



LESSON PLAN FOR HURRICANE RECOVERY:

Preparing for the Son of Floyd

Lesson 1: Prevention is the key to recovery.

- ◆ *Local governments must build disaster prevention into their land use planning.*

Many local governments in North Carolina use local land use planning to guide development in their communities. Although not a completely effective control on new development, it does serve an important role in shaping a community. A land use plan can incorporate many aspects of disaster prevention and mitigation, directing new development away from floodplains, and new parks and open space areas to the riverfront. Unfortunately, disaster prevention is often not considered while developing land use plans.

There are numerous land use planning tools which can minimize disaster impacts. Overlay zones, incentive zoning, and planned unit development are tools that provide for localized variations to comprehensive land use plans that allow for response to potential hazards. They work through both mandates and incentives to vary either density of construction, elevation of structures, or other hazard related practices. Although subject to limitations, these measures, when utilized in the broad context of a land use plan, can serve to reduce future danger.

Planning is ineffective if not enforced. Comprised of local decisions, it is important that local governments fully implement their plans and not change them through variance or atrophy. To encourage this, state funding for infrastructure should be tied to both the existence and enforcement of land use plans. The state has an interest in local government actions when it comes to the disposition of limited state resources.

- ◆ *The public must be educated about dangers to themselves and their property, and involved in decisions about them.*

An additional aspect of prevention lies in allowing the public to make better-informed decisions about the dangers posed by flooding and natural

disasters. We need to develop a program to make everyone, from public officials to schoolchildren, more knowledgeable about flood hazards, and our natural systems in general.

Local governments should work to involve citizens in floodplain use decision-making, building a constituency for planning and mitigation. The state has taken an important step by negotiating an agreement with the Federal Emergency Management Agency (FEMA) to rapidly update our floodplain maps. It is hoped that this effort will produce results statewide within five years. The availability of this data presents an excellent opportunity for stepping-up public involvement through broad dissemination and local discussion.

- ◆ *Sensitive uses must not be allowed in the floodplain.*
Some uses are simply unsuitable for a flood prone area. Beyond the tragedy of flooding residences and businesses, some activities present a broader danger to public health and the environment. The General Assembly recognized this when it passed floodplain legislation in 2000 which prohibited junkyards and hazardous waste storage facilities in the 100 year flood plain.

However, some additional uses also need to be reviewed. Wastewater treatment plants are often built in or near flood prone areas to allow gravity to control the wastewater flow, rather than additional pumping facilities. Unfortunately, this means that those same plants are likely to flood during storm events, in some instances bypassing treatment and discharging raw sewage. In the city of Kinston, the Peachtree wastewater treatment facility is being removed from the 100-year flood plain with funding from FEMA and additional state contributions. State policies should require new facilities to be built with flooding concerns in mind, and provide incentives for the relocation of existing treatment plants that are subject to repeated flooding incidents.

Lesson 2: Man made forces turn natural events into disasters.

◆ *We must not develop in flood prone areas.*

Floods are not a new phenomenon. Riverine systems have been working in roughly the same fashion for millions of years; we can see the effects they've had simply by looking at our geography. Floods carved out the valleys of our state. Even in the flat coastal plain, the gradual rise and fall of the land was carved by our rivers.

What turns these floods into disasters is the fact that people have built in areas where the floodwaters naturally drain. Those forces represented by the flooding vastly overpower our attempts to control them. Engineering solutions can only cope with limited portions of disasters. Natural systems, such as wetlands and forests, should be left intact in flood prone areas to accommodate the surge of water. Such systems are more effective than human intervention at decreasing the magnitude of flood events.

◆ *Upstream development must take into account both downstream water quality and water **quantity**.*

Building in flood prone areas is only part of the story of the increase in risk. Changes made upstream, in the headwaters of river basins, have dramatic impact on people and property downstream. Parking lots and malls allow far more water to runoff, and runoff more quickly, than fields and forests. With the widely publicized problems of pollution in the Neuse estuary, the public is gaining awareness about the water quality impacts we can have on our neighbors downstream through what we dump into the river and the changes we make to the landscape.

Upstream development must take this into account by implementing measures that will limit such uncontrolled run-off. Effective onsite stormwater controls, particularly in large cities and quickly growing towns, along with the establishment and maintenance of forested buffers along streams, can help counteract the impacts of development, and help lesson downstream flood potential.

Lesson 3: Rebuild smarter.

◆ *The state must not invest its limited resources in areas that will repeatedly flood.*

In the aftermath of Hurricane Floyd, the state spent almost \$830 million to rebuild homes, farms, and businesses. When faced with this type of tragedy, it is only natural to reach out with a helping hand to those who have been injured, or whose homes have been devastated. However, it is critical not to spend those resources in places that will simply be the sites of future repeated tragedies.

Although a significant block of money was correctly invested in helping people with flooded homes out of the floodplain, insufficient funds were provided by the state to redevelop affordable rental housing stock. Many rental properties did not receive flood recovery funds. Since affordable housing is most likely found on the least expensive property, and that property is more often found in the floodplain, less money than was needed was provided to meet this critical housing need, and it seems likely that new rental housing will again be rebuilt in harm's way.

Generally speaking, more careful thought needs to be given to funding guidelines for rebuilding areas destroyed by floods in order to prevent wasteful spending on facilities and buildings which will flood again, as well as protect our citizens and environment.

◆ *New construction of all types should be elevated out of the 100-year floodplain.*

While zoning controls can direct development out of the 100-year floodplain, it is unlikely that all development will be prohibited. It is imperative that development that does occur in the 100-year flood plain be elevated above base flood. Elevation decreases damage to property when the inevitable flooding does occur.

Elevation is important for two reasons. First, it limits the problems caused by inaccurate flood plain maps. Most floodplain maps in North Carolina are out of date, and do not take into account much of the recent explosive growth experienced in NC. Second, elevation helps to account for the impacts to the floodplain from future growth. Again, although it is hoped that measures will be put into place to limit the expansion of flood prone areas by providing for buffers and better stormwater controls, it is

unlikely that these measures will be sufficient to completely stop the ongoing expansion of the floodplain.

- ◆ *Critical infrastructure, including water systems, sewers, and highways, should be designed and built in a manner that will not encourage building in flood prone places.*

Current state law does not provide a means to direct general expenditures on infrastructure enhancement away from the floodplain. The legislation passed in 2000 by the General Assembly provides a modest incentive when applying for state water and sewer grants and loans for jurisdictions that adopt a floodplain ordinance that requires new construction to be built to “base flood” elevation. Unfortunately, the legislation does nothing to direct where the money is spent in those communities, allowing for further expansion into floodplains.

The state has an interest in seeing its resources used in the most cost effective manner. Encouraging development in places that will eventually need state funding for buy-out or repair is obviously not efficient. Development often follows infrastructure, and without a policy to govern this expansion, the state is inadvertently creating a demand for floodplain construction by providing funds for state road, water, and sewer construction in these areas. The legislative Smart Growth study commission is examining a more comprehensive policy on infrastructure spending, and it is important that floodplains be included in the criteria that are considered when parceling out limited state dollars.

Lesson 4: Work with natural forces, not against them.

Underlying each of the lessons above is the implication that it is manmade changes to the natural landscape which exacerbate the situation, and turn periodic flooding into disasters for our

communities and our environment. When making decisions for our future, we need to revisit several basic points:

- ◆ *Left undeveloped, floodplains absorb floodwaters like natural sponges.*

As mentioned above, North Carolina’s continued growth has meant that we have paved over, built up, and created vast impervious surfaces where floodwaters previously were able to sink into the ground, and disperse. Future growth and development decisions, land use patterns, and individual choices must be made with this fact in mind, and it must be a consideration in any cost benefit analysis of development choices. Forests and vegetation enhance the ability of land to absorb water, and help slow the rate of flow before water rushes into stream channels. The need for buffers along streams and rivers cannot be emphasized enough. Currently, buffer rules are only in place in the Neuse and Tar-Pamlico river basins. There is discussion about requiring buffers in our other rapidly developing basins, especially the Catawba and the Cape Fear. So far, these have met with local resistance.

- ◆ *Manipulating floodways and stream channels creates flooding.*

Engineering our waterways can help direct or reduce some hazards, but it is not a failsafe, and often has unforeseen impacts. Just as limiting the capacity of the land to absorb water results in flooding, so does blocking river and stream outlets downstream. More basically, if the water has nowhere to drain, it will flood where you don’t want it to go.

Channelization of streams and hardening of riverbanks also creates flooding problems. By allowing more water to drain down faster, these structures cause floods downstream, when a more natural setting would have allowed slower dissipation, thereby avoiding a flood. ◆