

Phase III Building Codes Project
DLCD Flood/Building Code Standards Task Force

Recommendations for
Improvements to the Administration of the NFIP
and Flood Related State Building Codes

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Peggy A. Collins
Collins Consulting Services

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Executive Summary

In an ongoing attempt to protect public safety and reduce losses due to local flooding, the Department of Land Conservation and Development (DLCD) sought to gain input from experts regarding how to improve state and local flood hazard mitigation efforts. These efforts are typically carried out through implementation of the National Flood Insurance Program (NFIP), local ordinances and Community Rating Systems and state and local administration of the state building codes.

Input was gained from a work group of state and local flood managers, building officials, a contractor representative and other interested parties. The Task Force noted at the beginning of the process that because there are several agencies and sets of complex regulations involved in carrying out a local flood management program, identifying simple ways to communicate and regulate are important. A contractor facilitated meetings of the Task Force and prepared this report summarizing their recommendations.

The Task Force discussions and recommendations can be categorized into four primary areas:

- Education and training
- Codes and standards
- Technical resources
- DLCD Model Ordinance.

In addition to these key areas of interest, the Task Force reviewed recommendations previously made to DLCD, relating specifically to the Oregon Residential and Structural Specialty Codes for residential and commercial development, and discussed the NFIP Community Rating System program. This report includes recommendations for particular types of training; identifies issues yet to be resolved to eliminate conflicts and better coordinate the NFIP and local ordinances with state building codes; suggests ideas for improved technical resources; and makes recommendations for revisions and clarifications to

the DLCD Model Ordinance. The details of these recommendations begin on page 13 of this report.

The Task Force agreed DLCD and the Federal Emergency Management Agency (FEMA) have excellent resources available to assist municipalities and the public concerning the NFIP. However, they also identified numerous additional ideas that can be implemented to help municipalities, property owners, developers and contractors better understand and comply with the requirements of the NFIP and flood related provisions of the state building codes. Many of the recommendations can be carried out independently by DLCD; however, others require working together with such agencies as the Oregon Building Codes Division (BCD), FEMA, local flood managers and the Oregon Building Officials Association. Although most of the recommendations can be accomplished in Oregon, it is believed some changes can be better implemented at national level because they affect the entire country.

Included are suggestions about “*Where to go from here?*” beginning on page 27. The Task Force recognized there is additional study needed to address some of their recommendations and suggested that the same or a similar group be organized to address them. This is especially true for some of the remaining code related issues that are time sensitive due to BCD code change cycles.

One of the benefits of the Task Force process was to provide a forum for flood managers and building officials to talk with each other about issues they commonly face. The ongoing efforts to implement their recommendations would benefit from broader representation including those listed in this report but who could not participate in this project. Future collaboration with others will ensure success and help achieve Department goals.

Background and Objectives

How this report fits into the scheme of things

The Department of Land Conservation and Development (DLCD) began work on issues related to this report in 2005. Phases I and II of the project included review and comparison of the *Oregon Residential Specialty Code (ORSC)*, the *Oregon Manufactured Dwelling and Park Specialty Code (OMDPSC)* and the *Oregon Structural Specialty Code (OSSC)* to the National Flood Insurance Program (NFIP) standards. These codes are promulgated in OAR 918-460 (OSSC), 918-480 (ORSC) and 918-600 (OMDPSC) by the Oregon Building Codes Division (BCD). The residential code is based on the model International Residential Code and the structural code is based on the International Building Code both published by the International Code Council. The manufactured dwelling code is Oregon specific and includes reference to various nationally recognized standards.

DLCD's stated objectives for all three phases of this project, which are consistent with meeting its requirements as the NFIP State Coordinator, include:

- ✚ *Providing a key component of the technical analysis needed to support DLCD's updating of the Model Ordinance for Flood Damage Prevention*
- ✚ *Improving DLCD's ability to assist local governments with issues related to the relationships of local floodplain ordinances, the NFIP, and state building codes*
- ✚ *Enhancing DLCD's ability to provide technical assistance to building officials, engineers, surveyors and properties owners with respect to addressing the NFIP and state building codes for residential developments in the floodplain*
- ✚ *Providing enhanced technical background to support DLCD's future coordination and consultation with the Oregon Building Codes Division about floodplain development*
- ✚ *Developing background information that can serve as the basis for future outreach to local planners, local building officials, and others about the above described regulatory relationships, to be distributed through the Natural Hazards Newsletter and other methods*

With completion of Phase I – *Comparison of Oregon Residential Building Codes to the National Flood Insurance Program (NFIP) Standards*, and Phase II – *Comparison of the*

Oregon Structural Specialty Code to the NFIP Standards, DLCD and BCD have a wealth of information available regarding the NFIP-building codes interface. This report summarizes the initial stage of Phase III of the project. It has been prepared by implementing the first recommendation of both previous reports which was to seek input from experts by creating a work group of interested and affected parties to review the report recommendations and provide additional recommendations on a variety of flood related issues. The contract objectives included multiple tasks designed to further analyze and build off the work completed in Phases I and II. Tasks included establishing the stakeholder work group, submitting residential code change amendments to BCD, making recommendations for revising the model flood plain ordinance, and providing technical assistance and outreach. Each of these actions furthers DLCD's objectives and helps meet FEMA requirements for administering the NFIP in Oregon.

Process and Task Force membership

In order to develop carefully considered responses to the Phase I and II information and to maximize chances for implementation success, DLCD sought to engage stakeholders through a work group process. Task Force members were chosen to bring diverse technical expertise and on-the-ground experiences to the table that could benefit DLCD. This involvement also was intended to enhance overall coordination and cooperation with respect to the land use and building code aspects of floodplain management.

As the Task Force members were selected by DLCD and the contractor, consideration was given to who is affected by the requirements of the NFIP and state building codes. It was agreed the task force should include members who are responsible for administering the requirements from a land use and building code perspective, those who design buildings using the standards and those who build according to the requirements. The importance of having large and small city and county jurisdictions in various regions of the state represented in order to evaluate the impacts of the regulations on municipalities affected by differing flood hazard conditions, was also recognized.

Attempts were made to include representation from the following organizations:

- local government floodplain program administrators (3)
- local government building officials (3)
- Oregon Building Codes Division (2)
- DLCD (1)
- Oregon Building Officials Association (1)
- Oregon Homebuilders Association (1)
- American Institute of Architects - Oregon Chapter (1)
- Structural Engineers Association of Oregon (1)
- Oregon Mechanical Officials Association (1)
- League of Oregon Cities (1)
- Association of Oregon Counties (1)
- FEMA Region 10 (1)
- OEM (1)

For various reasons some organizations were not able to participate at this time; however, most were kept abreast of the Task Force activities by electronic means and received a copy of the draft report for review and comment. Final Task Force membership can be found in *Appendix A* of this report. Even though some organizations were not officially represented, members of the task force were able to fairly well represent the general interests of various entities because of their wide range of qualifications and work experience. The advice from individual members of this group was very helpful in compiling this report and will help DLCD meet its goals.

The Task Force held five approximately three hour meetings in Salem to discuss and make recommendations. Members received a considerable volume of written information for review and consideration during the process. Included were such things as copies of the Phase I and II reports, the existing DLCD model ordinance, *Reducing Flood Losses Through the International Codes* published by the International Code Council in cooperation with FEMA, the NFIP Elevation Certificate and Instructions handbook, *A Summary of NFIP Policy for Local Officials* by NFIP, and the NFIP booklet *Answers to Questions About the NFIP*.

Task Force Deliberations

Tasks completed

The Task Force accomplished the following tasks:

- **Brainstorming** – Initial brainstorming ideas addressed what works well, what creates problems and where improvements in administration of flood hazard standards can be achieved. This was done at the beginning of the process in order to gain their first impressions of the issues without influence from other documents or recommendations from the Phase I and II reports. An ongoing list of recommendations was kept throughout the process and has been incorporated into the “*Recommendations*” section of this report.
- **Residential Specialty Code Changes** – Due to timing of this project corresponding with the BCD code change process for the *Oregon Residential Specialty Code*, the Task Force provided recommendations for amendments to Chapters 1 and 3 of that code. (See *Appendix B* for copies of the Code Change Committee approved amendments that will be sent to the BCD Administrator and the Residential Structures Board for consideration at public hearing.) Amendments include required NFIP procedures such as permanent record keeping, as well as clarifications to technical requirements for flood proofing structures.
- **Phase I and II report recommendations** – Input was received about whether they agreed or disagreed with the recommendations of these two reports and what appropriately should be done. Task Force opinions are incorporated under the “*Recommendations*” section of this report.
- **Model Ordinance** – Ideas were recommended for clarifying and removing conflicts with other regulations. (See *Appendix C* for Task Force recommendations.)
- **Technical Resources** – Ideas were provided for improving the availability of technical information, training and brochures. (See the “*Recommendations*” section of the report.)

Following completion of the five meetings it was agreed to send out the draft report electronically for Task Force review and comment to ensure it accurately reflects the opinions of the group.

Key Areas of Interest and Ideas

The Task Force emphasized that “keeping it simple” should be the primary focus of any efforts made to improve the program. Much of the available information and the standards themselves are very complicated and difficult to understand and consistently apply. Often times the effectiveness of a local program relies on “who” is administering the program rather than “what” is enforced. Frequent changes in personnel can cause not only a loss of historical data but also often require the new person to start over developing a knowledge base adequate to appropriately apply the regulations.

Common themes to address these concerns kept reoccurring during Task Force deliberations. The group identified the following key interest areas where improvements in administration of the NFIP and flood related building code regulations can be achieved:

- **Education and Training** – (identified as the #1 priority)

Education and training appears to be the most important aspect of the flood hazard mitigation program. All the best efforts to create clear and understandable standards and technical resources will not be successful without adequate training for users including local administrators and officials, flood program managers, building officials and inspectors, designers and contractors. It is difficult to evaluate the effectiveness of adopted standards unless they are appropriately applied. Efforts to increase awareness and acceptance of the requirements by the public, insurance agents and realtors could also be beneficial.

Education and training is cost effective and takes advantage of excellent existing resources available from FEMA, Insurance Services Office (ISO), DLCD, BCD and

the Oregon Building Officials Association (OBOA). Greater compliance, improved safety and lower insurance rates can be achieved through efforts in this area.

- **Codes and Standards**

It is important to have standards and codes that are as simple as possible and easy to administer, otherwise they confuse users and the public and generally will not be appropriately enforced. This may subject property owners to higher flood insurance rates and local jurisdictions to loss of their flood insurance program.

Conflicts between the NFIP standards and state codes should be eliminated while attempting to remain as consistent with national model codes as possible. A “Comprehensive Approach” to flood hazard mitigation is necessary in Oregon due to limitations of statutory authority for the Building Codes Division to adopt codes and Oregon’s land use laws. This means it is necessary to use not only the NFIP standards and model and state building codes, but also to adopt local flood management ordinances to regulate matters required by the NFIP but not included in state regulations and codes. Because of Oregon’s statutes it is not possible to adopt the national model building codes without appropriately amending them to match Oregon law. For this reason, it is important to coordinate DLCD’s model ordinance with not only the NFIP but also the state building code.

Code changes to remove conflicts between the NFIP and state codes are needed. This Phase III project included submitting proposals for the ORSC that have been tentatively approved for public hearing and adoption. (See *Appendix B*) Some of the changes help make the ORSC and OSSC more consistent with each other. This is an important aspect of code adoption in order to avoid confusion when applying code requirements. Additional changes are needed to the OMDPSC and the OSSC during future code change cycles. An update of the OMDPSC is currently underway and a Temporary Rule regulating the installation of manufactured dwellings in floodways was adopted by BCD effective August 21, 2007. (See *Appendix B*) This rule is intended to make the OMDPSC consistent with NFIP standards allowing installation

in floodways with strict conditions. The Task Force indicated they are not aware of any current conflicts or needed changes in the *Oregon Plumbing, Mechanical or Electrical Specialty Codes* which are frequently administered by local jurisdictions; or the elevator, boiler, manufactured dwelling and pre-fabricated structures codes which are enforced by BCD.

- **Technical Resources**

The requirements for flood mitigation are complex and sometimes confusing not only because of the number of entities involved in writing standards, but also because the standards themselves are complicated, varying from flood zone to flood zone.

Providing adequate and useful information to customers is time-consuming and expensive for jurisdictions to create often resulting in reinventing the wheel many times over. Having reliable technical resources available to assist those impacted by the program is critical to effective administration and compliance.

There are excellent publications available from FEMA and DLCD both in printed and electronic format on their respective web pages. FEMA has numerous handbooks and technical bulletins explaining the requirements of the NFIP. Although excellent resource information, the documents are frequently long and address numerous standards. Attached in *Appendix D* is a bibliography of available FEMA publications prepared by DLCD and listed on their web site. The Task Force indicated there are some particular issues that are not clear such as the requirements for basements and under floor below-grade crawl spaces and that more regionally specific information would be useful.

- **DLCD Model Ordinance**

FEMA requires, and the Task Force supports, the idea of having a statewide model for use by local jurisdictions when adopting their local ordinances for flood hazard mitigation. In fact, members suggested that as much as possible should be done to encourage statewide standards and procedures in order to make the program more

consistent throughout various local jurisdictions. This approach to the creation of local programs helps the public and construction industry better understand and apply requirements and allows local officials to move from jurisdiction to jurisdiction more easily. Having a model to use avoids the necessity of “reinventing the wheel” each time a jurisdiction chooses to adopt a local ordinance.

The current model ordinance does not reference the interface between the state building code and the NFIP standards. Doing so would encourage better coordination and cooperation between flood managers and building officials. A copy of the Model Ordinance with recommended revisions can be found in *Appendix C*.

- **Miscellaneous** – In addition to the above topics, Phase I and II report recommendations and the Community Rating System (CRS) were discussed. The Task Force supported most of the Phase I and II report recommendations except as noted under the “*Recommendations - Miscellaneous*” section of this report. It was pointed out that the CRS saves communities money by qualifying them for lower insurance rates but it is complicated to gain approval for the program. Input was also received electronically from a staff member of the Oregon Emergency Management (OEM) office concerning his desire to see local municipalities impose requirements to help eliminate repetitive losses. Such requirements can gain the jurisdiction Community Rating System points as they develop their local flood mitigation program.

Recommendations

Education and Training

The Task Force identified education and training as the most critical factor influencing the effectiveness of a local flood management program and the safety of the public. They noted there are a number of available options for training that could be more effectively used. It is very important to provide opportunities for flood managers and building officials to interact with one another. Training sessions provide a positive environment in which to do so.

Suggestions from the Task Force and writer include:

1. Take advantage of the excellent training available from FEMA and ISO by coordinating through DLCD, BCD and OBOA. Tap university resources as available.
2. Talk with BCD regarding availability of 1% training monies and possible contract or interagency agreement.
3. Provide regionalized detailed technical training for flood and building officials responsible for administering the NFIP program and building code. Incorporate information relating to local flood conditions such as coastal areas, tsunami inundation zones, unmitigated storm drainage issues and riverine floodways.
4. Focus training on local issues especially following a flood event to deal with conditions that may have aggravated the extent of flooding. Examples might include building code requirements not being enforced, grading and fill issues, or downstream obstructions caused by inappropriately located accessory structures.
5. Provide on-line courses as self-study guides to improve skills or use to prepare for the test to become a certified flood manager.
6. Provide short specific-issue training courses for designers, contractors and realtors that can be incorporated into their existing meetings as well as more lengthy presentations that can be offered as seminars. Contact existing organizations such as the Structural Engineers of Oregon, the Oregon Chapter of AIA, the Real Estate Commission and the Oregon Homebuilders Association to coordinate efforts. Work with these organizations to gain continuing education credits for their members.
7. Provide training on how to interface the requirements for flood hazard areas and tsunami inundation zones.

8. Incorporate flood hazard management awareness training for local building officials, public officials and administrators through OBOA and the League of Oregon Cities and Counties annual conferences.
9. Create a public awareness program similar to the state and local fire official's Wildfire Mitigation Program to improve safety and increase sensitivity and appreciation for the requirements of the NFIP and related code requirements.
10. The following individual training topics are recommended:
 - a. Flood proofing methods including wet and dry applications
 - b. Required record keeping for flood managers, building officials and permit technicians
 - c. Reading FIRM maps and completing and submitting flood elevation certificates for surveyors, engineers, flood managers and building officials
 - d. How and where to measure the required floor elevation
 - e. What requirements apply to work that does not need plan review such as utilities, mechanical equipment, electrical, etc.
 - f. Below-grade crawlspace construction and elevations including FEMA Technical Bulletin 11
 - g. Impacts of NFIP regulation violations on insurance rates
 - h. How to deal with regions that do not have established and mapped flood zones
 - i. Make existing FEMA classes available in Oregon
 - j. What steps can be taken to prevent flood damage including development of local Hazard Mitigation Plans
 - k. How to design and detail plan information for designers and contractors (Work with the Architects and Engineer's Boards and contractor organizations to accomplish this)
 - l. Detailed NFIP and code technical training for plan reviewers and flood managers (Case histories and examples helpful for this training which can be offered through the OBOA annual classes or as individual state sponsored classes)
 - m. Regionalized training based on information gathered following a local disaster
 - n. How to deal with development that does not require building permits

- o. What requirements apply to exempt agricultural buildings and equine facilities
- p. How to handle bridges, dikes, rip rap and other structures affecting waterways. Coordinate with Departments of State Lands and Water Resources.
- q. Consider using the Tillamook County film that is currently underway as a case study or basis for seminar
- r. Application of land use “takings” laws to flood hazard areas

Codes and Standards

As mentioned previously, there are a number of regulations (local, state and federal) that apply to flood hazard mitigation. DLCD will need cooperation of various agencies to accomplish these goals. General recommendations that reach across all of these regulations and the key affected agencies include:

1. Adopt rules or a law requiring contractors to notify their subcontractors when development is located in a flood hazard zone. (Construction Contractors Board, BCD)
2. Develop consistent standards for when plan review is required for flood hazard mitigation. (BCD)
3. Clarify the requirements for work that does not require permits such as mechanical, electrical, plumbing, etc. (Is plan review required when located in a flood hazard zone and if so what regulations apply?) (BCD)
4. Insert language in appropriate codes to explain how to measure the base flood level and required floor elevation. (BCD)
5. Identify appropriate model code amendments and submit at national level (resolve variation in definitions of floors). (BCD, OBOA, Home Builders Association)
6. Evaluate flood damage following events and identify appropriate code and ordinance changes to help prevent future damage. (OEM, FEMA, BCD)
7. Identify and implement methods to interface the requirements for flood hazard areas and tsunami inundation zones. (Department of Geology and Mineral Industries (DOGAMI), BCD)

8. Consider developing methods to allow local jurisdictions to impose requirements for regulating “substantial improvements” and repairs due to “substantial damage”, in order to reduce the frequency of reoccurring damage in certain locales and upgrading existing non-complying structures as they are remodeled. Such requirements may be more restrictive than the mini-maxi state building code and therefore need authorization through the codes or BCD rules similar to the method of allowing the establishment of a higher free-board for floor elevations. This is a method that helps municipalities qualify, or enhance existing status, for a local “Community Rating System” as well as NFIP mitigation funding from Increased Cost of Compliance (ICC) if they are substantially damaged by either a single event or cumulative events (if they adopt the cumulative language required by ICC). (OEM, FEMA, BCD)

The following recommendations are made concerning the various state building codes:

- **Residential Code Changes – 2007**

1. Follow the proposed ORSC changes (*Appendix B*) through the remainder of the process and support them at public hearing with written and or oral testimony. Fortunately the time period for this report coincided with the current BCD residential code change process and appropriate amendments were submitted to the Code Change Committee for review and approval. The amendments have been approved for public hearing by the Committee.
2. Additional residential code changes for future consideration by a codes work group include:
 - a. Clarify the requirements for accessory buildings
 - b. Clarify the definition of mixed use structures and the flood proofing requirements that apply (Residential/Commercial)
 - c. Work with FEMA to resolve confusion regarding below grade crawlspace construction and clarify code requirements
 - d. Consider adding a column to ORSC Table R301.2(1) identifying the required design flood elevation for each jurisdiction (indicate which jurisdictions require greater than one foot free board)
3. Share appropriate information with local officials when adopted.

4. Amend existing training programs to reflect final changes.

- **Oregon Manufactured Dwelling and Parks Specialty Code – 2007**

1. Participate in review of the OMDPSC beginning in August 2007.
2. Provide input and proposed changes relating to conflicts with NFIP in existing code.
 - a. Encourage maintenance of the minimum one (1) foot above base flood elevation for finished floors.
 - b. Consider continued prohibition of new manufactured dwellings in floodways except for replacement of existing homes. (See Temporary Rule in *Appendix B* allowing installation with strict conditions intended to be consistent with NFIP.)
 - c. Recommend sections similar to the ORSC and OSSC for maintenance of records and information required on plans.
 - d. Clarify flood related requirements for recreational vehicles and park trailers and their accessory structures.
3. Follow the process through adoption of the amended code.
4. Share appropriate information with local officials when adopted.
5. Amend existing training programs to reflect final changes.

- **Oregon Structural Specialty Code – (Future work group)**

Three issues relating to the OSSC were identified in the Phase I and II reports and again during this stage of Phase III. These concerns were not dealt with during the last OSSC code change cycle because of their complexity and timing of their identification. It was agreed at that time that the various issues should be reviewed during the interim and proposals forwarded to BCD to resolve problems. This did not occur due to delay in Phase III of this project. The Task Force also recommended the following issues be brought back to a similar work group for consideration:

1. *IBC/OSSC Appendix C – Agricultural Buildings* (In Oregon, equine facilities are included in this chapter)
 - a. Review Rescinded BCD Code Interpretation #93-25 (See *Appendix B* of this report) dealing with engineered design of structural elements for agricultural

and equine buildings located in flood hazard zones. Consider creation of a new BCD interpretation, ruling or code change in *OSSC Appendix C* to address when and what type of engineering is appropriate when these buildings are located in flood zones.

- b. Work with BCD to implement recommendations and share appropriate information.
- c. Amend existing training programs to reflect final changes.

2. *IBC Appendix G – Flood Resistant Construction*

- a. Review the model *International Building Code (IBC) Appendix Chapter G* to determine what Oregon amendments are necessary to comply with NFIP, state land use and building code statutes. If appropriate recommend language to be adopted by BCD as part of the OSSC or recommend deferral of appropriate matters covered by model code *IBC Appendix G* to the DLCDD model ordinance for adoption as part of local land use and flood program standards.
- b. Review the link between the ORSC and OSSC and when and if it may be appropriate to use the provisions of *IBC Appendix G* for application to residential structures under the ORSC. Identify an appropriate method for linking the two codes.
- c. Work with BCD to implement recommendations and share appropriate information.
- d. Amend existing training programs to reflect final changes.

3. *IBC Appendix J – Grading*

- a. Evaluate whether there are portions (or all) of *IBC Appendix J* that are appropriate to adopt as part of the state building code to be applied statewide in order to reduce geologic hazards and flooding.
- b. Review *IBC Appendix J* to determine what Oregon amendments are necessary to comply with NFIP, state land use and building code statutes. If appropriate recommend language to be adopted by BCD as part of the OSSC or recommend deferral of flood related matters covered by model code *Appendix J* to the DLCDD model ordinance for adoption as part of local land use and flood program standards.

- c. Incorporate in *Appendix J* or model ordinance, or identify and share with local jurisdictions, an appropriate method for dealing with development, grading and excavation in flood hazard areas that meets the NFIP requirements. NFIP requires that the cumulative effect of development when combined with existing and anticipated development will not increase the water surface elevation of the base flood more than one foot at any point within the community.
 - d. Review the link between the ORSC and OSSC and when, and if, it is appropriate to use the provisions of *IBC Appendix J* for application to residential structures under the ORSC. Identify an appropriate method for linking the two codes.
 - e. If not adopted statewide, consider encouraging local jurisdictions to adopt *IBC Appendix J* or some variation of it to mitigate local hazards.
4. The requirement for finished floors to be at least one foot above the base flood elevation should be added, at least for residential structures built under the OSSC, in order to be consistent with the ORSC. For example, this affects one- and two- family dwellings exceeding three stories in height.
 5. Consider cross referencing Sections 1803.7 and 1807.1.2.1 relating to drainage and crawlspaces.
 6. Consider whether it is feasible, and if so how, to allow local jurisdictions to set a lower value for their definition of “substantial improvement” in order to help communities qualify for the lower insurance rates under the CRS.
 7. Work with BCD to implement recommendations and share appropriate information.
 8. Amend existing training programs to reflect final changes.

- **National Model Codes**

It was agreed that some code amendments are most appropriately handled at the national model code level because they address a nationwide issue. Oregon representatives are active in this national process. The following actions are recommended:

1. Refer this matter to a future work group.

2. Work with others such as FEMA Region 10, BCD, OHBA and the OBOA Code Change Committee to identify and develop appropriate model code amendments for the International Code Council (ICC) code change process. Issues include such things as:
 - a. The definitions of basements and lowest and bottom floors
 - b. The inclusion or removal of land use regulations in the model building codes (*IBC Appendix G*)
 - c. Application of NFIP and flood mitigation standards to mixed use buildings
3. Follow amendments through the process providing technical assistance to those carrying the amendments at national level.
4. Work with BCD to implement the model code changes in Oregon and share appropriate information.
5. Amend existing training programs to reflect final changes.

- **FEMA Standards**

The current federal requirements are difficult to understand, enforce and apply during construction. For example, the FEMA definitions of basements and below grade crawlspaces continue to cause confusion for all involved. Because related provisions are found in federal law, NFIP standards and technical bulletins, it is not possible to resolve the issue solely in Oregon code or local ordinance. For this reason, the Task Force recommends:

1. Work with FEMA Region 10 and BCD to develop a solution that can be recommended at federal and model code level. Particular issues that are not clear include:
 - a. The definitions of basements and lowest or bottom floor
 - b. How to measure the required floor elevation
 - c. The requirements for below grade crawlspace construction
 - d. Which accessory structures are exempt from the NFIP
 - e. How to handle structures such as bridges, dikes and retaining walls that are located in the floodway
2. Pursue appropriate related ICC model code amendments to be consistent with FEMA standards.

3. Work with BCD to implement the changes in Oregon and share appropriate information.
4. Amend existing training programs to reflect final changes.

Technical Resources

There are numerous technical resources, especially those available from FEMA, but they are not well publicized or used as training tools in Oregon. Related general ideas include:

1. Update maps of coastal flood hazard and tsunami inundation zones and provide instruction brochure.
2. Update floodway and flood zone maps where needed.

The following additional recommendations are made related to specific agencies:

- **FEMA**

1. DLCDC maintain an up to date bibliography of available FEMA publications on the DLCDC web site and a link from the BCD, OBOA and other appropriate web sites to DLCDC and FEMA flood information. (See *Appendix D* for existing bibliography)
2. Use available publications as training tools not only with flood managers but also with building officials, inspectors and the construction industry.
3. Work with FEMA to simplify the Elevation Certificate and instructions. Recommend references be made to the “lowest floor” instead of “bottom floor” since the latter is not defined.
4. Work with FEMA to identify the types of accessory structures that are exempt from NFIP regulations.
5. Encourage FEMA not to adopt the 500 year flood as the standard for applying the NFIP program requirements because of the tremendous impact it would have on available buildable land. This would especially impact coastal areas and communities located along rivers and streams.

- **DLCD**

1. Provide an updated model ordinance. See *Appendix C* for recommended changes. Include appropriate revisions of sections relating to Coastal High Hazard Areas based on statutes and state building code.
2. Promote the update of the tsunami inundation zone maps along the coast based on new information and ensure local jurisdictions are evaluating the new information and as necessary using it to apply building code and local ordinance requirements.
3. Work with BCD and others to develop guidelines for appeals of flood hazard mitigation requirements.
4. Develop a model Development Permit Application for use in local jurisdictions. This form could be used solely for development that is not covered by the state building code to ensure plan review of flood related requirements or for all development.
5. Develop Oregon versions of Worksheets A, B and C taken from *Reducing Flood Losses through the International Codes, 2005 edition (Appendix E)*. The Task Force indicated Worksheet B, identifying who does what in local jurisdictions, might be most useful especially for larger municipalities. It is suggested contact information be added to this worksheet. Worksheet A identifying where particular requirements are found, and C suggesting how to evaluate and improve a local program may also be helpful but not as critical.
6. Explore the possibility of providing other types of standardized forms for local use. See related recommendation #2 under OBOA regarding best practices.
7. Prepare simple single issue brochures in electronic format that can be distributed to building and development department customers to answer flood mitigation questions. FEMA publications often are voluminous covering numerous flood related issues and not suitable for distribution. Work with BCD and others to create. This approach improves consistency, reduces cost impacts on local programs allowing them to add their logos and local office information and making it easier for users to find needed information.

- Potential subjects for these brochures include:
- a. Separate handouts for particular flood zones describing the applicable requirements in each
 - b. User specific brochures highlighting applicable requirements (Contractors, designers, homeowners, etc. Brochures should be limited to six pages or less.)
 - c. Wet and dry flood proofing
 - d. Accessory buildings
 - e. Agricultural buildings and equine facilities
 - f. Residential requirements
 - g. Commercial requirements
 - h. Historic buildings
 - i. Bridges and development affecting waterways
 - j. Coastal High Hazard Zone requirements
 - k. Tsunami Inundation Zone requirements
 - l. Below grade crawlspace construction with reference to Technical Bulletin 11 as an acceptable method of construction
 - m. Development exempt from state building code
 - n. Permit application requirements for plans, elevations and exempt work
8. Use computer technology to help administer program
- a. Develop recommended protocols for GIS programs that identify and block issuance of permits until appropriate requirements are fulfilled.
 - b. Ensure the “e-permitting systems” developed through BCD and in use in local jurisdictions address flood hazard areas and issues.
 - c. Work with FEMA and BCD to develop a program that walks the user through application of the NFIP standards (similar to “Turbo Tax”) which includes decision trees and prompts.
 - d. Work with other agencies and organizations to create links among web pages tying flood related information together and making it available to the public and local jurisdictions.
 - e. Develop electronic mapping systems for flood hazard areas that can be overlaid with local GIS maps.

9. Create a typical “job description” and operating manual for flood managers listing responsibilities, resources and describing interface with building departments and other agencies. Include a template for documenting local conditions and requirements in order to pass on historical data.

- **BCD**

1. DLCD and BCD work together to develop a plan review checklist for structures located in flood hazard areas. See sample Plan Review Checklists for flood zones A and V in *Appendix E of Reducing Flood Losses through the International Codes, 2005 edition*. (*Appendix E* of this report) It would be useful to separate the list into those items found in the state building code that are reviewed by building departments, and those that are the responsibility of local flood plain managers.
2. Work with DLCD and others to develop guidelines for appeals of flood hazard mitigation requirements.
3. Ensure the “e-permitting systems” developed through BCD and in use in local jurisdictions address flood hazard areas.
4. Update the BCD landslide brochure as needed and evaluate whether additional information is needed to address mud flows.
5. Provide related training for plan reviewers and flood managers.
6. Incorporate appropriate requirements for effective administration of flood hazard requirements as part of building department expectations and evaluation.

- **OBOA (Oregon Building Officials Association)**

1. Provide links to flood related information on the organization’s web site.
2. Work with DLCD, BCD, local flood plain managers and building officials to develop recommended best practices concerning flood program administration.
3. Offer flood related training to building officials, plans examiners, inspectors and permit technicians.

Model Ordinance

The current model ordinance is fairly effective and consistent with NFIP; however, it does not reflect the need to coordinate requirements for local flood plain management with state building code and the local building official. As a result the Task Force made several recommendations for revisions to the model ordinance.

1. See *Appendix C* for suggested revisions to the existing model ordinance.
2. Explore options with FEMA Region 10 for eliminating the duplication of requirements in the model ordinance that are already included in state building code. Discuss the possibility of inserting information boxes similar to those used in the ORSC and OSSC that are for information only and not intended to be adopted as part of the local ordinance. This would avoid the conflict with Oregon statute adopting the state building codes as mini-maxi statewide regulations.
3. Encourage local municipalities to adopt ordinances that include:
 - a. More restrictive land use regulations to avoid siting of development in flood hazard areas especially flood ways
 - b. Increases in required free board clearance above the base flood elevation
 - c. Stream wide or regionalized standards for free board rather than varying based on political boundaries and preferences in different communities
 - d. Balanced cut and fill requirements in flood hazard areas
 - e. Storm drainage ordinances to help manage storm runoff and resulting flooding at least in those regions prone to flooding
 - f. See Item #8 under “Codes and Standards-General Recommendations”
4. Prepare a list of “best practices” that are recommended for use in local ordinances based on what various communities include in theirs.

Miscellaneous

The Task Force generally supported the recommendations of the Phase I and II reports except as follows:

• Phase I Project – ORSC

1. The Task Force does not recommend changing the Architect and Engineer rules which allow single family dwellings to be designed by non-licensed persons. They would like

to continue allowing non-licensed designers to do this work and only require the structural elements necessary to meet flood standards to be designed by a qualified architect or engineer. The building official currently has authority to require this be done.

- **Phase II Project – OSSC**

1. Appeal processes were reviewed. It is the opinion of the Task Force that it is appropriate to leave the NFIP and local ordinance appeals with the flood manager and only handle the building code requirements through the building official. This means that the existing statute, code and model ordinance regulations remain as is. It was agreed that it is critical for the flood manager and building official to work together to resolve appeals because of the inter-related nature of the regulations. As mentioned under “*Technical Resources*” it would be valuable to local jurisdictions to have model guidelines available on how to handle appeal requests.
2. The Task Force does not see *Section 2308 Conventional Light-frame Construction* as a problem due to the narrow scope of buildings affected by these requirements. An engineer or architect is involved with the design of buildings greater than 4000 square feet in area or more than 20 feet in height. Many smaller buildings do not apply the light-frame construction methods.
3. Task Force members are not aware of any conflicts with the Plumbing, Mechanical, and Electrical Specialty Codes and do not see a need for special evaluation of those codes. Any issue that arises can be addressed during normal code change procedures.

- **Community Rating System**

1. It was recommended that local communities be encouraged to participate in the Community Rating System by providing a list of the best practices for qualifying for the program.

Where to go from here?

From the information available in this report it is easy to say that seeking input from experts in the field of flood hazard mitigation and the construction industry was worthwhile. It is also evident there is much more that can be done that takes time and additional resources. The following actions are recommended to address the suggestions raised by the Task Force and writer of this report.

1. As a state agency, prioritize the recommendations deleting any that do not fit within the agency's goals. Take into consideration the Task Force number one priority is "*making education and training available to the various affected parties*". Identify available resources and timelines for completion of any desired projects. Obtain necessary funding and begin implementation.
2. Identify and refer any of the recommendations that are outside DLCD's goals or scope of authority to other agencies or organizations. Continue to encourage and support completion of these projects as appropriate.
3. Reassemble the Task Force, or one similar, made up of flood mitigation and code experts to further study the various code and standards issues identified in the "*Recommendations*" section. Request a FEMA representative to serve on this Task Force in order to address concerns related to the NFIP standards and FEMA Elevation Certificate.
4. Identify appropriate code changes for the next available OSSC code change process and any additional ORSC changes for the next interim process. It may be necessary to wait until the next regular residential code change process if the proposed changes do not rise to the level of importance criteria for an interim amendment.
5. Involve others in carrying proposed model code and standard amendments to the national level.

Summary

This project has been useful in moving the Department closer to its goals identified on page 5 of this report. Recommendations have been made to update DLCD's Model Ordinance. The relationship of local ordinances, the NFIP and state building codes has been further explored and improvements have been recommended through submittal of proposed Oregon Residential Code changes. Remaining state building code issues have been identified for further action; ideas for education and training for flood managers, building officials, designers, developers and contractors have been proposed; increased understanding of related issues and background has been documented to assist DLCD as it works with BCD and others affected by the regulations; and suggestions have been made for future actions. The efforts and contributions of Task Force members and DLCD staff have been excellent and greatly appreciated. Implementation of some or all of the recommendations from this report will protect Oregonians and their property from floods and related disasters.

Appendix A

Task Force Membership

DLCD Task Force Members April 2007

- **Local government floodplain program administrators (4)**
 - Douglas Morgan, P.E. (Civil/Geotech) Portland Bureau of Development Services, MorganD@ci.portland.or.us, (503) 823-5824
 - Steve Hanschka – Clackamas County
stevehan@co.clackamas.or.us 503-353-4572
 - Richard Townsend – Lincoln City Planning Director
rtown@lincolncity.org 541-996-1227
 - Brandon Reich- Marion County Associate Planner
breich@co.marion.or.us 503-588-5038
- **Local government building officials (3)**
 - John Stelzenmuller – Tualatin Building Official, Plans Examiner, Inspector, jstelzen@ci.tualatin.or.us, (503) 691-3042
 - Derek Zwagerman, P.E. (Mechanical) – Medford Plans Examiner, Inspector, Derek.zwagerman@cityofmedford.org, (541) 774-2352
 - Craig Wakefield – Tillamook County Inspector, Plans Examiner, Certified Flood Manager, cwakefie@co.tillamook.or.us, (503) 842-3407 Ext. 3
- **Oregon Building Code Division (2)**
 - Michael Morter, BCD Regional Coordinator, Michael.H.Morter@state.or.us (503) 373-7510
 - Andrea Simmons, Andrea.F.Simmons@state.or.us, Richard Rogers, Richard.Rogers@state.or.us by email only
- **DLCD (2)**
 - Mark Darienzo, Dept. of Land Conservation and Development, Mark.Darienzo@state.or.us 503-373-0050 x269
 - Christine Shirley, Natural Hazard/Floodplain Coord, DLCD, Christine.Shirley@state.or.us 503-373-0050 x236
- **Oregon Building Officials Association (1)**
 - Martin Brown, Wilsonville Building Official, Plans Examiner, Inspector, brown@ci.wilsonville.or.us, (503) 570-1557
- **Oregon Homebuilders Association (1)**
 - Patrick Bridges, Retired homebuilder and current OHBA Representative, pbridges@comcast.net, 503-702-6106
- **American Institute of Architects - Oregon Chapter (1)**
 - (Open) Contacted Carol Halford, Arch Board Director
- **Professional Engineers of Oregon (1)**

Dave Bassett, P.E. – Ex-OSBEELS Board member, Josephine County Building Official, dbassett@co.josephine.or.us (541) 660-3130

- **Oregon Mechanical Officials Association (1)**
Jim Trussell – Marion County Senior Plans Examiner, Mechanical & Structural Inspector, jtrussell@co.marion.or.us, (503) 566-3989

- **League of Oregon Cities (1)**
Willie Tiffany, wtiffany@orcities.org 503-588-6550

- **Association of Oregon Counties (1)**

- **FEMA Region 10 (1)**
George Currin, NFIP Coordinator, gcurrin1@msn.com

- **OEM (1)**
Dennis Sigrist, Hazard Mitigation Officer, dsigrist@oem.state.or.us,
503-378-2911 x22247

Appendix B

Proposed 2008 Oregon Residential Code Changes, Manufactured Dwelling Temporary Rule And Rescinded BCD Ruling #93-25

(This Appendix includes the Task Force code change recommendations to
ORSC Chapter 1- Administration,
Chapter 3 - Floodplain and Flood Resistive Construction
as well as additional revisions proposed by BCD to Chapter 1,
Manufactured Dwelling installation in floodways
Temporary Rule effective August 21, 2007 and
Rescinded BCD Ruling #93-25 regarding agricultural buildings)

Additional modifications recommended by the DLCD Flood/Building Standards Task Force
to various sections in Chapter 1

(Task Force recommendations appear in green underlined type)

Note: The following recommendations are intended to make Oregon codes consistent with the provisions of federal law found in title 42, National Flood Insurance Act of 1968. In some cases the recommendations affect existing Oregon amendments and in other cases language is duplicated from the Oregon Structural Specialty Code (OSSC) amendments to Chapter 1 to gain not only consistency with federal law but also with the OSSC.

R104.7 Department Records. The building official shall keep official records, as dictated by OAR 166-150-0020 where a county has jurisdiction; OAR 166-200-0025 where a city has jurisdiction; and OAR Chapter 166 Division 300 et al for the cities and counties where the State of Oregon has jurisdiction. Such records shall be retained in the official records for the period indicated in the respective OARs noted above. The building official shall maintain a permanent record of all permits issued in flood hazard areas, including copies of inspection reports and certifications required in Section R109.1.3.

Note: The above language is taken from the current Oregon amendment to OSSC Section 104.7 and includes the FEMA National Flood Insurance Program (NFIP) requirements for permanent records relating to permits in flood hazard areas.

R104.10.1 Areas prone to flooding. (Adopted by the State of Oregon for optional use in municipalities.) The building official shall not grant modifications to any provision related to areas prone to flooding as established by the local jurisdiction [~~Table R304.2(1)~~] without the granting of a variance to such provisions by the board of appeals.

Note: Further amend the section to be consistent with the Oregon amendment reference to “the local jurisdiction” as recently approved by the Code Change Committee for use in R324 and other code sections.

R105.2 Work exempt from permit. Add a note below the list of exempt buildings, Items 1-20 as follows: Unless otherwise exempted, separate plumbing, electrical and mechanical permits may be required for the above exempted items. In addition, all new construction and substantial improvements (including the placement of prefabricated buildings and certain building work exempt from permit under Section 105.2) shall be designed and constructed with methods, practices and materials that minimize flood damage in accordance with this code, FEMA regulations and ASCE 24.

Note: The above language is taken from the current Oregon amendment to OSSC Section 105.2 and includes the requirements of the FEMA NFIP program.

R105.3.1.1 Determination of substantially improved or substantially damaged existing buildings in flood hazard areas. (Not adopted by the State of Oregon. For applications for reconstruction, rehabilitation, addition or other improvement of existing buildings or structures located in an area prone to flood-

ing as established by [the local jurisdiction Table R301.2\(1\)](#), the building official shall examine or cause to be examined the construction documents and shall prepare a finding with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its pre-damage condition. If the building official finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the finding shall be provided to the board of appeals for a determination of substantial improvement or substantial damage. Applications determined by the board of appeals to constitute substantial improvement or substantial damage shall meet the requirements of Section R324.

Note: The Task Force recommends this model code section not be adopted even though it is consistent with the NFIP program regulations. The reason for this recommendation is that the requirement is typically adopted by local ordinance and frequently is administered by the flood manager rather than the local building official. Application of the provisions relating to determining the market value of the work is outside the typical scope of responsibilities of the building official. Similar language relating to remodeling existing buildings was deleted from the state building code several code cycles ago due to the difficulty of administering the requirements. Appeals relating to flood mitigation often are heard by the Planning Commission or their board of appeals rather than the building board of appeals. If this section were adopted, it might also mean that the Structural Program Chief could be involved in these appeals (ORS 455.475) which would further complicate the process. The current Oregon amendment to this particular section could be retained in case the local jurisdiction wants to adopt the section where their building official does administer the NFIP requirements.

R106.1.3 Information for construction in flood hazard areas. For buildings and structures located [in whole or in part](#) in flood hazard areas as established by [the local jurisdiction Table R301.2\(1\)](#), construction documents shall include:

1. Delineation of flood hazard areas, floodway boundaries and flood zones and the design flood elevation, as appropriate;
2. The elevation of the proposed lowest floor, including basement; in areas of shallow flooding (AO zones), the height of the proposed lowest floor, including basement, above the highest adjacent grade; and
3. The elevation of the bottom of the lowest horizontal structural member in coastal high hazard areas (V Zone); and

If design flood elevations are not included on the community's Flood Insurance Rate Map (FIRM), the building official and the applicant shall obtain and reasonably utilize any design flood elevation and floodway data available from other sources.

Note: Retain existing Oregon amendment consistent with other code sections.

R106.2 Site plan. The construction documents submitted with the application for permit shall be accompanied by a site plan showing the size and location of new construction and existing structures on the site and distances from lot lines. [The building official is authorized to waive or modify the requirement for a site plan when the application for permit is for alteration or repair or when](#)

~~otherwise warranted. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot.~~

Note: The above language is taken from the current Oregon amendment to OSSC Section 106.2. The additional language of the OSSC (last sentence) pertaining to waiving the site plan is added to maintain administrative consistency between codes. The requirements pertaining to identification of flood hazard areas are included in R106.1.3 and do not need to be added here. Maintain existing Oregon deletion due to statutory limitations on authority.

R106.5 Retention of construction documents. ~~One set of approved construction documents shall be retained by the building official for a period of not less than that dictated by OAR 166-150-0020 where a county has jurisdiction; OAR 166-200-0025 where a city has jurisdiction; and OAR 166-300 et al for the jurisdictions where the State of Oregon has jurisdiction. One set of approved plans and specifications shall be returned to the applicant, and said set shall be kept on the site of the building or work at all times during which the work authorized thereby is in progress. The building official shall maintain a permanent record of all permits issued in flood hazard areas, including copies of inspection reports and certifications required in Section 109.1.3.~~

Note: The above language is taken from the current Oregon amendment to OSSC Section 106.5 and includes the requirements of NFIP.

R109.1.3 Floodplain inspections. For construction in areas prone to flooding as established by ~~the local jurisdiction Table R301.2(1),~~ upon placement of the lowest floor, including basement, and prior to further vertical construction, the building official shall require submission of documentation, prepared and sealed by a registered design professional, of the elevation of the lowest floor, including basement, required in Section R324.

Note: Retain existing Oregon amendment consistent with other code sections.

R112.2.1 Determination of substantial improvement in areas prone to flooding. ~~Not adopted by the State of Oregon. When the building official provides a finding required in Section R105.3.1.1, the board of appeals shall determine whether the value of the proposed work constitutes a substantial improvement. A substantial improvement means any repair, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the improvement or repair is started. If the building or structure has sustained substantial damage, all repairs are considered substantial improvement regardless of the actual repair work performed. The term does not include:~~

- ~~1. Improvements of a building or structure required to correct existing health, sanitary or safety code violations identified by the building official and which are the minimum necessary to assure safe living conditions; or~~
- ~~2. Any alteration of an historic building or structure, provided that the alteration will not preclude the continued designation as an historic building or structure. For the purpose of this exclusion, an historic building is:~~

- ~~2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places; or~~
- ~~2.2. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or~~
- ~~2.3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.~~

Note: The Task Force recommends maintaining the Oregon deletion of this language for reasons similar to those stated under R106.3.1.1.

R112.2.2 Criteria for issuance of a variance for areas prone to flooding.

Not adopted by the State of Oregon. A variance shall only be issued upon:

- ~~1. A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards in Section R324 inappropriate.~~
- ~~2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot un-developable.~~
- ~~3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, nor create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.~~
- ~~4. A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.~~

~~Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.~~

Note: The Task Force recommends maintaining the Oregon deletion of this language for reasons similar to those stated under R106.3.1.1.

**Matrix of the proposed 2008 Residential Specialty Code & 2007 Structural Specialty Code Chapter 1 (Administration)
integration for the 2008 Residential Code Adoption Committee**

Note: All green text reflects 2007 OSSC proposed text.

CODE LANGUAGE
<p>R102.7 Existing Structures. The legal occupancy of any structure existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically covered in this code, or as is deemed necessary by the building official for the general safety and welfare of the occupants and the public under local ordinance.</p>
<p>R104.1 General. The building official is hereby authorized and directed to enforce all the provisions of this code. The building official shall have the authority to render interpretations of this code and to <u>adopt policies and procedures in order to clarify the application of its provisions</u> enforce supplemental regulations in order to clarify the application of its provisions. Such interpretations, <u>policies</u> and <u>procedures</u> regulations shall be in conformance <u>compliance</u> with the intent and purpose of this code. <u>Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code or statewide interpretations of code.</u></p>
<p>R104.2 Application and permits. The building official shall receive applications, review construction documents and issue permits for the erection, and alteration, <u>and moving</u> of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.</p>
<p>R104.7 Department records. The building official shall keep official records, <u>as dictated by OAR 166-150-0020 where a county has jurisdiction; OAR 166-200-0025 where a city has jurisdiction; and OAR Chapter 166 Division 300 et al for the cities and counties where the State of Oregon has jurisdiction</u> of applications received, permits and certificates issued, fees collected, reports of inspections, and notices and orders issued. Such records shall be retained in the official records for the period <u>indicated in the respective OARs noted above required for the retention of public records.</u> See also R106.5.</p>
<p>R104.10 Modifications. Wherever there are practical difficulties involved in carrying out the provisions of this code, the building official shall have the authority to grant modifications for individual cases, <u>upon application of the owner or owner's representative,</u> provided the building official shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety, requirements or structural <u>requirements</u>. The details of action granting modifications shall be recorded and entered in the jurisdiction's files.</p>
<p>R104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code <u>in quality, strength, effectiveness, fire resistance, durability and safety.</u> Compliance with the specific performance-based provisions of the current editions of the Oregon specialty codes in lieu of specific requirements of this code shall also be permitted as an alternative. See ORS 455.060.</p>

<p>R105.2 Work exempt from permit. Permits shall not be required for the following. Exemptions from the permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. <u>Permits shall not be required for the following:</u></p> <p>5. <u>Platforms, Concrete</u> sidewalks, slabs and driveways not more than 30 inches (762 mm) above adjacent grade, and not over any basement or story below.</p>
<p>R105.3.2 Time limitation of application. An application for a permit for any proposed work shall be deemed to have been abandoned 180 days after the date of filing, unless such application has been pursued in good faith or a permit has been issued; except that the building official is authorized to grant one or more extensions of time for additional periods not exceeding 180 days each. The extension shall be requested in writing and justifiable cause demonstrated.</p>
<p>R105.6 Suspension or revocation. Suspension or revocation of permits shall be according to the provisions of the Oregon Administrative Procedures Act or local authority. The building official is authorized to suspend or revoke a permit issued under the provision of this code wherever the permit is issued in error or on the basis of incorrect, inaccurate or incomplete information, or in violation of any ordinance or regulation or any of the provisions of this code.</p>
<p>R106.1 Submittal documents. Construction documents, statement of special inspections and structural observation programs, and other data shall be submitted in one or more sets with each application for a permit application. <u>The construction documents shall</u> The building official shall require plans, calculations and specifications to be prepared and designed by an architect or engineer licensed by the state to practice as such (see ORS 672.129) a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the building official is authorized to require additional construction documents to be prepared by a registered design professional.</p> <p>Exceptions:</p> <p>2.2. The structure is a <u>A detached</u> single-family dwelling, or an accessory structure to a single family dwelling, or farm agricultural building, non-farm agricultural building, or accessory building to a single-family dwelling, farm agricultural building or non-farm agricultural building.</p> <p>2.3 The <u>A</u> alterations or repairs <u>that</u> do not involve any the structural <u>parts of the</u> building components.</p>
<p>R106.1.1 Information on construction documents. Construction documents shall be <u>dimensioned and</u> drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official.</p>
<p>R106.3.1 Approval of construction documents. When the building official issues a permit, the construction documents shall be approved, in writing or by stamp, <u>as “Reviewed for Code Compliance.”</u> One set of construction documents so reviewed shall be retained by the building official. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection by the building official or <u>a duly authorized representative</u> his or her authorized representative. <u>Construction documents shall be approved in the timelines specified in ORS 455.467.</u></p>

R106.3.4 Design professional in responsible charge.

106.3.4.1 General. When it is required that documents be prepared by a registered design professional, the building official shall be authorized to require the owner to engage and designate on the building permit application a registered design professional who shall act as the registered design professional in responsible charge. If the circumstances require, the owner shall designate a substitute registered design professional in responsible charge who shall perform the duties required of the original registered design professional in responsible charge. The building official shall be notified in writing by the owner if the registered design professional in responsible charge is changed or is unable to continue to perform the duties.

The registered design professional in responsible charge shall be responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building.

R106.5 Retention of construction documents. One set of approved construction documents shall be retained by the building official for a period of not less than that dictated by OAR 166-150-0020 where a county has jurisdiction; OAR 166-200-0025 where a city has jurisdiction; and OAR 166-300 et al for the jurisdictions where the State of Oregon has jurisdiction ~~180 days from date of completion of the permitted work, or as required by state or local laws.~~ One set of approved plans and specifications shall be returned to the applicant, and said set shall be kept on the site of the building or work at all times during which the work authorized thereby is in progress. The building official shall maintain a permanent record of all permits issued in flood hazard areas, including copies of inspection reports and certifications.

R108.2 Schedule of permit fees. On buildings, structures, or alterations requiring a permit, a fee for each permit shall be paid as required, in accordance with the schedule as established by the applicable governing authority under authority of ORS 455.020 and 455.210 ~~Permit and plan review fees shall be as adopted by the authority having jurisdiction, except as otherwise limited by statute.~~

R108.3 Building permit valuation. ~~The applicant for a permit shall provide an estimated permit value at time of application. Building permit valuation shall include total value of the work, for which a permit is being issued, such as including materials and labor, for which the permit is being issued such as electrical, gas, mechanical, plumbing equipment and other permanent systems, including materials and labor. If, in the opinion of the building official, the valuation is underestimated on the application, the permit shall be denied, unless the applicant can show detailed estimates to meet the approval of the building official. Final building permit valuation shall be set by the building official. Building permit valuations for prefabricated construction regulated by Oregon Building Codes Division are established in OAR 918-674-0155.~~

R108.4 Related fees. The payment of the fee for the construction; ~~or alteration; removal or demolition~~ for work done in connection ~~with~~ to or concurrently with the work authorized by a building permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

R108.5 Refunds. The building official ~~is may authorized~~ the refunding of any fee paid thereunder in accordance with the ~~to establish a refund policy in effect in the jurisdiction.~~

<p>R108.6 Work commencing before permit issuance. <u>Any person who commences any work on a building or structure before obtaining the necessary permits shall be subject to an investigation fee equal to the permit fee that shall be in addition to the required permit fees.</u></p> <p>Exception: <u>Work as permitted in Section 105.1</u></p>
<p>R109.1 Types of inspections General. For onsite construction, from time to time the building official, upon notification from the permit holder or his agent, shall make or cause to be made any necessary inspections and shall either approve that portion of the construction as completed or shall notify the permit holder or his or her agent wherein the same fails to comply with this code <u>Construction or work for which a permit is required shall be subject to inspection by the building official and such construction or work shall remain accessible and exposed for inspection purposes until approved. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other laws or ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other laws or ordinances of the jurisdiction shall not be valid. It shall be the duty of the permit applicant to cause the work to remain accessible and exposed for inspection purposes. Neither the building official nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.</u></p>
<p>R109.1.5 Other inspections. In addition to the called inspections specified above, the building official is authorized to may make or require any other inspections of any construction work to ascertain compliance with the provisions of this code and other laws that are enforced by the building official.</p>
<p>R109.1.6 Final inspection. Final inspection shall be made after the permitted work is complete and prior to occupancy <u>all work required by the building permit is completed.</u></p>
<p>R109.3 Inspection requests. It shall be the duty of the permit holder of the building permit or their duly authorized agent to notify the building official that when such work is ready for inspection. It shall be the duty of the person requesting any inspections required by this code permit holder to provide access to and means for inspections of such work that are required by this code.</p>
<p>R110.1 Use and occupancy. No building or structure shall be used or occupied, and no change in the existing character, use or occupancy classification of a building or structure or portion thereof shall be made until the building official has issued a certificate of occupancy for such change in character, use or occupancy, therefore as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Certificates presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdictions shall not be valid.</p>
<p>R110.5 Revocation. The building official is authorized to shall, in writing, suspend or revoke a certificate of occupancy or completion issued under the provisions of this code wherever the certificate is issued in error, or on the basis of incorrect information supplied, or where it is determined that the building or structure or portion thereof is in violation of any ordinance or regulation or any of the provisions of this code.</p>
<p>R112.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the building official relative to the application and interpretation of this code; the local jurisdiction shall establish an appeals procedure. This procedure shall be described in local operating plans as required by OAR 918-020-0090(1)(c).</p>
<p>R112.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply, or an equally good or better form of construction is proposed. An appeals board, when appointed, The board shall have no authority to waive requirements of this code.</p>

<p>R112.3 Qualifications. An appeals board of appeals, when appointed, shall consist of members who are qualified by experience and training to pass on matters pertaining to building construction and are not employees of the jurisdiction.</p>
<p>R113.1 Unlawful actsProhibited acts are as described in ORS 455.450. It shall be unlawful for any person, firm or corporation to erect, construct, alter, extend, repair, move, remove, demolish or occupy any building, structure or equipment regulated by this code, or cause same to be done, in conflict with or in violation of any provisions of his code.</p>
<p>R113.2 Notice of Vviolations. See ORS 455.450. <u>The building official is authorized to serve a notice of violation or order on the person responsible for the construction, reconstruction, alteration and repair of a building or structure in violation of the provisions of this code, or in violation of a permit or certificate issued under the provisions of this code. Such order shall direct the discontinuance of the illegal action on condition and the abatement of the violation.</u></p>
<p>R113.3 Prosecution of violation. Not adopted by the State of Oregon. <u>If the notice of violation is not complied with promptly, the building official is authorized to request the legal counsel of the jurisdiction to institute appropriate actions.</u></p>
<p>R113.4 Violation penalties. See ORS 455.895. <u>Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs a building or structure in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provision of this code, shall be subject to penalties as prescribed by law.</u></p>

DLCD Flood/Building Code Standards Task Force

May 15, 2007

Purple represents model code changes, either deletions or additions. Red indicates an existing or current addition by Oregon. Blue is a current or existing deletion by Oregon. Green is proposed further revisions by the DLCD Flood/Building Code Task Force. There were no new proposals submitted to this section.

(Current 2005 language showing
Oregon amendments)

SECTION R301

R301.2.4 Floodplain construction. Buildings and structures constructed in flood hazard areas (including A or V Zones) as established ~~by the local jurisdiction in Table R301.2(1)~~ shall be designed and constructed in accordance with Section R324.

Exception: ~~All buildings and structures in identified in~~ floodways that are designated on the Flood Insurance Rate Maps (FIRM) or the Flood Boundary and Floodway Maps (FBFM) that are provided by the National Flood Insurance Program as established in Table R301.2(1) shall ~~not be designed and constructed approved under this section; the provisions of the~~ as stipulated in the International Building Code shall apply.

(PROPOSED REVISION LANGUAGE)

R301.2.4 Floodplain construction. Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones) as established ~~by the local jurisdiction in Table R301.2(1)~~ shall be designed and constructed in accordance with Section R324. The jurisdiction shall adopt a flood hazard map and supporting data. The flood hazard map shall include, at a minimum, areas of special flood hazard as identified by the Federal Emergency Management Agency in an engineering report entitled "The Flood Insurance Study for [INSERT NAME OF JURISDICTION]," dated [INSERT DATE OF ISSUANCE], as amended or revised with the accompanying Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM) and related supporting data along with any revisions thereto. The adopted flood hazard map and supporting data are hereby adopted by reference and declared to be part of this section.

(Note: Recommendation includes adopting the model code revision, keeping existing Oregon amendment in first sentence and adding language copied from the 2007 OSSC, Section 1612.3 Establishment of flood hazard areas.)

Exception: ~~All buildings and structures in identified in~~ floodways ~~that are designated on the Flood Insurance Rate Maps (FIRM) or the Flood Boundary and Floodway Maps (FBFM) that are provided by the National Flood Insurance Program as established~~ by the local jurisdiction in Table R301.2(1) shall ~~not be designed and constructed approved under this section; the provisions of the~~ International Building Code shall apply.

(Note: This proposal includes maintaining the Oregon amendment referencing flood hazard areas established "...by the local jurisdiction...", eliminating portions of the existing Oregon amendment, reverting to model code language and moving the reference to the maps to R301.2.4.

SECTION R324 FLOOD-RESISTANT CONSTRUCTION

R324.1 General. Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones) as identified by the local jurisdiction established in Table R301.2(1) shall be designed and constructed in accordance with the provisions contained in this section. ~~For the purposes of Section R324, the required elevation of construction elements shall be a minimum of 1 foot (305 mm) above the design flood elevation unless increased by the local municipality under the authority of National Flood Insurance Program (NFIP) incorporated in 423 U.S.C. 4001-4128.~~

(Note: Relocated this requirement to R324.2.1, R324. R324.3.2 and R324.5.)

Exception: ~~All~~ Buildings and structures located in whole or in part in identified floodways as established by the local jurisdiction in Table R301.2(1) shall be designed and constructed as

stipulated in the *International Building Code* or equivalent design methods based on nationally recognized standards.

R324.1.1 Structural systems. All ~~The~~ structural systems of all buildings and structures shall be designed, connected and anchored to resist flotation, collapse or permanent lateral movement ~~resulting from hydrodynamic and hydrostatic due to structural~~ loads and stresses, including the effects of buoyancy. ~~from flooding equal to the design flood elevation.~~

R324.1.2 Flood-resistant construction. All buildings and structures erected in areas prone to flooding shall be constructed by methods and practices that minimize flood damage.

R324.1.3 Establishing the design flood elevation. The design flood elevation shall be used to define areas prone to flooding, and shall describe, at a minimum, the base flood elevation at the depth of peak elevation of flooding (including wave height) which has a 1 percent (100-year flood) or greater chance of being equaled or exceeded in any given year.

R324.1.3.1 Determination of design flood elevations. If design flood elevations are not specified, the building official is authorized to require the applicant to:

1. Obtain and reasonably use data available from a federal, state or other source; or
2. Determine the design flood elevation in accordance with accepted hydrologic and hydraulic engineering practices used to define special flood hazard areas. Determinations shall be undertaken by a registered design professional who shall document that the technical methods used reflect currently accepted engineering practice. Studies, analyses and computations shall be submitted in sufficient detail to allow thorough review and approval.

R324.1.3.2 Determination of impacts. In riverine flood hazard areas where design flood elevations are specified but floodways have not been designated, the applicant shall demonstrate that the effect of the proposed buildings and structures on design flood elevations, including fill, when combined with all other existing and anticipated flood hazard area encroachments, will not increase the design flood elevation more than 1 foot (305 mm) at any point within the jurisdiction.

R324.1.4 Lowest floor. The lowest floor shall be the floor of the lowest enclosed area, including basement, but excluding any unfinished flood-resistant enclosure that is useable solely for vehicle parking, building access or limited storage provided that such enclosure is not built so as to render the building or structure in violation of this section.

R324.1.5 Protection of mechanical and electrical systems. Electrical systems, equipment and components, and heating, ventilating, air conditioning and plumbing appliances, plumbing fixtures, duct systems, and other service equipment shall be located ~~at or~~ above the design flood elevation. If replaced as part of a substantial improvement, electrical systems, equipment and components, and heating, ventilating, air conditioning, and plumbing appliances, plumbing fixtures, duct systems, and other service equipment shall meet the requirements of this section. Systems, fixtures, and equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

Exception: Electrical systems, equipment and components, and heating, ventilating, air conditioning and plumbing appliances, plumbing fixtures, duct systems, and other service equipment are permitted to be located below the design flood elevation provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in compliance with the flood-resistant construction requirements of the *International Building Code*. Electrical wiring systems are permitted to be located below the design flood elevation provided they conform to the provisions of the electrical part of this code for wet locations.

R324.1.6 Protection of water supply and sanitary sewage systems. New and replacement water supply systems shall ~~be designed to~~ minimize or eliminate infiltration of flood waters into the systems in accordance with the plumbing provisions of this code. New and replacement sanitary sewage systems shall ~~be designed to~~ minimize or eliminate infiltration of floodwaters into systems and discharges from systems into floodwaters in accordance with the plumbing provisions of this code, ~~and Chapter 3 of the International Private Sewage Disposal Code.~~

R324.1.7 Flood-resistant materials. Building materials used below the design flood elevation shall comply with the following:

1. All wood, including floor sheathing, shall be pressure-preservative-treated in accordance with AWPA U1 for the species, product, preservative and end use or be the decay-resistant heartwood of redwood, black locust or cedars. Preservatives shall be listed in Section 4 of AWPA U1.

2. Materials and installation methods used for flooring and interior and exterior walls and wall coverings shall conform to the provisions of FEMA/FIA-TB

R324.1.8 Manufactured housing. New or replacement manufactured housing shall be elevated in accordance with Section ~~3-2.4 R324.2 and the anchor and tie down requirements~~ of ~~Sections AE604 and AE605 of Appendix E shall apply.~~ the Oregon Manufactured Dwelling and Park Specialty Code. The foundation and anchorage of manufactured housing to be located in identified flood ways, as established ~~in Table R301.2(1) by the local jurisdiction,~~ shall be designed and constructed in accordance with the applicable provisions in Section 3-2.4.2 of the Oregon Manufactured Dwelling and Park Specialty Code. ~~International Building Code.~~

R324.1.9 As-built elevation documentation. A registered design professional shall prepare and seal documentation of the elevations specified in Section R324.2 or R324.3.

R324.2 Flood hazard areas (including A Zones). Areas that have been determined to be prone to flooding but not subject to high velocity wave action shall be designated as flood hazard areas. All buildings and structures constructed in whole or in part in flood hazard areas shall be designed and constructed in accordance with Sections R324.2.1 and R324.2.3.

R324.2.1 Elevation requirements. For the purposes of Section R324, required elevations shall be a minimum of 1 foot (305 mm) above the design flood elevation unless increased by the local jurisdiction under the authority of National Flood Insurance Program (NFIP) incorporated in 423 U.S.C. 40001-4128.

1. Buildings and structures shall have the lowest floors elevated ~~to or~~ at least 1 foot above the design flood elevation.
2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated at least as high above the highest adjacent grade as 1 foot above the depth number specified in feet (mm) on the FIRM, or at least 3 2 feet (610 mm) if a depth number is not specified.
3. Basement floors that are below grade on all sides shall be elevated ~~to or~~ at least 1 foot above the design flood elevation.

Exception: Enclosed areas below the design flood elevation, including basements whose floors are not below grade on all sides, shall meet the requirements of Section R324.2.2.

4. The finished ground level of an under-floor space such as a crawl space shall be equal to or higher than the outside finished ground level.

Exception: Under-floor spaces that meet the requirements of FEMA/FIA-TB-11.

(Note: This is language similar to OSSC Section 1807.1.2.1 addressing crawl spaces.)

R324.2.2 Enclosed area below design flood elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria:
 - 2.1. There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.
 - 2.2. The total net area of all openings shall be at least 1 square inch (645 mm²) for each square foot (0.093 m²) of enclosed area, or the openings shall be designed and the construction documents shall include a statement that the design and installation will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters.
 - 2.3. The bottom of each opening shall be 1 foot (305 mm) or less above the adjacent ground level.
 - 2.4. Openings shall be at least 3 inches (76 mm) in diameter.
 - 2.5. Any louvers, screens or other opening covers shall allow the automatic flow of floodwaters into and out of the enclosed area.
 - 2.6. Openings installed in doors and windows, that meet requirements 2.1 through 2.5, are acceptable; however, doors and windows without installed openings do not meet the requirements of this section.

R324.2.3 Foundation design and construction. Foundation walls for all buildings and structures erected in flood hazard areas shall meet the requirements of Chapter 4.

Exception: Unless designed in accordance with Section R404:

1. The unsupported height of 6-inch (152 mm) plain masonry walls shall be no more than 3 feet (914 mm).
2. The unsupported height of 8-inch (203 mm) plain masonry walls shall be no more than 4 feet (1219 mm).
3. The unsupported height of 8-inch (203 mm) reinforced masonry walls shall be no more than 8 feet (2438 mm).

For the purpose of this exception, unsupported height is the distance from the finished grade of the under-floor space and the top of the wall.

R324.3 Coastal high-hazard areas (including V Zones). Areas that have been determined to be subject to wave heights in excess of 3 feet (914 mm) or subject to high-velocity wave action or wave-induced erosion shall be designated as coastal high-hazard areas. Buildings and structures constructed in whole or in part in coastal high-hazard areas shall be designated and constructed in accordance with Sections R324.3.1 through R324.3.6.

R324.3.1 Location and site preparation.

Buildings and structures shall be located landward of the reach of mean high tide.

For any alteration of sand dunes and mangrove stands the building official shall require submission of an engineering analysis which demonstrates that the proposed alteration will not increase the potential for flood damage.

R324.3.2 Elevation requirements.

All buildings and structures erected within coastal high hazard areas shall be elevated so that the lowest portion of all structural members supporting the lowest floor, with the exception of mat or raft foundations, piling, pile caps, columns, grade beams and bracing, is located ~~at or~~ at least 1 foot above the design flood elevation.

Basement floors that are below grade on all sides are prohibited.

The use of fill for structural support is prohibited.

The placement of fill beneath buildings and structures is prohibited.

Exception: Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R324.3.4 and R324.3.5.

R324.3.3 Foundations. Buildings and structures erected in coastal high-hazard areas shall be supported on pilings or columns and shall be adequately anchored to those pilings or columns. 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 R324.3.6. 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 mat, raft or other foundation is subject to scour or erosion from wave-velocity flow conditions. Slabs, pools, pool decks and walkways shall be located and constructed to be structurally independent of buildings and structures and their foundations to prevent transfer of flood loads to the buildings and structures during conditions of flooding, scour or erosion from wave-velocity flow conditions, unless the buildings and structures and their foundation are designed to resist the additional flood load.

R324.3.4 Walls below design flood elevation. Walls and partitions are permitted below the elevated floor, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical, and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a design safe loading resistance of not less than 10 (479 Pa) and no more than 20 pounds per square foot (958 Pa); or
4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa), the construction documents shall include documentation prepared and sealed by a registered design professional that:
 - 4.1. The walls and partitions below the design flood elevation have been designed to collapse from a water load less than that which would occur during the design flood.

4.2. The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on all building components (structural and nonstructural). Water loading values used shall be those associated with the design flood. Wind loading values shall be those required by this code.

R324.3.5 Enclosed areas below design flood elevation. Enclosed areas ~~below~~ less than 1 foot (305 mm) ~~above~~ the design flood elevation shall be used solely for parking of vehicles, building access or storage.

R324.3.6 Construction documents. The construction documents shall include documentation that is prepared and sealed by a registered design professional that the design and methods of construction to be used meet the applicable criteria of this section.

(**Note:** This revision is a deletion of an Oregon amendment that deletes model code. The Task Force recommends reinserting the model code language to be consistent with NFIP for coastal high hazard areas which requires engineered design of structural elements.)

TABLE R301.2(1)
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA
(Footnotes number appropriately)

l. See Section R301.2.4 and R324 for establishment of flood hazard design criteria.

m. See Section R325 for establishment of wildfire hazard design criteria.

ALL OTHER CODE REFERENCES TO TABLE R301.2(1) DEALING WITH FLOOD HAZARD AREAS

Keep existing Oregon amendments “.....established by the local jurisdiction.....” ~~Table R301.2(1).~~

**Manufactured Dwelling installation in floodways
Temporary Rule effective August 21, 2007**

CAN BE FOUND ON THE FOLLOWING WEB SITE

http://www.cbs.state.or.us/external/bcd/notices/temp_rules/20070821_amend_918-500-021_tr.pdf

RESCINDED

Oregon

Interpretive Ruling No. 93-25 ENGINEERING REQUIREMENTS FOR AGRICULTURAL BUILDINGS LOCATED IN FLOOD PLAINS

Requested By: PPPI MANUAL REVIEW COMMITTEE

QUESTION

Some building officials require engineered plans for an entire farm agricultural building located in a floodplain. Is it excessive regulation to require engineering for any aspect of an agricultural building other than flood worthiness or flood proofing?

APPLICABLE CODE SECTIONS

1993 Oregon Structural Specialty Code (OSSC), Appendix Chapter 11 and 23.

BACKGROUND

The Oregon legislature exempted agricultural buildings save for:

1. Incorporated cities may regulate them.
2. Buildings required to be flood-proofed by the National Flood Insurance Program or municipal ordinance are not exempt.

The Structural Code Advisory Board's policy is, when the building official deems engineered plans are needed for agricultural buildings in a flood plain, only those portions of the building pertaining to the flood worthiness or flood-proofing shall be required to be engineered and not the whole structure. Preferences: Lindahl letter of 12/2/80 and SCAB minutes of 1/27/80.

Originally Approved by: Jane Huston, Director of Commerce.

FINDINGS

The PPPI Manual Review Committee and the Structural Code Advisory Board find this interpretation still valid and recommend it be retained.

This interpretation is authorized by ORS 455.060, Rulings on Acceptability of Materials, Designs or Methods of Construction and Attorney General's Opinion OP-5208 issued October 1, 1981, advising the statute permits authoritative interpretations of existing code requirements.

DISCUSSION AND CONCLUSION

When the building official deems engineered plans are needed for agricultural buildings in a flood plain, only those portions of the building pertaining to the flood worthiness or flood proofing shall be required to be engineered and not the whole structure. Interpretive Ruling 93-25 replaces PPPI 2017.

(signed July 21, 1993)

John Talbott, Chairman
Structural Code Advisory Board

The recommendations and findings of the Structural Code Advisory Board are accepted and the conclusions are adopted.

(signed July 30, 1993)

Michelle J. Patterson for
Gary J. Wicks, Administrator
Building Codes Agency

Appendix C

Proposed DLCD Model Ordinance Changes

OREGON MODEL FLOOD DAMAGE PREVENTION ORDINANCE

Adoption of this ordinance will comply with the standards for participation in the National Flood Insurance Program. The model includes standards and provisions that encourage sound flood plain management and if implemented allows property owners to obtain flood insurance at a more affordable rate.

FEMA recommends that non-residential construction have the lowest floor elevated one foot above the base flood elevation; or that the area below one foot above the base flood elevation be floodproofed.

The minimum requirement for participation in the NFIP non-residential construction requires that the lowest floor be elevated to or above the base flood elevation or that the area below the base flood elevation be floodproofed.

Even though the minimum standards only require elevation to the base flood elevation, it is recommended that communities adopt the higher standard because elevating one foot above the base flood elevation will allow your industries and businesses to receive a substantial reduction in the cost of their flood insurance. Also, as increased development happens, flood elevations can increase, and the one foot above standard allows for an additional margin of safety.

Because of the substantial number of manufactured homes that have experienced foundation failure, this model recommends that dry stacked blocks not be used to support manufactured homes in areas of high velocity and/or high water depths.

The model ordinance also includes sections for development in Shallow Flooding Areas (AO Zones), Section 5.5 and Coastal High Hazard Areas (V1-V30, VE and/or V), Section 5.6. If your community does not have either of

these zones designated on your Flood Insurance Rate Map, it is not necessary to adopt these sections of the model ordinance.

If you have any questions concerning adoption of this model or participation in the NFIP, please contact our Regional Office at (425) 487-4677.

Items in *underlined italics* (on electronic copies) or *underlined italics* (on paper copies) of the ordinance need to be filled in by the community.

**OREGON MODEL
FLOOD DAMAGE PREVENTION ORDINANCE**

**SECTION 1.0
AUTHORIZATION, FINDINGS OF FACT, PURPOSE, AND OBJECTIVES**

1.1 AUTHORIZATION

The State of Oregon has in _____¹ delegated the responsibility to local governmental units to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, the city/town/county, does ordain as follows: {*change for tribal government*}

1.2 FINDINGS OF FACT

- (1) The flood hazard areas of city/town/county/tribe are subject to periodic inundation which results in loss of life and property, health, and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.
- (2) These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities, and when inadequately anchored, damage uses in other areas. Uses that are inadequately floodproofed, elevated, or otherwise protected from flood damage also contribute to the flood loss.

1.3 STATEMENT OF PURPOSE

It is the purpose of this ordinance to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- (1) To protect human life and health;
- (2) To minimize expenditure of public money and costly flood control projects;
- (3) To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- (4) To minimize prolonged business interruptions;

¹ Almost all Oregon cities and some Oregon counties will derive their authority to adopt a flood damage prevention ordinance from the home rule provisions of the Oregon Constitution. See Article XI, Section 2 of the Oregon Constitution and your local government charter, if applicable. All counties, including those without home rule charters, have been granted authority to enact ordinances under Oregon Revised Statute 203.035.

- (5) To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, and bridges located in areas of special flood hazard;
- (6) To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas;
- (7) To ensure that potential buyers are notified that property is in an area of special flood hazard; and,
- (8) To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

1.4 METHODS OF REDUCING FLOOD LOSSES

In order to accomplish its purposes, this ordinance includes methods and provisions for:

- (1) Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
- (2) Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- (3) Controlling the alteration of natural flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
- (4) Controlling filling, grading, dredging, and other development which may increase flood damage; and
- (5) Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or may increase flood hazards in other areas.

SECTION 2.0 DEFINITIONS

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

“APPEAL” means a request for a review of the interpretation of any provision of this ordinance or a request for a variance.

“AREA OF SHALLOW FLOODING” means a designated AO, or AH Zone on the Flood Insurance Rate Map (FIRM). The base flood depths range from one to three feet; a clearly defined channel does not exist; the path of flooding is unpredictable and indeterminate; and, velocity flow may be evident. AO is characterized as sheet flow and AH indicates ponding.

“AREA OF SPECIAL FLOOD HAZARD” means the land in the flood plain within a community subject to a one percent or greater chance of flooding in any given year. Designation on maps always includes the letters A or V.

“BASE FLOOD” means the flood having a one percent chance of being equaled or exceeded in any given year. Also referred to as the “100-year flood.” Designation on maps always includes the letters A or V.

“BASEMENT” means any area of the building having its floor subgrade (below ground level) on all sides. Include reference to crawl spaces below grade

“BREAKAWAY WALL” means a wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation system.

“COASTAL HIGH HAZARD AREA” means an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. The area is designated on the FIRM as Zone V1-V30, VE or V.

Add CRAWL SPACE (Below grade) (See Marion County example)

“CRITICAL FACILITY” means a facility for which even a slight chance of flooding might be too great. Critical facilities include, but are not limited to schools, nursing homes, hospitals police, fire and emergency response installations, installations which produce, use or store hazardous materials or hazardous waste.

“DEVELOPMENT” means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials located within the area of special flood hazard.

“ELEVATED BUILDING” means for insurance purposes, a nonbasement building which has its lowest elevated floor raised above ground level by foundation walls, shear walls, post, piers, pilings, or columns.

“EXISTING MANUFACTURED HOME PARK OR SUBDIVISION” means a manufactured home park subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the adopted floodplain management regulations.

“EXPANSION TO AN EXISTING MANUFACTURED HOME PARK OR SUBDIVISION” means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed

(including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

“FLOOD” OR “FLOODING” means a general and temporary condition of partial or complete inundation of normally dry land areas from:

- (1) The overflow of inland or tidal waters and/or
- (2) The unusual and rapid accumulation of runoff of surface waters from any source.

“FLOOD INSURANCE RATE MAP (FIRM)” means the official map on which the Federal Insurance Administration has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

“FLOOD INSURANCE STUDY” means the official report provided by the Federal Insurance Administration that includes flood profiles, the Flood Boundary-Floodway Map, and the water surface elevation of the base flood.

“FLOODWAY” means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

“LOWEST FLOOR” means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage, in an area other than a basement area, is not considered a building’s lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance found at Section 5.2-1(2).

“MANUFACTURED HOME” means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term “manufactured home” does not include a “recreational vehicle.”

“MANUFACTURED HOME PARK OR SUBDIVISION” means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

“NEW CONSTRUCTION” means structures for which the “start of construction” commenced on or after the effective date of this ordinance.

“NEW MANUFACTURED HOME PARK OR SUBDIVISION” means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the

pouring of concrete pads) is completed on or after the effective date of adopted floodplain management regulations.

“RECREATIONAL VEHICLE” means a vehicle which is:

- (a) Built on a single chassis;
- (b) 400 square feet or less when measured at the largest horizontal projection;
- (c) Designed to be self-propelled or permanently towable by a light duty truck; and
- (d) Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

“START OF CONSTRUCTION” includes substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, placement or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

Add STATE BUILDING CODE

“STRUCTURE” means a walled and roofed building including a gas or liquid storage tank that is principally above ground.

“SUBSTANTIAL DAMAGE” means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

“SUBSTANTIAL IMPROVEMENT” means any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either:

- (1) Before the improvement or repair is started; or
- (2) If the structure has been damaged and is being restored, before the damage occurred. For the purposes of this definition, “substantial improvement” is considered to occur when the first alteration of any wall,

ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure.

The term does not, however, include either:

- (1) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or
- (2) Any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.

“VARIANCE” means a grant of relief from the requirements of this ordinance which permits construction in a manner that would otherwise be prohibited by this ordinance.

“WATER DEPENDENT” means a structure for commerce or industry which cannot exist in any other location and is dependent on the water by reason of the intrinsic nature of its operations.

SECTION 3.0 GENERAL PROVISIONS

3.1 LANDS TO WHICH THIS ORDINANCE APPLIES

This ordinance shall apply to all areas of special flood hazards within the jurisdiction of city/town/county/tribe.

3.2 BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD

The areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled “The Flood Insurance Study for the city/town/county/tribe – use county if FIRMs are in countywide format,” dated month day, 20yr, with accompanying Flood Insurance Maps are hereby adopted by reference and declared to be a part of this ordinance. The Flood Insurance Study is on file at location. The best available information for flood hazard area identification as outlined in Section 4.3-2 shall be the basis for regulation until a new FIRM is issued which incorporates the data utilized under section 4.3-2.

3.3 PENALTIES FOR NONCOMPLIANCE

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations. Violations of the provisions of this ordinance by failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute a misdemeanor. Any person who violates this ordinance or fails to comply with any of its requirements shall upon conviction thereof be fined not more than \$ amount or imprisoned for not more than number days, or both, for each violation, and in addition shall pay all costs and expenses involved in the case. Nothing herein contained shall prevent the city/town/county/tribe from taking such other lawful action as is necessary to prevent or remedy any violation.

3.4 ABROGATION AND GREATER RESTRICTIONS

This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, state building code, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

3.5 INTERPRETATION

In the interpretation and application of this ordinance, all provisions shall be:

- (1) Considered as minimum requirements;
- (2) Liberally construed in favor of the governing body; and,
- (3) Deemed neither to limit or repeal any other powers granted under State statutes and rules including the state building code.

3.6 WARNING AND DISCLAIMER OF LIABILITY

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of city/town/county/tribe, any officer or employee thereof, or the Federal Insurance Administration, for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

SECTION 4.0 ADMINISTRATION

4.1 ESTABLISHMENT OF DEVELOPMENT PERMIT

4.1-1 Development Permit Required

A development permit shall be obtained before construction or development begins within any area of special flood hazard established in Section 3.2. The permit shall be for all structures including manufactured homes, as set forth in the “DEFINITIONS,” and for all development including fill and other activities, also as set forth in the “DEFINITIONS.”

4.1-2 Application for Development Permit

Application for a development permit shall be made on forms furnished by the dept., e.g. Planning, Engineering, etc. and may include but not be limited to plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities, and the location of the foregoing. Specifically, the following information is required:

- (1) Elevation in relation to mean sea level, of the lowest floor (including basement) of all structures;
- (2) Elevation in relation to mean sea level to which any structure has been floodproofed;
- (3) Certification by a registered professional engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing criteria in Section 5.2-2; and
- (4) Description of the extent to which a watercourse will be altered or relocated as a result of proposed development.

4.2 DESIGNATION OF THE local administrator

The local administrator is hereby appointed to administer and implement this ordinance by granting or denying development permit applications in accordance with its provisions.

4.3 DUTIES AND RESPONSIBILITIES OF THE local administrator

Duties of the local administrator shall include, but not be limited to:

4.3-1 Permit Review

- (1) Review all development permits to determine that the permit requirements of this ordinance have been satisfied.

- (2) Review all development permits to determine that all necessary permits have been obtained from those Federal, State, or local governmental agencies from which prior approval is required.
- (3) Review all development permits to determine if the proposed development is located in the floodway. If located in the floodway, assure that the encroachment provisions of Section 5.3(1) are met.

4.3-2 Use of Other Base Flood Data (In A and V Zones)

When base flood elevation data has not been provided (A and V Zones) in accordance with Section 3.2, BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD, the (local administrator) shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a Federal, State or other source, in order to administer Sections 5.2, SPECIFIC STANDARDS, and 5.3 FLOODWAYS.

4.3-3 Information to be Obtained and Maintained

- (1) Where base flood elevation data is provided through the Flood Insurance Study, FIRM, or required as in Section 4.3-2, obtain and record the actual elevation (in relation to mean sea level) of the lowest floor (including basement) of all new or substantially improved structures, and whether or not the structure contains a basement.
- (2) For all new or substantially improved floodproofed structures where base flood elevation data is provided through the Flood Insurance Study, FIRM, or as required in Section 4.3-2:
 - (i) Verify and record the actual elevation (in relation to mean seal level), and
 - (ii) Maintain the floodproofing certifications required in Section 4.1-2(3).
- (3) Maintain for public inspection all records pertaining to the provisions of this ordinance.

Add reference to length of time records are required to be maintained

4.3-4 Alteration of Watercourses

- (1) Notify adjacent communities and the Department of Land Conservation and Development prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration.
- (2) Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished.

Add reference to length of time records are required to be maintained

Consider adding reference to (1) to Department of State Lands and other affected agencies such as the Corps of Engineers and Water Resources

4.3-5 Interpretation of FIRM Boundaries

Make interpretations where needed, as to exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions). The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in Section 4.4.

NOTE: If you do not include Section 4.4 (Variance Procedure), end the above sentence after the word “interpretation,” and add the following sentence: “such appeals shall be granted consistent with the standards of Section 60.6 of the Rules and Regulations of the National Flood Insurance Program (44 CFR 59-76).”

4.4 VARIANCE PROCEDURE

4.4-1 Appeal Board

- (1) The governing body, e.g. council as established by ordinance shall hear and decide appeals and requests for variances from the requirements of this ordinance.
- (2) The governing body, e.g. council shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the city/town/county/tribe in the enforcement or administration of this ordinance.
- (3) Those aggrieved by the decision of the governing body, e.g. council, or any taxpayer, may appeal such decision to the court, as provided in ordinance.

Review appeal rights and reference appropriate parties that may appeal a decision. Remove specific reference to “court” and leave it up to the jurisdiction to establish their process.

- (4) In passing upon such applications, the governing body, e.g. council shall consider all technical evaluations, all relevant factors, standards specified in other sections of this ordinance, and:
 - (i) The danger that materials may be swept onto other lands to the injury of others;
 - (ii) The danger to life and property due to flooding or erosion damage;
 - (iii) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;
 - (iv) The importance of the services provided by the proposed facility to the community;

- (v) The necessity to the facility of a waterfront location, where applicable;
 - (vi) The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;
 - (vii) The compatibility of the proposed use with existing and anticipated development;
 - (viii) The relationship of the proposed use to the comprehensive plan and flood plain management program for that area;
 - (ix) The safety of access to the property in times of flood for ordinary and emergency vehicles;
 - (x) The expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and,
 - (xi) The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, and streets and bridges.
- (5) Upon consideration of the factors of Section 4.4-1(4) and the purposes of this ordinance, the *governing body, e.g. council* may attach such conditions to the granting of variances as it deems necessary to further the purposes of this ordinance.
- (6) The *clerk, planning dept., engineering dept., etc* shall maintain the records of all appeal actions and report any variances to the Federal Insurance Administration upon request.
- Reference length of time these records must be maintained

4.4-2 Conditions for Variances

- (1) Generally, the only condition under which a variance from the elevation standard may be issued is for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing items (i-xi) in Section 4.4-1(4) have been fully considered. As the lot size increases the technical justification required for issuing the variance increases.
- (2) Variances may be issued for the reconstruction, rehabilitation, or restoration of structures listed on the National Register of Historic Places or the Statewide Inventory of Historic Properties, without regard to the procedures set forth in this section.
- (3) Variances shall not be issued within a designated floodway if any increase in flood levels during the base flood discharge would result.
- (4) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.
- (5) Variances shall only be issued upon:

- (i) A showing of good and sufficient cause;
 - (ii) A determination that failure to grant the variance would result in exceptional hardship to the applicant;
 - (iii) A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public as identified in Section 4.1-4(4), or conflict with existing local laws, state building code or ordinances.
- (6) Variances as interpreted in the National Flood Insurance Program are based on the general zoning law principle that they pertain to a physical piece or property; they are not personal in nature and do not pertain to the structure, its inhabitants, economic or financial circumstances. They primarily address small lots in densely populated residential neighborhoods. As such, variances from the flood elevations should be quite rare.
- (7) Variances may be issued for nonresidential buildings in very limited circumstances to allow a lesser degree of floodproofing than watertight or dry-floodproofing, where it can be determined that such action will have low damage potential, complies with all other variance criteria except 4.4-2(1), and otherwise complies with Sections 5.1-1 and 5.1-2 of the GENERAL STANDARDS.
- (8) Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor elevation below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.

SECTION 5.0

PROVISIONS FOR FLOOD HAZARD REDUCTION

5.1 GENERAL STANDARDS

In all areas of special flood hazards, the following standards are required:
Add language to reference the state building code and that the most restrictive would apply

5.1-1 Anchoring

- (1) All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.
- (2) All manufactured homes must likewise be anchored to prevent flotation, collapse, or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors

(Reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for additional techniques).

5.1-2 AH Zone Drainage

Adequate drainage paths are required around structures on slopes to guide floodwaters around and away from proposed structures.

5.1-3 Construction Materials and Methods

- (1) All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.
- (2) All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.
- (3) Electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

5.1-4 Utilities

- (1) All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;
- (2) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters; and,
- (3) On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

5.1-5 Subdivision Proposals

- (1) All subdivision proposals shall be consistent with the need to minimize flood damage;
- (2) All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize or eliminate flood damage;
- (3) All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage; and,
- (4) Where base flood elevation data has not been provided or is not available from another authoritative source, it shall be generated for subdivision proposals and other proposed developments which contain at least 50 lots or 5 acres (whichever is less).

5.1-6 Review of Building Permits

Where elevation data is not available either through the Flood Insurance Study, FIRM, or from another authoritative source (Section 4.3-2),

applications for building permits shall be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

5.2 SPECIFIC STANDARDS

In all areas of special flood hazards where base flood elevation data has been provided (Zones A1-30, AH, and AE) as set forth in Section 3.2, BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD or Section 4.3-2, Use of Other Base Flood Data (In A and V Zones), the following provisions are required:

5.2-1 Residential Construction

- (1) New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated at least one foot above the base flood elevation.
- (2) Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must be either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria:
 - (i) A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.
 - (ii) The bottom of all openings shall be no higher than one foot above grade.
 - (iii) Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

Consider addition of language to cover crawl spaces and wet floodproofing of attached garages and accessory structures.

5.2-2 Nonresidential Construction

New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall either have the lowest floor, including basement, elevated at or above the base flood elevation; or, together with attendant utility and sanitary facilities, shall:

Consider recommendation to require 1 ft above base flood elevation for commercial structures with proviso that local adoption of higher requirement

- (1) Be floodproofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water;
- (2) Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;
- (3) Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the official as set forth in Section 4.3-3(2);
- (4) Nonresidential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as described in 5.2-1(2);
- (5) Applicants floodproofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the floodproofed level (e.g. a building floodproofed to the base flood level will be rated as one foot below).

Add language to cover wet floodproofing of non-residential type accessory structures such as agricultural and equine facilities

5.2-3 Manufactured Homes

(1) All manufactured homes to be placed or substantially improved on sites:

- (i) Outside of a manufactured home park or subdivision,
- (ii) In a new manufactured home park or subdivision,
- (iii) In an expansion to an existing manufactured home park or subdivision, or
- (iv) In an existing manufactured home park or subdivision on which a manufactured home has incurred “substantial damage” as the result of a flood;

shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated one foot above the base flood elevation and be securely anchored to an adequately designed foundation system to resist flotation, collapse and lateral movement.

(2) Manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within Zones A1-30, AH, and AE on the community’s FIRM that are not subject to the above manufactured home provisions be elevated so that either:

- (i) The lowest floor of the manufactured home is elevated at least one foot above the base flood elevation, or (look at bldg code for preferred language “not less than”?)
- (ii) The manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no

less than 36 inches in height above grade and be securely anchored to an adequately designed foundation system to resist flotation, collapse, and lateral movement.

Add reference to no new MD's allowed in floodways or the requirement that ends up in the revised OMDPSC

5.2-4 Recreational Vehicles

Recreational vehicles placed on sites are required to either:

- (i) Be on the site for fewer than 180 consecutive days,
- (ii) Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or
- (iii) Meet the requirements of 5.2-3 above and the elevation and anchoring requirements for manufactured homes.

5.3 BEFORE REGULATORY FLOODWAY

In areas where a regulatory floodway has not been designated, no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

5.4 FLOODWAYS

Located within areas of special flood hazard established in Section 3.2 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles, and erosion potential, the following provisions apply:

- (1) Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered professional civil engineer is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.
- (2) If Section 5.4(1) is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of Section 5.0, PROVISIONS FOR FLOOD HAZARD REDUCTION.

5.5 STANDARDS FOR SHALLOW FLOODING AREAS (AO ZONES)

Shallow flooding areas appear on FIRMs as AO zones with depth designations. The base flood depths in these zones range from 1 to 3 feet above ground where a clearly defined channel does not exist, or where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is usually characterized as sheet flow. In these areas, the following provisions apply:

- (1) New construction and substantial improvements of residential structures and manufactured homes within AO zones shall have the lowest floor (including basement) elevated above the highest grade adjacent to the building, one foot or more above the depth number specified on the FIRM (at least two feet if no depth number is specified).
- (2) New construction and substantial improvements of nonresidential structures within AO zones shall either:
 - (i) Have the lowest floor (including basement) elevated above the highest adjacent grade of the building site, one foot or more above the depth number specified on the FIRM (at least two feet if no depth number is specified); or
 - (ii) Together with attendant utility and sanitary facilities, be completely flood proofed to or above that level so that any space below that level is 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. If this method is used, compliance shall be certified by a registered professional engineer or architect as in section 5.2-2(3).
- (3) Require adequate drainage paths around structures on slopes to guide floodwaters around and away from proposed structures.
- (4) Recreational vehicles placed on sites within AO Zones on the community's FIRM either:
 - (i) Be on the site for fewer than 180 consecutive days,
 - (ii) Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or
 - (iii) Meet the requirements of 5.5 above and the elevation and anchoring requirements for manufactured homes.

5.6 COASTAL HIGH HAZARD AREAS

Work with DOGAMI to develop appropriate language to address the overlap of TIZ with coastal high hazard zones and other zones. Update map information available to local jurisdictions to identify and coordinate these areas. Contact

FEMA and possibly discuss this issue with east coast regions to develop language.

Located within areas of special flood hazard established in Section 3.2 are Coastal High Hazard Areas, designated as Zones V1-V30, VE and/or V. These areas have special flood hazards associated with high velocity waters from surges and, therefore, in addition to meeting all provisions in this ordinance, the following provisions shall also apply:

- (1) All new construction and substantial improvements in Zones V1-V30 and VE (V if base flood elevation data is available) shall be elevated on pilings and columns so that:
 - (i) The bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated one foot or more above the base flood level; and
 - (ii) The pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Wind and water loading values shall each have a one percent chance of being equaled or exceeded in and given year (100-year mean recurrence interval);
- (2) A registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction, and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of (i) and (ii) of this Section.
- (3) Obtain the elevation (in relation to mean sea level) of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures in Zones V1-30, VE, and V, and whether or not such structures contain a basement. The local administrator shall maintain a record of all such information.
- (4) All new construction shall be located landward of the reach of mean high tide.
- (5) Provide that all new construction and substantial improvements have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood lattice-work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system. For the purpose of this section, a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway walls which exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local or State codes) may be permitted only if a registered

professional engineer or architect certifies that the designs proposed meet the following conditions:

- (i) Breakaway wall collapse shall result from water load less than that which would occur during the base flood; and
 - (ii) 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 nonstructural). Maximum wind and water loading values to be used in this determination shall each have a one percent chance of being equaled or exceeded in any given year (100-year mean recurrence interval).
- (6) If breakaway walls are utilized, such enclosed space shall be useable solely for parking of vehicles, building access, or storage. Such space shall not be used for human habitation.
- (7) Prohibit the use of fill for structural support of buildings.
- (8) Prohibit man-made alteration of sand dunes which would increase potential flood damage.
- (9) All manufactured homes to be placed or substantially improved within Zones V1-V30, V, and VE on the community's FIRM on sites:
- (i) Outside of a manufactured home park or subdivision,
 - (ii) In a new manufactured home park or subdivision,
 - (iii) In an expansion to an existing manufactured home park or subdivision, or
 - (iv) In an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as the result of a flood;

meet the standards of paragraphs 5.6(1) through (8) of this section and that manufactured homes placed or substantially improved on other sites in an existing manufactured home park or subdivision within Zones V1-30, V, and VE on the FIRM meet the requirements of Section 5.2-3.

- (10) Recreational vehicles placed on sites within Zones V1-30, V, and VE on the community's FIRM either:

- (i) Be on the site for fewer than 180 consecutive days,
- (ii) Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or

- (iii) Meet the requirements of Section 4.1-1(Permitting requirements) and paragraphs 5.6(1) through (8) of this section.

5.7 CRITICAL FACILITY

Construction of new critical facilities shall be, to the extent possible, located outside the limits of the Special Flood Hazard Area (SFHA) (100-year floodplain). Construction of new critical facilities shall be permissible within the SFHA if no feasible alternative site is available. Critical facilities constructed within the SFHA shall have the lowest floor elevated three feet or to the height of the 500-year flood, whichever is higher. Access to and from the critical facility should also be protected to the height utilized above. Floodproofing and sealing measures must be taken to ensure that toxic substances will not be displaced by or released into floodwaters. Access routes elevated to or above the level of the base flood elevation shall be provided to all critical facilities to the extent possible. Add cross reference to state building code related to essential facilities, special occupancies, etc. TIZ.

Appendix D

DLCD Bibliography of Available FEMA Technical Resources

Technical Bulletin 1-93: Openings in foundation walls

Provides guidance on the NFIP regulations concerning the requirement for openings in below- Base Flood elevation foundation walls for buildings located in Zones A, AE, A-A30, AR, AO, and AH

Technical Bulletin 2-93: Flood resistant materials requirements

Provides guidance on the NFIP regulations concerning the required use of flood-damage resistant construction materials for building components located below the base Flood Elevation in Special Flood Hazard Areas (both A and V zones).

Technical Bulletin 3-93: Non-residential floodproofing- requirements and certification

Provides guidance on the NFIP regulations concerning watertight construction and the required certification for floodproofed non-residential buildings in Zones A, AE, A1-A30, AR, AO, and AH whose lowest floors are below the Base Flood Elevation.

Technical Bulletin 4-93: Elevator Installation

Provides guidance on the NFIP regulations concerning the installation of elevators below the Base Flood Elevation in Special Flood Hazard Areas (both A and V zones).

Technical Bulletin 5-93: Free-of-obstruction requirements

Provides guidance on the NFIP regulations concerning obstructions to flood waters below elevated buildings and on building sites in Coastal High Hazard Areas (Zones V, VE, and V1-V30)

Technical Bulletin 6-93: Below-grade parking requirements

Provides guidance on the NFIP regulations concerning the design of below-grade parking garages beneath buildings located in Zones A, AE, A1-A30, AR, AO, and AH.

Technical Bulletin 7-93: Wet floodproofing requirements

Provides guidance on the NFIP regulations concerning wet floodproofing of certain types of structures located in Zones A, AE, A1-A30, AR, AO, and AH

Technical Bulletin 8-96: Corrosion protection for metal connectors in coastal areas

Provides guidance on the need for, selection of, and use of corrosion-resistant metal connectors for the construction of buildings in coastal areas

Technical Bulletin 9-99: Design and construction guidance for breakaway walls below elevated coastal bridges

Provides prescriptive criteria for the design and construction of wood-frame and masonry breakaway walls compliant with NFIP regulatory requirements

Technical Bulletin 10-01: Ensuring that structures built on fill in or near Special Flood Hazard Areas are reasonably safe from flooding

Provides guidance on the construction of buildings on land elevated above the Base Flood Elevation through the placement of fill and provides guidance on how to determine that buildings with basements built in filled areas will be reasonably safe from flooding during the occurrence of the Base Flood and larger floods

Technical Bulletin 11-01: Crawlspace construction for buildings located in Special Flood Hazard Areas

Provides guidance on crawlspace constructions and supports a recent policy decision to allow construction of crawlspaces with interior grades up to 2 feet below the lowest adjacent exterior grade, referred to as below-grade crawlspaces, provided that other requirements are met

FEMA 213: Answers to questions about substantially damaged buildings (1991)

Provides answers to questions regarding FEMA regulations and policy on substantial improvements as it applies to damaged structures

FEMA 348: Protecting building utilities from flood damage (1999)

Illustrates the design and construction of building utility systems for residential and non-residential structures located in flood-prone areas in order to comply with the NFIP floodplain management requirements

FEMA 85: Manufactured home installation in flood hazard areas (1985)

Provides technical guidance on how to reduce the risk of flood damage to manufactured homes, addressing techniques for elevating the manufactured home above anticipated flood levels and for adequately anchoring against flood and wind forces

Technical Bulletins are on DLCD's website as pdfs

<http://www.oregon.gov/LCD/HAZ/techinfo.shtml>

Appendix E
Worksheets A, B, C and Plan Review Checklists

Taken from
“Reducing Flood Losses through the International Code Series”
2nd Edition 2005

That can be found on the following web site:

www.fema.gov/library/file?type=publishedFile&file=nfip_codes2005.pdf&fileid=e54a8040-1e55-11db-b486-000bdba87d5b