MEETING MINUTES
of the
STORMWATER STAKEHOLDER ADVISORY COMMITTEE (SSAC)
Lexington-Fayette Urban County Government (LFUCG)

Date of Meeting: September 2, 2016 (Meeting #25)
Time of Meeting: 9:00 a.m.
Location of Meeting: Division of Water Quality Tate Building Training Room
125 Lisle Industrial Avenue, Suite 180

Attendees:

COMMITTEE MEMBERS

Richard Archer – VA Medical Center
Kathleen Burke – Fayette Alliance (for Susan Speckert)
Ken Cooke – Friends of Wolf Run
Lee Faulkner – University of Kentucky (for Bob Kjelland)
Steve Garland – East Hickman Watershed At-Large
Jeff Harris – Fayette County Public Schools
Don Hill – Fayette County Neighborhood Council
Shelby Jett – Town Branch Watershed At-Large
Andi Johnson – Commerce Lexington
Ken Johnson – Link-Belt, Commerce Lexington
Todd Johnson – Home Builders Association of Lexington
Jim Kipp – Kentucky Water Resources Research Institute (for Lindell Ormsbee)
Corinne Mulberry – South Elkhorn Watershed At-Large
Jennifer Myatt – LFUCG Division of Environmental Services (for Susan Plueger)
Scott Smith – Smith Management Group, Commerce Lexington
Amy Sohner – Bluegrass Greensource
Russ Turpin – Wolf Run Watershed At-Large

LFUCG REPRESENTATIVES & OTHER ATTENDEES

Samantha Brown – Contech
Sandy Camargo – Advanced Drainage Systems, Inc.
Jennifer Carey – LFUCG Division of Water Quality
Jim Conner – University of Kentucky Coldstream
Chris Dent – LFUCG Division of Water Quality
Karen Fawcett – Friends of Wolf Run
Brian Hayes – Self
Steven Hoagland – Tetra Tech, LFUCG Program Management
Becky Irwin – LFUCG Division of Water Quality
Carey Johnson – Kentucky Division of Water
Ben Krebs – LFUCG Division of Water Quality
Karyn Leverenz – Blue Grass Area Development District
Greg Lubeck – LFUCG Division of Water Quality
Jason Martin – LFUCG Division of Water Quality
Joyce Probus – LFUCG Division of Water Quality
William Shane – Smith Management Group
Shri Vani Sripada – Smith Management Group
Brian Stephens – Ball Homes
Barry Tonning – Tetra Tech, LFUCG Program Management
Richard Walker – Tetra Tech, LFUCG Program Management

Opening Remarks
Scott Smith called the meeting to order at 9:06 a.m.

Approval of 6/3/16 Minutes
Mr. Smith asked if there were corrections or edits to the minutes. The minutes were approved as distributed.

Stormwater Quality Devices – Samantha Brown, Contech and Sandy Camargo, Advanced Draining Systems, Inc. (ADS)
Mr. Smith introduced Samantha Brown, Contech, and Sandy Camargo, ADS, who presented information about the various types of manufactured treatment devices (MTDs). This discussion was centered on post-construction water quality devices, as opposed to BMPs used for erosion and sediment control on construction sites. Post-construction refers to developed sites operating at their final intended use. Post-construction MTDs manage pollutants that are generated and that left untreated would be flushed into the storm sewer system from paved surfaces, sidewalks, parking lots, etc.

Ms. Brown recognized benefits of low impact development (LID) to recharge groundwater supply and base flow to streams by managing runoff at the source and infiltrating it on site. She noted the value to the community – the triple bottom line. However, site constraints which may include climate, site conditions, and space limitations, oftentimes necessitate the use of MTDs. MTDs are typically placed underground. Ms. Brown and Mr. Camargo then introduced the following technologies available and the level of treatment they provide:

- Screening and Settlement
- Hydrodynamic Separation – targets sand or gravel. Eight units are approved by NJ DEP for use.
- Filtration

These devices require maintenance, some of which may need to be provided by contractors. Performance factors include particle size and flow rates. The New Jersey Certification Program is the standard used in LFUCG's draft Stormwater Manual, which sets the criteria requiring removal of 50% of total suspended solids (TSS).

Mr. Smith asked the speakers to clarify the performance factors for the group, and Ms. Brown discussed target particle sizes. A follow-up question was whether the particle size is to be consistent across LFUCG or will it be site-specific. Ms. Brown replied that it is across LFUCG.

Brian Hayes explained that New Jersey has two programs: NJ CAT, which is verification of results, and NJ DEP (the regulatory authority), which provides the certification. He is of the opinion that LFUCG should follow NJ DEP.

Mr. Camargo and Ms. Brown reviewed the categories of MTDs: Inserts and Traps, Baffle Boxes, Hydrodynamic Separators, and Filtration, and their pros and cons.

A video of hydrodynamic separation is available at https://www.youtube.com/watch?v=IVnvknpizfM.

Brian Stephens asked if any of these MTDs were available for use in residential applications, and Richard Walker responded that these products are indicated for commercial use only. Ben Krebs and Mr. Walker pointed out that MTDs are allowable for infill development, redevelopment, and commercial sites where there are low permeability soils. A follow-up question was whether MTDs would be allowed for pre-treatment for a surface pond in a residential area. Jennifer Carey stated that if an MTD was installed that went above and

beyond the Stormwater Manual requirements, and if that MTD were to be maintained by an HOA in a residential area, that it would be permissible.

Corrine Mulberry stated this is a treatment, and can be very useful, but not in lieu of addressing the source of the pollutant(s).

After covering inserts and separators, which primarily address reducing total suspended solids, Ms. Brown reviewed the filtration products which target metals. Filtration devices are seeing greater use, but they are expensive and are not typically used as a primary source of treatment. Filtration treatments include:

- Sedimentation
- Physical Filtration
- Reactive Filtration - chemical reaction take place with this type of filtration

Reactive filtration has a larger footprint, requires more maintenance, and has greater filter replacement costs.

The group discussed standards in use and in development. Ms. Carey noted that Lexington has had initial conversations with Indianapolis, Nashville, Louisville MSD, SD1, and Cincinnati about developing our own regional standard.

Mr. Walker observed that these MTDs have been around for 20 years, and it is still not a clear design process. Mr. Cooke said he would be interested in knowing how many of our systems are getting NOVs, and commented that the stormwater basin at Wellington Way and Clays Mill, which is low maintenance, but treats all sorts of pollutants in terms of bio mass, biological treatment, settling, particulate removal.

No Adverse Impact – Carey Johnson, KDOW

Carey Johnson, Kentucky Division of Water and Chair of the Kentucky Association of Mitigation Managers, introduced the concept and practice of "No Adverse Impact "(NAI), which was created by the Association of State Floodplain Managers. Simply, No Adverse Impact means what you do on your site does not affect your neighbor downstream. In addition, NAI incorporates multi-objective and watershed planning principles. It does not preclude development, but strives for intelligent development. Any adverse impact, including increased flows and velocities, must be mitigated within the watershed, preferably based on a community or watershed-based plan.

Floodplain managers work toward reduced flood losses over time, reduced likelihood of storm damage to others, recognition through the Community Rating System (CRS), and the protection of natural resources and the beneficial uses of floodplains through the implementation of NAI.

There are strategies at three levels (Basic, Better, and No Adverse Impact) for:

1) identifying hazards and mapping floodplains,
2) education & outreach,
3) planning,
4) regulations and development standards,
5) mitigation actions,
6) infrastructure, and
7) emergency services.

BASIC: Every community in the flood insurance program is expected to implement and maintain floodplain maps, implement structural flood control measures, and make flood insurance available. The LFUCG program is rated 7 on a scale of 1 to 10. Lexington and Fayette County are mostly Zone AE: mapped areas subject to inundation by the 1-percent-annual-chance flood.

A basic approach would include making documents & maps available to the public, and providing staff to answer questions, but is likely to include minimal planning, response to events as they happen, and in-kind repair and replacement. However, generic response plans based on off-the-shelf models may not meet community needs.

BETTER: A strengthened Zone AE and Zone A Floodplain (Note: Fayette County has very little zone A), with improved base map data for floodplains, and mapping of other flood-related hazards are characteristics of a better approach. Implementation of a risk communication program with additional risk information is recommended.

Another approach in the "better" category is to identify flood-risk areas on plans and restrict development, *e.g.* low density zoning in floodplains. Using GIS and HAZUS, FEMA's software application for multi-hazard loss estimation, to make informed decisions, and including floodplain management, stormwater management, and special area plans to supplement comprehensive plans and mitigation plans, are also strategies of the "better" level of floodplain management for a community. Floodplain regulations with higher standards and the use of the CRS credits for the higher standards can result in lower insurance premiums for property owners in floodplains.

Strengthen building codes to meet flood improvement standards, e.g. requiring each developer to provide Zone AE data for all developments. Adopting stormwater regulations, strengthening building codes, and incorporating the utilization of green infrastructure are all components of the "better" level. Mr. Johnson told the group that FEMA's number one strategy and goal is implementation of green infrastructure practices.

Mr. Johnson added that Lexington-Fayette County is a Storm Ready Community, which means that we have a certification from the National Weather Service that indicates that we are prepared to respond and manage storm events.

NO ADVERSE IMPACT: Mr. Johnson told the group that sustainable development "meets the needs of the present without compromising the ability of future generations to meet their own needs." NAI practices use future conditions hydrology and adopts higher floodway mapping standards, and allows no loss of storage and no velocity increases.

NAI policy includes watershed master planning and sustainable development principles in land use planning, considering current and future development. A goal is preservation of beneficial natural floodplain functions, buffer zones, and implementation of stream restoration programs. Master flood planning, with involvement of stakeholders in the planning process, can help to mitigate issues while not transferring flood problems. Flooding is Kentucky's #1 natural hazard risk.

NAI goals include coordination of capital improvement plans with floodplain management plans, setting higher regulatory standards for critical facilities, and using green infrastructure to reduce maintenance and achieve co-benefits.

Important NAI concerns are improvement of pre- and post-disaster preparedness, and incorporation of multi-objective management / sustainability principles into post-disaster plans / actions. Climate resilience is recovery from shock and movement forward in an adaptive manner. The "new normal" is more intense, shorter duration rain events, in which flooding occurs as the stormwater tries to get to the river.

Ms. Mulberry asked how KDOW staff involved with watershed management worked with staff in floodplain management, and Mr. Johnson told the group that he works in the KDOW Director's office to coordinate the NAI approach at the watershed level.

Mr. Cooke asked if the FEMA buyout program will be continued, and Mr. Johnson replied funds will continue to assist in post-disaster instances through the Hazard Mitigation Grant Program and as part of FEMA's Pre-Disaster Mitigation Program.

The NAI Toolkit is located at http://www.floods.org/NoAdverseImpact/NAI_Toolkit_2003.pdf.

Greg Lubeck provided a link to updated No Adverse Impact (NAI) information from the Association of State Floodplain Managers (ASFPM) website at http://www.floods.org/index.asp?menuID=460&firstlevelmenuID=187&siteID=1.

Nominations for Remaining Vacant Watershed At-Large Seats

Cane Run, North Elkhorn, and Boone Creek At-Large seats remain vacant. Jim Conner accepted the Cane Run Watershed At-Large seat, upon nomination by Ms. Mulberry and a second by Mr. Cooke.

Topics for Next Meeting – 12/2/16

A summary of MTDs being used in Lexington was suggested for the December meeting.

Announcements

- Cane Run Dry Weather Screening volunteers will mobilize on Tuesday, September 6
- Ms. Carey told the group that Abby Rains, KDOW, will inspect our MS4 Program on September 13
- UCC's EQ&PW Committee – September 20, 2016 at 1:00 p.m. – Annual MS4 Presentation / Stormwater Manual Revisions
- Planning Commission Work Session – September 29, 2016 at 1:30 p.m. – Annual MS4 Presentation / Stormwater Manual Revisions
- Environmental Commission Award Nominations due September 30, 2016
- Water Quality Fees Board Meeting – October 13, 2016 at 9:00 a.m. – Tate Building Training Room

The meeting adjourned at 11:25 a.m.

Lexington-Fayette Urban County Government
Stormwater Stakeholder Advisory Committee

September 2, 2016
Meeting Agenda

Approval of 6/3/16 Minutes
Stormwater Quality Devices
No Adverse Impact
Nominations / Elections
Topics for Next Meeting
Announcements

THE WIDE WORLD OF STORMWATER QUALITY DEVICES

SAMANTHA BROWN – CONTECH

SANDY CAMARGO – ADS


WAL★MART
SUPERCENTER
WE SELL FOR LESS

HOW DO I COMPLY WITH WATER QUALITY REGS?

- Low Impact Development
- Utilizes small decentralized controls for Stormwater Management
- Intent is to mimic predevelopment hydrology
- Examples:
  - Rain gardens
  - Bioswales
  - Porous pavements

BENEFITS OF LID

- Habitat
- Water quantity & quality benefits
  - Reduce imperviousness and runoff volumes
  - Reduced pollutant loading
- Community value
  - Aesthetics
  - Added functional space

PHYSICAL CONSTRAINTS OF LID

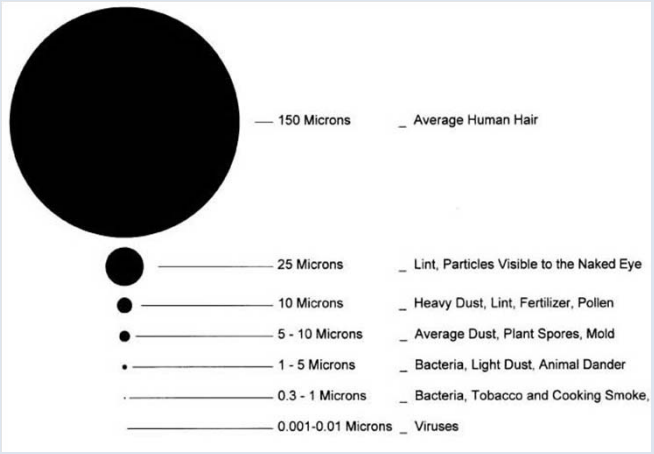
- Climate
  - Small-scale practices may be inundated by high storm intensities (i.E. Type II rainfall intensity)
- Site conditions
  - Low permeability soils
  - Proximity to foundations and utilities
  - Potential contamination of groundwater
  - Steep slopes
- Maximizing space/space constraints

MANUFACTURED TREATMENT DEVICES

- Typically proprietary stormwater treatment systems
- Variety of treatment mechanisms
  - Settlement
  - Screening
  - Hydrodynamic separation
  - Filtration
- Benefits
  - Space
  - Consistent sizing
  - Performance verification programs
  - Maintenance

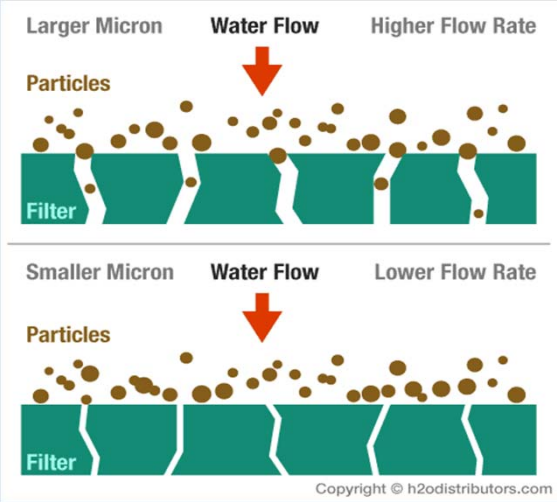
Performance Factors

- PARTICLE SIZE DISTRIBUTION



Performance Factors

- FLOW RATES

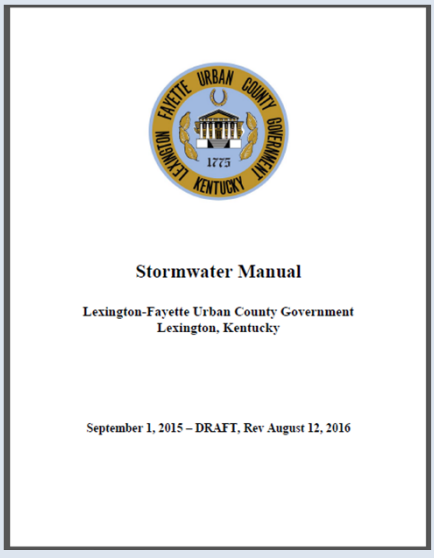


LFUCG CRITERIA

- References New Jersey certification process
- Must remove 50% of the total suspended solids (TSS) using NJ approvals

BENEFITS

- Ensures performance & effectiveness of implemented mtds
- Standard design expectations for engineers/owners
- Simplified review process for LFUCG
- Creates even playing field & evaluation process for all mtds



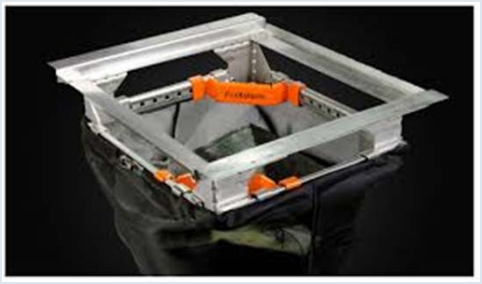
NEW JERSEY CERTIFICATION PROCESS

- NJ CAT provides performance verification
- NJ DEP is regulatory authority that provides certification
- Program has been rebooted
- Separate protocols for hydrodynamic/settling devices and filtration BMPs
  - HDS target of 50% TSS
  - Filtration 80% TSS
- Key dates
  - Historic interim certifications invalid – January, 2015
  - Final certifications based on field testing must complete new testing before December 1, 2016
  - All historic certifications revoked after December 1, 2016

NJDEP APPROVED TREATMENT DEVICES

Stormwater Management Manufactured Treatment Devices Certified by NJDEP	MTD Laboratory Test Certifications	Field Test Certifications	Superseded Certifications	Certified TSS Removal Rate
AquaFilter Filtration Chamber by AquaShield, Inc.		Certification	Superseded	80%
Aqua-Swirl Concentrator By Aqua-Shield. Inc.		Certification	Superseded	50%
Continuous Deflective Separator (CDS) Unit by CONTECH Stormwater Solutions, Inc.	Certification	Certification	Superseded	50%
Downstream Defender by Hydro International, Inc.	Certification		Superseded	50%
Dual Vortex Separator by Oldcastle Stormwater Solutions	Certificaton			50%
Filterra Bioretention System by Contech Engineered Solutions	Certification		Superseded	80%
First Defense HC (FDHC) Stormwater Treatment Device by Hydro International, Inc.	Certification			50%
Jellyfish Filter by Imbrium Systems Corporation		Certification	Superseded	80%
Kraken Stormwater Filtration System by BioClean Environmental Service, Inc.	Certification		Superseded	80%
Media Filtration Systems by CONTECH Stormwater Solutions, Inc.		Certification	Superseded	80%
SiteSaver Stormwater Treatment Device by Fresh Creek Technologies, Inc.	Certification			50%
StormPro Stormwater Treatment Device by Environment 21, LLC	Certification			50%
StormVault by Jensen Precast, Inc.		Certification	Superseded	80%
Stormwater Management StormFilter by CONTECH Stormwater Solutions, Inc.		Certification	Superseded	80%
Up-Flo Filter by Hydro International		Certification	Superseded	80%
Vortechs Stormwater Treatment System by CONTECH Stormwater Solutions, Inc.		Certification	Superseded	50%

INSERTS AND TRAPS



PROS AND CONS

PROS

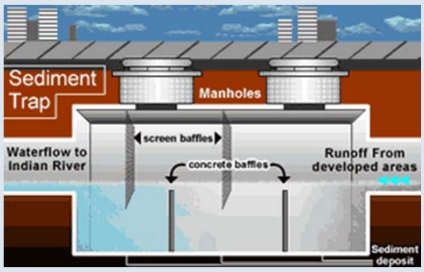
- LOW COST - $
- EASY INSTALLATION
- FLEXIBLE DESIGN
- GOOD PRETREATMENT

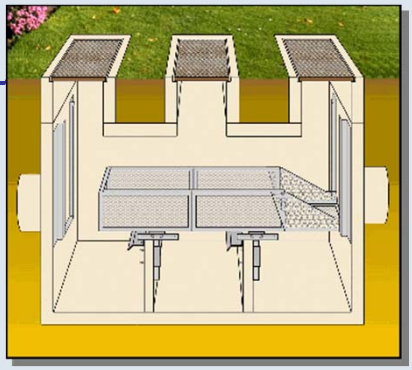
CONS

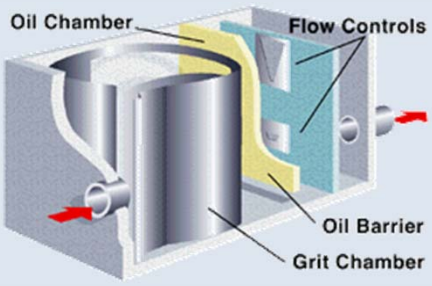
- FREQUENT MAINTENANCE
- LARGER PSD
- MEETING WQ REQTS
- NO VOLUME CONTROL

BAFFLE BOXES

VAULT TYPE

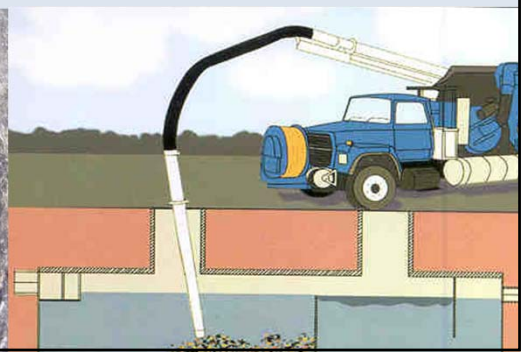






MAINTENANCE

- SEDIMENT AND FLOATABLES CAN BE REMOVED WITH A VACUUM TRUCK AND DISPOSED OF OFFSITE.



PROS AND CONS

PROS

- LOW COST - $$
- LARGE CAPACITY
- SHALLOW PROFILE
- HIGH PEAK BYPASS
- MANY MEET WQ REQTS

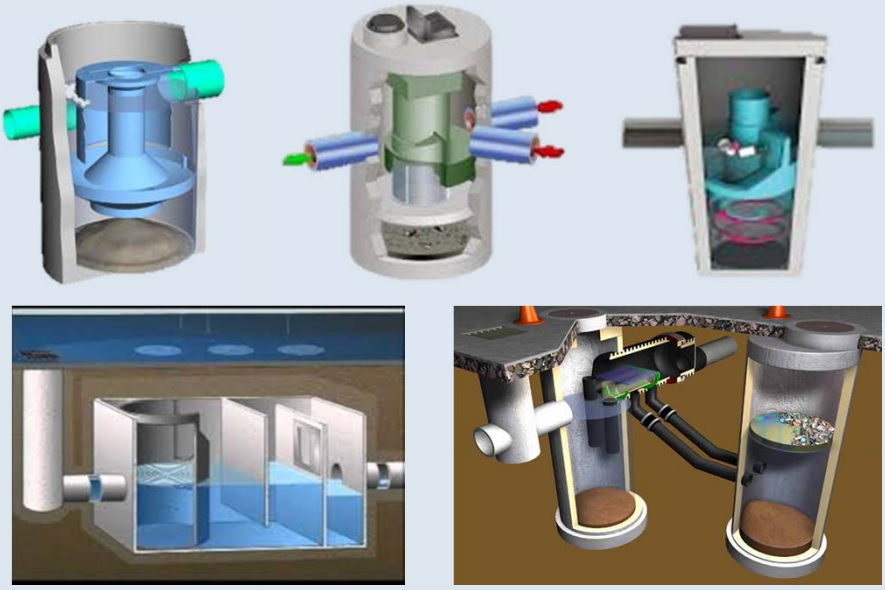
CONS

- GROSS POLLUTANT BMP
- SIZE
- LOW TREATMENT FLOW FOR SMALL PSD
- NO VOLUME CONTROL

Hydrodynamic Separation

- Low velocity swirl or vortex action
  - Increases flow path of flow path
  - Concentrates solids in low velocity flow field
- Flow controls
  - Minimizes turbulence and velocity
  - Prevents flow surges and re-suspension
  - Retains floating pollutants
- Pollutants of Concern
  - Sediments
  - Floatables
  - Oils
- Maintenance

Hydrodynamic Separation



PROS AND CONS

PROS

- LOW COST PER TREATED CFS - $$ TO $$$
- MOST MEET TSS TARGETS
- FLEXIBLE DESIGN
- SMALL FOOTPRINT
- EASY INSTALLATION
- EASY MAINTENANCE

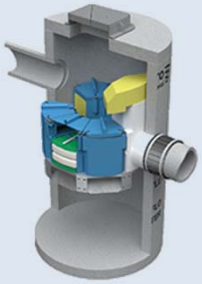
CONS

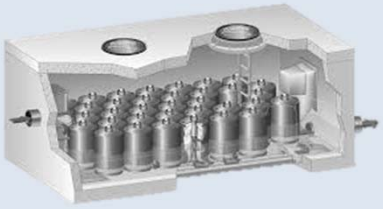
- CAN GET PRICEY WITH HIGH PEAKS
- MAY NEED OFFLINE
- NO CONTRIBUTION TO VOLUME CONTROL

Filtration

- TYPES OF FILTRATION
  - o SEDIMENTATION
  - o PHYSICAL FILTRATION
  - o REACTIVE FILTRATION
- POLLUTANTS OF CONCERN
  - o SEDIMENTS
  - o METALS
  - o NUTRIENTS
- MAINTENANCE
  - o ROUTINE
  - o REPLACEMENT

Filtration





PROS AND CONS

PROS

- EXCELLENT FINE PARTICLE REMOVAL ~ 20 MICRON
- METAL AND NUTRIENT REMOVAL
- POSSIBLE VOLUME REDUCTION AS PART OF DETENTION SYSTEM

CONS

- EXPENSIVE - $$$$$
- LOW TREATMENT FLOW
- EXPENSIVE MAINTENANCE
- OFTEN REQUIRE PRETREATMENT

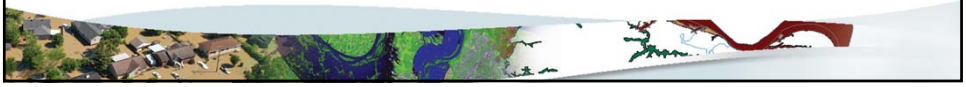
QUESTIONS?

No Adverse Impact

September 2, 2016

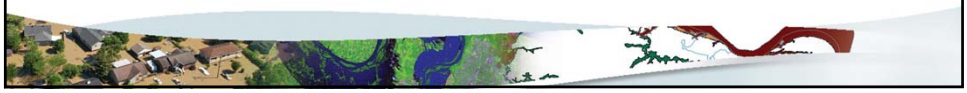
No Adverse Impact (NAI) Floodplain Management

- ✓ Takes place when the actions of one property owner are not allowed to adversely affect the rights of other property owners
- ✓ Incorporates multi-objective and watershed planning principles
- ✓ Does not mean “no development”
- ✓ NAI means that any adverse impact caused must be mitigated, preferably based on a community or watershed-based plan



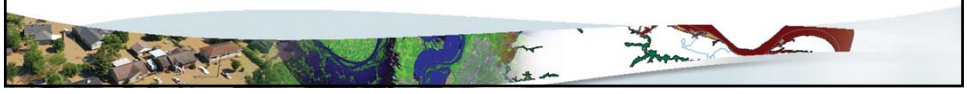
NAI Background

- ✓ Types of adverse impacts
  - Increased flood flows, velocities
  - Increased potential for erosion and sedimentation
  - Increased cost of public services
  - Degradation of water quality
- ✓ Impacts may occur anywhere in the watershed



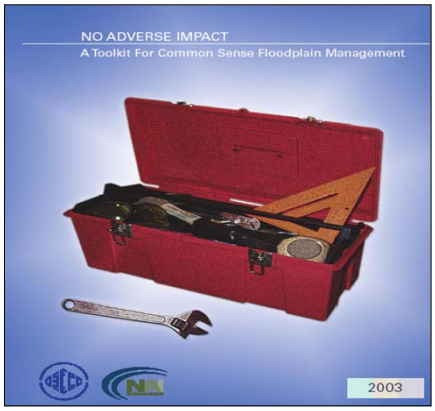
NAI Background

- ✓ Benefits of NAI
  - Reduced flood losses over time
  - Reduced likelihood of increasing flood damage to others
  - Recognition through the Community Rating System (CRS)
  - Incorporation of multiple planning objectives
  - Protection of natural resources and beneficial uses of floodplains



NAI Strategies

- ✓ Strategies grouped according to the following practices:
  - ➢ Basic
  - ➢ Better
  - ➢ NAI



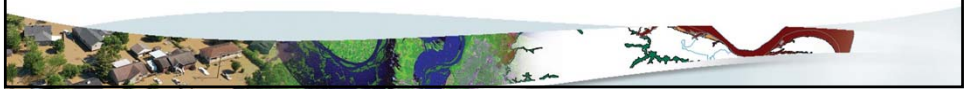
NAI Strategies

- ✓ Hazard identification and floodplain mapping
- ✓ Education and outreach
- ✓ Planning
- ✓ Regulations and development standards
- ✓ Mitigation Actions
- ✓ Infrastructure
- ✓ Emergency services

- ✓ NAI Toolkit: http://www.floods.org/NoAdverseImpact/NAI_Toolkit_2003.pdf

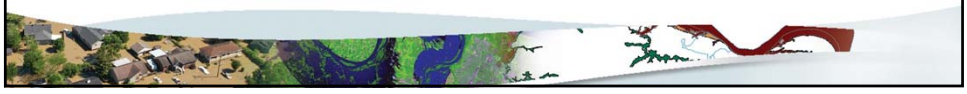
Hazard Identification and Floodplain Mapping

- ✓ Basic Strategies
  - ➢ NFIP participation
    - ❑ Adopt floodplain management ordinance
    - ❑ Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS)
  - ➢ Maintain FIRM/FIS and enforce ordinance



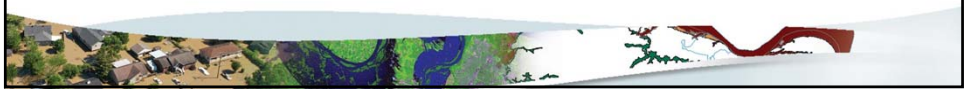
Hazard Identification and Floodplain Mapping

- ✓ Better strategies
  - ➢ Strengthen Zone A requirements
    - ❑ NFIP requires detailed (Zone AE) data if development is larger that 5 acres or 50 lots
    - ❑ Require developers to provide Zone AE data for all developments
  - ➢ Use better base map data for floodplain management decisions
    - ❑ Parcel and building data
      - ▪ PVA values
    - ❑ Include land use information



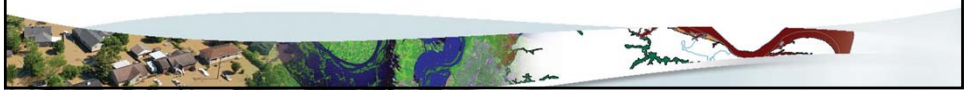
Hazard Identification and Floodplain Mapping

- ✓ Better strategies
  - ➢ Map other flood-related hazards
    - ❑ Fluvial erosion zones
    - ❑ Dam inundation zones
    - ❑ Land subsidence
    - ❑ Sinkholes



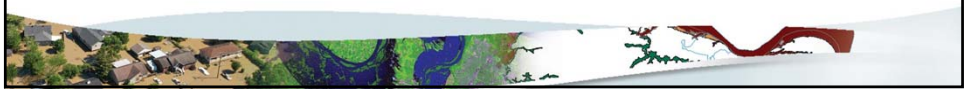
Hazard Identification and Floodplain Mapping

- ✓ NAI strategies
  - ➢ Use future conditions hydrology
    - ❑ Flood discharges based on projected land use or fully developed watershed conditions
    - ❑ Future condition floodplains may be shown on FIRMs
  - ➢ Adopt higher floodway mapping standards
    - ❑ Assume entire floodplain is a floodway
    - ❑ Development cannot cause any increase in BFEs



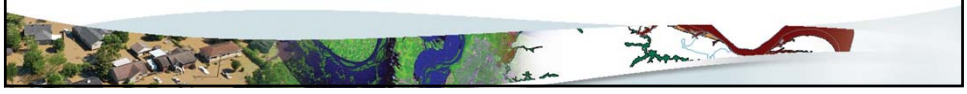
Hazard Identification and Floodplain Mapping

- ✓ NAI strategies
  - ➢ Require no loss of storage
    - ❑ Compensate for fill
    - ❑ Pond Creek watershed in Louisville Metro
  - ➢ Require no velocity increases
    - ❑ Reduce or eliminate channelization



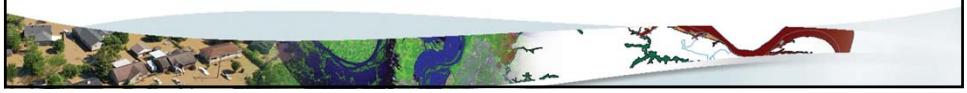
Education and Outreach

- ✓ Basic strategies
  - ➢ Make documents and maps available to the public
    - ❑ FISs/FIRMs
    - ❑ Permit records
  - ➢ Have staff available to answer questions
    - ❑ Is my property in the floodplain?
    - ❑ What is the base flood elevation?
    - ❑ What development regulations apply to me?
    - ❑ Where do I go for flood insurance?



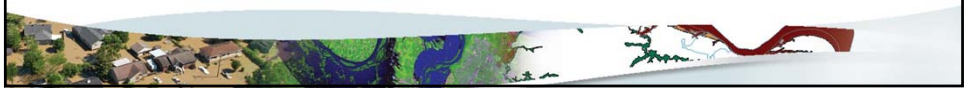
Education and Outreach

- ✓ Better strategies
  - ➢ Implement a risk communication program
    - ❑ Advise residents and businesses of flood and stormwater hazards
    - ❑ Provide information as to what is being done locally to address hazards
    - ❑ Provide information on how residents can protect themselves
    - ❑ Use innovative tactics (ex: websites, web mapping tools, utility bill inserts, neighborhood group meetings, signage, etc.)



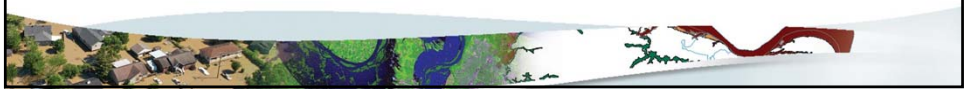
Education and Outreach

- ✓ Better strategies
  - ➢ Show additional risk information
    - ❑ Buildings in relation to flood hazards on FIRMs or websites
    - ❑ Dam inundation zones
    - ❑ Fluvial erosion zones
    - ❑ Repetitive loss and historic flood claims areas



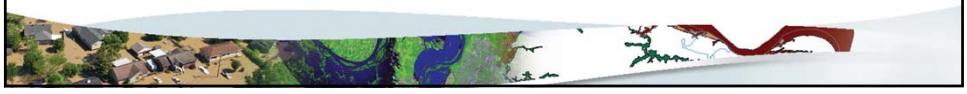
Education and Outreach

- ✓ NAI strategies
  - ➢ Educate staff, decision makers and the public
    - ❑ FEMA/State/ASFPM NFIP workshops and courses
    - ❑ Certified Floodplain Manager Program
    - ❑ Distribute NAI brochures, posters and videos
    - ❑ Develop school environmental and safety education programs



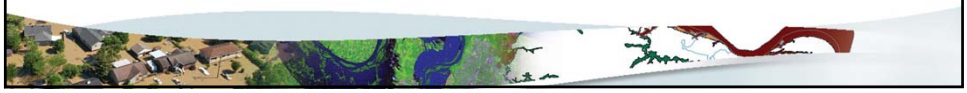
Planning

- ✓ Basic strategies
  - ➢ Prepare comprehensive land use plans
    - ❑ Identify hazard areas
    - ❑ Identify appropriate land uses
  - ➢ Develop special subject plans to supplement comprehensive plans
    - ❑ Economic development plan
    - ❑ Habitat protection plan
    - ❑ Watershed management plan
  - ➢ Adopt zoning or other ordinances to enforce plans



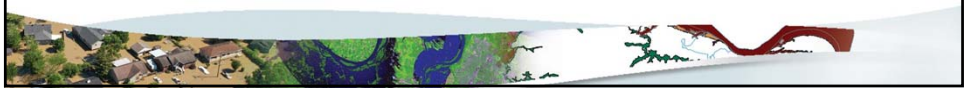
Planning

- ✓ Better strategies
  - ➢ Identify flood-risk areas on plans and restrict development
  - ➢ Adopt low-density zoning in floodplains
  - ➢ Use specialized tools (ex: GIS, HAZUS, etc.) to make informed decisions
  - ➢ Prepare floodplain management, stormwater management and special area plans to supplement comprehensive plans
  - ➢ Prepare multi-hazard mitigation plans



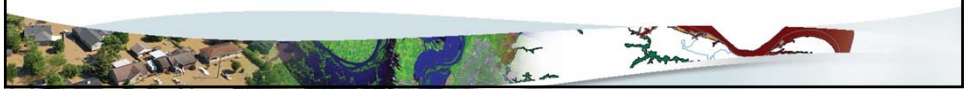
Planning

- ✓ Better strategies
  - ➢ Floodplain Management Plans
    - ❑ Identify flood prone/repetitive loss areas
    - ❑ Evaluate various flood damage reduction measures
    - ❑ Recommend actions for the community
    - ❑ Identify additional mapping needs
  - ➢ Multi-Hazard Management Plans
    - ❑ Identify all natural hazard areas
    - ❑ Evaluate various hazard mitigation measures
    - ❑ Recommend actions for the community



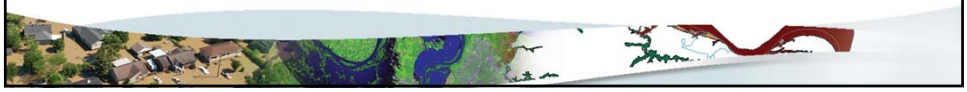
Planning

- ✓ NAI strategies
  - ➢ Include watershed master planning and sustainable development principles in land use planning
    - ❑ Consider current and future development
    - ❑ Coordinate floodplain planning with other planning activities (economic development, housing, recreation, ecosystem restoration, water quality, stormwater management, etc.)
    - ❑ Identify long-term implications of alternative land uses
    - ❑ Promote "sustainable" development



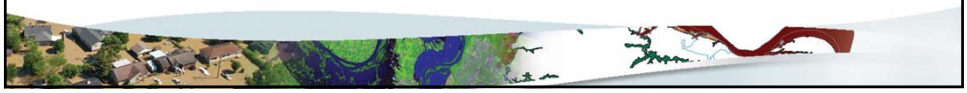
Planning

- ✓ NAI strategies
  - ➢ Sustainable development is "…development that meets the needs of the present without compromising the ability of future generations to meet their own needs."
    - ❑ *ASFPM NAI Toolkit*



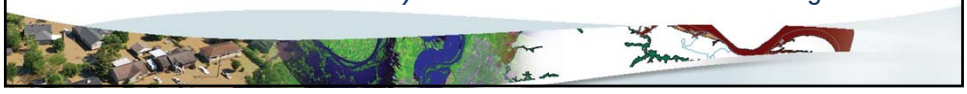
Regulations and Development Standards

- ✓ Basic strategies
  - ➢ Adopt floodplain management ordinance with minimum NFIP/state regulations
    - ❑ NFIP estimates that buildings built to minimum standards suffer 70% less than unprotected buildings
    - ❑ Flood damage can still occur with minimum standards
    - ❑ Flood elevations are subject to change, particularly as development occurs in watershed



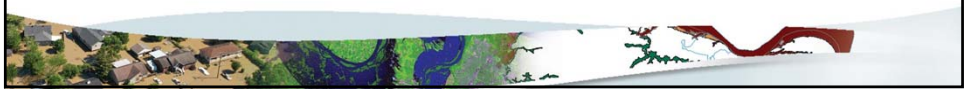
Regulations and Development Standards

- ✓ Basic strategies
  - ➢ Example minimum floodplain management regulations
    - ❑ All development in 100-yr floodplain must have a permit
    - ❑ Development in floodway must not cause increase in base flood levels
    - ❑ New residential buildings in riverine floodplains must have lowest floor elevated above BFE
    - ❑ New non-residential buildings in riverine floodplains must have lowest floor elevated to the BFE or flood proofed 1 foot above BFE
    - ❑ Substantially improved buildings (costs exceeding 50% of market value) are considered “new” buildings



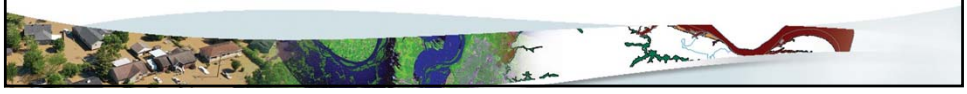
Regulations and Development Standards

- ✓ Better strategies
  - ➢ Adopt NFIP regulations with higher standards
  - ➢ Receive Community Rating System (CRS) credit for higher standards and lower insurance premiums for your community
  - ➢ LFUCG currently a Class 7 CRS community
    - ❑ 15% flood insurance premium discount in SFHAs
    - ❑ 5% discount for non-SFHAs



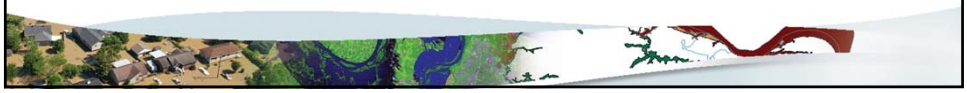
Regulations and Development Standards

- ✓ Better strategies
  - ➢ Require additional height requirement above BFE ("freeboard")
    - ❑ Accounts for rise in BFE due to development in floodplain and the watershed
    - ❑ Accounts for uncertainties inherent in flood modeling and mapping
    - ❑ Results in significantly lower flood insurance rates
    - ❑ Most common higher regulatory standard adopted by communities



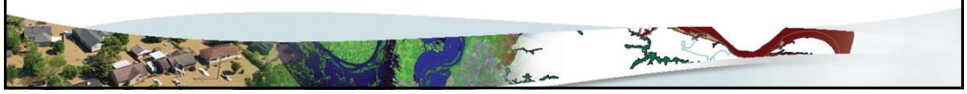
Regulations and Development Standards

- ✓ Better strategies
  - ➢ Strengthen "substantially improved" building requirements
    - ❑ For each structure, count substantial improvements cumulatively rather than individually to reach 50% threshold
      - KY substantial improvement requirement is 1 year
      - 401 KAR 4:060
    - ❑ Lower 50% threshold value
    - ❑ All additions outside original building footprint must meet building protection standards



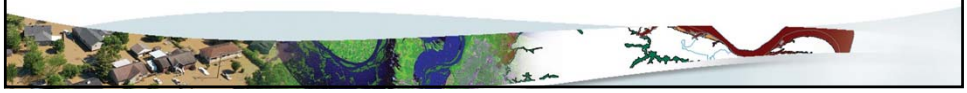
Regulations and Development Standards

- ✓ Better strategies
  - ➢ Flood fringe development
    - ❑ Require buildings to be built on columns, not fill
    - ❑ If buildings built on fill, require compensatory storage (ex: storage equal to1.5 or 2 times amount of fill)
  - ➢ Adopt building codes which include flood reduction standards
  - ➢ Adopt subdivision standards that require structures to be built outside of hazard areas



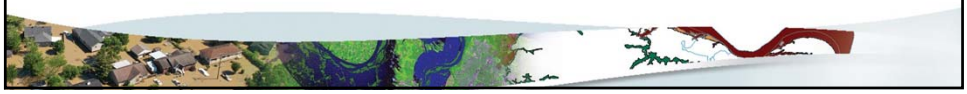
Regulations and Development Standards

- ✓ Better strategies
  - ➢ Utilize "green infrastructure"
    - ❑ Green space includes large metro and neighborhood parks, riparian buffers, linear parks and greenbelts
    - ❑ Green space is used as infrastructure just like roads, water lines and sewers
    - ❑ Green space provides services that are useful to humans, such as storm water storage and conveyance
    - ❑ Include green space to avoid more costly structural solutions



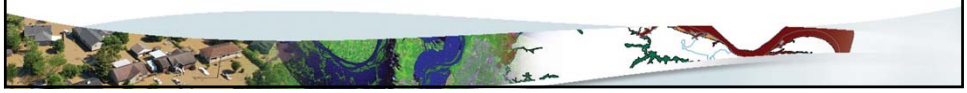
Regulations and Development Standards

- ✓ Better strategies
  - ➢ Adopt storm water regulations
    - ❑ Require developers to include detention basins
    - ❑ Require less impervious materials
    - ❑ Slow surface runoff
    - ❑ Develop erosion and sediment control plans
  - ➢ Adopt higher health and safety standards
    - ❑ Keep septic systems and landfills out of floodplains
    - ❑ Restrict hazardous materials in floodplains (exs: gasoline, pesticides and chemicals)



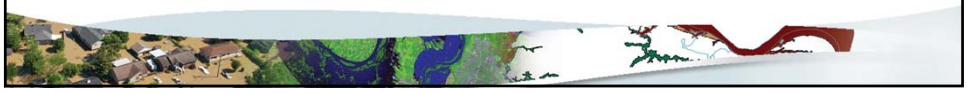
Regulations and Development Standards

- ✓ NAI strategies
  - ➢ Preserve beneficial natural floodplain functions
    - ❑ Adopt setback standards to establish minimum distances from stream channels and banks
    - ❑ Adopt buffer zone requirements between sensitive and developed areas
    - ❑ Implement stream restoration programs



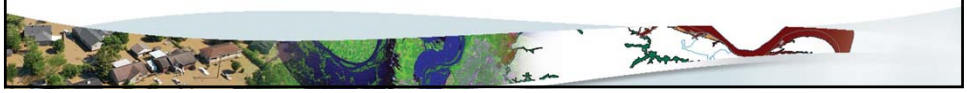
Mitigation Actions

- ✓ Basic strategies
  - ➢ Implement structural flood control measures
    - ❑ Dams/Reservoirs
    - ❑ Levees
    - ❑ Channel modifications
    - ❑ Bridge and culvert improvements
    - ❑ Diversions
  - ➢ Make flood insurance available



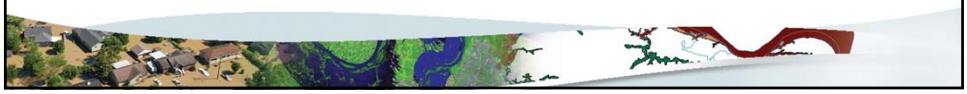
Mitigation Actions

- ✓ Better strategies
  - ➢ Implement non-structural flood management measures
    - ❑ Enforcement of community rules, regulations and procedures
    - ❑ Building elevation
    - ❑ Building relocation
    - ❑ Building acquisition/demolition
    - ❑ Dry and wet flood proofing



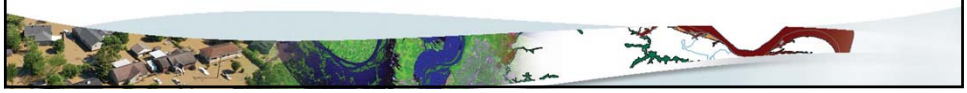
Mitigation Actions

- ✓ NAI strategies
  - ➢ Implement master flood planning (ex: integrate watershed, stormwater, habitat protection and floodplain planning efforts)
  - ➢ Involve all stakeholders in planning process
  - ➢ Mitigate while not transferring flood problems elsewhere



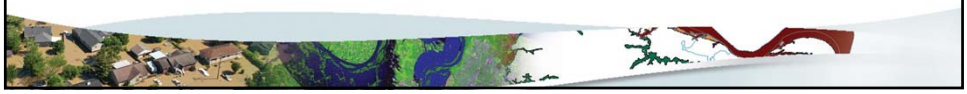
Infrastructure

- ✓ Basic strategies
  - ➢ Minimal flood planning
  - ➢ Respond to events as they happen
  - ➢ Repair or replace damaged facilities with similar facilities
    - ❑ "In-kind" replacement



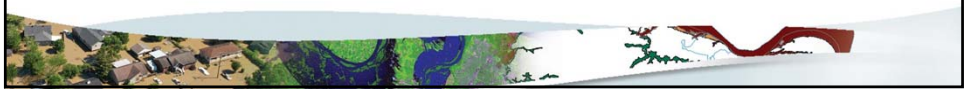
Infrastructure

- ✓ Better strategies
  - ➢ Inventory flood-prone facilities
  - ➢ Take actions to protect flood-prone facilities
  - ➢ Set protection standards for new facilities
  - ➢ Obtain flood insurance
  - ➢ Develop emergency action plans



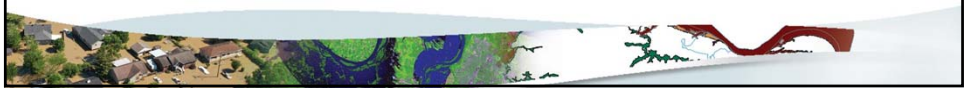
Infrastructure

- ✓ NAI strategies
  - Coordinate capital improvement plans with floodplain management plans
  - Set higher regulatory standards for critical facilities (ex: protect facilities from 0.2% event)
    - Reference EO 13690 – Federal Flood Risk Management Standard
  - Use green infrastructure to reduce maintenance costs and achieve co-benefits



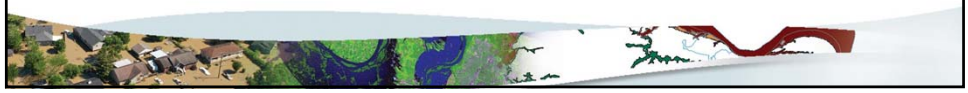
Emergency Services

- ✓ Basic strategies
  - Prepare generic response plans based upon off-the-shelf "model" plans
  - Plans may not meet needs of specific communities



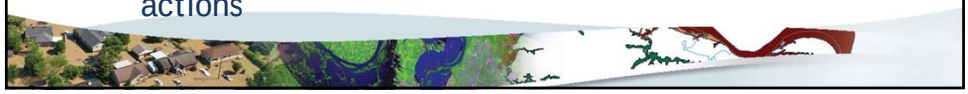
Emergency Services

- ✓ Better strategies
  - Prepare flood preparedness plans
  - Prepare dam/levee failure emergency action plans
  - Implement flood warning systems
  - Identify flood response actions and responsible parties
  - Be a StormReady community



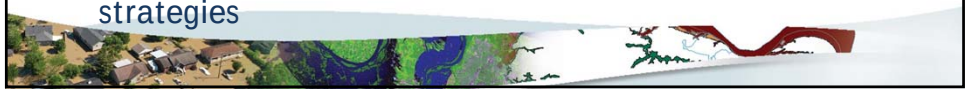
Emergency Services

- ✓ NAI strategies
  - Improve pre and post disaster preparedness and procedures
    - ❑ Ex: improve methods to evaluate damaged buildings, recognize that emergency barriers will divert floodwaters onto other, etc.
    - ❑ Get back to the "New Normal"
    - ❑ Implement resilience-based measures
  - Apply for pre and post disaster mitigation funds
    - ❑ HMGP, PDM, FMA, ICC
  - Incorporate multi-objective management /sustainability principles into post-disaster plans and actions



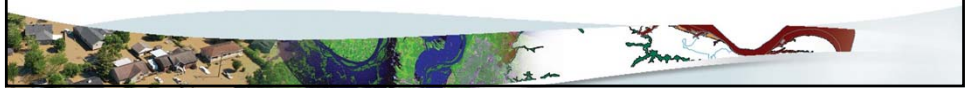
In Summary

- ✓ ASFPM No Adverse Impact strategies:
  - Hazard identification and floodplain mapping
  - Education and outreach
  - Planning
  - Regulations and development standards
  - Mitigation Actions
  - Infrastructure
  - Emergency services
- ✓ Strategies grouped by:
  - Basic
  - Better
  - No Adverse Impact
- ✓ Communities are encouraged to go beyond basic strategies



Resources

- ✓ NAI Toolkit:
  http://www.floods.org/NoAdverseImpact/NAI_Toolkit_2003.pdf
- ✓ ASFPM No Adverse Impact webpage:
  http://www.floods.org/index.asp?menuID=460&firstlevelmenuID=187&siteID=1



Questions?

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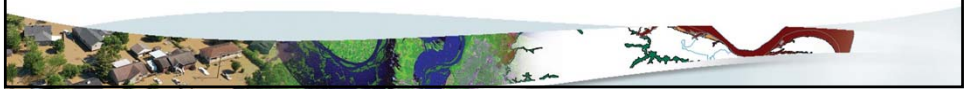

Nomination / Election of Watershed At-Large Seats

- Cane Run
- North Elkhorn
- Boone

Topics for Next Meeting December 2, 2016

Announcements

- UCC's EQ&PW Committee – September 20, 2016 at 1:00 p.m. – Annual MS4 Presentation / Stormwater Manual Revisions
- Planning Commission Work Session – September 29, 2016 at 1:00 p.m. – Annual MS4 Presentation / Stormwater Manual Revisions
- Environmental Commission Award Nominations due September 30, 2016
- Water Quality Fees Board Meeting – October 13, 2016 at 9:00 a.m. – Tate Building Training Room