

Fall 2005

STORMS&FLOODS

The premier publication of the Illinois Association for Floodplain & Stormwater Management



INSIDE:

Map Modernization

Innovative Green Stormwater Design

NPDES Phase II Program

No Adverse Impact Floodplain Management

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CONTENTS

MESSAGE:

- 5** Message from the IAFSM
Call for Speakers: 2006 Annual Conference

EDITORIAL:

- 6** Who Says I Can't Build There?
Written by French Wetmore, CFM
- 8** The Flood Insurance Rate Map Modernization Project in Illinois:
Coming to a Location Near You
Written by John Bishop
- 10** I Don't Like This Floodplain Map
Written by French Wetmore, CFM
- 13** Innovative Green Stormwater Design
Written by Don Dressel, PE, CFM and P. Kay Whitlock, PE.
- 15** Legal Implications for No Adverse Impact Floodplain Management
Written by Edward A. Thomas, Esq.
- 19** Point/Nonpoint: An Introduction to the NPDES Phase II Program
Written by Jonathan M. Diller, PE, CFM and Tom Tomaszewski, CFM with Troy Golem

23 BUYER'S GUIDE

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CHAIR'S MESSAGE

A NEW JOURNAL FOR ILLINOIS FLOODPLAIN AND STORMWATER MANAGERS

Welcome to the inaugural edition of *Storms & Floods*. The Illinois Association for Floodplain and Stormwater Management was organized in 1986 to serve engineers, planners, code officials, and other professionals who want to protect their communities from the dangers and damage caused by flooding.

We have published our quarterly newsletter, IAFSM News, since 1990 thanks to French Wetmore who has served as editor. This publication serves to provide relevant information to our 450 members. Now, in 2005, we take another step. We have started this new journal to reach over 4,500 professionals, elected officials, and others interested in protecting people, property and natural functions from flood damage caused by nature and human development.

Storms & Floods is intended to reach a wide audience of both technical and lay people. This issue contains articles for code officials, planners, engineers, and attorneys, but they are all written so everyone can understand them. Some articles are timely and others provide basic information that can help you over the years. We hope that you will keep this edition as a reference or pass it on to others in your office or community.

We'd like to thank our authors for contributing, our editorial board for editing, and Matrix Group Publishing for putting it all together. Special thanks go to our advertisers, whose contributions have helped our Association reach an audience 10 times the size of our mem-

bership! Please check out their products and services.

If you are interested in floodplain and stormwater management and want to know more about how you can protect your community and your natural features, we recommend three courses of action:

1. Visit our website, www.IllinoisFloods.org for more information on resources, policies, programs, and the benefits of becoming a member of IAFSM.
2. Come to our annual conference, February 8 - 9, 2006, in Tinley Park. A Call for Speakers appears below.
3. Read and keep this journal!

Sally McConkey, Chair, IAFSM

CALL FOR SPEAKERS

Illinois Association for Floodplain and Stormwater Management (IAFSM)

2006 Annual Conference, March 8 & 9, 2006, Holiday Inn Select, Tinley Park, Illinois

EQUAL PARTNERS-Both Large and Small Community Floodplain and Stormwater Managers. The conference will provide an excellent training forum for Professional Engineers to earn professional development hours (2 PDH for original presentations and one for each hour of contact) and Certified Floodplain Managers to earn CECs. Floodplain managers, engineers, and community officials attend. Informative product, service, agency, and organization exhibits will be on display Wednesday, March 8. More information can be found at:

<http://www.illinoisfloods.org>

We are looking for speakers on floodplain and stormwater management topics (for both large and small local governments) such as:

- Cooperating Technical Partners
- FEMA's National Service Provider
- Map Modernization
- What is a DFIRM?
- Community adoption of digital floodplain maps
- Digital mapping tools & products
- Automated H&H and H&H software
- Advanced Survey techniques LIDAR/GPS
- Estimating BFEs in Zone A areas LOMCs
- Guided tours of FEMA's web site
- FIRMettes
- Community Rating System
- Floodplain Manager Certification
- No Adverse Impact
- Flood Insurance Reform Act of 2004
- Repetitive Losses
- Flood warning and response
- Flood hazard mitigation
- Floodplain / Stormwater regulations-compelling incentives for compliance
- Updating and implementing Floodplain and Stormwater Ordinances
- Flood proofing/acquisition programs
- HAZUS
- Increased Cost of Compliance
- Substantial Damage Estimation
- Pre-disaster mitigation funds
- Levee certification
- Legal Issues
- Navigating Local, State, & Federal Permits
- NPDES / non-point source pollution
- Stormwater/flood modeling
- Stormwater utility fees
- Integrating stormwater quantity & quality management
- Innovative stormwater design
- Intergovernmental Agreements
- Stream maintenance & restoration
- Watershed Stakeholder Groups
- Integrating floodplain, stormwater, & watershed management & planning
- Wetlands
- Disaster Mitigation Act of 2000
- Army Corps of Engineer's Programs

We are looking at three tracks in 2006. One track will be aimed at small governmental jurisdictions. One track will be aimed at large population governmental jurisdictions. The third track will be aimed at professional engineers. Please indicate which track your presentation would be aimed at.

Send the following information: Name, Affiliation, Address, Telephone Number, FAX, email, maximum 200 word vita & maximum 300 word summary of the talk, and audio-visual needs. See Web site for REQUIRED electronic format.

Please e-mail your information by October 28, 2005, to: E. Stuart Richter, Conference Chair, Whiteside County Development, 200 E. Knox St., Morrison, IL 61270, E-mail: srichter@whiteside.org

Notification of acceptance will be by Nov. 30, 2005.

WHO SAYS I CAN'T BUILD THERE?

WHO SAYS I CAN'T BUILD IN THE FLOODPLAIN?

BY FRENCH WETMORE, CFM, FRENCH & ASSOCIATES, LTD., PARK FOREST

Actually, "they" probably didn't say you can't build there. More likely your city or county official said you have to do certain things if you want to build in a place where floods will damage property and put people at risk.

There are 800 cities, villages, and counties in Illinois that have floodplain management ordinances that restrict what people can and cannot do in the floodplain. These are the communities that participate in the National Flood Insurance Program (NFIP).

If there is a floodplain map for your community, the odds are that your community is in the NFIP and has a floodplain management ordinance. If you're in doubt, ask a municipal or county official or an insurance agent. The latter should know if flood insurance can be sold in the community. If so, your community is in the NFIP and has to abide by some minimum requirements on what is allowable in the floodplain.

The governing document is the community's ordinance, but it has to meet some minimum State and Federal rules. The State rules are set by the Illinois Department of Natural Resources (IDNR), Office of Water Resources. The Office of Water Resources is charged by State law to prevent development projects in floodplains from adversely affecting other properties.

The Federal rules are established by the Department of Homeland Security's Federal Emergency Management Agency (FEMA), which administers the NFIP. As a condition of making flood insurance available within a community, the local governing board (city council, village board of trustees, or county board) agreed to abide by FEMA's rules. FEMA's NFIP rules focus on protecting buildings (flood insurance policies are limited to buildings and their contents).

The State and FEMA requirements that are in the local ordinance can be summarized under five basic rules. These are

reviewed in this article, but are spelled out in much more detail in the Illinois Association for Floodplain and Stormwater Management's Floodplain Management Home Study Course. You can see the Home Study Course and download it for free at: www.IllinoisFloods.org.



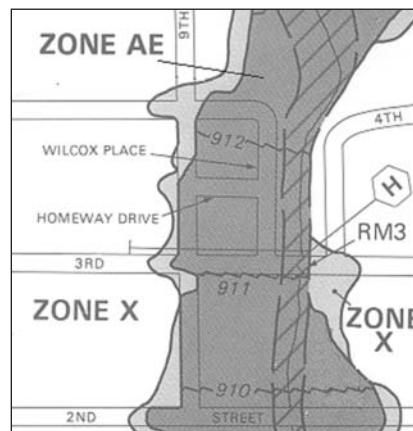
The floodplain management ordinance guides development to prevent or minimize damage from future floods.

Rule #1

The official floodplain map is the Flood Insurance Rate Map.

The Flood Insurance Rate Map or "FIRM" is published by FEMA, approved by IDNR, and adopted by the community. It may show all or part of the following:

- A shaded zone designated by the letter "A." This is the area subject to inundation by the 100-year flood (e.g., the Zone AE in the example below).
- A lighter shaded area. This is the 500-year floodplain, designated as a "B" or "X" Zone.
- A white area, designated as a "C" or unshaded "X" Zone. This is not mapped



as floodplain but may well have local flooding or drainage problems.

- Slanted lines within the A Zone. This is the regulatory floodway where special rules apply. It is comprised of the channel and the deeper, faster flowing portion of the A Zone.

You can see the FIRM for your community at your local building, permit or planning office. You can also see and download a "FIRMette" for an area from the Flood Map Store on FEMA's website-<http://store.msc.fema.gov/>. If you think the FIRM has incorrectly shown a property in the floodplain, see the article "I Don't Like This Floodplain Map."

Rule #2

All development in the A Zone must have a permit from the community.

"Development" is defined as "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."

In other words, if you're going to change the shape of the ground in the floodplain, or put something of value on it, then you need to go the community and get permission. That's the only way the community can make sure that all the State, Federal, and local requirements will be met.

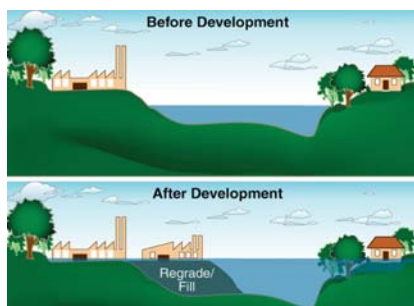
Rule #3

Development must not increase the flood hazard on other properties.

Development along a river or other channel cannot obstruct flows so as to cause an increase in flooding on other properties. The best way to make sure this is done is to stay out of the regulatory floodway.

If the property is in the floodway, or if there is no floodway mapped, an analysis must be conducted to measure the cumulative effect of the proposed development, when combined with all other existing and anticipated development. The analysis is submitted to IDNR as part of an application for a State floodway permit. Unless

“The floodplain management ordinance guides development to prevent or minimize damage from future floods.”



Floodway regulations keep new development from sending floodwaters to other properties

the project is very small and won't obstruct flood flows, you'll need an engineering study.

The IDNR has the State floodway permit application form as well as a list of allowable Statewide Permit activities listed at:

http://dnr.state.il.us/owr/resman/permitprogs.htm#Letter_G

Rule #4

New buildings must be protected from flood damage.

New buildings may be built in the floodplain, but they must be protected from damage by the 100-year flood. The lowest floor of residential buildings (including basements) must be elevated to or above the flood protection elevation stated in the ordinance. Nonresidential buildings must



Commercial building elevated on fill be either elevated or flood proofed.

A key part of this requirement is that the permit office must have a record of

how high the building was elevated. This is usually done by a surveyor, who completes a FEMA Elevation Certificate after the building is built and before the community issues a certificate of occupancy.



Residence elevated on crawlspace. [Note openings close to the ground to allow floodwaters to flow through and not place pressure on the walls.]

Rule #5

A substantially improved building is treated as a new building.

The regulations define “substantial improvement” as “any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement.” This requirement also applies to buildings that are substantially damaged.

Northeastern Illinois

The State Legislature and IDNR set additional rules for Cook, DuPage, Kane, Lake, McHenry, and Will Counties. For example, no new buildings are allowed in the floodway in those six counties.



NAI and CRS

Now, what has been reviewed are the minimum State and federal requirements. Communities are encouraged to adopt ordinances that are more

comprehensive or provide more protection than the NFIP or IDNR criteria. For these reasons, your local ordinance may be more stringent than the rules that are covered in this article.

An excellent series of handouts and publications on why and how communities can do this can be found in the Association of State Floodplain Managers' No Adverse Impact (NAI)



Instead of meeting minimum rules that protect new development from flood damage, one NAI approach is to preserve the floodplain as open space, i.e., development not subject to damage

website, found at www.floods.org. Communities that do exceed the NFIP's minimums can receive insurance premium credits for their residents under the Community Rating System (CRS).

For more information:

- Floodplain management rules in Downstate communities: Paul Osman, 217/782-4428, Posman@dnrmail.state.il.us
- Floodplain management rules in Northeastern Illinois: John Lentz, 847/705-4570, Jlentz@dnrmail.state.il.us
- Community Rating System: Scott Cofoid, 815/220-1002, SCofoid@iso.com ❖

COMING TO A LOCATION NEAR YOU

The Flood Insurance Rate Map Modernization Project in Illinois

BY JOHN BISHOP, ILLINOIS DEPARTMENT OF NATURAL RESOURCES, SPRINGFIELD

The community of people responsible for floodplain management in Illinois are a savvy group. Attend an Illinois Association for Floodplain and Stormwater Management (IAFSM) sponsored conference as I did in February 2005 and you realize pretty quickly that these people are dedicated to their mission, proud of what they do, and keenly aware of the newest developments in their field. "Hip" is probably not a word that most of them would apply to themselves, but with respect to floodplain issues it applies. Thus, it was with some trepidation that I accepted an invitation to write a brief article about the Map Modernization Project in Illinois for the inaugural issue of this journal. What could I tell these hip floodplain people about the program that they didn't already know? Surely everyone by now has heard the broad outline of the FEMA mapping project.

"As part of its effort to modernize the nation's flood maps, the Federal Emergency Management Agency has partnered with state and local government to convert existing flood insurance rate maps to a newer countywide Geographic Information System (GIS) format. The new digital mapping format will address all communities within a county by consolidating community-based maps into a single countywide set of digital maps. This initiative, known as the Flood Map Modernization Program, will make flood risk maps easier to use and more readily available both in digital and hard copy format. It is anticipated that the conversion of existing effective maps will take place over a 5-year period."

IDNR Presentation at Peoria
IAFSM Conference
February 22, 2005

There aren't any juicy behind-the-scenes tidbits about the Map Modernization program that I can share with readers; no one has shared any with me. Besides, this is after all a government program and, therefore, unlikely to be connected with anything considered remotely juicy. Consultation with my colleagues convinced me that the most informative (if not titillating) article would be one

which presents the project schedule and describes for floodplain managers what they can do to prepare for the conversion of their paper maps or older style digital maps to a new GIS format. So here goes.

Timing: In 2004, FEMA released its Multi-Year Flood Hazard Identification Plan (MHIP), which has a schedule of studies by county based on an examination of several criteria including population and housing characteristics and various risk factors including number of flood insurance policies in effect and repetitive losses and claims. Certain refinements were made to the schedule to smooth out the flow of money, to balance urban with more rural counties, and to leverage other ongoing research that might impact mapping in a particular county.

It was anticipated that minor changes to the sequencing of county studies would occur occasionally over the course of the 5-year project. One such example occurred early in 2005 when the decision was made to group counties along the Mississippi River to more systematically incorporate the *Upper Mississippi River Flow Frequency Study* (US Army Corps of Engineers, August 2003) and the *Upper Mississippi River Floodway Computation study* (draft report, June, 2004) both funded by FEMA. FEMA plans to update the MHIP twice a year. The latest version can be seen at www.fema.gov/fhm/mh_main.shtm.

Calhoun County and Jersey County were moved back one year while Alexander County and Union County were moved up one year on the schedule. The map on the next page summarizes the projected schedule and shows this recent revision. The counties of Alexander, Union, Jackson, Randolph and Monroe will commence in the latter part of calendar year 2005. Jersey, Calhoun, Pike and Adams county are slated for funding in 2006. Counties north of Adams are scheduled for future years.

One thought to keep in mind when examining the map is that it depicts the calendar year in which the project is started. Typically conversion to the new GIS format is minimally a 15 month process.

For the 2005 counties, IDNR expects to have signed agreements with FEMA to begin work in July, although some preliminary work has already begun, such as developing community mailing lists and synthesizing the Pre-scoping reports prepared by Michael Baker Corporation for each county. These reports examine the current state of mapping in the county from several perspectives.

Project Team Meetings: By the time this journal issue is distributed, the IDNR staff will be holding Project Team and Scoping meetings in each of the calendar year 2005 counties. Project Team meetings are a chance to introduce the project to county staff as well as staff from the larger communities within the county, and to seek their help in establishing a date, time, and location for the Scoping meeting. Additionally, the Project Team can be a forum to discuss mapping issues and priorities and to ascertain whether base map information exists at the local level which could augment the map conversion process. Project Team members can be floodplain administrators, county engineers, GIS managers, building inspectors, or anyone with flood mapping knowledge that the county or community CEO assigns as a representative to the Project Team.

Scoping Meetings: Unlike the Project Team meeting, the Scoping meeting is intended for a broader audience. All communities within the county as well as county personnel are invited to attend. The purpose of the meeting is to elicit from attendees any information that will help to refine the time and cost estimate for map conversion within that particular county. Participants might, for example, provide information on new studies that should be included in the mapping, assuming these studies have been reviewed and approved by FEMA. Additionally, meeting attendees might point out errors or omissions in the current effective flood map so that these can be addressed in the map conversion. Any information that will help

to better define the scope of the project will be appreciated.

Map Conversion: In conjunction with the Project Team and Scoping meetings, the State Water Survey as the mapping partner in the project, will be preparing for the actual map conversion work. This is a multi-step process involving the use of U.S. Geological Survey orthophotography and topographic information (or locally available information of more recent vintage and/or higher resolution) to properly align flood hazard boundaries on the new digital map. Included in this process is incorporation of new studies approved by FEMA and Letters of Map Change, which represent exceptions or corrections to the current effective flood map.



“Close attention to details during the map conversion phase and good base map information” are key to producing a better quality product, according to Sally McConkey, Mapping Program Manager at the State Water Survey. High resolution topographic information such as that developed from Light Detection and Ranging (LIDAR) mapping is also crucial. “Contour data with 2 to 5 foot intervals, if available, will permit us to more quickly and more accurately depict floodplain boundaries on the new maps,” according to McConkey.

What you can do: Like the old adage about the three most important factors in

real estate being location, location, and location, in floodplain mapping the three factors are preparation, preparation, and preparation. Scoping meetings are most successful and productive when there is full participation from communities and local stakeholders, according to Karen Miller, Chief Scoping Officer for the Map Modernization Project.

To this end there are several things that counties and communities can do to ensure a successful map conversion. Chief among the steps is to make certain that the appropriate person represents your community. Sometimes meeting notices get lost or the person with floodplain responsibilities is overlooked when the CEO assigns a person to cover the meeting. This is a simple but critical point. If someone who should be at the Scoping meeting is left out key information may be omitted from the process or take longer to reach the staff who make the maps. Be aware of where your county falls on the schedule (reference the map) and please call the IDNR Office if you are uncertain about the sequence of steps leading up to the actual conversion and adoption of your county's maps. A graphic of the major steps in the Map Modernization program appears to the right.

Equally important, you should submit any flood studies which have been completed since the date of the effective FIRM to FEMA for review and approval. Because of a tight budget and project timeline, the Illinois Map Modernization Program cannot guarantee that study data which has not been previously approved by FEMA will be included in the new maps.

If recent topographic mapping, aerial photography, and other base mapping (such as street centerlines and annotation, streams, and political boundaries) is available for your community or county, please be prepared to help us evaluate the quality and characteristics of this information with respect to accuracy, resolution, file format, vintage of the data, geographic area of coverage, etc. FEMA requires that data used in the mapping process meet strict specifications for accuracy and resolution. The Map Modernization project needs to know not only that data are available but the quality of the data as well.

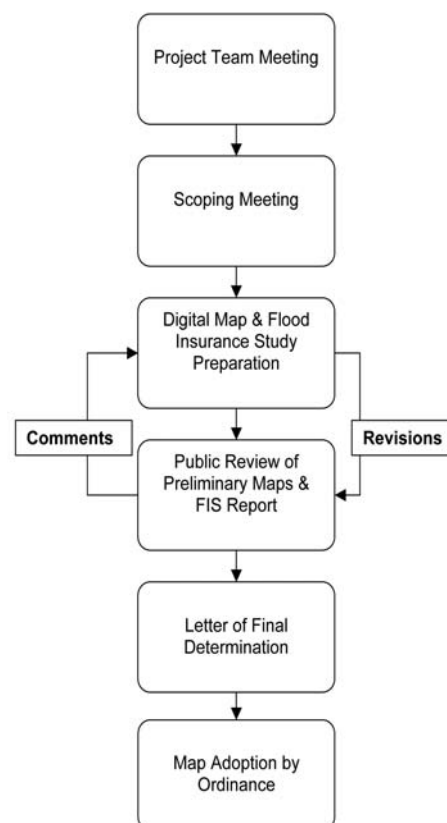
Be on the look-out for mailings from the Illinois Map Modernization Program. A hand-

out is mailed with Scoping meeting invitations with suggestions of things to think about prior to the meeting and things to bring to the meeting. Based on this handout, jot down important information that you wish to transmit to our staff. Typed or handwritten notes are most useful and are reviewed by IDNR staff after the meeting and are summarized in a scoping meeting report.

Last but not least, communities and the county should be prepared to check the accuracy of the list of Letters of Map Change (LOMAs, LOMRs, or LOMR-Fs) that is distributed at the Scoping Meeting. An accurate list will permit the Map Modernization Program to correctly categorize LOMCs for incorporation, revalidation, or additional review, and include only those that should be included in the new maps.

Map Modernization in Illinois is a reality. The first group of counties begun in late 2004 are well on their way to being converted and the activities and budgets for the next round are awaiting approval from FEMA. Staff and equipment are being added to the program and soon Map Modernization will be coming to a location near you. So be prepared. ❖

Major Components of the Map Modernization Process



I DON'T LIKE THIS FLOOD PLAIN MAP

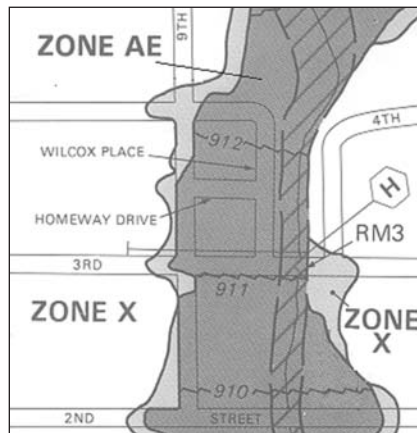
DON'T LIKE THE MAP? YOU HAVE SOME OPTIONS.

BY FRENCH WETMORE, CFM, FRENCH & ASSOCIATES LTD., PARK FOREST

More than 800 communities in Illinois have floodplain maps published by the Department of Homeland Security's Federal Emergency Management Agency (FEMA). FEMA administers the National Flood Insurance Program and needs maps

- To show where insurance is required,
- To help set the premium rates, and
- To help local government regulate future construction.

This official map is called the Flood Insurance Rate Map or "FIRM." It is published by FEMA and adopted by the community. It shows the 100-year floodplain as a shaded zone, designated by the letter "A." How the State and the community use it is discussed in the article on "Who Says I Can't Build There?".



Typical FIRM format

If a property is in the A Zone, it is affected by the following programs:

- A flood insurance policy will be required if the building is used to secure a mortgage, second mortgage, or home improvement loan from a lender that is regulated or insured by the Federal government. Almost all banks and other lenders are affected by this rule. Most people first meet up with it when they secure a mortgage and the bank tells them that a flood insurance policy is required.
- A flood insurance policy will be required if the property receives Federal financial assistance, such as a VA loan or FEMA disaster assistance (even if the disaster was not a flood—if the property is in a floodplain, insurance is required).

- A flood insurance policy generally costs more for properties in the floodplain. This makes sense—charge more where we know there's a hazard.
- A local (and perhaps a State) permit will be needed if the owner wants to build, improve, remodel, add on, regrade, or otherwise modify the property.

MISCONCEPTIONS

Because being in a designated A Zone has so many impacts, property owners are concerned if the map appears to be inaccurate, especially if they've never been flooded. So, let's clear up three misconceptions.

Misconception #1: It has never flooded here, so how can it be a floodplain?

The map is designed to display the 100-year flood, not the worst flood people can remember. Floodplain management programs are based on the risk of future flooding. Flood studies extrapolate from historical records to determine the statistical potential that storms and floods of certain magnitude will recur. Such events are measured by their "recurrence interval," i.e., a 10-year storm or a 50-year flood.

These terms are often misconstrued. Commonly, people interpret the 100-year flood definition to mean "once every 100 years." This is incorrect. Statistically speaking, a 100-year flood has a 1/100 (1 per cent) chance of occurring in any given year. In reality, a 100-year flood could occur two times in the same year, two years in a row, or four times over the course of 100 years. It is possible to not have a 100-year flood over the course of 100 years.

During the typical 30 year mortgage, a house in the A Zone has a 26 per cent (1 out of 4) chance of being hit by the 100 year flood. If a house is low enough, it may be subject to the 10- or 25 year flood. The odds are 96 per cent (nearly guaranteed) that a 10 year flood will occur during the 30-year period. Compare those odds to the only 5 per cent chance that the house will catch fire during the same 30 year mortgage.

Misconception #2: We had the 100-year flood and it wasn't as bad as the map says.

Are you sure you had a 100-year flood? The term has been used a lot in the mass media, but there really haven't been that many 100-year floods recently. Heavy storms don't always produce large floods and sometimes a prolonged wet period (as in 1993) only needs a small storm to cause a flood. In some places, but not all, the 1993 Mississippi River flood exceeded the 100-year level.

Some floods are very localized. Many people hear that a 100-year flood occurred somewhere and assume that if they weren't affected, they must be out of the A Zone. In July 1996, Aurora got hit with a record rainfall, but that doesn't mean that Naperville or other nearby areas were hit by a 100-year flood.

Misconception #3: You can't fight City Hall or the Federal government, so we're stuck with a bad map.

Not so. Federal, state and local agencies all want accurate maps, but FEMA has a limited budget to pay for engineering studies of all the floodplains in the country, and works with available maps, which usually do not show many details, may not be based on accurate ground elevations, and become outdated as development occurs.

CHALLENGING THE MAPS

No map is perfect and no flood situation is static. FEMA maps are based on the best information available at the time the study was completed. FEMA knows its maps' limitations and has procedures for revising them to reflect better or more recent information.

Depending on the situation, there are three approaches that one can follow:

- Provide better ground elevations that show that your property is higher than the flood elevation,
- Provide new flood information that shows that your property is not floodprone, or
- Show that the bank is reading the map wrong.

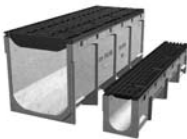
Let's summarize each approach and show you where you can get more information.

Better ground information: Especially in flat Illinois, it is hard to find a map
Continued on page 12



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that shows accurate ground elevations. The topographic or contour map used in the flood study cannot show every building that is on ground slightly higher than the flood level. When this is the case, the property owner can apply for a Letter of Map Amendment, or "LOMA."

What is needed: More accurate ground elevations on a FEMA form MT-EZ, signed and sealed by a licensed architect, engineer, or surveyor.

For a lot with a building on it: It must be shown that the lowest adjacent grade of natural ground is at or above the map's 100-year flood elevation. "Lowest adjacent grade" is the lowest point around the outside of a building where soil touches the foundation.



If a survey shows the elevation of the lowest adjacent grade next to a building to be higher than the base flood elevation, then the owner may apply for a Letter of Map Amendment to document that the site is out of the A Zone.

For a vacant lot: It must be shown that the lowest elevation within the boundaries

of the property is at or above the map's 100-year flood elevation.

For new fill: If fill has been placed (legally) in the floodplain, a Letter of Map Revision based on Fill (LOMR-F) can be requested. Again, an engineer or surveyor needs to certify the new ground elevations. FEMA form MT-1 is used. In addition, the local official must sign off that the site is reasonably safe from flooding.

For more information:
www.fema.gov/fhm/dl_mt-ez.shtm

Better flood information: Under this approach, you're challenging the FEMA flood study by saying it's in error or incomplete. For example, it may not reflect a recent construction project that enlarged a bridge opening and eliminated backwater flooding. Or, the FIRM may not have included a flood elevation and now you have one. If this is the case, you can request a map revision or, more common for individual properties, a Letter of Map Revision ("LOMR").

It is important to note that many small projects, such as channel clearing, low-level dams, private levees, land treatment, or retention basins in new subdivisions are most useful to reduce smaller, more frequent flooding. They may not have measurable effects on the 100-year flood, and, therefore, often do not warrant a map change.

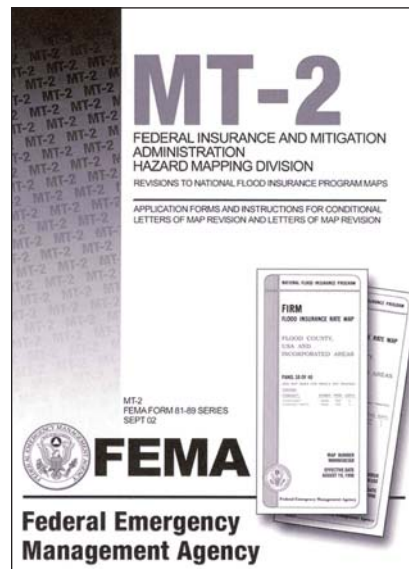
What is needed: A new flood study prepared by a licensed engineer who is familiar with FEMA flood study guidelines. FEMA form MT-2 is used to request a map revision or a LOMR.

For more information:
www.fema.gov/fhm/dl_mt-2.shtm

Better map reading: The Flood Disaster Protection Act requires banks, other lenders, and Federal agencies to determine if a loan or other financial assistance is for a property located in an A Zone. Many banks and lenders hire contractors to do their flood map determinations.

The borrower may feel that the lender or the map determination company misread the map. For example, insurance is only required by law if the building is in the floodplain. In some cases, a vacant portion of the lot may be in the floodplain, but the part the building is on is obviously out. The map determination company may not have information that shows where the building is and played it safe by telling the bank the property is in the A Zone.

In such cases, the first step is to show the correct information, (e.g., a lot survey showing the building's location) to the lender. If the lender is not willing to change the determination, the owner can ask FEMA for a determination review.



FEMA's MT-2 form

What is needed: A Flood Hazard Determination Review is requested jointly by the owner and the lender. Requests must be postmarked not later than 45 days following the date the lender notified the borrower that the property is in an SFHA.

Many banks feel they are legally bound to their contractor's flood zone determination. This is not true. The Federal law simply requires the bank to make a "good faith determination." If your information is more accurate than the zone determination company's, the bank can use it in the loan portfolio.

For more information: See FEMA's website, www.fema.gov/nfip/lomri.shtm, for the latest instructions and addresses.

If the submittal is complete and on time, FEMA will issue a Letter of Determination Review (LODR). This review does not result in an amendment or revision to the FIRM. It is only a finding about the location of a building relative to the A Zone. A LODR only affects the Federal requirement for purchase of flood insurance. If it is concluded that the map is in error, a Letter of Map Amendment can be requested.

Important note: A LODR or LOMA only clarify that flood insurance is not required by Federal law. The lender always has the option to require flood insurance as a condition of providing financing, regardless of the location of the structure. ❖

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INNOVATIVE GREEN STORMWATER DESIGN

BY DON DRESSEL, PE, CFM AND P. KAY WHITLOCK, PE. CHRISTOPHER B. BURKE ENGINEERING, LTD. ROSEMONT

Urban stormwater management has made progress in recent years toward environmental sensitivity, aesthetics and multiple purposes that better serve the urban environment. The rectangular, trapezoidal basins of the early years have been rejected as aesthetic blights in our communities with no value except storing site stormwater. Land is too highly valued and our population expects better solutions. The development community has accepted the need for stormwater management and has demanded solutions that are enhancements rather than the eyesore of the past.

As a result, several innovative projects in northeastern Illinois have met these higher expectations. They cover a wide range of application from regional facilities serving multiple watersheds to parking lot surface water management. Here are some specifics about the unique features of a few of these solutions.

BMPs at the Morton Arboretum

The Morton Arboretum prepared a Stormwater Management Plan, which was approved by DuPage County Department of Development and Environmental Concerns as a guideline for the permitting of more than \$20 million in projects scheduled to be completed between 2000 and 2020 as part of the "Morton Arboretum Master Plan for Year 2020." The highlights of the Stormwater Management Plan include:

- **Regional Stormwater Detention Facilities:** The 1,725-acre Morton Arboretum falls within 3 major watersheds in DuPage County: Willoway Brook, the East Branch of the DuPage River, and Lacey Creek. Rather than providing a small stormwater detention basin for each proposed project, the Stormwater Management Plan outlined a plan that called for The Morton Arboretum to construct one stormwater management facility in each of the three watersheds. The stormwater detention required for development in a watershed could be provided in the one centralized location that will provide maximum environmental benefit to the watershed while allowing The Morton Arboretum to provide the highest quality experience to its visitors.
- **Centralized Wetland Mitigation:** Wetland mitigation is the process of creating new wetland areas and/or enhancing existing degraded wetlands in order to compen-

sate for the removal of a wetland as part of a project. The wetland mitigation that was required as a result of development associated with the Master Plan was provided in two wetland mitigation areas. This allowed the Morton Arboretum to mitigate minor impacts to wetlands on a site-wide basis and to consolidate wetlands to achieve a higher success rate.

- **Green Parking Lot:** Best Management Practices (BMPs) have been incorporated into the design of the 5-acre Main Parking Lot to the Arboretum. The environmentally sensitive (green) design protects water temperature and quality. The Main Parking Lot is located in the floodplain of the East Branch of the DuPage River, and stormwater runoff from the parking lot drains to Meadow Lake. The design of the Main Parking Lot includes the following environmental BMPs:
- **Porous Pavement:** The Main Parking Lot surface is composed of "Eco-Lock" Pavement that allows water to drain through the pavement to stormwater storage areas below the parking lot.
- **Depressed Medians:** The medians were



The green parking lot

vegetated and depressed with curb cuts so that stormwater runoff from the Main Parking Lot will drain into medians and have a chance to be absorbed before draining into the storm sewer system.

- **Subsurface Stormwater Storage:** The base material for the Main Parking Lot contains up to 35% voids that provide significant stormwater storage. The subsurface storage will also recharge the groundwater table in the vicinity of the parking lot.
- **Wetland Sedimentation Basin:** The parking lot storm sewer system outlets into a wetland sedimentation basin to filter out pollutants and provide cooling time for the flows before draining into Meadow Lake. These BMPs are in place and functioning

while providing parking for 500 cars and buses. The parking lot is used year-round and is becoming a demonstration project on how stormwater and pollutants can be best handled in an urban environment.

Parkside Park Detention

The initial project need was to provide stormwater storage for a new condominium development in downtown Roselle. Due to limited available land within the downtown area, an existing park owned by the Roselle Park District was selected to provide the required detention storage. The Village, its consulting engineer, and the Park District developed a very successful multi-purpose facility to serve the broader Roselle population.

The park, which consisted of older baseball fields, was lowered several feet to provide the detention storage. Modern park facilities were then installed to include a Skate Park, Pony League baseball field and Miracle League baseball field. The Skate Park includes low-maintenance concrete ramps. The Pony League baseball field has an outfield fence, warming track and fenced backstop and dugouts.

The Miracle League field is specially designed for individuals with mobility impairments. The special surface and ADA-accessible design make playing baseball possible for those who otherwise would have to participate only as a spectator. The Miracle League Field is located next to the Marklund Center for the disabled and has become a very popular and loved recreation opportunity.

Park improvements were implemented through a combination design/build contract for the detention and park features. Roselle Park District and the Village of Roselle are very proud of the popularity of the new park facilities and the Miracle League Field, all of them incorporated into a detention basin.



Miracle League ball field

Pottawatomie Park

In August of 2001, the Village of Tinley Park studied existing flooding problems in the Timber's Edge Subdivision and recommended

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flood control alternatives to provide relief. The Village formed a Pottawatomie Park Steering Committee that was composed of Village and Park District officials, consulting engineers, landscape architects and Timber's Edge residents. The Steering Committee established design criteria for the function of the flood control facility and the amenities of the future park.

A plan was developed with the Village to accomplish Village goals through construction of a multi-purpose facility. The recommended design was to utilize an existing park within the Subdivision, Pottawatomie Park, as a dry-bottom floodwater storage facility. Pottawatomie Park is located upstream of the corridor within the Subdivision that experienced the greatest amount of flooding. The design of the flood control facility was based on diverting floodwaters into a 17 acre-foot flood control facility during severe storm events to reduce the burden on the downstream storm sewer system.



Pottawatomie Park after heavy local storms before and after the project

The Pottawatomie Park Flood Control Facility was designed to provide 100-year flood protection to the residential structures in Timber's Edge Subdivision. However, the contributions of this project to the residents of Timber's Edge are not limited to flood control. In reconstructing the existing park, the Village added many new amenities including a 1/2 mile walking path, 70 new trees, a softball field, a soccer field, rest areas with park benches and trash receptacles, a new bridge and an underdrain system. These park enhancements represent a significant effort on the part of the Village of Tinley Park to provide a dual-purpose park and flood control facility that would benefit all residents of the Timber's Edge Subdivision. ♦

LEGAL IMPLICATIONS FOR NO ADVERSE IMPACT FLOODPLAIN MANAGEMENT

BY EDWARD A. THOMAS, ESQ., MICHAEL BAKER INC, BOSTON, MA

I have a simple message for you today: The National Flood Insurance Program (NFIP) and the concept of No Adverse Impact (NAI), which is a further extension of the philosophy of the NFIP, have profoundly deep legal roots, and if properly applied, should resist legal challenge.

As someone who has spent over 30 years working on disaster response and recovery, it is awesome how much misery that the NFIP has prevented. Misery prevented to home and business owners who are not flooded; misery prevented to our environment which does not have buildings and their contents spread across the landscape by floodwater, and misery prevented to the taxpayer, who does not have to pay to clean up flooded buildings.

NAI: NAI or No Adverse Impact is defined as "...an approach that ensures the action of any property owner, public or private, does not adversely impact the property and rights of others." This principle makes a community look at what really needs to be done to prevent damage to people, property, and the environment. This concept requires looking beyond business as usual, including rote reliance on local, Federal and State minimum standards. The NAI principle kicks the NFIP up a notch or two!

NAI is a PRINCIPLE that leads to a PROCESS which is legally acceptable, non-adversarial (neither pro- nor anti- development), understandable, and palatable to the community as a whole. The process clearly establishes that the "victim" in a land use development is not the developer, but rather the other members of the community who would be adversely affected by a proposed development. Developers are liberated to understand what the community's con-

cerns are so they can plan and engineer their way to a successful, beneficial development.

Is this some new concept that the Association of State Floodplain Managers cooked up? No, it is a very old idea. So old that it is a Maxim of ancient Roman Law:

"Sic utere tuo ut alienum non laedas"

Or in English: "Use your own property so that you do not injure another's property."

The bottom line: No Adverse Impact is consistent with ancient common law. But what about today's world? Floodplain and stormwater management regulations restrict how one can use or develop one's property. There are legal limits on how restrictive such regulations can be. If they are too restrictive, courts can rule the regulations as a "taking."

Taking: The US Constitution's 5th Amendment states "...nor shall private property be taken for public use without just compensation." There have been some famous court cases that clarified this, notably *Pennsylvania Coal Company v. Mahon*, 260 US 293 (1922) which stated that a government regulation can restrict the owner's freedom to use his property to such an extent that it can constitute a "Taking."

Over the last few decades, there has been an increase in "Taking" issue cases and related controversies involving development. Many people think that developers are winning and that governments are retracting their regulations. However, some of us in the field have reviewed these cases as they applied to protecting people and property from a hazard. We have seen a common thread: *the courts have modified common law to require an increased standard of care*

as the state of the art of hazard management has improved.

State and local governments are vastly more likely to be sued for permitting development that causes problems, such as roads, stormwater systems, and bridges, than they are for prohibiting such development. There have been almost no hazard based regulations held to be a taking. Almost none! On the other hand, there have been many, many cases where communities and landowners were held liable for harming others.

SITUATIONS WHERE GOVERNMENTS MAY BE HELD LIABLE

- Construction of a road blocks drainage
- Stormwater system increases flows
- Structure blocks watercourse
- Bridge built without adequate opening
- Grading land increases runoff
- Flood control structure causes damage
- Filling wetland causes damage
- Issuing permits for development that causes harm to a third party

What is a Taking? The United States Supreme Court recently issued a ruling in the Case of *Lingle V. Chevron* (No. 04-163, decided May, 23, 2005). That unanimous opinion of the Court sets forth the following bases for ruling in favor of a property owner's claim of regulatory Taking:

1. *Physical Invasion*, as in *Loretto v. Teleprompter Manhattan*, 458 US 419 (1992). The Loretto Case involved a New York City requirement that all residen-

tial buildings must permit a cable company to install cables, and a cable box the size of a cigarette pack. The Court held that any physical invasion must be considered a Taking.

2. *A total, or near total regulatory Taking*, as exemplified by the case of *Lucas v. South Carolina Coastal Council*, 505 US 1003 (1992). In this case, plaintiff Lucas was prohibited from building a home on the only vacant lots left on an otherwise fully developed barrier beach just outside Charleston.
3. *A significant, but not nearly total Taking*, as exemplified by the *Penn Central Transportation Company v. New York City*, 438 US 104 (1978) where the railroad was not permitted to build above Grand Central Station in New York City to the full height permitted by the overlay zoning in the area for Historic Preservation reasons. The company was provided transferable development rights, and the Court held that the Historic Preservation regulation was not a Taking.
4. *Land use exactions which are not related to the articulated government interest*, as in *Nollan v. California Coastal Commission*, 483 US 825 (1987). The Coastal Commission conditioned a permit to expand an existing beachfront home on the owner granting an easement to allow the

public to cross his beachfront land. The articulated government interest was that the lateral expansion of the home would reduce the amount of beach and ocean visible to the public from the road. The Court indicated that preserving public views from the road really did not have an essential nexus with allowing folks to cross a beach. The Court also cited the *Dolan v. Tigard*, 512 US 374 (1994) case where someone wanted to expand a plumbing store and the community wanted the store to give the community some adjacent floodplain property and an easement for a bike path in return for the possible increase in traffic caused by the expansion of the store. Again, in *Dolan*, the court basically indicated that there was really no relationship between the government interest and the exaction attempted.

In *Agins v. City of Tiburon*, 447 US 255 (1980), the Court had established a two part test for determining a Taking: 1) whether the regulation substantially advances a legitimate state interest and 2) whether the regulation denies the owner an economically viable use of the land. In the recent *Lingle* ruling, the Court specifically indicated that it will no longer use the first part of this test. The removal of the "substantially

advances a legitimate state interest" Takings test is a huge help to floodplain managers, to the concept of NAI, and to planning in general. The "substantially advances" test has been used as a screen for a "substantial due process" inquiry to second guess legislatures and regulators all over the country.

The Court summed up its reasoning by stating that the tests articulated "...all aim to identify regulatory actions that are functionally equivalent to a direct appropriation of or ouster from private property..."

What a community can do: When NAI planning is done and the community's plans and regulations look like they may meet resistance from landowners and developers, here are some hints to help frame the product to avoid a Taking ruling:

- Avoid interfering with the owner's right to exclude others. See, *Loretto v. Teleprompter Manhattan*, *supra*.
- Avoid denial of all economic use. See *Lucas*, *supra*.
- In highly regulated areas, consider transferable development rights or similar tool so the land has appropriate value. See, *Penn Central Transportation Company v. City of New York*, 438 US 104 (1978).
- Clearly relate the regulation to preventing a hazard. See, *Annicelli v. Town of South Kingston*, (Rhode Island Supreme Court) 463 A. 2d 133 (1983); contrasted with the recent excellent case upholding denial of a permit to build in a Special Flood Hazard Area, *Gove v. Zoning Board of Appeals of Chatham, Massachusetts*, *Massachusetts Supreme Judicial Court*, decided July 26, 2005.
- You'll have even better odds if there is flexibility in the regulation and the community applies the principle to its own activities.
- See, also American planning Association (APA) "Policy Guide on Takings" adopted in 1995.

Property owner's rights: When you consider its basic concept, NAI has broad support. For example, the Cato Institute is a conservative think tank closely associated with the "Constitution in Exile," the "Property Rights



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“As someone who has spent over 30 years working on disaster response and recovery, it is awesome how much misery that the NFIP has prevented”

Movement,” and other similar causes. The Institute stated that *compensation is not due when:*

“...the government acts to secure rights—when it stops someone from polluting his neighbor...it is acting under its police power...because the use prohibited...was wrong to begin with.” “Protecting Property Rights from Regulatory Takings” (the Cato Institute, 1995, Chapter 22, p.230).

The Institute has also testified before Congress about legislation requiring government paying landowners for regulations limiting what a property owner can do. The Institute testified that there should be provided a “...nuisance exception to **the compensation requirement....When regulation prohibits wrongful uses, no compensation is required.**” (Testimony of Roger Pilon, Senior Fellow and director, Center for Constitutional Studies, Cato Institute, before the Subcommittee on Constitution, Committee on Judiciary, US House of Representatives, February 10, 1995, emphasis added.)

LANDOWNERS DO NOT HAVE ALL RIGHTS

- No right to be a nuisance
- No right to violate the rights of others
- No right to trespass
- No right to be negligent
- No right to violate laws of reasonable surface water use or riparian laws
- No right to violate the “public trust”

What the other side will do: So how will folks who want to fight your efforts to base your land development regulations on NAI principles proceed? They will likely use one or more of three approaches:

1. Bluster and threats: Don't let their threats succeed by ensuring that:
 - The impacts on all other properties are identified;

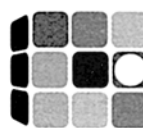
- You do not respond in kind: your angry statements can be used to show personal animus or bias;
 - All affected portions of the community are notified and can express their concern to elected officials; and
 - The burden is on the developers to show how they will not harm others.
2. Allegations of depriving someone of property “under the color of law:” At a recent American Bar Association course, a developer's attorney acknowledged that from a purely legal perspective, there was essentially no chance for a successful “Takings” lawsuit against hazard-based regulation. However, he said that challengers might well succeed by essentially rolling over government because states and municipalities did not have the legal information to fight back. Now you have a legal overview, and can obtain much more detailed information at one of ASFPM's Legal Aspects of NAI Workshops, or on line at www.floods.org.

Courts are very deferential to government efforts to prevent harm. The defendant government might well raise the possibility that the plaintiff and his or her attorney should be sanctioned for bringing a frivolous lawsuit under Rule 11 of the Federal Rules of Civil Procedure or similar state rules; and/or the state bar's regulator ethics rules.

3. “Class of One” allegations can be resisted in two ways. First, NAI reduces the confrontation between regulator and developer. Second, NAI makes the development process a collegial problem-solving effort. YOU can help this one by not reacting to threats in a way which can bite you later.

In summary: Local officials should understand two things:

- Hazard-based regulations are generally sustained against Constitutional challenges, and
- The goal of protecting the public is afforded enormous deference by the courts. Therefore, local officials should:



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LEGAL IMPLICATIONS FOR NO ADVERSE IMPACT FLOODPLAIN MANAGEMENT, CONTINUED

- Be confident,
- Be assertive when protecting the public and the landowner, and
- Partner with other hazard regulators, such as wind, subsidence, erosion and even wetlands programs.

You can follow the NAI approach and set the regulatory standards needed to protect people and property in your community.

REMEMBER, YOU HAVE THE LAW ON YOUR SIDE.

Author's note: This article is a pro bono presentation on behalf of the Association of

State Floodplain Managers. It reflects the personal views of the author. The statements and views contained in this article are not legal advice, but rather a statement of general principles of law. The law, especially property law is enormously driven by the individual facts of a situation as well as state and local law. For legal advice see an attorney licensed in your jurisdiction.

This article is dedicated to my friend and mentor Attorney Jon Kusler, Ph.D., whose research and partnership served as the foundation of this document.

My thanks also to Michael Baker, Inc. which is providing generous financial support to enable me to conduct the research necessary to develop this article as well as the ongoing series of lectures on behalf of the Association of State Floodplain Managers (ASFPM) which explain the concepts set forth in this article in much more detail. ♦



More information on the NAI concept, legal implications, and local tools to implement it can be found at www.floods.org

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ANOTHER RECENT AND NOTEWORTHY COURT CASE

Palazzolo v. State, 2005 R.I. Super. LEXIS 108 (R.I. Super. Ct. July 5, 2005).

Palazzolo, an important Taking Issue case was remanded in 2001 by the US Supreme Court for re-hearing by the Rhode Island courts. It was recently decided, against the landowner. The decision is a well written, well reasoned, huge win for floodplain and hazard managers. Essentially a Rhode Island Superior court determined that the stringent restrictions in coastal construction implemented by the Rhode Island Coastal Resources Council did not "Take" the Palazzolo property in violation to the Fifth Amendment to the US Constitution.

The case is well worth reading since it offers a great review of Takings Law, the Penn Central balancing test, the Public Trust Doctrine and nuisance law. A link to the case is: <http://www.olemiss.edu/orgs/SGLC/casealert.htm>. The Palazzolo case is not necessarily "over and final." However, the Superior Court has written an extremely well reasoned opinion that should strongly resist challenge on appeal.

POINT/NONPOINT: AN INTRODUCTION TO THE NPDES PHASE II PROGRAM

RAIN, RAIN GO AWAY. COME AGAIN SOME OTHER DAY.

BY JONATHAN M. DILLER, P.E., CFM, ROBINSON ENGINEERING, LTD., FRANKFORT AND TOM TOMASZEWSKI, CFM, VILLAGE OF FRANKFORT, WITH TROY GOLEM, ROBINSON ENGINEERING, LTD., FRANKFORT

Sometimes we need the rain for our lawns, landscaping and crops. So when it does rain where does the stormwater go? In most communities, it is usually to *separate* storm sewers. We call them *separate* storm sewers because they are separate from the *sanitary* sewers. *Sanitary* sewers carry away sewage and other wastewaters to treatment plants. Storm sewers carry clean runoff from rain and snowmelt, so no treatment is necessary (or so we thought).

A few older communities have combined sewers that convey both stormwater and wastewater together. These systems have many problems and are gradually being reduced or eliminated.

In most cases, the first stop for stormwater in a *separate* sewer is a *detention basin*. *Detention basins* are those ponds and low areas in subdivisions and commercial developments. These slow the water down to help prevent flooding. *Detention basins* also help to provide treatment by allowing solids in the stormwater to settle out.

All of the stormwater runoff in the *separate* sewer system ultimately leads to the streams and creeks that flow through the community. This is a good thing because the streams and creeks need this water. Unfortunately, the stormwater also carries with it pollutants that contribute to poor water quality. We now recognize that runoff from rain and snowmelt is not really clean. It picks up oils, sediments, and fertilizers that wash off the streets, lawns, rooftops, and driveways and carries these pollutants to our rivers, streams and lakes.

In 1972, the United States Environmental Protection Agency (*USEPA*) developed the National Pollutant Discharge Elimination System (*NPDES*). This program regulates

the discharge of pollutants into the nation's lakes, rivers, and streams. In its early days, the *NPDES* program focused on sewage and industrial wastewaters that entered our waterways from treatment plants and other "point" sources.

In 1990, the *USEPA* developed the *NPDES Phase I* stormwater regulations. The *NPDES Phase I* program regulates runoff from industries, and medium to large cities. The *Phase II* program, which was adopted in December 1999, regulates the runoff from the small communities in urban areas.

The *NPDES Phase II Stormwater* program is applicable to all municipalities, counties and townships within urbanized areas. Additionally, the Illinois Environmental Protection Agency (*IEPA*) is charged with reviewing whether or not municipalities with populations of 10,000 or more should be included within the *Phase II Stormwater* program. Communities covered under the *Phase I* program continue to be covered under that program. Finally, all construction sites of one acre or more, no matter where they are located are subject to the construction site provisions of *NPDES Phase II*.

The *Phase II* program established six *Minimum Control Measures (MCMs)* to reduce the amount of pollutants in stormwater runoff from urbanized areas. Here's what these are.

1. *Public Education and Outreach*, which includes projects such as this article, the distribution of literature on stormwater topics, and public education programs.
2. *Public Involvement and Participation*, such as public hearings and/or citizens advisory committees.
3. *Illicit Discharge Detection and Elimination* is a program to stop non-stormwa-



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ter discharges from entering stormwater runoff. This can range from improper sanitary or industrial connections to rinse water from non-residential car washes. Did you ever think about where all that dirt went the last time you were at a charity carwash? Most likely, it went into the nearest river. Under NPDES Phase II, these car washes are illegal unless set up to have the washwater conveyed to a sanitary or combined sewer.



A construction site in need of a Stormwater Pollution Prevention Plan

4. *Construction Site Stormwater Control* involves the prevention of erosion and the control of sediments leaving construction sites. This calls for the adoption of regulations requiring the use of certain practices and materials that control runoff and catch sediment. An important part of Construction Site Stormwater Control involves the implementation of a Stormwater Pollution Prevention Plan (SWPPP). A well writ-

ten SWPPP should identify the locations of receiving waters, the current and future site topography, drainage patterns extending 1/4 mile past the construction site, locations of outfalls, and locations of stormwater discharges. In addition, controls necessary to prevent erosion from leaving the site, including silt fence at the perimeter of the site and around all stockpiles; structural controls such as sedimentation ponds and swales, must be called out in the SWPPP. The plan must provide for permanent stabilization methods such as seeding upon the finishing of land disturbing activities. Most erosion controls are to be installed prior to land disturbance. Education of the construction community is most important. In the winter of 2004 - 2005, the Village of Frankfort held an informational seminar for contractors, developers, and engineers on the requirements of the NPDES program. The presentation was well attended and allowed those responsible for compliance to ask questions and obtain information they needed to implement their projects.

5. *Post-Construction Stormwater Management* deals with the design of building sites. Designs that reduce the amount of pollutants that leave completed sites are encouraged. For example, instead of pipes or concrete channels, grassy swales can be used to filter water. Wetland or wet-



Wet bottom detention basin

bottom detention ponds reduce the amount of pollutants in stormwater runoff better than dry-bottom detention ponds. The use of aerators, cascading streams, and waterfalls are other design practices that can improve water quality. These additions are both aesthetically pleasing and can reduce contaminants. Eliminating low-flow channel and separating inlets and outlets further improve the pollutant removal processes in the detention basins, in most cases at no additional cost.

6. *Pollution Prevention and Good Housekeeping* deals with the ways the community controls its own operations. It includes how vehicles are maintained, salt is applied, wastes are managed, cleaning of stormwater catch basins, and any other community operations that could impact stormwater runoff.

The communities must fully implement these six MCMs by March of 2008. The implementation of these six MCMs throughout the communities will form the framework of a comprehensive program of reducing stormwater pollution. This will be another significant step towards improving the water quality of our lakes, rivers, and streams.

The *Phase II* program will continue to develop. As public awareness and participation increase, contractors and developers become used to these requirements as a part of doing business, the implementation of the program will continue to improve. This program has the potential to remove thousands of tons of stormwater pollution each year. It is hoped that the communities will embrace the NPDES Phase II program rather than just do the minimum. The cost to a community of fully embracing the NPDES Phase II program is very small when compared to the water quality benefits and increase of quality of life for the community. ❖

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COFFER DAMS & WATER DIVERSION

Portadam Inc.....22

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James J. Benes & Associates Inc.....23

CONSULTING ENGINEERS

Camp Dresser & McKee.....11

Cowhey Gudmundson Leder Ltd.....17

Crawford, Murphy & Tilly Inc.....21

Intech Consultants.....18

Mactec Engineering & Consulting Inc.....19

Watershed Concepts.....12

CONSULTING ENGINEERS, LAND SURVEYORS & PLANNERS

Cemcon Ltd.....11

CONSULTING ENGINEERS FIRM

Christopher B. Burke Engineering Ltd.....11

DRAINAGE & FLOOD CONTROL CONSULTANTS

MWH Americas Inc.....21

ENGINEERING LANDSCAPE ARCHITECTURE & ENVIRONMENTAL SERVICES

Kabbes Engineering Inc.....18

ENGINEERS & SURVEYORS

Intech Consultants.....18

ENVIRONMENTAL / CIVIL WATER RESOURCE ENGINEERING

Manhard Consulting Ltd.....20

FLOOD AND EMERGENCY RESPONSE PRODUCTS

Flood Master Barriers Inc.....4

FLOODPLAIN SURVEYS

Matthews & Lazdins Ltd.....23

FLOODPLAIN & STORMWATER CONSULTING/ MANAGEMENT SERVICES

Clark Dietz Inc.....23

Engineering Enterprises Inc.....23

Hampton Lenzini & Renwick Inc.....23

FOUNDATION FLOODVENTS

Smart Vent.....4

GEOMEMBRANE LINERS

Environmental Protection Inc.....16

LANDSCAPE ARCHITECTS

Planning Resources Inc.....22

LEGAL SERVICES

Barnes & Thornburg LLP.....OBC

PRECAST CONCRETE PIPE

County Materials Corporation.....14

PROFESSIONAL & CONTRACTING SERVICES

V3 Companies.....4

PROFESSIONAL CONSULTING SERVICES

Molly O'Toole & Associates Ltd.....23

RAINFALL MONITORING

One Rain.....14

STENCILING

Earthwater Stencils.....21

STORMWATER / STRUCTURAL / TRANSPORTATION / WASH WATER

Robert E. Hamilton Consulting Engineers.....23

STORMWATER MANAGEMENT

Advanced Drainage Systems.....IFC

Advanced Pavement Technology.....21

TRENCH DRAINS

ACO Polymer Products Inc.....11

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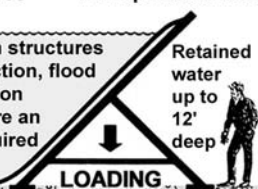
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