

# Appendix A





# City of Milwaukee

## Text File

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

### Resolution-Immediate Adoption

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**Introduced:** 7/27/2010

**File Number:** 100418

**Status:** Passed

**Version:** 0

**Sponsors:** Ald. Bohl, Ald. Hamilton, Ald. Kovac, Ald. Wade, Ald. Murphy, Ald. Dudzik, Ald. Wtkowski and Ald. Coggs

..Number  
100418

..Version  
Original

..Reference

..Sponsor  
ALD. BOHL, Hamilton, Kovac, Wade, Murphy, Dudzik, WITKOWski AND COGGS

..Title  
Resolution creating a Flooding Study Task Force to recommend remedies for storm water and sewage backup flooding of City residential and commercial properties, and flooding of streets and alleyways.

..Analysis  
This resolution creates a Flooding Study Task Force to recommend remedies for storm water and sewage backup flooding of City residential and commercial properties, and flooding of streets and alleyways.

This resolution further directs the Flooding Study Task Force to include in its review an evaluation and analysis of the region's storm water and sewage capacity, and shall include all relevant capacity recommendations with its findings.

The chair of this Flooding Study Task Force shall be designated by the Common Council President, and the task force shall be staffed by the City Clerk's Office. The 7-member Flooding Study Task Force shall include:

1. 2 Council members appointed by the Common Council President.
2. The Commissioner of Public Works or the Commissioner's designee.
3. The Executive Director of the Milwaukee Metropolitan Sewerage District or the Executive Director's designee.
4. The Executive Director of the Southeastern Wisconsin Regional Planning Commission or the Executive Director's designee.

5. One member appointed by the Mayor.
6. One member appointed by the Common Council President.

The Flooding Study Task Force shall report its findings not later than February 1, 2011, and shall thereafter be dissolved.

..Body

Whereas, The City of Milwaukee has been beset by chronic storm water and sewage backup flooding of City residential and commercial properties, and flooding of streets and alleyways; and

Whereas, Storm water and sewage backup flooding of residential and commercial properties poses serious possible health risks, burdens residents and other property owners with expensive cleanup, appliance and furnishings replacements and repair costs, and diminishes the quality of life for residents; and

Whereas, Storm water and sewage backup flooding of residential and commercial properties not only burdens the City's tight budget with the costs of additional police, fire and other emergency response services and the costs for additional trash pickups of furnishings and building materials damage during the flooding, but it reduces property values by damaging homes and businesses and threatens the City's long-term financial viability by eroding its tax base; and

Whereas, Storm water and sewage backup flooding of residential and commercial properties may diminish the quality of life to the point residents flee the City and potential new residents refuse to seriously consider moving to Milwaukee; and

Whereas, Flooding of streets and alleyways, and covers popping off sewer manholes from surging floodwater pressure, pose a significant threat to the health and safety of drivers, passengers and pedestrians; and

Whereas, Flooding of streets and alleyways and dislocated manhole covers burden the City not only with increased police, fire and other emergency response expenses, but with costly, emergency repairs to the City's infrastructure as graphically evidenced during the July 22, 2010, rainstorm when a sinkhole opened up at Oakland and North Avenue which the City must repair at considerable expense; now, therefore, be it

Resolved, By the Common Council of the City of Milwaukee, that a Flooding Study Task Force is created to recommend remedies for storm water and sewage backup flooding of City residential and commercial properties, and flooding of streets and alleyways; and, be it

Further Resolved, The Flooding Study Task Force shall include in its review an evaluation and analysis of the regional's storm water and sewage capacity, and shall include all relevant capacity recommendations with its findings; and, be it

Further Resolved, The chair of this Flooding Study Task Force shall be designated by the Common Council President, and the task force shall be staffed by the City Clerk's Office; and, be it

Further Resolved, The Flooding Study Task Force membership shall consist of the following 7 members:

- 1 2 Council members appointed by the Common Council President.
- 2 The Commissioner of Public Works or the Commissioner's designee.
- 3 The Executive Director of the Milwaukee Metropolitan Sewerage District or the Executive Director's designee.
- 4 The Executive Director of the Southeastern Wisconsin Regional Planning Commission or the Executive Director's designee.
- 5 One member appointed by the Mayor.
- 6 One member appointed by the Common Council President.

; and, be it

Further Resolved, All departments are directed to assist the Flooding Study Task Force as requested to complete its mission; and, be it

Further Resolved, The Flooding Study Task Force shall report its findings to the Common Council not later than February 1, 2011, and shall thereafter be dissolved.

..Requester

..Drafter

LRB #10634-1

ANC

07/23/10





**City of Milwaukee**  
**Text File**

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

**Resolution-Immediate Adoption**

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**Introduced:** 9/1/2010

**File Number:** 100541

**Status:** Passed

**Version:** 1

**Sponsors:** Ald. Bohl

..Number  
100541

..Version  
Substitute 1

..Reference  
100418

..Sponsor  
ALD. BOHL

..Title  
Substitute resolution amending Common Council Resolution File Number 100418 relating to the Flooding Study Task Force.

..Analysis  
This resolution amends Common Council Resolution File Number 100418 adopted July 27, 2010, creating a Flooding Study Task Force by adding to its membership a representative from the Wisconsin Department of Natural Resources. The addition of this new member increases the task force from 7 to 8 members.

The resolution also extends the Flooding Study Task Force's deadline for reporting its findings to the Common Council from February 1, 2011, to May 31, 2011.

..Body  
Whereas, The Common Council adopted Resolution File Number 100418 on July 27, 2010, creating a Flooding Study Task Force; and

Whereas, This additional member will increase the task force's effectiveness; and

Whereas, Extending the task force's reporting deadline will ensure the task force has sufficient time to thoroughly investigate and analyze this complex issue; now, therefore, be it

Resolved, By the Common Council of the City of Milwaukee, that Common Council File

Number 100418 is amended as follows:

1. Delete the third "Further Resolved" clause, and insert in lieu thereof:

"Further Resolved, The Flooding Study Task Force membership shall consist of the following 8 members:

1. 2 Council members appointed by the Common Council President.
2. The Commissioner of Public Works or the Commissioner's designee.
3. The Executive Director of the Milwaukee Metropolitan Sewerage District or the Executive Director's designee.
4. The Executive Director of the Southeastern Wisconsin Regional Planning Commission or the Executive Director's designee.
5. One representative of the Wisconsin Department of Natural Resources.
6. One member appointed by the Mayor.
7. One member appointed by the Common Council President.

; and, be it"

2. Delete the last "Further Resolved" clause, and insert in lieu thereof:

"Further Resolved, The Flooding Study Task Force shall report its findings to the Common Council not later than May 31, 2011, and shall thereafter be dissolved."

..Requester

..Drafter  
#121485-2  
ANC  
09/01/10





# City of Milwaukee

## Text File

### Appointment

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

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**Introduced:** 10/12/2010

**File Number:** 100663

**Status:** Placed On File

**Version:** 0

**Sponsors:** THE CHAIR

..Number

100663

..Version

ORIGINAL

..Reference

100418

..Sponsor

THE CHAIR

..Title

Appointment of Erick Shambarger to serve on the Flooding Study Task Force by the Mayor.

..Drafter

Mayor

TB

9/22/10





# City of Milwaukee

## Text File

### Appointment

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

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**Introduced:** 10/12/2010

**File Number:** 100664

**Status:** Placed On File

**Version:** 0

**Sponsors:** THE CHAIR

..Number

100664

..Version

ORIGINAL

..Reference

100418

..Sponsor

THE CHAIR

..Title

Appointments of Ald. James Bohl, Rep. Sandy Pasch and Ald. Ashanti Hamilton to serve as Chair of the Flooding Study Task Force by the Common Council President.

..Drafter

CC-CC

wlh

9/22/10





**City of Milwaukee**  
**Text File**

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

**Communication-Report**

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**Introduced:** 9/21/2010

**File Number:** 100665

**Status:** In Committee

**Version:** 0

**Sponsors:** THE CHAIR

..Number

100665

..Version

ORIGINAL

..Reference

..Sponsor

THE CHAIR

..Title

Communication relating to the activities of the Flooding Study Task Force.

..Requestor

..Drafter

CC-CC

lme

9/22/10





**City of Milwaukee**  
**Text File**

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

**Communication-Report**

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**Introduced:** 9/21/2010

**File Number:** 100666

**Status:** In Committee

**Version:** 0

**Sponsors:** THE CHAIR

..Number

100666

..Version

ORIGINAL

..Reference

..Sponsor

THE CHAIR

..Title

Communication transmitting the report of the Flooding Study Task Force.

..Requestor

..Drafter

CC-CC

lme

9/22/10







# City of Milwaukee

## Text File

### Appointment

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

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**Introduced:** 12/21/2010

**File Number:** 101059

**Status:** Placed On File

**Version:** 0

**Sponsors:** THE CHAIR

..Number

101059

..Version

ORIGINAL

..Reference

100418

..Sponsor

THE CHAIR

..Title

Appointment of Gerry Novotny to serve on the Flooding Study Task Force by the Wisconsin Department of Natural Resources.

..Drafter

WDNR

hjl

12/9/10





# City of Milwaukee

## Text File

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

### Resolution-Immediate Adoption

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**Introduced:** 12/21/2010

**File Number:** 101120

**Status:** Passed

**Version:** 0

**Sponsors:** Ald. Bohl

..Number  
101120

..Version  
Original

..Reference  
100418, 100541

..Sponsor  
ALD. BOHL

..Title  
Resolution amending Common Council Resolution File Number 100418, as amended by File Number 100541, relating to the Flooding Study Task Force.

..Analysis  
This resolution amends Common Council Resolution File Number 100418 adopted July 27, 2010, which created a Flooding Study Task Force, as amended by Resolution File Number 100541 adopted September 1, 2010, by making the 2 Council members appointed by the Common Council President co-chairs of the task force.

..Body  
Whereas, The Common Council adopted Resolution File Number 100418 on July 27, 2010, creating a Flooding Study Task Force and amended this resolution through Resolution File Number 100541, adopted September 1, 2010; now, therefore, be it

Resolved, By the Common Council of the City of Milwaukee, that Common Council File Number 100418, as amended by File Number 100541, is amended by inserting the following "Further Resolved" clause between the third and fourth "Further Resolved" clauses:

"Further Resolved, That the 2 Council members appointed by the Common Council President to the Flooding Study Task Force shall serve as co-chairs of the task force; and, be it"

..Requester

..Drafter

LRB #124300-1

ANC

12/20/10



**City of Milwaukee**  
**Text File**

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

**Resolution-Immediate Adoption**

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**Introduced:** 4/12/2011

**File Number:** 101556

**Status:** Passed

**Version:** 0

**Sponsors:** Ald. Bohl

..Number  
101556

..Version  
original

..Reference  
100541, 100418

..Sponsor  
ALD. BOHL

..Title  
Resolution amending Common Council Resolution File Number 100541 relating to the reporting deadline for the Flooding Study Task Force.

..Analysis  
This resolution amends Common Council Resolution File Number 100541 adopted on September 1, 2010, by extending the Flooding Study Task Force's deadline for reporting its findings to the Common Council from May 31, 2011, to July 26, 2011.

The Flooding Study Task Force was created by File Number 100418 adopted July on 27, 2010. File Number 100541 extended the original February 1, 2011, reporting deadline to May 31, 2011.

..Body  
Whereas, The Common Council adopted Resolution File Number 100418 on July 27, 2010, creating a Flooding Study Task Force, and adopted Resolution File Number 100541 on September 1, 2010, extending the task force's reporting deadline to May 31, 2011; and

Whereas, Further extending the task force's reporting deadline will ensure the task force has sufficient time to thoroughly investigate and analyze this complex issue; now, therefore, be it

Resolved, By the Common Council of the City of Milwaukee, that Common Council File Number 100541 is amended as follows:

1. Delete Item 2 of the "Resolved" clause, and insert:

"2. Delete the last "Further Resolved" clause, and insert in lieu thereof:

Further Resolved, The Flooding Study Task Force shall report its findings to the Common Council not later than July 26, 2011, and shall thereafter be dissolved."

..Requester

..Drafter

LRB #126911-1

Aaron Cadle

04/05/11

# Appendix B







# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Agenda

### FLOODING STUDY TASK FORCE

*ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS*

*Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin Shafer,  
Erick Shambarger, and Ken Yunker*

*Staff Assistant Linda Elmer 286-2232; Fax: 286-3456;  
lelmer@milwaukee.gov*

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Thursday, January 6, 2011

10:00 AM

Room 301-A, City Hall

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1. Introduction of members.
2. Appearance by Jim Owczarski, Deputy City Clerk, relating to open meetings and open records law.
3. Climate trends for Southeastern Wisconsin.
4. Overview of recent flooding-related activities in Milwaukee
5. Next meeting agenda.

Members of the Common Council and its standing committees who are not members of this committee may attend this meeting to participate or to gather information. Notice is given that this meeting may constitute a meeting of the Common Council or any of its standing committees, although they will not take any formal action at this meeting.

Upon reasonable notice, efforts will be made to accommodate the needs of persons with disabilities through sign language interpreters or auxiliary aids. For additional information or to request this service, contact the Council Services Division ADA Coordinator at 286-2998, (FAX)286-3456, (TDD)286-2025 or by writing to the Coordinator at Room 205, City Hall, 200 E. Wells Street, Milwaukee, WI 53202.

Limited parking for persons attending meetings in City Hall is available at reduced rates (5 hour limit) at the Milwaukee Center on the southwest corner of East Kilbourn and North Water Street. Parking tickets must be validated in Room 205, (City Clerk's Office) or the first floor Information Booth in City Hall.

Persons engaged in lobbying as defined in s. 305-43-4 of the Milwaukee Code of Ordinances are required to register with the City Clerk's Office License Division. Registered lobbyists appearing before a Common Council committee are required to identify themselves as such. More information is available at [www.milwaukee.gov/lobby](http://www.milwaukee.gov/lobby).



# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Minutes

### FLOODING STUDY TASK FORCE

ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS

Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin  
Shafer, Erick Shambarger, and Ken Yunker

Staff Assistant Tobie Black, 286-2232; Fax: 286-3456;  
tblack@milwaukee.gov

Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov

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Thursday, January 6, 2011

10:00 AM

Room 301-A, City Hall

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*Meeting convened: 10:06 A.M.*

*Members excused: Ald. Ashanti Hamilton and Rep. Sandy Pasch*

**1. Introduction of members.**

*Members introduced themselves and spoke briefly on their organizations and backgrounds.*

**2. Appearance by Jim Owczarski, Deputy City Clerk, relating to open meetings and open records law.**

*Mr. Owczarski appeared and spoke on open meetings and open records law.*

**3. Climate trends for Southeastern Wisconsin.**

*Mike Hahn, Southeastern Wisconsin Regional Planning Commission (SEWRPC), presented a PowerPoint on this issue (attached to Council file 100665). He presented background on rain and flood events while noting that 100-year floods have a probability of occurring of 1% in any year, while a 50-year event has a 2% probability of occurring. Many of the storm sewers in the city were built with a capacity for a 5-year event, per Mr. Hahn. The amount of rain calculated over the amount of time it fell is also used in the calculations. As the climate changes, the rain event calculations may need to be recalculated, as well as the amount of impervious surface that exists that was not present in the past. In the June 2008 rains, over a 3-day period, the amounts of rain varied widely across the Milwaukee metropolitan area. Area rivers also contribute to peak flows in the Milwaukee River among the watershed areas. There have been 10 large floods in 96 years in the Milwaukee River watershed, which is a large river and it is expected that over 15 years there would be 1-2 floods, while 4 floods have occurred during the past 15 years. There are indications with the river flood data over many years that we have been getting*

more flooding over the past 15 years.

Mr. Hahn said that there are indications that we're experiencing climate change and we will be seeing differing patterns than we have, although it's too early to revise study design approaches. Mr. Shafer noted that the Milwaukee area is experiencing heavier rainfalls over a shorter period of time more often. Ald. Bohl noted that several studies that he has seen have said that we are experiencing a climate change, which may or may not be accurate. Mr. Hahn noted that these flooding events reflect the trend of changes over the past 50-60 years.

Citizens who came to the table and spoke were:

Bruce Wiggins - executive director of Milwaukee Urban Gardens, said that a good way to address this issue is to keep water out of the sewers to begin with and to do that through green solutions, such as disconnecting downspouts and the use of rain barrels. More rain barrels would probably be utilized if an incentive program were offered and installation of these barrels could function as an employment program. Mr. Shafer noted that the Milwaukee Metropolitan Sewerage District (MMSD) does offer incentives and rain barrels.

Richard Wanta - Wisconsin Underground Contractors' Association, said that his members and other trade association members can provide information on problem areas or potential solutions.

#### 4. Overview of recent flooding-related activities in Milwaukee

Jeff Polenske and Kevin Shafer presented a PowerPoint Presentation (available online in Council File 100665) and noted that MMSD receives sewer flows from 28 communities, some of which have combined sewers which contain both rain and sanitary sewer water). MMSD averages 2.5 overflows per year and is allowed 6 overflows per year by the state. With the July 2010 storms, the rain hit so fast and so hard in a localized area that the water could not get to the deep tunnel fast enough. The water flows from private laterals (3,000 miles of sewers) to municipal sewers (3,000 miles of sewers) to MMSD sewers (300 miles of sewers). Prior to operation of the deep tunnel in 1994, there were 50-60 overflows per year by MMSD. Approximately 26% of the system is a combined sewer system. In the city, there are 2,446 miles of sewers with 198 miles of them being over 90 years old with 1,500 miles of private laterals. These private laterals are the responsibility of the homeowner. Prior to 1954, homes were allowed to connect their foundation drains directly to the sanitary drain. There were a number of homes grandfathered in so there are a number of homes that are putting rain water into the sanitary sewer system. Mr. Polenske noted that the likelihood of a system being overwhelmed are those with laterals in disrepair or that have clear water draining into the sanitary sewer. Mr. Shafer noted that a lot of foundation pipes are collecting water from the roof, not just from the foundation, so a large volume of water is going into the system at a fairly fast rate.

Storm sewers are designed to accommodate 1.5 inches of rain per hour and combined sewers are designed to accommodate 2.0 inches of rain per hour. In July 2010 the rain was of just too high of an intensity for the sewers to accommodate. Mr. Polenske noted that there are a number of residents who don't report basement overflows as they don't want that noted on the property. Ald. Wade came to the table and asked the percentage of number of properties that reported flooding and Tim Thur, Dept. of Public Works, said that approximately 125,000-140,000 properties experienced flooding, which is less than 10% of properties. If properties get the same amount of rain in a different area of the city, they may experience the same

*backwater issues as was faced by the northwest side in 2010. With dye testing, it was shown that 77% of the dyed water infiltrated the private lateral. A large number of properties may result in flooding at one property based upon location or geography. Both the city and MMSD have been funding improvements to reduce flooding, both surface and in homeowners' basements.*

*Citizen who came to the table and addressed the task force:*

*Kay Baldwin - Milwaukee resident who lives on Kenwood Blvd who has experienced increasingly bad flooding over the past 3 years.*

**5. Next meeting agenda.**

*Long-range maintenance plans of the Dept. of Public Works and MMSD relating to flood prevention.*

*Review reports:*

*Mayor's Independent Audit Committee report of 2004*

*Final report and Analysis of the Sewer Maintenance Fund.*

*3rd meeting:*

*Inflow and infiltration Issues - city and MMSD*

*Residential sewer later program study*

*Mr. Shambarger would like to discuss green initiatives and land-use plans and consideration of flood-plain areas.*

*The Feb. 3rd meeting might be moved to Feb. 10th due to conflict with 2 members.*

*Meeting adjourned: 12:01 P.M.*

*Linda M. Elmer*

*Staff Assistant*



# Climate Trends in Southeastern Wisconsin



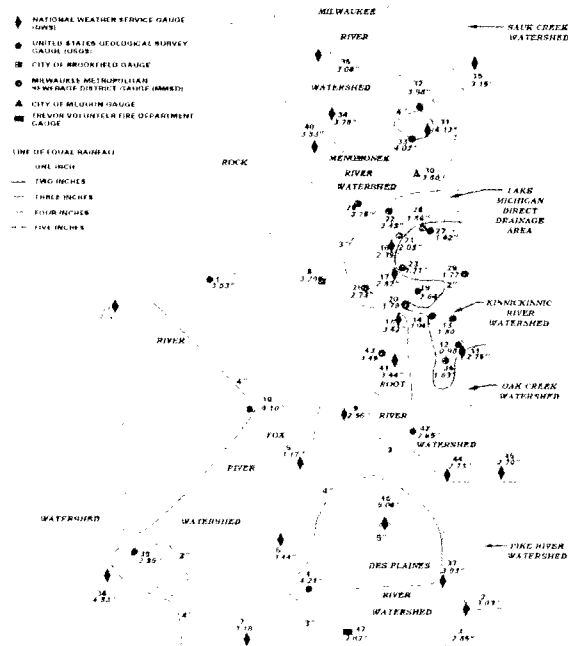
Presentation to City of Milwaukee Flooding  
Study Task Force  
January 6, 2011  
Michael G. Hahn, P.E., P.H.  
SEWRPC Chief Environmental Engineer

#155158



## Rainfall Frequency in the Southeastern Wisconsin Region - Recent Extreme Storms

- August 6, 1986
- June 16-18, 1996 (Port Washington)
- June 20-21, 1997
- August 6, 1998
- May 2004 (3-day rainfalls shown)
- June 5 through 14, 2008
- June 19, 2009
- July 14 and July 22-23, 2010





## *Background on Rainfall and Flood Probabilities*

- Traditionally referred to recurrence intervals (R.I.) (i.e., a 100-year recurrence interval rainfall or flood)
- Led to public confusion that such an event would only occur once every 100 years
- Probability of occurrence =  $(1/R.I.) * 100$
- Therefore, a 100-year event actually has a 1 percent probability of occurring or being exceeded in any given year, and a 50-year event has a 2-percent-annual-probability
- The lower the annual probability, the less likely that the event will occur
  
- Risk of rainfall events or floods occurring over a given period of time:
  - 100-year event over a 30-year period (common mortgage term) = 26 %
  - 10-year event over a 10-year period = 65 %
  - Five-year event over a 10-year period = 89 %



## *Background on Rainfall and Flood Probabilities*

- Rainfall probability information is generally developed for a particular "point" location (e.g., a rain gauge)
  - The probability of occurrence of a rainfall of a given magnitude occurring over a larger area (e.g., a city or region) is greater than the probability of the same rainfall occurring at a specific point
- Rainfall probability information is developed for storms of specific durations
  - Thus, there are multiple rainfall depths with the same probability, with each depth corresponding to a duration of rain.
    - For example, in the Southeastern Wisconsin Region, the 100-year storm depth varies from 0.74 inches over a five-minute period to 7.46 inches over a 10-day period
  - Also, as an example, a rainfall of 3.64 inches over a two-hour period has a recurrence interval (R.I.) of 100 years, but the same rainfall over a 24-hour period has a R.I. of about ten years



## ***The Concept of “Stationarity”***

- A data set, such as observed rainfall depths or streamflows, is considered to be “stationary” if “it is free of trends, shifts, or periodicity (cyclicality).” (Source: David R. Maidment, *Handbook of Hydrology*, 1993)
- Under conditions where stationarity governs, a long-term data set representing past events can be used to develop rainfall frequency or flood frequency relationships that would be assumed to be valid in the future. This is the foundation of many hydrologic analyses.
- Examples of factors that can result in nonstationarity of rainfall data include influences on the 1) amount of rainfall, 2) single-storm and seasonal distribution of rainfall over time, and 3) possible effects from changes in land use over time. Thus, climate change may result in nonstationarity of rainfall over time, requiring new, or revised approaches to developing rainfall frequency estimates in the future.
- Examples of changes that can result in nonstationarity of streamflow data include changes in land use over time, changes in the stormwater management system, and changes in the stream system. These changes can be addressed through development of hydrologic models that “normalize” land use and system characteristics to represent a consistent existing or future condition.



### ***Characterization of June 2008 Rainfalls in Southeastern Wisconsin***

- Why are these rains of interest?
- What was unusual about these rains?
- What were the probabilities of occurrence of the rains?
- What were the effects of the rains?
- How do these rains compare with past severe storms?



## Why are the 2008 rains of interest?

- They occurred over a 10-day period and included both relatively rare short-duration and long-duration rainfall depths.
- They caused sanitary sewer infiltration and inflow that contributed to widespread sewer overflows throughout southern Wisconsin.
- In some locations large floods occurred.
- In other locations flooding was limited



*Kinnickinnic River at 9<sup>th</sup> Place and E. Cleveland Avenue, City of Milwaukee - June 7, 2008. Photo Source: MMSD*

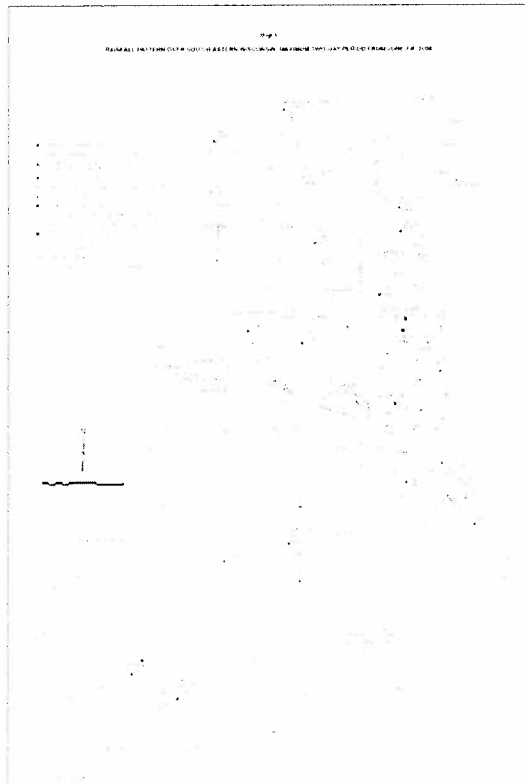


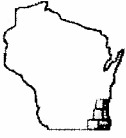
*Edgerton Channel, E. Holmes Avenue, City of Cudahy - June 7, 2008. Photo Source: MMSD*



## What were the probabilities of the 2008 rains?

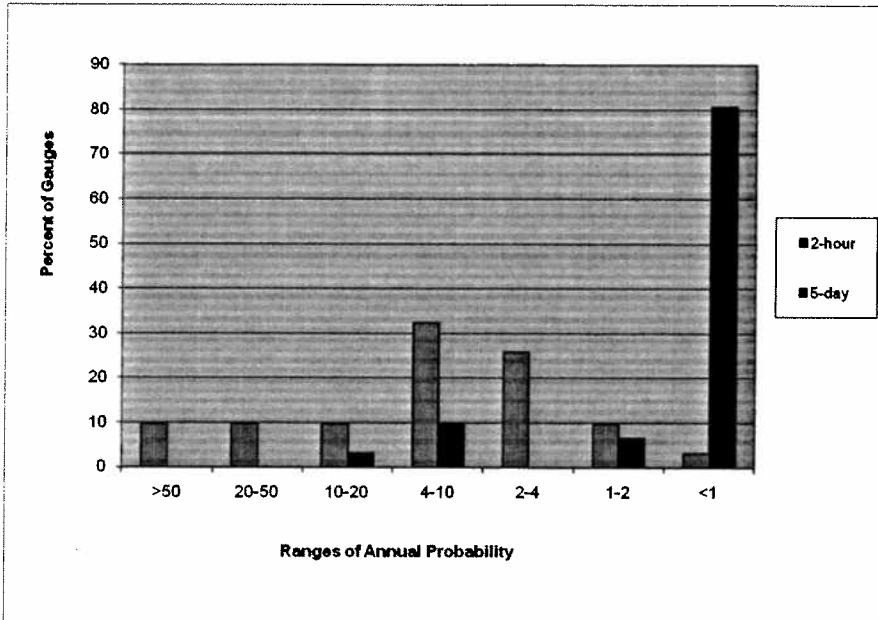
- 31 gauges were analyzed
- Two-hour storms had probabilities of occurrence ranging from < 0.6 %, or 175 year recurrence interval, (Elm Grove) to > 50%, or less than two-year R.I., (Mequon, Cedarburg, Kenosha)
- 1-, 2-, 3-, 5-, and 10-day rains had lower probabilities
  - 1-day: Elm Grove, 7.52", 0.3%, 355 years
  - 2-day: Elm Grove, 9.19", <0.2%, >500 years
  - 3-day: MMSD South Shore WWTP, 9.41", <0.2%, >500 years
  - 5-day: MMSD SS WWTP, 11.27", <0.2%, >500 years
  - 10-day: Elm Grove, 13.05", <0.2%, >500 years





## What were the probabilities of the June 2008 rains?

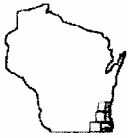
June 2008 Rains: Ranges of Probability by Rainfall Duration



## What were the effects of the June 2008 rains?

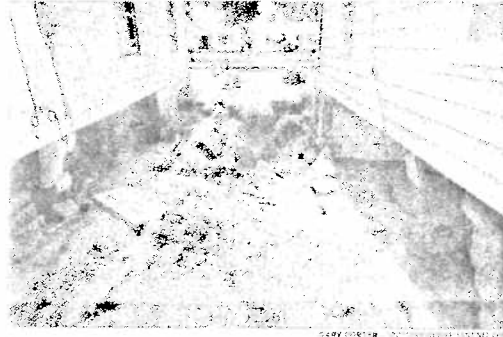
### ➤ New "floods of record" (PRELIMINARY EVALUATION):

- **MILWAUKEE RIVER WATERSHED**
  - Milwaukee River near Cedarburg, 27-year record (Ozaukee County), **1%**
  - Lincoln Creek at Sherman Boulevard, 5-year record (Milwaukee County) **2 TO 10%**
- **MENOMONEE RIVER WATERSHED**
  - Little Menomonee River at Milwaukee, 7-year record (Milwaukee County) **>10%**
  - Honey Creek at Wauwatosa 10-year record (Milwaukee County) **4 TO 10%**
- **KINNICKINNIC RIVER WATERSHED**
  - Wilson Park Creek at St. Luke's Hospital, 11-year record (Milwaukee County) **2 TO 4%**
- **OAK CREEK WATERSHED**
  - Oak Creek at South Milwaukee, 45-year record (Milwaukee County) **0.2 TO 1%**
- **ROOT RIVER WATERSHED**
  - Root River at Franklin, 46-year record (Milwaukee County) **0.2 TO 1%**
  - Root River Canal at Raymond, 45-year record (Racine County) **1 TO 2 %**
  - Root River at Racine, 45-year record (Racine County) **<0.2 %**
- **BARK RIVER WATERSHED**
  - Bark River at Nagawicka Road, 6-year record (Waukesha County)
  - Bark River near Rome, 25-year record (Jefferson County) **0.2 TO 1%**
- **FOX RIVER WATERSHED**
  - Mukwonago River at Mukwonago, 35-year record (Waukesha County) **<0.2 %**



## Characterization of July 2010 Rainfalls in Southeastern Wisconsin

- Why are these rains of interest?
- What was unusual about these rains?
- What were the probabilities of occurrence of the rains?
- What were the effects of the rains?
- How do these rains compare with past severe storms?



Two homes in the 1000 block of W. Eggert Place are scheduled to be demolished after Thursday night's torrential rains destroyed portions of their foundations.



Photo source: Milwaukee Journal Sentinel



## Why are the 2010 rains of interest?

- They generally occurred on three days within a 10-day period and included both relatively rare short-duration and long-duration rainfall depths.
- They caused sanitary sewer infiltration and inflow that contributed to sewer overflows.
- In some locations, rains were so intense that they overwhelmed the capacity of the storm sewer system and caused flooding and damage in areas remote from streams
- In some locations large floods occurred.
- In other locations flooding was limited.



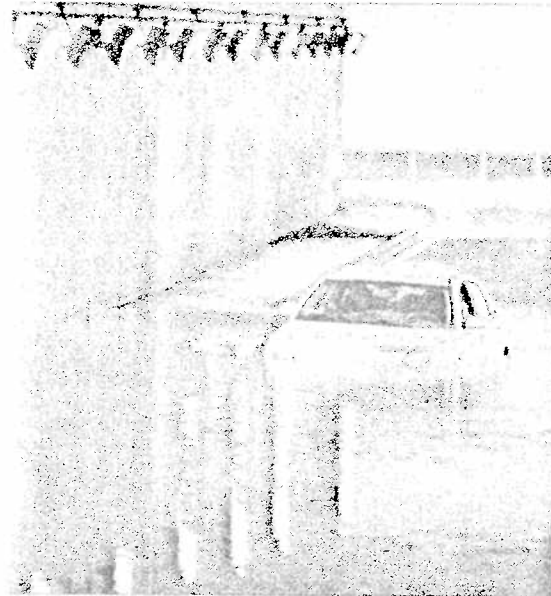
Photo source:  
Milwaukee Journal Sentinel

Flooding about a mile past the sewer treatment plant on E. Foxrest St. on Thursday, July 15, 2010.



## What were the probabilities of the 2010 rains?

- To date, data from 38 gauges have been analyzed
- Two-hour storms had probabilities of occurrence ranging from < 0.2 %, or >500-year recurrence interval, (Milwaukee, 5335 N. Teutonia) to > 50%, or less than two-year R.I., (Cedarburg, Kenosha)
- 1-, 2-, and 10-day rains had lower probabilities
  - 1-day: Milwaukee, 3626 W. Fond du Lac, 7.98", ~0.2%, ~500 years
  - 2-day: Milwaukee, 3626 W. Fond du Lac, 8.98", <0.2%, >500 years
  - 10-day: Milwaukee, 3626 W. Fond du Lac, 14.62", <0.2%, >500 years



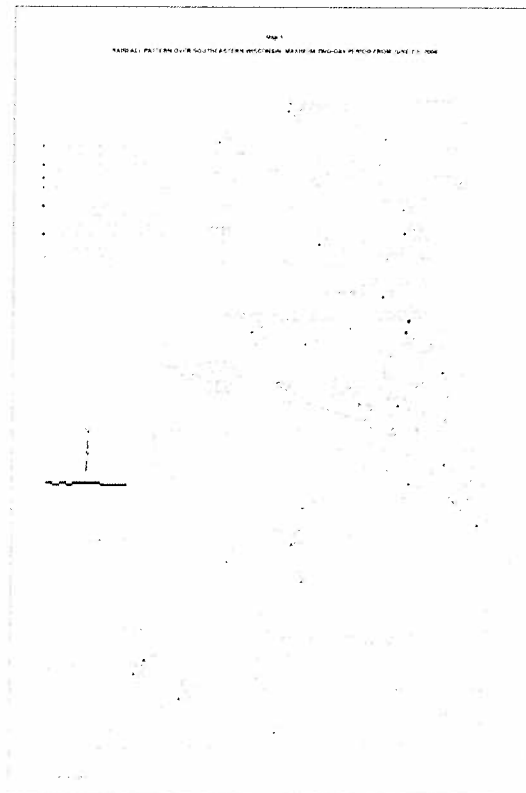
A car exiting I-43 at the Kilbourn Tunnel is stalled in storm water that rose as high as its headlights.

Photo source: Milwaukee Journal Sentinel



## What were the effects of the July 2010 rains?

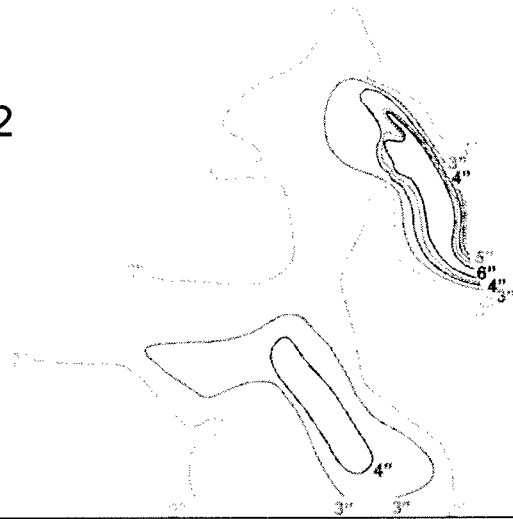
- **New "floods of record" (PRELIMINARY EVALUATION):**
  - **MILWAUKEE RIVER WATERSHED**
    - Milwaukee River at Estabrook Dam, 96 years of record, ~18,800 cfs, 0.2% probability
    - Lincoln Creek at Sherman Boulevard, 7 years of record, 9,700 cfs, <0.2% probability
  - **MENOMONEE RIVER WATERSHED**
    - Little Menomonee River at Appleton Avenue, 9 years of record, 2,000cfs, 1 to 2% probability
  - **OAK CREEK WATERSHED**
    - Oak Creek at South Milwaukee, 47 years of record, 2,590 cfs, 0.2% probability
- **Kinnickinnic River watershed streams, Menomonee River main stem, Root River main stem: >1% probability**





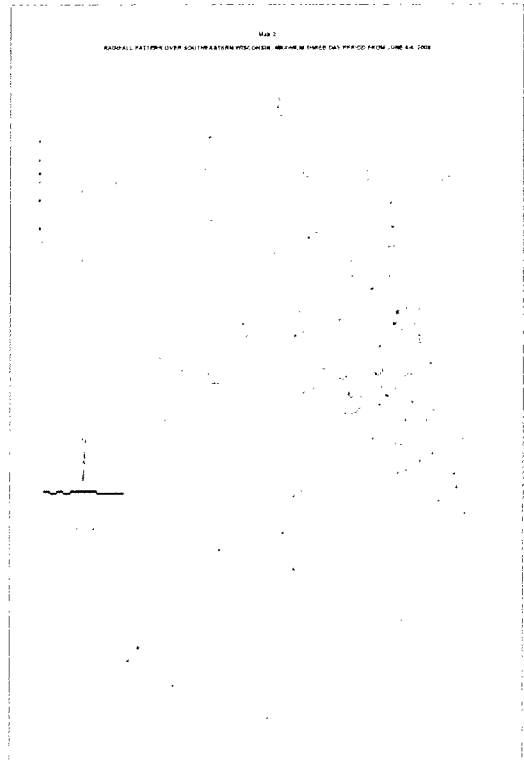
## How do the 2008 and 2010 rains compare with past severe storms?

- August 6, 1986: 5.24 inches in 2 hours at Milwaukee Mitchell Field (0.14 %)
- June 7 2008: 4.05 inches in 2 hours at Elm Grove (0.6%)
- July 2010 5.72" in 2 hours at 5335 N. Teutonia, Milwaukee (0.09%)



## How do the 2008 and 2010 rains compare with past severe storms?

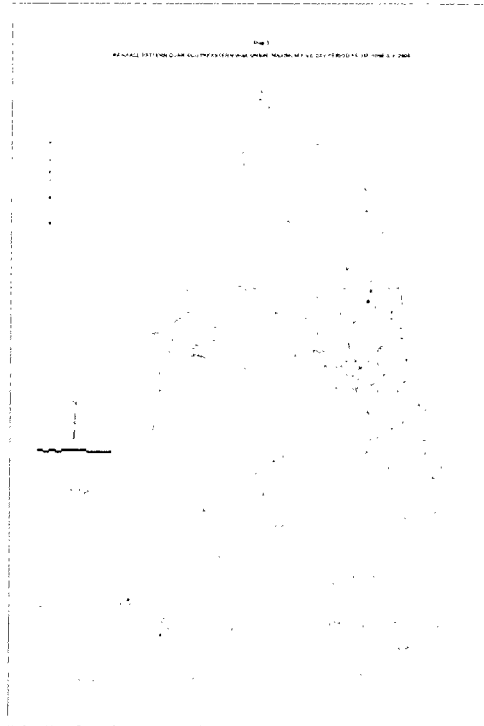
- June 16-18, 1996
  - 9.87" in 24 hours at Port Washington (0.06%)
- June 20-21, 1997
  - 7.44 inches in 24-hours at 2647 N. Bartlett Ave., City of Milwaukee (0.30%)
- August 6, 1998
  - 8.30 inches in 24-hours at Village of Elm Grove (0.17%)
- June 2008
  - 7.52 inches in 24 hours at Elm Grove (0.28%)
- July 2010
  - 7.98 inches in 24 hours at 3626 W. Fond du Lac, Milwaukee (0.21%)





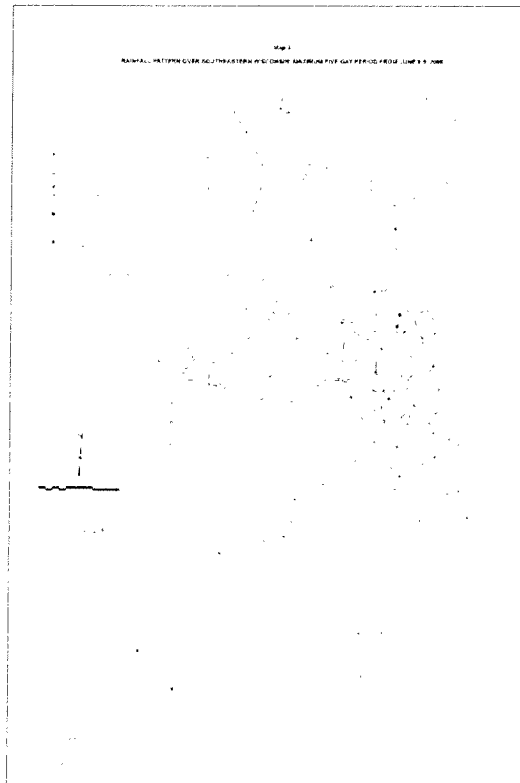
## How do the 2008 and 2010 rains compare with past severe storms?

- August 3-6, 1924
  - 9.3" in 4 days at West Bend (<0.2%)
- June 16-18, 1996
  - 13.52" in 3 days at Port Washington (<0.2%)
- May 2004
  - 5.58" in 3 days at Kenosha Airport (2%)
  - 5.7" in 5 days at Kenosha Airport (2 to 4 %)
- June 2008
  - 9.41" in 3 days at MMSD SSWWTP (<0.2%)
  - 11.27" in 5 days at MMSD SSWWTP (<0.2%)
- July 2010 (Preliminary)
  - 8.98" in 3 days at 3626 W. Fond du Lac, Milwaukee (<0.2%)
  - 8.98" in 5 days at 3626 W. Fond du Lac, Milwaukee



## How do the 2008 and 2010 rains compare with past severe storms?

- May 2004
  - ~8.3 inches in 10 days at Union Grove (slightly <1%)
- June 2008
  - 15.35 inches in 10 days at Pewaukee (<0.2%)
- July 2010
  - 14.62 inches in 10 days at 3626 W. Fond du Lac, Milwaukee (<0.2%)





## Frequency of Occurrence of Large Floods

### ➤ Kinnickinnic River (34 years of record)

1. 8/6/1986: 10,600 cfs
2. 6/7/2008: 6,490 cfs
3. 7/9/2006: 6,260 cfs
4. 7/2/2000: 6,170 cfs
5. 7/22/2010: 6,120 cfs
6. 7/19/2009: 5,390 cfs
7. 7/21/1999: 4,980 cfs
8. 7/14/1994: 4,720 cfs
9. 7/4/2004: 4,600 cfs
10. 6/21/1997: 4,420 cfs

Source: USGS and SEWRPC

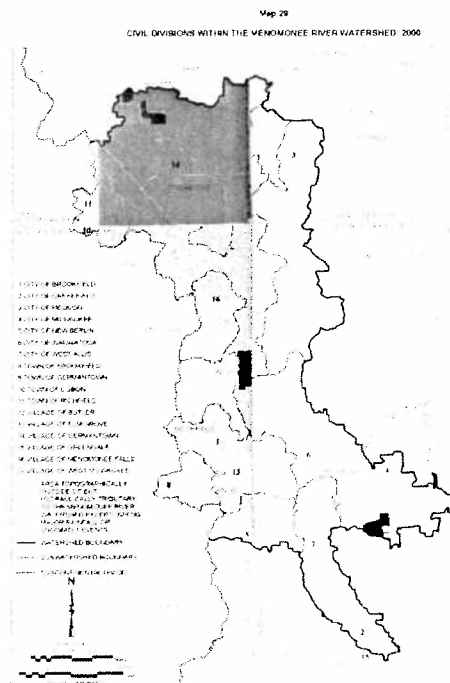


## Frequency of Occurrence of Large Floods

### ➤ Menomonee River (49 years of record)

1. 4/21/1973: 13,500 cfs
2. 6/21/1997: 13,500 cfs
3. 8/6/1998: 12,800 cfs
4. 6/7/2008: 12,400 cfs
5. 6/19/2009: 11,800 cfs
6. 7/22/2010: 10,700 cfs
7. 8/6/1986: 10,600 cfs
8. 8/17/1983: 7,560 cfs
9. 9/18/1972: 6,610 cfs
10. 7/21/1999: 6,280 cfs

Source: USGS and SEWRPC







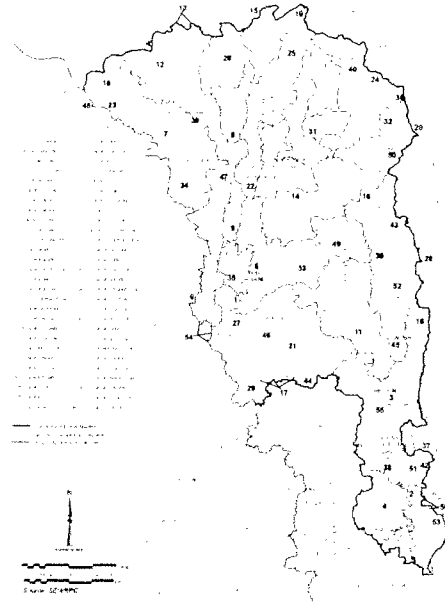
## Frequency of Occurrence of Large Floods

### ➤ Milwaukee River (96 years of record)

1. 7/22/2010: ~18,800 cfs
2. 7/21/1997: 16,500 cfs
3. 3/20/1918: 15,100 cfs
4. 8/6/1924: 15,100 cfs
5. 4/21/1973: 12,600 cfs
6. 3/15/1929: 11,000 cfs
7. 6/7/2008: 10,400 cfs
8. 3/31/1960: 9,300 cfs
9. 4/3/1959: 8,780 cfs
10. 8/6/1998: 8,600 cfs

Source: USGS and SEWRPC

CIVIL DIVISIONS WITHIN THE MILWAUKEE RIVER WATERSHED 2000



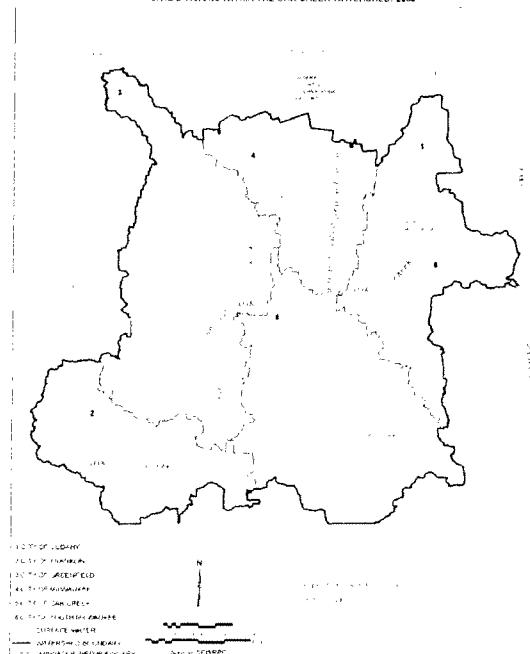
## Frequency of Occurrence of Large Floods

### ➤ Oak Creek (47 years of record)

1. 7/22/2010: 2,590 cfs
2. 6/7/2008: 2,370 cfs
3. 8/6/1986: 1,140 cfs
4. 7/2/2000: 1,120 cfs
5. 6/21/1997: 1,110 cfs
6. 4/23/1999: 1,060 cfs
7. 9/13/1978: 1,020 cfs
8. 3/4/1976: 935 cfs
9. 9/18/1972: 916 cfs
10. 4/19/1993: 887 cfs

Source: USGS and SEWRPC

CIVIL DIVISIONS WITHIN THE OAK CREEK WATERSHED 2000

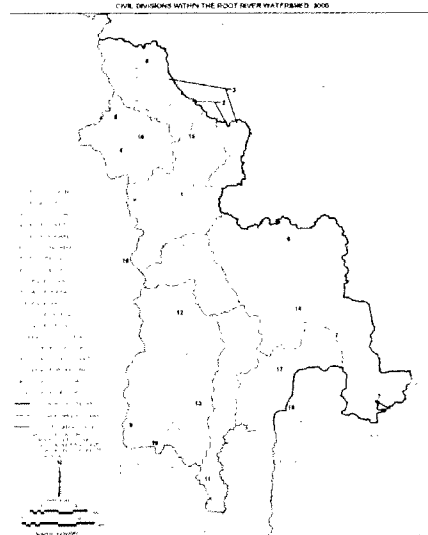




## *Frequency of Occurrence of Large Floods*

➤ Root River (48 years  
of record)

1. 6/8/2008: 5,350 cfs
2. 3/30/1960: 5,130 cfs
3. 4/21/1973: 3,700 cfs
4. 7/23/2010: 3,440 cfs
5. 6/30/1969: 2,650 cfs
6. 7/3/2000: 2,420 cfs
7. 9/18/1972: 2,270 cfs
8. 6/20/2009: 2,260 cfs
9. 3/5/1976: 2,160 cfs
10. 6/13/1999: 2,050 cfs



Source: USGS and SEWRPC



## *Sources of Rainfall Frequency Estimates*

➤ 2000: SEWRPC Technical Report No. 40, *Rainfall  
Frequency in Southeastern Wisconsin, 2000*

- Prepared by CDM in cooperation with UW-Madison
- Based on Milwaukee rainfall data for the 108-year period from 1891 to 1998
- Updated a 1990 SEWRPC study using Milwaukee data for the 84-year period from 1903 through 1986
- Used by municipalities and consultants in the Region

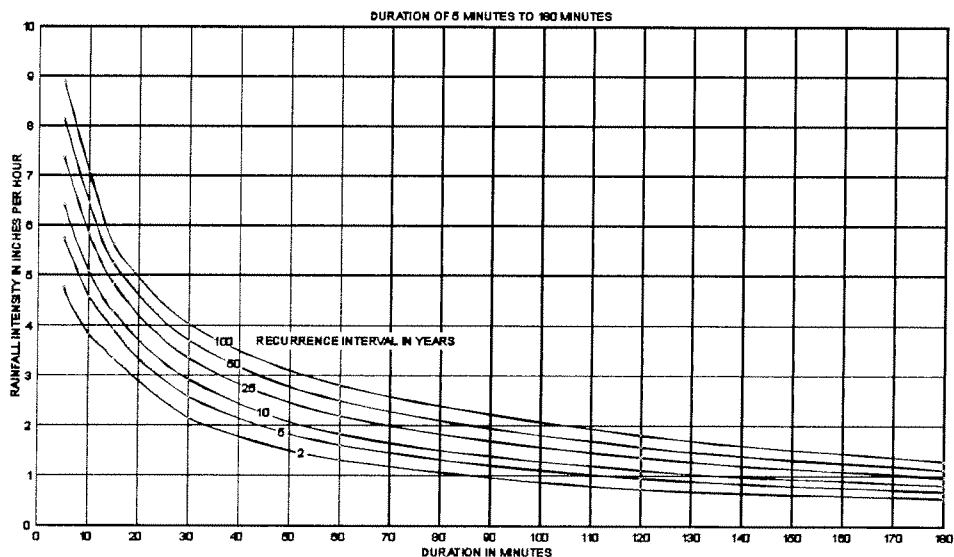


## Sources of Rainfall Frequency Estimates

- 2012: NOAA Atlas 14 for Midwestern States
  - Updates U.S. Weather Bureau Technical Paper No. 40, that was issued in 1960
  - Funding for Wisconsin portion of the study provided by WisDOT, WDNR, and SEWRPC
  - Will utilize rainfall data through 2009
  - Using MMSD/City of Milwaukee rain gauge data as one source of information



## Recommended Rainfall Depths for Southeastern Wisconsin Intensity-Duration-Frequency Curves







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# Temperatures in state projected to increase 6 degrees

## Warming trend could affect farming, tourism

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By [Lee Bergquist](#) and [Thomas Content](#) of the Journal Sentinel

Feb. 7, 2011 | [\(365\) Comments](#)

Wisconsin's temperatures are expected to increase by an annual average of 6 to 7 degrees Fahrenheit by midcentury - a warming trend that will be highly variable and affect everything from our farming practices to the way we fish.

The [study by University of Wisconsin-Madison scientists](#) and others in state government shows that a rise in temperature produces a jumble of different outcomes.

Northern Wisconsin, for example, is expected to warm the most. Meanwhile, warming would be less dramatic near Lake Michigan.

Also, state climate models show that the biggest increases in warming will occur in the winter - not the summer. The biggest changes are expected to take place in northwestern Wisconsin.

Without delving into policy recommendations, the study is the latest effort by Wisconsin scientists and other experts to examine possible outcomes of a changing climate.

"Our core mission is to help Wisconsin decision-makers make plans to help the state adapt to changes in the natural environment," said Lewis Gilbert, associate director of the Nelson Institute for

Environmental Studies at UW-Madison.

The state has already become warmer and wetter over the past 60 years, and the warming trend is projected to "continue and increase considerably in the decades ahead," the study says.

As temperatures increase, plant hardiness will shift so northern species such as black spruce, balsam fir and paper birch will have difficulty growing by the end of the century.

Also, the American marten, spruce grouse and snowshoe hare may disappear from the state.

But a warming climate will benefit other species: gray squirrels, white-tailed deer, European starlings and Canada geese.

Greater warming is expected to spur evaporation. That's likely to push down lake levels on the Great Lakes. Lake Michigan could drop 1 foot by the end of the century, increasing shoreline erosion. Water levels of northern lakes and wetlands could drop more during droughts.

But, paradoxically, warming will spur more heavy rain events, raising the likelihood of algae blooms when sediment and organic material such as manure and fertilizer wash into waterways.

As for Wisconsin agriculture - which accounts for more than 350,000 jobs - the growing season is expected to lengthen, with longer springs and falls. That should boost crop production, but it could be diminished by an increase in soil erosion.

If farmers don't adapt, key crops such as corn and soybeans could be harmed. Every increase of 2 degrees could cut corn yields by 13% and soybeans by 16%, studies have shown, the report says.

The report also says the state could see an impact on another sector of its economy - tourism.

"Increased water temperatures and runoff from intense storms may create an environment that deposits and supports pathogens on beaches," the study says. "More pathogens on beaches will most likely lead to more frequent beach closures."

In a statement, Ned Zuelsdorff, director of the American Birkebeiner Ski Foundation, said the study "confirms our suspicions about the conditions we've been working with several years."

The annual ski marathon between Cable and Hayward will be held on Feb. 26. In the past 15 years, Zuelsdorff said, there have been more instances where the race had to be shortened or modified than in the previous 15 years.

Average winter temperature increases could vary from 5 degrees to 11 degrees, depending on the model, the study found.

By contrast, the models showed that global warming is weakest during the summer, with increases ranging from 3 degrees to 8 degrees.

Among other changes: more 90-degree days per year across much of the state, along with more frequent intense precipitation events like the flooding Milwaukee experienced last summer.

Typically, daily high temperatures now exceed 90 degrees about 12 times a year in the south and five

times per year in the north. The number of days when the mercury hits 90 may double to 25 times a year in the south, and more than double to about 12 times in the north.

### **Localized models**

The temperature estimates are the work of UW climatologists, who used the same models as teams of international scientists working on climate change.

Then, working groups in various disciplines looked at the data and predicted outcomes and ways the state might need to adapt.

The estimate of 6 to 7 degrees is an average over 14 different computer models used by international scientists. Individual models predict a range of 4 degrees to 9 degrees, depending on the assumptions used.

Wisconsin's report generally mirrors the outcomes of the 2007 Intergovernmental Panel on Climate Change, which forecast global changes of 3.2 degrees to 7.1 degrees by the end of the century.

The UW climatologists fine-tuned the climate panel's work by localizing temperature data between 1950 and 2006 from spots across the state.

The localized work reflects the thinking among many climate scientists that inland continental temperatures in the Northern Hemisphere are likely to warm relatively more and exhibit greater extremes.

The Intergovernmental Panel on Climate Change is generally seen as the most authoritative source for calculating the relationship between rising levels of carbon dioxide and its climate effect.

But the IPCC is not without its detractors. Critics pointed to several errors in the 2007 report, including a projection that "most Himalayan glaciers would melt by 2035."

The criticism prompted several independent reviews, one of which found that there was no reason to doubt the panel's key findings. Another review recommended procedural changes aimed at improving the organization's transparency. The IPCC has agreed to the changes as it prepares its next assessment, due out in two years.

In a report last month, the National Oceanic and Atmospheric Administration said 2010 tied with 2005 as the warmest year on record, based on global surface temperature. It was the warmest year in the Northern Hemisphere. It was also the wettest year on record worldwide, and among the busiest years for both hurricanes and tornadoes, according to NOAA.

### **Steers clear of policy**

The 226-page Wisconsin study was produced by the Wisconsin Initiative on Climate Change Impacts, a project of the Nelson Institute and the state Department of Natural Resources.

Unlike former Gov. Jim Doyle's climate change task force, which last year unsuccessfully sought ways to cut carbon emissions, the authors generally sought to steer clear of dictating policy.

Jack Sullivan, director of the DNR's Bureau of Integrated Science Services, said the study is designed to

"open the agency's eyes, so we know what may need to change."

For example, "forestry decisions are 100-year decisions," Sullivan said.

He noted the study was not good news for brook trout, which need cold streams and currently live in the southern edge of their range.

Thus, one possible strategy for brook trout is to stock them for a single season, knowing the fish will not survive.

The habitat for brook trout could be lost altogether, brown trout could lose 88% of their habitat and northern pike could lose 72%, the study showed.

But the habitat for large mouth bass could increase by 34% and for channel catfish by 32%.

**Find this article at:**

<http://www.jsonline.com/news/wisconsin/115510994.html>

Check the box to include the list of links referenced in the article.





Union of  
Concerned  
Scientists

July 2009

# Confronting Climate Change in the U.S. Midwest



WISCONSIN

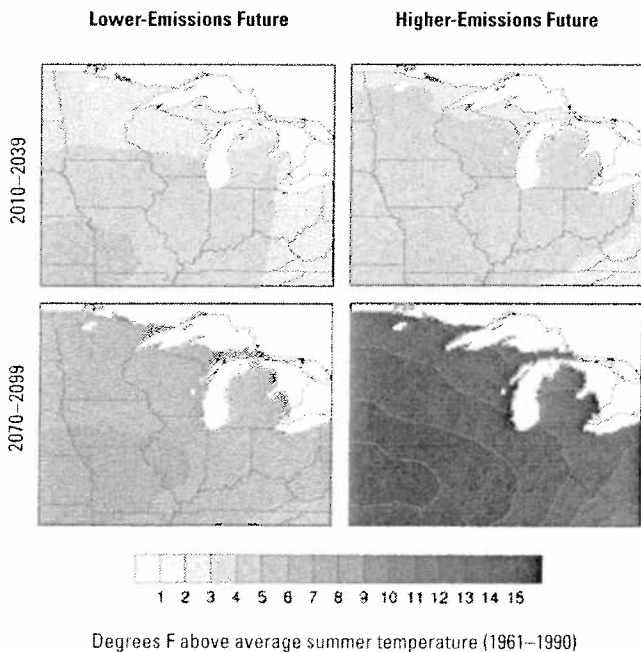
**F**rom its glacial lakes and hardwood forests to its rich farmland and many riverside communities, Wisconsin has been strongly shaped by its climate. However, that climate is changing due to global warming, and unless we make deep and swift cuts in our heat-trapping emissions, the changes ahead could be dramatic. This report presents new projections showing some of the potential impacts of global warming on Wisconsin, including severe summer heat, more dangerous storms and floods, and new threats to agricultural production.

## GLOBAL WARMING AND THE MIDWEST

Global warming is caused by an increase of pollutants in the atmosphere, including carbon dioxide produced by human activities such as the burning of fossil fuels and

the clearing of forests. Carbon dioxide acts like a blanket that traps heat in our atmosphere and warms our climate; oceans, forests, and land can absorb some of this carbon, but not as fast as we are creating it. As a result, heat-trapping emissions are building up in our atmosphere to levels that could produce severe effects including extreme heat, prolonged droughts, intense storms, corrosive ocean acidification, and dangerous sea-level rise.

The climate of the Midwest has already changed measurably over the last half century (De Gaetano 2002; Kunkel et al. 1999). Average annual temperatures have risen, accompanied by a number of major heat waves in the last few years. There have been fewer cold snaps, and ice and snow are melting sooner in the spring and arriving later in the fall. Heavy rains are occurring about twice as frequently as they did a century ago, increasing the risk of flooding.



### Scorching Summers Become Standard

If our heat-trapping emissions continue to increase at the current rates, every summer in Wisconsin toward the end of the century is projected to be as hot as or hotter than 1988—the state's hottest summer of the last half century. Under the higher-emissions scenario (right), average summer temperatures are projected to increase over the next several decades by more than 3°F and, toward the end of the century, by an extraordinary 12°F. Under the lower-emissions scenario (left), that increase would be halved.

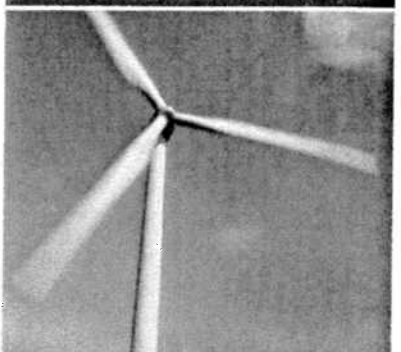
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## New Climate Projections for Wisconsin

New research summarized here projects significant consequences for Wisconsin as soon as the next few decades, increasing in severity into the middle and end of this century. This report considers these consequences in terms of three time frames: 2010–2039 (“the next few decades”), 2040–2069 (“mid-century”), and 2070–2099 (“toward the end of the century”). We compare these periods with the climate in Wisconsin during 1961–1990 (“the historical baseline”).

**Toward the end of the century, if current pollution trends continue, projected effects in the state include:**

### Far more scorching summers

- Every summer in Wisconsin would be hotter than 1988—the hottest summer during the historical baseline.
- Milwaukee would experience more than 55 days per summer with highs over 90 degrees Fahrenheit (°F) and more than 22 days with highs over 100°F.
- Milwaukee would face at least one heat wave per summer like the one that killed hundreds in Chicago in 1995.
- Air quality would deteriorate, as hotter weather causes more severe smog problems (assuming similar levels of tailpipe and smokestack emissions). This would have serious consequences for public health, including a greater incidence of asthma attacks and other respiratory conditions.

### Dangerous storms and flooding

- Heavy rains would become more common throughout the year, leading to a greater incidence of flash flooding.
- Winters and springs, when the flood risk is already high, would become 25 percent wetter.

### New threats to agriculture

- Crops and livestock would face substantially more heat stress, decreasing crop yields and livestock productivity.
- Warmer winters and a growing season up to six weeks longer would enable pests like the corn earworm to expand their range.
- Crop production would be inhibited by changing rain patterns such as wetter springs (which delay planting and increase flood risk) and more than 10 percent less rain during the increasingly hot summers.

## Effective and Affordable Solutions

The most dangerous effects of climate change are likely to occur if the global average temperature rises more than two degrees Celsius above where it stood in 1850. Science shows we still have a chance of keeping temperatures below this level if we cut heat-trapping emissions deeply and quickly—and limit atmospheric levels

of carbon dioxide to 450 parts per million (see [www.ucsusa.org/mwclimate](http://www.ucsusa.org/mwclimate) for more details).

Wisconsin can do its part by implementing its own carbon-reducing state policies and investing in clean energy technologies that can both reduce consumer energy costs and build new growth industries in the state. Wisconsin can also play a lead role in calling for strong federal

legislation that would provide climate-friendly choices for Wisconsin consumers and businesses and help for resource managers and local governments that must prepare for the effects of climate change that cannot be avoided.

A recent analysis by the Union of Concerned Scientists (UCS), *Climate 2030: A National Blueprint for a Clean Energy Economy* (Clecutus, Clemmer, and Friedman 2009), demonstrates that the United States can cut heat-trapping emissions deeply and swiftly enough to avoid the most dangerous consequences of climate change. A comprehensive climate and energy approach—combining a cap on emissions with policies that encourage renewable electricity, energy efficiency, and cleaner transportation choices—can reduce emissions 26 percent below 2005 levels by 2020 and 56 percent below 2005 levels by 2030 while saving consumers and businesses money.

## Our Analysis

Our analysis considers two different possible futures: one with a lower level of global warming pollution and one with a higher level (see [www.ucsusa.org/mwclimate](http://www.ucsusa.org/mwclimate)). These futures represent the best and worst cases of the emissions scenarios described by the international scientific community in 2000 and which have been used for scientific analysis ever since. However, they by no means encompass the full range of futures that could plausibly unfold.

Climate protection policies, if implemented quickly, could reduce emissions significantly below the lower-emissions scenario considered here. On the other hand, up until 2008, global emissions have been higher than the higher-emissions scenario being considered.

## HOW WILL EMISSIONS CHOICES AFFECT WISCONSIN'S FUTURE?

### Dangerously Hot Summers

Our new analysis projects dramatically hotter summers for Wisconsin. This is true under both the lower- and higher-emissions scenarios, but the prevalence of extreme heat is much greater under the higher-emissions scenario. The conditions that constitute “extreme” heat were measured in two ways: counting the expected number of days above 90°F and 100°F per summer, and projecting the likelihood of extreme heat waves similar to the one that hit Chicago in 1995. By both measures, summers in Wisconsin will become dangerously hot.

### More days over 90°F and 100°F

Because heat waves are especially lethal in cities, where urban landscapes absorb more heat during the day and are less effective at releasing it at night (the “heat island” effect), our analysis focused on the extreme heat projected for the state’s largest city, Milwaukee, and the number of days each year likely to exceed 90°F and 100°F. During the historical baseline Milwaukee averaged only nine days per summer with highs over 90°F. That number rises substantially in the next several decades to more than 15, and toward the end of the century under the higher-emissions scenario, the city is projected to experience more than 55 days over 90°F—more than half the summer. Under the lower-emissions scenario that number would be cut by half.

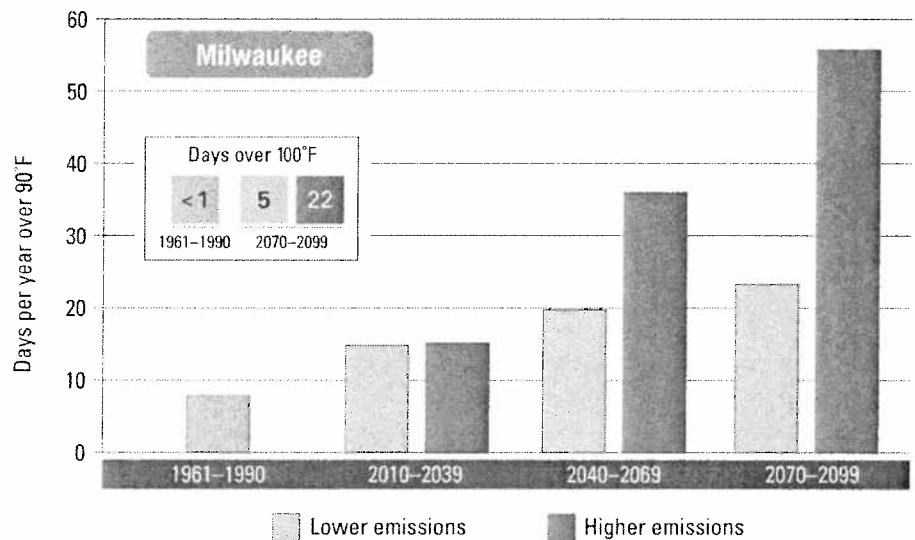
As for the more dangerous days over 100°F, Milwaukee averaged less than one such day each summer during the historical baseline. But

toward the end of the century under the higher-emissions scenario, the city is projected to face more than 22 such days. That number would be reduced to five under the lower-emissions scenario. Compounding matters is the likelihood that Wisconsin’s summers will continue to be humid—probably even more humid. Other Wisconsin cities such as Kenosha, Madison, and Racine will face conditions similar to Milwaukee.

The severe heat projected for Wisconsin poses serious health risks for its residents. Heat waves already kill more people in the United States each year than hurricanes, tornadoes, floods, and lightning combined

(CDC 2006), and the average annual death toll of nearly 700 may well be an underestimate, since there are no uniform reporting requirements and many deaths are probably misclassified (Luber and McGeehin 2008). Studies show that deaths from many causes, including cardiovascular and respiratory disease, increase during heat waves.

The health costs associated with heat waves are not limited to deaths; many other people become sick enough to be hospitalized. In 2005, medical costs related to extreme heat and cold totaled \$1.5 billion nationwide, or more than \$16,000 per patient. The Chicago heat wave of



### Extreme Heat Becomes More Frequent

Under the higher-emissions scenario, Milwaukee could experience more than 55 days per summer with highs above 90°F toward the end of the century. Under the lower-emissions scenario, the number of such days would be halved. Dangerously hot days over 100°F (shown in the inset box) are also projected to increase dramatically, with more than three weeks of such days expected under the higher-emissions scenario.

## Wisconsin Could Face Heat Waves of Historic Proportions

In July 1995, Chicago experienced its worst weather-related disaster ever. Temperatures reached or exceeded 90°F for seven days in a row and exceeded 100°F on two of those days (Kaiser et al. 2007). Conditions were made worse by high humidity levels, unusually warm night-time temperatures, and pollution that built up in the stagnant air. Thousands of Chicagoans developed serious heat-related conditions, overwhelming the city's emergency responders and forcing 23 hospitals to close their emergency room doors to new patients. Like the city's hospitals, the county morgue was completely overwhelmed (Klinenberg 2002).

The heat wave was ultimately responsible for between 450 and 700 heat-related deaths (Klinenberg 2002; CDC 1995). Hundreds of additional heat-related deaths occurred in other parts of the Midwest and along the East Coast (NOAA 1996).

**If our heat-trapping emissions continue unabated, heat waves of historic proportions are projected to become routine in Wisconsin.**

If our heat-trapping emissions continue unabated, heat waves like these are projected to become common in Wisconsin. Under the higher-emissions scenario, for example, Milwaukee would face a heat wave as hot as the 1995 Chicago heat wave at least once every summer toward the end of the century.

Chicago's experience actually pales in comparison to the European heat wave of 2003—the worst of the past 150 years in terms of both

duration and intensity. For almost three months daily high temperatures were hotter than normal, with half of those days more than 10°F above normal. Daily low temperatures were also abnormally hot. The death toll was initially estimated around 30,000 (UNEP 2004), but more recent analyses have identified 70,000 heat-related deaths that summer in 16 countries (Robine et al. 2008). Hardest hit was France, where fatalities exceeded 2,000 per day during the heat wave's peak (Pirard et al. 2005).

Projections for Chicago and Minneapolis show that these cities—not far from Milwaukee—are very likely to suffer a heat wave comparable to the 2003 European heat wave in the next several decades. Under the higher-emissions scenario a heat wave of this magnitude would occur at least every fifth year by mid-century and every other year toward the end of the century.

1995 increased admissions to Cook County hospitals 11 percent (more than 1,000 patients) during the peak week (Semenza et al. 1999). Many heat-related deaths and illnesses can be prevented by improving warning systems, access to air conditioning, and year-round medical staffing.

### *More dangerous air pollution*

In areas where there are local sources of fossil fuel emissions, ground-level ozone—a dangerous air pollutant and the main component of smog—increases at temperatures over 90°F (Luber and McGeehin 2008). Since our projections show that, under the higher-emissions scenario, Wisconsin will experience such temperatures

virtually the entire summer toward the end of the century, large cities can expect far more days of unhealthy ozone levels than would occur without global warming. This is particularly bad news for the eight counties (including those around Milwaukee) that already experience ozone levels higher than the Environmental Protection Agency's (EPA's) health-based ozone standard (EPA 2008b).

High concentrations of ground-level ozone (not to be confused with ozone in the stratosphere, which provides an important natural shield against solar radiation) diminish lung function, cause a burning sensation in the lungs, and aggravate asthma and other respiratory conditions.

Ozone may also contribute to premature death, especially in people with heart and lung disease (EPA 2008). Studies show that when ozone levels go up, so do hospitalizations for asthma and other lung conditions, and it appears that heat and ozone together increase mortality (Luber and McGeehin 2008). Ozone also damages plant life; the EPA warns that a climate change-induced increase in ozone could damage ecosystems and agriculture as well as human health (EPA 2008).

Another air contaminant of particular concern is small particulate pollution (or soot). Small particulates increase the severity of asthma attacks in children, increase the number of

heart attacks and hospitalizations related to cardiovascular disease and asthma, and cause early deaths from heart and lung disease (ALA 2009). While Wisconsin currently meets the EPA's standard for particulate pollution, the state still experiences numerous days—more than 100 between 2005 and 2007—when the air is considered unhealthy for sensitive groups including children, the elderly, people with cardiovascular or respiratory disease, and athletes (ALA 2009).

The leading source of small particulate air pollution is coal-fired power plants, and as demand for electricity increases in response to rising temperatures, power plants generate more emissions. Therefore, climate change threatens to exacerbate Wisconsin's particulate air pollution.

In Wisconsin today, more than 9 percent of the population (more than 97,000 children and more than 312,000 adults) suffers from asthma (ALA 2009). Heart disease caused 486 of every 100,000 deaths among residents older than 35 between 1996 and 2000. (CDC 2009). The combination of increasing heat, ozone, and small particulate pollution can be especially dangerous for these populations.

### **Changes in Storm, Flood, and Drought Patterns**

In 2008 much of Wisconsin experienced its wettest June on record (NCDC 2008). Up to six inches of rain fell on the town of Ontario in a single day, contributing to flash floods that caused widespread damage to homes, roads, and bridges, even destroying a dam at the Wisconsin Dells. Twenty-nine counties were declared federal disaster areas (FEMA 2008), and losses from ruined crops, lower crop yields, and delayed

plantings totaled nearly \$150 million (Wisconsin State Legislature 2008).

As heavy rainfalls become more common, the threat of flooding will rise, as will the value of the property at risk and the costs of emergency response systems and flood control measures such as levees and dams.

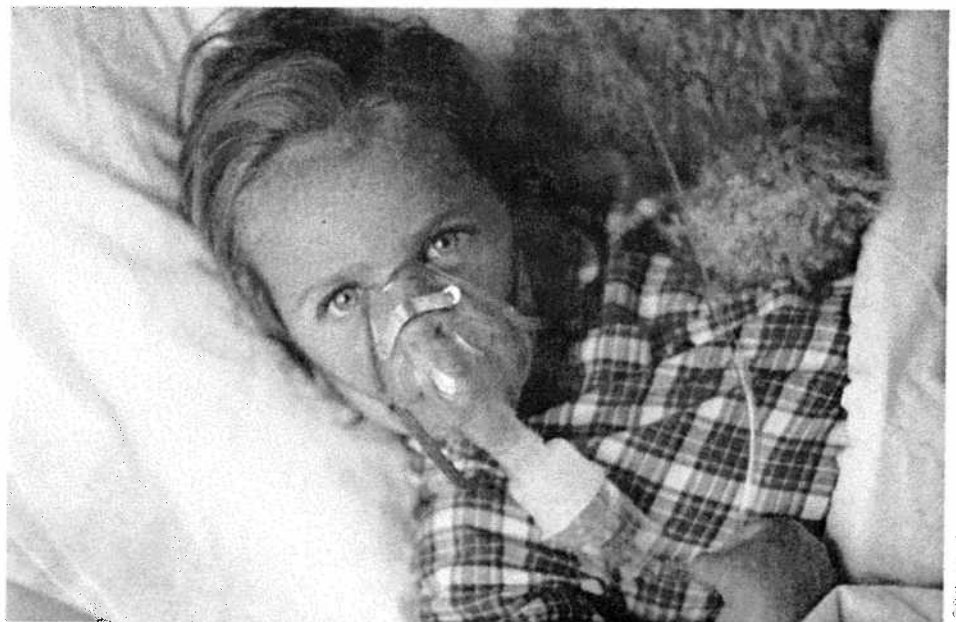
### *More frequent downpours and flooding*

Heavy downpours are already twice as frequent in the Midwest as they were a century ago (Kunkel et al. 1999). While scientists cannot attribute any single storm to climate change, more heavy precipitation can be attributed to climate change that has already occurred over the past 50 years (Trenberth et al. 2007).

Our analysis indicates that the warming ahead will make Wisconsin

substantially more vulnerable to the kind of natural disasters it suffered in 2008. Two findings stand out from the research:

- **Precipitation is more likely to come in the form of heavy rains.** Under the higher-emissions scenario Milwaukee is projected to experience a 50 percent increase in heavy rainfalls (defined as more than two inches of rain in one day) over the next few decades. Toward the end of the century, heavy rainfalls are projected to occur twice as often.
- **Winters, springs, and falls will be wetter but summers will be drier.** Winters and springs are projected to see almost one-third more precipitation toward the end of the century under the higher-emissions scenario, and autumns are



### **Warming Climate Leads to Poor Air Quality**

The fact that air pollution worsens as temperatures rise should concern residents of Milwaukee—poor air quality already puts large numbers of people at risk from respiratory illnesses such as asthma, chronic bronchitis, and emphysema. Higher temperatures are also expected to increase the dangers of allergy-related diseases (Ziska et al. 2008).

projected to see more precipitation as well. Meanwhile, summers will see 10 percent less rain. As described above, more of the rain that does fall will be in the form of downpours.

These projections support earlier studies showing a substantially increased risk of flooding in Wisconsin as the century progresses, especially if emissions are high. While there is likely to be some increase in local summertime flooding due to more frequent downpours, the greatest flooding risk will occur in the winter and spring, when rainfalls combine with melting snow and still-frozen soils to increase runoff.

In fact, analyses of various rivers in the Midwest (which used a level of emissions somewhat lower than our higher-emissions scenario) projected more than triple the number of high-flow days toward the end of the century (Cherkauer and Sinha 2009; Wuebbles et al. 2008).

*More frequent short-term droughts*

Paradoxically, Wisconsin could face not only the risk of greater flooding but also the risk of greater drought, although climate projections are less consistent in this regard. The more temperatures rise, the more water evaporates from the soil and plants, requiring more rainfall just to maintain the same soil moisture levels.

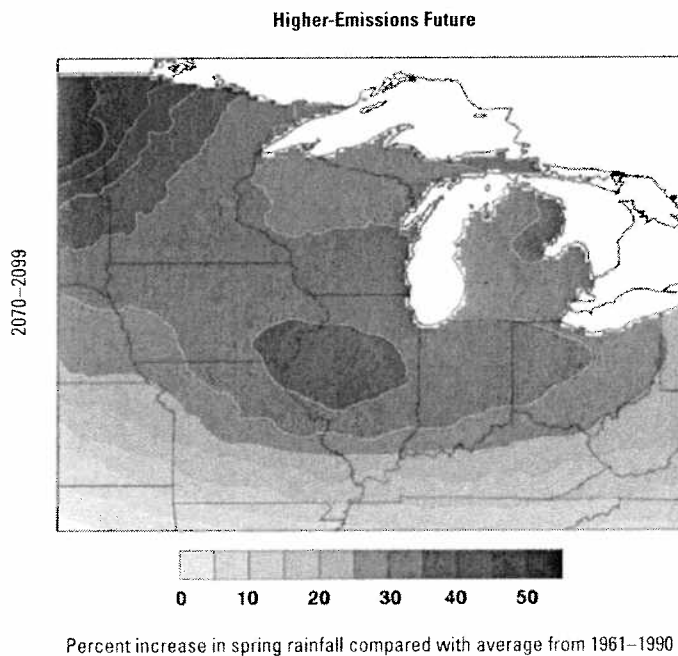
However, the Midwest is projected to receive less rain in the summer (when temperatures are hottest), not more. As a result, the likelihood of drought in the region will increase, as overall water levels in rivers, streams, and wetlands are likely to decline. In Wisconsin, short-term droughts are projected to increase, but long-duration droughts (lasting more than two years) are likely to decline.

*Lower water levels in the Great Lakes*

Water levels in the Great Lakes are projected to decline both in summer (due to increased evaporation caused by higher temperatures) and winter (due to a decrease in lake ice) (Angel and Kunkel 2009; Hayhoe et al. 2009). The greatest declines are expected for Lake Huron and Lake Michigan. Under the lower-emissions scenario, water levels are projected to fall less than one foot toward the end of the century; under the higher-emissions scenario, levels are projected to fall between one and two feet. A decline of this magnitude can have significant economic, aesthetic, recreational, and environmental impacts, such as significantly lengthening the distance to the lakeshore, affecting beach and coastal ecosystems, exposing toxic contaminants, and impairing recreational boating and commercial shipping.

*More threats to water quality*

Heavy rains increase runoff that not only washes pollutants into waterways but—in cities such as Milwaukee—also causes raw sewage to spill from sewers into rivers and lakes. The Milwaukee metropolitan region has invested more than \$4 billion to deal with this problem, thus far reducing sewage overflows from an average of 9 billion gallons per year in 1999 to 1.5 billion gallons



**Spring Rains Increase**

Heavy downpours are now twice as frequent in the Midwest as they were a century ago. Under the higher-emissions scenario, Wisconsin's spring rainfall is projected to increase almost 15 percent over the next several decades and up to 30 percent toward the end of the century. This may lead to more flooding, delays in the planting of spring crops, and declining water quality in rivers, streams, and storage reservoirs.

per year in 2008 (MMSD 2009). As rainfall increases, however, the Milwaukee sewer system and those of other Wisconsin cities and towns will have to continue to adapt.

### **New Threats to Wisconsin's Agriculture**

Wisconsin is an important part of the nation's agricultural heartland. Nearly 44 percent of the state's acreage is devoted to farmland (USDA 2009a); it ranks ninth nationally in total agricultural product value, second in dairy product sales, first in acres devoted to corn for silage, and fourth in acres devoted to vegetables (USDA 2009b). In 2002, more than 16 percent of Wisconsin's jobs were farm-related (USDA 2005) and, in 2007, agricultural commodities brought nearly \$9 billion to the state (USDA 2009a).

The heat and precipitation changes projected for Wisconsin have potentially profound implications for agricultural production. Toward the end of the century, growing seasons are likely to lengthen by three weeks under the lower-emissions scenario and by six to seven weeks under the higher-emissions scenario. Also, rising CO<sub>2</sub> levels have a fertilizing effect on crops. These changes by themselves would increase crop production, but they will be accompanied by many other changes that threaten production, such as heat stress, increased drought and flood risks, and an expansion of crop pests' range.

#### ***More heat stress for crops***

The extreme summer heat projected for Wisconsin, particularly under the higher-emissions scenario, puts the region's crops at significant risk. Corn crops, for example, can fail at 95°F, with the risk increasing the longer the heat lasts. When such hot spells



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#### **More Disastrous Spring Floods Could Be on the Way**

While Wisconsin will likely see some increase in localized summer flooding due to heavier downpours, the greatest flood risk will be in the spring, when seasonal precipitation is expected to increase the most. This would result in catastrophic flooding like that experienced in 2008, which caused damage at Lake Delton and across much of the state.

coincide with droughts, as they often do, crop losses can be severe.

The United States lost \$40 billion from a 1988 heat wave—mostly due to crop losses. Crop yields in Wisconsin dropped precipitously that year, with corn and soybeans falling below 65 percent of their average annual yields for the period 1978–1997 (USDA 2009c). Over the next few decades (under both emissions scenarios) most Wisconsin summers are projected to be hotter than 1988, and by mid-century under the higher-emissions scenario, all Wisconsin summers are projected to be hotter than 1988.

Our analysis projects the frequency with which Wisconsin and the Midwest would face three- and

seven-day periods of crop-damaging temperatures of 95°F or higher. During the historical baseline such periods of intense heat were extremely rare in the Midwest, with three-day periods occurring about once every 10 years and seven-day periods occurring on average only once every 30 years in the more southern states.

Under the higher-emissions scenario, however, a three-day period with temperatures reaching 95°F or higher is projected to occur in three of every four summers in Wisconsin within the next few decades, and in every summer toward the end of the century. A more destructive seven-day period would occur in at least half of Wisconsin's summers by mid-century and in at least three of every four



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**Declining Lake Levels Endanger the State's Economy**

Under the higher-emissions scenario, water levels in the Great Lakes are projected to fall between one and two feet toward the end of the century. Such a decline represents a threat to the state's lucrative shipping industry.

summers toward the end of the century. Under the lower-emissions scenario, the frequency of such periods would be significantly less toward the end of the century, with a week-long period of extreme heat occurring in about half of Wisconsin's summers.

The possibility of crop-damaging heat waves becoming commonplace in Wisconsin within a few decades represents a significant threat to the state's economy, which took in more than \$1.2 billion from corn alone in 2007 (USDA 2009a). Crops such as wheat that fail at lower temperatures than corn are even more vulnerable.

*More heat stress for livestock*

Extreme heat is also projected to cause heat stress for much of Wisconsin's livestock. Dairy cattle are particularly vulnerable to high temperatures, and milk production can

decline when temperatures exceed 75°F to 80°F depending on humidity. This represents a significant threat to Wisconsin's economy since dairy products are the state's most lucrative agricultural product, accounting for nearly \$4.6 billion in 2007 revenue. During the historical baseline, average summer temperatures and humidity in Wisconsin did not exceed levels known to cause stress in livestock. Under the higher-emissions scenario, however, dairy cattle and other livestock will endure near-permanent heat stress during the average Wisconsin summer toward the end of the century—unless they are kept cool using costly measures such as air-conditioned barns.

*Wider spread of pests*

The warmer winters ahead mean that crop pests and pathogens normally

kept in check by cold temperatures are projected to expand their ranges northward. A recent study warned that the expanding ranges of corn pests could have a substantial economic impact in the form of higher seed and insecticide costs and lower yields (Diffenbaugh et al. 2008). Already, corn pests cost U.S. corn producers more than \$1 billion annually; the corn earworm alone is responsible for destroying about 2 percent of the nation's corn crop every year, and it has shown resistance to a wide range of insecticides (Diffenbaugh et al. 2008).

Wisconsin's valuable corn crop would be at risk if the corn earworm does indeed move north. During the historical baseline, conditions conducive to this pest occurred rarely. Under the higher-emissions scenario, however, conditions conducive to the corn earworm will occur virtually every year in Wisconsin toward the end of the century.

*Potentially damaging changes in precipitation*

Crops under stress from extreme heat need more rain, but Wisconsin is projected to receive less rain in the summer growing season as the climate warms. Dry conditions will be a particular problem for Wisconsin's crops because only about 4 percent have access to irrigation (USDA 2009a).

In addition, the projected increase in spring rains could interfere with planting and pose a greater risk of floods like those of June 2008, which affected thousands of acres of the state's farmland (MRCC 2009). Changes in precipitation are therefore likely to limit farmers' ability to take advantage of the longer growing seasons expected to accompany future climate change.



## CLIMATE SOLUTIONS FOR WISCONSIN

Wisconsin accounts for about 2 percent of U.S. global warming emissions (EIA 2008). Since 1990, the state's emissions have grown 1 percent per year—slightly faster than the Midwest and national averages—with the fastest growth occurring in the electricity generation sector (Governor's Task Force on Global Warming 2008).

Energy use accounts for 85 percent of Wisconsin's global warming emissions, and agriculture accounts for another 8 percent. More than half of these agricultural emissions take the form of methane gas emitted by livestock—primarily the more than 1 million head of dairy cattle in Wisconsin, which ranks ahead of every state in this regard except California (WRI 2008).

If Wisconsin and the world are to avoid the worst consequences of climate change, the state must aggressively reduce its emissions by:

- increasing energy efficiency and conservation in industries and homes;
- improving vehicle fuel efficiency and reducing the number of miles driven;
- boosting the use of renewable energy resources such as wind power, advanced biofuels, and geothermal energy; and
- improving agricultural practices to reduce the release of heat-trapping emissions from soil cultivation and fertilizer application.

These actions will also provide benefits such as lower energy costs (within a few years at most), new local jobs, and cleaner air and water. A recent analysis by the Union of

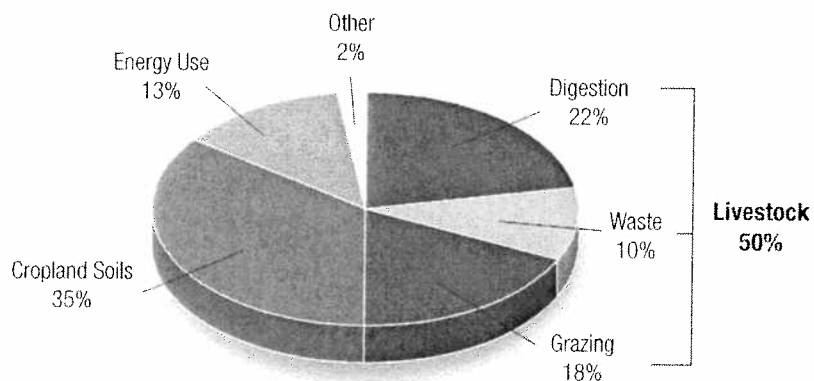
Concerned Scientists shows that businesses and industries in the Midwest could collectively save \$3.8 billion in 2020 and \$11.9 billion in 2030 by instituting these kinds of changes, with the average household saving \$200 in 2020 and \$800 in 2030 (Cleetus, Clemmer, and Friedman 2009).

Wisconsin has made strides toward implementing a number of the strategies listed above and deserves credit for its progress on the following initiatives:

- A law that doubles the state's investment in energy efficiency by requiring all utilities to spend 1.2 percent of their annual operating revenue on energy efficiency and renewable energy (DSIRE 2008).
- A renewable electricity standard that requires utilities to supply

customers with 10 percent renewable electricity by 2015 (DSIRE 2009a).

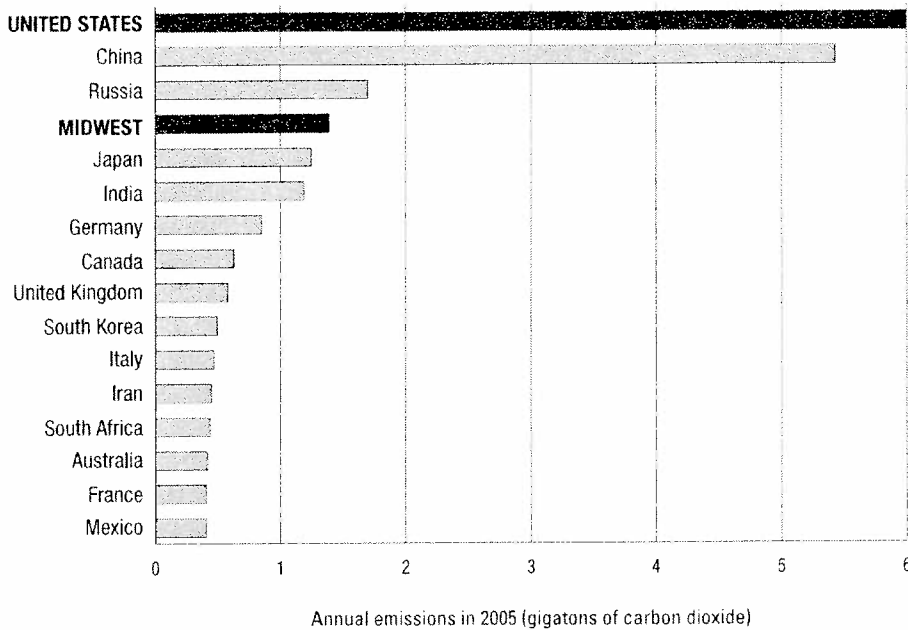
- The purchase of 92,400 megawatt-hours of renewable electricity, equivalent to roughly 10 percent of the electricity consumed each year by seven participating state agencies and the state university system (DSIRE 2009b).
- The formation of a state task force on global warming, which has already recommended a number of specific actions Wisconsin can take to reduce emissions; the recommendations are currently being drafted into legislation that will be introduced this year.
- A plan supported by Governor Doyle that would reconfigure three coal-fired power plants to run on biomass and natural gas.



Emissions percentages are CO<sub>2</sub>-equivalent units

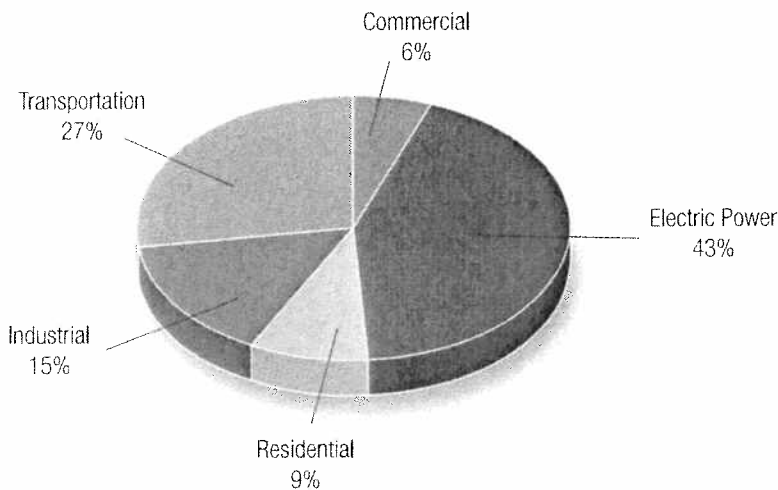
### Agriculture Contributes to Warmer Temperatures

Agriculture generates 7 percent of total U.S. heat-trapping emissions, including three potent global warming gases: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). Half of these emissions come from livestock production, one-third from the cultivation and fertilization of cropland (which decreases its ability to absorb carbon), and the rest from energy used for power generation, transportation, and construction (USDA 2008).



### The Midwest Burns More Fossil Fuels Than Entire Nations

The total combined emissions from eight states (Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin) would make the Midwest the world's fourth largest polluter if it were a nation. The region's emissions are more than double those of the United Kingdom, which has about the same population (EIA 2008b).



### Vehicles and Power Plants Are Michigan's Biggest Fossil Fuel Polluters

Transportation and electricity generation—primarily from coal-fired power plants—are the largest sources of heat-trapping emissions in Wisconsin (EIA 2008a). This chart reflects CO<sub>2</sub> emitted by power plants within the state; it has not been adjusted to reflect power imported to or exported from Wisconsin.

### Pathways to Real Progress

Wisconsin can do much more to take advantage of clean energy opportunities and reduce global warming emissions, by pursuing the cost-effective strategies summarized below.

#### *Strengthen the renewable electricity standard (RES)*

A strong RES can create local jobs and save residents money, but Wisconsin's standard is so weak that the state's utilities have already far surpassed its requirements, thanks primarily to ample wind resources. With its capacity for producing both wind power and bioenergy, Wisconsin is particularly well-positioned to benefit from renewable energy, yet the lack of a strong RES is holding back this sector, which generated less than 5 percent of the state's electricity in 2006 (NREL 2008). Wisconsin should follow the lead of states such as Illinois and Minnesota, which both have an RES that requires 25 percent renewable electricity by 2025.

#### *Adopt a renewable energy "buy-back" program*

The Governor's Task Force on Global Warming has recommended that Wisconsin encourage the growth of renewable energy by paying homeowners, farmers, small business owners, and others who generate renewable electricity and feed the excess into the electric grid; payment would be made at the same rate the state already pays utilities for their electricity. Buy-back programs (also called "advanced renewable" or "feed-in" tariffs) have succeeded in quickly expanding renewable energy production in several European countries and Canada.

### *Promote energy efficiency programs*

Wisconsin should require its electric and natural gas utilities to increase their investments in energy efficiency. The state could also follow the lead of Illinois, Michigan, Minnesota, and Ohio, which require utilities to reduce energy demand by helping their customers become more energy-efficient.

Energy efficiency reduces global warming emissions while saving consumers money and creating local jobs for people who perform energy audits, weatherize homes, and manufacture efficient windows. A \$340 million annual investment in energy efficiency, for example, would create up to 9,000 jobs in Wisconsin, reduce energy use by 1.6 percent, and save an estimated \$900 million annually by 2012 (Energy Center of Wisconsin 2009). If continued through 2018, this investment would reduce energy use by 13 percent.

### *Stop investing in polluting coal plants*

Wisconsin should adopt a moratorium (or outright ban) on both the construction of new coal-fired power plants and the import of power from new coal plants outside the state—unless and until such plants reduce their emissions using carbon capture and storage (CCS) technology (provided this proves commercially feasible). New financial commitments to coal plants without CCS will lock the state into high emissions for decades, while inhibiting needed investments in clean energy technologies.

### **Building More Resilient Communities**

Because climate change is already upon us and some amount of additional warming is inevitable, Wisconsin must adapt to higher temperatures and more heavy rains while



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### **Renewable Energy Presents Opportunity for Growth**

Nationwide, the wind power industry employs 85,000 people (AWEA 2009) while generating clean energy that reduces the heat-trapping emissions from coal-fired power plants (the United States' primary contributor to global warming). Wind energy in Wisconsin could provide jobs and revenue that can help build a clean energy economy.

working to reduce its emissions. Any delay in emissions reductions will make it more difficult and costly to adapt; conversely, aggressive steps to reduce emissions *now* will provide the time ecosystems and societies need to become more resilient. For each adaptation measure considered, Wisconsin's decision makers must carefully assess the potential barriers, costs, and unintended social and environmental consequences.

### **A State-Federal Partnership**

Although Wisconsin can achieve much with its own policies and resources, the scale of emissions reductions required suggests that individual states will need strong support from the federal government. The United States should therefore enact a comprehensive set of climate and energy policies including standards

for renewable electricity, energy efficiency, and transportation that set a tight limit on heat-trapping emissions nationwide. The goal should be to reduce emissions at least 35 percent below current levels by 2020 and at least 80 percent by 2050.

A national renewable electricity standard and strong fuel economy standards for cars and trucks can boost local economies while substantially reducing emissions nationwide. For example, a renewable electricity standard of 20 percent by 2020 would create 4,240 jobs in Wisconsin and lower residents' electricity and natural gas bills a total of \$90 million by 2020 (UCS 2007). A separate UCS analysis showed that if every car and light truck on U.S. roads averaged 35 miles per gallon (mpg) by 2018 (compared with the fleetwide average of 26 mpg today), drivers

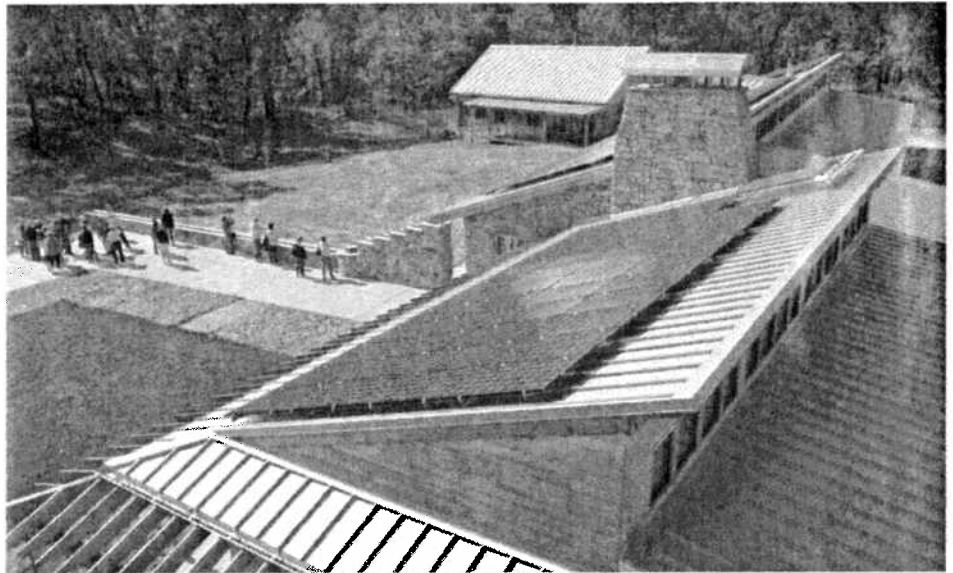
would save enough in fuel costs to create 4,800 new jobs in Wisconsin by 2020 (UCS 2007b). The Obama administration is currently pursuing new standards that would achieve an average of 35.5 mpg by 2016.

Another complementary federal strategy known as a “cap-and-trade” program would set a price on emissions and require polluters to obtain government-issued permits in order to continue emitting. By auctioning these permits the government could generate revenue for investment in:

- Energy efficiency and renewable energy solutions
- Assistance for consumers, workers, and communities facing the most difficult transition to a clean energy economy (coal miners and mining towns, for example)
- Conservation of precious natural resources
- Assistance for communities that must adapt to unavoidable consequences of climate change

Setting a price on heat-trapping emissions will also stimulate investment in cleaner and more efficient energy technologies such as CCS (if and when this proves commercially feasible) by making them more cost-competitive.

Finally, federal resources devoted to climate monitoring and assessments



Aldo Leopold Legacy Center

**Green Building Design Saves Money and Energy**

Despite the demands of Wisconsin’s seasonal temperature extremes, the Aldo Leopold Legacy Center near Baraboo uses 70 percent less energy than a building that meets the minimum requirements of the state building code. An innovative design that combines energy efficiency and renewable energy (in the form of a rooftop solar array) makes the center completely self-sufficient in terms of its yearly energy needs.

can provide essential information for states and communities that need to devise and implement adaptation plans. Wisconsin’s U.S. senators and representatives must therefore support strong federal climate and clean energy policies that will help the state reduce emissions, transition to a clean energy economy, and prepare for the climate change that will occur in the interim.

**CONCLUSION**

Global warming represents an enormous challenge to Wisconsin’s way of life and its residents’ livelihoods, but we can meet this challenge if we act swiftly. The emissions choices we make today—in Wisconsin and throughout the nation—will shape the climate our children and grandchildren inherit. The time to act is now.

The Union of Concerned Scientists is the leading science-based nonprofit working for a healthy environment and a safer world.

For more information on the Midwest’s changing climate, along with a list of references for this report, visit: [www.ucsusa.org/mwclimate](http://www.ucsusa.org/mwclimate)

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# Appendix C





# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Agenda

### FLOODING STUDY TASK FORCE

**ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS**

*Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin Shafer,  
Erick Shambarger, and Ken Yunker*

*Staff Assistant Linda Elmer 286-2232; Fax: 286-3456;  
lElmer@milwaukee.gov*

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Thursday, January 20, 2011

10:00 AM

Room 301-A, City Hall

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1. **Review and approval of the minutes of the January 6th meeting.**
2. **Long-term and short-term maintenance and flood-prevention plans of the city and the sewerage district.**  
*—May include, but not be limited to, discussion relating to the Mayor's Independent MMSD Audit Committee report of 2004 and the Final Report and Analysis of the Sewer Maintenance Fund (both available online in Council file 100665).*
3. **Set next meeting date and agenda.**

Members of the Common Council and its standing committees who are not members of this committee may attend this meeting to participate or to gather information. Notice is given that this meeting may constitute a meeting of the Common Council or any of its standing committees, although they will not take any formal action at this meeting.

Upon reasonable notice, efforts will be made to accommodate the needs of persons with disabilities through sign language interpreters or auxiliary aids. For additional information or to request this service, contact the Council Services Division ADA Coordinator at 286-2998, (FAX)286-3456, (TDD)286-2025 or by writing to the Coordinator at Room 205, City Hall, 200 E. Wells Street, Milwaukee, WI 53202.

Limited parking for persons attending meetings in City Hall is available at reduced rates (5 hour limit) at the Milwaukee Center on the southwest corner of East Kilbourn and North Water Street. Parking tickets must be validated in Room 205, (City Clerk's Office) or the first floor Information Booth in City Hall.

Persons engaged in lobbying as defined in s. 305-43-4 of the Milwaukee Code of Ordinances are required to register with the City Clerk's Office License Division. Registered lobbyists appearing before a Common Council committee are required to identify themselves as such. More information is available at [www.milwaukee.gov/lobby](http://www.milwaukee.gov/lobby).







# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Minutes

### FLOODING STUDY TASK FORCE

ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS

Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin  
Shafer, Erick Shambarger, and Ken Yunker

Staff Assistant Tobie Black, 286-2231; Fax: 286-3456;  
tblack@milwaukee.gov

Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov

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Thursday, January 20, 2011

10:00 AM

Room 301-A, City Hall

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*Meeting convened: 10:08 A.M.  
Members excused: Sandy Pasch*

**1. Review and approval of the minutes of the January 6th meeting.**

*Mr. Yunker moved, seconded by Mr. Polenske, for approval of the minutes. There were no objections.*

**2. Long-term and short-term maintenance and flood-prevention plans of the city and the sewerage district.**

*Mr. Polenske presented the rest of the PowerPoint presentation from the prior meeting. The Dept. of Public Works has been inspecting and repairing manholes to deal with clear water entering the sewer system through that means. The city is spending a lot of money in the public way, but money has not been spent on private property, where much of the clear water may be infiltrating the system. The city spent \$36 million on the sewers last year, of which \$15 million was in grant funds and the rest was in low-interest loans from the state. Mr. Shambarger noted that a line item was created in the budget for the elimination of sanitary sewer overflows, an inflow and infiltration (I&I) account, for work on the public way with the goal of reducing the amount spent over the years as improvements are made. This account was then increased with the intention of addressing I&I on private property. The amount in the account will depend on what the city decides to do on private property. Ald. Bohl had questions about the funding of the sewer maintenance fund. The city has been performing work to prevent sewer overflows in specific areas of the city that have been occurring consistently over a number of years. These projects tend to be fairly costly. Martin Aquino, Dept. of Public Works, said that sewer lining will last at least 50 years. Prior to working private laterals, the dept. can install meters to monitor the flow in the sewers and then can monitor the flow once the work is completed. Unless there is almost 100% compliance, the project wouldn't be valid in terms of reducing overflows. Kevin Shafer noted that the Metropolitan Milwaukee Sewerage District will be providing the bulk of the funding for work on private laterals and it will mandate that work be done and that access to private property be*

provided. Mr. Shafer doesn't think the combined sewers are responsible for the backups as they are too deep for clear water to access them and the bulk of the overflows in the July storm were in the separate sewer areas.

Mr. Shafer noted that there are approximately 20 communities across the country that have put public money into private lateral work or into the separation of foundation drains from the sewer system. Mr. Polenske noted that the city will be improving laterals on 5 city-owned homes to get a better understanding of the cost and effectiveness. Mr. Aquino stated that for lateral linings workers do not need access to the basement, but they would for disconnection of foundation drains.

Mr. Yunker left at 10:51 A.M.

If roots have infiltrated a lateral, then the roots can be cut and the lining replaced. If a lateral is sagging or broken, then it cannot merely be lined, but it must be replaced. The dept. intends to have experts inspect the laterals and suggest what the city should do. Ald. Bohl sees that it may be a problem to gain access to private homes if the homeowner may then face a huge bill for sewer work. Politically it may be difficult to sell to homeowners. Mr. Shafer is assuming that the work will need to be completed when funding is available to fund 60% of the work. This may run over 25-50 years and all homes may not need to be examined based upon the flow as the work is done. This program will not stop all basement back-ups, but is a step toward that goal. As time goes along, technology and knowledge will be shared across all municipalities and across the country so expertise can be brought to solve this problem. Mr. Shamberger noted that focusing on a single watershed allows the city to see what impacts changes make and to maximize funding. Ald. Bohl also suggested creating a financial incentive to have the work done when the city is prepared to do the work, such as 60% will be funded by the city, but in the future it will be only 40%.

Mr. Polenske said that there are 2,400 miles of sewer system and 940 miles of those miles are sanitary sewers, with an estimated additional 1,500 miles of private laterals. The dept. has selected 15 areas across the city to work on reducing I&I. Mr. Shamberger would like to look at land-use decisions and Mr. Shafer encouraged the task force to look at stormwater management issues. Mike Hahn is present for Mr. Yunker who agrees that stormwater management needs to be examined. Mr. Aquino noted that some of the pipes that are only 50 years old are in worse shape than those 150 years old.

Mr. Shafer presented his PowerPoint presentation on the Mayor's report (attached to file). The text in red in the presentation was added by Mr. Shafer as to how the recommendations have been implemented to date. The Milwaukee Metropolitan Sewerage District (MMSD) is looking at a fast-flow treatment which would be a full treatment of sewerage as part of a pilot study and that would meet all the Wisconsin Dept. of Natural Resources' standards for treatment and would be used as needed during a heavy rain event. Blending also meets the full state and federal standards for treatment. Jones Island can treat 330 millions of gallon per day, and add an additional 60 million gallons, if needed. Mr. Shamberger noted that the combined sewer system is currently a treatment plant, so separation of sewers would need to be closely examined. The maximum daily load is the amount of pollution an area of the river can hold without the pollution being a problem.

Mr. Hahn said that, though not desirable, basement backups can equalize pressure and aid in preventing the collapse of basement walls, but backflow preventers can create an unequal pressure on basement walls, which can cause the walls to collapse. He said that this should be taken into consideration when installing these

devices. Sump pumps can be installed on sewer laterals rather than just in the basement floor. Separating the combined sewer system, per Mr. Shafer, noted that this is not the most cost-effective way to solve backups and overflows and might put the city into non-compliance with the state in terms of suspended solids. Mr. Shafer sees a lot of positives with green infrastructure as a means of reducing clear water into the sewer system.

### 3 Set next meeting date and agenda.

The next meeting will be Feb. 24th and the proposed meeting dates over the next two months generally work okay for members.

The agenda for Feb. 24th will include:

Sanitary sewer overflows (which will include Milw. Metropolitan Sewerage District's use of pumps)

Combined sewer system

Southeastern Wisconsin Regional Planning Commission's stormwater and inflow study

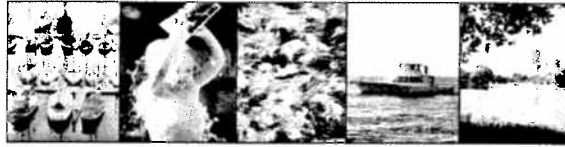
The agenda for March 10th will include the Dept. of Public Work's discussion of submitted proposals.

Meeting adjourned: 12:00 P.M.

Linda M. Elmer

Staff Assistant





## Mayor's Independent Audit Committee Report On Questions Related to Milwaukee Metropolitan Sewerage District (MMSD) Operations

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Members of Committee:

Don Theiler, King County Wastewater Treatment Division

Tony Earl, Former Governor of Wisconsin

Theresa Estness, Mayor of Wauwatosa

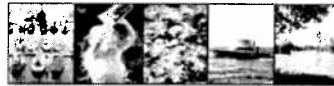
Nancy Frank, UW-Milwaukee, School of Architecture & Urban Planning

Ashanti Hamilton, Milwaukee Alderman

Wally Morics, City of Milwaukee Comptroller

RoseMary Oliveira, Citizen

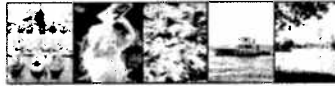
Milwaukee Flood Task Force  
January 20, 2011  
Response to Audit



## Basic Findings

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- Stormwater flows into the sewer system are excessive and must be reduced.
- Public expectations exceed current regulatory requirements and current performance.
- A collaborative region-wide effort which goes beyond the authority and geographic boundary of the MMSD service area will be needed to deal with issues.

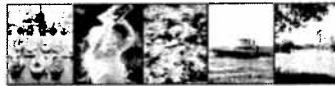


## Recommendations

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### 1. Reduce Stormwater Flow into System

- Separate System
  - Private Property I/I
  - Regional flood management
  - Stormwater best management practices
- Combined System
  - Private Property I/I
  - Regional flood management
  - Stormwater best management practices



## Recommendations

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### 2. Implement Other Actions

- Construct projects on the drawing boards
  - DNR Stipulation Projects will be completed in 2011
  - Have initiated 2020 Facility Plan Projects
- Fast flow treatment where appropriate
  - Performed pilot studies in 2008 and are in test mode in 2011

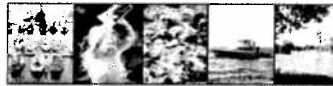


## Recommendations

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### 2. Implement Other Actions (cont'd)

- Reduce Blending
  - Response to recommendation 1 will assist with this
- Partial Separation
  - City of Shorewood is investigating this
  - City of Milwaukee has performed some initial separation

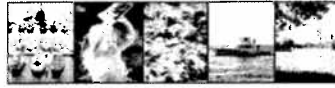


## Recommendations

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### 3. Provide Program for Financing

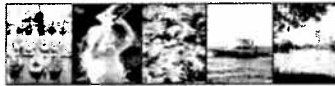
- I/I reductions where cost effective
  - 2010 Private Property I/I Program
- Institute excess flow charge
  - Technical Advisory Team discussions began in 2009, Milwaukee County ICC will consider in February 2011



## Recommendations

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4. Enforcement Needed
  - Eliminate illegal connections
    - Ongoing through work with municipalities
  - DNR should provide strong even handed enforcement
  - Ongoing, 2006 Stipulation with the municipalities



## Recommendations

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5. Non-point and Stormwater Control Requires Attention
  - Non-point source pollution
    - Greenseams<sup>SM</sup>
    - Water Quality Trading
    - Watershed Permitting
  - Stormwater control/Milwaukee region
    - Ongoing
  - Beaches
    - Bradford Beach revitalization

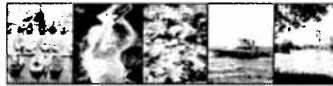




## Recommendations

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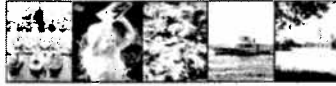
6. Public Information and Communication Needed
  - No single villain, no single cure - ongoing
  - Nature of the water quality problem - ongoing
  - SSO and CSO goals and impact - ongoing
  - Nature of I/I and control goals - ongoing
  - Non-point source and stormwater pollution goals - ongoing



## Recommendations

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7. United Water Services and MMSD Management Recommendations
  - UWS – addressed with 2008 Veolia Contract**
    - Succession planning needed
    - Improved maintenance
    - Overflow incentives
    - Technical Environment Committee
  - MMSD - ongoing**
    - Establish Priorities for projects
    - Ensure process and resources available
    - Continue strong outreach program
    - Use authority to implement I/I program



## Recommendations

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### 8. A Regional Watershed Approach Needed

- Collaborative program to reduce stormwater flows into system (I/I control) - ongoing
- Non-point/Stormwater control program - ongoing
- Specific measurable water quality goals
  - Total Maximum Daily Loads (TMDL) – to be initiated in 2011
- WDNR participation and resources - ongoing



# **Mayor's Independent MMSD Audit Committee**

## **Final Report**

Presented to Mayor Tom Barrett

October 1st, 2004

October 1, 2004

The Honorable Tom Barrett  
Mayor of the City of Milwaukee  
City Hall, Room 201  
200 East Wells Street  
Milwaukee, WI 53202

Regarding: Final Recommendations and Performance Review of the Milwaukee  
Metropolitan Sewerage District (MMSD) Conducted by the Mayor's  
MMSD Audit Committee

Dear Mayor Barrett:

On behalf of the Mayor's MMSD Audit Committee, we are proud to present to you the following *Final Recommendations and Performance Review of MMSD*. While running for Mayor of Milwaukee, you announced as part of The Barrett First 100 Days Action Plan that you would initiate an independent audit of MMSD.

At your directive, the Committee has conducted all of its proceedings in public and has heard extensive testimony from a variety of outstanding individuals and organizations. The Committee would like to thank the many scientists, local public officials, environmentalists, fishing organizations, national wastewater treatment experts, and staff members from the Wisconsin Department of Natural Resources (DNR) and the Southeastern Regional Planning Commission (SEWRPC) who appeared before the Committee. Their expertise, base of knowledge, commitment to clean water and unique perspectives were invaluable in producing this audit of MMSD's practices and performance.

This review has been conducted over the past three months with the assistance of nationally respected leaders in the wastewater industry including Dick Sandaas, a consultant with extensive history in the wastewater treatment industry, and Andy Lukas and staff from Brown and Caldwell. The *Final Recommendations and Performance Review of MMSD* contains new scientific information developed specifically for purposes of this audit. The review also consisted of document reviews as well as extensive discussions and testimony from MMSD executives and staff. United Water Services staff also provided input.

Clean water is a regional challenge that will take a coordinated regional response. The Committee hopes that its audit will benefit MMSD, the 28 municipalities it serves, and all those dedicated to improving water quality and moving the region forward.

Letter to Tom Barrett  
October 1, 2004  
Page 2

On behalf of the entire Committee, we would like to thank you for the honor and privilege of serving on the Mayor's MMSD Audit Committee.

Sincerely,

Mayor's MMSD Audit Committee:



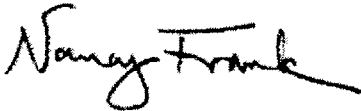
Don Theiler, Committee Chair  
Division Director  
King County Wastewater Treatment  
Division



Tony Earl  
Former Governor of Wisconsin



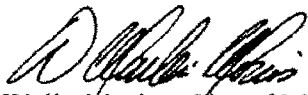
Theresa M. Estness  
Mayor of Wauwatosa



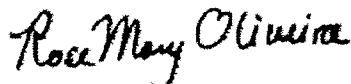
Nancy Frank  
UW-Milwaukee, School of Architecture &  
Urban Planning



Ashanti Hamilton, Milwaukee Alderman



Wally Morics, City of Milwaukee Comptroller



RoseMary Oliveira, Citizen

## **1. Executive Summary**

In June of 2004, Mayor Tom Barrett of the City of Milwaukee formed the MMSD Audit Committee to explore the causes of the large volume of sewer overflows in May 2004. The review was to evaluate the adequacy of the sewer system and its management during this period as well as other periods of wet weather. In addition, the Mayor requested that the Audit Committee answer several questions in this regard and make recommendations for improvements. The Audit Committee conducted five day-long meetings, during which it accumulated extensive information leading to its recommendations. The Audit Committee received input from expert panels, MMSD staff presentations, and consultant presentations. This provided a wide spectrum of information covering policy, environmental, regulatory, technical, and operational matters.

The issues reviewed by the Audit Committee were complex. However, certain facts are clear to the committee as a result of its deliberations. First and foremost, there is too much storm water getting into the system during major storm events. This excess water is overwhelming the MMSD sewer system and causing an unacceptable level of overflows.

Two of the Committee's recommendations address excessive wet-weather flows into the MMSD system. The first calls for MMSD and the 28 contributing communities to reduce excessive infiltration and inflow in the separate sewer area. This could be accomplished by eliminating illegal connections, developing a cost effective infiltration and inflow (I/I) reduction program, and establishing maximum I/I levels. The second calls for development of a program to reduce excess flows into the combined sewer area, which would include partial sewer separation.

The Committee recommends that MMSD follow through on overflow reduction project implementation, minimize blending, and build treatment systems at combined sewer overflow points to minimize environmental damage. The Committee also recommends that the municipalities in the MMSD service area create a system to share the cost of I/I reduction as well the cost of treating storm water and non-point source pollution.

Complete separation of the existing combined system is not recommended at this time for a combination of reasons: the cost is prohibitive; the disruption of the downtown area would be enormous; and the impact on water quality would be negative because of the loss of the stormwater treatment, which currently occurs.

Finally, the Committee sensed a willingness on the part of regional leaders to work together on the solutions to this problem. The successful implementation of these recommendations is reliant upon regional leadership and cooperation. Assigning MMSD with sole responsibility for solutions to regional issues will not work. The committee is encouraged by the efforts of the MMSD Executive Director, Kevin Shafer, who is working regionally to improve communications and understanding of the issues. Local

**Final Recommendations and Performance Review of the MMSD**  
**October 1, 2004**

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suburban officials who appeared before the Audit Committee testified that Mr. Shafer has been “extremely good” at sharing information and involving communities in developing regional solutions. The regional summit hosted by MMSD on September 23 of this year is an example of these efforts.

## 2. Recommendations

Wastewater collection systems in the Milwaukee area and the Milwaukee Metropolitan Sewer District (MMSD) have recently been overwhelmed – notably in May 2004 - by the amount of stormwater entering the system. Stormwater enters the system from both the combined sewer area and the separate sewer area. The result has been overflows and backups of untreated sewage into the area rivers, lakes, streams, and basements. MMSD has clear and specific responsibilities in this regard, including: 1) Elimination of sewer backups into homes caused by the public sewer system, 2), Elimination of Sanitary Sewer Overflows (SSOs) from the separate sewer system, and 3) Minimization and reduction of Combined Sewer Overflow (CSO) impacts. The Audit Committee recommendations are directed primarily at addressing these three areas of concern.

### **2.1. *Reduce wet weather flow into the sewer system.***

Activities must address infiltration and inflow (I/I) reduction in the separate sewer service area, and combined sewer runoff reduction in the combined sewer service area. Wet weather flows into the system have reached a level which is causing separate system overflows which must be eliminated. Flow reductions cannot occur unless both the combined sewer area and the separated sewer area undertake programs to reduce flows to an acceptable level.

- a. All MMSD communities have ordinances making stormwater connections to the separate sewer illegal. MMSD must ensure that all communities enforce these ordinances.
- b. MMSD should develop a continual I/I management program that provides for the cost effective reduction of I/I in existing service areas and significantly limits I/I from future development. The program must be:
  - enforceable,
  - rapidly implementable,
  - measurable,
  - fundable, and
  - supported by the communities.

The program must include comprehensive and consistent I/I investigations in all communities to identify sources of the I/I, and the costs and benefits of controlling these sources. The program should identify I/I sources and implement activities designed to reduce I/I from identified illegal connections and from other sources which would be cost effective to control.

The program should include a set of actions to insure that future I/I



does not increase above an accepted rate. Examples are:

- Requiring the identification of possible I/I from residences and commercial establishments at time of sale;
  - Developing ongoing programs to replace or repair defective or failing sanitary and storm sewers when streets, alleys, and highways are repaired;
  - Providing backflow preventors in areas experiencing basement backups; and
  - Testing laterals for soundness following the reconstruction of buildings.
- c. MMSD should undertake a program with Milwaukee County and the cities of Milwaukee and Shorewood to analyze runoff reduction opportunities in the combined sewer area including downspout disconnection, rain barrels, rain gardens, rooftop storage and flow restrictors, catch basin storage and other techniques. These techniques should be implemented where it is determined to be reasonable and will not create other problems, such as localized flooding and building foundation problems.
- d. MMSD should establish maximum acceptable I/I levels from future development.

## **2.2. *Additional actions to reduce the impact of or eliminate overflows***

- a. MMSD should follow through on project commitments made in the Stipulation Agreement with WDNR.
- b. MMSD should prioritize projects that will accelerate reduction of existing overflows and eliminate sewer backups into homes. MMSD should also look for opportunities to accelerate these projects. Among them, Port Washington Road and Wisconsin Avenue Relief Sewer projects provide overflow reduction and both might be accelerated, with a change in contracting policy. MMSD must, at the same time, be mindful of other organizational constraints that may limit the ability to deliver projects at an accelerated rate.
- c. Using the results of the high rate treatment pilot project, MMSD should implement this type of treatment technology at appropriate CSO points to reduce impacts of untreated overflows in the combined system.
- d. MMSD must make every attempt to reduce the need for blending by reducing system wet weather flows or adding treatment capacity. As a part of the blending reduction effort, MMSD should also explore the

feasibility and desirability of fast flow treatment of the flows diverted around the secondary treatment process.

- e. MMSD, the cities of Milwaukee and Shorewood, and Milwaukee County should look at opportunities to reduce flows to the combined sewer area by partially separating portions of the combined sewer where the first flush pollutants could still be captured in the MMSD system. Examples of where this approach is already being pursued are the Marquette Interchange and Canal Street Reconstruction Projects. Complete separation of the existing combined system is not recommended at this time for a combination of reasons: the cost is prohibitive; the disruption of the downtown area would be enormous; and the impact on water quality would be negative because of the loss of the stormwater treatment, which currently occurs.

### **2.3. *Financing***

- a. If determined to be cost-effective, MMSD should provide funding or incentives for private property owners who rehabilitate their private laterals.
- b. MMSD should establish a program which creates financial incentives to control and reduce excess flows within each community's sewer system. This program could involve a surcharge for excess flows above a predetermined base flow within each community's system. The charge should reflect the cost of transporting and treating excess flows from that community including the maintenance of the overall system. Such a rate program should be designed to reward communities which control and reduce excess flows in their systems. Consideration should be given to putting at least a portion of the rates from such a charge into a fund to assist communities to control and reduce excess flows into the MMSD and local sewer systems.

### **2.4. *Enforcement***

- a. Enact programs that ensure illegal contributions to sanitary system are eliminated.
- b. WDNR should be aggressive and equitable in SSO enforcement actions throughout the state. Communities in Wisconsin which have experienced SSOs should be required to eliminate them.

## **2.5. Non-Point Source and Stormwater Pollution/ Beach Closures**

Water quality problems, such as beach closures, are not caused by MMSD overflows alone. Eliminating all MMSD overflows would not prevent most beach closings. Pollution from non-point sources and pollution from municipal and county stormwater collection systems must be addressed in order to achieve the water quality levels desired by the public. There is a vacuum in assigned responsibility for and leadership in addressing non-point source and stormwater pollution.

- a. MMSD should aggressively continue its efforts to assist the region in dealing with these issues.
- b. All communities contribute to the water quality impacts because they generate non-point source and stormwater pollution. The Intergovernmental Cooperation Council (ICC) and MMSD contract communities should take the lead in developing a system of cost sharing for treating stormwater in the region. By virtue of the deep tunnel, all MMSD customers currently pay for treating a substantial volume of stormwater generated in the combined sewer areas of Milwaukee and Shorewood. The cost-sharing system would need to recognize this reality and include equitable ways to fund stormwater treatment in the separate sewer areas.
- c. MMSD should contribute, within the limits of their authority and responsibility, to solutions that reduce non-point source and stormwater pollution to tributary lakes and rivers, for example, improving stormwater management on parking lots that discharge without treatment into receiving waters near beaches.
- d. Other entities such as Milwaukee County should take actions that would have an immediate, cost-effective benefit on water quality near beaches. Such actions would include beach raking and local stormwater control on and near the beaches.

## **2.6. Public Communications**

Public communication is needed to clarify the causes and potential solutions for regional water quality problems. It is important for everyone to understand that there is no single villain causing our water quality problems, just as there is no single cure.

- a. Other organizations, working with MMSD, should communicate with the public on the respective roles and responsibilities of MMSD and

- other governmental entities in protecting and improving regional water quality.
- b. Research public expectations on water quality and sewer overflows to assist in establishing specific water quality goals for the region taking into account public willingness to pay for the solutions.
- c. Communicate with public on five key things:
  - i. Nature of the regional water quality problem.
  - ii. SSO and CSO goals and their impacts on water quality.
  - iii. Nature of I/I and strategies for controlling I/I.
  - iv. Nature of non-point source and stormwater pollution and strategies for achieving control goals.
  - v. Respective responsibilities for achieving water quality goals.

### **2.7. *United Water Services (UWS) Oversight***

The Audit Committee focused its attention on the May 2004 overflows and did not identify UWS as a significant contributor to them. However, the Audit Committee has identified a number of concerns going forward.

- a. To ensure that an adequate number of skilled technical staff will be available in the future to operate this highly complex system, MMSD should require any subsequent contractor to provide a Succession Plan for key human resources.
- b. MMSD should follow-up on 2003 UWS Performance Evaluation recommendations related to maintenance schedules on non-critical assets.
- c. On future operating contracts, MMSD should include contract incentives pertaining to overflow prevention that were recommended in the 2003 Performance Evaluation.
- d. MMSD should ensure the Technical Environment Committee is fulfilling its charge of overseeing the performance of UWS in meeting its responsibilities. This should include active participation of its members, regular meetings and, at a minimum, quarterly reports to the MMSD Commission.

### **2.8. *Regional Watershed Approach to Solutions***

- a. Develop and implement a mechanism for meaningful and effective suburban input to implement the recommendations in this report in an atmosphere of cooperation so that all members of the sewered community feel included in decision-making.
- b. The region must develop and implement mechanisms to address all sources of pollution and also determine what the specific water quality goals are for the area. Without this information the communities

**Final Recommendations and Performance Review of the MMSD**  
**October 1, 2004**

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responsible for the sewer system cannot determine how to design and maintain their individual systems.

- c. The WDNR should become more active in fulfilling its responsibilities and be provided with the resources to assist the region in establishing specific goals and implementation solutions.

### **3. Discussion of Panel Questions Regarding May 2004 Performance**

Mayor Barrett commissioned the Audit Committee to answer several pressing questions regarding the environmental situation and causes surrounding the overflows in May 2004. The Mayor and his cabinet created seven categories of questions for the Audit Committee to focus on, and they are discussed as follows.

#### **3.1. Relating to United Water Service (UWS) Performance**

*What impact has privatization of Milwaukee Metropolitan Sewerage District's (MMSD's) operations had on overflows?*

There is no clearly identifiable impact of privatization on the major overflows which occurred in May 2004. The tunnel operating decisions are made jointly between UWS and MMSD during larger storm events. Otherwise, UWS has full authority to make operational decisions. Some isolated overflows events appear to be due to operational errors during the period UWS has been operating the system.

Weather information used by UWS and MMSD management during the May storm events for making decisions on tunnel operation, included radar and satellite imaging; current storm intensity, duration, and probability; recorded rainfall amounts for preceding events; and forecasted rainfall amounts. Resources include National Oceanic and Atmospheric Administration (NOAA) forecasts, weather-related internet websites, the Great Lakes Weather Service, and MMSD rain gages. The historic reliability of weather forecasting resources is not known at this time.

The 2003 UWS Performance Evaluation reviewed whether UWS cost-savings measures could be contributing to overflows. That review did not find that this was the case. Further, tunnel operating data would indicate that the tunnel was performing in a similar manner while MMSD was solely responsible. The review did express some concerns for reduced staffing levels, including experienced staff, and the potential for performance impacts in the future.

*How has UWS performed against their contract?*

UWS's performance has generally been satisfactory.

There are no contract incentives/disincentives linked to overflow prevention, as contrasted with the treatment plant operations which have incentives/disincentives. UWS has responded in a positive fashion to the incentives for treatment in their current contract. UWS follows standard operating procedures and collaborates with MMSD management while operating the system.

**Final Recommendations and Performance Review of the MMSD  
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*Is UWS making errors that are causing or contributing to the overflows?*

A limited number of minor overflows might have been prevented if UWS had better technology provided to experienced operators. Also, during the first May 2004 storm, basement backups occurred, and a review is underway regarding UWS operation of overflow gates during that period.

*Is UWS trying to save money at the expense of our environment?*

Nothing is currently evident to suggest that UWS is making decisions that harm the environment. However, issues identified in the 2003 Performance Evaluation, such as staffing levels (reduced by one-third and lack of succession planning), and deferred maintenance of non-critical equipment, will have an impact on system performance if not addressed. The effects of cost pressures on UWS from sky-rocketing utility costs should be monitored for any future impact on their performance.

The 2003 Performance Evaluation showed the system performance since the tunnel has gone “on line” is not significantly different since UWS came under contract. Some operational protocols for the tunnel have changed as operating experience has been built, but these changes had the input of both MMSD and UWS staff and management.

The effluent quality at treatment plants has historically exceeded contract requirements, which are significantly lower than the WPDES permit for effluent. For this, UWS has received performance bonuses as provided in their contract. The following outlines the bonus, penalty, contract and permit limits for wastewater effluent.

**Table 1. UWS Contract Incentives for Treatment Plant Effluent**

<b>Constituent</b>	<b>Bonus Limit (Less than)</b>	<b>Penalty Threshold (Greater than)</b>	<b>Contract Limit (Greater than)</b>	<b>Permit Limit (Greater than)</b>
BOD	9 mg/L <sup>2</sup>	13 mg/L <sup>2</sup>	15 mg/L <sup>1</sup>	30 mg/L <sup>1</sup>
TSS	8 mg/L <sup>2</sup>	13 mg/L <sup>2</sup>	15 mg/L <sup>1</sup>	30 mg/L <sup>1</sup>
Total phosphorus	None	None	1 mg/L at South Shore 0.5 mg/L at Jones Island <sup>1</sup>	1.0 mg/L <sup>1</sup>
Fecal Coliform	None	None	100 units/100 mL <sup>2</sup>	400 units/100 ml <sup>3</sup>

<sup>1</sup>Monthly average

<sup>2</sup>Annual average

<sup>3</sup>Monthly geometric mean

There are no incentives/penalties in the contract for CSO’s, SSO’s, or other operational performance.

**3.2. Relating to Deep Tunnel**

*What exactly was the deep tunnel supposed to accomplish for us?*

The deep tunnel was initially designed to capture all overflows from the separate system for the largest storm of concern that was analyzed for the Water Pollution Abatement Program (WPAP). The period of record analyzed was from 1940 to 1978. Engineers

## Final Recommendations and Performance Review of the MMSD October 1, 2004

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then determined that a storm in June 1940 produced the largest amount of separate sewer flow that would require storage. Subsequently this storm was termed “the Storm of Record.” The tunnel sizing was based on the estimated flows from the June 1940 Storm of Record assuming 12.8 percent reduction in local sewer system I/I.

Since this type of storm is rare (once in 40 years), engineers also determined that smaller storms occurring much more frequently would not use much of the tunnel volume. MMSD determined that using the excess tunnel capacity in smaller events to capture potential CSO would allow it to meet its water pollution abatement goals at significant cost savings over other alternatives. The result was a dual purpose tunnel: preventing SSOs and reducing the number of CSOs. When the decision was made to use the tunnel for dual purposes, the overall volume of the tunnel was increased to the present size. MMSD’s challenge is to operate the tunnel in a manner that maximizes CSO controls while at the same time not jeopardizing its ability to prevent SSOs. The Appendix provides further information regarding tunnel design and performance history.

Unfortunately, as MMSD communicated the plans and expected performance for the tunnel, the public came away with a perception that no overflows of any kind would occur after the tunnel was operational. However, newspaper accounts from the Milwaukee Sentinel in September 1993, shortly after the tunnel became operational, clearly make a distinction between expected control performance for CSO (1.4 per year after the tunnel is operational) and SSO (elimination).

### *What are the standards the deep tunnel is required to meet?*

The design standards for the deep tunnel are no separate sewer overflows (SSOs) and an annual average of 1.4 combined sewer overflows (CSOs). The permit standards for the MMSD wastewater system are zero SSOs and up to 6 CSOs annually. An explanation of tunnel permit and design standards is provided in Appendix B. It is important to note that during the original planning (WPAP), engineers recognized that there would be events of significant CSO volumes. Public attention from the May 2004 events has been focused on the magnitude of the overflow volume; however, it would be more appropriate to consider the significance of the SSO events which are not allowed by permit.

### *Is the deep tunnel meeting these expectations and standards?*

The deep tunnel falls short of public expectations for a very expensive project. It does, however, appear to be performing close to the technical objectives established during the design. To answer this question properly, it must be broken into two categories: CSO and SSO. The ability to meet CSO control objectives is largely determined by the weather, and more specifically how many large storm events occur during a given year. MMSD records indicate that the annual average for the 10 year operational history of the tunnel (1994 through 2003) is approximately 2.4 CSOs per year, which is higher than the estimated 1.4 per year. This includes a yearly high of 6 and a low of zero (shown in Figure 1). From this perspective, the tunnel has allowed MMSD to meet the permit conditions for CSO and control overflows to close to the design expectations. It is



## Final Recommendations and Performance Review of the MMSD October 1, 2004

important to note that the tunnel was not sized to contain total CSO volumes during heavy rains. In fact, during the original planning (WPAP), engineers estimated that there would be events of significant CSO volume (greater than 1 billion gallons).

As for SSO events, there are two primary causes: 1) tunnel-related, and 2) pipeline bottlenecks in the system. This discussion deals with tunnel-related SSOs. Even with the changes in tunnel operation protocols that improved the capture of SSOs after 1999, SSOs have occurred. This means the zero SSO permit requirement has not been met. The remaining question is whether this is because the tunnel was originally sized with insufficient capacity or if flows from the separate sewer area are greater than what was anticipated at the time of the WPAP. Further discussion of this question is provided below.

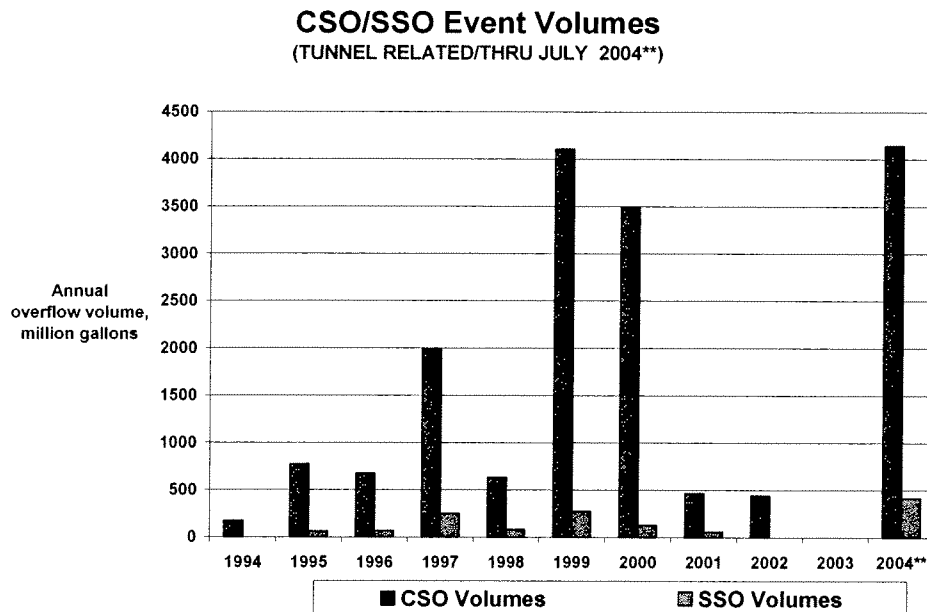


Figure 1. Tunnel-Related CSO and SSO Volumes Reported by MMSD Since 1994

### *If not, what are the reasons?*

Excess I/I appears to be a key factor. MMSD has the authority to order I/I remediation in local systems but has not exercised it. Their current approach is to use 2020 Facility planning for dealing with I/I. The DNR is seeking legal remedies against 28 communities for excessive flows.

During the May 2004 storms, about 13 percent (equal to 7.6 billion gallons) of the rain that fell on the MMSD separate sewer service area flowed into the sewer system. This is a significant amount. Even so, it is within the range experienced in the past five years (1999 through 2003). Over that five-year period, the amount of rain flowing into the

## Final Recommendations and Performance Review of the MMSD October 1, 2004

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separate sewer system ranged from 7 percent to 15 percent, with an average of 9 percent. This shows the May 2004 storms were not exceptional in terms of the percentage of stormwater entering the MMSD separate sewer system; however, the volumes were extraordinary. Appendix D provides further information on these calculations.

A comparison of these I/I percentages to the Seattle, Washington area separate system shows that the MMSD system has much more I/I. An analysis of a portion of the Seattle system showed the following:

- 1 to 2 percent I/I rate for a 1 year storm event.
- 2 to 4 percent for a 20 year storm event

A broader estimate for the entire separate system in Seattle indicated the I/I is in the range of 6 to 7 percent for the 20 year storm. All of these amounts characterizing the Seattle system show significantly less I/I than in the MMSD system.

What is just as telling is the comparison of separate sewer flow to combined sewer flow that enters the MMSD system. Over the past 5 years, the separate sewer system generated, on average, 64 percent of the wet weather flow. For comparison, during May 2004 storms, 66 percent of the wet weather flow originated in the separate sewer area. This means that the majority of total sewer flow during storm events originates in the separate sewer system.

Another reason is the difficulty in predicting the amount of tunnel volume to reserve for flow from the separate sewer area. This is particularly challenging in extended rainy periods such as May 2004. A post-event analysis performed for this audit indicated that if the entire tunnel had been reserved for SSO capture, the tunnel would not have filled completely. This action would have increased CSO volumes by approximately 800 million gallons. MMSD has several projects addressing this operating constraint, including contracting with a provider of long-range precipitation forecasts.

A Monday Morning Quarterback could criticize the MMSD for not reserving all of the capacity for the separate sewer flows; however, if this had occurred, as pointed out above the increase in overflow volume would have been approximately 400 million gallons. Also, if the rainfall had ended earlier, the tunnel would not have been fully utilized. In that event, the MMSD would have certainly been rebuked for not using the tunnel to reduce combined sewer overflows.

### **3.3. Relating to Other Communities with Combined Sewers**

*How does Milwaukee's situation compare to other similar sized communities with similar climate? What efforts have these communities made to reduce CSO's?*

The communities of Minneapolis, as well as St. Paul and South St. Paul, Minnesota, separated their combined sewers in the 1970s through the 1990s. Despite sewer separation, Minneapolis still experiences overflows in larger storm events, with the most active overflows spilling four times per year or more. A primary cause of this continued overflow activity is incomplete separation on private property that was deemed too expensive to tackle at the time. Minneapolis has recently initiated a downspout disconnection program that will require all homeowners to eventually disconnect from the system.

Chicago's system, operated by MWRDGC, includes approximately 400 square miles of combined sewer area. Chicago's most recent permit authorizes CSOs, but requires the system be able to convey and treat up to 10 times dry weather flows without a CSO occurring. This is consistent with Illinois state standards for CSO, which also requires CSOs to be treated in order to prevent sludge deposits, floating debris, and solids, and to prevent depression of dissolved oxygen levels below the applicable water quality standard. MWRDGC has no direct overflows to Lake Michigan, but in large flood events CSOs to the Chicago Sanitary and Ship Canal can discharge to the lake. The last such event was in 2002. The MMSD system performs at a higher standard than the 10 times dry weather flow standard, but would not meet the CSO treatment standard. Appendix F provides further discussion of the differing regulatory approaches to CSO and SSO discharges in the Great Lakes states.

The City of Detroit has a combined sewer area of 500 to 550 square miles, roughly 20 times the size of Milwaukee's. Detroit has implemented a \$1 Billion program for downspout disconnection to reduce combined sewer flows, CSO treatment to reduce overflow impacts, and containment of stormwater in the combined sewer area to reduce the need to overflow. A sewer separation study indicated that separation was not a viable option due to the cost and the negative impact of polluted stormwater runoff on water quality if it were removed from the sewer system. Detroit plans on constructing a deep tunnel which would be designed for 1 overflow per year and 200 MG of storage for the CSO. They are also investigating I/I concurrently to quantify if it is a cost effective solution.

*What has been their operational experience under similar rainfall conditions?*

The City of Detroit generally experiences the same weather patterns as Milwaukee, and has historically experienced up to 50 overflows per year for the combined sewer area. Based on our understanding of the Detroit system plan, overflows will occur more frequently in Detroit than Milwaukee, but most of these overflows will receive treatment.

## Final Recommendations and Performance Review of the MMSD October 1, 2004

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The State of Michigan requires treatment to consist of screening and disinfection at a minimum.

Chicago continues to implement its Tunnel and Reservoir Plan (TARP); however, overflows still occur. Records obtained from MWRDGC indicate that CSOs occurred at major discharge locations on 20 dates in 2004 thus far. MWRDGC has 145 permitted CSO discharge points. For comparison, MMSD has 117 permitted CSO outfalls.

### **3.4. Relating to Existing Plans at MMSD**

*What projects are currently developed and can/should they be accelerated?*

There are a number of projects currently being undertaken by MMSD and included in the Stipulation Agreement with the Wisconsin Department of Natural Resources. Current projects that will provide additional storage are:

- Northwest Side Relief Sewer (88 MG – complete in 2005);
- Port Washington Road Relief Sewer (up to 30 MG – complete in 2008);
- West Wisconsin Avenue Relief Sewer (25 MG – complete in 2009).

The Harbor Siphons project will also add capacity from the combined sewer system into the Jones Island Wastewater Treatment Plant. This capacity will allow MMSD to delay the discharge of combined sewer flows into the deep tunnel, thus preserving storage for separate sewer flows.

Acceleration opportunities are being sought by MMSD staff for Port Washington Road and West Wisconsin Avenue. It should be noted that MMSD organizational constraints can impede these project acceleration efforts. For example, MMSD's \$1.2 Billion Capital Improvement Program over the next six years exceeds the MMSD's capacity to do the work. A recent American Society of Civil Engineers (ASCE) peer review confirmed these project delivery constraints.

Current MMSD Commission policy requires a second Request for Proposals process to obtain final design services for both Port Washington Road and West Wisconsin Avenue projects. Changing this policy to allow amending the current preliminary engineering contracts to provide for final design services could save approximately six months for each project.

*How would these projects have affected the May storm events if they had been in place at that time?*

Based on an analysis of system operating data, it appears that these planned projects would have allowed MMSD and UWS to prevent tunnel-related SSOs during the May storm.

During the May storm period, MMSD was only able to use two of the three deep tunnel pumps due to an emergency construction project. The project was initiated to avoid a

catastrophic failure of the pumping system. If full pump capacity had been available during that event, one of the tunnel-related SSOs would have been avoided. The SSOs on May 23-24 would still have occurred, but would have been substantially less. There would have been virtually no reduction in the CSO volume reported, which at a reported 4.1 billion gallons is the largest portion of the May overflows.

*What additional projects would have had a substantial positive effect on the May 2004 overflows?*

Based on the analysis for this Audit, it appears that additional pumping out of the tunnel, beyond what is currently designed into the system, would have allowed MMSD to greatly reduce SSOs in May. This additional pumping would take advantage of treatment plant capacity that was available at certain times during the May storms. Some SSOs would still have occurred with this additional pumping, but CSO volumes would not have been reduced. Had additional storage and pumping both been implemented before the May 2004 events, tunnel-full SSOs could have been avoided, but CSO volumes probably would have been reduced only slightly.

MMSD has provided WDNR with a list of the SSO locations during the May storms and projects that will provide local relief for SSOs. Of the sixteen reported SSO locations, five are associated with either the Port Washington or Wisconsin Avenue Relief Sewer projects. Another three would be addressed by other projects already underway. Three more locations overflowed due to the tunnel being full and could potentially be addressed with more storage. There are no planned projects for the five remaining SSO locations, and further analysis will be required to address them.

### **3.5. Relating to Sewer Separation**

*Is sewer separation a viable option?*

Full separation is not a viable option for the following reasons:

- Untreated discharge of the stormwater resulting from separation would increase the level of pollution currently being experienced
- Disruption to the combined sewer area would be extensive during the extended construction period required for full separation.
- Cost of separation would be very great and not cost-effective when compared to the benefits.

Partial separation projects should be pursued where feasible when considering cost, disruption, and environmental impacts. Wherever partial separation is pursued, the first flush of stormwater pollutants should be delivered to a treatment system. The Appendix provides further details concerning the potential impacts of sewer separation.

*What would full separation cost?*

Estimates for full separation range from \$2.1 – \$2.7 billion (not including private property costs) in studies conducted for MMSD in 2000 and 2002. These costs did not include separation costs for private property owners' sewer improvements. In some instances these costs could be substantial and should not be overlooked when considering the full cost of sewer separation. The 2020 Facilities Plan team is performing a very thorough evaluation of separation costs and effectiveness that will include input from local construction experts.

*What would be the impact on water quality and flooding?*

Without proper stormwater treatment, sewer separation will cause a net increase in pollutants to area rivers and the lake. Untreated stormwater discharges would have a negative impact on water quality. The flooding impact of separation is unknown, but any further evaluations of separation should include the costs required to provide the same or better level of flood protection residents currently experience.

*How does sewer separation compare to other options?*

Sewer separation has not been shown as a cost effective option in many studies, especially when the cost of stormwater treatment is taken into account. Partial separation and CSO treatment should be pursued instead of full separation where shown to be viable and where it would provide significant environmental benefit.

**3.6. Relating to Eliminating Overflows**

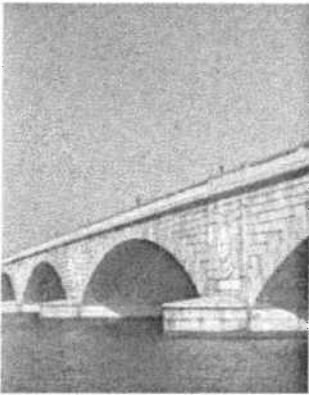
*Is achieving zero overflows from the entire collection system a realistic and desirable goal?*

It is a realistic and necessary goal for SSOs. A reasonable goal for CSOs is to reduce them and limit their impact. Tactics could include reducing runoff to combined sewers and treating CSOs. During this Audit, the Committee received considerable scientific input indicating that CSOs are not the major contributors to beach closures and other water quality problems. If proven to be correct with further study, it would be difficult to justify the cost to achieve zero CSOs. It is quite likely that significant water quality problems will remain even if overflows were eliminated.

**3.7. Relating to MMSD Management of System**

*How did MMSD management perform during these wet weather events?*

The joint decision making process between MMSD and UWS during tunnel events seems appropriate and effective. There is a strong commitment within MMSD to achieve optimum system operation. Since the tunnel became operational in 1994, MMSD and UWS have learned how to better operate the system to reduce and in some cases avoid overflows. The key decision in this operation relates to interpreting weather forecasts to anticipate when to close off combined sewer flows to the tunnel. While this decision is hampered by the availability of reliable long term rainfall forecasts, decision-makers appear to be doing a reasonable job of managing the system.



# Final Report

**City of Milwaukee, Wisconsin**

Analysis of the Sewer Maintenance Fund

October 12, 2010

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**LETTER OF TRANSMITTAL**

October 12, 2010

Mr. Timothy Thur, Chief Sewer Design Manager  
Mr. Mark Nicolini, Budget and Management Director  
Hon. W. Martin Morics, Comptroller  
City of Milwaukee  
200 E. Wells Street  
Room 603  
Milwaukee, Wisconsin 53202

**Re: Summary of Analysis of Sewer Maintenance Fund User Rates**

Gentlemen:

Springsted Incorporated was hired to perform a user rate analysis for the Sewer Maintenance Fund of the City of Milwaukee. This Study includes a review of the past performance of the fund, a determination of the adequacy of revenues in the Fund, and recommendations for future sewer and stormwater rates which reflect recent cost experience as well as anticipated capital improvement costs of the Fund. In addition to rate recommendations, recommendations for possible process and budget changes are included as part of our analysis.

We appreciate the opportunity to conduct the Analysis of the Sewer Maintenance Fund for the City of Milwaukee.

Respectfully submitted,

*Joel Pittelman*

Joel Pittelman, Vice President

maj

## 1. Executive Summary

This report was prepared to review the financial performance of the City of Milwaukee's current Sewer Maintenance Fund, ("SMF") and determine the appropriate sewer and stormwater rate structure and other revenue needed to adequately fund operations through 2016. The process included a historical review of the utility fund, the evaluation of the appropriate rate structures needed to fund operations over the planning period, a comparison of rates with other similar utilities, and recommendations regarding current budget practices.

In addition to the financial review and rate recommendations for the Sewer Maintenance Fund, the scope of work for this project included the reconciliation of the City's Comprehensive Annual Financial Report (CAFR) with the budget expense and revenue statements. The need for this reconciliation is to enable the managers of the Sewer Maintenance Fund to understand the reasons for differences between the budget documents and the City's CAFR.

The following conclusions were determined as a result of this study and our financial projections:

1. The Sewer Maintenance Fund as a whole shows historical operating revenues and expenditures have remained fairly stable over time.
2. Cash flow in the fund was insufficient to cover cash expenditures as a result of two circumstances relating to borrowing:
  - a. capital expenditures that are to be paid with borrowed funds exceeded new borrowing by \$36,771,000, and
  - b. the repayment of BANS that were previously issued. To cover this cash deficit, a series of three cash allocations in the years 2007, 2008 and 2009 totaling \$27,958,000 were made from the City's pooled cash to the Sewer Maintenance Fund.

These two items are symptomatic of the difficulty the budget staff encounters as it attempts to manage the financial condition of the SMF. What is an appropriate action for the execution of borrowing for SMF facilities may not be most appropriate for the cash management and budgeting of that Fund.

3. We recommend the Comptroller's debt management staff meet with the management of the Sewer Maintenance Fund on a semi-annual basis to review the status of the cash position in the Sewer Maintenance Fund and to discuss the financing of their capital improvements. As an adjunct to this recommendation, we further suggest that a more formalized process be developed by the Comptroller and the budget staff to estimate debt service costs for each upcoming budget cycle.
4. Our analysis of all prior bond issues for the sewer system indicates that the system of public bidding has produced very favorable interest rates and extraordinarily low costs of issuance in nearly every instance.

5. The use of short-term funding could be eliminated if it will assist in reducing confusion over the financial condition of the Sewer Maintenance Fund or the budgeting of the Fund's operations. This can be done by altering the procedure the City uses in drawing down funds from the state clean water loan program.
6. The reserves set aside in the sewer revenue bond program cannot be reduced as long as those revenue bonds are outstanding.
7. The use of revenue bonds carries some additional costs for the sewer system that could affect future sewer utility rates adversely. These costs could be offset by advantages realized by not having to use the City's limited general obligation issuing powers. A review of future borrowing needs for all City infrastructure improvements will be necessary to make a determination whether or not to use revenue bonds for sewer projects in the future.
8. All of the cash in the fund at the end of 2009 is restricted for debt service reserves. To provide more financial flexibility, the City should develop a policy regarding appropriate levels of unrestricted or operating cash that is held in the Sewer Maintenance Fund.
9. The City should maintain a minimum cash balance in the Sewer Maintenance Fund of at least three months of anticipated operating expenses, 50% of annual debt service, and legally required debt service reserves at the end of each year. If the City is prepared to promptly use general fund revenue to cover SMF deficiencies, this can substitute for some of these reserve requirements. However, the City should be fully aware that this action changes the self supporting nature of the sewer enterprise.
10. Sewer user rates and stormwater rates should be increased annually by 4.70% 2011 through 2015. These increases are needed to pay for anticipated operating and maintenance expenses, capital improvements, to provide sufficient cash flow for operations, and to maintain adequate cash reserves for future capital improvements.
11. We recommend the City establish the user rates for each utility fund for a three-year period and review them on an annual basis concurrent with the development of the following year's budget.
12. Three sensitivity analyses to show the impact on the projected rate increase caused by incorporating different, less favorable, assumptions into the projections. Three sensitivity analyses were performed as follows:
  - Capital expenditures are 20% greater than projected in the CIP
  - Operating expenditures increase at double the rate used in the previous financial projections
  - The cost of curb and gutter replacement is added to this fund

Of the three sensitivity variables evaluated, operating costs increasing at double the rate projected would require the most revenue at \$364.1 million over the planning period. Capital expenditures 20% greater than planned would require the second most revenues at \$363.1 million and adding the

cost of curb and gutter replacement to the fund would require the least at \$354.3 million.

These recommendations are based on information provided to us by City staff and used in our planning model (which has also been provided to the City). Therefore, the City will need to monitor the performance of each utility fund and make any necessary adjustments based upon its actual performance and on the actual construction costs of the anticipated capital improvements.

# Appendix D





# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Agenda FLOODING STUDY TASK FORCE

*ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS*

*Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin Shafer,  
Erick Shambarger, and Ken Yunker*

*Staff Assistant Tobie Black, 286-2232; Fax: 286-3456;  
tblack@milwaukee.gov*

*Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov*

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Thursday, February 24, 2011

10:00 AM

Room 301-A, 3rd Fl., City Hall

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1. **Review and approval of the minutes of the January 20th meeting.**
2. **Discussion of the relationship between stormwater management and sanitary sewer inflow.**
3. **Continued discussion of the Analysis of the Sewer Maintenance Fund.**
4. **Discussion of Sanitary Sewer Overflows.**
5. **Discussion of the future of the Combined Sewer System.**
6. **Set next agenda.**

Members of the Common Council and its standing committees who are not members of this committee may attend this meeting to participate or to gather information. Notice is given that this meeting may constitute a meeting of the Common Council or any of its standing committees, although they will not take any formal action at this meeting.

Upon reasonable notice, efforts will be made to accommodate the needs of persons with disabilities through sign language interpreters or auxiliary aids. For additional information or to request this service, contact the Council Services Division ADA Coordinator at 286-2998, (FAX)286-3456, (TDD)286-2025 or by writing to the Coordinator at Room 205, City Hall, 200 E. Wells Street, Milwaukee, WI 53202.

Limited parking for persons attending meetings in City Hall is available at reduced rates (5 hour limit) at the Milwaukee Center on the southwest corner of East Kilbourn and North Water Street. Parking tickets must be validated in Room 205, (City Clerk's Office) or the first floor Information Booth in City Hall.

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# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Minutes

### FLOODING STUDY TASK FORCE

ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS

Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin  
Shafer, Erick Shambarger, and Ken Yunker

Staff Assistant Tobie Black, 286-2231; Fax: 286-3456;  
tblack@milwaukee.gov

Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov

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Thursday, February 24, 2011

10:00 AM

Room 301-A, 3rd Fl., City Hall

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Meeting called to order at 10:06 a.m.

Roll call taken:

Present: Ald. Hamilton, Ald. Bohl, Gerry Novotny, Jeff Polenske, Erick  
Shambarger

Excused: Rep. Sandy Pasch, Kevin Shafer, Ken Yunker

Also in attendance:

Steve Jacquart, Intergovernmental Coordinator, Milwaukee Metropolitan  
Sewerage District

Mike Hahn, Chief Environmental Engineer, Southeastern Wisconsin  
Regional Planning Commission

Martin Aquino, Department of Public Works

Tim Thur, Department of Public Works

1. **Review and approval of the minutes of the January 20th meeting.**

*Correction to the minutes: On page 2 in the last paragraph, Mr. Hahn says that his comment regarding sewer backups was more directed towards the use of backflow preventers. Basement backups can equalize pressure and aid in preventing the collapse of basement walls, but backflow preventers can create an unequal pressure on basement walls, which can cause the walls to collapse. He said that this should be taken into consideration when installing these devices.*

*Mr. Polenske moved to accept the amendment and approve the minutes. Seconded by Mr. Shambarger. There were no objections.*

2. **Discussion of the relationship between stormwater management and sanitary sewer inflow.**

*Mr. Hahn gave a presentation on stormwater management and sanitary sewer inflow (please see the attachment to Common Council File 100665).*

*Ald. Bohl mentioned that in neighborhoods that experienced a great amount of flooding, downspouts that are connected to the sanitary sewer system are exacerbating the problem. Mr. Aquino mentioned that the city ordinance was changed to encourage people to disconnect the downspouts that connect to the system. Mr. Polenske said that there were pilot programs to encourage the disconnection of downspouts. He said that the vast majority of citizens that did not experience flooding did not want to disconnect their downspouts. Mr. Aquino said that the city encourages residents to disconnect downspouts and that it is not a good idea to have the downspout connected for various reasons, including the potential for a cracked pipe to allow leaks into the basement of the house.*

*Mr. Thur said that it is not legal to have the downspout connected. Mr. Aquino said that in some newer subdivisions, downspouts are not connected at all to the storm sewer system.*

*Ald. Bohl asked what is done in neighborhoods that were constructed in low level points and if there is a potential remedy to increase or improve the flow system. Mr. Polenske said that in many cases, there are a number of different options and part of the solution is trying to find a place to detain some of the flow and to then discharge it into a nearby waterway. There is a challenge finding a property on which to build a detention basin, particularly on county park property. The county is reluctant to allow the construction of a stormwater management facility and the members of the public that do not experience flooding do not want the park space used for stormwater management and not recreation.*

*Mr. Shambarger said that the office of Environmental Sustainability is exploring the possibility of using vacant lots that the community wants to use as public gardens as stormwater detention parks as well. He said that it would have to be designed in a specific way to allow the rainwater to be collected that would not damage the garden. Ald. Bohl suggested using half of a green lot for crops and the other half for a rain garden that could be utilized for the flow. Mr. Shambarger suggested bringing to a task force meeting people who are more involved in the use of vacant lots for public gardens to get their input.*

*Ald. Hamilton mentioned the bio-sweles that were built on N. 27th street for water retention and asked if the project was working, and if so, would it be expanded. Mr. Polenske said that the project is successful and is being expanded in other areas, including Grange Street.*

*Mr. Aquino added that other communities have placed water detention areas underneath parking lots and the water is recycled, but it requires an agreement with the owners of the properties and the funds to do the work. Mr. Polenske mentioned a Green Alley Project in the Southlawn area that uses the subsurface of the alley to detain stormwater instead of sending it directly to the sewer system. Mr. Aquino said that there are different techniques to do this, but the practice is expensive.*

*Ald. Bohl asked if a drainage system is needed underneath a driveway if the material on the driveway is porous. Mr. Aquino said that the topography of the area and type of soil are important and must be considered when determining the necessity of an under drain.*

*Ald. Bohl asked for information on the cost comparison between the type of material used for pavement in alleys and the type of material that is being used in Chicago for*

*Green Alleys. He asked staff to provide data on sources of funding and cost requirements.*

*Mr. Jacquart said that the city has looked into using a drop shaft that would send flow into the regional sewer system.*

### **3. Continued discussion of the Analysis of the Sewer Maintenance Fund.**

*Mr. Shambarger said that the administration is looking into penciling in a steady of budget of 35 million dollars for sewers. Ald. Bohl asked if the number was referring to the figure on page 29 of the analysis. Mr. Shambarger answered in the affirmative and also said that the amount does not include funding provided by the Milwaukee Metropolitan Sewerage District.*

*Ald. Bohl said that there needs to be education for property owners emphasizing that it is imperative on the part of the city to spend more money to remedy the problem of sewer overflows and basement flooding. He said that it is in the best interest of everyone to show that rectifying the problem is beneficial to the entire city. Mr. Shambarger emphasized showing the success of projects that the city has supported. Mr. Polenske said that there are two demonstration projects to help achieve this. The improvements made to foreclosed homes and a neighborhood in which all the public improvements that are needed have been performed and that will have improvements made to private laterals. Mr. Polenske said that a significant amount of outreach and education is needed.*

*Ald. Bohl asked if the city will need to increase fees annually for the Sewer Maintenance Fund. Mr. Shambarger said that the city is looking at a four percent increase annually because of the way the fund is financed and due to other cost pressures. If private property programs are expanded, Mr. Shambarger said that there is a question of what percentage of that work should be paid for by special assessments and what percentage should be paid for by the general public through fees. Ald. Bohl asked if it would be legal to create a special assessment for work that is done on private property. Mr. Shambarger answered that the state statutes indicate that special assessments could be applicable to laterals. Mr. Jacquart said that when dealing with laterals, it is legal to apply special assessments on private property. However, the consensus of the technical advisory team hosted by MMSD and consisting of engineers from the twenty-eight communities is that it should not be mandated that the homeowner pay a percentage of the costs. He said the team thinks that requiring homeowners to contribute will lead to lower levels of participation. Also, imposing a special assessment at a low level, such as fifty or a hundred dollars, would require administrative and legal requirements that would make it costly to even use the money that would be collected.*

### **4. Discussion of Sanitary Sewer Overflows.**

*Ald. Bohl asked about the expansion of the pump system. Mr. Jacquart said that the project at 59th and Trenton is being analyzed as to whether it should be expanded. He said that there may be five pumps installed, but they would only operate after the deep tunnel is filled.*

*Ald. Bohl asked if the pumps would be pushing sanitary flow into the stormwater system. Mr. Jacquart said that the outlet for the pumps is right at the river.*

*Mr. Novotny said that anytime untreated wastewater is discharged onto the raw surface of the ground or into a storm sewer or a watercourse, it is illegal. He also*

said that the Department of Natural Resources recognizes that there is sometimes no practical alternative and it is a judgment call in each circumstance. Mr. Novotny also said that MMSD has a permit that allows six combined sewer overflows per year. He also said that DNR is not referring every incident of sanitary sewer overflow to the Department of Justice. Each incident is analyzed and extreme events are taken into consideration.

Mr. Aquino said that all of the pumping stations are operational and that there are two private companies now maintaining and testing the pumps. He said that the pumping stations either send water to a pipe from MMSD called an MIS or to the storm sewer. Mr. Aquino also said that in some areas, the city is looking to direct the water to the storm sewer or the river instead of the MIS because it is not providing the outlet that the city needs. Mr. Jacquart said that pumps might be working at the beginning of a storm, but might be overwhelmed or disabled by lightning strikes. Mr. Aquino said that the city can speak to the Department of Natural Resources about getting more pumping stations, but originally, DNR did not want the pumps being used at all.

The committee requested seeing a graph illustrating where all of the 30 overflows occurred in the city at the next meeting.

Mr. Thur said that almost all of the overflows are tied to the large storm events and DNR counts every incident of overflow as a separate occurrence. Otherwise, there is not a great deal of overflows in any given year.

## 5. Discussion of the future of the Combined Sewer System

Mr. Aquino gave a PowerPoint presentation (please see the attachment to Common Council File 100665).

Ald. Bohl asked what determines where in the city the backwater incidents occur. Mr. Aquino said that it depends on the rainfall pattern and the intensity and duration of the rain.

Ald. Bohl brought up the separation of the Combined Sewer System. Mr. Jacquart said that some people believe that the separation of the sewer system is the most cost effective solution to sewer overflows and basement backups. He said that MMSD initiated a study of this option and determined that it would be cost prohibitive and that water quality would decline as a result. Mr. Aquino said that the cost would be three to four billion dollars to separate about 89 percent of the Combined Sewers. Mr. Thur said that the separation for the whole city would have to be designed at once and the laterals to each home would have to be reconnected. The city cannot just drop in a pipe underground. Mr. Polenske said that this approach would not immediately rectify the problem of basement flooding, which is what the city wants.

Mr. Thur said that before the deep tunnel went online, there were nearly 70 overflows per year. Now there are two or so overflows per year on average. If this was part of a stormwater system, the water would be going directly into rivers without being treated.

Ald. Bohl asked what storm water management practice available to the city would be the most cost effective and practical. Mr. Aquino said that the detention ponds would probably be the most effective because they have the greatest ability to solve the problems that are being created. Mr. Polenske said that the city must try to utilize green spaces in a different fashion and can create green spaces that can be used at all times except in the instance of a very heavy rain. Mr. Shambarger said that the drainage ditches that are being utilized at the Pabst Brewery could be incorporated

*more broadly into the redevelopment of streets.*

*Mr. Polenske said that all of the reduction practices are valuable and it is important to utilize as many practices as possible and there is no one practice that will solve all of the flooding problems.*

*Public Commentary:*

*Tim Ballering, Affordable Rentals, said that the practice of disconnecting downspouts was never publicized and that the Department of Neighborhood Services inspectors that inspect property do not know the city code well enough. He said that education is very important to inform people that disconnecting downspouts is effective and is allowed by the city. Mr. Thur said that the Department of Public Works works with property owners who are interested in disconnecting their downspouts, but DNS is primarily responsible for inspecting properties. He says that DNS was involved in changing the code and is aware of it.*

*Marty Well, citizen, asked if there was a correlation between the estuary of Lincoln Creek and the area of flooding outside of the combined sewer area. Mr. Hahn said that he could not answer the question in specific detail, but the flooding that occurred in the area in July was due to the unprecedented amount of water that was running off.*

*Angel Sanchez, Affordable Rentals, said that he is concerned about the cost of rain barrels and he said that creative ways should be found for hiring unemployed citizens to install rain barrels instead of a private company.*

**6. Set next agenda.**

*Pilot study on the I & I issue- including a representative from Brown and Caldwell  
Discussion of I & I program options- research of other communities by LRB  
Review and discussion of residential sewer lateral program analysis*

**Meeting adjourned at 12:16 p.m.**

**Staff Assistant Tobie Black**

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# Minor and Major Stormwater Management System Concepts

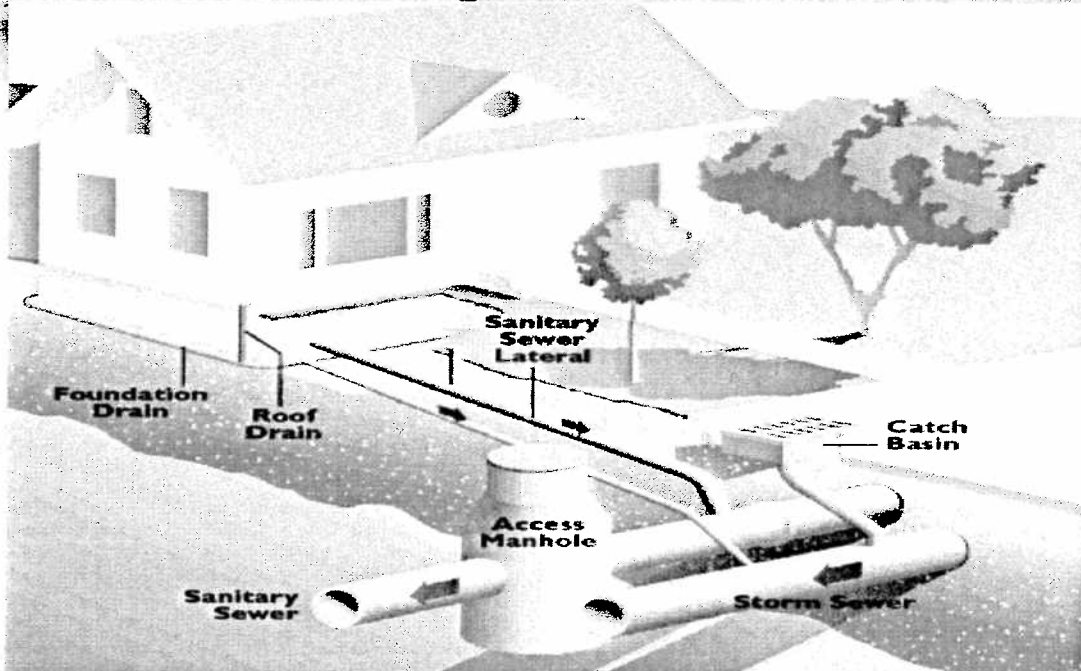
City  
of  
Milwaukee

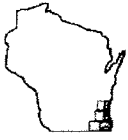


Presentation to City of Milwaukee Flooding  
Study Task Force  
February 24, 2011  
Michael G. Hahn, P.E., P.H.  
SEWRPC Chief Environmental Engineer

#155158

## Sanitary and Storm Sewer Systems





## Minor and Major Urban Stormwater Management Systems

### ➤ Minor System

- Operates frequently (Five- to 10-year design storm frequency)
- Designed to minimize inconvenience during small rainfall and snowmelt events
- Components:
  - Urban streets: Gutters, storm sewers
  - Rural streets: Roadside swales, culverts
  - Both: Detention basins, infiltration facilities, low impact development features



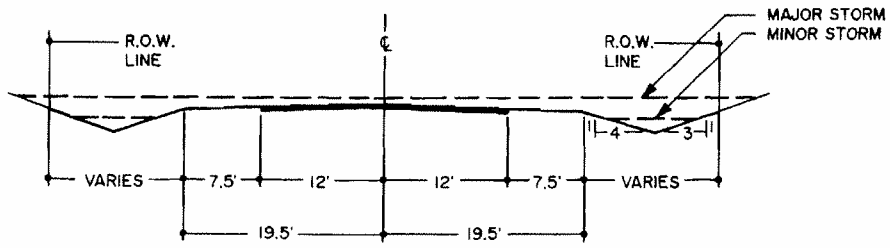
## Minor and Major Urban Stormwater Management Systems

### ➤ Major System

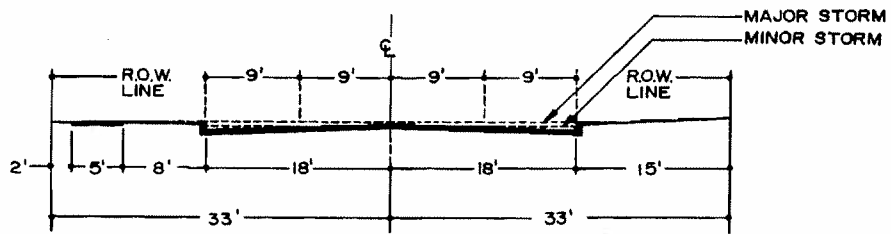
- Operates infrequently (100-year design storm frequency)
- Designed to avoid damaging inundation of buildings during large rainfall and snowmelt events
- Components (minor system components plus):
  - Urban and rural streets: Entire street cross section, major detention facilities, major open channels
  - Overland flow routes to receiving streams



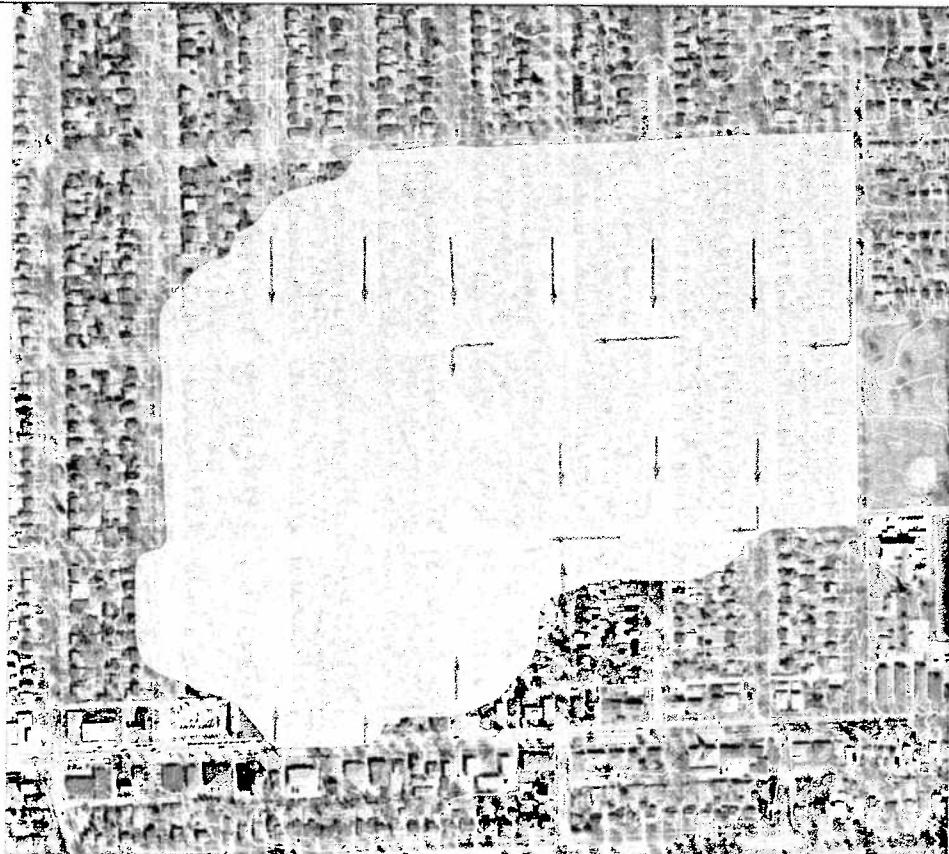
ROADWAY WITH ROADSIDE SWALE

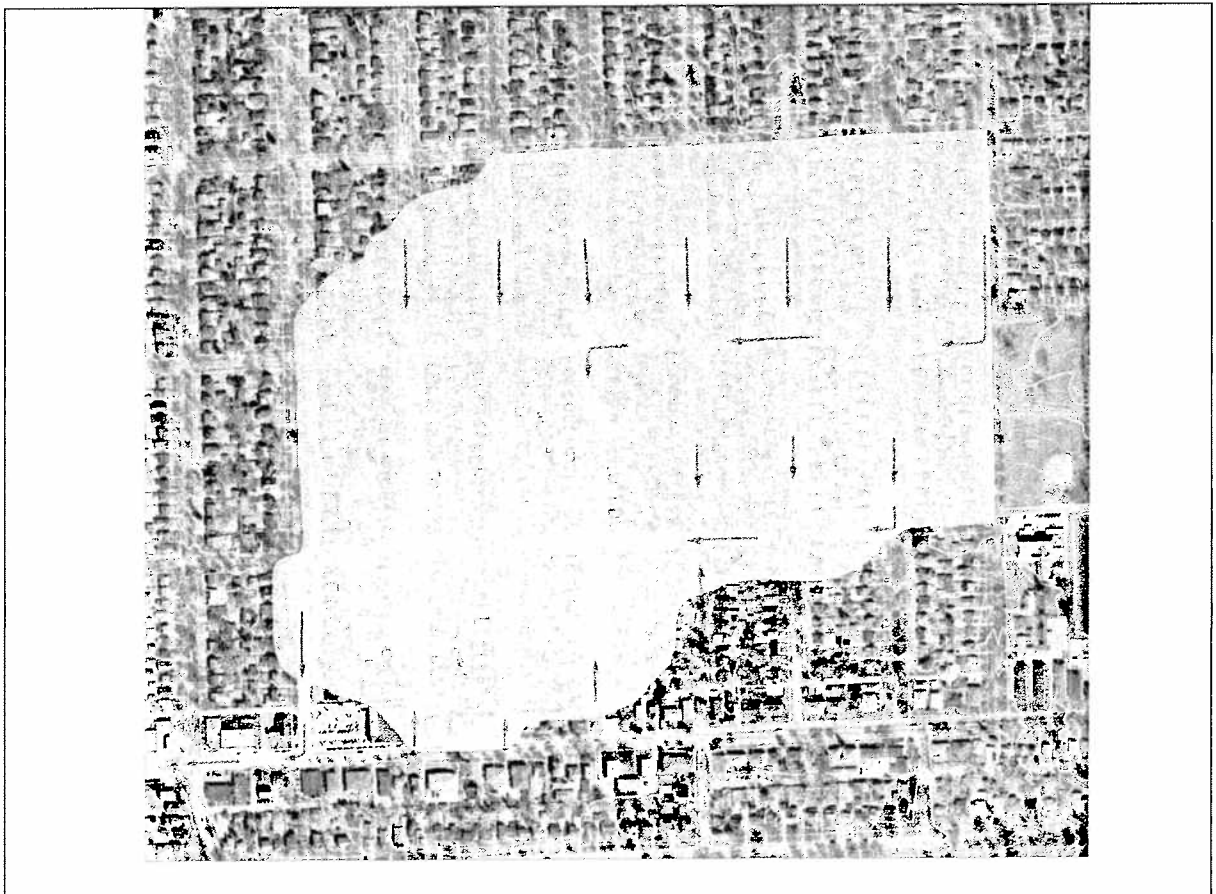
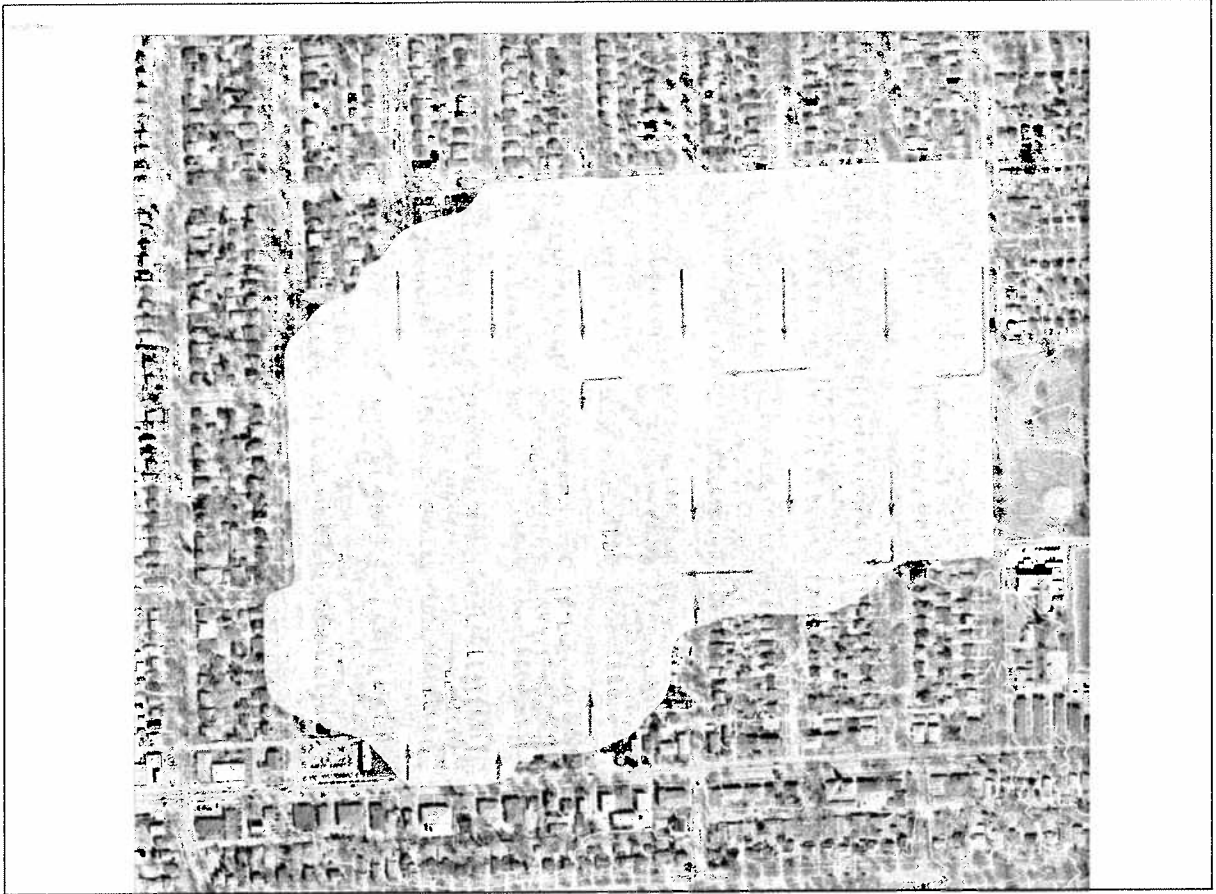


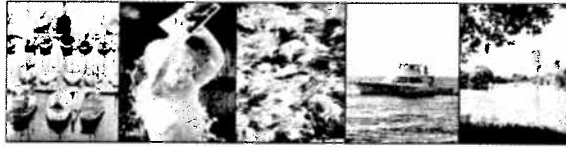
ROADWAY WITH CURB AND GUTTER



Source: City of West Bend and SEWRPC.







## Mayor's Independent Audit Committee Report On Questions Related to Milwaukee Metropolitan Sewerage District (MMSD) Operations

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Members of Committee:

Don Theiler, King County Wastewater Treatment Division

Tony Earl, Former Governor of Wisconsin

Theresa Estness, Mayor of Wauwatosa

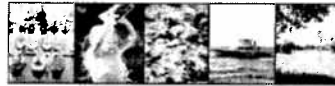
Nancy Frank, UW-Milwaukee, School of Architecture & Urban Planning

Ashanti Hamilton, Milwaukee Alderman

Wally Morics, City of Milwaukee Comptroller

RoseMary Oliveira, Citizen

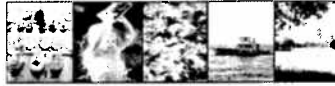
Milwaukee Flood Task Force  
January 20, 2011  
Response to Audit



## Basic Findings

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- Stormwater flows into the sewer system are excessive and must be reduced.
- Public expectations exceed current regulatory requirements and current performance.
- A collaborative region-wide effort which goes beyond the authority and geographic boundary of the MMSD service area will be needed to deal with issues.

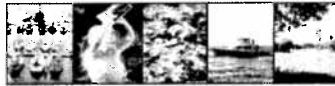


## Recommendations

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### 1. Reduce Stormwater Flow into System

- Separate System
  - Private Property I/I
  - Regional flood management
  - Stormwater best management practices
- Combined System
  - Private Property I/I
  - Regional flood management
  - Stormwater best management practices

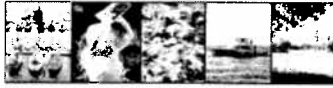


## Recommendations

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### 2. Implement Other Actions

- Construct projects on the drawing boards
  - DNR Stipulation Projects will be completed in 2011
  - Have initiated 2020 Facility Plan Projects
- Fast flow treatment where appropriate
  - Performed pilot studies in 2008 and are in test mode in 2011

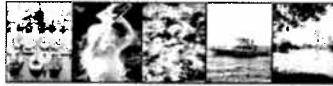


## Recommendations

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### 2. Implement Other Actions (cont'd)

- Reduce Blending
  - Response to recommendation 1 will assist with this
- Partial Separation
  - City of Shorewood is investigating this
  - City of Milwaukee has performed some initial separation

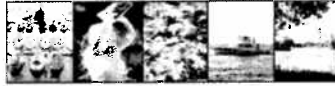


## Recommendations

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### 3. Provide Program for Financing

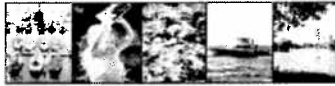
- I/I reductions where cost effective
  - 2010 Private Property I/I Program
- Institute excess flow charge
  - Technical Advisory Team discussions began in 2009, Milwaukee County ICC will consider in February 2011



## Recommendations

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4. Enforcement Needed
  - Eliminate illegal connections
    - Ongoing through work with municipalities
  - DNR should provide strong even handed enforcement
  - Ongoing, 2006 Stipulation with the municipalities



## Recommendations

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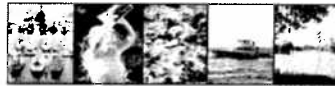
5. Non-point and Stormwater Control Requires Attention
  - Non-point source pollution
    - Greenseams<sup>SM</sup>
    - Water Quality Trading
    - Watershed Permitting
  - Stormwater control/Milwaukee region
    - Ongoing
  - Beaches
    - Bradford Beach revitalization



## Recommendations

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6. Public Information and Communication Needed
  - No single villain, no single cure - ongoing
  - Nature of the water quality problem - ongoing
  - SSO and CSO goals and impact - ongoing
  - Nature of I/I and control goals - ongoing
  - Non-point source and stormwater pollution goals - ongoing



## Recommendations

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7. United Water Services and MMSD Management Recommendations
  - UWS – addressed with 2008 Veolia Contract**
    - Succession planning needed
    - Improved maintenance
    - Overflow incentives
    - Technical Environment Committee
  - MMSD - ongoing**
    - Establish Priorities for projects
    - Ensure process and resources available
    - Continue strong outreach program
    - Use authority to implement I/I program



## Recommendations

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### 8. A Regional Watershed Approach Needed

- Collaborative program to reduce stormwater flows into system (I/I control) - ongoing
- Non-point/Stormwater control program - ongoing
- Specific measurable water quality goals
  - Total Maximum Daily Loads (TMDL) – to be initiated in 2011
- WDNR participation and resources - ongoing



# Department of Public Works Environmental Engineering Section

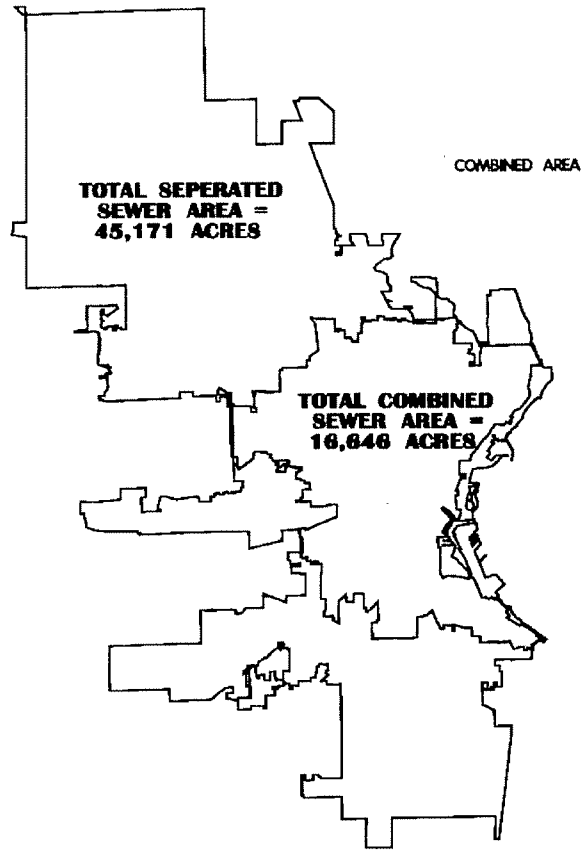


City of Milwaukee  
and  
Efforts to Reduce Flow in the Combined Sewer Area  
**FLOODING STUDY TASK FORCE MEETING**  
Thursday, February 24, 2011

## City of Milwaukee Sewers

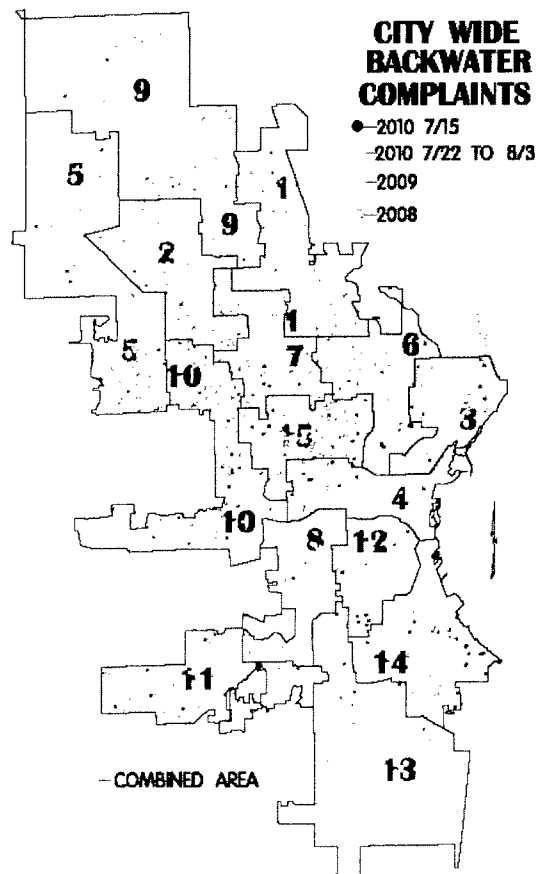
	Total Miles	Years Old		
		0 to 50	51 to 90	> 90
Combined	547	252	110	185
Sanitary	939	396	536	7
Storm	960	371	583	6
Grand Total	2,446	1,019	1,229	198

- The combined sewer area is located in Milwaukee and Shorewood
- Approximately 26% of the City of Milwaukee is located in the Combined Sewer Area



City of Milwaukee, Environmental Engineering

- The majority of backwaters reported in the July 2010 storms were in the separated area



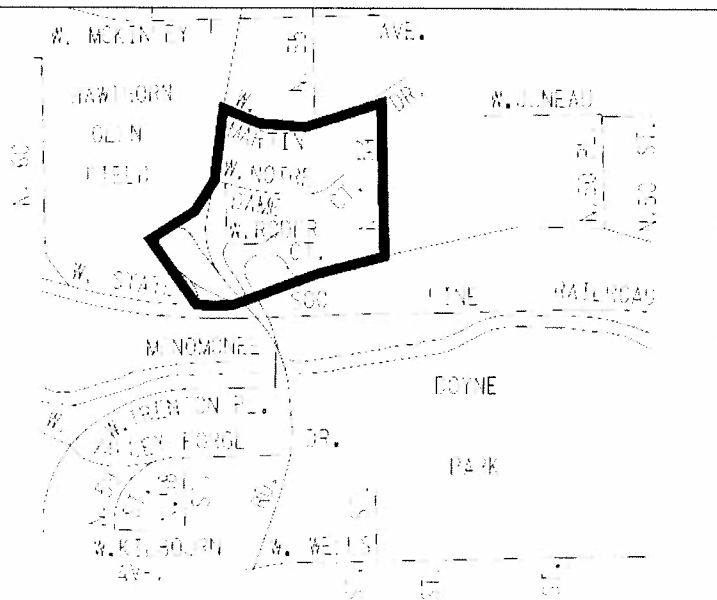
City of Milwaukee, Environmental Engineering

# Washington Park Sewer Separation Project

- Storm Sewers were constructed in certain locations in the area bounded by: N 35<sup>th</sup> St to N 55<sup>th</sup> St from W Locust St to the Menomonee River
- A 13-foot diameter sewer and a 8 by 9 foot double box sewer were constructed
- Storm sewers carried roadway drainage only
- Houses and lots still drain into the combined sewer

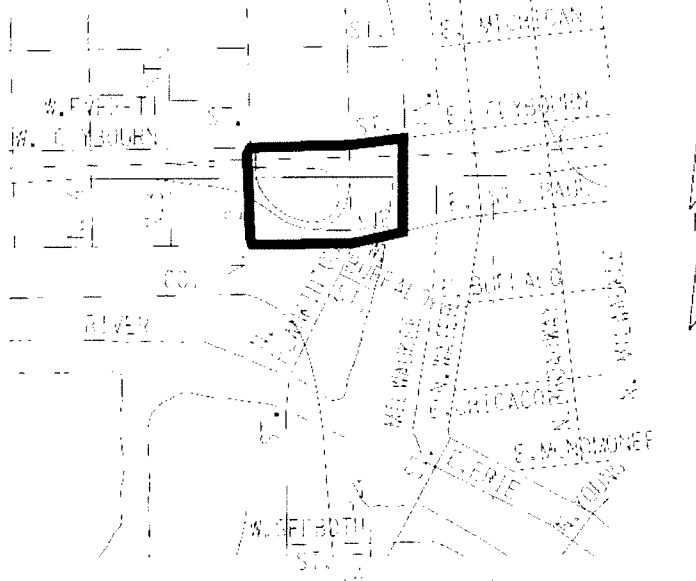


- A new storm sewer was constructed in N Hawley Rd to the Menomonee River to convey existing separated sewers



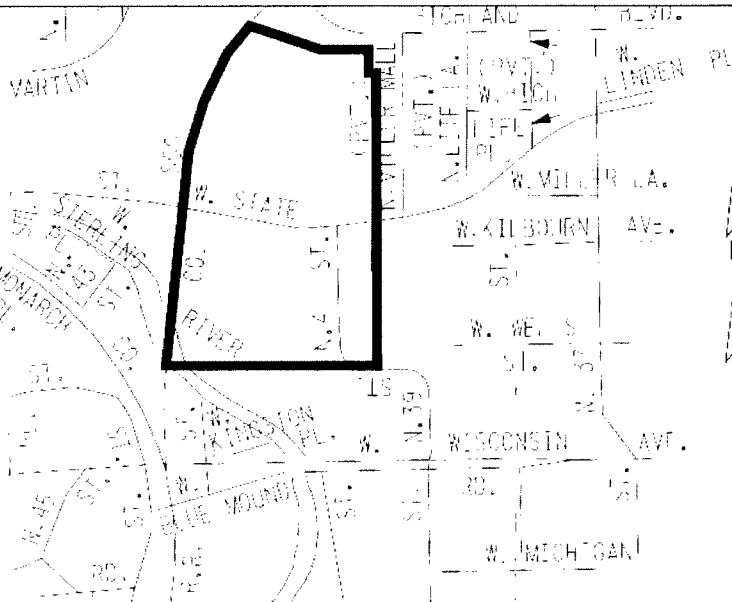
**N. HAWLEY RD.  
W. STATE ST. TO W. MARTIN DR  
SEPARATION**

- Combined Sewers in N Plankinton Ave were replaced with sanitary and storm sewers
- Storm flow was diverted from the combined sewer to an existing storm sewer



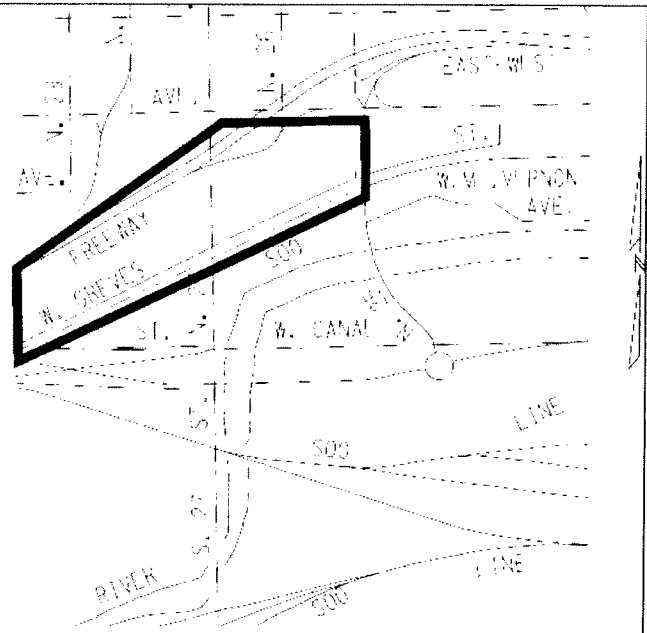
**N. PLANKINTON AVE.  
W. ST. PAUL AVE. TO W. CLYBOURN ST.  
SEPARATION**

- Storm Flow was diverted into the Menomonee River at N 41<sup>st</sup> St
- A 76 by 48 inch storm sewer was constructed

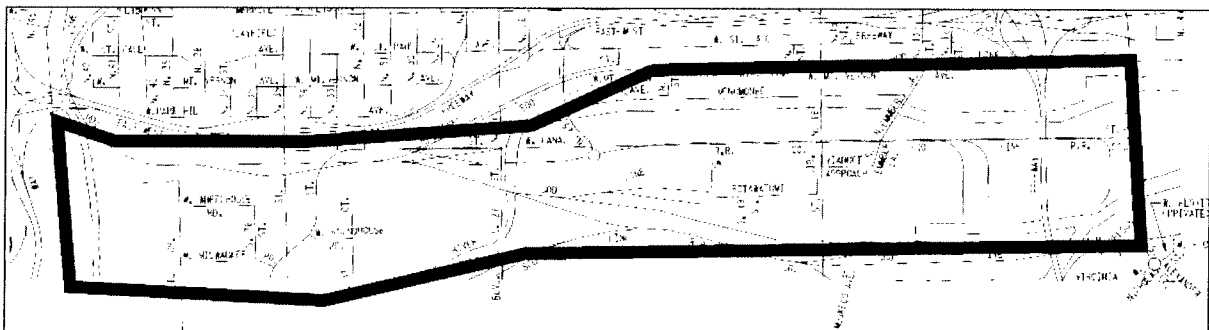


**W. STATE ST.  
AT N. 41ST ST. TO MILWAUKEE RIVER  
SEPARATION**

- Storm sewers were constructed to convey additional street drainage
- Storm flow was diverted from the combined sewer to an existing storm sewer



**W. GREVES ST.  
N. 25TH ST. TO N. 30TH ST.**



**W. CANAL ST. (MENOMONEE VALLEY)  
S. 6TH TO S. 44TH ST.  
SEPARATION**

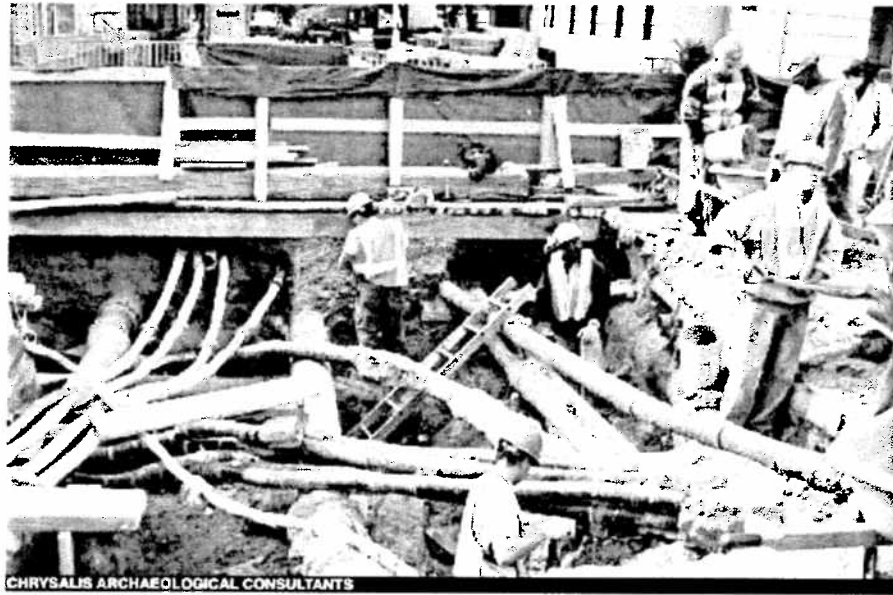
- Sanitary and storm sewers were constructed
- Multiple storm sewers discharged into the Menomonee River
- Several new developments have been constructed in this area

# Difficulties in Separation

- Large storm sewers will need to be constructed to a waterway outlet
- Roadway Construction would have a negative impact in the downtown area and to businesses
- Private plumbing would need to be modified to separate the flow
- NR 151 Storm Water quality standards set by the DNR for 40% total suspended solids (TSS) removal would not be met
  - \$2.0 million is spent for every 1% of TSS removed from the storm system
- Additional storm water treatment devices will still need to be installed

# Separation Totals

- Since 1968 the City has removed nearly 760 Acres from the Combined Sewer



City of Milwaukee, Environmental  
Engineering

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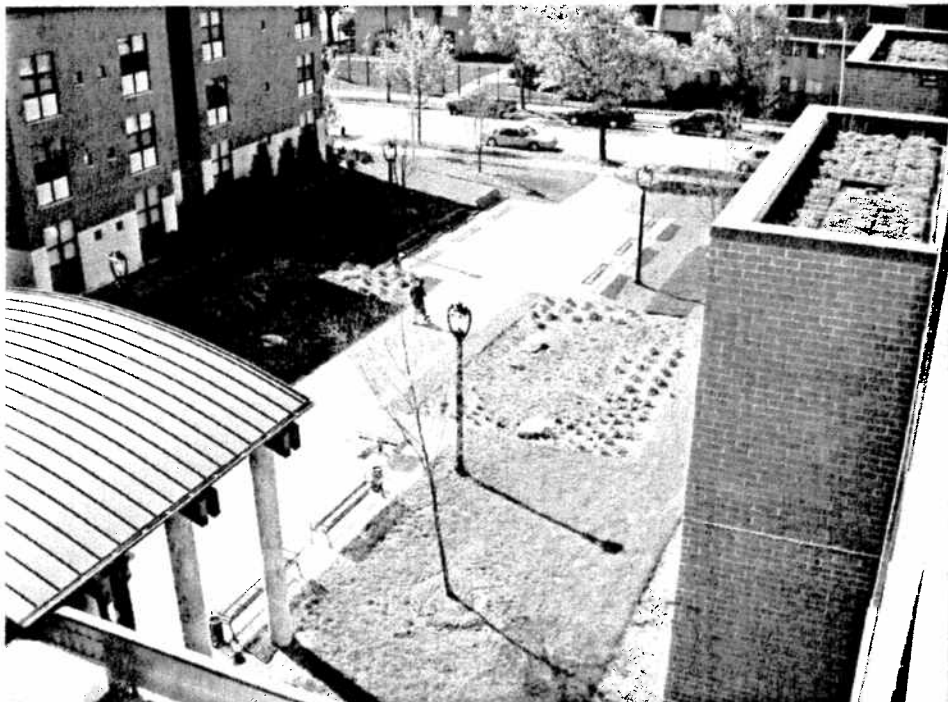
Based on MMSD's 2020 Facilities Plan,  
Chapter 9A, it would cost \$3-4 billion  
dollars to separate 89% of the Combined  
Sewers

14

# Stormwater Management Plans

- All new developments in the City are required to complete a Storm Water Management Plan (SWMP) if the development results in one acre or more of disturbance or an addition of one half acre of new impervious surface.
- 1156 SWMP's submitted to the City since 1993 covering private, County, State and City owned properties
- The submitted SWMPs comply with both City of Milwaukee Chapter 120 and MMSD Chapter 13
- Since 2006 all developments are required to reduce flows by 10%
- Since 1993 93 SWMP's were submitted for projects located in the combined sewer area covering a total area of 400 acres
- City requirements are more strict than MMSD and the DNR

## Highland Gardens Development





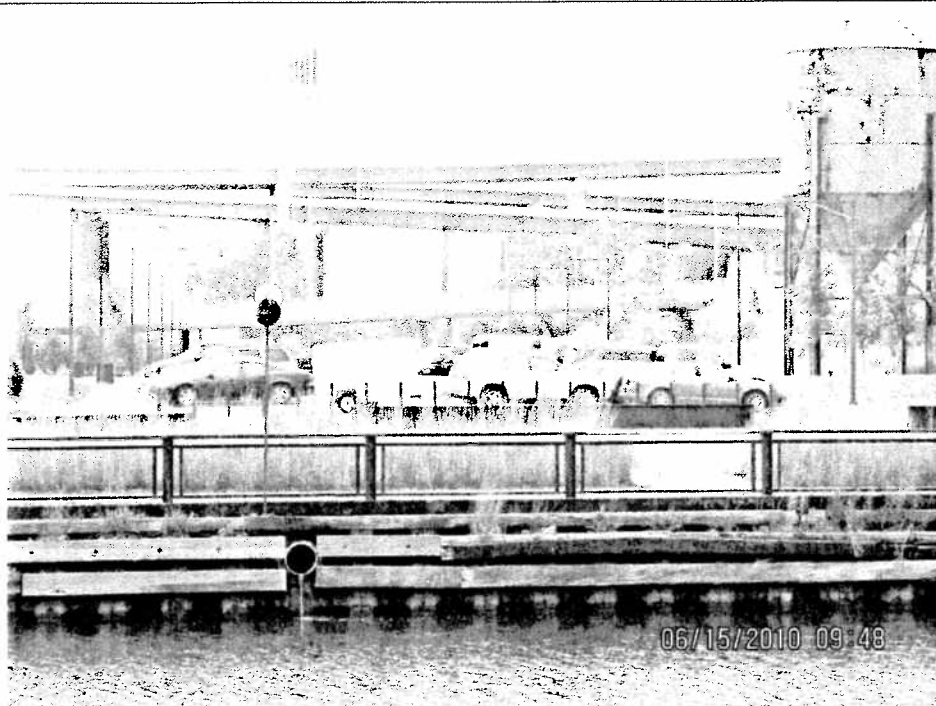
As a result of Best Management Practices (BMP's) during a 100-year rain event 250,000 gallons, and during a 2-year rain event 100,000 gallons are eliminated from the combined sewer

17



Bio-Retention Facility at 35<sup>th</sup> and Canal

18



All developments adjacent to the River are required to discharge their storm water to the river  
(Harley Davidson Museum Parking Lot)

19

## Flow Reduction Practices

- Bio-retention
- Detention Ponds
- Pervious Pavements
- Rain Gardens and Barrels
- Downspout Disconnection
- Green Streets
- Green Roofs
- Inlet Restrictors

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# Rain Garden

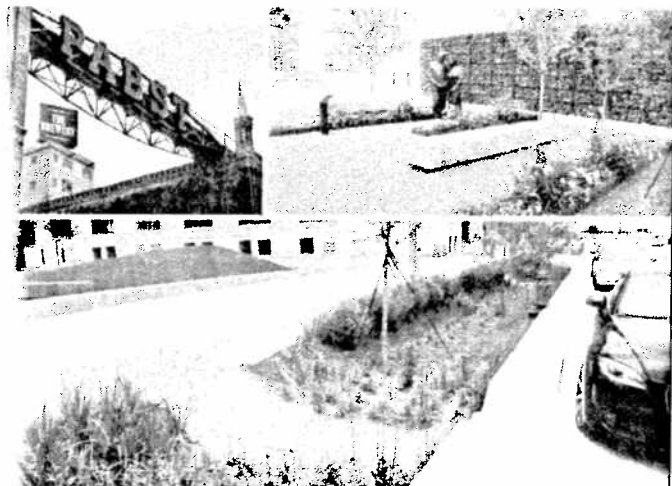


City of Milwaukee, Environmental  
Engineering

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## Private Projects in the Combined Sewer Area since 2006

- Pabst Brewery – N 8<sup>th</sup> and I-43
- Harbor Front Condo – S Milwaukee St
- North End – N Water and Lyon



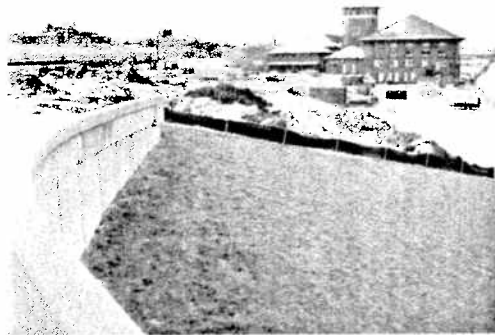
These projects have incorporated Stormwater  
Management and separation

City of Milwaukee, Environmental  
Engineering

22

## Private Projects in the Combined Sewer Area since 2006

- Beer Line – N Commerce Street
- City Lights – N 25<sup>th</sup> and St Paul
- The Edge – N Commerce St.
- Reed Street – Will be constructed with separate sewers



City of Milwaukee, Environmental  
Engineering

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## Green Roofs in the Combined Sewer Area



Convent Hill



Rockwell Automation



MMSD's Seeboth Street Building



Highland Gardens Development

City of Milwaukee, Environmental  
Engineering

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## Additional Green Roof Locations

- Central Library at 816 W Wisconsin Ave
- Olga Village at 7<sup>th</sup> and Washington
- Cherry Court Development at 18<sup>th</sup> and Cherry
- Hillside Family Resource Center at 7<sup>th</sup> and Cherry
- Community Services Building at 6<sup>th</sup> and Reservoir
- City of Milwaukee 809 Building



Green Roof projects eliminate storm flow from the combined sewer

City of Milwaukee, Environmental  
Engineering

25



**Department of Public Works**  
**Environmental Engineering Section**



## Questions

City of Milwaukee, Environmental  
Engineering

26





Separate Sewer Overflows Recorded by the MMSD									
Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
Annual Volume (MG)	0.598	0.090	476	0.000	1.11	0.096	686	56.8	327
No. of Events Annually	3	1	6	0	3	2	2	4	4





# Appendix E





# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Agenda

### FLOODING STUDY TASK FORCE

*ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS*

*Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin Shafer,  
Erick Shambarger, and Ken Yunker*

*Staff Assistant Tobie Black, 286-2231; Fax: 286-3456;  
tblack@milwaukee.gov*

*Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov*

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Thursday, March 10, 2011

10:00 AM

Room 301-A, 3rd Floor, City Hall

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1. **Review and approval of the minutes of the February 24th meeting.**
2. **Discussion of inflow and infiltration program options, including the practices of other communities.**
3. **Review and discussion of the residential sewer lateral maintenance program analysis.**
4. **Overview of the Department of Public Works' infiltration and inflow pilot study.**
5. **Set next agenda.**

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# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Minutes

### FLOODING STUDY TASK FORCE

ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS

Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin  
Shafer, Erick Shambarger, and Ken Yunker

Staff Assistant Tobie Black, 286-2231; Fax: 286-3456;  
tblack@milwaukee.gov

Legislative Liaison Aaron Cadle,  
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Thursday, March 10, 2011

10:00 AM

Room 301-A, 3rd Floor, City Hall

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Meeting called to order at 10:11 a.m.

Roll call taken:

Present: Ald. Bohl, Gerry Novotny, Jeff Polenske, Kevin Shafer, Ken  
Yunker

Excused: Ald. Hamilton, Rep. Sandy Pasch, Erick Shambarger

Also in attendance:

Andy Lukas, Brown and Caldwell  
Martin Aquino, Department of Public Works

1. **Review and approval of the minutes of the February 24th meeting.**

*Mr. Aquino requested the following changes to the minutes:*

*In Item 2, paragraph 3, the sentence should be "in SOME newer subdivisions the  
downspouts are not connected." Instead of Sanitary it should be Storm in the same  
sentence*

*In Item 4, in paragraph four, fourth line, the minutes should say that the city is looking  
to direct the water to the storm sewer or to the river.*

*In Item 5, paragraph five, second sentence, the statements were in reference to  
stormwater management.*

*In Item 5, last paragraph, Mr. Aquino said that the comments about rain barrels  
should be taken out as the issue being discussed was foundation drain  
disconnection.*

*Mr. Novotny requested the following change be made to the minutes:*

*In Item 4, page 4, third line from the top, the minutes should say that six combined SEWER OVERFLOWS are allowed per year.*

*The minutes were approved as amended.*

**2. Discussion of inflow and infiltration program options, including the practices of other communities.**

*Individual appearing:*

*Andy Lukas, Brown and Caldwell*

*Mr. Lukas gave a PowerPoint presentation (please see Common Council file#100665) about inflow and infiltration programs being used in various cities.*

*Mr. Lukas said that programs were driven by a need to reduce basement backups and sanitary sewer overflows in the community. He said that there are many variations and examples beyond the programs featured in the PowerPoint, but the ones featured offer good descriptions of what programs are available.*

*Ald. Bohl asked if a backflow prevention valve, while it may be of some benefit to a private homeowner, does nothing to alleviate the inflow and infiltration problem and may only prevent additional water from entering the basement. Mr. Shafer said that MMUSD's program does not pay for backflow prevention valves because they do not help prevent inflow and infiltration.*

*Ald. Bohl also asked if a backflow prevention valve might not prevent water from entering a basement. Mr. Shafer said that this could be the case. He said that if there is a disconnected downspout and a backflow prevention device installed, if a lot of water is coming into the sewer pipe from the property, there could still be basement backups. Mr. Polenske said that another possible concern is if one homeowner is putting in a backflow prevention device, it may shift the flooding problem to another homeowner.*

*Regarding the Stege Sanitation District in California, Mr. Lukas said that the initial program was a point of sale program to address the part of the lateral that was in the public right of way. It is now being expanded to address the entire lateral. He said that there was not a lot of local press about the program, but on realtors created pages on their websites to inform homeowners about the program. Mr. Shafer added that there was a federal consent decree from the Environmental Protection Agency in this situation.*

*Regarding the program in Miami-Dade, Florida, Ald. Bohl asked how the air pressure test is administered and Mr. Lukas explained the process. He also said it is common for an air pressure test to be done at the time of construction. Mr. Shafer said that the air pressure test would not be as effective for older housing stock because the pipes are not intact enough, but the test might be more effective after lateral repair to make sure everything is secure.*

*Ald. Bohl asked what a reasonable cost would be for the core work of foundation drain disconnections. Mr. Lukas said that he likes the Duluth program because the city has worked with contractors to establish reasonable costs and pay scales for the required work. He said that the costs in Duluth are around 2,000 dollars to do the disconnections of wholesale areas where the foundation drains have a connection to*

*the sanitary sewer. Mr. Lukas said that any cost estimate would be site specific.*

*Mr. Lukas said one of the lessons learned from the various programs is that communities that have used a financial incentive for the homeowners' participation have been able to stretch their dollar effectively.*

*Mr. Polenske asked if any of the communities have a formal report that measures the improvements. Mr. Lukas said yes and mentioned that an analysis of the Duluth program had been done a number of years ago to determine what kind of reductions were occurring as a result of the foundation drain work. He said the analysis showed a dramatic reduction in flows and it showed that there was a tremendous cost savings by doing the foundation drain disconnection work.*

*Mr. Yunker asked if there has been a similar report that tracks how many basement backups have occurred since the work. Mr. Lukas said that he believes that Duluth does make reports on this data, and that he could look into it.*

*Mr. Yunker said that he would not call programs in which there is a penalty for not participating as having financial incentives. Mr. Lukas said that since that part of infrastructure is the responsibility of homeowners and their asset, the homeowners could have been required to do the improvements on the own instead of with the help of the city.*

*Ald. Bohl asked Mr. Lukas: if the city of Milwaukee were looking into using funds from the sewerage district and supplementing them to devise a program to reduce infiltration and inflow, particularly geared toward reducing basement backups, what would Brown and Caldwell suggest as the most cost effective programs? Mr. Lukas said that foundation drains potentially could be a huge source of flow into the system. Illegally connected downspouts also need to be found and disconnected and that laterals can be a significant source of flow into the sewer system. He recommended prioritizing activities in areas that are bringing significant amounts of flow into the sewer system. He added that trying to do things as comprehensively as possible in these areas is best so that a flow that is removed from a lateral does not migrate to another area.*

### **3. Review and discussion of the residential sewer lateral maintenance program analysis.**

*Mr. Aquino gave a PowerPoint presentation (please see the attachment to Common Council File #100665) discussing the analysis from the LaFollette School of Public Affairs (also attached to the file). The study was done to look at the inflow and infiltration in Milwaukee and what the city's options are to address it. The task force discussed the recommendations of the school.*

*Ald. Bohl asked if the statement that city staff believes that the program would be inequitable to homeowners who do not have damaged laterals is the opinion of city staff members about the school's recommendation. Mr. Aquino said that the statement was added because the program analysis did not factor in the inequity of the program. Ald. Bohl brought up the possibility of a flat fee that will incentivize the program. According to Mr. Polenske, there is a benefit to each property owner even if their property is not affected by basement backups. The challenge is to design a program in which property owners are willing to participate. Property owner participation is often influenced by the amount that property owners are asked to pay.*

*The task force discussed a variety of mechanisms for paying for the required work. Mr. Polenske said that the city has funded and performed some demonstration*

projects in order to demonstrate to the public the importance and effectiveness of the improvements. In the future, a determination of a financing plan for a long-term program would have to be established with the help of the Budget Office. In the short term, the goal is to better educate the public as to what the program can provide to the community. Ald. Bohl said that the task force is charged with recommending not only a cost effective approach to remedying I & I, basement backup issues and overflow issues, but also to propose a method of financing the recommended remedy.

Mr. Shafer away from the table at 11:45 a.m.

Ms. Brengosz presented a memo providing information on private sewer lateral insurance (please see the attachment to Common Council file #100665).

Ms. Brengosz said that she was able to find four companies that provide utility insurance for municipalities and water utilities. The companies just provide for catastrophic coverage. She said that one company, Utility Service Partners, is endorsed by the National League of Cities and is very open to providing products that address the inflow and infiltration issue that the city is experiencing. The company could potentially come up with a schedule of lateral replacement as well as other options, and the company would expect that the city would make the insurance coverage mandatory.

Ald. Bohl said that the LaFollette School recommended the program used in Pittsburgh and Davenport, Iowa. But he said that he had doubts that a program which charges a nominal monthly fee for financial assistance with lateral repairs would sustain the level of funding needed if the city mandated a certain level of repair and replacement.

Ms. Brengosz said that the best strategy is to clearly define what the city is trying to accomplish and determine what the parameters are. She said that there are brokerage services that will match up municipalities with insurance companies that provide appropriate services or will build a plan based on what the city needs. She said that the city should keep an open mind as to what is available.

#### **4. Overview of the Department of Public Works' infiltration and inflow pilot study.**

Mr. Aquino presented a PowerPoint presentation (please see Common Council File#100665)

Ald. Bohl asked why the cost of the demonstration project is \$95,000. Mr. Aquino said that for sewer mains the cost of lining averages \$40 per foot, but lining laterals is three times the cost of lining a main. He said that the cost of lateral lining may go down as the number of contractors who do the work increases.

Mr. Lukas said that market forces will determine how much lining laterals costs.

Ald. Bohl asked what the purpose was of Duluth having large scale lateral lining. Mr. Lukas said that it was to reduce inflow and infiltration. In their program, observable infiltration is sufficient for seeking the lining of laterals.

Ald. Bohl said that smoke and dye testing had been utilized by the city. Based on the result of the testing, he asked what percentage of homes were required to have the work done. Mr. Aquino said that 60-70 percent need some lateral improvements. Unless there is a broken pipe, the city is not aggressive about ordering laterals



*repaired.*

*Mr. Lukas said that the program in Florissant is administered by a private company, not the city.*

*Ald. Bohl said that he wants to focus on downspout disconnection for the next meeting.*

**5. Set next agenda.**

*Next meeting will be March 24th.*

*Further Discussion of I & I Pilot Programs*

*Discussion of downspout disconnection- overall cost of program, programs run by MMSD and costs to property owners per downspout, how many homes were targeted, etc.*

*Additional foundation drain options.*

**Meeting adjourned at 12:22 p.m.**

**Staff Assistant Tobie Black**



# Summary of Other Municipal Private Property I/I Reduction Programs

Andy Lukas, PE

Brown and Caldwell, Milwaukee, WI



## Summary of Other Municipal or District Programs

- 8 examples showing variety of programs
- Most programs driven by need to reduce basement backups and SSO's
- Some programs included in consent orders
- Mix of municipal and districts
- Many other examples and variations

## **Definitions of Acronyms**

- BB: Basement Backup
- BFP: Back Flow Prevention
- CCTV: Closed-Circuit Television
- CSO: Combined Sewer Overflow
- DD: Downspout Disconnection
- FDD: Foundation Drain Disconnection
- HO: Homeowner
- PPII: Private Property Infiltration and Inflow
- ROW: Right-of-Way
- SSO: Sanitary Sewer Overflow

## **General Observations**

- All programs reported reduced:
  - Flows
  - SSOs
  - Basement backups
  - Service calls
- Most programs do not include pay for basement backup prevention devices
  - Many programs geared towards reducing basement backups

## **Duluth, MN**

- **Work performed:** Initially FD disconnect. Now lateral rehab/replacement
- **Cost share:** Initially full cost by City. Now City pays \$2150 for FDD and 80% of lateral work up to \$4000
- **Work:** Initial FDDs by HO (3 quotes). Later City bid out groups of FDDs. Now back to HO responsible but must use approved contractors.
- **Extent of program:** City-wide, but focused in priority areas
- **Incentive:** Homeowner charged \$50/month if inspection refused, \$250/month if required work is refused

## **Location: Aberdeen, WA**

- **Work performed:** Initially focused on lateral, now focusing on inflow sources
- **Cost sharing details:** HO pays for all work; city offers \$300 incentive; failure to fix issue results in doubling sewer bill
- **Work performance:** HO performs work and applies for credit
- **Extent of program:** 380 properties
- **Other comments:** Smoke testing used to identify inflow sources. Work included in consent decree

## **Location: Canton, OH**

- **Work performed:** downspout disconnection; backwater preventers
- **Cost sharing details:** HO paid for DD; Utility paid 100% of BFP
- **Work performance:** DD by HO; City pays cost of BFP work, HO has contract w/ City
- **Extent of program:** HO request, must have had 3 BB
- **Other comments:** As required by permit, Canton reports to State annually on SSOs and sewer backups (WIBs), including locations and causes

## **Location: Florissant, MO**

- **Work performed:** Lateral repairs
- **Cost sharing details:** Lateral insurance program, HO pays \$50 annual fee to participate, opts in through application
- **Work performance:** Performed by City contractor
- **Extent of program:** 11,640 participants
- **Other comments:** Not an I/I reduction program, provides insurance for HO, in case lateral has a failure. Part of a regional initiative by St. Louis MSD.

## **Location: MWWSSB – Montgomery, AL**

- **Work performed:** Lateral repair and replacement
- **Cost sharing details:** MWWSSB pays for work in public ROW, HO outside ROW
- **Extent of program:** 6,543 laterals
- **Lateral definition:** HO owns entire lateral, but MWWSSB will pay for work on portion in ROW
- **Includes backup prevention:** No
- **Other comments:** MWWSSB actively pursuing problem laterals. Smoke test used to identify issues with lateral and inflow connections. HO shown CCTV evidence of problem. Water service will be shut off if compliance is not achieved.

## **Location: Stege SD, CA**

- **Work performed:** Lateral repair, BFP installation, private inflow removal
- **Cost sharing details:** HO responsible for all costs
- **Work performance:** HO contracts with Stege SD-approved contractor
- **Extent of program:** 11,700 laterals, approx.
- **Lateral definition:** HO owns lateral from building to main
- **Other comments:** Satellite to EDMUD. Time of sale program. Modifying program to comply with EBMUD CD requiring system-wide private lateral ordinance

## **Location: Miami-Dade, FL**

- **Program drivers:** Consent Decree, public I/I work didn't resolve wet weather issues
- **Work performed:** Lateral rehabilitation or replacement
- **Cost sharing details:** M-D WASD pays public lateral rehab; HO pays private lateral rehab
- **Work performance:** Started w/TV inspection, then moved to air pressure test used to determine need to correct
- **Extent of program:** 52 of 500 basins were selected for program. 1,200 laterals repaired as of 2007, with 4000 left to repair
- **Lateral definition:** Property line defines ownership transition
- **Other comments:** Initial program was developed as pilot. Results concluded the value in continuing as larger program. Cleanout installed at home to facilitate pressure test.

## **Location: Ann Arbor, MI**

- **Work performed:** FDD
- **Cost sharing details:** City pays up to \$4100 for core work
- **Work performance:** HO works w/ prequalified contractor, contractor paid by City
- **Extent of program:** 2000 completed
- **Other comments:** Homeowner has 90 days to complete work once identified. 6-8 weeks for If not performed, pays \$100/month surcharge. City also paid for installation of curb drain (for sump discharge). In consent order



## **Summary**

- Many ways to tackle PPII
- Driven by individual community interests
- Programs we looked at showed reduced SSOs, basement backups, flows
- Contracting models vary
- Variety of cost share models
  - Homeowner pays nothing
  - Homeowner fully responsible
  - Cost sharing
- Rules often financially incentivize owner





March 10, 2011

## Residential Sewer Lateral Maintenance Program Analysis for the City of Milwaukee

Summary of Report Prepared By the Robert  
M La Follette School of Public Affairs –  
University of Wisconsin, Madison

### Background

- Infiltration and Inflow (I/I) is the clear water entry into sanitary main sewers.
- Deteriorating and leaky sanitary laterals, which are owned by the homeowner, are a major contributing factor to the I/I problem.
- Efforts to significantly reduce I/I cannot be effective unless private sanitary sewer laterals are addressed.

## Study Methodology

- A brief telephone survey of 44 U.S. cities (Phase One):

24 municipalities had some sort of private sanitary lateral program.

20 municipalities did not have any programs.

## Study Methodology - Continued

- An in-depth telephone survey with 13 U.S. cities (Phase Two).

Cities from phase One were selected to conduct an in-depth survey based on their sanitary laterals policy. These cities varied in size and included larger municipalities such as Atlanta, Georgia and St. Paul, Minnesota, as well as smaller cities such as Racine, Wisconsin, Davenport, Iowa and Madison, Wisconsin.

## Study Findings

- Three Alternatives were studied.
- The alternatives were analyzed based on:
  - Affordability from the City's and homeowner's perspectives
  - Political Feasibility (will present ordinances and laws apply to new policy)
  - Effectiveness (will solution be effective in attaining reduced I/I)

The three alternatives recommended were:

- The Status Quo alternative
- Insurance Program
- Loan Program

## Alternative 1: The Status Quo Alternative

- **Affordability:** affordable to City since the City does not perform private lateral repairs. Not affordable to homeowner who must pay for lateral repairs (as much as \$10,000) once orders are issued by City.
- **Political Feasibility:** Politically feasible since no legal changes are required. However, new MMSD I/I reduction rules will increase public pressure.
- **Effectiveness:** Not effective at decreasing private I/I.

## Alternative 2: Insurance Program

- Funded using a dedicated monthly sewer fee in the Municipal Services Bill, to be used as a premium for the insurance program.
- Additional funding would be provided by the property owner with a deductible of a set amount (for example, the city of Davenport enacted a \$5 monthly premium fee and a \$500 deductible.)
- Once the deductible is met, the full cost of repairing the lateral will be covered by the City.

## Insurance Program - Continued

- **Affordability:** Affordable to City and to homeowners who have damaged laterals. However, City staff believes that a program like this would be inequitable to homeowners who do not own damaged laterals.
- **Political Feasibility:** A flat-fee program-funding mechanism like this would impact all citizens but likely benefit only those in areas of high I/I. This may raise issues of benefit equity.
- **Effectiveness:** This program would decrease I/I because it is a City-wide effort.

## Alternative 3: Loan Program

- This is a revolving loan fund program (RLF).
- RLF assists residential property owners in financing sewer lateral maintenance by offering low-interest loans to help cover costs.
- As loans are repaid, the money is returned to the RLF to make additional loans.
- Racine, Wisconsin is running a program similar to this.
- The funding mechanism to establish a loan program for sewer lateral maintenance would be a bond, note or an allocation from the Sewer Maintenance Fund.

## Loan Program - Continued

- The report was not clear on how a bond would be repaid.
- As repayments are made, funds become available for new loans to additional property owners. The interest paid by RLF-borrowers would support program administration so that the fund's capital base remains intact.
- Affordability: Not very affordable to the City since the challenge with establishing a RLF is securing upfront capital. Reallocating funds from the Sewer Maintenance Fund is a possibility, but might be politically difficult. Not affordable for low-income homeowners. Therefore, this option may not be politically feasible or effective in reducing I/I.

## RECOMMENDATION FROM UW – LA FOLLETTE

- Alternative 2: Insurance Program offers affordability, political feasibility and a long term effective solution to the City's I/I problems.
- An educational campaign is highly recommended as part of this Alternative.



# Department of Public Works Environmental Engineering Section



## City of Milwaukee Flooding Study Task Force

March 10, 2011

## City of Milwaukee I/I Pilot Project

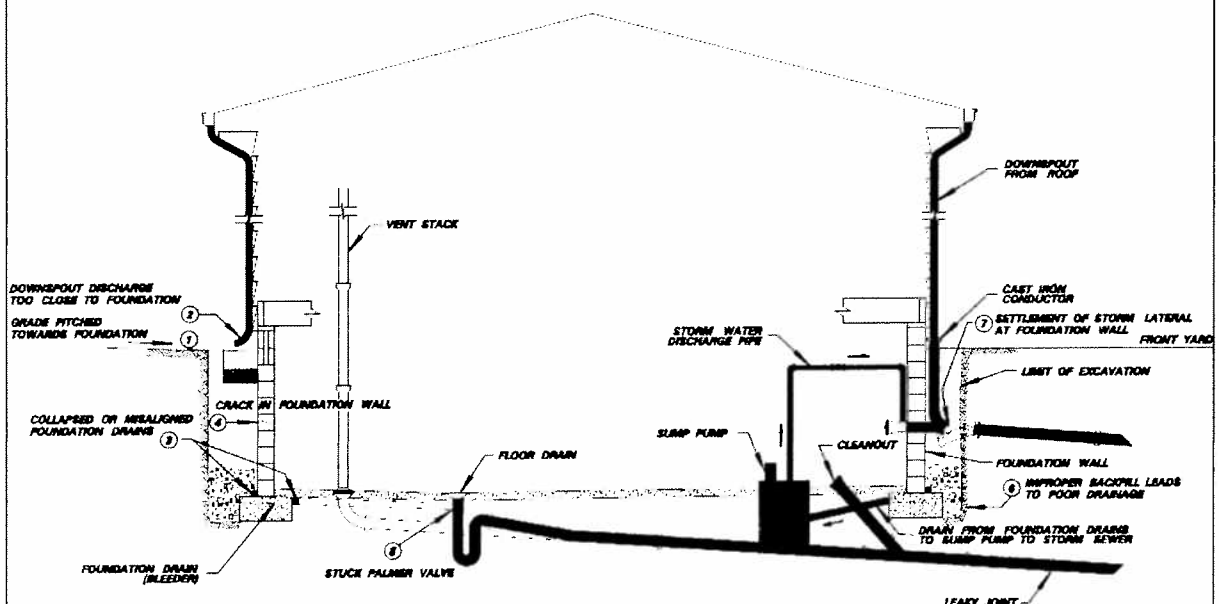
- The purpose of this project is to reduce clear water from entering into the sanitary sewer, ultimately reducing the chances of basement backups throughout the City
- This project consists of updating the existing plumbing of 5 City of Milwaukee owned homes
- These properties are located in the area bounded by: North 35<sup>th</sup> Street to West Fond Du Lac Avenue from West Nash Street to West Marion Avenue
- This area has reported approximately 450 basement backups in 2010
- Construction is currently underway and is estimated to be completed by the end of March 2011
- Once completed, this project will develop a procedure to rehabilitate the existing private plumbing, and eliminate inflow and infiltration from the Sanitary Sewer
- This project will cost \$95,000 to complete

# Project Status

## Locations

- 4220 North 42<sup>nd</sup> Street
  - 3938 North 42<sup>nd</sup> Street
  - 4238 North 40<sup>th</sup> Street
  - 3825 North 40<sup>th</sup> Street
  - 3847 North 39<sup>th</sup> Street
- Currently 3 out of the 5 properties have had the plumbing rehabilitated in the basement
  - Lateral lining is expected to start next week
  - This project is expected to be completed by the end of March 2011

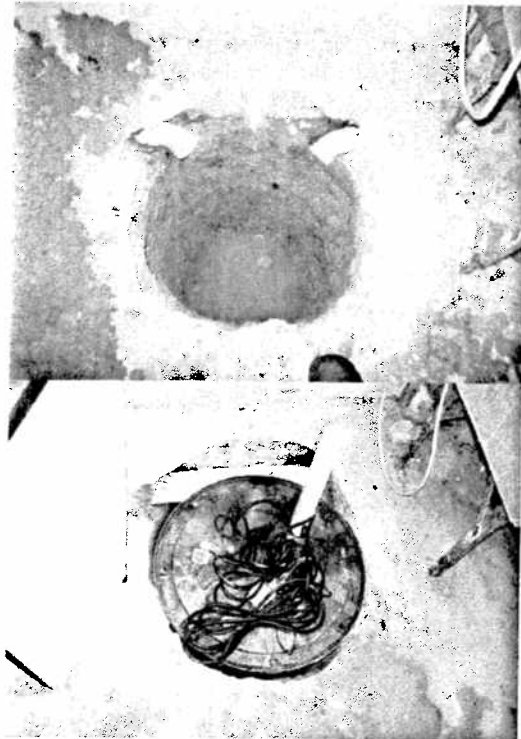
## Private Plumbing Details



# What is being done?

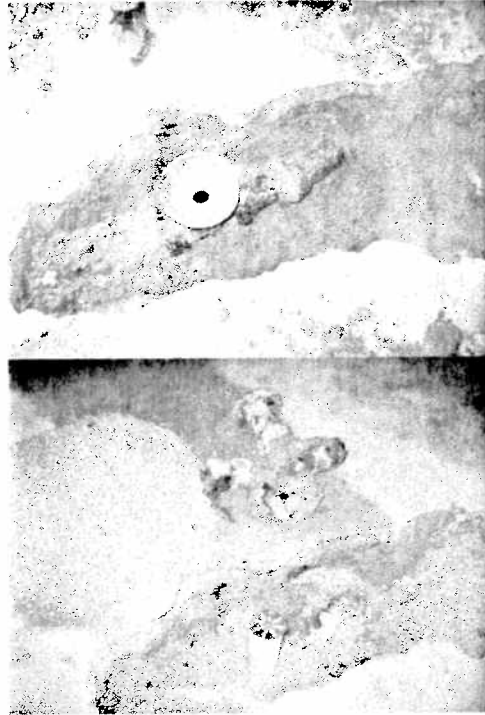
## 1. Foundation Drain Disconnection

- The existing foundation drains are televised to determine if they are functioning properly
- The foundation drains are re-routed from sanitary sewer connections to a sump pit in the basement
- A sump pump with a battery backup is installed in the sump pit
- Electrical Services are installed to power the sump pump
- The collected water from the foundation drains is now discharged to the yard that previously was going to the sanitary sewers



## 2. Removal of Palmer Valve

- The foundation drains connect to the sanitary lateral through a palmer valve
- This valve and the connection is removed and replaced with a new floor drain
- Most homes built prior to 1955 have foundation drain connections to the sanitary lateral

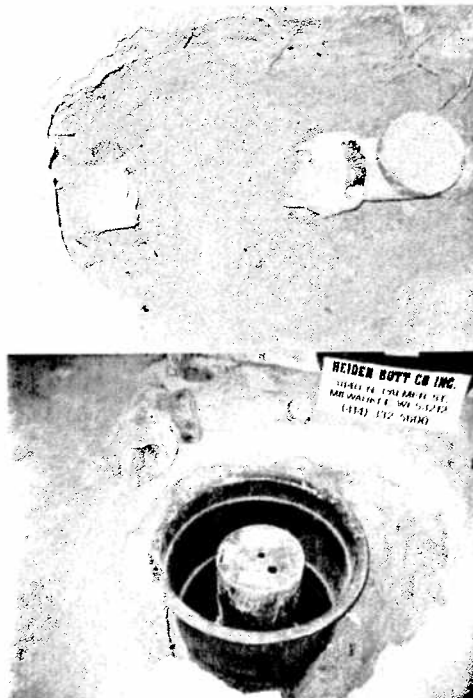


City of Milwaukee, Environmental Engineering

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## 3. Install Backflow Preventer

- A backflow preventer is installed on the existing sanitary lateral
- This blocks water from flowing back into the house from the sewer main in the street in the event of a flood



City of Milwaukee, Environmental Engineering

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## 4. Rehabilitate existing Sanitary Lateral

- The existing sanitary laterals are televised
- A cleanout is installed in the yard on the sanitary lateral
- If necessary, the lateral is cleaned from the cleanout
- The sanitary lateral is rehabilitated with a cured-in-place lining method

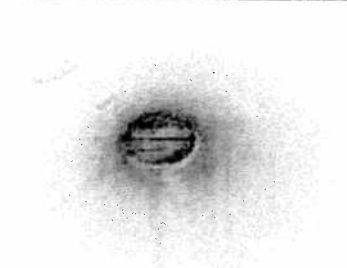
Before



During



After



## Challenges?

- Existing electric services at some locations have to be upgraded to provide dedicated service for the sump pump (additional cost)
- Locating areas in the basement where a sump pump can be installed due to existing conditions
- Evaluating the conditions and functionality of the foundation drains
- Locating an acceptable discharge location for the sump pump drain to meet the plumbing code

# Department of Public Works Environmental Engineering Section



## Questions?

## Sanitary Bypass Pump Station Locations

The City owns and maintains two types of pumping facilities, sanitary bypass pumps and sanitary lift stations

- Bypass Pumping Stations (83)
- Lift Stations (6)

Bypass pumps are located in areas where there has been a history of backwaters

Lift stations are located where gravity sewer service is not available, usually in low-lying areas



# Sanitary Bypass Pump Station Locations

- Our records indicate that the original pumps were installed in the 1960s and 1970s
- Bypass pumps are located in areas where there has been a history of backwaters
- Generally pumps are programmed to turn on approximately 2 to 4 feet below the low basement elevation in the vicinity of the pump

# Pump Operations During Last 10 Years

Reason	Precipitation		Clogged Sewers	Other *	Total
	Rain Events	Pump Runs			
2001	1	1	1	0	2
2002	1	1	0	3	4
2003	0	0	3	0	3
2004	2	19	0	1	20
2005	1	3	3	0	6
2006	1	1	0	2	3
2007	0	0	0	0	0
2008	1	30	1	0	31
2009	1	7	0	1	8
2010	3	69	2	1	72
<b>Total</b>	<b>11</b>	<b>131</b>	<b>10</b>	<b>8</b>	<b>149</b>

\* Includes lift station equipment failure and contractor errors







# MEMORANDUM

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## LEGISLATIVE REFERENCE BUREAU

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WWW.MILWAUKEE.GOV/LRB

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**To:** Ald Bohl  
**From:** Kathleen Brengosz – Fiscal Planning Specialist  
**Date:** March 10, 2011  
**Subject:** Private Sewer Lateral Insurance

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In response to your request for information regarding private sewer lateral insurance, I was able to identify at least four firms that provide utility insurance for municipalities and water utilities on a fairly large scale. There also appears to be brokerage services available that match municipalities to firms offering appropriate services.

- Utility Service Partners – endorsed by the National League of Cities
- TWG Home Warranty Services, Inc. - serving Piedmont Water Utility
- Utility Line Security Inc. – serving Pittsburgh
- The Manchester Group – serving communities in OH, MI, PA, IN, and IL.

The basic products these companies provide are similar. Citizens contract with the company, and for a set monthly fee, receive a fixed level of coverage for work required to repair their failed sewer lateral or other utility line. (see table below). Depending on how the contract is structured, revenues are received by the municipality as a royalty for endorsement of the company or as a fee for the administration costs associated with billing. Claim procedures vary, but generally, the insurance company provides 24/7 customer service to expedite the examination and repair of failed laterals.

Municipalities I spoke with had varying reasons for participating; some were approached by a company offering services, others sought out services at the request of their customers. Hard data was not available but it appears overall participation in voluntary programs was low, even when customer request was the reason for seeking insurance services. An estimate received from a service provider confirms that it is not likely that a significant number of Milwaukee homeowners would purchase sewer lateral policies.

Customer satisfaction data was not available, but all the municipalities I spoke with represented that overall, homeowners were satisfied with the services they received.

It is important to note that none of the standard products offered address the inflow and infiltration issues Milwaukee is experiencing. Most policies are designed to cover costs related to catastrophic failure of a utility line. A leaky lateral which allows excessive clear water to enter the sewer system would generally not be considered a failure. If the City chose to mandate the repair of private laterals to address flooding issues, it is likely that those repairs would not be covered under the terms of most

standard policies. However, there appears to be a willingness within the industry to design products which address the particular needs or goals of a municipality. The cost of custom products cannot be determined at this time.

Costs to the City to participate may include the review and approval of mailings and other information sent to homeowners and efforts required to include the charge on quarterly utility bills. These costs can be recovered by agreement with the insurance provider. The City receives the benefit of an insurance plan that is easy to implement and maintain without the risks associated with a self-insured program.

In order to maximize value for the City and its residents, the City must clearly define its goals and desired outcomes before moving ahead with any type of insurance program.

	<b>Utility Service Partners</b>	<b>TWG</b>	<b>Utility Line Security Inc.</b>	<b>The Manchester Group</b>
Eligibility	Residential Properties	Residential Properties	Residential and commercial with Water Service <2" Sewer Lateral < 10"	Owners of single family homes (OH, MI, PA, IN, IL)
Approx Cost				Unavailable
Sewer	\$4.25 - \$4.70	\$7.95		
Water	\$5.50 - \$5.95	\$5.95		
Sewer & Water		\$9.95	\$5.00	
Deductible	No	No		
Billing Method	Invoice	On utility bill	On utility bill	
Participation	Opt In	Opt In	Opt out	Opt In
Rebate	10% of revenue	Negotiated to cover admin costs		Unknown
Coverage Limits	\$4,000 per claim	Sewer \$5,000 per claim  Water \$2,500 per claim	Unlimited Complete repair and restoration including sidewalks, driveways and pavement	Varies with policy
Repeat Coverage	Full benefit coverage on every repair	\$5,000 limit per utility per year		
Prior/Existing Damage	Known conditions not covered	Known conditions not covered	Not Covered	Not Covered
Municipal Endorsement Req'd	Yes		Yes	No
Misc		Excludes residential properties used for commercial purposes	Coverage can be cancelled without notice if customer is 90 days delinquent on utility bill	Does not cover insurable events

# **Residential Sewer Lateral Maintenance Program Analysis for the City of Milwaukee**

Caroline Ellerkamp  
Erin Fifield  
Amy Klusmeier  
Julie K. Ruder  
Erik R. Viel

Prepared for the City of Milwaukee, Department of Administration,  
Budget and Management Division

Public Affairs 869  
Workshop in Public Affairs, Domestic Issues

May 7, 2010



**ROBERT M. LA FOLLETTE  
SCHOOL OF PUBLIC AFFAIRS  
University of Wisconsin-Madison**

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## **Foreword**

Students in the master of public affairs program in the Robert M. La Follette School of Public Affairs at the University of Wisconsin–Madison produced this report for the City of Milwaukee’s Department of Administration’s Budget and Management Division. The opinions and judgments presented in the report do not represent the views, official or unofficial, of the La Follette School or of the clients for whom the students prepared the report.

The authors are enrolled in the Public Affairs Workshop, Domestic Issues, the capstone course in their graduate program. The La Follette School offers a two-year graduate program leading to a master of public affairs or a master of international public affairs degree. The workshop provides practical experience applying the tools of analysis acquired during three semesters of coursework to actual issues clients face in the public, nongovernmental, and private sectors. Students work in teams to produce carefully crafted policy reports that meet high professional standards within the timeframe of a single academic semester. The reports are research-based, analytical, and when appropriate, evaluative.

This report would not have been possible without the encouragement and leadership of the City of Milwaukee’s dedicated employees. The report also benefited greatly from the support of the staff of the La Follette School. In particular, Outreach Director Terry Shelton contributed logistical and practical support. Karen FASTER, La Follette publications director, and Alice Honeywell, senior editor emerita, edited the report, and Karen oversaw production of the final bound document.

This report was generated primarily for the educational benefit of its student authors, and the purpose of the project was to improve their analytical skills by applying them to an issue with a substantial policy or management component. This culminating experience is the ideal equivalent of the thesis for the La Follette School degrees in public affairs.

Dr. Susan Webb Yackee  
Assistant Professor of Public Affairs and Political Science  
May 2010

## ***Acknowledgments***

We thank all of the individuals who provided guidance and assistance in the preparation of this report. In particular, we thank Erick Shambarger, City of Milwaukee Budget and Management Division, for his direction and feedback; Nader Jaber, Tim Thur, and Gregg Hotson, City of Milwaukee Department of Public Works; Hal Jenkins, Mike Greylak, and Foster Finco, City of Milwaukee Department of Neighborhood Services; and Tim Bate, Sara Hackbarth, and Tom Simmons, Milwaukee Metropolitan Sewerage District, for their assistance in data and information gathering. Additionally, we are grateful to all of the municipal employees from around the nation who graciously took time to respond to our city surveys and questions. Finally, we thank Karen FASTER and Alice Honeywell for their editing assistance, and Professor Susan Yackee for her guidance and support.



## ***Executive Summary***

The City of Milwaukee is interested in developing a long-term program that would encourage residential property owners to maintain private property sanitary sewer laterals. This report analyzes three program alternatives and recommends an insurance program that will encourage residential sewer lateral maintenance while meeting Milwaukee's public policy goals.

Sewer laterals are the underground pipes that connect a residence or business to the main sewer line. In Milwaukee, as in many cities in the United States, maintenance of sewer laterals is the responsibility of private property owners. Poorly maintained sewer laterals contribute to the infiltration and inflow (I/I) of storm water or groundwater into the Milwaukee's dedicated sanitary sewer system, which can cause the system to overflow. The discharge of sewer overflow into residential basements and surrounding waters negatively affects the environment and public health, and it also violates state and federal regulations. As cities throughout the United States struggle to address problems of I/I, municipal programs to encourage and assist residential private property owners in maintaining private sewer laterals are growing in popularity.

Our research aimed to identify innovative residential sewer lateral programs and assess which programs are feasible for Milwaukee. Following a broad Internet search and literature review, we identified and contacted 78 cities with a brief telephone survey. The purpose of this survey was to understand the varying municipal approaches to residential sewer lateral programs. As a result, we identified three key components of sewer lateral maintenance programs: 1) funding mechanism; 2) eligibility and assistance criteria; and 3) implementation strategy.

We conducted a second in-depth telephone survey with 13 cities, which were selected based on diversity of program type, innovation, and geographic similarity to Milwaukee. We gathered detailed information about each municipal program in order to analyze how the components of the residential sewer lateral maintenance program met Milwaukee's policy goals of affordability, political feasibility, and effectiveness.

This report identifies three residential sewer lateral maintenance programs for the city of Milwaukee: 1) the status quo; 2) an insurance program; and 3) a loan program. Based on an analysis of the program components and policy goals, we recommend that Milwaukee implement an insurance program. An insurance program is the most affordable, politically feasible, and effective long-term solution to encourage the maintenance of residential sewer laterals and to ensure the reduction of I/I in Milwaukee.

Furthermore, our research identified a limited, short-term funding source through the Milwaukee Metropolitan Sewerage District for programs that aim to reduce private property I/I. This funding is not available to capitalize a citywide maintenance program; however, we recommend Milwaukee take advantage of this funding opportunity by implementing a targeted program in high I/I areas to supplement the insurance program.



# Appendix F





# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Agenda FLOODING STUDY TASK FORCE

*ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS*

*Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin Shafer,  
Erick Shambarger, and Ken Yunker*

*Staff Assistant Tobie Black, 286-2231; Fax: 286-3456;  
tblack@milwaukee.gov*

*Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov*

---

Thursday, March 24, 2011

10:00 AM

Room 301-A, 3rd Floor, City Hall

---

1. **Review and approval of the minutes of the March 10th meeting.**
2. **Discussion of downspout disconnection.**
3. **Discussion of foundation drain options.**
4. **Further discussion of the city's inflow and infiltration pilot project.**
5. **Set next agenda.**

Members of the Common Council and its standing committees who are not members of this committee may attend this meeting to participate or to gather information. Notice is given that this meeting may constitute a meeting of the Common Council or any of its standing committees, although they will not take any formal action at this meeting.

Upon reasonable notice, efforts will be made to accommodate the needs of persons with disabilities through sign language interpreters or auxiliary aids. For additional information or to request this service, contact the Council Services Division ADA Coordinator at 286-2998, (FAX)286-3456, (TDD)286-2025 or by writing to the Coordinator at Room 205, City Hall, 200 E. Wells Street, Milwaukee, WI 53202.

Limited parking for persons attending meetings in City Hall is available at reduced rates (5 hour limit) at the Milwaukee Center on the southwest corner of East Kilbourn and North Water Street. Parking tickets must be validated in Room 205, (City Clerk's Office) or the first floor Information Booth in City Hall.

Persons engaged in lobbying as defined in s. 305-43-4 of the Milwaukee Code of Ordinances are required to register with the City Clerk's Office License Division. Registered lobbyists appearing before a Common Council committee are required to identify themselves as such. More information is available at [www.milwaukee.gov/lobby](http://www.milwaukee.gov/lobby).



# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Minutes

### FLOODING STUDY TASK FORCE

ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS

Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin  
Shafer, Erick Shambarger, and Ken Yunker

Staff Assistant Tobie Black, 286-2231; Fax: 286-3456;  
tblack@milwaukee.gov

Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov

---

Thursday, March 24, 2011

10:00 AM

Room 301-A, 3rd Floor, City Hall

---

Meeting convened at 10:01 a.m.

**Individuals excused:**

Ald. Ashanti Hamilton  
Rep. Sandy Pasch  
Jeff Polenske

**Individuals also present:**

Martin Aquino and Tim Thur, Department of Public Works  
Kathy Brengosz, Fiscal Planning Specialist

**1. Review and approval of the minutes of the March 10th meeting.**

*Mr. Yunker moved to approve the minutes of the March 10th, 2011 meeting. There were no objections.*

**2. Discussion of downspout disconnection.**

*Mr. Aquino talked about the downspout disconnection program that was implemented in the city of Milwaukee over the last 10 years. There were three separate projects.*

*The first project was in 2001 that targeted the east side. Residents would do the disconnection and be reimbursed. Cost was \$50 per downspout up to \$100. Out of 282 properties, 42 (15%) were interested. 12 homes out of those 42 were suitable. Only 4 (1%) participated. The project was not successful due to lack of participation.*

*The second project was in 2002 and targeted the north side. The city contracted with Milwaukee Committee Service Corps. There was no cost to the home owner. Out of 217 homes in the area, 155 were suitable. 61 (39%) participated. This project yielded better results.*

The last project was in 2006 and targeted the Washington Heights area. An outside professional marketing firm was contracted as a public outreach to increase participation. Out of 3000 properties, 106 (4%) were in participation.

Overall, Mr. Aquino said this program was challenged with getting participation from the public.

Ald. Bohl asked about the cost of the marketing campaign done for the third project. Mr. Shambarger said \$80,000 was used for marketing out of a \$300,000 budget for the program. The marketing consisted of letters, brochures, hand delivery, night meetings, and press events. Ald. Bohl replied that the marketing was ineffective given the high cost and low participation. He suggested that marketing should be improved.

Ald. Bohl asked if rooftop water flow is cleaner than street water flow into tributaries. Mr. Shambarger replied yes due to less debris from rooftop water.

Ald. Bohl asked why houses were deemed unsuitable for the program and if there are other options for home owners if there was a mandate for this program. Mr. Aquino said factors included the lack of yard area and the pitch of the land around a property. Mr. Shambarger added that other reasons include the potential of water runoff to concrete surfaces and to adjacent properties within close proximity.

Mr. Shambarger asked if the grade of the land around a property was also considered for eligibility of a home for the program. Mr. Aquino responded yes. The pitch may recycle the water back to the home. Mr. Shafer added that landscaping the land can be a remedy. Mr. Aquino later said that installing outside drain tiles is also an option.

Mr. Shafer talked about a memo prepared by Kathy Brengosz (LRB staff) regarding the downspout disconnection program in Minneapolis and St. Paul, Minnesota. Participation during the first 5 years of the program was voluntary followed by a mandate. In 2000 or 2001, he and Ald. Murphy visited these cities. Mr. Shafer said the program was successful in these cities.

Ald. Bohl asked if there was any financial incentive for the program in Minnesota. Mr. Shafer replied that there was no financial incentive, but there was a grace period to enforce the program.

Ald. Bohl said that the approximate cost in metro Milwaukee compared to metro Minneapolis is 5 dollars more expensive for downspout extension and seemed inflated.

Ald. Bohl asked if there were any data on the percentage of rooftop and roadway water flow in a combined system. Mr. Shafer responded that is no data at the moment; however, over a five-year period, 64% of water flow came from a separated system compared to a combined system.

Ald. Bohl asked if mandating the downspout disconnection program would make it more effective. Mr. Aquino replied that mandating would be a policy issue. However, there are other pilot programs being implemented, such as installing inlet restrictors, putting ladders on homes, and foundation drain disconnection. Mr. Shafer suggested that some kind of public education should be done if this program were to continue.

There was an individual present by the name of Angel who asked if there was a map depicting illegal downspout connections. Mr. Aquino answered there is no map and



database information. Illegal connections are found by testing programs and complaints about illegal discharges.

Mr. Shafer mentioned the issue of water on lawns stemming from downspout disconnection. He said homeowners should look into rain barrels and rain gardens.

### 3. Discussion of foundation drain options.

Ms. Brengosz said she could not find viable alternatives to the construction of a basement sump pump when disconnecting foundation drains from the sewer system.

Ald. Bohl had previously asked Ms. Brengosz to determine which neighborhoods had a preponderance of homes built before 1955. A map showing single-family, two-family and multi-family tax keys with year built before 1955 was presented. Ms. Shafer asked if MMSD could get the map Ms. Brengosz provided in GIS.

Ald. Bohl asked if MMSD was doing away with a mandate for foundation drain disconnection. Mr. Shafer said that the mandate has only been put on hold, he said that MMSD is starting the disconnection program and will be examining how successful the current program is without it being mandated. He also said that the city could mandate the program now, but MMSD is leaving the decision up to municipalities.

Ald. Bohl asked Mr. Shafer about the effect the state budget will have on funds that were budgeted for I & I reduction. Mr. Shafer said that MMSD is looking to reduce the amount of money spent by ninety-seven million dollars. He said that amount budgeted for 2012 will be reduced from twenty-two million dollars to five million dollars. The program is significantly impacted by the state's budget.

Ald. Bohl said that he did not think foundation drain disconnection could be mandated for only certain parts of the city. Mr. Shafer said that it depends on how much the city is willing to pay. Mr. Yunker asked how Fox Point is handling the situation. Mr. Shafer said that downspout disconnection was mandated for the entire village, and possibly the same for foundation drains.

Mr. Aquino said that since the state plumbing code prohibits clear water from going into the sanitary sewer system, the city's plumbing code technically already requires that property owners take measures to prevent this from happening. So the city has a law that allows the city to mandate foundation drain and downspout disconnection.

Mr. Thur said that now the city is trying to determine the effectiveness of programs and the costs. The city can then decide how wide-spread the program should be and how much it will cost homeowners, if anything.

Mr. Yunker asked if insisting everyone disconnect their foundation drain, even if it's not contributing to the overflow, is necessary. Ald. Bohl said if the overall objective is to prevent clear water from entering the sewage system, the program should be broader than just target neighborhoods. If the goal is reducing basement backups, then the program should probably be targeted.

Mr. Shafer said that MMSD's primary goal is reducing basement backups, but the secondary goal is reducing overflows. He said that ways of reducing the volume of clear water getting into the system need to be found since the water getting into the system is causing both the backups and the overflows. He said that there will need to be continuous adaptive improvements over time.

Ald. Bohl asked Mr. Shafer how the Village of Fox Point has handled capping off foundation drains. Mr. Shafer said that he will provide a copy of the Fox Point ordinance and requested a copy of the city's ordinance regulating downspouts disconnections.

Mr. Shambarger requested a map that shows the parts of the city that are in low spots.

Ald. Bohl asked what was average anticipated cost of capping a foundation drain, electrical work and installation of a sump pump. Mr. Aquino said that the cost is about five thousand dollars. He said that some electrical work must be done and some houses are not up to code and need to be upgraded, which presents an additional cost.

Ald. Bohl asked how much the city had budgeted for the reduction of inflow and infiltration prior to the revised budget that MIVSD is anticipating. Mr. Aquino said that 8.7 million dollars is planned based on the revised amount. Before the state budget was announced, the city was planning on spending 14 million dollars. Ald. Bohl asked what DPW was planning to do with the funds. Mr. Aquino said that the funds are to be used for targeting areas that have basement backups and for doing lateral inspections and lining of both the city's and private sewer mains. Mr. Shambarger said that the budget was designed to give the department flexibility as to how much would be spent on public improvements versus private improvements.

#### 4. Further discussion of the city's inflow and infiltration pilot project.

Ald. Bohl asked how stringent the recommendation of Department of Public Works will be to address a leaky lateral. Mr. Aquino said that any solution will most likely have to be voluntary and not mandated, so the public will have to be encouraged to participate. Ald. Bohl said that the city will need to provide a significant incentive to homeowners to spend their money if they are not directly affected by basement flooding.

Ald. Bohl wants an opinion from the City Attorney's office as to the legality of mandating participation in a program in only certain pilot areas of the city. Mr. Yunker said that there could be a requirement for participation if public funds are offered. He also said that a program could be mandated citywide but only enforced in areas where there are flooding problems.

Mr. Shambarger brought up the example of special assessments for street improvements, which targets areas that have the most need of street repairs. Ald. Bohl said that the policy of the city with special assessments has been for allowing input on the special assessments by the citizens in an area.

Individual at the table:

Angel Sanchez, property owner

Mr. Sanchez said that a mandated program would not be popular or good for property owners and that necessary improvements would be too expensive for many homeowners. He also said that the city should not be taking on more expenses and that property owners that have problems with flooding in their basements should make the necessary adjustments and repairs to their properties. Mr. Thur said that the solution to flooding may not be something a homeowner can afford on his own and mentioned that one homeowner's problem may be causing another neighbors' problem. He said that the city considers this a public health issue.

*Ald. Bohl recommended seeing how the city can utilize the reverse auction ordinance that was recently passed to get lower estimates for lateral lining work to reduce costs. Mr. Aquino said that the city is only using one contractor because there are currently only three contractors in Wisconsin that are licensed to do the work that the city requires and only one in Milwaukee. Not a lot of communities around the country are doing lateral lining, although they are looking into it.*

*Regarding the infiltration and inflow pilot project, Mr. Aquino said that the city is done with all the foundation drain disconnections and sump pumps and lateral liners are being put in. Mr. Thur said that all the internal work on the homes has been completed.*

*Ald. Bohl asked if the city would elect to disconnect foundation drains or to fix laterals that are leaky but not broken. Mr. Aquino said that the lateral lining would be the first option while Mr. Shafer said that the foundation drain disconnection would be the first option. Mr. Shafer said that the foundation drain is always delivering water, but decisions on which option to use should be made on a case by case basis. Ald. Bohl said the city may need to chose the disconnection of foundation drains over the replacement of laterals because homeowners will be more willing to participate in the cheaper foundation drain plan.*

*Mr. Yunker asked how much it cost to test for a leaky lateral. Mr. Thur said the cost would be 300 to 400 dollars per home. The test for a leaky lateral will be done by injecting dye water into the ground above the lateral.*

*Mr. Thur said that part of the reason the pilot program has been initiated is to discover the challenges that the city will face in getting homeowners to participate in improvements to their property that will prevent flooding.*

**5. Set next agenda.**

*Discussion of Fox Point Ordinance  
Financial Impact of the state budget on inflow and infiltration programming  
City Attorney opinion regarding mandating programs in parts of the city  
Discussion of land use*

**Meeting adjourned at 12:13 p.m.  
Staff Assistant Tobie Black**





# MEMORANDUM

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## LEGISLATIVE REFERENCE BUREAU

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WWW.MILWAUKEE.GOV/LRB

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**To:** Ald. Bohl  
**From:** Kathleen Brengosz Fiscal Planning Specialist  
**Date:** March 23, 2011  
**Subject:** Residential Property Maps Based on Year Built

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In response to your request for information regarding the number of homes built prior to 1955 the following information was found.

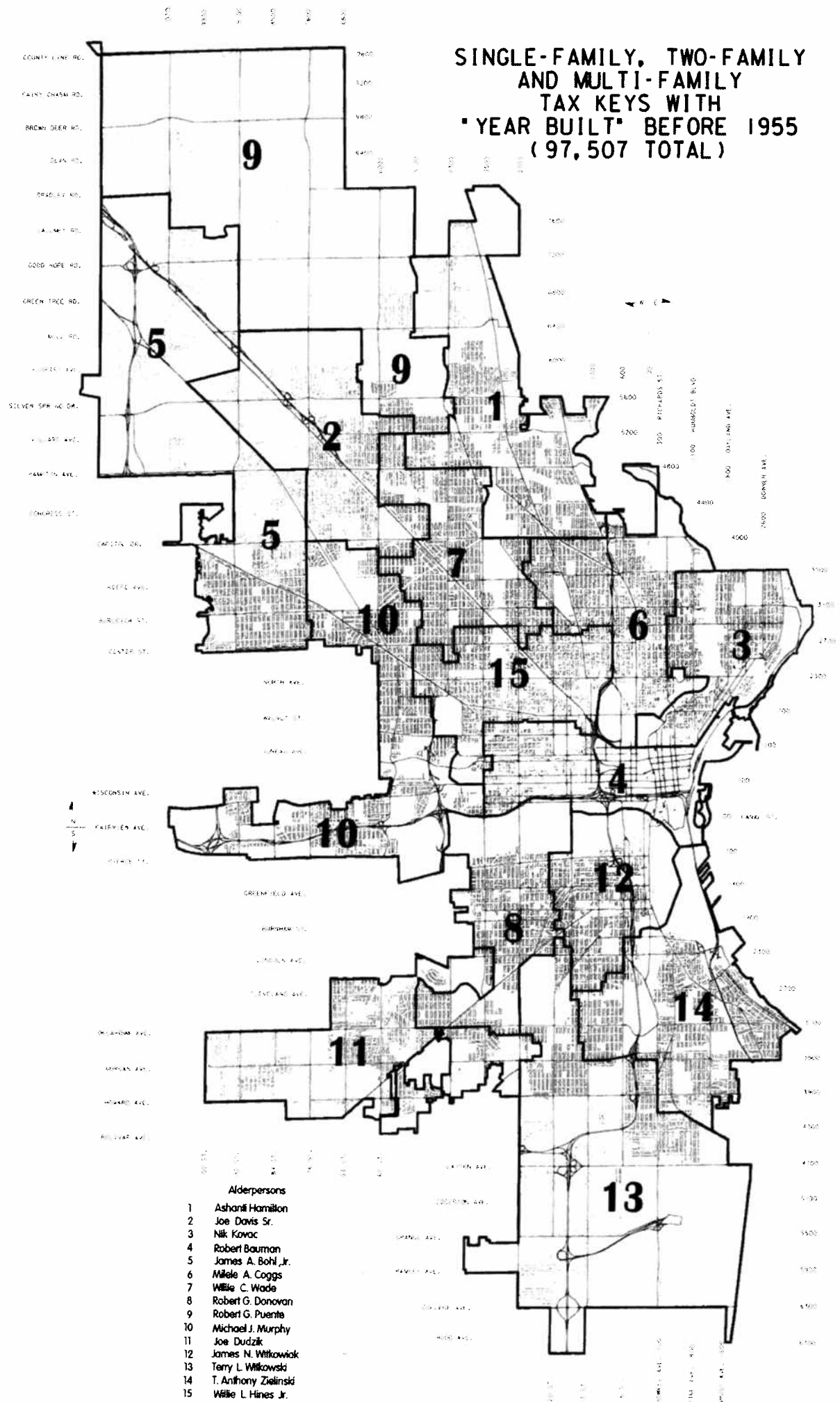
There are 140,570 tax keys in the City of Milwaukee that are classified as single family, two family or multi-family. Of that number 97,507 (69%) were built prior to 1955. Older homes are primarily located north of Howard Avenue and south Silver Spring Drive. Concentrations of newer homes can be found south of Howard Avenue between 13<sup>th</sup> Street and the west City limits, the western portion of the 11<sup>th</sup> Aldermanic district and in neighborhoods north of Silver Spring Drive. Attached to this memo are two maps, one showing the distribution of homes built before 1955 and the other showing home built in 1955 or later.

According to the Department of Neighborhood Services, most homes built prior to 1955 were constructed with foundation drains connecting to the sewer system. A property owner wishing to disconnect the foundation drain from the sewer system would be required to obtain a permit for the installation of a sump. Historic permit records are stored on microfiche in the Department of City Development. It is unknown at this time if an accurate estimation of disconnected homes can be determined by reviewing the historic permit records.

Each year the Department of Neighborhood Services reports to Environmental Engineering the number of sump permits that were issued. This information is included in an annual report sent to the Milwaukee Metropolitan Sewerage District. A review of those reports may provide recent trend information that could be used to estimate the number of homes that may still be connected. Because most property owners disconnect from the sewer system when they are experiencing drainage problems, it is not expected that a large percentage of homes have been disconnected.



**SINGLE-FAMILY, TWO-FAMILY  
AND MULTI-FAMILY  
TAX KEYS WITH  
"YEAR BUILT" BEFORE 1955  
( 97,507 TOTAL )**



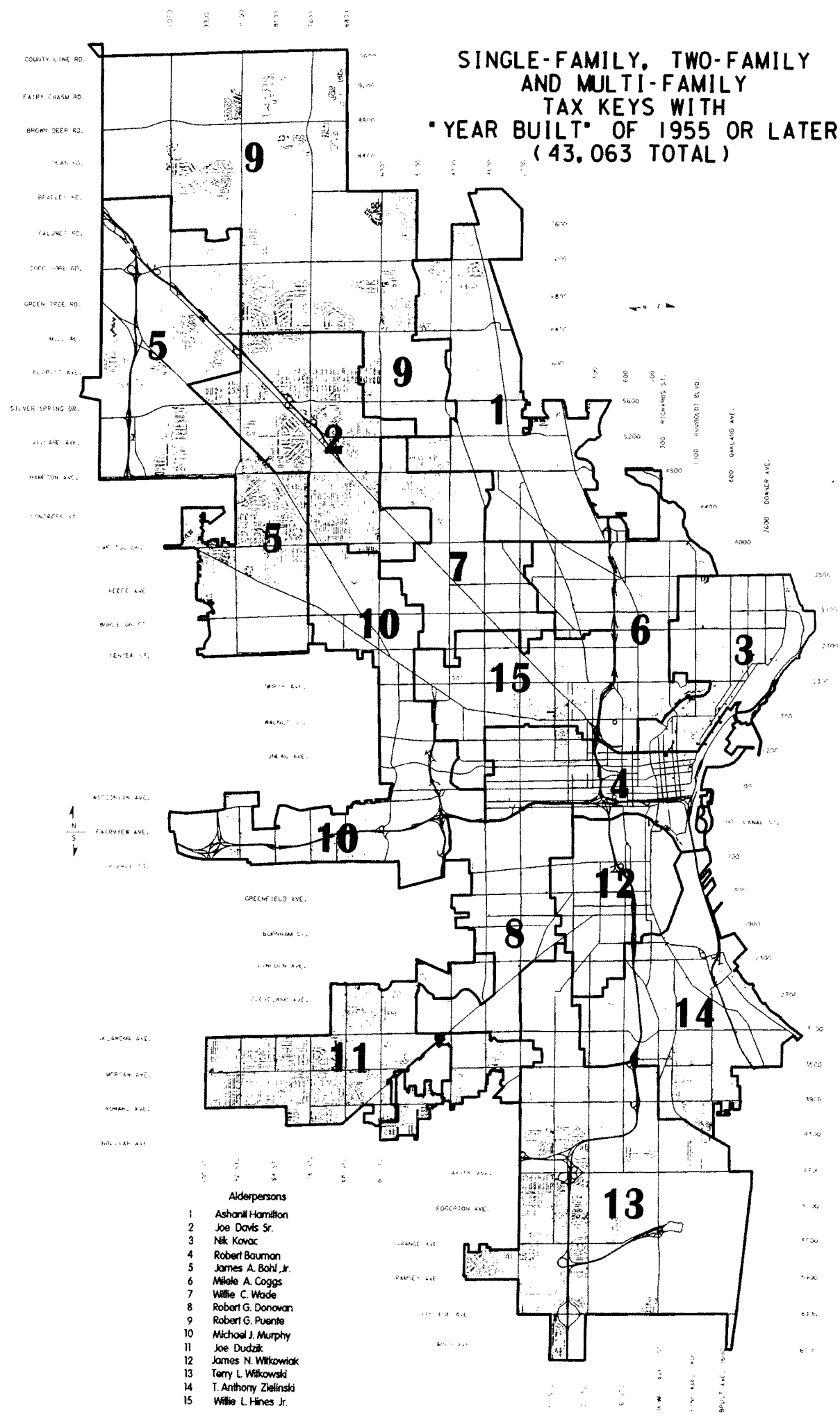
**Alderpersons**

- 1 Ashanti Hamilton
- 2 Joe Davis Sr.
- 3 Nik Kovac
- 4 Robert Bauman
- 5 James A. Bohl, Jr.
- 6 Milele A. Coggs
- 7 Willie C. Wade
- 8 Robert G. Donovan
- 9 Robert G. Puente
- 10 Michael J. Murphy
- 11 Joe Dudzik
- 12 James N. Witkowiak
- 13 Terry L. Witkowski
- 14 T. Anthony Zielinski
- 15 Willie L. Hines Jr.





**SINGLE-FAMILY, TWO-FAMILY  
AND MULTI-FAMILY  
TAX KEYS WITH  
"YEAR BUILT" OF 1955 OR LATER  
(43,063 TOTAL)**



**Alderpersons**

- 1 Ashanti Hamilton
- 2 Joe Davis Sr.
- 3 Nik Kovac
- 4 Robert Bauman
- 5 James A. Bohl, Jr.
- 6 Milele A. Coggs
- 7 Willie C. Wade
- 8 Robert G. Donovan
- 9 Robert G. Puente
- 10 Michael J. Murphy
- 11 Joe Dudzik
- 12 James N. Witkowiak
- 13 Terry L. Witkowski
- 14 T. Anthony Zielinski
- 15 Willie L. Hines Jr.





# MEMORANDUM

## LEGISLATIVE REFERENCE BUREAU

WWW.MILWAUKEE.GOV/LRB

**To:** Ald. Bohl  
**From:** Kathleen Brengosz – Fiscal Planning Specialist  
**Date:** March 23, 2011  
**Subject:** Downspout Disconnection – City of Minneapolis

The City of Minneapolis has a comprehensive downspout (rain leader) disconnection program. The primary impetus for the program was the reduction of combined sewer overflows. The Program was instituted by ordinance (*Chapter 56. Prohibited Discharges to Sanitary Sewer System*) on August 1, 2003. The ordinance prohibited both new and pre-existing roof drain, area drain or other clearwater connections. All property owners (residential and commercial) were required to permanently disconnect all prohibited connections upon notice from the City or by January 1, 2005 whichever occurred first. Property inspections began in February 2003 and continued through 2007.

The inspection process focused on four key areas:

- **Priority Area Inspections** - 41 priority neighborhoods based on the 2002 Brown and Caldwell Sewer Separation Study.
- **Institutional Inspections** – Facilities owned by the City of Minneapolis, the Minneapolis Public Schools, the Parks and Recreation Board, Hennepin County, and the University of Minnesota
- **Public Works Street Projects** – These inspections were done in advance of planned street improvements, to allow owners to coordinate their work with street construction work.
- **Site Plan Inspections** – Inspections done in conjunction with the Public Works approval process for site plans.

Violations were divided into two categories, inflow violations which were defined as illegal connections to the sanitary sewer system; and non-inflow violations which were described as violations where disconnections had been completed in such a manner that they could easily be reconnected. Between 2003 and 2007, 103,711 parcels were inspected. A total of 5,997 violations were found. Of the 5,997 violations, 3,789 (63%) were for downspouts or open standpipes. As of March 2009, 6,131 violations had been recorded; 4,537 (74%) have become compliant, leaving 1,594 (26%) uncorrected.

Work is to be done at the property owner's expense. If the property owner fails to make an ordered disconnection, the city may elect to make the disconnection and assess the cost against the property owner. Revisions to Chapter 56 were approved in 2006 that were designed to accelerate compliance. These changes allow for the issuance of administrative citations to continuing violators. The fine is \$750 and \$1,500 for first and second violations respectively and \$2,000 for each subsequent violation. Unpaid fines may be placed on the property tax bill.

In practice, if the owner of a residential property fails to make the disconnection, the city will attempt to obtain permission from the homeowner and if successful, will make the required

<b>Minneapolis Rainleader Disconnection Program(*)</b>					
	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Neighborhoods Inspected	12	17	16	20	
Parcels Inspected	16,742	16,826	20,337	31,105	28,966
Violations					
Inflow	586	984	891	489	
Non-inflow	713	593	303	457	
Total	1,299	1,577	1,194	946	285
Violation Rate – Inflow	3.5%	5.8%	4.4%	1.6%	
Violation Rate - Overall	7.8%	9.4%	5.9%	3.0%	1.0%

(\*) As reported in Minneapolis Combined Sewer Overflow Annual Reports

disconnection. There is generally no charge for this service. Citations are typically issued for non-response (as opposed to non-compliance). If a property is brought into compliance after a citation has been issued, fines may be forgiven if they have not been officially levied against the property. In addition, a small grant was received in 2008 which was used to purchase materials which were distributed free of charge to property owners.

Funding for the rain leader disconnect program is provided by the city's storm water fund. A storm water fee is paid by Minneapolis property owners based in part on the amount of impervious surface on a property. The program operated with a staff of approximately eleven during the initial inspection period. Staffing has been reduced to five; a program manager, an administrative analyst and three inspectors. Information regarding actual costs for administering the program and the amount of the storm water fee attributable to the rain leader disconnection program was not readily available.

The city of Minneapolis determined that a large scale public education campaign at the beginning of the disconnection program would not be cost effective due to the low percentage of properties that were expected to be non-compliant. Information and educational resources were targeted to property owners who had prohibited connections. Initial compliance with notifications was relatively low. The city found it necessary in many cases to make multiple attempts to contact owners using various methods including written notifications, warning letters, site visits and citations. The highest levels of compliance were achieved when written correspondence was able to elicit a phone call from the property owner to the city.

Work must be done in accordance to all applicable state rules and Minneapolis ordinances. A disconnection permit must be obtained before work can begin. There is no charge for the permit which is valid for one year. Time extensions are available if the work is not completed prior to the expiration of the permit. Prior to January 1, 2007 a \$25 filing fee was charged for the extension. Since that date, the extension fee has been calculated using the current sewer utility rate, the area of the property contributing rainwater to the sanitary system and the average annual rainfall. (*current sewer utility rate x area contributing rainwater x average annual rainfall*) Owner occupants of single family dwellings may perform the work on that dwelling. All other work must be performed by a licensed plumbing contractor. Work must be inspected before it is concealed or covered up.

Estimates provided by the City of Minneapolis indicate that materials for disconnecting a typical single family dwelling or duplex would be less than \$20. Costs may be higher if property owners

need to purchase the required tools. Recommended tools include a hacksaw, pliers, screwdriver, hammer and tape measure. Costs for disconnecting multi-family, commercial and industrial properties were significantly higher and varied considerably.

<b>Materials</b>	<b>Approx Cost</b>	
	Minneapolis	Milwaukee
Downspout extension – steel (10 feet)	\$8.00 each	\$13.00
Downspout elbow	\$2.00 each	\$2.50
Downspout strap	\$1.00 each	\$1.50
Sheet metal screws		
Splash block (optional)		\$10.00
6 Lb bucket of quick setting cement	\$5.00 each	\$10.00 (10 lbs)
OR		
4 inch soil pipe gasket	\$2.00 each	
4 inch cast iron blind plug	\$5.50 each	\$6.00

Minneapolis has been successful in reducing the number of combined sewer overflows. However, because Minneapolis uses a multi-faceted approach to addressing overflows it is not known how much of the reduction is attributable to the rain leader disconnection program.





# MEMORANDUM

## LEGISLATIVE REFERENCE BUREAU

WWW.MILWAUKEE.GOV/LRB

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**To:** Ald. Bohl  
**From:** Kathleen Brengosz – Fiscal Planning Specialist  
**Date:** March 23, 2011  
**Subject:** Foundation Drain Disconnection Alternatives

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My research was unable to identify any viable alternatives to the construction of a basement sump when disconnecting foundation drains from the sewer system. Two commonly used structures to handle clear water are dry wells and cisterns. While each of them has useful applications, their use is not easily adapted to collecting water from below the surface in a residential setting.

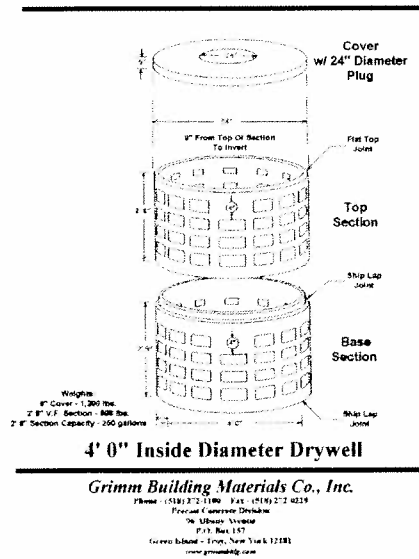
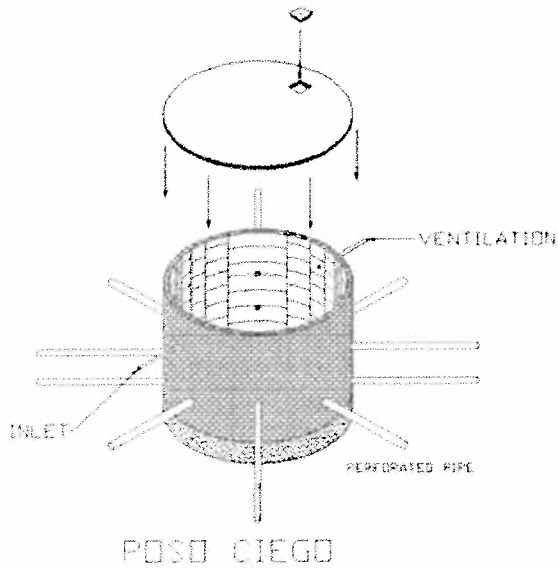
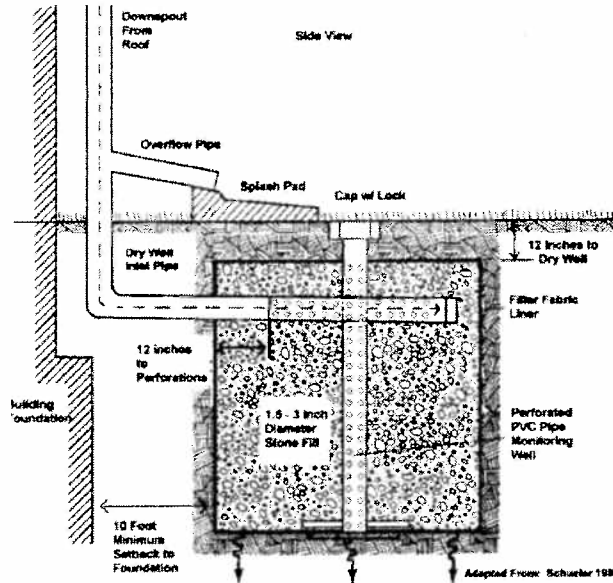
A dry well is a passive underground structure that disposes of unwanted water. It receives water from one or more entry pipes or channels at its top. Water is discharged through the sides and bottom of the dry well. Simple dry wells consist of a pit filled with gravel, riprap, rubble or other debris. Dry wells of this type do not have much storage capacity. A more advanced dry well consists of a reinforced concrete cylinder with perforated sides and bottom. Dry wells are usually buried completely, so that they do not take up any land area. Because dry wells are gravity fed, they must be constructed below the water's point of entry. Installing a dry well to accept foundation drain water would require significant excavation.

Cisterns are receptacles for water. They are commonly used for irrigation and for collecting rain in areas that have limited rainfall. Rain barrels are a type of cistern. Cisterns are not a practical alternative to sump construction. A buried cistern would function much like a sump. Water from the foundation drain would collect in the cistern and be pumped out when the cistern reached its capacity. It would require significant excavation to install. In addition, the pumping mechanism would be inaccessible from the house making maintenance and repairs problematic. An above ground cistern would require the installation of a sump or similar structure to facilitate the pumping of water from the foundation to the surface. In homes with older electrical systems, upgrades may be required to facilitate the installation of the cistern's pumping mechanism.

The primary difficulty with disposing of foundation drain water is its location beneath the surface. The installation of any gravity fed structure outside the house would require significant excavation. Pumping the water to the surface would require the installation of an underground collection point and a pumping mechanism. Both of these options are likely to be cost prohibitive. In addition, the repair and maintenance of underground structures is more problematic relative to sumps which are located within the house.

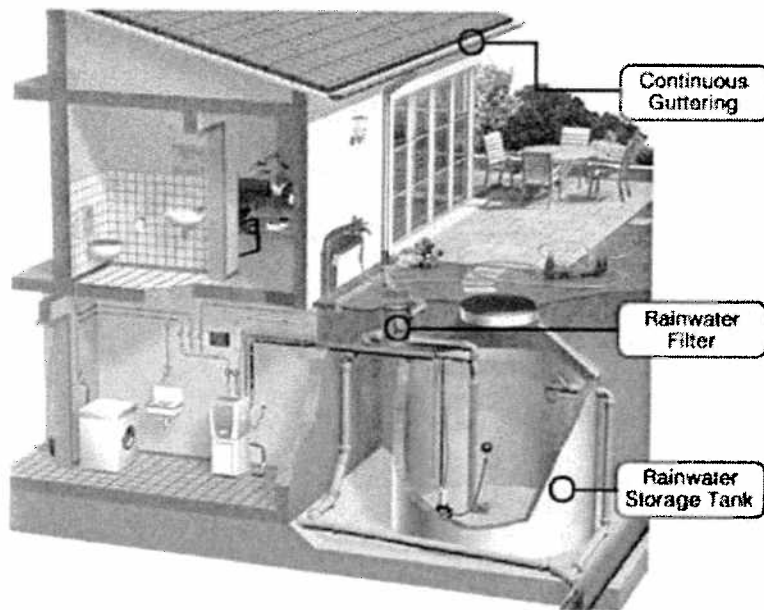
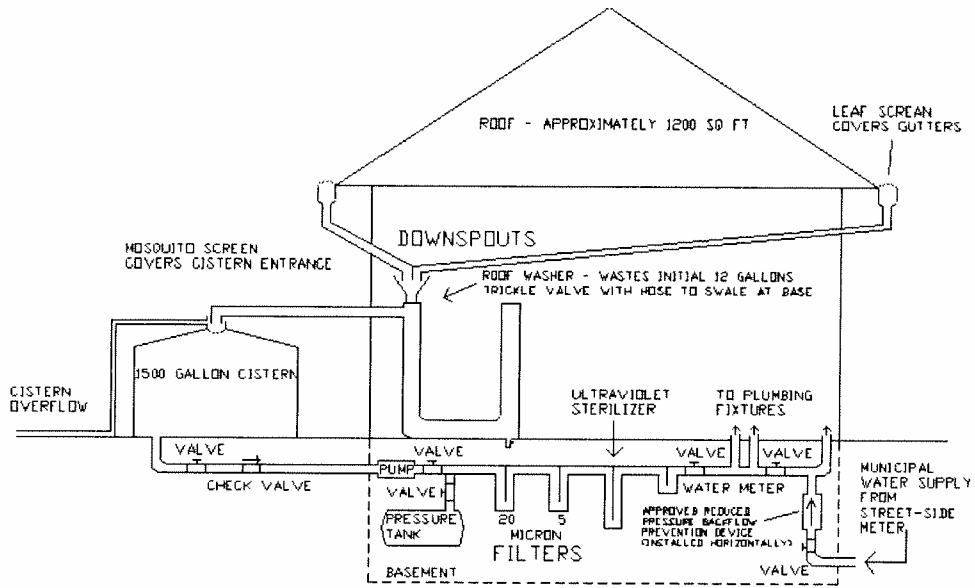
I have included diagrams of drywells, cisterns and sumps for comparison.

# Drywell Diagrams

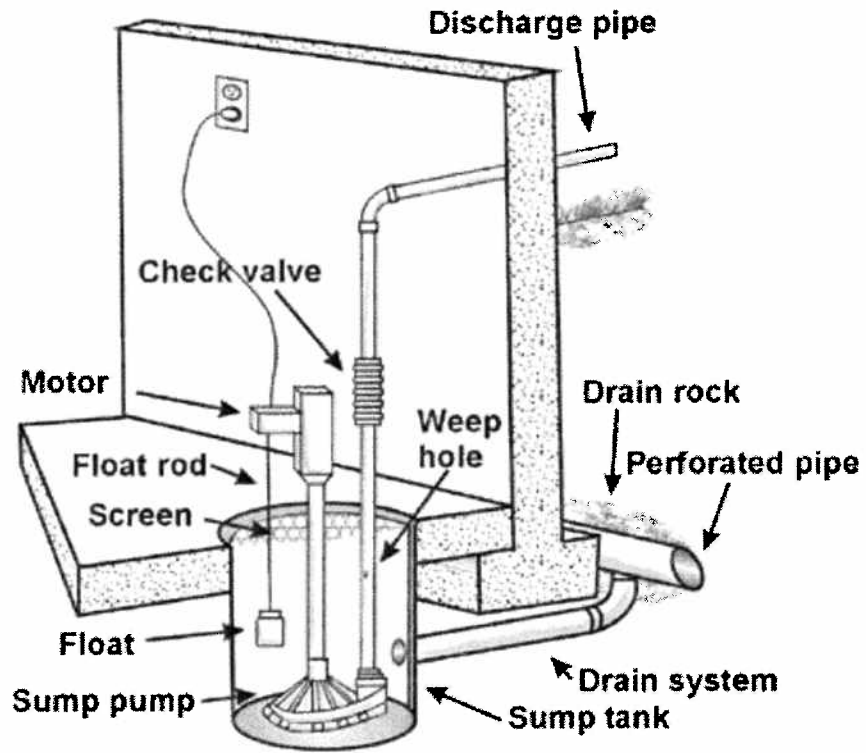




# Cistern Diagrams



# Sump Diagram



# Appendix G





# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Agenda FLOODING STUDY TASK FORCE

*ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS*

*Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin Shafer,  
Erick Shambarger, and Ken Yunker*

*Staff Assistant Tobie Black, 286-2231; Fax: 286-3456;  
tblack@milwaukee.gov*

*Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov*

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Thursday, April 14, 2011

10:00 AM

Room 301-B, City Hall

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1. Review and approval of the minutes of the March 24th meeting.
2. Discussion of the Village of Fox Point's ordinance prohibiting connections to its sanitary sewer system.
3. State, Milwaukee Metropolitan Sewerage District, and local revenue for infiltration and inflow programming.
4. Discussion of correspondence with the City Attorney's office.
5. Set next agenda and meeting date(s).

Members of the Common Council and its standing committees who are not members of this committee may attend this meeting to participate or to gather information. Notice is given that this meeting may constitute a meeting of the Common Council or any of its standing committees, although they will not take any formal action at this meeting.

Upon reasonable notice, efforts will be made to accommodate the needs of persons with disabilities through sign language interpreters or auxiliary aids. For additional information or to request this service, contact the Council Services Division ADA Coordinator at 286-2998, (FAX)286-3456, (TDD)286-2025 or by writing to the Coordinator at Room 205, City Hall, 200 E. Wells Street, Milwaukee, WI 53202.

Limited parking for persons attending meetings in City Hall is available at reduced rates (5 hour limit) at the Milwaukee Center on the southwest corner of East Kilbourn and North Water Street. Parking tickets must be validated in Room 205, (City Clerk's Office) or the first floor Information Booth in City Hall.

Persons engaged in lobbying as defined in s. 305-43-4 of the Milwaukee Code of Ordinances are required to register with the City Clerk's Office License Division. Registered lobbyists appearing before a Common Council committee are required to identify themselves as such. More information is available at [www.milwaukee.gov/lobby](http://www.milwaukee.gov/lobby).



# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Minutes

### FLOODING STUDY TASK FORCE

ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS

Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin  
Shafer, Erick Shambarger, and Ken Yunker

Staff Assistant Tobie Black, 286-2231; Fax: 286-3456;  
tblack@milwaukee.gov

Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov

---

Thursday, April 14, 2011

10:00 AM

Room 301-B, City Hall

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Meeting called to order at 10:09 a.m.

Members excused:

Rep. Sandy Pasch  
Ald. Ashanti Hamilton

Also in attendance:

Kathy Brengosz, Fiscal Planning Specialist  
Assistant City Atty. Thomas Miller, City Attorney's office

1. **Review and approval of the minutes of the March 24th meeting.**

*Amendments:*

*Third paragraph, page 2, last sentence- strike the sentence "incentives for homeowners"*

*Mr. Yunker moved to approve the minutes as amended. Seconded by Mr. Shafer.*

2. **Discussion of the Village of Fox Point's ordinance prohibiting connections to its sanitary sewer system.**

*Mr. Shafer discussed Chapter 20 of the Fox Point ordinance (please see attachment to Common Council file #100665). Mr. Shafer said that ordinance defines what the illegal clear water connections might be and provides a six-month grace period for homeowners to complete the required work. He said that the ordinance stems from stormwater and sanitary connection issues by the lake front and along Beach Drive.*

*Ald. Bohl asked if there is any public incentive in the ordinance. Mr. Shafer said that he was not aware of one. Ald. Bohl asked what the compliance rate is in the village.*

Mr. Shafer said that that information could be obtained. Ald. Bohl also asked what other work was entailed other than work on foundation drains. Mr. Shafer said that there was no work on laterals, but the village made sure that illegal connections in basements were eliminated.

Ald. Bohl asked what the incentive is of having downspout disconnection. Mr. Shafer said that a downspout being connected to the sanitary sewer system is illegal in the separate sewer area. Ald. Bohl also asked if more of a problem is being created with a downspout disconnection if it is not being directed far enough away from the foundation of the home. Mr. Shafer said that the downspout should be at least three to five feet from the foundation.

Ald. Bohl asked if there are more problems in the city because of the amount of clay under the subsurface in the city since it is not a water soluble surface. Mr. Yunker said that water will infiltrate in clay soils with some additional steps. But the clay does make infiltration more difficult.

Mr. Yunker said that relative to the city of Milwaukee, Fox Point has a separate sanitary sewer system and larger lot sizes. He said the number of affected homes in the village as opposed to the number in the city of Milwaukee should be considered, i.e., how many houses were built before 1954. Mr. Yunker also wondered if sump pump installation or downspout disconnection is sold is now mandated by the Fox Point ordinance when a house is sold since the ordinance mentions requiring compliance upon change of occupancy.

Ald. Bohl asked for information on the age of the housing stock in Fox Point. Mr. Shafer said that he believes the majority of houses were built before 1954.

Mr. Shambarger said that the part of the ordinance prohibiting groundwater infiltration would be difficult to enforce. Mr. Shafer said that he believes that this refers to a direct drainage channel or any man made system connected to the sewer system, not to a source such as leaks in laterals.

Ald. Bohl asked when the ordinance took effect. Mr. Shafer said that he believes that it was about a year ago. Ald. Bohl also asked if the village has any information on the rate of compliance now that the six-month grace period is over. Ald. Bohl also mentioned the "Penalties" section and asked if the village has defined "public nuisance" and if there will be assessments or fines for non-compliance.

Ms. Brengosz said that there are penalties for public nuisances, such as fines, imprisonment for defaulting on the fines, and punishments for continued violations. The village can also put a lien on a property and add charges to the tax bill. Ms. Brengosz said that there is a section in the ordinance regarding public nuisances, but she also said that there was nothing that specifically related to illegal disconnections as a public nuisance.

Mr. Shafer said that the president of the Village of Fox Point, Mike West, could attend a meeting and give a history of and more info on the ordinance.

### **3. State, Milwaukee Metropolitan Sewerage District, and local revenue for infiltration and inflow programming.**

Ald. Bohl said that any particular programming is going to require an infusion of revenues. He asked if the proposed state budget restricts MMSD from raising revenues through property taxes as it does for municipalities. Mr. Shafer said that the cap does not apply to the sewerage district, but MMSD is voluntarily developing



*its budget based on the assumption that the district would adopt the same limits that the municipalities would have placed on them. Ald. Bohl said that the city will have to look closely at what it could mandate if there is a reduction in funds from MMSD.*

*Ald. Bohl said that if the city is not going to pay the vast preponderance of the cost of repairs or the entire cost, at what point can the city pick certain neighborhoods for requiring improvements. Mr. Polenske said that participation in the demonstration project, which is not mandated, will help the city measure the public's response to private property improvements. He said that the city will do a cost-benefit analysis by collecting before and after data and indentifying what the benefit will be of private property improvements. He said that the challenge is financing since the city does not want to take funding away from the relief and relay program that is essential to the maintenance of the sewer system. Mr. Polenske said that the city cannot take money from that program and distribute it to I & I. The I & I program may require additional funding or additional buy in from property owners. Mr. Polenske said that the pilot program will give the city good information on what the benefits, costs and attitudes of the public are towards the city's work.*

*Mr. Polenske said that several areas have been identified by MMSD as having poor performing sewersheds, and those areas are where improvements are a priority. The demonstration project is in one of these areas.*

*Ald. Bohl asked what the city's revenues were for the 2011 Sewer Maintenance Fund. Mr. Shambarger estimated that about 27 million was from the Local Sewerage Charge and about 23 million from the Stormwater fee. He also said that most of the capital is financed with borrowing. The State Clean Water fund, which subsidizes the interest rate on the borrowing, was reduced in the proposed state budget, which would make projects more costly for the Sewer Maintenance Fund.*

*Mr. Shafer said the change in subsidization will cost ratepayers throughout MMSD's service area 28.5 million dollars over twenty years, and there will be more in interest payments over time.*

*Mr. Shambarger asked how soon the city can do an evaluation of the pilot program so a decision can be made on whether the program should be expanded. Mr. Polenske said that it depends on the weather and how information is collected, but he expects that DPW could obtain good data the season after the private property work is done. He also said that the first phase of the program is inspections in the neighborhood, which may depend on cooperation from homeowners as inspections may need to be performed inside properties.*

*Ald. Bohl asked how many areas in the city MMSD has determined to have poor performing sewersheds. Mr. Shambarger pointed out that both MMSD and the Department of Natural Resources have identified areas with problem sewersheds and that some of the areas overlap. Mr. Polenske said that a map can be brought to the next meeting that will show the problem areas.*

*Ald. Bohl asked if the work mandated by MMSD in the areas with problem sewersheds is to make improvements to city's sewer mains or to both sewer mains and private property. Mr. Polenske said that the city is required to make a plan to limit the amount of clear water that is getting into MMSD's system. He said that it is easiest to get to the problems in the public way.*

*Ald. Bohl asked if there could be an assessment of the number of homes that will be impacted in the 18 problem areas. Mr. Polenske said that that has already been done, along with cost estimates for improvements to private property. Mr. Polenske*

said that the time estimate for addressing problems in the areas would be about four years. However, the timeline is dependent on MMSD dollars received.

Ald. Bohl asked if any American Recovery and Reinvestment Act (ARRA) or stimulus funds had been received for sewer maintenance. Mr. Polenske said that projects that the city received money for have been completed. Ald. Bohl asked if the state contributes any funds towards water mitigation efforts. Mr. Shambarger mentioned the Clean Water Fund and Mr. Shafer said that a few grants for different small projects had been provided.

Ald. Bohl asked how realistic it is for the city to step up the Sewer Maintenance Fund rate. Mr. Polenske said that the demonstration project is important for determining the ultimate benefit of doing work on private property. He said that the results will be a key part of a discussion on increasing the rate. Ald. Bohl asked if MMSD has set a barometer for what is an acceptable level of improvement in areas with problem sewersheds. Mr. Shafer said that Chapter three of MMSD's rules establishes standards for sewershed performance, which is how it identified the eighteen poorly performing areas in the city. He also said that if municipalities can get the flow down to certain limits and maintain that, MMSD will say that the standards have been met.

Ald. Bohl said that he prefers that the task force push further than what was anticipated in the previous revenue report. He said that the task force should be bold in its recommendations, which may include suggesting means of creating increased revenue. Mr. Shambarger said it will be easier to make suggestions when the city has the results from the pilot program. He also said that consideration of a special assessment would make the necessary work more palatable to the property owners.

#### **4. Discussion of correspondence with the City Attorney's office.**

A response from the City Attorney's office has not yet been completed. Atty. Miller said that a written legal opinion will be issued by the City Attorney and that the issues framed by the task force revolve around uniformity, equal protection, and selective enforcement. There are issues that are posed by not only a hypothetical city-wide program but by any kind of targeted program. Although he said that he cannot give conclusions in the open meeting, he said that he understands the concern about uniformity and that the City Attorney's office will be looking at the principle that just because a municipal action may create a specific classification it does not mean the equal protection clause has been violated. He said that the courts would look at whether a municipality is acting reasonably to further a legitimate governmental interest and if the classification has a rational basis or if one class of people is being provided benefits over another. Ald. Bohl said that the opinion is driven by a lot of hypotheticals, which makes it difficult for the City Attorney to give an opinion. Ald. Bohl asked Atty. Miller to let City Attorney Langley know that the task force is working in a limited time frame.

Mr. Yunker asked if a targeted program that protects public health, safety and welfare could be permitted. Atty. Miller said that this is among the criteria that the city attorney's office will be looking at for the equal protection analysis.

#### **5. Set next agenda and meeting date(s).**

-Follow up discussion items on the Fox Point Ordinance-Availability of Mike West  
-Information on and maps of the sewershed target areas provided by DPW  
-Land Use planning issues and an appearance by Department of City Development staff to include a discussion of incorporation of green infrastructure for managing

*stormwater*

*Mr. Shamberger asked if it is possible to collect any data on whether there has been any meaningful improvement in flows from the stipulation work that has already been done. Mr. Polenske said that the stipulation work was all done in the public way and that he would look for any data that would show any improvement.*

*Ald. Bohl said that he will contact Vanessa Koster or Rocky Marcoux regarding an appearance of DCD at the next task force meeting regarding land use.*

*Next meeting scheduled for April 28th at 10:00 a.m.*

**Meeting adjourned at 11:41 a.m.**  
**Staff Assistant Tobie Black**



**CHAPTER 20**  
**PROHIBITED DISCHARGE INTO PUBLIC SANITARY SEWER SYSTEM**

20.01 **PURPOSE.** The purpose of this chapter is eliminate the unnecessary connection of clear water to the public sanitary sewer system, and thereby to reduce the occurrence of overflows and backups in the sanitary sewer conveyance system; to reduce the cost of operating the sanitary sewer system; to comply with applicable regulations, rules, stipulations and other laws and lawful orders of the State of Wisconsin, the federal government, and the Milwaukee Metropolitan Sewerage District; and to reduce the likelihood of failure of the sanitary sewer system. This purpose will serve to protect the health, safety and welfare of the Village of Fox Point and its environs.

20.02 **PROHIBITED DISCHARGES.** No person shall discharge or cause to be discharged any clear water into the public sanitary sewer system, except as described herein. Clear water includes, without limitation, stormwater, groundwater, rain water, street drainage, roof runoff, yard drainage, yard fountain, swimming pool, pond overflow, and sub-surface drainage. Prohibited discharges include, without limitation, any connection pipe or direct drainage channel carrying flow from a building foundation drain, sump pump, downspout, or any other means for connecting clear water to the public sanitary sewer system. This prohibition is subject to the following exceptions:

- (a) Existing Connections. Properties that have existing clear water connections to the sanitary sewer system on the date of adoption of this chapter shall remove the clear water connection from the sanitary sewer system in a manner approved by the Village Director of Public Works or Village Building Inspector. Such properties are allowed six (6) months to do so, as a grace period. The grace period shall be measured from the date the property owner first has actual knowledge of the clear water connection, or the date the property owner receives written notice of the clear water connection from the Village, whichever occurs first. The Village Director of Public Works and Village Building Inspector are, individually, authorized to extend this grace period for up to an additional six (6) months, in writing, upon a showing of extenuating circumstances which requires additional time to remove the illicit connection. Upon expiration of any such applicable grace period, any connection that remains in violation of this chapter is prohibited.
- (b) Waiver. Property owners may petition to the Village Board for a waiver of the requirements of this chapter. The Village Board may grant a waiver and allow the connection of clear water to the sanitary sewer system upon a showing that there is no reasonable alternative method of discharge of the clear water. Any waiver granted pursuant to this section may be granted subject to reasonable conditions which may include, without limitation, the following: limitations on the type of connection; limitations on the water source that may be connected; inspections by Village officials at all reasonable times; fees or charges related to the connection and inspection; and a requirement that the property owner enter an agreement in a form approved by the Village Board that is recorded with the Milwaukee County Register of Deeds. Any waiver granted under this section can be reviewed by the Village Board at a later date for any reason, and without cause. Upon such review, the Village Board can order the property owner to appear and show cause as to why the connection should not be removed, and after the property owner is heard, or if the property owner does not appear, the

Village Board can rescind the waiver in which case the connection must be removed within the time required by the Village Board. Any determination made by the Village Board pursuant to this Section is final and cannot be appealed to the Board of Appeals.

**20.03 NO LIMITATION.** Nothing in this chapter shall be interpreted as limiting or restricting the obligations described in other sections of the Fox Point Village Code or other applicable laws. In particular, and without limitation, the following requirements shall continue to apply as described therein: connection of surface water to the sanitary sewer (Section 30P.63, Fox Point Village Code); connection of stormwater to the sanitary sewer, whether above or below the surface of the ground (Section 30.05(5)(b), Fox Point Village Code); requiring sump pumps to discharge into a drainage ditch or into a storm sewer or into the ground (Section 12.11, Fox Point Village Code); and requiring compliance upon change of occupancy (Section 30P.62, Fox Point Village Code), in addition to such other regulations as may apply. In the event of conflict between the requirements of this chapter and the requirements of any other applicable ordinance or other law, the more restrictive shall apply as determined by the Village Director of Public Works.

**20.04 PENALTIES.** Any person violating any provision of this chapter shall be subject to the penalties and remedies as provided in Section 1.07 of the Village of Fox Point Village Code. Each day that a violation exists shall constitute a separate offense. Violation of this chapter is declared to be a public nuisance, and the Village Board may authorize all actions it deems to be necessary to abate and enjoin the public nuisance.

April, 2011

Mr. Grant Langley  
City Attorney  
Room 800  
City Hall  
Milwaukee, WI 53202

Mr. Langley:

The Flooding Study Task Force has been charged with recommending remedies for sewage backups and street flooding in the City of Milwaukee. Its discussions of potential solutions have included the implementation of a city-wide program to address inflow and infiltration issues in the sanitary sewer.

The proposed program would require property owners to disconnect clear water sources from the sanitary sewer. These sources could include downspouts, foundation drains and leaking sewer laterals. The purpose of the program is to reduce overall flows in the sanitary sewer. This will help prevent sewage from backing up into basements during rain events and help the City to comply with discharge permits regulating sanitary and combined sewer overflows.

The program would be implemented over a period of years, initially targeting neighborhoods that are believed to allow the greatest amount of clear water into the sewer system. These neighborhoods may or may not be the same neighborhoods that have experienced flooding in the past. Repairs would be ordered if the City's examination of the property revealed excessive flows into the sanitary sewer system. Property owners would be required to make repairs even if they have not experienced flooding or sewage backups.

Funding for the initial inspection to determine the extent of the work required would likely be provided by the Sewer Maintenance Fund. Funding sources for the repairs have not been determined, but it is anticipated that property owners will be required to pay at least a portion of the cost of repairs. Current estimates indicate that costs may approach \$15,000 per property depending on the type and extent of work required.

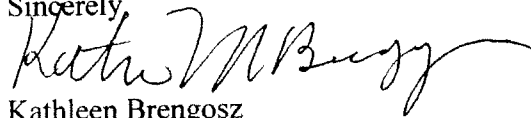
The Flooding Study Task Force has several questions regarding the permissibility of various components of the program.

1. Is it allowable for the City to mandate repairs on private property at the property owner's expense if the program's implementation schedule is so extended that as a practical matter some property owners may not have to comply with the mandate for 100 years or more?

2. Does the use of public funds to pay for all or a portion of mandated repairs on private property or the use of City forces to do the work alter the enforceability of the program?
3. If inflow and infiltration exist city wide, does targeting neighborhoods with the highest level of inflow and infiltration, as opposed to the highest incidence of flooding, represent a violation of equal protection?
4. What are the implications if the City implements this program for a short period of time and then discontinues it before repairs have been made on all properties?

The Flooding Task Force is seeking guidance on these issues prior to its meeting on April 14, 2011. I would be happy to meet with the appropriate staff attorney to provide any necessary clarification and discuss to this further. I can be reached at 286-3926.

Sincerely,



Kathleen Brengosz  
Fiscal Planning Specialist

cc: Linda Burke



**GRANT F. LANGLEY**  
City Attorney

**RUDOLPH M. KONRAD**  
**LINDA ULISS BURKE**  
**VINCENT D. MOSCHELLA**  
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**G. O'SULLIVAN-CROWLEY**  
**KATHRYN Z. BLOCK**  
**ELOISA DE LEÓN**  
**ADAM B. STEPHENS**  
**KEVIN P. SULLIVAN**  
**BETH CONRADSON CLEARY**  
**THOMAS D. MILLER**  
**JARELY M. RUIZ**  
**ROBIN A. PEDERSON**  
**DANIELLE M. BERGNER**  
**CHRISTINE M. QUINN**  
Assistant City Attorneys

May 11, 2011

Richard Pfaff, Manager  
Legislative Reference Bureau  
City Hall, Room 307

Attention: Kathleen Brengosz  
Fiscal Planning Specialist

Re: Guidance to the Flooding Study Task Force regarding implementation of a program to address inflow and infiltration

Dear Mr. Pfaff:

By letter dated April 1, 2011, Kathleen Brengosz, of your department, asked several questions that will assist the Flooding Study Task Force in its discussion of potential solutions to address inflow and infiltration ("I/I") issues in the sanitary sewers. Ms. Brengosz described a proposed city-wide program under discussion that would require property owners to disconnect clear water sources from the sanitary sewer, possibly including disconnection of down spouts and foundation drains, as well as repair, lining, or replacement of leaking sewer laterals.

As described, the proposed program would be implemented over a period of years, initially targeting neighborhoods that allow the greatest amount of clear water into the sanitary sewer system. Repairs would be ordered if inspections revealed excessive flows into the sanitary sewer system. Ms. Brengosz anticipates that property owners would be required to pay at least a portion of the cost of repairs and disconnection.

We understand that this is not a formal proposal but is intended for purposes of discussion by the task force. While Ms. Brengosz describes a potential city-wide I/I program, the Milwaukee Metropolitan Sewerage District's 2010-2020 Private Property Inflow and Infiltration Reduction Program ("MMSD Program"), which provides funding for eligible work to reduce I/I from private property sources, encourages a targeted approach<sup>1</sup>. The MMSD Program Policy Statement, a copy of which is attached, states:

<sup>1</sup> The MMSD Program, approved by the MMSD Commissioners in March 2011, authorizes spending \$156 million on private property I/I reduction efforts. However, MMSD's Executive Directors informed the members of the task force that the proposed State of Wisconsin Budget will have significant effects on the program's funding level, potentially reducing funding for the Program to \$50 million.

The District expects Municipalities to prioritize work areas, where feasible, to focus on areas with sewersheds within identified metersheds that do not comply with the District's rules on Peak Flow Rate Reduction (MMSD Rules § 3.201 et seq.), on areas with basement back-up issues, on areas with a history of municipal or District overflow activity, and other areas identified as sources of high I/I because of age and type of infrastructure. Municipalities which demonstrate they have no contiguous or discrete I/I problem areas may utilize funding for I/I work across the Municipality.

In addition, in adopting the MMSD Program Policy Statement, MMSD made the following "Legislative Findings as the rational basis for this Program[:]"

1. Basement backups are a significant public health and safety issue.
2. Under many circumstances, removing I/I from private property is the most direct means to reduce the risk of basement backups because it removes excess flow at the source.
3. In most circumstances, basement backups are caused by sewer surcharging that is very close to the affected property. Therefore, a) I/I reduction work in the combined sewer area will help reduce the risk of basement backups in the combined sewer area, and b) separating combined sewers is likely to have a minimal effect, if any, on basement backups in the separated sewer area. Most basement backups in 2008-2010 occurred in separated sewer areas.
4. Private property I/I work can result in lower capital and operating costs to the District and the 28 municipalities it serves, along with benefits including the availability of sewer backup insurance, lower disaster recovery costs, and preventing the devaluation of properties.
5. Disconnecting foundation drains is a very effective strategy for reducing inflow. Rehabilitation or replacement of laterals (including flood grouting) is also one of the most effective strategies for reducing infiltration, especially in older communities where deteriorated laterals can contribute very large quantities of clear water to the sanitary sewer system.
6. Private property I/I work reduces the risks of combined and sanitary sewer overflows to surface water during wet weather by

increasing the percentage of total flow that can be conveyed, stored and treated.

7. Deteriorated laterals are also a source of pollution to area surface and ground waters and pose public health issues other than basement backups.
8. Although privately owned, lateral sewers are a necessary part of the collection system. Although lateral replacement or rehabilitation may be a benefit to the private property owner, that benefit is incidental to the public benefits and public purpose described above.

Before answering Ms. Brengosz's questions we wish to address the City's authority to require property owners to disconnect downspouts and foundation drains in both the separated and combined sewer areas and to repair, line, or replace leaking sewer laterals.

A. Connection in Areas Served by Separated Sewers

The State and City plumbing codes prohibit connection of stormwater or clearwater piping, including foundation drains and downspouts, to the separated sanitary sewer. Wis. Admin Code §§ Comm 82.30(11)(g) and Comm 82.36(4)(b)1; MCO § 225-5-4. However, under MMSD rules, foundation drains connected to the sanitary sewer before 1954 are grandfathered and may remain connected unless a governmental unit requires disconnection to reduce inflow. MMSD Rule 3-108(3).

Although pre-1954 connections to the sanitary sewer have been grandfathered, it is our opinion that, based on MMSD's "Legislative Findings" quoted above, the City could adopt an ordinance requiring property owners to disconnect foundation drains from the separated sanitary sewer. In *Village of Menomonee Falls v. Michelson*, the court held that a property owner's constitutional right to due process was not violated when the village enforced an ordinance requiring her to disconnect her foundation drain from the sanitary sewer. 104 Wis. 2d 137, 311 N.W.2d 658 (Ct. App. 1981).

Michelson claimed that an earlier ordinance required homeowners to connect foundation drains to the sanitary sewer system. The court, finding nothing in the record showing that the village had previously required such connections, nonetheless held that even if there had been a requirement, the owner's due process rights were not violated because a property owner has no vested right to have a drain connection to the sanitary sewer. *Id.* at 143. The court held that the right "to connect with a municipal sewer is in the nature of a license only...and may be revoked for cause at any time." *Id.* at 144 (citing 11 McQuillin, *The Law of Municipal Corporations*, § 31.31, at 241 (3<sup>rd</sup> ed. 1977)). In finding such cause, the court held:

The ordinance involved in the present case is a valid exercise of the Village's police powers and is consistent with the Village's contractual and legal obligations. As the Village points out, when a large amount of clear water is permitted to flow into sanitary sewers, as during a rainstorm, the sewers may overflow and sewage may back up into basements. Further, the influx of clear water into sanitary sewers may reduce the ability of sewage treatment plants to dispose of sewage.

*Michelson*, 104 Wis. 2d at 144 (citation omitted).

B. Connections in Areas Served by Combined Sewers

Pursuant to Comm 82.36(4)(b)(2), the State plumbing code permits connection of foundation drains and downspouts with the combined sewer:

- (b) *Segregation of wastewater.* 1. Except as provided in subd. 2., stormwater or clearwater piping may not connect to a sanitary drain system.
2. Where a combined sanitary-storm sewer system is available, stormwater, clearwater and sanitary wastewater may be combined in the building sewer.

While the City and MMSD encourage owners to voluntarily disconnect downspouts from the combined sewers, the City plumbing code provides that property owners are required to connect downspouts to the storm sewer or combined sewer unless certain discharge requirements are met. *See* MCO § 225-4-2-a. *See also* MMSD Rule 3.107(2)(b) ("If a roof drain was connected to a combined sewer before the construction of a storm sewer that serves the property, then the roof drain may remain connected to the combined sewer, unless a governmental unit requires disconnection).

The State plumbing code, pursuant to Wis. Stat. § 145.13, provides that chapter 82 of the plumbing code is "uniform in application and a municipality may not enact an ordinance for the design, construction, installation, supervision, maintenance and inspection of plumbing which is more stringent than [chapter 82], except as specifically permitted by rule." Comm 82.03(2). Accordingly, it is our opinion that absent a change in the plumbing code requiring disconnection of stormwater and clearwater piping from the combined sewers, the City lacks authority to enact an ordinance prohibiting such connections to the combined sewers.

The City can, however, implement a targeted inspection-driven mandatory disconnection program as proposed by MMSD<sup>2</sup>. For example, where testing and inspections

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<sup>2</sup> Note that the MMSD Program does not list downspout disconnections as work eligible for funding.

demonstrate that connections of foundation drains and downspouts to the combined sewer result in excessive I/I, the City can require that those sources of clear water be disconnected from the combined sewer. *See* Comm 82.22(2)(b) (“When a hazard to life, health or property exists or is created by an existing system, that system shall be repaired or replaced.”). In addition, MCO § 225-02 provides that certain plumbing code sections, including Comm 82.30(11)(g)’s prohibition against connection of storm drain piping or clear water drain piping to a sanitary sewer lateral, shall apply retroactively if *upon inspection* a condition is identified that tends to create a potential health hazard. In such case, the plumbing system, or any part thereof, shall be repaired, renovated, replaced, or removed in conformity with the State code. MCO § 225-02.

C. Sewer Lateral Rehabilitation and Replacement

The City has authority to order property owners to repair or replace defective or leaking sewer laterals. *See* City Charter § 12-15; Comm 82.22(2)(b), *supra*. In addition MCO § 275-55-2, the plumbing subchapter of the City’s building code, provides in pertinent part, “Every . . . sewer line shall be so installed and maintained as to function properly and shall be kept free from obstructions, leaks and defects to prevent structural deterioration or health hazards.”

Pursuant to City Charter § 12-15 the property owner is responsible for maintenance of the sewer lateral as well as the cost of necessary repairs. Charter § 12-15-1 provides, in pertinent part:

1. MAINTENANCE. It shall be the duty of the abutting land owner to maintain in a reasonable state of repair all sewer laterals, including storm, sanitary and combined house sewers leading from the property to the main sewer. Where any lateral located within, under or on any street, alley or public way is either out of repair or has caused damage to the surface or substructure of the street in any way, the commissioner of public works shall order the abutting land owner to make the necessary repairs. If the owner refuses to comply with the order, or if the owner cannot be determined or found, the commissioner shall make the repairs, assess the cost against the property abutting the lateral and notify the owner of the charges by certified letter.

We recently opined that the City could continue a project to line a short length of lateral at the main/lateral junction, such work to be performed in the public right-of-way. *See* City Attorney Opinion dated January 22, 2010. That opinion did not address Charter § 12-15 because the City was not lining the laterals in order to repair individual defective laterals but rather as part of a comprehensive effort to line all the lateral segments, regardless of their condition, in certain problem areas to reduce I/I. If the City adopts an inspection or test-based targeted program, such as proposed by MMSD, it may be

advisable to amend this Charter section to permit the City to pay all or a portion of the lateral repair or replacement costs when ordering work pursuant to such program.<sup>3</sup>

D. Questions Posed

To assist the task force in its discussion, Ms. Brengosz's letter asks the following questions:

1. *Is it allowable for the City to mandate repairs [and disconnection of clear water sources] on private property at the property owner's expense if the program's implementation schedule is so extended that as a practical matter some property owners may not have to comply with the mandate for 100 years or more?*

Answering Question 1, a City ordinance requiring property owners to disconnect foundation drains and downspouts from the separated sanitary sewer at the property owner's expense would not violate the equal protection clause of either the United States Constitution or the Wisconsin Constitution notwithstanding the fact that limited resources would likely require the ordinance to be enforced over several years. The fact that the City may not have resources to inspect and enforce the ordinance against every property would not, by itself, constitute illegal selective enforcement.

In *Michelson*, discussed above, the court rejected Michelson's argument that the village was engaging in selective enforcement in violation of the equal protection clause because she claimed it was enforcing the ordinance against only about fifty percent of the properties that had a drain connection in violation of the ordinance. 104 Wis. 2d at 145. The court reasoned:

The equal protection clause of the Fourteenth Amendment is violated if an ordinance is administered "with an evil eye and an unequal hand, so as practically to make unjust and illegal discriminations between persons in similar circumstances, material to their rights." . . . Nevertheless, evidence that a municipality has enforced an ordinance in one instance and not in others would not in itself establish a violation of the equal protection clause. . . . There must be a showing of an intentional, systematic and arbitrary discrimination.

*Id.* at 145 (citations omitted).

"Selective enforcement which occurs over a period of time does not, by itself, constitute a constitutional violation unless there is no intention to follow it up by general

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<sup>3</sup> We understand that the City and MMSD will implement a voluntary private property I/I reduction demonstration project in 2011 using MMSD funds and MMSD contractors.

enforcement against others.” *Carpenter v. Commissioner of Public Works*, 115 Wis. 2d 211, 219, 339 N.W.2d 608 (Ct. App. 1983) (citing *Michelson*, 104 Wis. 2d at 146). “It is only when the selective enforcement is designed to discriminate against the persons prosecuted, without any intention to follow it up by general enforcement against others, that a constitutional violation may be found.” *Michelson*, 104 Wis. 2d at 146 (citation omitted).

Further, an inspection-driven mandatory disconnection and lateral repair program applying to both the separated and combined sewer areas would not violate the equal protection clause, provided there is a rational basis for targeting certain areas rather than others. The fact that a classification scheme results in some inequity does not provide a sufficient basis for invalidating it. *Metropolitan Assocs. v. City of Milwaukee*, 2011 WI 20, ¶ 62. Equal protection “does not deny a [municipality] the power to treat persons within its jurisdiction differently...” *Nankin v. Village of Shorewood*, 2001 WI 92, ¶ 12, 245, Wis. 2d 86, 630 N.W.2d 141. Unless a suspect class or fundamental interest is involved, courts will sustain a classification if any rational basis exists to support it. *Metropolitan Assocs.*, at ¶ 60, *in* 20. Any doubts must be resolved in favor of the reasonableness of the classification. *Id.* at ¶ 61 (citation omitted).

The Wisconsin Supreme Court has specified five factors as relevant to the determination whether a classification is reasonable for purposes of equal protection:

- (1) All classifications must be based upon substantial distinctions which make one class really different from another;
- (2) The classification adopted must be germane to the purpose of the law;
- (3) The classification must not be based upon existing circumstances only [it must not be so constituted as to preclude addition to the numbers included within the class];
- (4) To whatever class a law may apply it must apply equally to each member thereof; and
- (5) The characteristics of each class should be so far different from those of other classes as to reasonably suggest at least the propriety, having regard to the public good, of substantially different legislation.

*Metropolitan Assocs.*, at ¶ 64.

In exercising its police power, a municipality need not attempt to remedy or eliminate an entire problem; “reform may take one step at a time, addressing itself to the phase of the

problem which seems most acute to the legislative mind.” *Vaden v. City of Maywood*, 809 F.2d 361, 365 (7<sup>th</sup> Cir. 1987) (quoting *Williamson v. Lee Optical of Oklahoma, Inc.*, 348 U.S. 483, 489 (1955); see also *Greater Chicago Combine and Center, Inc. v. City of Chicago*, 431 F.3d 1065, 1072 (7<sup>th</sup> Cir. 2005) (“a city’s decision to address a problem gradually is rational.”).

Accordingly, if the City can identify a rational basis for targeting certain areas as part of a clear water disconnection and lateral repair program, then such a targeted effort will not violate the equal protection clause. Relevant criteria for classifying targeted areas could include, for example, whether MMSD has identified the area as belonging to a “poorly performing” sewershed under objective metering tests.

2. *Does the use of public funds to pay for all or a portion of mandated repairs on private property or the use of City forces to do the work alter the enforceability of the program?*

a. Equal Protection

Answering question 2, the use of public funds to pay all or a portion of mandated disconnection or lateral repair work would not change the equal protection analysis provided in response to question 1. Courts employ the same analysis regardless of whether the classification confers a benefit or imposes an obligation. See City Attorney Opinion dated August 6, 1975, at p. 5.

b. Public Purpose

The use of public funds to pay for all or a portion of disconnection and lateral repair work on private property must be consistent with the public purpose doctrine, which requires that public funds be used only for public purposes. *Town of Beloit v. County of Rock*, 2003 WI 8, ¶ 27, 259 Wis. 2d 37, 657 N.W.2d 344. It is our opinion that the public purpose doctrine would not likely preclude the use of public funds for private property I/I reduction efforts.

A reviewing court must determine whether any public purpose “can be conceived” to reasonably justify the expenditure, giving great weight to the legislature’s declarations. *Id.* at ¶ 21. “A court will conclude that there is no public purpose only if it is ‘clear and palpable’ that there can be no benefit to the public.” *Id.*, at ¶ 28 (citation omitted). Accordingly, “the public purpose doctrine has been broadly interpreted” and liberally applied. *Id.*, at ¶¶ 29, 33.

The threshold issue is whether the appropriation is related to public necessity, convenience, or welfare. *Hopper v. City of Madison*, 79 Wis. 2d 120, 129-30, 256 N.W.2d 139 (1977). As the Wisconsin Supreme Court explained in *Town of Beloit*:



In determining whether a public purpose exists, courts have considered whether the subject matter or commodity of the expenditure is one of “public necessity, convenience or welfare,” as well as the difficulty private individuals have in providing the benefit for themselves...Courts also look to see if the benefit to the public is direct or remote...Additionally, provided that the primary purpose of the expenditure is designed for a public purpose, any direct or incidental private benefit does not destroy the public purpose and render the expenditure unconstitutional...

2003 WI 8, ¶ 29.

Based on MMSD’s Legislative Findings, *supra*, it appears that there is a strong argument that public funds for private property disconnection and repair work would further the “public necessity, convenience, or welfare” by reducing the risk of basement backups. This conclusion is strengthened if it is determined that a comprehensive effort to reduce private property I/I within “poorly performing” sewersheds is not feasible without public funding.

In addition, an argument can be made that private property I/I reduction will provide public fiscal benefits through improving the value of housing stock in the affected areas. *Town of Beloit*, 2008 WI 8, ¶ 49 (combination of goals of creating jobs, promoting orderly growth, enhancing the tax base, and preserving and conserving environmentally sensitive lands is a legitimate public purpose); *Libertarian Party of Wisconsin v. State*, 199 Wis. 2d 790, 546, N.W.2d 424 (1996) (holding that creating jobs and enhancing the tax base, among other reasons, provided a public purpose in the expenditure of public funds to build Miller Park).

The fact that a targeted program may benefit only a small number of residents or that these residents would derive a benefit would not necessarily eliminate the public purpose, provided that the private benefits to the individual homeowners are incidental to the public purpose of reducing basement backups within the targeted sewershed. As the court held in *Hopper*:

If an appropriation is designed in its principle parts to promote a public purpose so that its accomplishment is a reasonable probability, private benefits which are necessary and reasonable to the main purpose are permissible.

\* \* \*

Although the number of beneficiaries is a pertinent factor in determining whether an appropriation has a public purpose, this court has stated many times “the fact the (appropriation) may benefit certain individuals or one

particular class of people, more immediately than other individuals or classes does not necessarily deprive the (appropriation) of its public purpose.”

79 Wis. 2d at 129, 134-35 (citations omitted) (finding public purpose for municipal appropriation to organization to provide information and grievance services to tenants). *See also State ex rel. Warren v. Reuter*, 44 Wis. 2d 201, 214, 170 N.W.2d 790 (1969) (holding that appropriation to a private university was not made primarily to benefit the institution to promote and maintain public health and therefore was for a public purpose). *State ex rel. Warren v. Nusbaum*, 59 Wis. 2d 391, 208 N.W.2d 780 (1973) (finding a public purpose in legislation providing for financing authority for construction of low and moderate income housing).

c. Liability

While not affecting the enforceability of the program, use of City funds or City forces on a private property I/I reduction program may expose the City to liability for which it would not otherwise be subject to. The use of hold harmless agreements, at a minimum, is advisable.

*3. If inflow and infiltration exist city wide, does targeting neighborhoods with the highest level of inflow and infiltration, as opposed to the highest incidence of flooding, represent a violation of equal protection?*

Answering Question 3, we do not know the extent to which I/I occurs city-wide or the degree to which some sewersheds experience excessive I/I in comparison to other parts of the City. Nonetheless, so long as there is a rational basis for doing so, targeting a sewershed based on excessive I/I as opposed to flooding incidents would not violate the equal protection clause. As long as there is a reasonable basis for selecting excessive I/I as the determining factor, it does not matter that another party may find a different classification to be more reasonable. *Kahn v. McCormack*, 99 Wis. 2d 382 (1980).

*4. What are the implications if the City implements this program for a short period of time and then discontinues it before repairs have been made on all properties?*

Answering question 4, based upon MMSD’s “Legislative Findings” a targeted, inspection-driven foundation drain and downspout disconnection and lateral repair and replacement program appears reasonably related to the City’s police power to further the public health, safety, and welfare; so too does a general ordinance requiring property owners to disconnect foundation drains from the sanitary sewer area. The fact that the City may discontinue the program or repeal the ordinance before requiring disconnection

Richard Pfaff  
May 11, 2011  
Page 11

and repair/replacement work on all properties does not affect the determination whether there is a rational basis for these efforts in the first place.

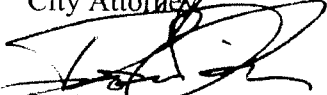
As for liability implications, the City would not take on greater liability by terminating a program before all potential target areas are addressed. The design, planning, and implementation of sewer systems are discretionary acts for which the municipality enjoys immunity in the event of future basement backups. *Milwaukee Metro. Sewerage Dist. v. City of Milwaukee*, 2005 WI 8, ¶ 60, 277 Wis. 2d 635, 691 N.W.2d 658.

We trust that this analysis answers your questions. Please contact the undersigned if you have any further questions.

Very truly yours,



GRANT F. LANGLEY  
City Attorney



THOMAS D. MILLER  
Assistant City Attorney

TDM:wt:168147  
1055-2011-1064



# Appendix H





# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Agenda

### FLOODING STUDY TASK FORCE

*ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS*

*Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin Shafer,  
Erick Shambarger, and Ken Yunker*

*Staff Assistant Tobie Black, 286-2231; Fax: 286-3456;  
tblack@milwaukee.gov*

*Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov*

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Thursday, April 28, 2011

10:00 AM

Room 301-A, City Hall

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**This meeting has been cancelled due to lack of quorum.**

1. **Review and approval of the minutes of the April 14th meeting.**
2. **Further discussion of the Fox Point ordinance prohibiting connections to its sanitary sewer system.**
3. **Discussion of land use issues, including but not limited to a discussion of the incorporation of green infrastructure for managing stormwater.**
4. **Discussion of the areas of the city identified as having poorly performing sewersheds.**
5. **Set next agenda.**

Members of the Common Council and its standing committees who are not members of this committee may attend this meeting to participate or to gather information. Notice is given that this meeting may constitute a meeting of the Common Council or any of its standing committees, although they will not take any formal action at this meeting.

Upon reasonable notice, efforts will be made to accommodate the needs of persons with disabilities through sign language interpreters or auxiliary aids. For additional information or to request this service, contact the Council Services Division ADA Coordinator at 286-2998, (FAX)286-3456, (TDD)286-2025 or by writing to the Coordinator at Room 205, City Hall, 200 E. Wells Street, Milwaukee, WI 53202.

Limited parking for persons attending meetings in City Hall is available at reduced rates (5 hour limit) at the Milwaukee Center on the southwest corner of East Kilbourn and North Water Street. Parking tickets must be validated in Room 205, (City Clerk's Office) or the first floor Information Booth in City Hall.

Persons engaged in lobbying as defined in s. 305-43-4 of the Milwaukee Code of Ordinances are required to register with the City Clerk's Office License Division. Registered lobbyists appearing before a Common Council committee are required to identify themselves as such. More information is available at [www.milwaukee.gov/lobby](http://www.milwaukee.gov/lobby).





**To:** Flooding Study Task Force  
**CC:** File  
**Date:** April 26, 2011  
**Re:** Response to Task Force Inquiry

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I regret that I am unable to attend the Flooding Study Task Force meeting on April 28, 2011. I am committed to a previously scheduled training program that day. I offer the following responses to the questions that the Task Force has that are within my areas of knowledge.

*What types of restrictions are there on redevelopment in areas defined as having surface flood risk?*

The only areas currently identified as having surface flood risk are those indicated on the Flood Insurance Rate Maps published by the Federal Emergency Management Agency (FEMA). These indicate those areas of the city that are designated as within the floodplain. Any proposed development within a mapped floodplain must meet various requirements of federal and state regulations for such construction. There are provisions in the Wisconsin Uniform Dwelling Code for the construction of a one- or two-family dwelling in a floodplain. Those restrictions include elevating the lowest level to at or above the base flood elevation, floodproof basements, and protection of electrical and mechanical equipment. Our current zoning code would restrict such development, however. Areas outside of a mapped flood plain may experience surface flooding for other reasons, but are not subject to those restrictions. These areas of surface flooding risk are not identified at this time.

*What are DCD's thoughts on disallowing basements on new construction in areas that have a known basement back-up flooding risk?*

In the City of Milwaukee Code of Ordinances, s. 225-7 requires that all new construction be referred to DPW to determine if the property is in a critical backwater area. If it is, the lowest level of the new building must be at least three feet higher than the top of the public sanitary sewer or provided with a backwater valve to prevent water from entering the dwelling. These devices cost approximately \$50.00. Disallowing basements may be a conflict with State Uniform Dwelling Code (UDC). According to s. 20.02(2) (a) of that code, no municipality may enact a restriction greater than the UDC.

*Could DCD require that on new construction, HVAC units be suspended x amount of feet off of the basement floor to reduce property damage in the event of flooding?*

Similar to the previous question, this would be a local requirement that is more restrictive than the UDC and would not be permitted.

April 26, 2011

*Does the City currently have any existing point of sale requirements for structural issues on properties? What are the pros and cons of point-of-sale requirements relative to sewer connections on commercial, industrial, residential properties?*

DNS had a point of sale interior/exterior code compliance program and I believe it still does for the exterior in limited areas. DNS is best equipped to provide insights to this question.

I hope that the Task Force will find the above information helpful.

A handwritten signature in black ink, appearing to read "Chris Rute". The signature is fluid and cursive, with the first name "Chris" and last name "Rute" clearly distinguishable.

Chris Rute, AIA  
Permit & Development Center Manager  
(414) 286-3018  
crute@milwaukee.gov

## FLOODPLAIN OVERLAY ZONES

“FW” Floodway overlay zone

“FF” Flood fringe overlay zone

“FSD” Flood storage overlay zone

## FLOODPLAIN OVERLAY ZONES

“FW” Floodway overlay zone

Deeper, faster moving water

Purpose: insure that the flow of water is not impeded during periodic flooding, and that flood heights upstream are not increased.

Permitted uses include agricultural, non structural industrial/commercial, open space, water dependent uses, public utilities and earth grading activities

## FLOODPLAIN OVERLAY ZONES

### **“FF” Flood fringe overlay zone**

Contains shallow, slow moving water,

Purpose: allow limited development so long as adequate floodproofing measures are followed, flood storage areas are not reduced during periodic flooding and flood heights are not increased upstream

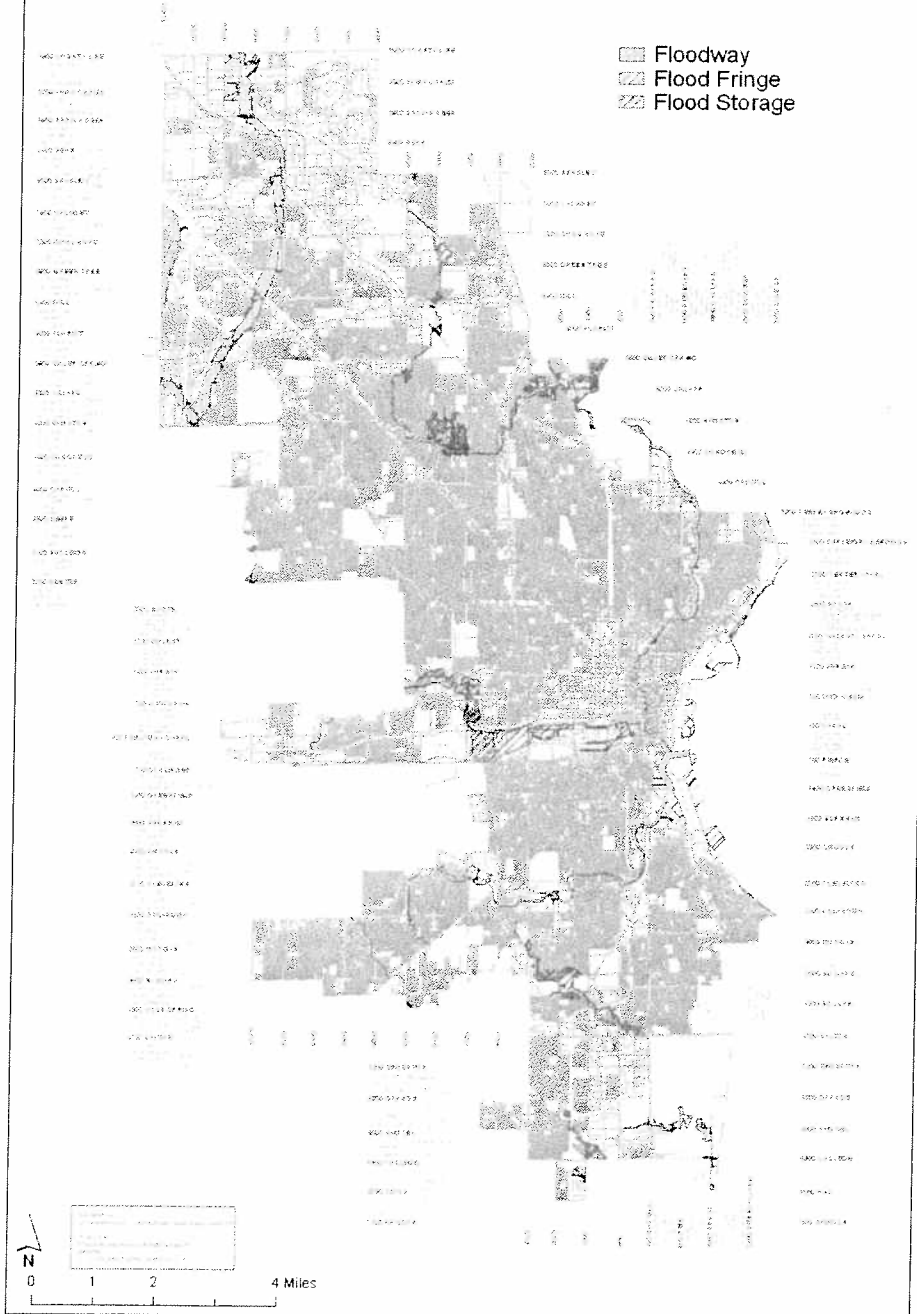
## FLOODPLAIN OVERLAY ZONES

### **“FSD” Flood storage overlay zone**

storage of flood waters has been taken into account during analysis in reducing the regional flood discharge, permits development provided development standards are met

Purpose: reduce the regional flood discharge

# City of Milwaukee Floodplains





# City of Milwaukee Department of Public Works

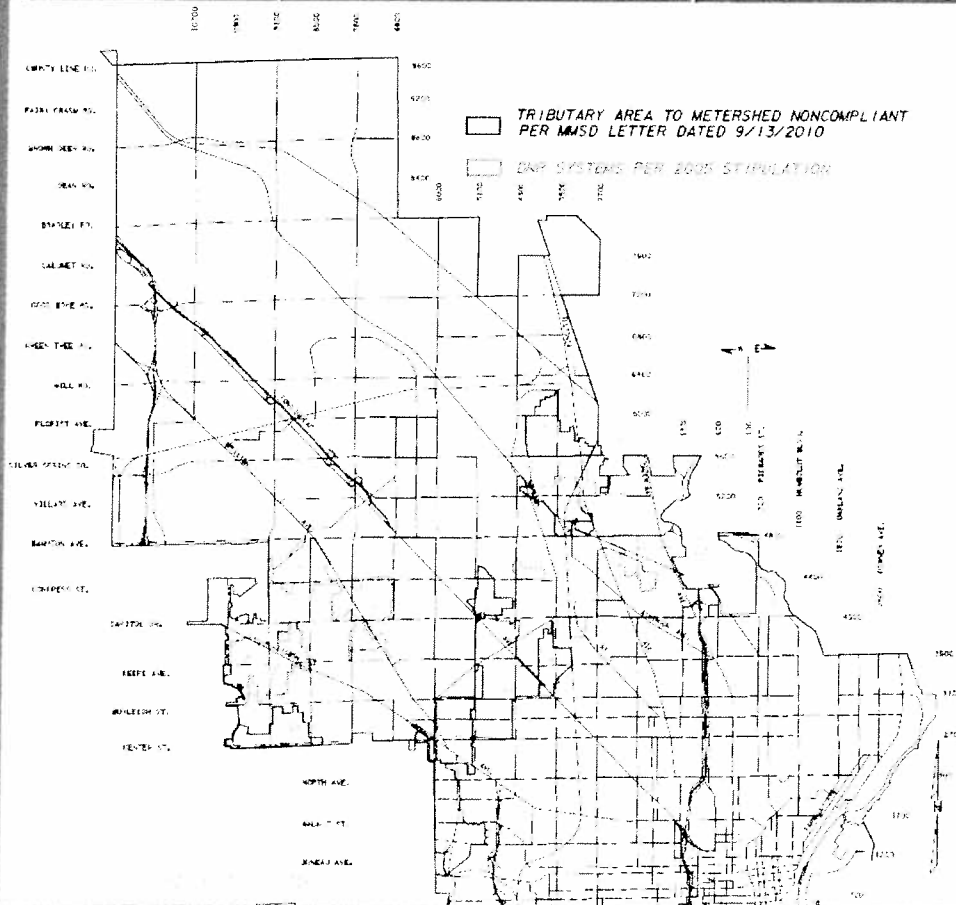


## DNR Stipulated Areas and Noncompliant Tributaries

City of Milwaukee

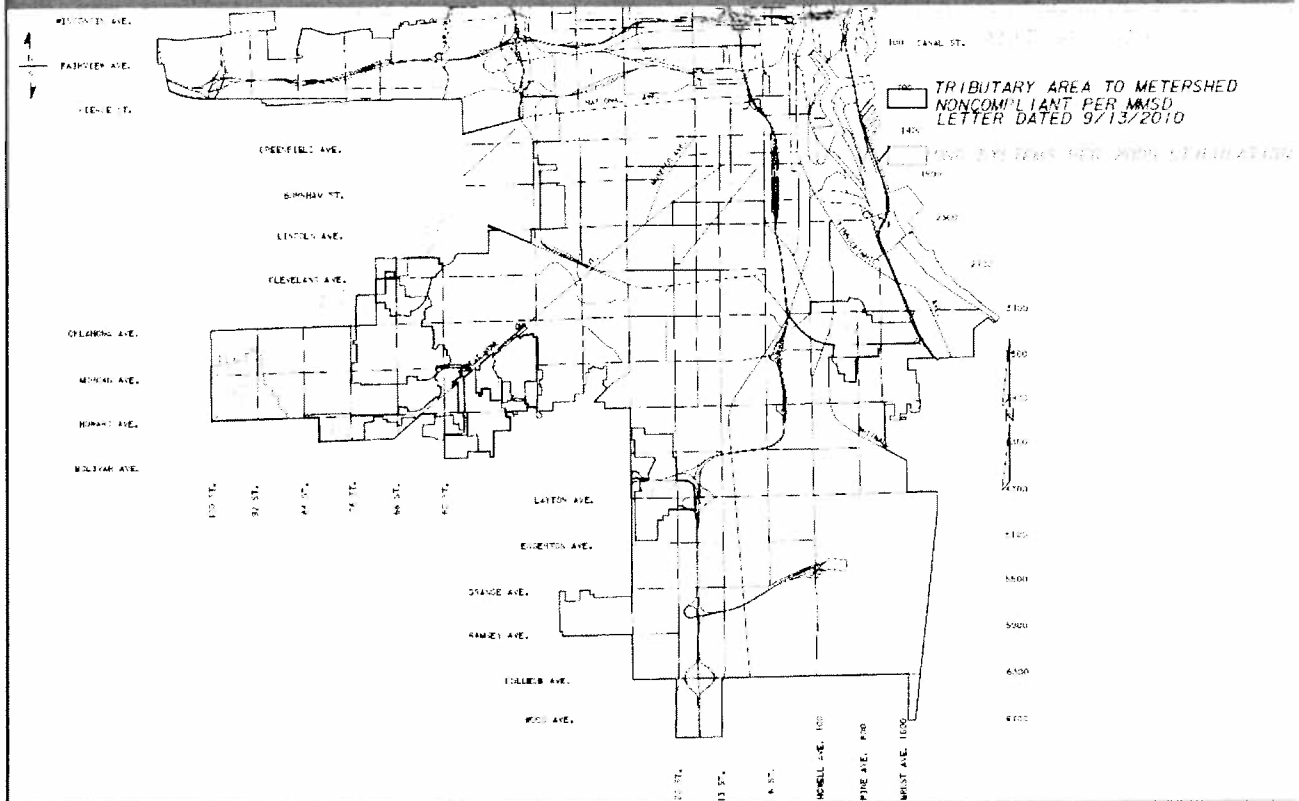
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## Citywide DNR Stipulations and Non-Compliant – North Side



2

## Citywide DNR Stipulations and Non-Compliant – South Side



## DNR Stipulated Areas

- 7 Systems were selected based on flow monitoring and modeling data
- All systems exhibiting high levels of Inflow and Infiltration (I/I) were selected

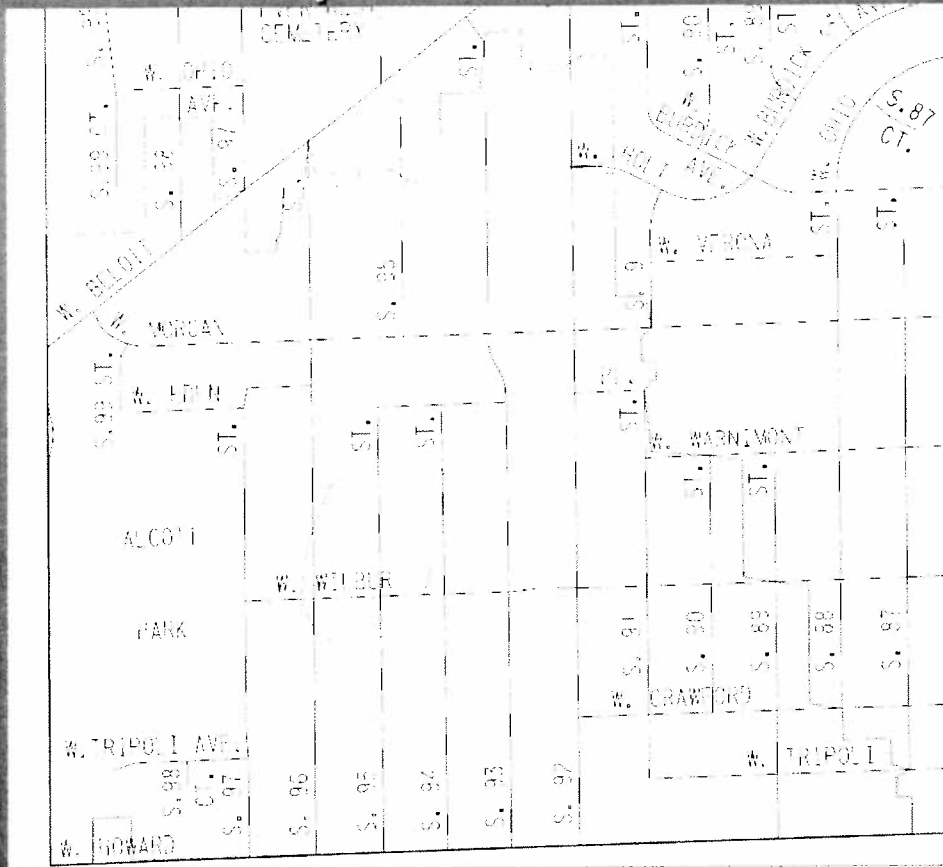








# DNR Stipulated Area - G



11

## Work performed related to DOJ Stipulation

- All work in the 7 critical areas as stipulated by the DNR was bid out between 2007 and 2010
- Total work performed for all area:
  - \$13,421,000 for sewer rehabilitations
  - \$ 9,206,000 for sanitary manhole rehabilitation
  - \$ 1,150,000 for dye water flooding
  - \$ 615,000 for sanitary manhole inspection
- The total cost for the work performed is \$24,392,000

# MMSD Noncompliant Metersheds

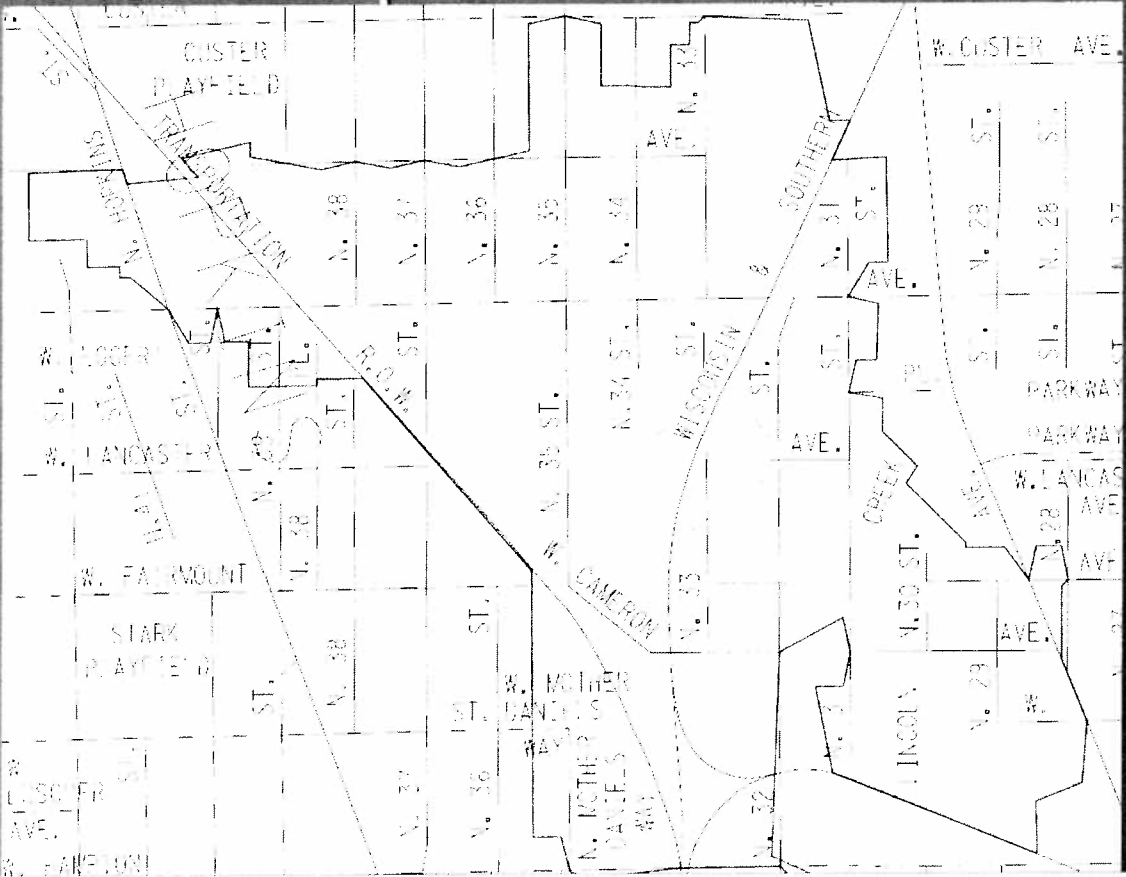
- MMSD has selected 15 metersheds that are non-compliant in the City of Milwaukee
- These areas were determined by comparing the peak hourly flow monitoring data with design data

MMSD'S Non-compliant Sewersheds			Peak Hourly Flow Rate (gallons per acre per day) (flow data may contain other municipalities)	
Metershed	MMSD Sewershed	Estimated Sewer Area (acres)	Area-Velocity Data	Limit
1	MS0528	240.9	25,000	22,000
2	MS0538	189.1	29,800	22,000
3	MS0513	142.2	27,700	22,000
4	MS0514	644.0	52,100	19,000
5	MS0418	275.5	26,600	21,000
6	MS0411	168.6	29,600	19,000
7	MS0339	379.3	34,900	21,000
8	MS0338	206.6	24,400	22,000
9	MS0703	365.7	25,200	21,000
10	MS0117	138.5	33,600	22,000
11	MS0608	402.6	26,600	19,000
12	MS0607	49.5	62,800	22,000
13	MS0114	347.2	21,800	21,000
14	MS0305	581.9	16,800	15,500
15	MS0420	111.4	39,300	22,000

# Non-compliant Metershed - 1



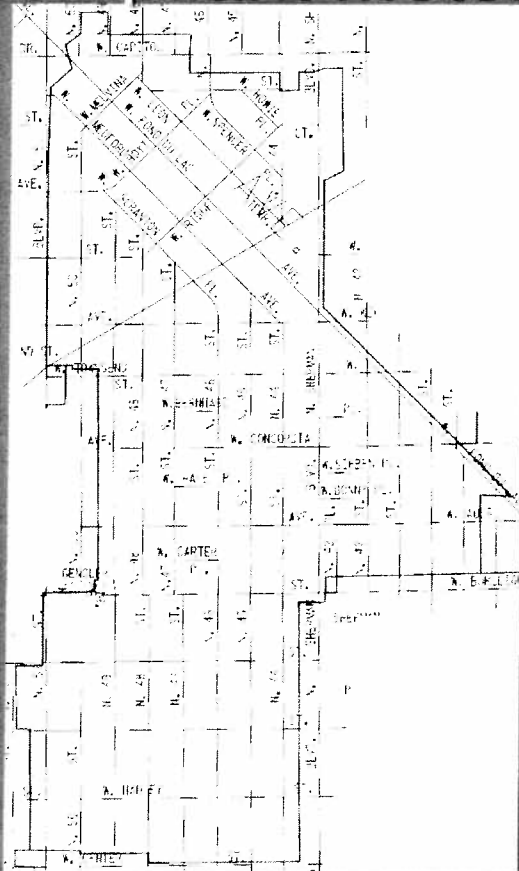
# Non-compliant Metershed - 2



# Non-compliant Metershed - 3



# Non-compliant Metershed - 4



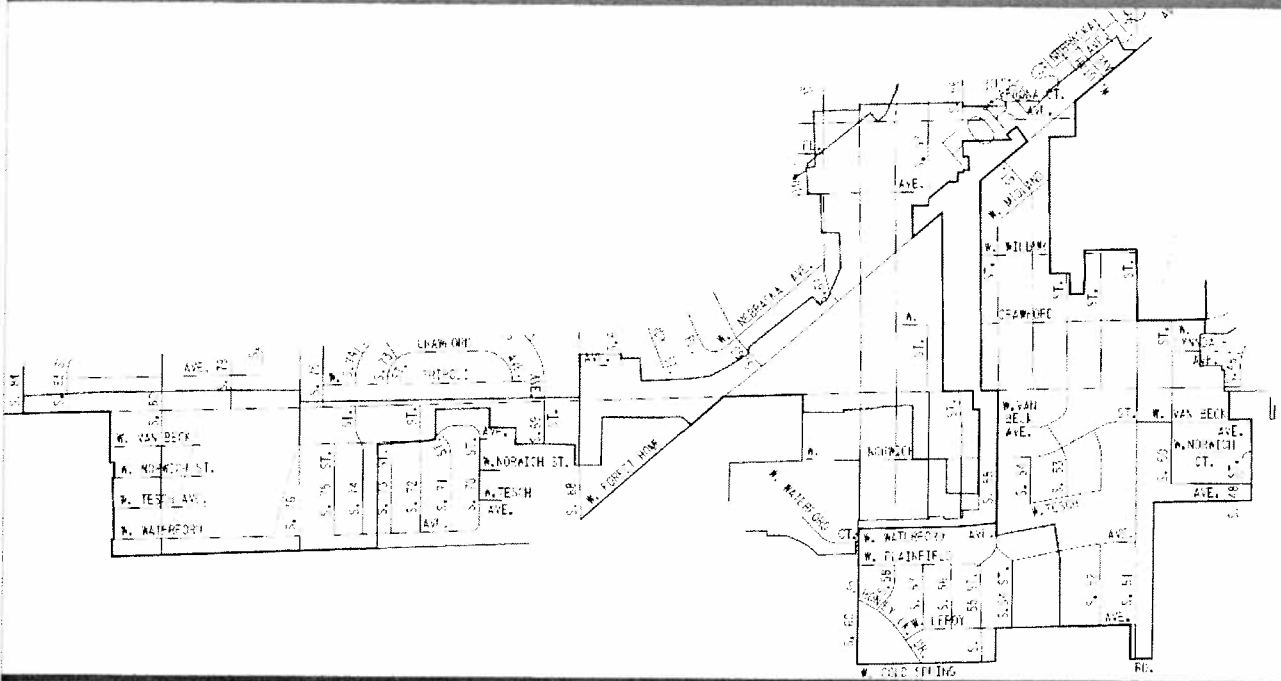




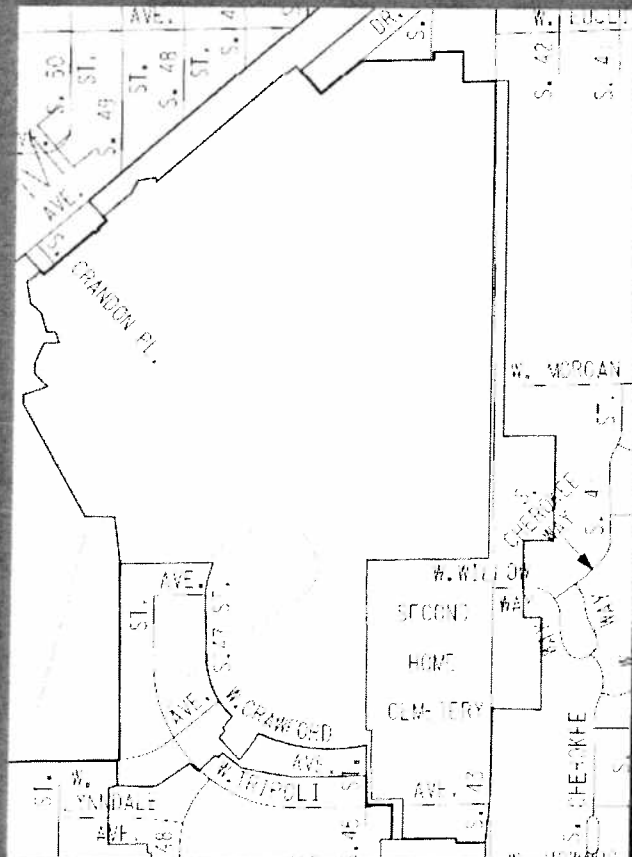




# Non-compliant Metershed - 11



# Non-compliant Metershed - 12









City of Milwaukee  
City Of Milwaukee

# Appendix I







# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Agenda

### FLOODING STUDY TASK FORCE

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Friday, May 13, 2011

9:00 AM

Room 301-B, City Hall

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1. **Review and approval of the minutes of the April 14th meeting.**
2. **Discussion of the state's Uniform Dwelling Code.**
3. **Discussion of the recommendations submitted by task force members.**
4. **Discussion of the proposed reduction in the clean water fund's interest rate subsidy.**
5. **Set next agenda.**

Members of the Common Council and its standing committees who are not members of this committee may attend this meeting to participate or to gather information. Notice is given that this meeting may constitute a meeting of the Common Council or any of its standing committees, although they will not take any formal action at this meeting.

Upon reasonable notice, efforts will be made to accommodate the needs of persons with disabilities through sign language interpreters or auxiliary aids. For additional information or to request this service, contact the Council Services Division ADA Coordinator at 286-2998, (FAX)286-3456, (TDD)286-2025 or by writing to the Coordinator at Room 205, City Hall, 200 E. Wells Street, Milwaukee, WI 53202.

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# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Minutes

### FLOODING STUDY TASK FORCE

ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS

Gery Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin  
Shafer, Erick Shambarger, and Ken Yunker

Staff Assistant Tobie Black, 286-2231; Fax: 286-3456;  
tblack@milwaukee.gov

Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov

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Friday, May 13, 2011

9:00 AM

Room 301-B, City Hall

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Meeting called to order at 9:05 a.m.

Members excused:

Ken Shafer

Also in attendance:

Kathy Brengosz, Fiscal Planning Specialist

Tim Thur, Department of Public Works

Steve Jacquart, Intergovernmental Coordinator, Milwaukee Metropolitan  
Sewerage District

Mike Hahn, Chief Environmental Engineer, Southeastern Wisconsin  
Regional Planning Commission (SWRPC)

1. **Review and approval of the minutes of the April 14th meeting.**

*Minutes from April 14, 2011 were approved as written.*

2. **Discussion of the state's Uniform Dwelling Code.**

*Ms. Brengosz said that municipalities are not allowed to enact ordinances that are more stringent or more restrictive than the Uniform Dwelling Code. She said the UDC is several chapters of the state code that are administered by the Department of Commerce. If the task force makes a recommendation that conflicts with the UDC, the city can apply for a variance, but the municipality has to show that the purpose is to protect the health, safety and welfare of individuals and it has to be based on specific climate issues or soil conditions.*

*She also said that although the UDC covers plumbing, the state plumbing code is covered by separate chapters. She said that the process for getting a variance is*

*slightly different when dealing with plumbing issues. Ms. Brengosz said that there were two different issues raised by recommendations, HVAC requirements and hung plumbing. Ms. Brengosz said that according to the Department of Commerce, there is more leeway in the language of the plumbing code that would be permissive. Municipalities are allowed to do certain things when a property is subject to backwater. There is no definition of "subject to backwater", which means that there is some flexibility in terms of how the city identifies properties that may be subject to backwater. The city may be able to modify construction requirements to help address backwater and flooding issues. If the city gives the state specific recommendations, the state will work with the city to determine whether a variance can be granted.*

*According to Mr. Shambarger, Chris Rute from the Development Center said that the city has some leeway in dealing with property in a critical backwater area and that it can be addressed through the zoning code. He quoted the zoning code (s. 225-7) that dictates that a building project be referred to the City Engineer if it is determined to be in a critical backwater area. The Commissioner of the Department of City Development can also review extra requirements for the project under existing law.*

*Ms. Pasch requested a copy of the Uniform Dwelling Code.*

### **3. Discussion of the recommendations submitted by task force members.**

*The task force discussed the draft recommendations submitted by members (please see the attachments "Draft Recommendations 5-13-11 and "Draft Recommendations from Polenske-Shambarger" to Common Council file #100665).*

*Mr. Polenske passed out recommendations from himself and Mr. Shambarger. They were added to the previously submitted draft recommendations.*

#### **POLENSKE-SHAMBARGER RECOMMENDATIONS**

*Ald. Bohl asked if item number one of Mr. Shambarger and Mr. Polenske's recommendations regarding the city's prioritizing of flooding and basement backup reduction initiatives is really a recommendation or something that should be assumed. Mr. Polenske said that it is a recommendation because it dictates what should be a priority. He said that it should be made clear that the flooding initiatives need to be made a higher priority.*

*Mr. Polenske said that data obtained from DPW projects will allow the city to prioritize future improvements. Ald. Hamilton said that the schedules for the pilot programs should be included in the fourth recommendation. Mr. Polenske agreed.*

*Mr. Shambarger said that he agrees that there should be a preamble to the recommendations pointing out that the city has created a major budget initiative and that flooding and basement backup reduction initiatives are already a priority for the city and will remain one.*

*Ald. Bohl said that it would be more appropriate to say that the city will continue increasing its efforts to construct streets with green infrastructure elements. He said that he wants to make it clear that the city is not implying that it has been using a lot of green infrastructure elements. There were no objections.*

Mr. Yunker said that his first recommendation is the same as number six of the Polenske-Shambarger recommendations. He said that it would be better to use the stronger language that is in his recommendation about preparing major stormwater management plans. Mr. Novotny said that he had the same comment. The task force agreed that they should use the stronger language.

Ald. Hamilton away from the table at 9:35 a.m.

Regarding the eighth recommendation, Mr. Shambarger said that there may be an opportunity to work with MMSD to ensure that the work mandated by MMSD is in the areas that would have the most direct impact on residents.

Regarding the ninth recommendation, Mr. Yunker suggested adding "work with MMSD and SWRPC" to the recommendation since those entities are doing work with rainfall frequency. He suggested using his third recommendation and adding the wording from Polenske-Shambarger's recommendation number nine. There were no objections.

Regarding the eleventh recommendation, SWRPC had the same recommendation.

Regarding the twelfth recommendation, Mr. Shambarger said that it is important to talk about the state's role in flood mitigation assistance for municipalities.

#### BOHL RECOMMENDATIONS

Regarding the first recommendation, Ald. Bohl said that he prefers Polenske-Shambarger's tenth recommendation.

Regarding the second recommendation, Mr. Polenske said that he is concerned about a mandated policy for downspout disconnection. He said that the previous pilot projects illustrated the difficulty of getting property owner cooperation. In addition, there is little room in dense areas to redirect downspouts, which would lead to water still going into the sewer system.

Ald. Bohl said that he sought to phrase the recommendation in a way that allows for exemptions. He said that his recommendation is a less expensive remedy than other possible ones and a pilot program would not have been attempted if it were not reasonable. He also agreed with Mr. Polenske that some neighborhoods should be exempt from a mandatory program.

Mr. Polenske said that in the combined sewer area there are different solutions than for the areas with the separated sewer system. He said that once a more comprehensive assessment is made of the different solutions to flooding, the tools can be utilized to mitigate flooding in areas based on the needs in those areas. He said that downspout disconnection is a low-cost improvement, but it may not be the right solution in the separated sewer area. Mr. Shambarger suggested talking to MMSD and requesting a map be drawn up that shows where downspout disconnections could be performed without risking an overflow of water in an area that does not have sufficient greenspace to absorb it.

In the terms of desired participation, Ald. Bohl asked Mr. Polenske if the participation in the voluntary downspout disconnection program has been disappointing. Mr. Polenske said that it was. Ald. Bohl suggested rewording the recommendation to say that the city will increase education for residents about the program with consideration of targeted compulsory participation in the future.

Mr. Yunker asked Mr. Polenske if the downspout disconnection helps address the primary goal of the task force, which is reducing basement backups. Mr. Polenske said that the downspout disconnections will not have a great effect on basement backups, especially in the combined sewer area.

Mr. Jacquart said that the rain barrel program is voluntary and has been very successful. He said it is a great public education tool and educates people on how water enters the sanitary sewer system and how to manage water on their property, but MMSD could be more aggressive about the program in the future.

Rep. Pasch asked if the mandating of downspout disconnection at the point of sale of a home has made much of a difference. Mr. Jacquart said that it might have an impact over time. He said that plumbing inspectors are not generally supportive of people disconnecting downspouts, although it is now legal.

Ald. Bohl asked if there was any objection to rewording the second recommendation for review at the next meeting. There were no objections.

Regarding the third recommendation, Mr. Jacquart said that MMSD is increasing education, including videos, on its website for homeowners in common sense terms that will help them manage water on their properties.

Rep. Pasch asked if there was any intention of partnering with local media to provide information to people who do not have internet access. Ald. Bohl suggested that MMSD create something like a Flooding Prevention Week and provide something for broadcast on local news stations. Mr. Jacquart also said that MMSD has created a GIS tool that allows a view of how flooding has occurred in different neighborhoods. Mr. Shambarger said that the Office of Environmental Sustainability is also doing education in the community.

Regarding the fourth recommendation, it was decided that it can be absorbed into the recommendation suggesting more education in the community.

Regarding the fifth recommendation, Mr. Polenske asked if this is more of a statement based on assessments and pilot projects. He said it is referring to the potential outcome of the recommendations. Mr. Shambarger said that the city is looking at different ways of financing, which may not include an increase in fees.

Ald. Bohl compared an increase in fees to the wheel tax that was passed. He said that it needs to be stated that more money needs to be spent and that increased fees may be needed.

Mr. Polenske said that a precursor statement recognizing that some of the initiatives will have an additional expense should be included, but it should be noted that the city is unclear on what the expense will be. Mr. Jacquart said that data that shows the benefit of pilot programs is not yet ready to present, so it will be difficult to make a case to the public for any increase in funding.

Regarding the sixth recommendation, Mr. Shambarger said that the recommendation is similar to the sixth Shambarger/Polenske recommendation.

Regarding the seventh recommendation, Ald. Bohl asked if one program will be more cost effective and will enable the city to take one approach each area instead of both approaches. Mr. Polenske said that the city is trying to find an answer through the demonstration project. He said that the city cannot make any mandates or precise

statements as to what should be done now versus later until the appropriate amount of data is collected.

Mr. Yunker said that the recommendation should state that the pilot project will provide data, but the city should be working towards a prioritization or one approach over the other.

Regarding the eighth recommendation, Mr. Shambarger said that talking about the potential reasons for a public investment on foundation drain repair is necessary, but he does not think that a particular percentage can be endorsed.

Mr. Polenske said that the funding for lateral work is something that will need to be discussed, but not until after the results have been gathered from the demonstration project.

Mr. Yunker said that the idea of 100 percent cost recovery by the city versus 80/20 or 70/30 funding might be premature. He said that there is additional information that needs to be gathered.

Ald. Bohl said that the reference to 100 percent cost recovery will be removed and there will be discussion point that will detail utilizing and analyzing more cost effective approaches.

Rep. Pasch away from the table at 11:00 a.m.

The ninth recommendation was not considered, but Ald. Bohl said that although capping a foundation drain and installing a sump pump is intrusive to homeowners, if the cost is 100 percent paid by the city, the homeowner will opt for that instead of the less intrusive option that they will have to help fund.

Regarding the tenth recommendation, Ald. Bohl said that at least one alderman is strongly in favor of endorsing an insurance provider. Ald. Bohl also asked if the recommendation is worthy to state as any insurance would not cover the scope of work. Ms. Brengosz said that the recommendation would be to see if the insurance plan would be viable for the city and if it should be pursued. She said that it might be worthwhile to see if an insurance plan could be cost effective and that the task force could recommend that a formal inquiry be made to determine this.

Regarding the eleventh recommendation, Ald. Bohl asked if this recommendation is worth stating. Mr. Jacquart agreed that the city should not provide funding and subsidization for backflow preventer valves. Mr. Shambarger said that he believes that it is worth stating.

Regarding the twelfth recommendation, Ald. Bohl said that it should be combined with one of the previous recommendations. There were no objections.

Regarding the thirteenth recommendation, Ald. Bohl asked if there would be any opposition to the recommendation within the Department of Public Works. Mr. Polenske said that there is no opposition in DPW, but that it is a challenge to find locations for these types of improvements. Mr. Shambarger said that DCD is the only department that might have any objections to it, but the recommendation should be considered.

Mr. Yunker said that this recommendation could be combined with the recommendation regarding major stormwater management systems.

**NOVOTNY RECOMMENDATIONS**

Regarding the first recommendation, Mr. Novotny said that there needs to be a focus on I & I inspections and there should be a definitive recommendation regarding inspections at the time of sale. Mr. Shambarger said that if a point-of-sale requirement was recommended, it would be preferable if MMSD implemented it regionally so it would not only be a requirement in the City of Milwaukee. Mr. Jacquart said that this makes sense from a real estate market standpoint.

Mr. Novotny said that when he formed the recommendation he was thinking more in terms of the condition of and inspection of laterals.

Ald. Bohl said that he would suggest rewording the recommendation in a way that will create a consideration of point of sale inspections only if requirements are made by MMSD to encompass all areas instead of just the City of Milwaukee. Mr. Novotny agreed.

Recommendations two, three, four and five were deemed to have already been discussed.

**SHAFER RECOMMENDATIONS**

Regarding the first set of recommendations, Mr. Shambarger said that the issue of requiring hung plumbing for all new properties may not be allowed by the state. Ms. Brengosz said that the Commerce Department does allow hung plumbing. She said if the city were to identify properties or neighborhoods that were subject to backwater, the city might be able to include a requirement in an ordinance without conflict with the plumbing code. There would have to be some rational or reasonable justification for requiring hung plumbing for only certain properties. She said that there is some subjectivity as to how the state identifies a property as being subject to backwater.

Ald. Bohl said that there is widespread agreement on prioritizing green infrastructure technologies for new construction. Mr. Polenske agreed, but it should not be a priority for only certain parts of the city.

Regarding the second set of recommendations, Mr. Polenske said that it is similar to the discussion of requirements for new construction and it should be discussed with MMSD to make it a district-wide.

Mr. Thur said that there are guidelines for redevelopment in the city's current stormwater management ordinance, so some of the requirements suggested in the recommendation are being done, but the recommendation would make requirements much more restrictive. Mr. Thur said that the city is already somewhat more restrictive than MMSD. He also said that anything that makes it more difficult to redevelop an area by adding more stormwater management requirements should be looked at carefully so it does not lead developers to seek property elsewhere.

Mr. Hahn said that there would have to be a lot more background on what the sewerage district is proposing in the recommendation. He said that requirements like the ones suggested should be more locally geared instead of district-wide. Mr. Hahn also mentioned that the state already has standards in place regarding infiltration of runoff for new development and it should be examined how these suggestions



from MMSD fit in with those standards.

Regarding the third set of recommendations, Mr. Polenske said that he is still reluctant to endorse point-of-sale requirements. He said that he cannot say if a universal requirement really benefits every area in which it would be required. Mr. Shambarger said that the recommendation could be viable if it is reworded to highlight the areas in which the requirements could be feasible and beneficial.

Ald. Bohl said that the city should focus on the target areas and should not divert its resources to subsidize the disconnection of foundation drains on isolated properties that are outside of the target area. Mr. Shambarger said that the city has to be able to show quantifiable improvement to flows, which would not be possible when work is done city-wide as opposed to in target areas.

Mr. Yunker said that when discussing what should be the public contribution towards addressing the flooding problem, the issue of whether requirements should be imposed at time of sale should be addressed.

Regarding the fourth and fifth recommendations, Mr. Polenske said that there is an increase in costs of projects that use green infrastructure, so the city will have to be selective as to when it should be used. Mr. Shambarger said that the city should systematically evaluate the opportunities for using green infrastructure in the future. Mr. Shambarger also said that he would prefer that the recommendation be written in a way that does not make it seem as if the city is just starting to use green infrastructure, particularly since the city has been a leader in using it.

Regarding the sixth recommendation, Ald. Bohl said that the city will utilize the demonstration programs and prioritize the scope of work based on effectiveness and a cost-effective approach. Mr. Shambarger suggested saying that the city suspects, but does not know definitively, that foundation drain disconnection is the highest priority, and that it should be a topic of study.

The seventh recommendation was already discussed via another recommendation.

The task force is in agreement with the eighth recommendation.

#### YUNKER RECOMMENDATIONS

Mr. Yunker said that all of his recommendations have been incorporated into the other recommendations already discussed.

#### 4. Discussion of the proposed reduction in the clean water fund's interest rate subsidy.

Mr. Jacquart said the governor's proposed budget reduced the interest rate subsidy. The current subsidy requires municipalities to pay sixty percent of the interest rate. The governor's proposed budget would change the rate from sixty percent to sixty percent. The Joint Finance Committee voted to change it to seventy-five percent. He said that the clean water revolving loan program is a significant source of funding for MMSD and that the change will cost the district 28.5 million dollars over twenty years. It is the one significant remaining funding source for capital projects and wastewater projects but Mr. Jacquart said that MMSD will try to get as good or better interest rates out in the market with its high bond rating.

Ald. Bohl said that the increased cost will force the city to scale back the amount of projects that will be done unless more funding is found. Mr. Jacquart said that

wastewater projects are not discretionary since there is regulation on overflows and stormwater issues. Consequently, flood management programs will get impacted the most. Mr. Jacquart said that municipalities will have to find creative ways to raise the money for projects that prevent flooding.

Ald. Bohl asked Mr. Polenske how the change would affect programs in the City of Milwaukee. Mr. Polenske said that a lot of effort goes into applying for the loans, which makes it less likely that the program will be utilized in the future. Mr. Thur said that 22 to 24 million dollars of the city's capital work is funded through the clean water fund loan. If an extra fifteen to twenty percent is being paid on a loan, the amount of work being done in a given year would be reduced and the city would have to pay more for debt service.

Mr. Shambarger said that if the city does not use the clean water fund and instead uses other sources such as revenue bonds or something else with a higher interest rate, there will be an effect on the amount of work that can be done or on the rates that the city will have to charge.

**5. Set next agenda.**

*The recommendations will be revised and voted on at the next meeting on June 10th at 9:00 a.m.*

**Meeting adjourned at 12:10 p.m.**  
**Staff Assistant Tobie Black**

**DRAFT Recommendations of the Flooding Study Task Force-**  
**May 13, 2011**

**Ald. Bohl**

**The city should continue to engage in a policy of targeted separation of the combined sewers on areas of the periphery of combined sewer area when and where it is practical.**

Full separation of the system is not economically feasible and neither is it practical. Besides the billions of dollars in cost and the disruption it would bring, full separation would have an adverse environmental impact (non-point pollution issues) and would not remedy basement flooding issues that result largely from infiltration and inflow into leaking pipes and homes with connected drain tile systems. In fact, spending moneys on full separation would divert needed funds away from programmatic efforts to remedy basement floodings.

**The city should mandate a policy of required downspout disconnection for homeowners who resident in the combined sewer area. This policy should establish reasonable standards for exemption, such as unreasonably small lot sizes or minimal front or side setbacks. Consideration should be given to providing some form of subsidy to property owners for materials or work performed if need is established.**

**The city should work with the Metropolitan Milwaukee Sewerage District (MMSD) and other partners to better educate the public on the causes and effects of sewer and flooding issues and the remedies at hand. Efforts can be made to utilize the public relations office of the Common Council-City Clerk to put together education pamphlets, articles for Aldermanic newsletters and the city's web site, as well having city/MMSD representatives who can make presentations at Aldermanic town hall and neighborhood meetings.**

There is much misunderstanding of the sources of basement flooding, the use of the deep tunnel system, combined vs. separated sewers, non-point pollution, infiltration and inflow, etc. A much better job must be done to educate the public as to the causes and prospective solutions for diversions of waste during heavy storms, as well as overland and basement flooding

concerns. Additionally, the city must endeavor to utilize in-house talent as much as possible and avoid the debacle of using expensive outside marketing firms such as was the case for the 2006 down-spout disconnection pilot where \$80,000 was spent in outside public relations ineffectively.

**Education/public relations efforts should encourage public use of rain-barrels and construction of private property rain gardens.**

**The Mayor and Common Council will need to consider a sizable increase in funding to establish an effective flooding prevention program. This would come most logically in the form of increased fees supporting the city's Sewer Maintenance Fund.**

The amount of funding to establish an effective I&I prevention program is unknown but significant. While much of the work entails changes on private property, the ability of city property owners to pay sums that may routinely run into the thousands of dollars is dubious. MMSD had proposed a 10-year \$151 million seed funding effort to district member communities to assist in local I&I remediation efforts but due to state imposed and other financial constraints has since proposed reducing funding to approximately \$50 million over 10 years. The city's Oct. 2010 Sewer Maintenance Fund report proposed 4.7% annual increases to the sewer fund over the next several years. This proposed level of increase was directed substantially to stabilization of cash proceeds into the fund, and did not envision significant increases in city I&I related work. In fact, the 2011 budget was approved without any increase to the 2011 sewer maintenance fee, contrary to what the just released report was recommending. Given the scope of the problem, the amount of work needed to be accomplished and the need find a reasonable subsidy to address private homeowners costs, increased revenues will need to be generated.

**Given the scope of work necessary on private I&I remediation, the City should primarily focus efforts on neighborhoods identified by the DNR or MMSD as poor performing sewer-shed areas, and expand efforts outward as funding allows.**

**Given the dearth of funds and the practical reality that many problematic flooded areas will not otherwise be addressed in a reasonable time frame, the city may wish to re-examine the policy of addressing both foundation drain capping and sewer lateral leaks**

**comprehensively and instead target the most cost-effective of these two solutions for work to be done in the targeted poor performing sewer-shed areas. Addressing one of the two issues may affectively reduce clear waters entering the sanitary sewer system sufficiently to elevate sewer shed status and mitigate the chances of basement backups in the area. It also would enable that the scope of areas seeing some form of relief are significantly increased. If it is determined that addressing only one of the two targeted solutions does not elevate sufficiently the sewer shed status of that area, the city may wish to ensure both measures are adopted.**

This approach is akin to giving everyone a cup of soup instead of giving some a bowl and some nothing.

**The city should provide 100% cost recovery for any mandated work that involves capping foundation drains, and installing a sump pump system. Consideration may be given for requiring property owners to pay for some or all of an electrical upgrade to the property if that work is required for the installation of a sump pump. Given the lower cost of this approach when compared to sewer lateral inspection and replacement, the city may wish to target this solution as its initial primary response to I&I issues.**

The rationale for city cost reimbursement is that this is a change in city policy undoing former legalities in our plumbing code for houses built prior to 1955. As it has been described before the task force, foundation drain work in most instances is expected to cost less than the typical sewer lateral replacement job or sewer lateral lining job. The rationale for considering either partial or non-compensation on electrical work is individuals who require an electrical upgrade in their home are currently out of compliance with city code.

**The city should consider a reasonable cost recovery subsidy for any sanitary sewer lateral work that is indentified in need of lining or replacement. An example would be a 80/20 or 70/30 split on cost where the city would pick up the higher percentage of the cost-share subsidy on jobs costing up to \$5000. Residents would be given an option to utilize an assessment payment plan for their portion of work costs similar to that established with assessments on local road projects. Any other costs in excess of \$5000 would be born entirely by property**

**owners. This cost subsidy should entail work for lining or sanitary sewer later replacement identified as leaking and in need of mandated repair but not catastrophically broken.**

**The city should not make any recommendations or endorsements on outside lateral insurance plans unless a plan is devised that would cover the scope of work required to remedy identified I&I leakage problems.**

Most plans identified would cover only catastrophic work on laterals that are broken and not work to rectify pipes that are not broken but are substantially leaking at joints to render improvement work necessary via city orders. Since it is expected that many more residents will have the later than the former, city endorsement of an outside insurance plan that would serve the purposes of few should be questioned.

**The city should not fund or subsidize sewer back-up prevention devices.**

The city has limited funds and must utilize them to comply with DNR/MMSD mandates as well as address the issue at hand which is I&I. Sewer back-up prevention devices do not resolve/remedy the problem of I&I in various watershed areas, but where used, may actually push the problem onto neighbors or neighboring areas. The city should not make any changes to current policies allowing owners from legally purchasing and installing such devices at their own cost.

**The city should move to implement piloted green strategies impacting development into ordinances. These may include but not be limited to storm drain restrictors for flat roof buildings in the combined sewer area, inlet restrictors, and porous paving surfaces in driveways.**

**In areas where overland flooding is excessive, the City should employ i utilization of vacant lots in low lying points for bio-swale development to promote water retention. Similar efforts should be re-explored with Milwaukee County government for the development of water retention ponds in select parks near areas where overland flooding has been problematic.**

## Gerry Novotny

The information provided to the Task Force demonstrates that multiple factors contribute to the problem of basement flooding. There is no single action that can be taken that will correct the problem. The issues of street flooding, basement flooding and sanitary sewer overflows are all different aspects of the effect of urbanization on the hydrology of the region. The problem has been aggravated by deteriorated infrastructure and recent extreme rainfall events.

The basic challenge is to improve the infrastructure and urban landscape in order to keep clear water out of the sanitary sewers, manage storm water to reduce the rate of peak storm water runoff and provide adequate outlets for storm water during extreme precipitation events.

The problems that the Task Force was asked to address are not new and have developed over decades. The solutions will likewise require a long-term effort.

1. As has been found in other cities throughout the US, more attention needs to be focused on the private property sources of clear water entering the sanitary sewer system. The City should develop ordinances requiring the disconnection of foundation drains and the rehabilitation or replacement of leaky building sewers. Both time-of-sale inspections as well as targeted efforts to reduce clear water in particular areas should be considered.
2. The City should initiate a study of the “major” storm water management system (as defined by SEWRPC in its Feb 124, 2011 power point presentation) to determine what can be done to improve major storm water flow paths and reduce flooding during extreme rainfall events.
3. The City should develop policies to incorporate, where appropriate, “Green” infrastructure techniques into paving and re-development efforts. These techniques can reduce the potential for flooding and improve the quality of storm water runoff.
4. The City should prioritize the implementation of these recommendations to target areas identified by the MMSD as “poorly performing sewer sheds”

and those areas that have experienced significant numbers of flooded basements.

5. As part of the implementation of the above recommendations the City should develop a public information program to explain the interrelationships between the public and private sanitary sewer systems, storm water systems and basement flooding.

### **Kevin Shafer**

#### **Private Development**

##### ***New Construction***

Require all new development to meet a stormwater retention standard of 1.2 inches (actual value might be modified by future runoff modeling). The requirement will also prioritize green infrastructure technologies as the first choice. Green infrastructure technologies to be used include rain barrels, cisterns, rain gardens, green roofs, bioswales, porous pavement, increased tree canopy, and downspout disconnection.

Require hung plumbing for all new properties with basements.

##### ***Redevelopment***

Require all redevelopment to meet a stormwater retention standard of 1.0 inches (actual value might be modified by future runoff modeling). The requirement will also prioritize green infrastructure technologies as the first choice. Green infrastructure technologies to be used include rain barrels, cisterns, rain gardens, green roofs, bioswales, porous pavement, increased tree canopy, and downspout disconnection.

##### ***Time of Sale***

Require downspouts to be disconnected from the combined sewer system.

Require laterals to be televised and repaired if needed.

Require foundation drains to be disconnected and sump pumps installed.

#### **City of Milwaukee Construction/Development/Redevelopment**

For all street construction require green infrastructure to manage the first 0.75 inches (actual value might be modified by future runoff modeling) of stormwater runoff from the site. Green infrastructure technologies to be



implemented include catch basin retrofits in road and street rights-of-way, curb extension swales, bioswales, street trees, permeable pavement, green roofs and stormwater planters.

For all City properties, utilize green infrastructure to manage the first 1.0 inches (actual value might be modified by future runoff modeling) of stormwater runoff. Green infrastructure technologies to be used include rain barrels, cisterns, rain gardens, green roofs, bioswales, porous pavement, increased tree canopy, and downspout disconnection.

For the City's private property I&I program, prioritize foundation drain disconnection as the highest priority.

The City will collaborate with Milwaukee County to determine if existing parkland can be improved to provide additional stormwater benefits. This might include "reshaping" portions of the parkland to create wetland parks.

The state should assist local communities by expanding its financial assistance programs for flood management projects.

## **Ken Yunker**

### **Background Information to be Considered for Inclusion in the Task Force Report**

It is suggested that the report:

- Include a summary of the status of implementation of the recommendations of the October 2004 Mayor's Independent Audit Committee Report, based on the January 20, 2011 presentation to the Flooding Study Task Force by Kevin Shafer of MMSD,
- Summarize MMSD flood mitigation efforts and implemented projects under its watercourse program,
- Summarize the City's efforts to address sanitary sewer infiltration and inflow (I/I), and
- Summarize the City's efforts to address stormwater management issues and relate those efforts to direct stormwater flooding of buildings and to reduction in I/I.

## Recommendations to be Considered for Inclusion in the Task Force Report

- That the City identify specific locations where the major stormwater management system is inadequate to handle runoff from storms with annual probabilities of one percent or greater, and prepare stormwater management plans to address those deficiencies,
- That, for stormwater management purposes, the City adopt the new rainfall frequency information that is anticipated to be released in 2012 as National Oceanic and Atmospheric Administration Atlas 14 for the Upper Midwest. (The funding for the Wisconsin portion of that study being provided by the Wisconsin Department of Natural Resources, the Wisconsin Department of Transportation, and SEWRPC.)
- That the City staff coordinate with the SEWRPC staff and the Milwaukee Working Group of the Wisconsin Initiative on Climate Change Impacts to keep abreast of new developments related to possible climate change influences on sanitary sewerage and stormwater management systems.
- That the City staff work with MMSD to identify locations where the MMSD Metropolitan Interceptor Sewer (MIS) could surcharge into a municipal sanitary sewer during a large storm, to establish critical elevations at connections to the MIS, and to pursue possible MIS and/or local system upgrades to minimize basement backups in such situations.
- It is suggested that consideration be given to including recommendations which would address:
  - private property I/I, including whether implementation should be targeted at poorly-performing sewersheds or pursued City-wide,
  - establishing priorities for fixing the main sources of private property I/I (i.e., downspout and foundation drain connections and leaky laterals),
  - the timing aspects of, and mechanisms for, implementing private property I/I remediation measures (e.g., by ordinance throughout the City within a specified time frame or at time of sale, or a combination), and
  - what mix of private and public funds should be applied to solving I/I problems.

The development of these recommendations should be guided by the findings of the City's private property I/I pilot programs.

# Appendix J





# City of Milwaukee

200 E. Wells Street  
Milwaukee, Wisconsin  
53202

## Meeting Agenda

### FLOODING STUDY TASK FORCE

*ALD. ASHANTI HAMILTON and ALD. JAMES A. BOHL, JR.,  
CO-CHAIRS*

*Gerry Novotny, Rep. Sandy Pasch, Jeff Polenske, Kevin Shafer,  
Erick Shambarger, and Ken Yunker*

*Staff Assistant Tobie Black, 286-2231; Fax: 286-3456;  
tblack@milwaukee.gov*

*Legislative Liaison Aaron Cadle,  
286-8666; acadle@milwaukee.gov*

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Friday, June 10, 2011

9:00 AM

Room 301-B, City Hall

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1. **Review and approval of the minutes of the May 13, 2011 meeting.**
2. **Final discussion of and adoption of the recommendations of the Flooding Study Task Force.**

Members of the Common Council and its standing committees who are not members of this committee may attend this meeting to participate or to gather information. Notice is given that this meeting may constitute a meeting of the Common Council or any of its standing committees, although they will not take any formal action at this meeting.

Upon reasonable notice, efforts will be made to accommodate the needs of persons with disabilities through sign language interpreters or auxiliary aids. For additional information or to request this service, contact the Council Services Division ADA Coordinator at 286-2998, (FAX)286-3456, (TDD)286-2025 or by writing to the Coordinator at Room 205, City Hall, 200 E. Wells Street, Milwaukee, WI 53202.

Limited parking for persons attending meetings in City Hall is available at reduced rates (5 hour limit) at the Milwaukee Center on the southwest corner of East Kilbourn and North Water Street. Parking tickets must be validated in Room 205, (City Clerk's Office) or the first floor Information Booth in City Hall.

Persons engaged in lobbying as defined in s. 305-43-4 of the Milwaukee Code of Ordinances are required to register with the City Clerk's Office License Division. Registered lobbyists appearing before a Common Council committee are required to identify themselves as such. More information is available at [www.milwaukee.gov/lobby](http://www.milwaukee.gov/lobby).



## **Flooding Study Task Force Recommendations**

The City of Milwaukee Flooding Study Task Force (FSTF) was created by immediate adoption of Common Council file #100418 on July 27, 2010. The charge of the task force was to recommend remedies for storm water and sewage backup flooding of city residential and commercial properties, and flooding of streets and alleyways. The FSTF met on 9 occasions between January 6, 2011 and June 10, 2011.

The information provided to the FSTF demonstrates that multiple factors contribute to the problem of basement flooding. There is no single action that can be taken that will correct the problem. The issues of street flooding, basement flooding and sanitary sewer overflows are all different aspects of the effect of urbanization on the hydrology of the region. The problem has been aggravated by deteriorated infrastructure, deficient city building code regulations prior to 1955 and recent extreme rainfall events.

The city has placed a high priority on upgrading city maintained storm and sanitary sewer related infrastructure. Notwithstanding this, the basic challenge the city and region faces is to continuously improve the infrastructure and urban landscape in order to keep clear water out of the sanitary sewers, manage storm water to reduce the rate of peak storm water runoff and provide adequate outlets for storm water during extreme precipitation events. Given that private property sources account for up to 85% of the clear water that is entering and inundating sanitary sewer systems, any attempted solution to basement flooding will need to substantially address those private property sources.

The problems that the Task Force was asked to address are not new and have developed over decades. The solutions will likewise require a long-term effort, significant public investment and the political will of policy makers to make difficult decisions for the collective good of the community.

- For stormwater management purposes, the City should adopt the new rainfall frequency information anticipated to be released in 2012 as National Oceanic and Atmospheric Administration Atlas 14 for the Upper Midwest.
- The City should work with the MMSD, SEWRPC and Wisconsin Initiative on Climate Change Impacts to keep abreast of possible climate change trends and incorporate emerging climate models and rainfall frequency into sewer design criteria to better meet expected weather conditions.
- The City of Milwaukee DPW should complete the Private Property I&D Demonstration Project and evaluate the results by using flow monitoring data to assess effectiveness of techniques used. The demonstration project and other I&D improvements made in the DNR stipulated sewersheds should be comprehensively assessed and used to evaluate improvements based upon their cost-effectiveness and ability to reduce future basement back-ups. Private

property work should be prioritized to target sewersheds previously identified by MMSD as poorly performing. Funding limitations should dictate whether the city explores foundation drain capping and sewer lateral work comprehensively or targets the more cost-effective of these two procedures.

- The City should evaluate areas that have a history of surface flooding to identify measures that will improve appropriate storm water flow paths and identify management measures that will address deficiencies. The Department of Public Works (DPW) should work to increase green infrastructure elements that help control storm water in identified problem areas. Examples of these elements include median and roadside bio-retention projects, alleys utilizing pervious pavement, catch basin retrofits, green roofs, stormwater planters and the utilization of vacant lots in low lying areas for bio-retention greenspace.
- The City should collaborate with Milwaukee County to determine where existing parkland can be improved to provide stormwater benefit to areas with significant surface flooding. This might include "reshaping" portions of the parkland to create wetland parks.
- City staff should work with MMSD to identify locations where the MMSD Metropolitan Interceptor Sewer (MIS) could surcharge into a municipal sanitary sewer during a large storm, to establish critical elevations at connections to the MIS, and to pursue possible MIS and/or local system upgrades to minimize basement backups in such situations.
- The city should require that all new development and major redevelopment meet a stormwater retention standard of 1.2 inches and 1.0 inches respectively.
- The city should develop policies to incorporate green infrastructure into development, re-development and street construction efforts. Examples of green technologies include rain barrels, cisterns, rain gardens, green roofs, storm drain restrictors, porous pavement, median and roadside bio-retention projects, catch basin retrofits, storm water planters, vacant lot bio-retention, increased tree canopy, downspout disconnection and a requirement for hung plumbing for properties with basements.
- The City of Milwaukee should continue to engage in targeted separation of the combined sewers in areas where timing and volume generate a high risk of inflow-induced backups and where limited utility connections and an accessible outlet allow for separation to be cost-effective.
- The city should weigh future changes to the city's ordinances requiring the mandatory disconnection of foundation drains and the rehabilitation or replacement of faulty sewer laterals. These however should be only considered by the city as part of a uniform policy requirement within the entire MMSD area so as not to create a negative tax/assessment island in the city. If such policies



are enacted, time-of-sale inspections as well as targeted inspections should be employed.

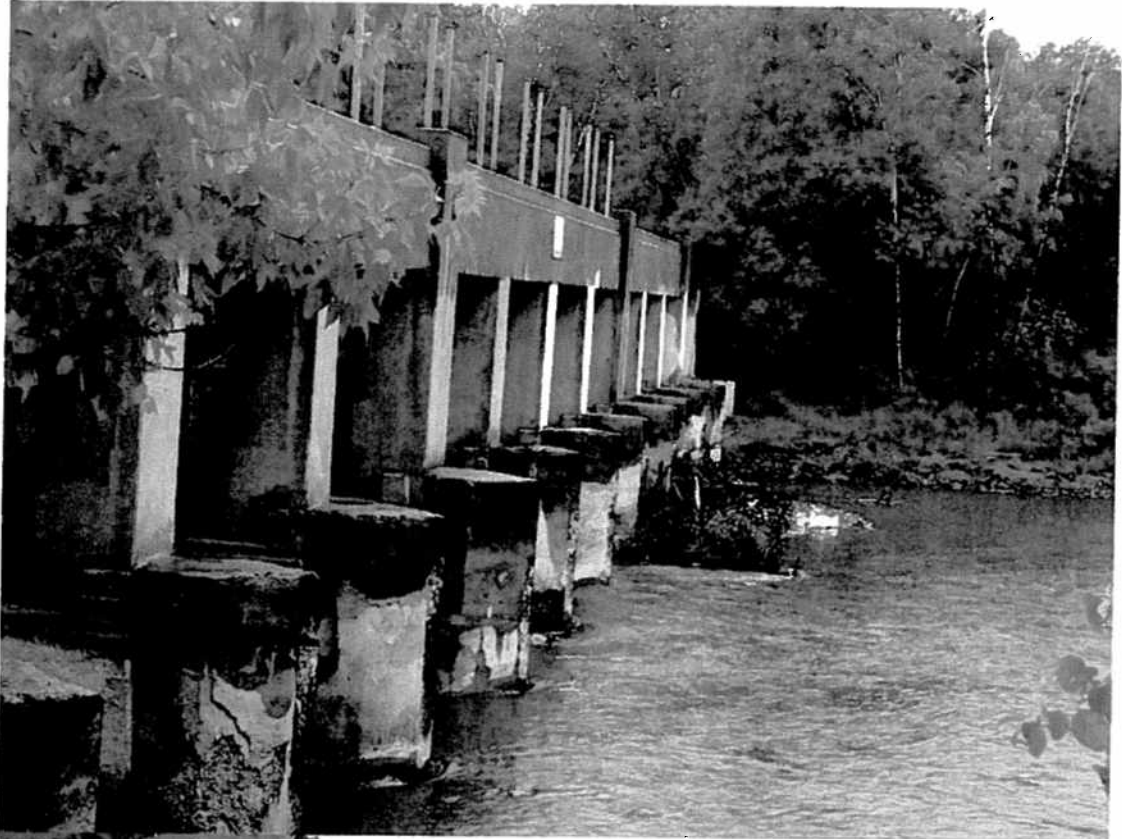
- The city should lobby for increased State assistance in flood mitigation projects. This may include financial assistance through programming and grant opportunities, and the restoration of funding resources to the Clean Water Fund.
- The city should evaluate the combined sewer area to establish targeted zones where mandatory downspout disconnection can be implemented. This policy should establish reasonable standards for exempting properties, such as unreasonably small lot sizes or minimal front or side setbacks. Consideration should be given to providing some form of subsidy to property owners for materials or work performed (if need is established) during an initial phase in period. Inspection and enforcement can be made at point of sale.
- The city should work with the Metropolitan Milwaukee Sewerage District (MMSD) and other partners to better educate the public on the causes and effects of sewer and flooding issues and the remedies at hand. Efforts can be made to utilize the public relations office of the Common Council-City Clerk to put together education pamphlets, articles for Aldermanic newsletters and the city's web site, as well as having city/MMSD representatives who can make presentations at Aldermanic town hall and neighborhood meetings. Early education should focus on the interrelationships between the public and private portions of the sanitary sewer system and low cost improvements like properly grading properties, use of rain-barrels and construction of private property rain gardens.
- A sizable public investment will be needed to fund an effective flooding prevention program. Funding should be pursued from federal, state and MMSD sources but will likely require increased funding via the city's Sewer Maintenance Fund.
- The city should consider 100% cost recovery for any work that involves the capping foundation drains and installation of a sump pump system. Consideration may be given for requiring property owners to pay for some or all of an electrical upgrade to the property if that work is required for the installation of a sump pump.
- The city should consider a reasonable cost recovery subsidy for any sanitary sewer lateral work that is identified in need of lining or replacement.
- The city should not consider recommending or endorsing any outside lateral insurance plan unless the plan is devised to cover the scope of work required to remedy identified I&I issues and not just catastrophic breaks.

- While the city should allow the continued private installation of back-up prevention devices, the city should not fund or subsidize any cost associated with the devices.

Draft









# Appendix K





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Common Council President

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15th District Alderman

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**Willie L. Hines, Jr.**  
*City of Milwaukee Common Council*

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**For Immediate Release:  
September 20, 2010**

**Contact: Alex Runner  
414-286-3771**

## **President Hines Announces Appointments to Flooding Study Task Force**

In late July, the City of Milwaukee Common Council unanimously voted to create a Flooding Study Task Force, which will “recommend remedies for storm water and sewage backup flooding of city residential and commercial properties, and flooding of streets and alleyways.” Mayor Barrett signed the resolution in early August.

Common Council President Hines has three appointments to the task force. He has named Alderman Ashanti Hamilton, Alderman Jim Bohl and State Representative Sandy Pasch as his appointed members. Alderman Hamilton is chair of the Judiciary and Legislation Committee and a former board member of the Milwaukee Metropolitan Sewerage District (MMSD). Alderman Bohl is chair of the Licenses Committee and was the lead sponsor of the resolution that created the Flooding Study Task Force. Representative Pasch represents areas of the City of Milwaukee, as well as North Shore suburbs, which experienced severe flooding.

“Both Alderman Hamilton and Alderman Bohl will bring considerable experience, insight and expertise to the task force,” said President Hines. “Alderman Hamilton’s district was hit harder than any other in the city by the historic storm of July 22, so he is intimately aware of this issue’s urgency and importance. I commend Alderman Bohl for initiating this task force, and I know that numerous residents and businesses in his district have endured flood damage, too.”

With regard to Representative Sandy Pasch, President Hines called her “an ideal appointment” to this body. “The city and the suburbs must work collaboratively to prevent future flooding of homes and businesses,” he continued. “We cannot afford to silo our efforts – everyone must be at the table so that comprehensive, regional solutions can be uncovered to prevent future flooding and sewage backups.”

-More-

In addition to Pres. Hines' appointments, other appointees are the commissioner of the City of Milwaukee Department of Public Works, the executive director of MMSD, the executive director of the Southeastern Wisconsin Regional Planning Commission (SEWRPC), a representative from the State of Wisconsin Department of Natural Resources and an appointee of Mayor Barrett.

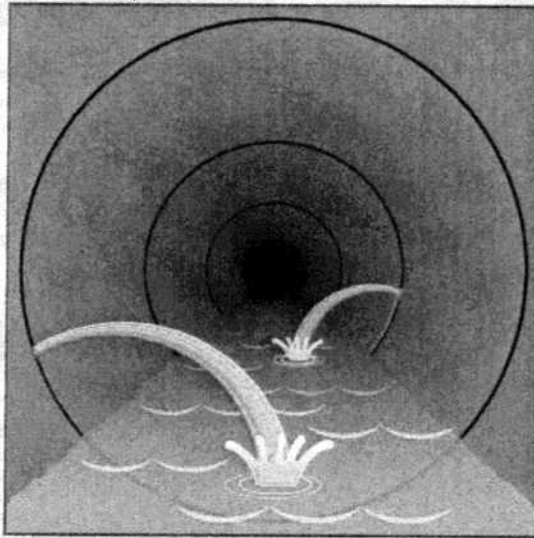
The Flooding Study Task Force was created with an aggressive timeline for reporting its results. Findings are scheduled to be reported to the City of Milwaukee Common Council no later than May 31, 2011.



## Protecting Our San Francisco Bay: EBMUD Regional Private Sewer Lateral Program

The United States Environmental Protection Agency (EPA) is spearheading an effort to keep the San Francisco Bay clean by requiring EBMUD, several East Bay cities and one sewer district to fix old, cracked sewer pipes to ensure they don't allow the infiltration of rainwater which can overwhelm wastewater treatment facilities, resulting in untreated and partially treated sewage being released into the Bay. Property owners will be required to obtain a certificate from EBMUD indicating their private sewer laterals are without defects and have proper connections.

The leaky sewer pipes range from large pipes that run beneath streets to the smaller pipes that connect directly to homes and businesses and are part of a national concern over the burgeoning problem of aging infrastructure. Here, in the San Francisco Bay Area, it becomes an even larger concern when leaky pipes cause releases of partially-treated sewage into the Bay posing a threat to public health. The plan to address this concern involves all of us.



RAINWATER INFILTRATION INTO SEWER LINE

The Regional Private Sewer Lateral Program (PSL) helps keep San Francisco Bay healthy by requiring the inspection and repair of old sewer pipes. A new Private Sewer Lateral Ordinance passed by EBMUD will be phased in for some East Bay communities and will require people selling their property, remodeling (greater than \$100,000) or requesting a different size water meter to fix their leaking sewer laterals first. Property owners will be required to obtain a Certificate of Compliance from EBMUD indicating their PSLs are without defects and have the proper connections.

**The private sewer lateral ordinance will be phased in throughout 2011. Currently the EPA is working through program details. Please check this website for the launch date and most up-to-date information about the Regional PSL Program.**

EBMUD, the EPA and municipal officials will work together to inform residents of the ordinance and will assist with compliance. Prior to ordinance implementation, the agencies will reach out to affected communities to jointly explain the requirements and be available to answer questions.

### Frequently Asked Questions

#### What is a private sewer lateral (PSL)?

A sewer lateral is the pipe that connects the plumbing in a home or business to the sewer main, usually located in the street. The PSL carries sewage from a building to a public sewer. It is the responsibility of the property owner to maintain the sewer lateral.

#### How does the Private Sewer Lateral Program protect the San Francisco Bay?

By property owners inspecting, testing and repairing old cracked sewer pipes it helps to ensure that during storms rainwater does not enter sewer lines. Too much rainwater can overwhelm the sewer system and the treatment plant, causing releases of partially-treated sewage into the Bay.

#### What are the problems associated with private sewer laterals?

Many East Bay homes were built before 1950, and most have never had their original sewer laterals replaced. Over time, these pipelines, generally made of clay, can crack or become disjointed, become displaced, and/or become subjected to intrusion by rainwater and tree roots, which can cause leaks and blockages. In addition, some sewer laterals lack the right kind of "cleanout," which provides access for clearing blockages.

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Private Sewer Lateral

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**Where does this private sewer lateral program apply?**

These requirements will affect properties in the EBMUD wastewater service area in Emeryville, Oakland, Piedmont, El Cerrito, Kensington and the Richmond Annex. The cities of Alameda, Albany and Berkeley have local private sewer lateral ordinances already in effect. Check with these cities for their specific PSL requirements.

**When are property owners required to obtain a compliance certificate?**

The ordinance specifies three conditions which require property owners to test and, if needed, repair or replace their private sewer laterals:

- Prior to selling the property; or
- When obtaining any permit for the construction or modification of the property estimated to be greater than \$100,000; or
- When increasing or decreasing EBMUD water service that requires a change in meter size.

**Why does EBMUD require a verification test on the private sewer lateral?**

EBMUD determined that an air pressure test or water exfiltration test is the best way to ensure that the lateral is free of leaks.

**How long is the Certificate of Compliance good for?**

If the sewer lateral is a complete replacement, the certificate is valid for 20 years. For certificates obtained without complete replacement (repaired or tested without repair), the certificate is valid for 7 years.

**For More Information**

Questions? E-mail [psl@ebmud.com](mailto:psl@ebmud.com). Additional details on the private sewer lateral program will be available as the implementation approaches. Please check back for news and updates.

EBMUD

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

APR 20 2011

MEMORANDUM

SUBJECT: Protecting Water Quality with Green Infrastructure in EPA Water Permitting and Enforcement Programs

FROM: Nancy Stoner   
Acting Assistant Administrator  
Office of Water (OW)

Cynthia Giles   
Assistant Administrator  
Office of Enforcement and Compliance Assurance (OECA)

TO: EPA Regional Administrators, OW & OECA Office & Division Directors

The United States Environmental Protection Agency (EPA) strongly encourages and supports the use of green infrastructure approaches to manage wet weather through infiltration, evapotranspiration, and rainwater harvesting. As stated in previous memoranda,<sup>1</sup> EPA recognizes that green infrastructure can be a cost-effective, flexible, and environmentally-sound approach to reduce stormwater runoff and sewer overflows and to meet Clean Water Act (CWA) requirements. Green infrastructure also provides a variety of community benefits including economic savings, green jobs, neighborhood enhancements and sustainable communities. The benefits of green infrastructure are particularly enhanced in urban and suburban areas where green space is limited and environmental damage may be more extensive. The Office of Water (OW) and the Office of Enforcement and Compliance Assurance (OECA) are committed to working with interested communities and water resource managers to successfully incorporate green infrastructure into National Pollutant Discharge Elimination System (NPDES) permits, as well as remedies designed to address non-compliance with the CWA, to better manage both stormwater runoff and sewer overflows.

Given the multiple benefits associated with green infrastructure, EPA encourages the use of green approaches to stormwater runoff and sewer overflow management to the maximum extent possible. Green practices reduce stormwater runoff, preventing it from entering combined and separate sanitary sewer systems and reducing the volume and occurrence of overflows.

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<sup>1</sup> "Using Green Infrastructure to Protect Water Quality in Stormwater, CSO, Nonpoint Source and other Water Programs" signed by Benjamin Grumbles, Assistant Administrator, Office of Water, on March 5, 2007, and "Use of Green Infrastructure in NPDES Permits and Enforcement" signed by Linda Boornazian, Director, Water Permits Division and Mark Pollins, Director, Water Enforcement Division, on August 16, 2007.

Green practices also lower the amount of untreated stormwater discharging to surface waters. Green infrastructure provides additional green spaces and recreational opportunities, enhanced ecosystem services, improved air quality, increased property values, energy savings, economic development, reduced urban heat island effects, and job creation opportunities. In addition, green infrastructure can serve as both a climate change mitigation and adaptation strategy, through increased carbon sequestration from plants and soils, and flexibility in adjusting to potential changes in precipitation patterns. As a result of these benefits, communities around the country are increasingly incorporating green designs into wet weather controls through both NPDES permits and water enforcement agreements.

Tremendous progress has been made in recent years on models and technical approaches to assist communities with green infrastructure planning, making it easier for communities to demonstrate that green infrastructure solutions meet CWA requirements. CWA NPDES permits and enforcement agreements that incorporate green or gray infrastructure solutions require enforceable performance criteria, implementation schedules, monitoring plans and protocols, progress tracking and reporting, and operation and maintenance requirements. Regardless of the technology used, EPA looks for a demonstration of sound modeling and technical approaches as well as planning for overall wet weather control approaches to satisfy regulatory requirements. EPA will continue to increase its efforts to help interested communities ensure that green infrastructure meets CWA requirements as well as community goals and encourages communities to consider green infrastructure in all wet weather control plans.

In November 2010, EPA Deputy Administrator Bob Perciasepe formed a cross-agency green infrastructure Steering Committee and Work Group comprised of representatives of each region and every Assistant Administrator's office to further encourage and support the implementation of green infrastructure solutions. As part of this effort, EPA will continue to work with other federal agencies, state and local governments, tribes, municipalities, and the private sector to identify opportunities and provide technical assistance to communities implementing green approaches to control wet weather. EPA will also provide additional tools to encourage states and communities to leverage green infrastructure opportunities within other innovative environmental projects.

We encourage you and your staff to contact OW's Green Infrastructure Coordinator, Chris Kloss at [kloss.christopher@epa.gov](mailto:kloss.christopher@epa.gov) and OECA's Green Infrastructure Coordinator, Mahri Monson at [monson.mahri@epa.gov](mailto:monson.mahri@epa.gov) with questions, comments and information on green infrastructure in permitting and enforcement. Attachment A to this memorandum contains some recent examples of successful incorporation of green infrastructure into NPDES permits and enforcement actions. Attachment B lists the green infrastructure regional liaisons for both the water and the enforcement programs.

Cc: Regional Permit and Enforcement Liaisons

Attachments

## Attachment A

### Recent Examples of Green Infrastructure in Permits and Enforcement Actions

#### **Stormwater Permitting Approaches with Green Infrastructure**

**California** - Since May 2009, California Regional Water Quality Control Boards have adopted nine Phase I MS4 permits requiring that new development and redevelopment projects retain the 85<sup>th</sup> percentile storm event via infiltration, evapotranspiration, and rainwater harvest and reuse by utilizing green infrastructure practices. Within the individual permits, there are provisions that allow for off-site mitigation or payment of fees if retention and biofiltration are not technically feasible on site.

**Charles River Watershed, MA** - The draft Residual Designated Discharge General Permit has been developed and noticed for the communities of Milford, Bellingham and Franklin, Massachusetts. The draft permit proposes stormwater control requirements to reduce phosphorus loading for properties with two or more acres of impervious area and the use of infiltration/recharge practices to achieve the required phosphorus load reduction for a property if it is determined that such practices are technically feasible.

**Massachusetts** - EPA's draft small MS4 general permit for Massachusetts encourages the use of practices which capture (infiltrate, evapotranspire, and/or harvest and reuse rainwater) the 90<sup>th</sup> percentile storm event (1 inch storm). The draft permit also requires municipalities to examine existing guidelines and policies for their ability to support green infrastructure options in new development and redevelopment, identify impediments, and determine what changes need to be made.

**Santa Monica, CA** - In July 2010, the City updated its Urban Runoff Pollution Ordinance to require that new development and redevelopment projects infiltrate, store for non-potable use, or evapotranspire the first ¾ inch of a storm, or pay an Urban Runoff Reduction fee that the City then uses for larger scale stormwater control projects. The ordinance promotes the use of green infrastructure for meeting the stormwater retention requirements.

**Washington, DC** - The District's draft MS4 permit includes a development retention standard of 1.2 and 1.7 inches for non-federal and federal properties, respectively, along with numeric targets for green roofs (350,000 square feet over the permit cycle on District properties) and tree canopy (4,150 trees per year and 13,500 by 2014). The draft DC MS4 permit built off of a supplement to the previous permit that identified numeric targets for tree canopy, LID projects (17 by August 2009), rain gardens (50 by December 2009), rain barrels (125 by December 2009), and downspout disconnection (200 by December 2009).

#### **Enforcement Actions with Green Infrastructure**

**Cincinnati, OH** - Cincinnati's 2004 consent decree (CD) to control sewer overflows was amended in 2010, providing opportunities to incorporate green infrastructure solutions by

substituting “green for grey” on a project by project basis. The city is currently evaluating potential green infrastructure projects and has a three year study and detailed design period to examine green solutions in the Lick Run Watershed, in Mill Creek Valley on the west side of Cincinnati. One promising project in the Lick Run drainage area, a corridor that includes an environmental justice community, would remove storm water flows from the combined sewer system and create a new above-ground drainage feature with surrounding park land. Cincinnati will be meeting with EPA throughout 2011 to discuss green infrastructure plans, and proposals for “green for grey” substitutions are likely to be submitted in 2012.

***Cleveland, OH-*** The 2010 Cleveland, OH, CD requires that green infrastructure be used to capture 44 million gallons of combined sewer overflow discharge in order to clean up Cleveland’s waters. The city agreed to spend at least \$42 million on green infrastructure and will conduct a feasibility study to develop a green infrastructure plan to meet the 44 million gallon reduction requirement. The agreement allows Cleveland to submit plans for additional green infrastructure controls, based on the results of initial projects. The city will target the majority of its green infrastructure projects in low-income and minority concentrated neighborhoods, where there is an abundance of vacant land that can be utilized at a relatively low cost. The residents of Cleveland will benefit from reduction of sewer overflows and their associated health hazards, increased green space and recreational opportunities, increased property values and job opportunities.

***Kansas City, MO-*** EPA and Kansas City, Missouri signed a consent decree in May 2010 which requires the city to use green infrastructure to help control and eliminate sewer overflows. Kansas City will initially implement a green infrastructure plan to control wet weather flows in a 744-acre environmental justice neighborhood, with the option to expand green infrastructure programs throughout the city to help keep sewer overflows from polluting the community’s water. Green infrastructure technologies to be implemented include catch basin retrofits in road and street rights-of-way, curb extension swales, street trees, permeable pavement, green roofs and stormwater planters. Thanks to this agreement, the citizens of Kansas City will benefit from improvements in water quality, air quality, and new green spaces throughout the city.

***Louisville, KY-*** Through an agreement with EPA filed in 2005 and amended in 2009, Louisville, Kentucky is using green infrastructure to help solve the city’s sewer overflow problems. Louisville has committed to constructing 19 initial green infrastructure demonstration projects including green roofs, green streets, urban reforestation, and other green elements to keep polluted runoff from entering their waters. After a six-year study period to monitor demonstration projects, the sewer department may propose additional green infrastructure controls. Louisville’s sewer department has already distributed hundreds of rain barrels to residents throughout the city, providing citizens the opportunity to participate in cleaning up their waters. The community at large will continue to benefit from ongoing installment of rain gardens, permeable parking lots, and other green amenities throughout Louisville.



Attachment B

Regional Green Infrastructure Liaisons

<b>Region</b>	<b>Water Program Green Infrastructure Liaisons</b>	<b>Enforcement and Compliance Green Infrastructure Liaisons</b>
<b>1</b>	Johanna Hunter	Joy Hilton Jeff Kopf
<b>2</b>	Jeff Gratz	Murray Lantner
<b>3</b>	Dominique Lueckenhoff	Allison Graham
<b>4</b>	MaryAnn Gerber Darryl Williams	Araceli Bonilla
<b>5</b>	Bob Newport	Jonathan Moody
<b>6</b>	Brent Larsen Suzanna Perea	Diana McDonald
<b>7</b>	Kerry Herndon Mandy Whitsitt	Jodi Bruno
<b>8</b>	Stacey Eriksen	David Gwisdalla
<b>9</b>	John Kemmerer	Michelle Moustakas
<b>10</b>	Krista Mendelman	Rob Grandinetti



**Bohl, James**

**From:** Patrice Mickowski [pmickowski@gmail.com]  
**Sent:** Wednesday, January 19, 2011 1:08 PM  
**To:** Bohl, James; Hamilton, Ashanti; Michael Hahn P.E. P.H.  
**Subject:** Flooding Study Task Force Idea/Product Information  
**Attachments:** PI, Sterling Hall R.doc; PI Restrictor Update Oct 2010 R.doc

The following and attached is information on a product that could be a viable part of your solution/plan for reducing flooding in the Milwaukee area.

The name of the product is the Restrictor. It is manufactured and sold by Plumbing Innovations in Brookfield, Wisconsin.

The Restrictor fits over the roof drains found on flat-roofed buildings.

During a rain event, it temporarily restricts or controls the amount of water going into the roof drains. This in turn, reduces the amount of water going into the sewer system during peak flows, reducing or eliminating the potential for overflows and property floodings.

For example, a conventional 4" roof drain can allow up to 145 gallons of water per minute (gpm) to enter a sewer system. With a Restrictor, this same drain would only allow approximately 30 gallons per minute to enter the system.

Over the last five years, over 100 Restrictors have been put into place in the City of Milwaukee – on the roofs of fire stations, libraries, administrative buildings, etc. -- where they have good results.

And last summer, Restrictors were installed in Madison where buildings flooded after a fire pump test. After several Restrictors were installed, another test was run – *no flooding* (see attached information).

In terms of cost, at approximately \$250 - \$400 each depending on the size of the roof drain, quantity and whether or not installation is included the Restrictor is an extremely cost-effective CSO control method.

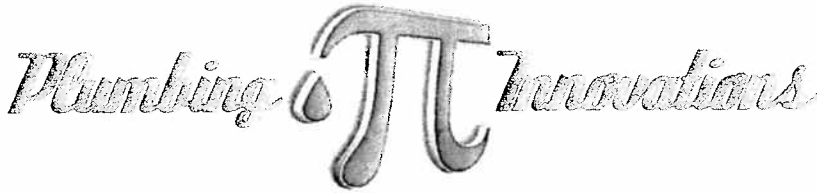
This cost does not include a roof inspection (to make sure the roof is up to code and does not have a history of leaking), which can be done by the city or village, or locally to create jobs. Please note that the Restrictor does not void roof warranties as it fits over the drains versus being attached to the structure.

Another plus of the Restrictor is the time it takes to install – approximately 20 – 30 minutes per drain. This means you can start reducing overflow and property flooding NOW.

I appreciate the opportunity to introduce the Restrictor to you. If you would like more information or a presentation, please contact me at 262.957.7671 or [pmickowski@gmail.com](mailto:pmickowski@gmail.com).

Patrice Mickowski  
Plumbing Innovations  
262.957.7671  
[pmickowski@gmail.com](mailto:pmickowski@gmail.com)  
[www.plumbing-innovations.net](http://www.plumbing-innovations.net)

4/28/2011



## **Restrictor Project Summary**

### **University of Wisconsin Sterling Hall Renovation**

**Completion Date – June 2010**

PSJ Engineering of Milwaukee, Wisconsin, was the plumbing design engineer for the recently completed renovation of Sterling Hall.

Sterling Hall was constructed in 1917 with additional wings added in 1959. On an historical note, the building was the site of the August 24, 1970 protest bombing that killed a UW researcher and injured four others.

Part of the building's recent renovation was to add a fire protection sprinkler system and a 1,000-gallon per minute (gpm) fire pump.

During the preliminary testing of the fire pump - which discharged 1,000 gpm of water onto the roof, the basement HVAC clear water (storm) drains surcharged and flooded the basement level of the building.

The problem was traced to two 4" roof drains. Each of these drains received 125 gpm during the test. The maximum design capacity of the 1917 cast iron, horizontal 4" drains (1/8" pitch) was 90 gpm.

To prevent future surcharging, two stock Plumbing Innovations 4" Restrictors were installed over the drains on Tuesday, June 15, 2010.

Another fire pump test was run. The 30 gpm discharge rate of the Restrictor detained the water sufficiently to solve the flooding problem caused by the fire pump discharge.

The cost and time required to complete the installation of the Restrictor on this roof was as follows:

<b>INSTALLATION TIME:</b>	<b>Approximately 1 Hour</b>
<b>COST OF RESTRICTORS, INSTALLED:</b>	<b>\$800</b>
<b>COST OF STRUCTURAL MODIFICATIONS:</b>	<b>\$0</b>
<b>COST OF ROOFING MODIFICATIONS:</b>	<b>\$0</b>
<b>PLUMBING COST MODIFICATIONS:</b>	<b>\$0</b>

## Project Follow-up

### Storms Slam UW Campus

Between June 19 and June 21, 2010 - less than a week after the Restrictors were installed on Sterling Hall, the City of Madison received 6.34" of rain.

Some of the worst flooding occurred on or near the UW campus:

A computer-printing technician at the UW Humanities Copy Center said he was shocked by the amount of water he saw during cleanup. "(In one room), (water) was coming out of the electrical panel there, coming out the door, and the clock had a half-inch of water in it."

The Director of the UW Physical Plant said, "I've not seen a flood like this or a rain like this in the time that I've been here... I've been on campus a little over 15 years."

The UW-Madison's Physical Plant Crisis Center took more than 380 calls for service.

Campus officials dispatched crews to 68 different locations to deal with leaky roofs, flooded buildings and parking structures.

Apartments buildings near the UW campus reported heavy damage, with residents, many of which were students, reporting up to four feet of water in basement apartments.

#### **But despite the widespread storm damage – Sterling Hall did not flood.**

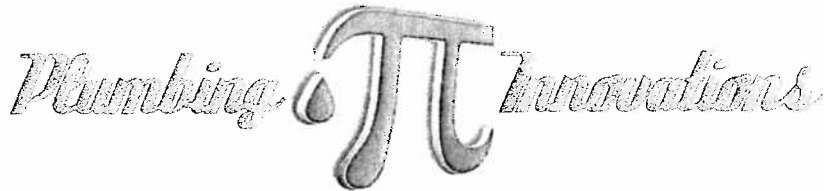
Three months later, on September 22, the City of Madison experienced another record rainstorm.

According to the *Wisconsin State Journal*, the rain fell for about six hours. The airport weather station reported two-thirds of an inch of rain fell in one 15-minute period and about three-quarters of the total rainfall for the day fell over the course of just two hours.

The total rainfall reported was 3.63".

#### **But again, no flooding occurred at Sterling Hall.**

For more information on the Restrictor by Plumbing Innovations call .262.957.7671 or visit [plumbing-innovations.net](http://plumbing-innovations.net)



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## **Restrictor Update, October 2010**

The following information was taken from a recommendation made by an engineering firm to a university. The university campus, which has a combined sewer infrastructure, was suspect to surcharging even during normal rain and storm water events.

The building described below was suspect to storm water interior discharges through a hub drain – which was videotaped leaking during a rain event.

It is one example of how the Restrictor can be used to reduce the potential for property flooding.

### **Roof**

- Existing ballasted roof with (4) six-inch conventional roof drains and four (4) six-inch overflow drains that discharge to daylight.
- Overflow drains are located approximately 15 feet from the roof drains and have an integral dam.
- All plumbing vents and HVAC curbs are a minimum of six inches above the roof drains.

### **Piping**

- Conventional gravity drainage system consisting of cast iron no hub pipe and fittings and HVAC hub drains on the first and second floor connecting to the storm conductor piping at the foundation wall.
- All hub drains are located above street level.
- Foundation drain tile is connected to a sump pump in the basement and discharges on grade.

### **Exterior**

- Existing storm building drain connects to an exterior concrete structure with grated cover and the rim elevation is significantly above street level.
- Inlet of the manhole (building drain) has a rubber duckbill check valve to prevent the municipal combination sewer effluent from backing up into the building. The duckbill check valve was installed on the inlet of the manhole rather than the outlet for two reasons.

1. Maintenance purposes (removal and replacement)
2. The style of duckbill with the flared end offers the least amount of resistance and full flow.

### **Hub Drains**

- First floor clear water hub drain is fitted with a fernco cap as a preventative measure. This hub drain, serves the air conditioning unit and was videotaped leaking during a rainstorm. The leaks were apparently caused by the storm water discharge being obstructed and backing up in surges (pulsating) above the first floor level. The duckbill check valve was suspected of not opening and restricting the roof drain discharge.

## **Testing the Duckbill Check Valve**

To test the duckbill's operation, the outlet of the structure was plugged and the storm building drain was filled from the second floor hub drain with a ½" hose from a mop basin.

The exterior storm structure was filled from the storm drain through the duckbill and the structure continued to fill to a point where the duckbill was submerged with at least 4 feet of water.

The duckbill was still discharging into the structure when the test was suspended. The duckbill still operated and opened with a minimum discharge despite being submerged.

## Conclusion

The roof drain discharge rate varies the discharge into the exterior structure.

If the municipal sewer is flooded or surcharged, the duckbill check valve is submerged.

The duckbill is open because of the storm water discharge; however the discharge is obstructed by the plugged municipal sewer lateral and the water level in the structure rises.

As the roof drain discharge pressure increases (head pressure) it pushes the municipal storm water out of the structure. This is not a consistent action but a pulsating action witnessed by the surging on the video tape of the hub drain.

## Recommendations

1. Install a standpipe prior to the duckbill to minimize the pulsations and provide storm water discharge relief.
2. Install hub drain backwater sewer stops as a preventive measure and additional safeguard.

*3. Install roof drain Restrictors (Plumbing Innovations) to regulate, stabilize and minimize the roof drain discharge rate.*

Hope this information helps you to reduce the number of CSOs in your area.

For more information contact

**Plumbing Innovations**  
*Protecting Water Quality*  
*One Roof at a Time...*

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**3815 N Brookfield Road**  
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Photos courtesy of Macalester College and shrewsbury.net websites





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Joint Finance Committee vote

## Budget trim would cut subsidies for sewer construction

By [Don Behm](#) of the Journal Sentinel

May 8, 2011 | [\(0\) Comments](#)

Wisconsin municipalities building sewers or expanding sewage treatment plants in the next two years would pay up to \$59 million more in interest costs to repay loans through the state's clean water fund, under a proposal approved last week by the Legislature's budget committee.

The Joint Finance Committee's plan to reduce a state subsidy for clean water fund loans would shift \$59 million in interest payments from the state budget to local property taxes over a 20-year repayment period, several municipal officials said.

The state buys down the interest rate to be paid by communities requesting the loans, offering repayment at an interest rate lower than the state pays on the bond market. The program provides rates at 60% of market rate, a 40% subsidy.

Since the communities aren't paying the full market rate, the state goes into debt by issuing bonds to generate revenue to pay the difference.

Gov. Scott Walker proposed cutting the subsidy in half, to 20%, boosting clean water fund interest rates paid by communities to 80% of market.

That step would have boosted interest costs paid by municipalities by as much as \$80 million in the next 20 years, according to Milwaukee Metropolitan Sewerage District Executive Director Kevin Shafer. Shafer and the directors of the Madison and Green Bay metropolitan sewerage districts expressed their opposition to such a change in a written statement to the committee.

The budget committee, on a 12-4 vote following partisan makeup of the panel, chose a compromise rate

of 75% of market, according to co-chair Rep. Robin Vos (R-Burlington).

By cutting the subsidy that much, the state would not have to take on more than \$20 million in new bond debt to finance the program in the 2011-'13 biennium, Vos said.

"These are the difficult choices we need to make" in the next state budget, Vos said.

## Could delay projects

But this shift in financing, coupled with Gov. Scott Walker's proposed property tax levy limits on local governments, could result in long delays or the elimination of sewer projects, according to local officials.

Cities and villages throughout Wisconsin took advantage of federal grants in the 1970s to build new sewer lines and upgrade treatment plants, said Paul Kent, a representative of the Municipal Environmental Group. The group has 96 municipal members.

Those sewers and treatment facilities are 40 years old and need to be replaced, Kent said.

Though federal grants are no longer awarded to communities, federal funds have been used as the capital to establish state revolving loan funds since 1991 in Wisconsin. States are required to put in some capital, equaling at least 20% of the federal funds.

The budget committee's decision to cut the program's interest rate subsidy - forcing the program to approve loans in the 2011-'13 biennium with rates at 75% of market rates rather than the current program's rates pegged at 60% of market rates - will create an immediate, costly burden for communities, according to Kent.

The decision, if it stands through budget deliberations, will set up other long-term, negative consequences for the smallest participating communities, according to Kent.

"Once you get to interest rates at 75% of market rates, the discount is so little that some of the larger communities and metropolitan sewerage districts will not use the program," he said.


The Milwaukee Metropolitan Sewerage District, as well as regional districts in the Madison and Green Bay metropolitan areas, have high credit ratings and would find better market rates if they struck out on their own, Kent said.

The remaining pool of communities generally have lower credit ratings so the bond interest rate offered to the state program is likely to suffer and go higher, he said. This would heap additional loan repayment costs on those municipalities, according to Kent.

MMSD will re-evaluate its participation in the state clean water fund if rates go above 70% of market, said Steve Jacquart, district intergovernmental coordinator.

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