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**Tackling Barriers to Green Infrastructure
One Code at a Time**

NOAA GREAT LAKES COASTAL STORMS PROGRAM
**Great Lakes Planning and Mitigation Needs
Assessment of Coastal Storm Hazards**

Survey Summary

PREPARED BY THE UNIVERSITY OF WISCONSIN SEA GRANT INSTITUTE

JUNE 2014



The Great Lakes Coastal Storms Program seeks to provide resources to Great Lakes communities to help them plan and implement mitigation strategies to reduce the impacts of these coastal storm hazards.

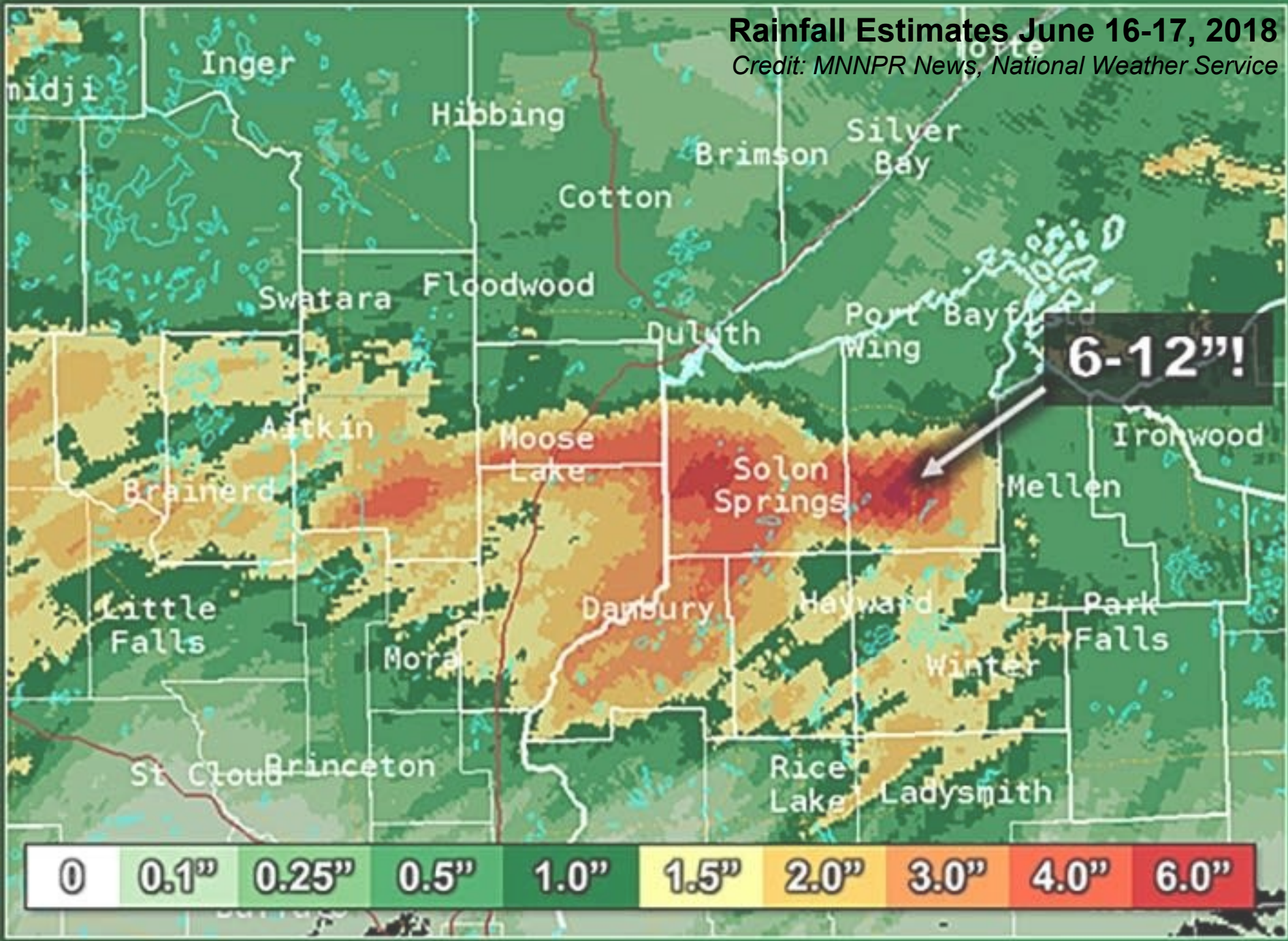


Top Hazards

- 1) Bluff and shoreline erosion (67%)
- 2) Stormwater/agricultural runoff pollution (62%)**
- 3) Stormwater/agricultural runoff sedimentation (60%)**
- 4) Overflow of combined sewer and stormwater systems (57%)**
- 5) Residential and commercial stormwater flooding of residential and commercial developments (55%)**

Rainfall Estimates June 16-17, 2018

Credit: MNNPR News, National Weather Service



Lake Superior June 21, 2018

NOAA/UW-Madison SSEC





Credit: Mike Werthman

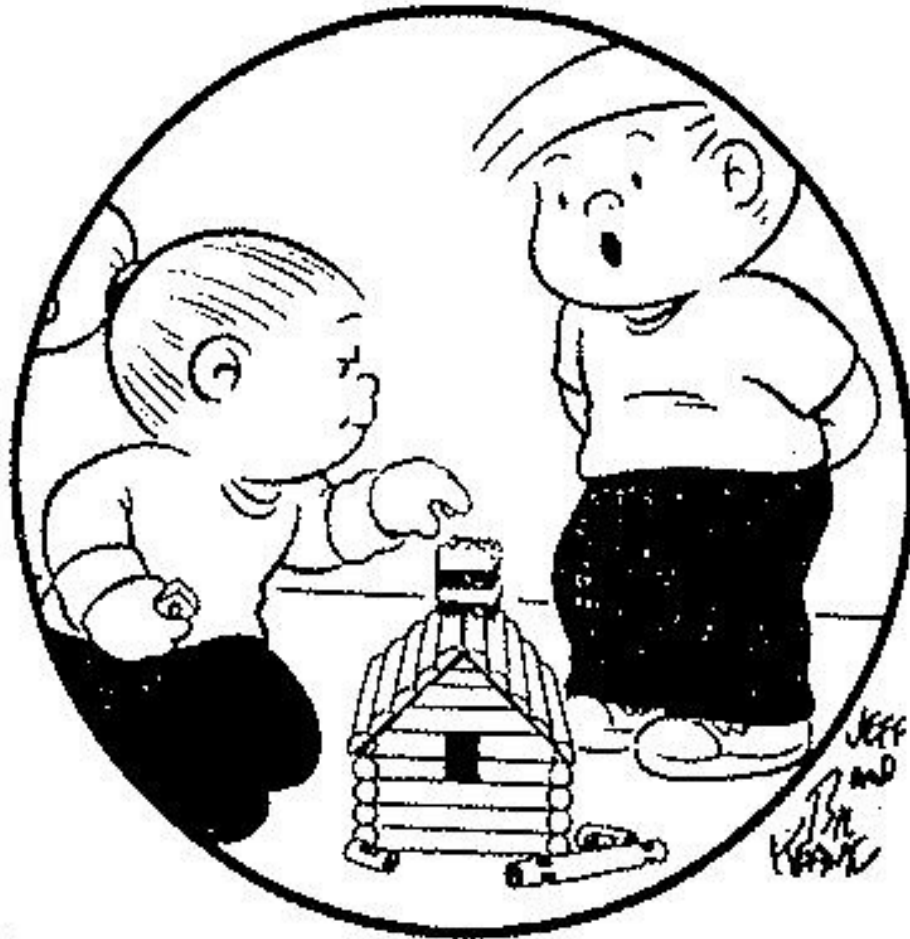
Hmmm...



Top Planning Needs

- 1) Updated 100/500-year flood maps (80%)
- 2) Local ordinance, zoning and building code assessment and analysis maps (79%)**
- 3) Shoreline erosion mapping and predictions (69%)
- 4) Public communication of risks and disaster response (69%)
- 5) Predictions about public health impacts (66%)

Why are Codes & Ordinances important for Green Infrastructure?



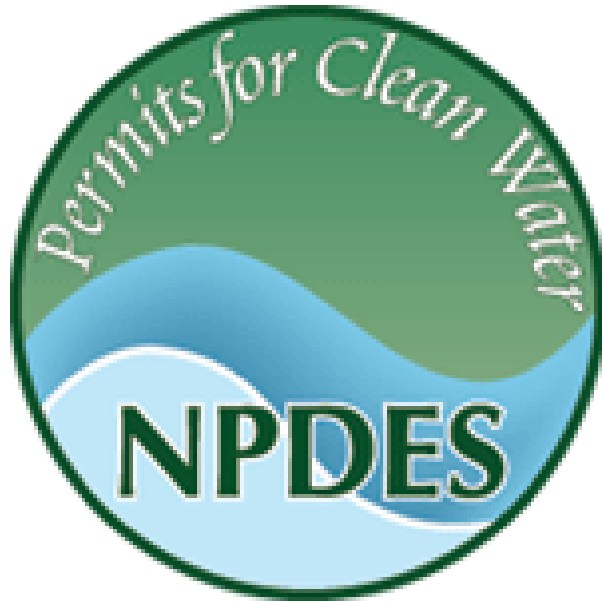
“The building code doesn’t allow a LEGO chimney on a Lincoln Log cabin.”



THE CITY OF CHICAGO

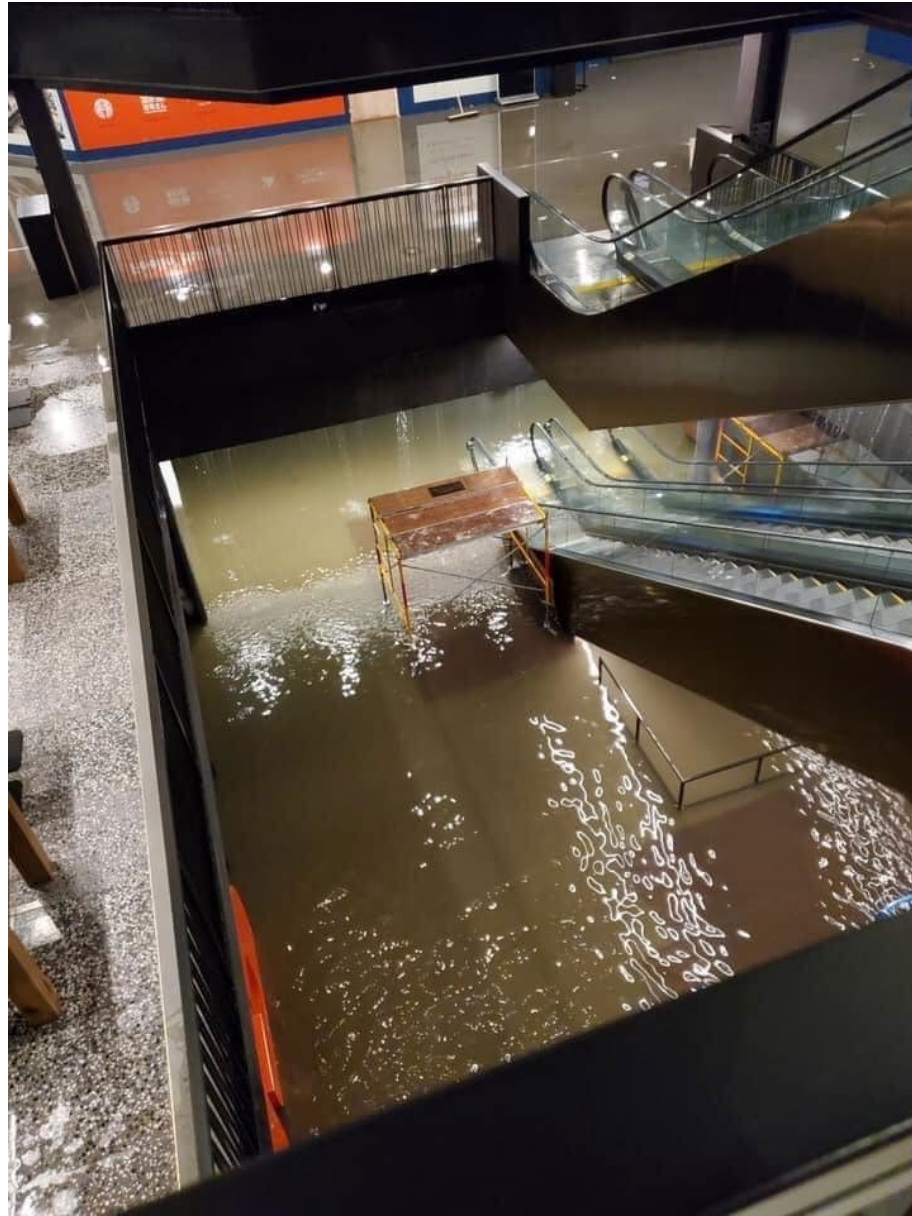
AS IT WAS BEFORE THE GREAT CONFLAGRATION OF OCTOBER 8TH, 9TH & 10TH 1871.

Emerging and evolving needs & issues



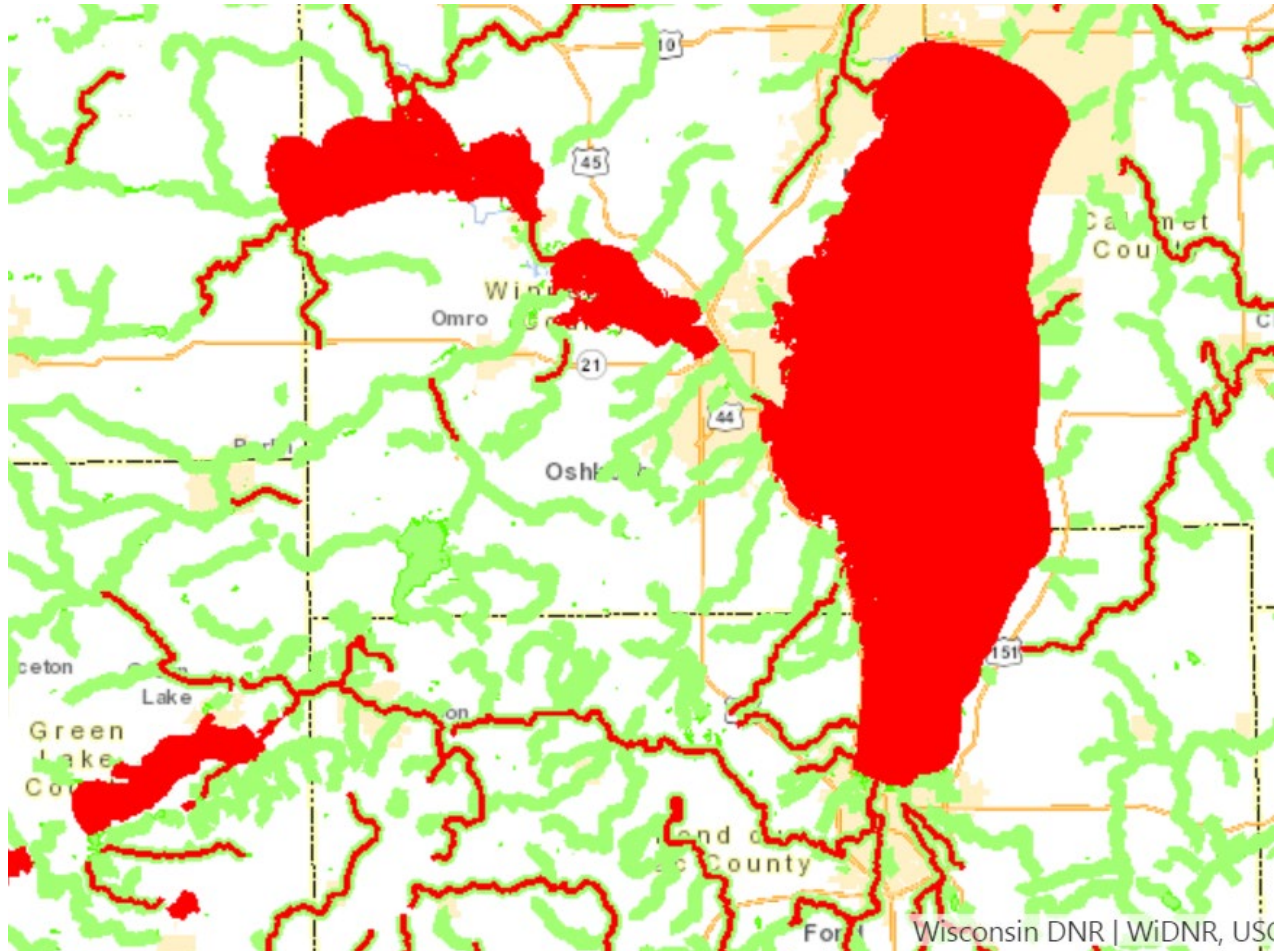
Stormwater permit updates

Emerging and evolving needs & issues



Intense storm events

Emerging and evolving needs & issues



Environmental Protection Agency
Total Maximum Daily Loads (TMDLs)

Emerging and evolving needs & issues

Changing
technical
standards



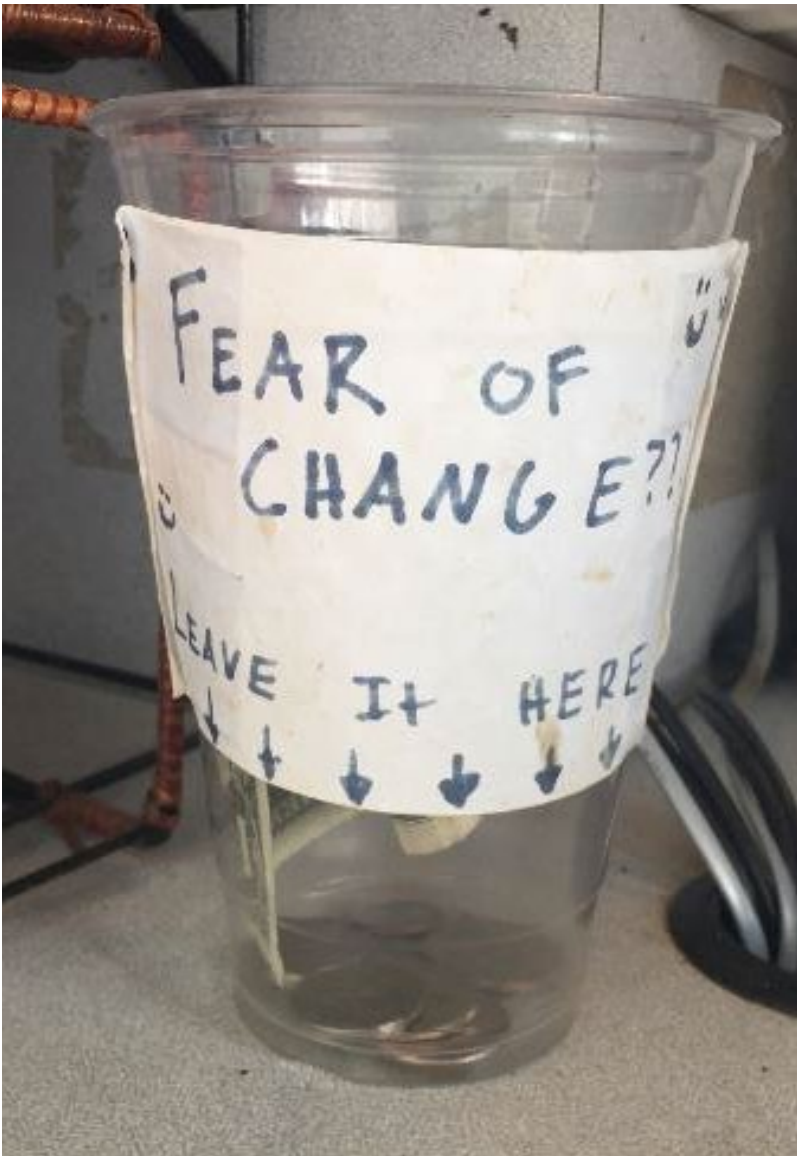
Emerging and evolving needs & issues



PaveDrain

New products
& technology

And Finally: The Discretion & Decider Barriers



WHO'S IN CHARGE HERE?!



The charismatic leader, "Make it so!"

Discretionary approval needed...



“The applicant shall incorporate the comments of the...”

Aesthetic Habits



“Because we’ve always done it that way.”

When no one is deciding



What's missing here?

"I heard it failed in..."



Norman Rockwell

So what? We comply with the state stormwater standards....



Why are Codes and Ordinances Important?

If the code language is not clear that green infrastructure is an acceptable or preferred approach to managing stormwater, it will not likely be considered in development proposals, design plans or capital projects.

It's not about more regulation or cost!



It's not about more regulation or cost!



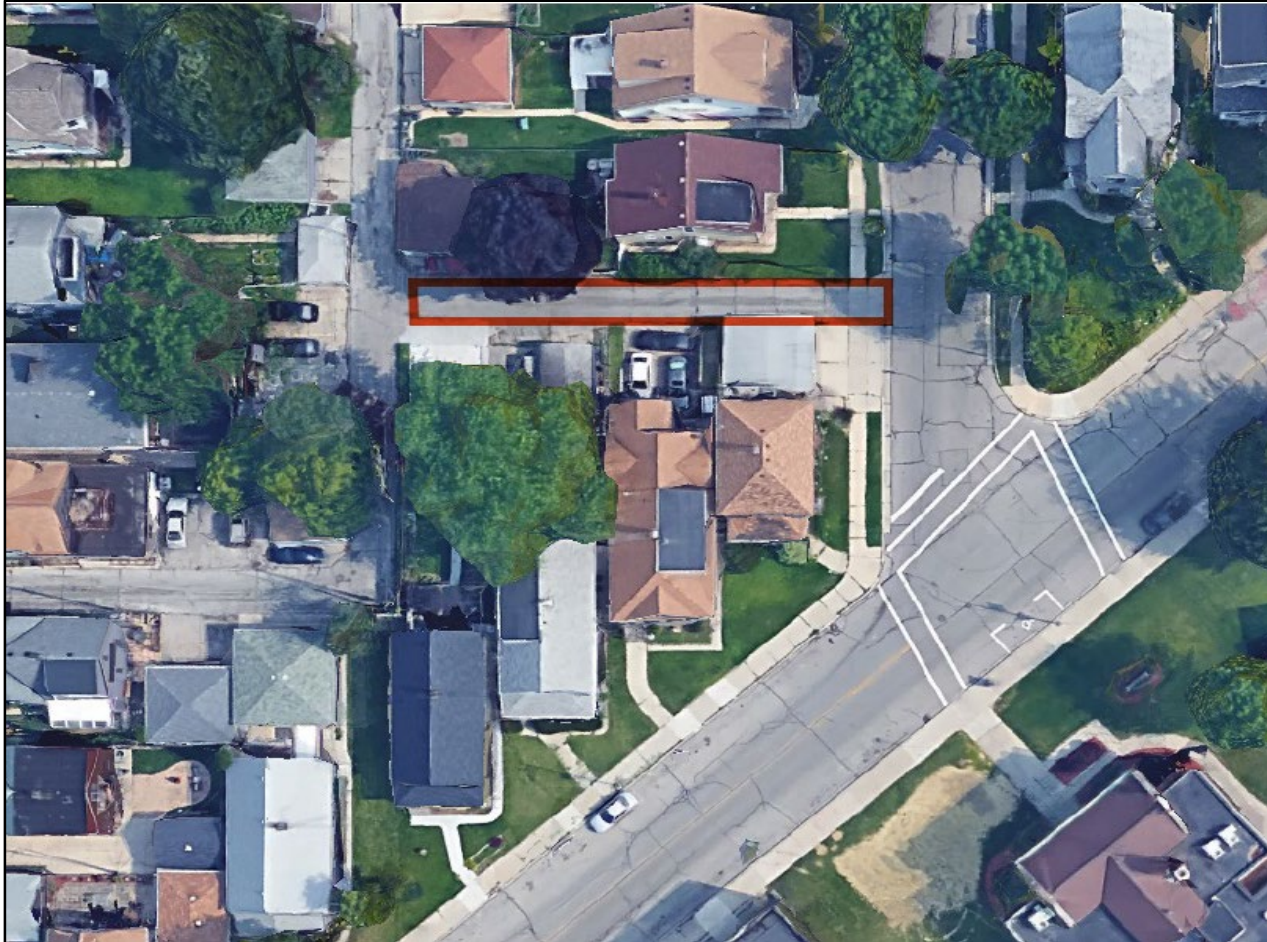


Do codes actually matter?

Code Revision: Allow use of permeable surfacing in driveways and alleys

- (3) *Surfacing.* All driveways shall be surfaced ~~with an asphaltic or Portland cement pavement~~ in accordance with village standards and specifications so as to provide a durable and dust-free surface, and shall be so graded and drained as to dispose of all surface water. Permeable surfacing may be used upon review and approval by the village engineer.

What's the Impact: Permeable Alleyways



63% runoff volume reduction

63% total suspended solids reduction

Code Revision: Encourage use of natives in lawn areas and limit total percent of site in turf grass

CODE OF ORDINANCES
Chapter 122 – ZONING

7. Landscaping. A general description of landscaping standards, screening, and parking lot treatments. Naturalized landscaping, the use of native vegetation, preservation of existing trees and wooded area, and tree planting that will provide additional tree canopy on the site are encouraged. The use of turfgrass should be limited to those areas intended for outdoor recreation or gathering areas.

What's the Impact:

Substituting Deep Rooted Plantings for Turf



74% runoff volume reduction

64% total suspended solids reduction

Code Revision: Reduce minimum parking ratio and set a maximum number of drive-through lanes.

Sec. 13-1-92 Parking Requirements.

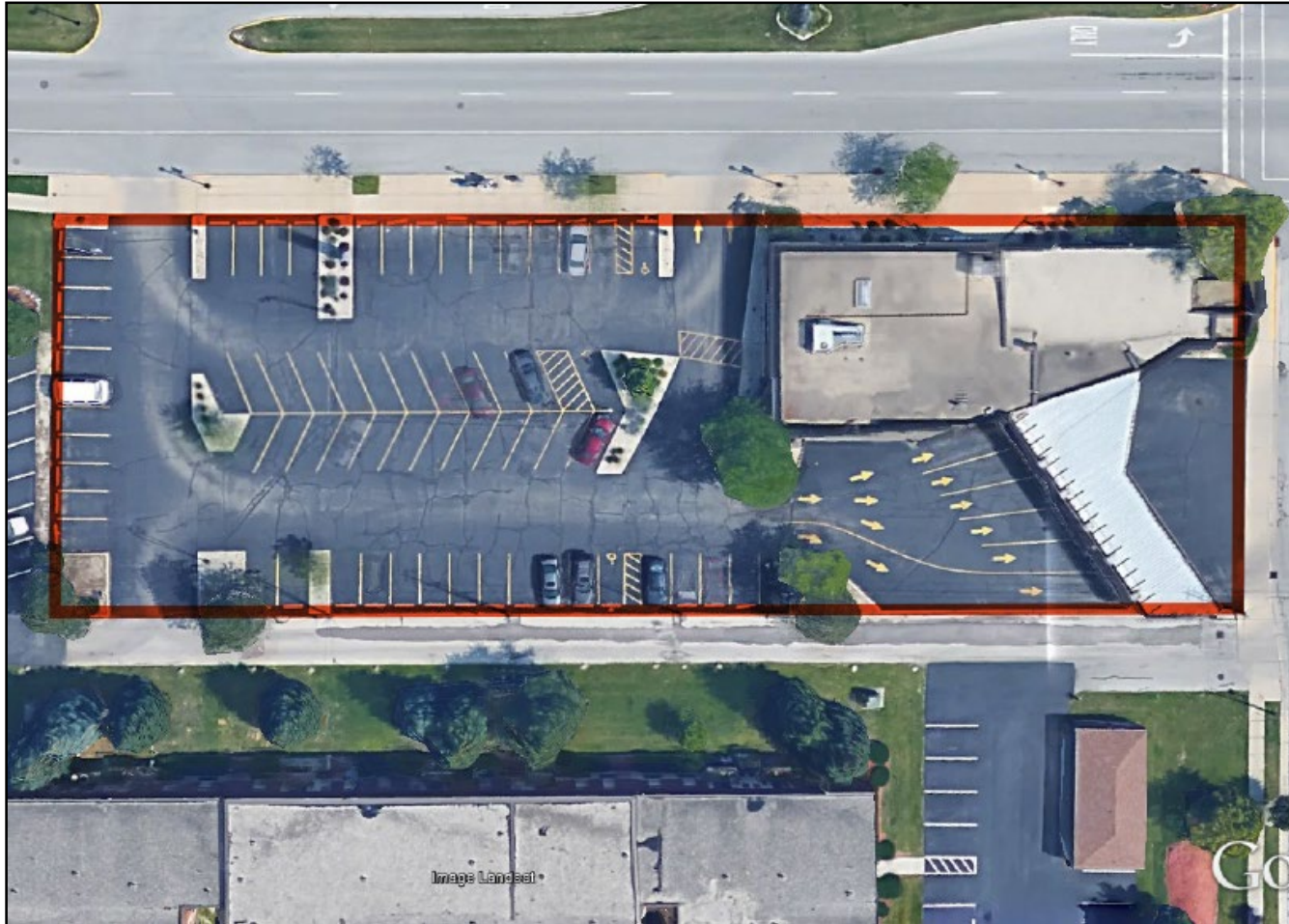
(2) Retail Sales and Customer Service Uses; Places of Entertainment.

Retail sales and customer service uses, and places of entertainment, except as specifically set forth below: one (1) space per two hundred (200) ~~one hundred fifty (150)~~ square feet of gross floor area of customer sales and service, plus one (1) space per two hundred (200) square feet of storage and/or office gross floor area, or if the use has at least eighty thousand (80,000) square feet gross floor area, one (1) space per two hundred (200) square feet of gross floor area.

a. Financial Institutions: One (1) per two hundred (200) ~~one hundred fifty (150)~~ square feet of gross floor area of customer sales and service, plus one (1) space per employee for the work shift with the largest number of employees. Financial institutions with drive-through service facilities shall provide sufficient space for up to four (4) waiting vehicles at each drive-through service lane.

What's the Impact:

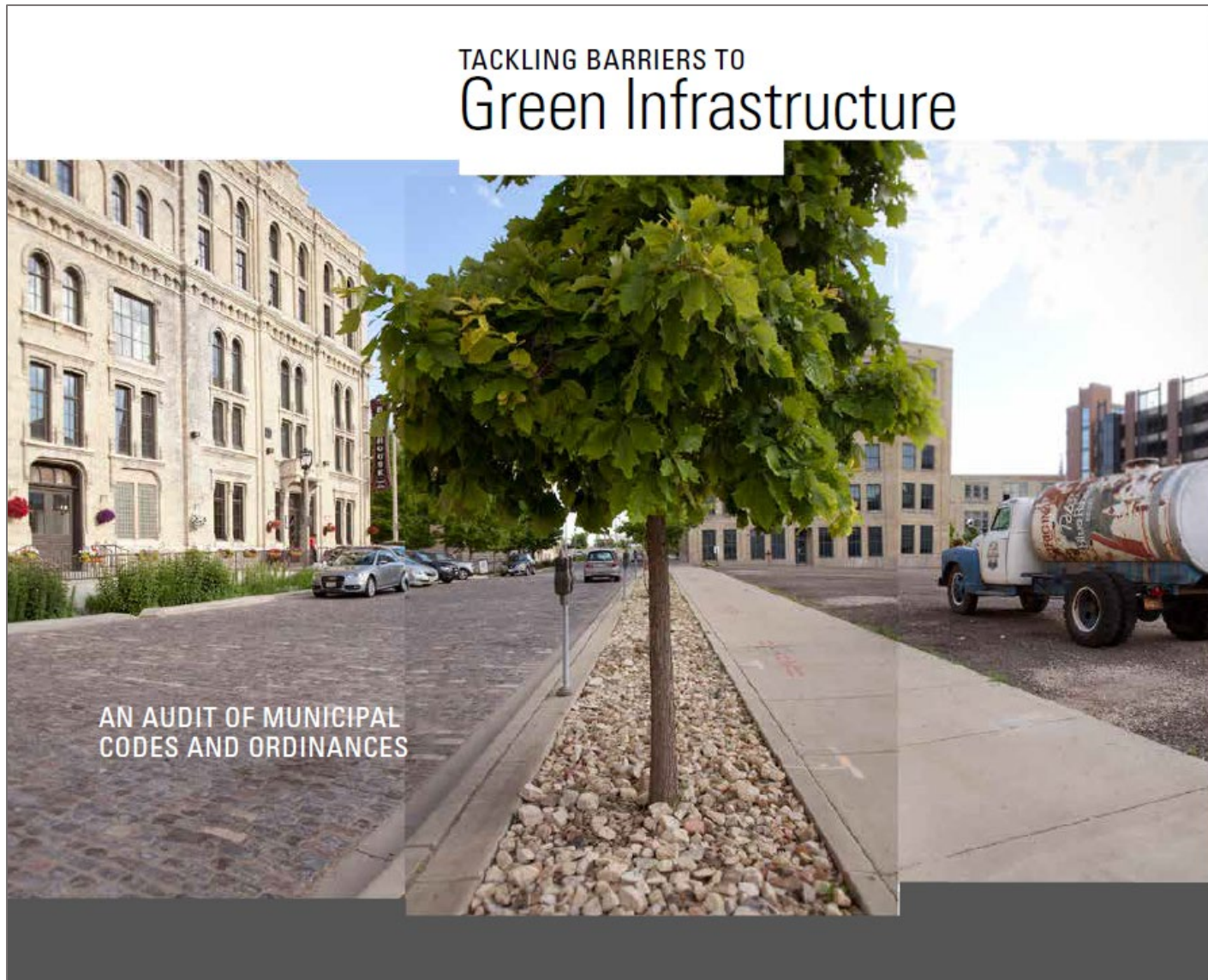
Reducing Total Impervious Area Associated with Parking



19% runoff volume reduction

23% total suspended solids reduction

...Yes, codes matter and we can do better!



www.seagrant.wisc.edu/greeninfrastructure

What makes this audit unique?



One code to rule them all....



COMMUNITY SCOPING WORKSHEET

Community Planning

1. Has a comprehensive plan been adopted for the community?
 Yes No

If yes, how are the community's natural resources addressed in the comprehensive plan?

2. Is there specific attention to the community's water resources in the comprehensive plan?
 Yes No

If yes, is green infrastructure implementation listed as a key element in the watershed restoration implementation plan?

Yes No

3. Has your municipality taken part in the development of a watershed restoration or other similar plan?
 Yes No

Natural Assets

1. Are there rivers or streams flowing through your community?
 Yes No

How aware are residents of these resources? _____

2. Are there private or public properties within your community that have frontage on a lake, pond or river?
 Yes No

3. Are there other important natural areas adjacent or within your community?
 Yes No

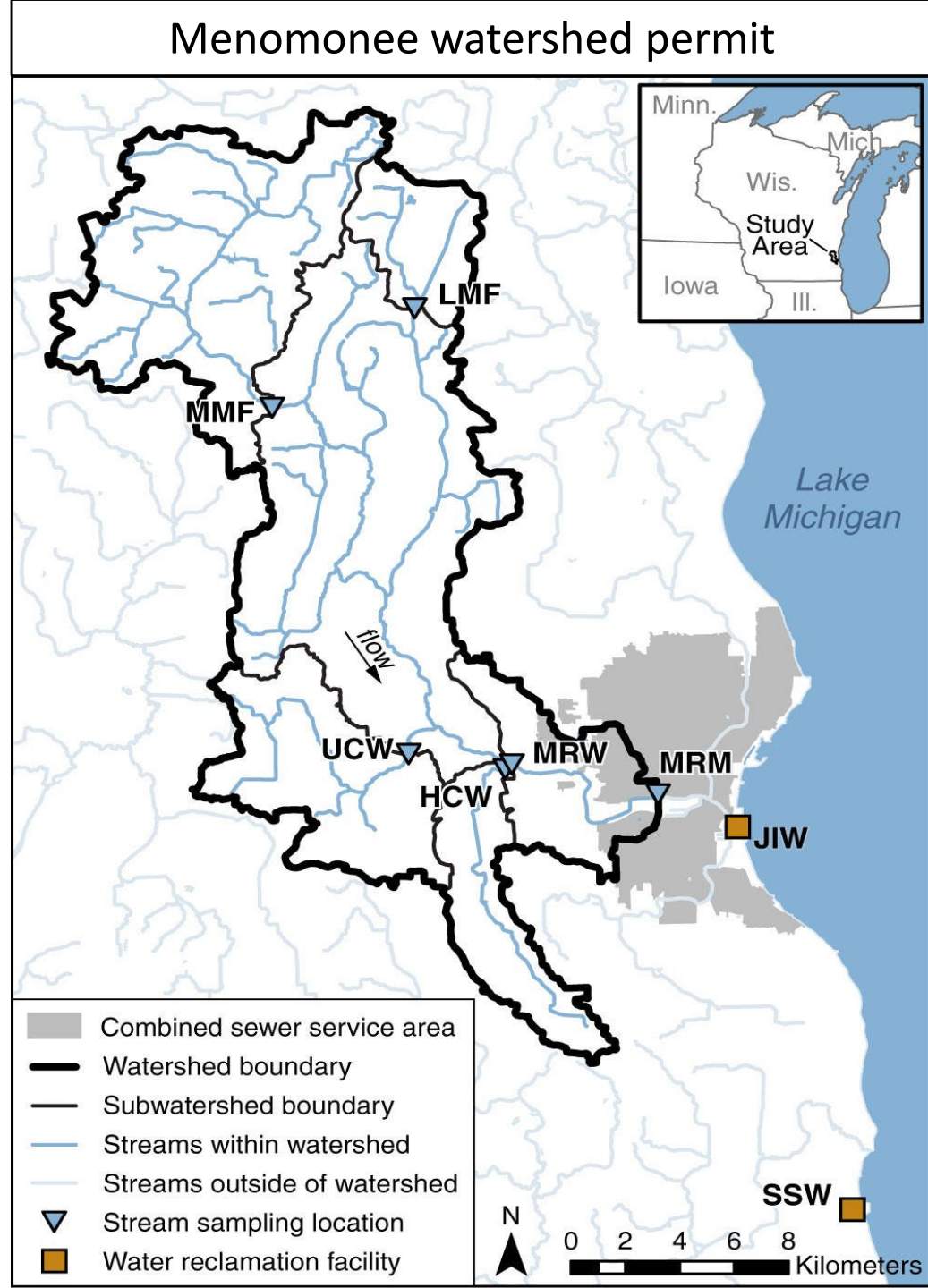
If yes, how are those natural areas incorporated into the community's culture, such as for events?

Natural Assets?



Stormwater Permit?

Pollution Limit?
(e.g., TMDLs)



Hazards?



Community Identity and Character?





Green
Infrastructure
Usage?

Acceptance?



Acceptance?



Down in the weeds



- ✓ ARCHITECTURAL DESIGN STANDARDS
- ✓ COASTAL COMMUNITIES
- ✓ COMMUNITY OUTREACH AND EDUCATION
- ✓ CONSTRUCTION AND POST-CONSTRUCTION MANAGEMENT
- ✓ LANDSCAPING
- ✓ PARKING
- ✓ PERMEABLE MATERIALS
- ✓ POLLUTANT REDUCTION THROUGH SITE PLAN REVIEW
- ✓ POST-CONSTRUCTION STORMWATER STANDARDS AND LONG-TERM MAINTENANCE
- ✓ PUBLIC WORKS STANDARDS
- ✓ PURPOSE STATEMENTS AND COMMUNITY PLANS
- ✓ SANITARY AND STORM SEWER DISCONNECTIONS
- ✓ STORMWATER MANAGEMENT STANDARDS
- ✓ SUBDIVISIONS AND NEW “GREENFIELD” DEVELOPMENT
- ✓ ZONING

15 Code Topics!

Reduce impervious surfaces and maximize vegetated and landscaped areas



Reduce impervious surfaces and maximize vegetated and landscaped areas





Buffers, buffers and more buffers!



Buffers, buffers and more buffers!

Restore and protect natural functions of soils and vegetation



Restore and protect natural functions of soils and vegetation



Control pollution from yucky things!



Control pollution from yucky things!



Clarify the intent and purpose of codes to encourage green infrastructure use



Nuanced Code Ranking

GI practice clearly allowed and approved as-of-right	GI practice allowable but some ambiguity or potential conflict	GI practice allowed with discretionary approval	GI practice mentioned but w/o standards or guidance	No policy or standards adopted, but not disallowed	Limitations or prohibitive language, but could potentially be approved	GI practice prohibited or prevented by conflicting code
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Permeable Materials

	1	2	3	4	5	6	7	8	9
May alleys be permeable or widths varied?	Blue	Orange	Blue	Blue	Red	Blue	Green	Yellow	Blue
Are parking areas allowed to be permeable?	Red	Red	Green	Orange	Red	Red	Green	Green	Red
Are loading areas allowed/encouraged to be permeable?	Orange	Orange	Blue	Red	Red	Blue	Light Blue	Orange	Red
Are sidewalks allowed/encouraged to be permeable?	Yellow	Orange	Orange	Red	Red	Red	Green	Orange	Orange
Are driveways allowed/encouraged to be permeable?	Blue	Orange	Blue	Orange	Blue	Green	Green	Yellow	Blue
Are low-volume street sections allowed/encouraged to be permeable?	Red	Orange	Orange	Red	Red	Blue	Light Blue	Red	Orange
Does the use of permeable materials reduce the stormwater quantity required to be managed? If so is this a written or informal standard?	Orange	Grey	Blue	Yellow	Light Green	Yellow	Yellow	Yellow	Yellow
Is there a provision that driveways may/shall be partially permeable or drained to pervious area if exceeding a certain width/total SF?	Blue	Green	Blue	Blue	Red	Blue	Green	Blue	Blue
Is permeable surfacing allowed for parking lanes?	Orange	Orange	Orange	Red	Red	Blue	Green	Orange	Red
Must driveway aprons be made of impermeable surfaces?	Blue	Orange	Orange	Blue	Red	Red	Green	Blue	Blue
Must a sealant be used and can that provision be waived?	Blue	Orange	Orange	Blue	Red	Blue	Green	Red	Blue
Can grasscrete be used to meet public safety/fire access needs?	Light Green	Light Green	Blue	Light Green	Light Green	Light Green	Green	Dark Green	Blue
Is there municipal experience with permeable material, curbless streets, or other GI measures?	Light Green	Light Green	Dark Green	Light Green	Light Green	Dark Green	Green	Light Green	Blue
Are standard specifications or performance standard adopted or referenced for permeable materials?	Red	Orange	Blue	Red	Blue	Blue	Light Green	Blue	Blue

Nuanced Code Ranking



Juli Beth Hinds,
Birchline Planning, LLC

A+	Practice is enabled and described specifically; clearly allowed and approved as-of-right
A	Practice is specifically allowable/ as-of-right approval, but some ambiguity or potential conflict
A-	Practice is enabled or encouraged, with discretionary approval
B	Practice is mentioned but without standards or guidance for use
C	No policy or standards adopted, but not disallowed
D	Limitations or prohibitive language in the code, but could potentially be approved
F	Practice prohibited by code language, or an active conflict would prevent approval

Landscaping

Audit Question	Type of Barrier	Tips	Grade
Is the use of deep-rooted or native plants, plants with habitat value, or edibles allowed or encouraged in the landscaping standards?	Landscape standards Design guidelines	Explicitly listing desired types of landscaping in the regulations tells site planners up front that the community encourages these types of plantings.	A-

Green Infrastructure Audit Tool Report Card

ARCHITECTURAL DESIGN STANDARDS

- A Are rainwater-harvesting and stormwater-control elements acknowledged in design standards?
- B Are green infrastructure practices suitable for high-density areas (e.g., planter boxes, cisterns) allowed to extend into the right-of-way or onto sidewalks?
- C Do design standards allow siting of stormwater-control measures along façade?
- B Do standards allow for the waiver of design or architectural provisions to accommodate stormwater-control measures (planters, cisterns, green roofs, etc.)?
- D Are pitched roofs required? If so, is a waiver or provision for green roofs or rainwater harvesting made?
- C Are green infrastructure practices suitable for high-density areas allowed or encouraged in streetscapes (e.g., tree boxes, sidewalk bioretention areas, curb bump-outs)?



“How do I choose?!”

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 Yes No

Natural Assets

1. Are there rivers or streams flowing through your community?
 Yes No

How aware are residents of these resources? _____

2. Are there private or public properties within your community that have frontage on a lake, pond or river?
 Yes No

Are there any important natural areas adjacent or within the community?

Are these areas incorporated into the community events?



Current and future development?



Current and future development?





No Near-term Development or Redevelopment?

MARY BETH DOYLE
PARK AND WETLAND
PRESERVE



Flooding or CSO issues?

What code changes will meet your community's goals?





TBD....



CANADA

Lake Superior

Ontario

Quebec

Wisconsin

Michigan

Lake Huron

Toronto

Lake Ontario

Milwaukee

Detroit

Buffalo

Illinois

Chicago

UNITED STATES

Ohio

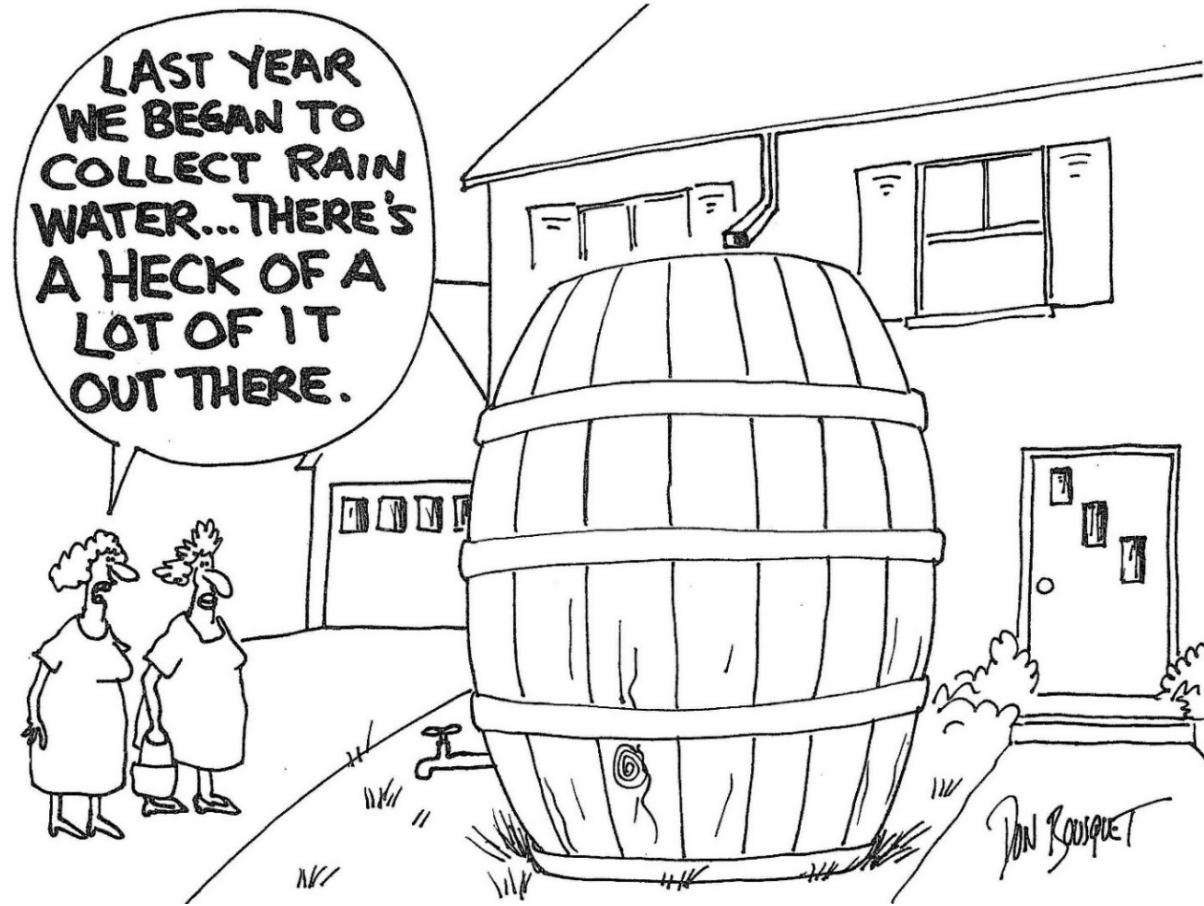
Lake Erie

Cleveland

Pennsylvania

Pittsburgh

Thank you!



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