
Floodplain – Shoreland Management Notes

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Supreme Court Affirms Shoreline Protection Rules

A recent ruling by the Wisconsin Supreme Court in the Kenosha County Board of Adjustment (Huntoon) case upheld Wisconsin's nationally-recognized shoreland zoning laws and strict variance criteria standards. The high court concluded that the legal standard of unnecessary hardship requires that the property owner demonstrate that without the variance they have no reasonable use of the property. This ruling reaffirms the common-law principle that zoning variances should only be granted under very limited circumstances.

In its ruling, the high court rejected the 2nd District Court of Appeals reasoning that an

applicant for an "area" variance only needed to prove that the zoning regulations were "unnecessarily burdensome" to the applicant, rather than proving that they would have "no reasonable use" of the property without the granting of the variance.

It further noted that laws designed to protect state lakes, rivers and streams must be strictly enforced to protect the public interest and to control development along the state's waterways.

"Only when the applicant has demonstrated that he or she will have no reasonable use of the property, in the absence of a variance, is an unnecessary hardship present," Justice Janine Geske wrote for the court.

"... Huntoon has a reasonable use of the property without the variance," Geske added. "The record demonstrates that the house has been used as a residence since it was first built."

The court acted in the case of a Kenosha County woman, Jan Huntoon, who had added a 14-foot-by-23-foot deck to her house. The house was set back 78 feet from the lake, but the deck intruded 11 feet into the 75-foot setback required by local law. The Board of Adjustment granted the variance, reasoning that other development on the lake also intruded into the setback

zone, that to deny the variance would lower the value of Huntoon's land, that the property had a unique limitation due to steep slopes which caused a safety problem, and that the public interest is served when citizens are permitted a reasonable use of their property that is not harmful to the public.

The court rejected all these arguments, finding that nothing in the hearing records would support any of the reasons offered for granting the variance and that in fact the applicant or her representative didn't even raise loss in value or safety as issues. Further, the court pointed out that the Board's interpretation of the public interest test would seem to "approve of any of a number of reasonable uses, so long as it does not cause harm to the public. The Board's statement is too accommodating."

"It's a wonderful decision that validates the role of shoreland zoning in the protection of our state waters," said JoAnne Kloppenburg, director of the Department of Justice's environmental protection unit. "It preserves the intent of the law, which is to strike a balance between private use of the shore and public rights to the water."

The case was remanded to the circuit court for remand and rehearing by the Board of Adjustment consistent with the legal standards described in the opinion.

New Guidance on Nonconforming Structures

The Oneida County Corporation Counsel recently asked the Wisconsin Attorney General's Office three questions on how state statutes and administrative rules related to shoreland zoning affect nonconforming structures. The answers have broad

application for all Wisconsin communities and provide some rationale for enacting and enforcing nonconforming regulations. The three questions asked were:

1. *May a county enact a shoreland zoning ordinance that does not expressly regulate legal nonconforming uses, structures and properties?*

Section 59.69(10)(a), Stats., and Wisconsin Administrative Code Chapter NR 115.05(3)(e) allow a county to enact a zoning ordinance that does not regulate nonconforming uses, structures or properties, except that its ordinance must regulate the reuse of nonconforming uses or structures. If such a use or structure is discontinued for twelve consecutive months, any future use must conform to current ordinance standards. This guidance is based on the legal principle of "general rule of express mention and implied exclusion" under which the "express mention of one matter excludes other similar matters not mentioned." Since the rules only specifically mention the twelve-month discontinuation of use standard, it is implied that other standard nonconforming use language is excluded from mandatory adoption requirements.

2. *May a county enact a shoreland zoning ordinance that does not include the "50% rule" for altering, adding to, or repairing nonconforming uses or structures? If so, what, if anything, would then restrict the county's authority to regulate or not regulate alterations, additions or repairs to nonconforming uses or structures?*

Section 59.97(10), Stats., state that "the continuation of the lawful use of a building,

structure or property, existing at the time an ordinance ... takes effect ... shall not be prohibited, but the alteration of, addition to, or repair, over the life of the structure, in excess of 50% of the equalized assessed value ... may be prohibited. Clearly, counties have the permissive authority to adopt, or not adopt, the 50% rule. Furthermore, section 59.692(1s), Stats., created by 1997 Wisconsin Act 27, allows a structure damaged by wind, vandalism, fire or flood to be rebuilt to the size, location and use it had immediately before the damage or destruction occurred, with no limits placed on the cost of rebuilding. As a result, a county cannot enact a 50% restriction for limiting the restoration costs of those damaged or destroyed nonconforming structures.

However, counties retain broad authority to regulate nonconforming uses or structures not covered by the above statute. In fact, common law may limit the extension of legal nonconforming uses or structures if the extension is contrary to the spirit of zoning. Many Wisconsin court cases have found that common law is controlling unless specific changes, such as the above statute, are made by the legislature. The idea that there would be no restrictions on nonconforming uses or structures is contrary to the common law reasons for having nonconforming uses at all. If there were no restrictions, there would be no reason to classify a use or structure as nonconforming.

In general, common law principles would allow a county to regulate nonconforming uses or structures even without the 50% rule. For example, the right to continue a nonconforming use does not include a right to extend or enlarge it, since the courts have held that expansion of a nonconforming use offends the spirit of zoning regulation.

Even if a county elects not to enact a 50% rule, it is still subject to other minimum shoreland zoning requirements, such as lot sizes, setbacks, and vegetation cutting requirements.

3. *Under Wisconsin zoning law, does an isolated lot, on which there is a pre-existing dwelling or principal structure between 40 and 75 feet of the OHWM of a navigable water, constitute an "existing development pattern"?*

When a non-technical word is not defined in statute or administrative code, the courts have ruled that it must be given the relevant, ordinary and accepted meaning that is found in a dictionary. "Pattern" is defined as a "representative instance: a typical example." "Isolated" is defined as "occurring alone or once: unique." Clearly, something that is occurring alone and is unique cannot be a representative instance or typical example. Thus, an isolated lot on which there is a pre-existing dwelling is not an existing development pattern under Wis. Admin. Code Ch. NR 115.05(3)(b)1. If it were to be construed as such, it would nullify the minimum setback requirements in many instances and contradict the spirit of zoning restrictions on nonconforming uses and structures.

FEMA/Wisconsin Differences for Removal of Lands From Floodplain

If people own land they believe is incorrectly mapped in the floodplain, they can petition FEMA for a flood insurance exemption if they can prove the floodplain designation is incorrect. FEMA issues Letters of Map Amendment (LOMA) for map errors or Letters of Map Revision (LOMR-F) for land that has been filled.

The Department has learned of several cases where FEMA has questioned the design features of future structures to be built on land that the owner is requesting be removed from floodplain status because the property is or will be filled above the flood protection elevation. In the past, our understanding of FEMA regulations was that vacant land that had been filled to a level at or above the 100-year level was adequate criteria to remove the parcel from the floodplain.

When a request is made to FEMA for a Letter of Map Revision based on Fill (LOMR-F) for an existing or proposed structure, FEMA will request information regarding the lowest floor, including basement. This information will then be compared to the Base (1% annual chance) Flood Elevation (BFE) before a determination is made. Since August of 1986, FEMA cannot authorize removal of a parcel of land where the existing or proposed structures has or will have a lowest floor BELOW the 100-year level, (44 CFR 65.5).

This highlights distinctions between FEMA's criteria and what NR 116 requires for DNR to approve "Removal of Lands from Floodplain status." State criteria say that land to be removed from a floodplain must be filled "2 ft. above the 100 year elevation, and contiguous to lands outside the floodplain." The DNR must approve removal of lands that have been filled according to this criteria, but the property owner and the community may not be able to get approval from FEMA if structures to be built on the property will have basement floor levels BELOW the 100-year level.

If DNR is presented with a proposal to fill and remove vacant floodplain land that meets NR 116 criteria for removal, the DNR will not wait for FEMA review before

approving the local map amendment. However, the Department will notify local officials that federal regulations do not allow the same change to the floodplain, if an existing or future structure on the property has or will have a lowest floor below the Base Flood Elevation.

When FEMA issues a LOMA or LOMR-F for filling vacant land, this does not change the map that has been adopted locally. There has been some confusion on this because the process that FEMA has adopted by federal rule to remove structures from the requirement to have flood insurance coverage is called, 'Letter of Map Amendment/Letter of Map Revision', (LOMA/LOMR). The names FEMA uses for these letters implies that the map that the community has adopted by reference into its ordinance (as required by FEMA) has been changed by these letters. ***The intent of the federal process is really to remove the insurance requirement only.*** The practical side is that most property owners who initiate the FEMA process do so with that sole intent.

Local officials should remember that the map that is referenced in the ordinance cannot be changed unless there is an amendment adopted at the local level and then approved by DNR through the ordinance amendment process in NR 116. Any request to rezone property out of a designated floodplain must meet the criteria of NR 116.18, Wis. Adm. Code that requires that property be "filled to the flood protection elevation and contiguous to lands lying outside the floodplain."

If local officials are aware that a property owner's request to FEMA does not meet this code, they should object to FEMA in writing so that FEMA is aware of this conflict. To avoid these problems, the Department

suggests that the following steps be used before submitting an application for a LOMR-F to FEMA:

- The property owner should request a permit for filling the floodplain.
- Fill the property and then obtain certification that the property has been filled in accordance with the permit.
- Initiate the local map amendment process.
- When the map revision is adopted locally, proceed with community and DNR approval.

Mitigation The Focus At Recent FEMA Meeting

State representatives of both the flood insurance and hazard mitigation programs from Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin met with FEMA Region V representatives in Traverse City, Michigan this August to discuss recent flooding events and related mitigation initiatives.

With the spring flood disasters in Ohio, Minnesota and North Dakota plus the June flooding in southeast Wisconsin still on everyone's mind, many participants were understandably still operating in a recovery mode and had plenty of revelatory and fascinating information to share with those from more fortunate states. Evocative portrayals of the numbing losses suffered by Fargo, Grand Forks and Moorhead residents along with concerns over state/federal disaster relief and mitigation coordination highlighted the discussions over the three day period.

Stu Rifkind, the recently appointed chief of the Mitigation Division for the FEMA Regional Office in Chicago, stated that there

are 50 open disasters at this time in the Region. This figure includes a number of still-open disasters from the 1993 Great Midwest Flood. He also noted that amendments to the Stafford Mitigation Act are being fast-tracked through Congress that would allow mitigation money to be used outside of declared disaster areas. Some states had requested this flexibility to better utilize the limited mitigation grant moneys they had available.

The Department of Housing and Urban Development has received special appropriations for both Minnesota and North Dakota to rebuild those areas most severely affected by the flooding. The legislatures in both of those states have also appropriated millions to assist in the relief efforts.

There was also a lot of discussion on changes to Hazard Mitigation Grant Program. The Region is pushing the idea of using unspent funds for pre-disaster planning. Unclear if this would change the way unspent funds are distributed. The Region says that from now on the cost share for HMGP and Public Assistance will be capped at 75%. In 1993, some communities were given 100% funding. The states would like the flexibility to fund projects with a less than 75% federal match because in some cases it might be the only way to approve a project. The Region would like to eliminate structural flood control projects as eligible activities.

NFIP Performance Measures/Compliance Issues - Several states raised concerns about communities that have not been placed on probation or suspension, but aren't fulfilling the requirements to be in good standing in the NFIP. FEMA was criticized for failing to discipline "bad actors" - communities that have been recommended for probation, but are still in good standing. FEMA said it's a

workload issue and they are getting close to placing several communities on probation. Illinois suggested that disaster assistance and mitigation funds be withheld from communities that fail to comply with requirements. All agreed that compliance needs to be strengthened. FEMA has developed several draft policy papers as starting points for this discussion.

Mapping Issues - FEMA wants to resolve the many "zone A" problems with priority given to unmapped areas and rapidly urbanizing areas. They plan to give the Regions and technical firms the authority to develop base flood elevations. They are interested in partnering with communities to develop more accurate base maps. However, they estimate that over 35,000 panels need to be reviewed. A minimum base map standard will be established - likely based on digital orthophotos. Another goal is converting all maps to digital formats. Other priorities include post-disaster map verification, metric conversions and NGVD conversions. The map service centers will be upgraded to distribute flood boundary floodway maps and flood insurance studies along with flood insurance rate maps. The service centers will offer products through the WEB in the future.

Substantial Damage - Some states want to use "replacement cost" instead of "market cost" when doing substantial damage determinations. Property owners in some communities are unfairly penalized because unemployment levels or other factors have depressed the market value of their house compared to a similar house in a nearby community. By using replacement value, all similar properties will be valued evenly and the substantial damage (50%) rule will be more equitable. However, the regulations would have to change to allow this.

A big issue was local capabilities for doing damage assessments. In Ohio, it took six months to get all the assessments completed. It was obvious that a small village with a part-time building inspector couldn't quickly and accurately do 400 damage assessments, which actually happened in some Ohio communities. Another problem is the number of agencies doing assessments. The Red Cross, insurance adjusters, SBA, FEMA and local officials might all be out at the same time doing assessments for different purpose and using different criteria and methods for conducting the assessments.

Proprietary software has been developed for doing assessments, but you must use Marshall and Swifts cost manuals with this software and not all communities are familiar with these manuals. It was suggested that state and local staff attend insurance adjuster training sessions to become more familiar with the methodologies used to arrive at the damage assessments and share this information with other officials.

It was suggested that joint meetings with lenders, insurance agents and community officials be held to discuss flood insurance issues and administration of the local floodplain management program. A Community Assistance Visit could be conducted through this process and training requirements for lenders and agents could also be fulfilled. States see the need for bringing these groups together, since there has been much confusion over the requirements of the flood insurance program and how that interacts with the administration of the floodplain management program.

State Reports - Illinois asked what types of structures are allowed on property that has been acquired through HMGP. Many

communities would like to put up park shelters with concrete floors even though the regs say no impervious surfaces are allowed. The state also recently published an updated "Mitigation Planning Guide" for local officials.

Indiana is concerned about the high costs of appraisals for acquired properties. Ohio, Minnesota and Wisconsin reported their costs to average between \$250.00 - \$300.00. Indiana is spending two to three times that. The state recently completed a flood video and hosted its first state mitigation conference in September. DNR staff will be conducting post-flood mitigation workshops with local communities to provide assistance in administration of floodplain zoning ordinances.

Ohio reported that there were a lot of discrepancies in damage assessments from this spring's flooding events. Some communities are very reluctant to declare a structure "substantially damaged" because residents either can't afford to rebuild or would not be allowed to rebuild. This later led to a long discussion between Ohio and Regional staff about who and how post-disaster damage assessments should be conducted. More expertise and consistency needs to be brought to this task.

Michigan is proposing to give a \$100 tax break to anyone who purchases a flood insurance policy. They are teaming with FEMA to put on additional flood insurance workshops in the coming year.

Minnesota brought us up to date on this spring's flooding in East Grand Forks and Moorhead. Flooding on the Red River was in some areas almost two feet above the 100-year event, with flood waters spreading as much as a mile beyond the mapped floodplain. Over 100 properties have been

bought out to date and the goal is over 1,000 properties. The state has appropriated \$40 million for mitigation including \$10 million for buyouts. The feds have chipped in an additional \$120 million towards disaster repairs and mitigation. The state is requesting additional technical assistance moneys to study the feasibility of alternatives of levees for mitigation.

The flooding will change the hydrology in some communities and the state will cost-share new flood insurance studies to reflect the changes. The state has been using a new software package to do damage assessments and are generally pleased with its performance. We discussed different initiatives among the Regions to develop damage assessment methods and the need to standardize this function.

Wisconsin has signed a Memorandum of Understanding with the State Historical Society on how to deal with historic preservation issues when conducting disaster relief and mitigation projects. The state has also pioneered a MOU with FEMA regarding the role of mitigation initiatives as part of the federal Public Assistance Program. This is typically overlooked in the rush to rebuild and get people back in their homes and businesses.

Flood Mitigation Assistance Program Has Arrived

The Flood Mitigation Assistance (FMA) program was developed by FEMA to provide mitigation opportunities for repetitively or substantially damaged structures in order to reduce or eliminate the risks of flood damage to insurable structures. Unlike the Hazard Mitigation Grant Program (HMGP) which is only

funded after a presidentially declared disaster, FMA will provide yearly appropriations to each state to fund mitigation planning, technical assistance and acquisition/floodproofing projects.

Each state was asked to name a Point of Contact to administer the program.

Roxanne Gray, Wisconsin's State Hazard Mitigation Officer, will handle those duties with technical assistance from the DNR and other agencies. As with other FEMA grant programs, states will be annually notified about their grant award. The program's authority and obligations will be detailed in Wisconsin's Cooperative Agreement with FEMA.

To be eligible for the program, all communities and tribal governments must participate in the National Flood Insurance Program, have building code authority over all special flood hazard areas, and have a flood mitigation plan adopted by its governing body. Existing plans such as those credited through the Community Rating System may meet the FMA requirements.

The plan should summarize your planning process and should be reviewed by the community periodically. Projects must be consistent with FEMA's goals to reduce damage to NFIP-insured structures. Eligible activities include acquisition and floodproofing and each project must meet minimum criteria such as cost effectiveness, environmental considerations, etc. Planning grants will not be awarded to develop new or improved floodplain maps.

Each year funds will be allocated to the FEMA regions. The Regional Director will allocate technical assistance and planning grants through the annual cooperative agreements; approve mitigation plans and

award all project grants after evaluating applications for minimum eligibility and ensuring compliance with applicable federal laws. The state of Wisconsin will serve as grantee through Wisconsin Emergency Management to ensure that FMA is coordinated with other mitigation activities.

State agencies will also provide technical assistance to communities to assist them in developing applications and implementing approved applications; award planning grants; submit plans to the Regional Director for approval; evaluate project applications and select projects to be forwarded to FEMA for final approval; and submit performance and financial reports to FEMA. The communities role will be to complete and submit applications to the POC for planning and project grants; prepare and submit the Flood Mitigation Plan; implement all approved projects; comply with FMA requirements, the grant agreement, applicable federal, state and local regulations; and account for the appropriate use of grant funds to the POC. Communities are eligible to apply for planning and project grants and to act as a sub-grantee as are other state agencies.

While communities have considerable leeway in preparing a plan, keep in mind that certain federally required components must be included. These are:

- Description of the planning process and public involvement techniques
- Description of the flooding problem and structures at risk
- Floodplain management goals
- Identification and evaluation of possible mitigation alternatives
- Strategies for reducing flood risks, maintaining NFIP compliance, and implementing, managing, and evaluating the plan

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- Documentation of formal legal adoption of plan by governing body

Each state will receive a base amount of \$10,000 for planning grants and \$150,000 for project grants. Additional funds will be distributed based on the number of NFIP policies, repetitive loss structures and other flood risk criteria. When reviewing possible mitigation projects, communities should keep in mind that FEMA relies heavily on a "cost/benefit" calculation to determine eligibility. Simply put, a mitigation project's costs can not exceed the estimated reductions in direct damages and future negative impacts from a flooding event. Both costs and benefits are computed on a net present value basis.

The project must also be in full compliance with all applicable environmental regulations, be technically feasible, identified in the community's flood mitigation plan, and the community cannot be on probation or suspension from the NFIP.

The following types of projects are eligible for FMA funding:

- Acquisition and relocation of insured structures to non-hazard areas
- Demolition and removal of insured structures
- Elevation or dry floodproofing of insured structures
- Minor structural flood mitigation projects that don't duplicate the flood prevention activities of other agencies
- Other activities that bring insured structures into compliance with federal regulations

FEMA will fund up to 75 percent of the total eligible costs of each grant. The remaining 25 percent must come from nonfederal sources, with no more than half coming

from in-kind contributions. If there are insufficient federal funds for a particular project, communities can contribute or secure nonfederal contributions that exceed the 25 percent limit if the extra money is needed to insure a project's approval. A maximum of 10 percent of the project grant money nationally will be allocated to technical assistance grants each fiscal year. No state can receive more than \$10,000,000 and no community can receive more than \$3,300,000 in any five-year period.

For more information on FMA or other federal or state mitigation assistance programs, contact Roxanne Gray, Wisconsin State Hazard Mitigation Officer, at (608) 242-3211.

Basics Of The Hazard Mitigation Grant Program

Hazard Mitigation Grant Program (HMGP) funding is only available to applicants that live or own property in a presidentially declared disaster area. Specifically, the HMGP can provide grants to state and local governments; certain private, non-profit organizations and institutions; Indian tribes or authorized tribal organizations; and Alaska Native villages or organizations. Local government may also sponsor an application on behalf of individuals.

What types of projects can be funded by the HMGP?

HMGP funds may be used to fund projects that will reduce or eliminate the losses from future disasters. Projects must provide a long-term solution to a problem. For example, elevation of a home to reduce the risk of flood damages as opposed to buying sand bags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the

project. Funds may be used to protect wither public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage.

Examples of projects include, but are not limited to: acquisition and relocation of structures from hazard-prone areas; strengthening structure against floods, high winds, wildfire, or other hazards to protect structures from future damage; elevating structures to comply with the National Flood Insurance Program (NFIP) on development of state or local standards to protect new and substantially improved structures from disaster damage. The states are responsible for administering the HMGP, prioritizing projects submitted by local jurisdictions and forwarding to FEMA those which are consistent with state mitigation planning objectives and for which there is available funding.

How do I apply?

Following a disaster declaration, the State will advertise that HMGP funding is available to fund mitigation projects in the State. Those interested in applying to the HMGP should contact their local government to begin the application process. Local governments should contact their State Hazard Mitigation Officer.

How much money is available in the HGMP?

The amount of funding available under a particular disaster declaration is allocated according to a legislated formula. The formula provides 15% of FEMA's estimated total disaster costs available in the form of HMGP funds. The state sets priorities and allocates funding among applicants that meet program objectives. FEMA can fund up to 75% of the eligible costs of each project. The state or grantee must provide a 25% match, which can be a combination of cash and in-kind sources. Funding from

other federal sources cannot be used for the 25% share except for Community Development Block Grant moneys.

How are projects selected for funding, and by whom?

The State is responsible for defining a project identification and selection process, ranking and prioritizing projects for funding, and forwarding projects to FEMA for approval. States evaluate projects according to the state's Hazard Mitigation Plan priorities. Approved projects are carried out by the applicant or sub-grantee.

How long will it take to get my project approved under HMGP?

Once eligible projects are selected by the state, they are forwarded to the FEMA Regional Office where they are reviewed to ensure compliance with Federal laws and regulations. One such law is the National Environmental Policy Act, passed by Congress in 1970, which requires FEMA to evaluate the potential environmental impacts of each proposed project. The time required for the environmental review depends on the complexity of the project.

How can I get more information about the HMGP?

For further information on the Hazard Mitigation Grant Program, contact your State Hazard Mitigation Officer, Roxann Gray, at (608) 242-3211.

A Primer On Stormwater Management: Reducing the Impacts of Urban Runoff

By Dennis Dreher
Northeastern Illinois Planning Commission

The Problem

Conventional urban development dramatically increases the amount of

stormwater runoff generated by the landscape. The principal causes of this effect are impervious surfaces (streets, parking lots, and buildings) and compaction of soil due to construction activities. Instead of soaking into the ground, rainfall is converted quickly to runoff and is then eliminated from the site via sewers and channels.

Some common site development standards may actually worsen stormwater runoff problems. For example, modern standards that require wide streets, expansive parking lots, and artificial drainage systems produce even more runoff than similar developments of 40 to 50 years ago.

In recognition of the effect that increased runoff has had on flooding, new development often incorporates stormwater detention to slow the release of runoff to downstream rivers. Unfortunately, this still leaves several runoff-related problems inadequately addressed.

- Stormwater runoff is contaminated with various water pollutants that are byproducts of such urban activities as automobile use, lawn care, and industrial fallout. If unchecked, these pollutants will damage the aquatic life, including fish, in downstream lakes, streams, and wetlands.
- Water that runs off urban landscapes can no longer recharge groundwater supplies. For communities that depend on locally recharged aquifers, resultant water shortages could limit future development and necessitate sprinkling bans and other restrictions.
- Urban runoff causes instability in the drainage system by (1) increasing the high flows, which can cause streams to rapidly erode, and (2) decreasing the

flows (or baseflows), which literally causes small streams and lakes to dry up and concentrates pollutants to damaging levels.

- Although stormwater detention can effectively reduce runoff rates, thereby controlling localized flooding, it does little to control the increased volume of runoff caused by urbanization. As a consequence, flooding continues to worsen on larger drainage systems.

A Solution: Alternative Site Designs

Fortunately, there are alternative stormwater drainage and site design approaches that can substantially reduce the identified impacts. These alternative development techniques, commonly called best management practices, or BMPs, involve measures that accomplish two basic objectives:

- They reduce the amount of impervious surface area, thereby reducing runoff; and
- They utilize the landscape to naturally filter and infiltrate runoff before it leaves the development site.

Interestingly, the recommended alternatives reflect both old and new design philosophies. Some mirror a design philosophy that existed before the 1950s and 1960 when 'modern' subdivisions began to spread across the landscape. Older developments, for example, often used natural drainage approaches and narrower streets. In other instances the alternative approaches, such as landscaping with native vegetation, emulate conditions that existed before the arrival of European settlers. Also recommended are innovative planning approaches, such as cluster developments, that have not yet been widely implemented in this region.

Recommended Site Design Alternatives

- Natural drainage measures: Drainage swales, vegetated filter strips, and other natural drainage approaches in contrast to storm sewers, lined channels, and curbs and gutters will reduce runoff volumes and greatly enhance the removal of pollutants from runoff water.
- Natural detention basin designs: Natural detention designs incorporate features of natural wetland and lake systems, such as gradual shoreline slopes, a border of wetland vegetation, and areas of open water – in contrast to conventional designs which feature dry bottoms or rip rap-edged wet basins. Natural designs are much more effective in removing stormwater pollutants than are conventional wet and dry bottom basins.
- Infiltration practices: Where soils are sufficiently permeable, infiltration trenches and basins dramatically reduce surface runoff volumes and naturally recharge groundwater.
- Permeable paving: Permeable paving blocks are recommended for low-traffic parking areas, emergency access roads, and driveways to reduce runoff volumes and pollutant loads.
- Natural landscaping: Natural landscaping uses native plants, particularly wildflowers, prairie grasses, and wetland species, instead of conventional turf grass and ornamental plants. It reduces both stormwater runoff and the need for maintaining conventional landscaping.
- Reduced imperviousness via alternative residential streetscapes: The area of impervious surfaces in a residential development can be reduced in several ways: utilizing narrower

streets and homes, thereby reducing the length of driveways; and minimizing sidewalk widths.

- Reduced imperviousness via alternative parking lot designs: Impervious surfaces also can be reduced in parking lots by downsizing individual parking stalls, sharing parking between adjacent users, adjusting peak demand assumptions, and/or banking parking until it is needed.
- Cluster development: Cluster development increases densities on portions of a development site to preserve natural land amenities and common open space on other parts of the site. This results in substantially less impervious area overall. Planned unit developments provide for greater flexibility in the site planning process, allowing the inclusion of many of the site design alternatives described above.

Summary of Benefits

When used in combination on a development site, these techniques can remarkably reduce both stormwater related impacts and construction costs. Based on assessments of case studies in northeastern Illinois and other parts of the country, it is estimated that alternative site design approaches can:

- Reduce stormwater runoff volumes by 20% to 170% (in comparison to conventional development);
- Reduce runoff pollutant loads by 60% to 90%;
- Reduce site development costs by \$1,000 to over \$4,000 per lot for residential developments and by \$4,000 to \$10,000 per acre for commercial/industrial developments.

Other documented benefits of these approaches include reduced infrastructure maintenance and replacement costs, improved protection of sensitive natural areas, enhanced aesthetics, higher property values, and greater flexibility of site design.

Tradeoffs

Clearly, not all of the recommended design approaches are applicable to all sites. While the recommended alternatives have obvious documented benefits, they also may have some disadvantages. From the developer's perspective, some of these approaches may entail more difficult and time consuming local government approval process.

From local government perspective, acceptance of some of these approaches will require education of local resident and still might result in complaints from some residents about "standing water" or

"weedy conditions." Some local planners or engineers may be hesitant because there is relatively little experience in some parts of the country with certain alternative design practices.

It is hope that eventually local officials and developers will thoroughly consider the tradeoffs between conventional and alternative site design approaches. They should weigh all the relevant factors, including construction costs, maintenance needs, public safety, aesthetics, and marketing considerations, as well as the obvious benefits.

- This topic is discussed in much greater detail in *Reducing the Impacts of Urban Runoff: The Advantages of Alternative Site Design Approaches*. This report, including extensive references, is available from the Northeast Illinois Planning Commission's Publications Department at (312) 454-0400.

Bureau of Water Regulation and Zoning
Wisconsin Department of Natural Resources
Box 7921
Madison, Wisconsin 53707-7921

"Floodplain – Shoreland Management Notes" is published by the Wisconsin Department of Natural Resources' Bureau of Water Regulation and Zoning. Our purpose is to inform local zoning officials and others concerned with state and federal floodplain management and flood insurance issues, shoreland and wetland management, and dam safety issues. Comments or contributions are welcome, call (608) 266-3093.

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