stands that would increase potential flood damage.

(J) No Manufactured Homes

No manufactured homes shall be permitted except in an existing manufactured home park or subdivision. A replacement manufactured home may be placed on a lot in an existing manufactured home park or subdivision provided the anchoring and elevation standards are in compliance with this section of the Ordinance.

(K) Recreation Vehicles Allowed

Recreational vehicles shall be permitted in coastal high hazard areas provided that they meet the recreational vehicle criteria of subsection 6.2.4(2)(F)(i) and the temporary structure provisions of subsection 6.2.4(2)(2)(G).

(L) Decks and Patios

(i) A deck that is structurally attached to a building or structure shall have the bottom of the lowest horizontal structural member at or above the Regulatory Flood Protection Elevation and any supporting members that extend below the Regulatory Flood Protection Elevation shall comply with the foundation requirements that apply to the building or structure, which shall be designed to accommodate any increased loads resulting from the attached deck. The increased loads must be considered in the design of the primary structure and included in the V-Zone Certification required under the flood damage prevention regulations of this Ordinance.

(ii) A deck or patio that is located below the Regulatory Flood Protection Elevation shall be structurally independent from buildings or structures and their foundation systems, and shall be designed and constructed either to remain intact and in place during design flood conditions or to break apart into small pieces to minimize debris during flooding that is capable of causing structural damage to the building or structure or to adjacent buildings and structures.

(M) Development Activities other than Buildings and Structures

Shall be permitted only if also authorized by the appropriate state or local authority, if located outside the footprint of, and not structurally attached to, buildings and structures; and if analyses prepared by qualified registered design professionals demonstrate no harmful diversion of floodwaters or wave run-up and wave reflection that would increase damage to adjacent buildings and structures. Such other development activities include but are not limited to:

(i) Bulkheads, seawalls, retaining walls, revetments, and similar erosion control structures

(ii) Solid fences and privacy walls, and fences prone to trapping debris, unless designed and constructed to fail under flood conditions less than the design flood or otherwise function to avoid obstruction of floodwaters.

(ii) Docks, piers and similar structures

(N) Electrical Outlets and Switches

No more than four (4) electrical outlets and no more than four (4) electrical switches may be permitted below RFPE unless required by building code.

(O) Registered Professional

A registered professional engineer or architect shall certify that the design, specifications and plans for construction are in compliance with the provisions of current flood damage prevention regulations in this Ordinance and on the current version of the North Carolina V-Zone Certification or equivalent local version

(6) Standards For Coastal A Zones (Zone CAZ) LIMWA

Structures in CAZs shall be designed and constructed to meet V Zone requirements, including requirements for breakaway walls. However, the NFIP regulations also require flood openings in walls surrounding enclosures below elevated buildings in CAZs (see Technical Bulletin 1, Openings in Foundation Walls and Walls of Enclosures). Breakaway walls used in CAZs must have flood openings that allow for the automatic entry and exit of floodwaters to minimize damage caused by hydrostatic loads. Openings also function during smaller storms or if anticipated wave loading does not occur with the base flood.

(i) All new construction and substantial improvements shall be elevated so that the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings or columns) is no lower than the regulatory flood protection elevation. Floodproofing shall not be utilized on any structures in Coastal A Zones to satisfy the regulatory flood protection elevation requirements.

(ii) All new construction and substantial improvements shall have the space below the bottom of the lowest horizontal structural member of the lowest floor either be free of obstruction or constructed with breakaway walls, open wood latticework or insect screening, provided they are not part of the structural support of the building and are designed so as to breakaway, under abnormally high tides or wave action without causing damage to the elevated portion of the building or supporting foundation system or otherwise jeopardizing the structural integrity of the building. The following design specifications shall be met:

(a) Material shall consist of open wood or plastic lattice having at least 40 percent of its area open, or

(b) Insect screening; or

(c) Breakaway walls shall meet the following design specifications:

(1) Breakaway walls shall have flood openings to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters. To meet this requirement, the openings must either be certified by a professional engineer or architect or meet or exceed the design criteria in Section 6.2.4 (2)(D)(iv); and

(2) Design safe loading resistance shall be not less than 10 nor more than 20 pounds per square foot; or

(3) Breakaway walls that exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by State or local codes) shall be certified by a registered professional engineer or architect that the breakaway wall will collapse from a water load less than that which would occur during the base flood event, and the elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and non-structural). The water loading values used shall be those associated with the base flood. The wind loading values used shall be those required by the North Carolina State Building Code.

(d) Concrete pads, including patios, decks, parking pads, walkways, driveways, etc. must meet the provisions of Section 6.2.4 (2)(G)).

(e) All new construction and substantial improvements shall meet the provisions of Section 6.2.4 (5).

(f) A registered professional engineer or architect shall certify that the design, specifications and plans for construction are in compliance with the provisions of Section 2.4.9 and Section 6.2.4(5)(B)(C), on the current version of the North Carolina V-Zone Certification form or a locally developed V-Zone Certification form.

(g) Recreational vehicles may be permitted in Coastal A Zones provided that they meet the Recreational Vehicle criteria of Section 6.2.4(5)(K).

(h) Fill/Grading must meet the provisions of Section 6.2.4(5)(H).

(i) Decks and patios must meet the provisions of Section 6.2.4(5)(L).

(j) In coastal high hazard areas, development activities other than buildings and structures must meet the provisions of Section 6.2.4(5)(M)

(7) Standards for Areas of Shallow Flooding (Zone AO)

Located within the Special Flood Hazard Areas established in Article 3, Section B, are areas designated as shallow flooding areas. These areas have special flood hazards associated with base flood depths of one (1) to three (3) feet where a clearly defined channel does not exist and where the path of flooding is unpredictable and indeterminate. In addition to Article 5, Sections A and B, all new construction and substantial improvements shall meet the following requirements:

(i) The reference level shall be elevated at least as high as the depth number specified on the Flood Insurance Rate Map (FIRM), in feet, plus a freeboard of two (2) feet above the highest adjacent grade; or at least of two (2) feet above the highest adjacent grade if no depth number is specified.

(ii) Non-residential structures may, in lieu of elevation, be floodproofed to the same level as required in Article 5, Section I (1) so that the structure, together with attendant utility and sanitary facilities, below that level shall be watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. Certification is required in accordance with Section 2.4.9 and Section 6.2.4(2)(B)

(iii) Adequate drainage paths shall be provided around structures on slopes, to guide floodwaters around and away from