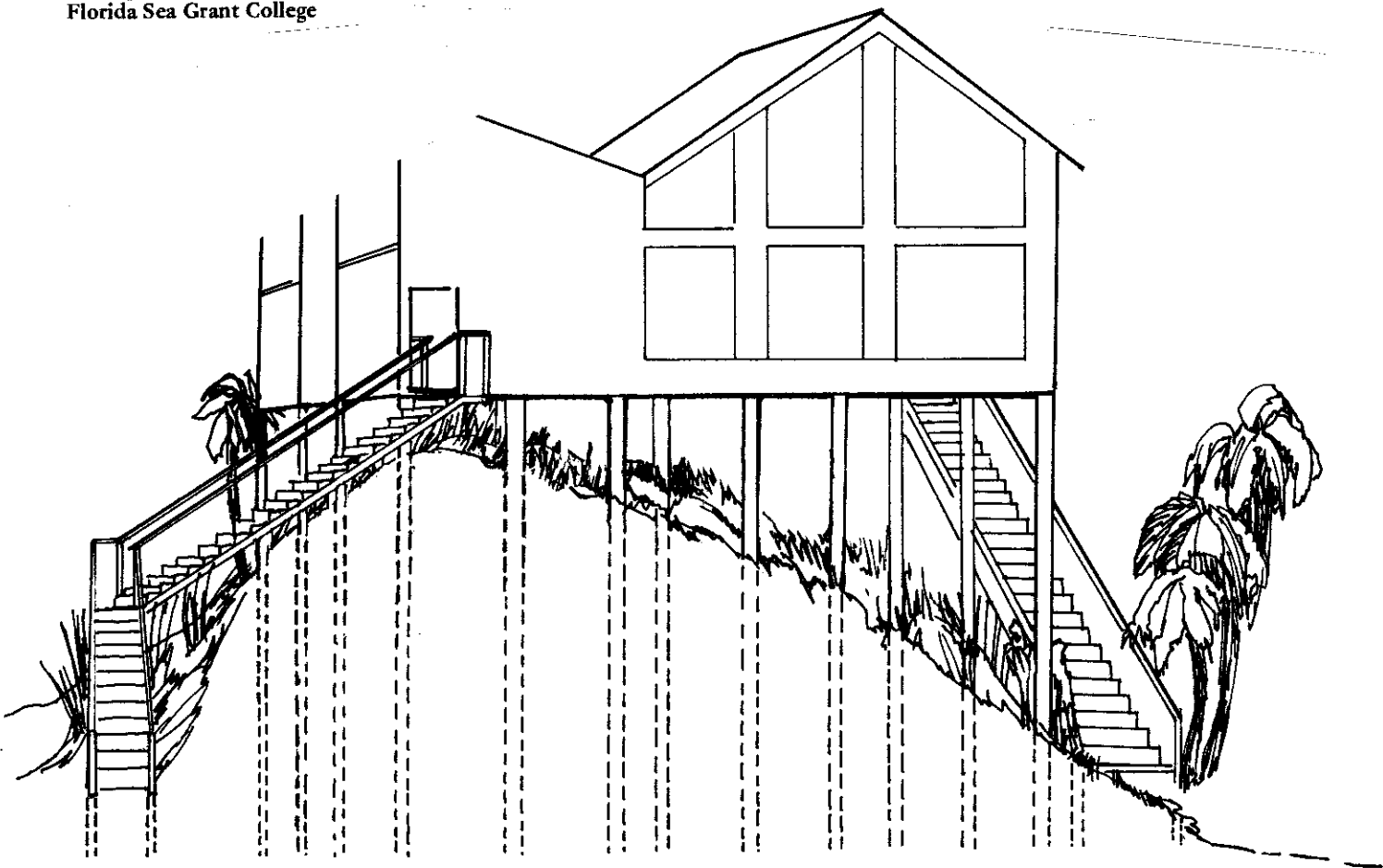


BUILDING CONSTRUCTION ON SHORELINE PROPERTY



Printed and Distributed by:
Florida Cooperative Extension Service
Marine Advisory Program
in cooperation with the
Florida Sea Grant College



Sponsored by:
Florida Dept. of Natural Resources
Bureau of Beaches and Shores

A Checklist by
C. A. Collier

A CHECKLIST FOR OWNERS, DESIGNERS AND BUILDERS OF SHORE AREA BUILDINGS

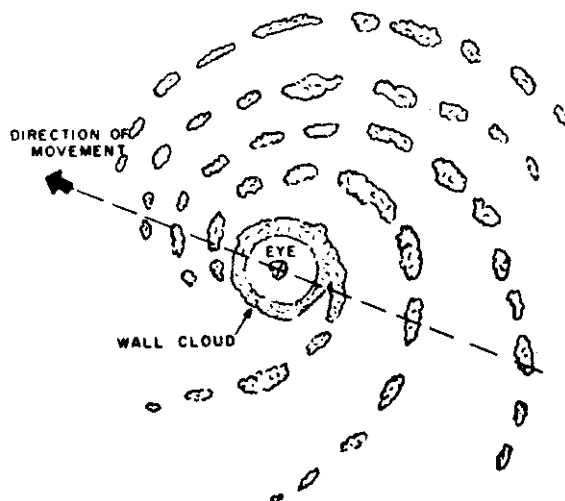
Prospective buyers or current owners of shore property naturally are concerned about the specialized problems involved in shore area construction. This check list summarizes a number of items of importance in evaluating the effects of predictable storm forces and long term erosion. The list includes most major concerns, but is not exhaustive. Before becoming committed to any major expenditures, a competent professional engineer experienced in shore area design and construction should be retained and requested to supply satisfactory answers to the following questions.

A. LOCATION YES NO

- ___ 1. LOCAL ZONING REGULATIONS. Does the building site plan conform to local city or county zoning regulations regarding setback lines and other code provision? (Contact the City or County Engineer for details.)
- ___ 2. STATE COASTAL CONSTRUCTION SETBACK LINE (CCSBL).
 - ___ a. Has a state CCSBL been adopted for this county? (Inquire from the County Engineer.)
 - ___ b. If the CCSBL has been adopted for this county, is the selected building site seaward of the CCSBL?
 - ___ c. If the selected site is seaward of the CCSBL has application for a variance been made to the Department of Natural Resources, Bureau of Beaches and Shores, 202 Blount Street, Tallahassee, FL 32304?
- ___ 3. OFF-BEACH SITE. Is the building site located off of the active beach zone and behind the major vegetated dune line?
- ___ 4. EVACUATION ROUTE. Does the location have a suitable evacuation route to a safe inland refuge in case of severe storm tide and high wave conditions?
(Check the elevation of low points in the road compared to anticipated storm tide levels at the County Engineer's Office.)
- ___ 5. ELEVATED WALKWAYS. If there are dunes located between the building and the beach, have elevated walkways for beach access been provided to prevent damage to the stabilizing vegetation on the dunes?
- ___ 6. CHECK ALL JURISDICTIONS. Does the proposed location conform to all applicable governmental regulations by all jurisdictions, including Local, State and Federal?
(Approval of one agency does not necessarily imply approval by other agencies.)
- ___ 7. SITE VEGETATION. Is finished site provided with adequate natural or planted vegetation to protect against soil erosion from wind and surface water runoff?

B. ELEVATION YES NO

- ___ 1. STORM TIDE ELEVATION. Has the elevation of the 100 year storm tide (or flood plain) been determined and compared with the existing ground elevation at this building site?
(Call City or County Engineer for information on 100 year storm tide elevation. Existing site elevation can be found by a local surveyor.)
- ___ 2. FLOOR ABOVE 100 YEAR TIDE LEVEL. If this location is subject to flooding during the 100 year storm is the lowest habitable floor raised above the top of the highest storm wave cresting on the 100 year storm tide?



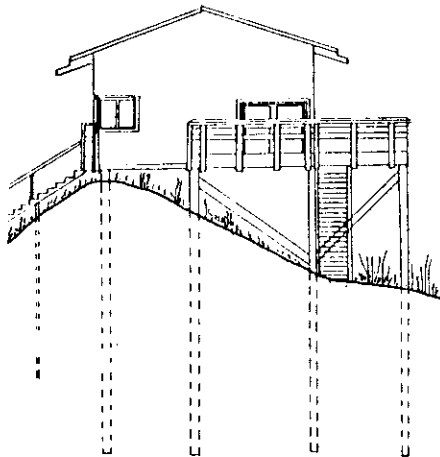
C. DESIGN WIND FORCES YES NO

- ___ 1. 100 YEAR WIND SPEED. Has the wind velocity for a 100 year storm been found for this building site?
(See map in Sec. 1205 Southern Standard Building Code, or call City or County Engineer.)
- ___ 2. FRAME DESIGN. Is the structural frame designed to withstand at least a 100 year storm wind with an adequate safety factor?
- ___ 3. ELEMENT DESIGN. Is each element of the building designed to withstand both pressure and suction forces associated with at least a 100 year storm wind while remaining attached to the building?
- ___ 4. SHAPE FACTOR. Has the effect of shape factors and roof slope been accounted for when calculating wind pressure and suction?
(See South Florida Building Code or Southern Standard Building Code for more details.)

D. PILE FOUNDATIONS

YES NO

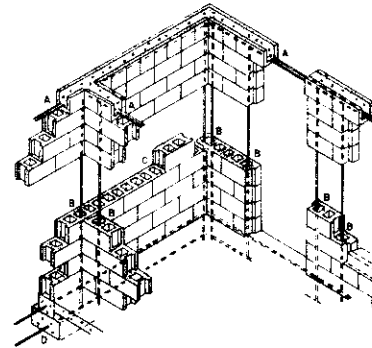
- ___ ___ 1. **CONSIDER PILES.** Are piles the best foundation for raising the structure to the proper elevation and preventing any surface water flow from undermining the structure?
- ___ ___ 2. **POST-SCOUR GROUND ELEVATION.** If subject to wave scour, has the elevation of stable soil after 100 year storm scour been determined for this site by a qualified consultant?
- ___ ___ 3. **POST-SCOUR PILE LOADINGS.** Have the piles or other foundations been designed to sustain the horizontal and vertical loads associated with at least a 100 year storm after the supporting soil has been scoured down to the 100 year storm scour elevation?
- ___ ___ 4. **PILE SPACING.** If subject to water flow beneath the structure during the 100 year storm, are the piles or other foundations spaced wide enough apart to provide relatively free flow under the building?
(Clearance between piles or other foundations suggested as 8 feet or more where piles are subject to scouring action.)
- ___ ___ 5. **WAVE FORCES.** If subject to wave attack during the 100 year storm, have the piles or other foundations been designed to withstand wave forces impacting on them?
- ___ ___ 6. **DEBRIS IMPACT.** Does the design of piles or other foundations allow some reserve to allow for the impacting forces of floating debris?
- ___ ___ 7. **CORROSION AND INSECT RESISTANCE.** Is the selected type pile or other foundation specially designed, constructed or treated to provide maximum service life with minimum maintenance in a corrosive marine environment with anticipated, exposure to moist warm salt air, marine borers, and rot?



E. WOOD FRAME BUILDING

YES NO

- ___ ___ 1. **TIE STUDS AND SILLS TO FOUNDATIONS.** Are studs fastened to sill plates and sill plates fastened through supporting members to the foundations well enough to withstand a 100 year storm?
- ___ ___ 2. **TIE RAFTERS AND PLATES TO STUDS.** Are rafters or trusses fastened to top plates and studs with metal straps or framing connections well enough to withstand a 100 year storm?
- ___ ___ 3. **OUTSIDE WALL SHEATHING.** Are studs sheathed on the outside with plywood or other durable sheathing material?
- ___ ___ 4. **TIE FROM ROOF TO FOUNDATIONS.** Is there a positive sequence of connections fastening all members together from the roof on down through the foundations?
- ___ ___ 5. **SECURE CANTILEVERS.** Are all cantilevered and other projecting members adequately supported and braced to withstand a 100 year storm?



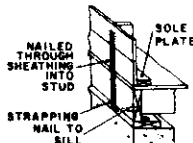
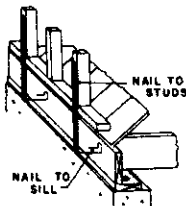
F. CONCRETE BLOCK BUILDING

YES NO

- ___ ___ 1. **MASONRY WALL REINFORCEMENT.** Does the concrete block wall contain vertical reinforcement firmly anchored into the tie beam on top and the footing at the bottom?
- ___ ___ 2. **REINFORCEMENT OF CORNERS AND OPENINGS.** Is the vertical reinforcement in the concrete wall placed at all corners, all openings in the wall, and at periodic intervals throughout the length of each wall?
- ___ ___ 3. **TIE BEAM.** Are the concrete block walls topped with a reinforced concrete tie beam extending continuously around the outside of wall of the building?
- ___ ___ 4. **SECURE ROOF TO TIE BEAMS.** Are all rafters or trusses firmly fastened to the supporting concrete tie beam?
- ___ ___ 5. **TIE FROM ROOF TO FOUNDATIONS.** Is there a positive system of ties extending from the roof on down through the foundations to firm anchorage into the earth that is designed to safely withstand a 100 year storm?

G. ROOF, SIDING, SHUTTERS AND TRIM

- YES NO
- — 1. **REDUCE SHINGLE-TILE EXPOSURE.** If the roof is shingle or tile, have the overlaps been increased and the fastening strengthened to account for 100 year storm pressures and suction?
 - — 2. **SECURE THE CORNERS.** Has particular attention been given to securing roof ridges, edges, eaves, corners, trim, and any other angular or irregular surfaces exposed to the wind?
 - — 3. **INSURE ADHESION.** If built-up roof is used, are special measures specified to eliminate possible areas of inadequate adhesion or fastening between layers which could lead to subsequent uplift and failure?
 - — 4. **NO FLYING GRAVEL.** Has gravel surfacing been eliminated to protect against pitting or cracking of finish and glass on nearby structures?
 - — 5. **SECURE THE ROOF PANELS.** If the roof is of panel construction, has this installation been specially designed to withstand 100 year storm forces at this site?
 - — 6. **SECURE THE SIDING.** Has the siding been fastened securely enough to withstand a 100 year storm?
 - — 7. **REINFORCE THE CORNERS.** Has the fastening between siding and wall been reinforced at the corners of the building to account for the increased suction forces in these areas?
 - — 8. **SHUTTERS.** Have hurricane shutters been provided for all windows and other vulnerable openings?
 - — 9. **FAST, EASY CLOSURE.** Are the shutters designed for quick, simple closure in time of need?
 - — 10. **ACCOUNT FOR CORROSION LOSSES.** Are all the fastenings and hardware used in this building designed to withstand storm loadings after suffering anticipated corrosion losses over the entire service life of the building?
 - — 11. **SECURE ALL PARTS.** Is this building with all its components adequately secured from roof through foundation and firmly anchored into the ground so as to safely withstand both wind and wave forces associated with at least a 100 year storm?



H. UTILITIES

- YES NO
- — 1. **STORM PROOF THE TELEPHONE AND ELECTRIC.** Are telephone and electric lines located underground in waterproof conduit laid in protected areas not subject to erosion?
 - — 2. **PROTECT THE WATER AND SEWAGE.** Are the water supply and sewage facilities located in protected areas not subject to erosion?

I. DESIGN-CONSTRUCT-INSPECT

- YES NO
- — 1. **CONTRACTOR QUALIFICATIONS.** Is the contractor experienced in constructing shore area construction?
 - — 2. **PLANS AND SPECIFICATIONS.** Does the contractor have fully detailed plans and specifications? Do plans and specifications bear the seal and signature of a registered professional engineer? Is the engineer experienced in type of design specified?
 - — 3. **INSPECTION.** Have provisions been made to have the work inspected by a registered professional engineer?

The information in this brochure was prepared by Courtland A. Collier, Assoc. Professor, Department of Civil Engineering, University of Florida, Gainesville, FL 32611.

The State University System of Florida Sea Grant Program is supported by Award of the Office of Sea Grant, National Oceanic and Atmospheric Administration U.S. Department of Commerce, contract number 04-6-158-44055, under provisions of the National Sea Grant College and Programs Act of 1966. This information is published in cooperation with the Florida Cooperative Extension Service, John T. Woeste, dean, in conducting Cooperative Extension work in Agriculture, Home Economics, and Marine Sciences, State of Florida, U.S. Department of Agriculture, U.S. Department of Commerce, and Boards of County Commissioners, cooperating. Printed and distributed in furtherance of the Acts of May 8 and June 14, 1914.

This public document is promulgated at a cost of \$ 135.43 or 4.5 cents per copy to inform owners, designers, and builders of shore area buildings of some construction guidelines and considerations.

Copies available from:

Marine Advisory Program
Florida Cooperative Extension Service
G022 McCarty Hall
University of Florida
Gainesville, FL 32611

Florida Dept. of Natural Resources
Bureau of Beaches and Shores
202 Blount Street
Tallahassee, FL 32304