Mayor's Audit Committee
MMSD
June 28, 2004

1. What role does your agency have in addressing the water quality and wet weather issues facing the Milwaukee area including MMSD. Who has what responsibility for determining how fishable and swimable water quality will be achieved in the Milwaukee area? What is the role of your agency. Are there other water quality goals that must be achieved in the area? If so what are they?

- Chapter 281, WI Statutes identifies the DNR as the *central unit of state government to protect, maintain and improve the quality and management of the waters of the state, ground and surface, public and private.* The statute further states (281.11) *A comprehensive action program directed at all present and potential sources of water pollution whether home, farm, recreational, municipal, industrial or commercial is needed to protect human life and health, fish and aquatic life, scenic and ecological values and domestic, municipal, recreational, industrial, agricultural and other uses of water.*

- The DNR promulgates water quality standards, which are regulations adopted to enhance and protect water quality and protect public health and welfare.
- Water quality standards provide the foundation for accomplishing the two primary goals of the Federal Clean Water Act:
  1. *To restore and maintain the chemical, physical, and biological integrity of the Nation's waters; and*
  2. *Where attainable, to achieve water quality that promotes protection and propagation of fish, shellfish and wildlife, and provides for recreation in and on the water ("Fishable/Swimmable").*
- *Water quality standards serve as a basis for developing and implementing control strategies to achieve legislative policies and goals. Water quality standards are the basis for deriving water quality based effluent limitations. Water quality standards also serve as a basis for decisions in other regulatory, permitting or funding activities that impact water quality* (Ch. NR 102.01(3), WI Admin. Code).

- Water quality standards are comprised of three parts that collectively establish the quality goals for a waterbody or portion thereof.
  1. Designated use of the waterbody
  2. Stating the water quality criteria needed to protect the designated use
  3. Setting in place an antidegradation policy to ensure that water quality is maintained.
- Ch. NR 102 identifies criteria for the following uses of a waterbody:
  1. Fish and Aquatic Life
  2. Public Health and Welfare
  3. Recreation
  4. Wildlife

There is a discrepancy between what DNR has authority to regulate for water quality protection and what the public would like to see. There is a long history of using advisory committees for setting goals and objectives for water quality improvement in the southeastern part of the state. The most recent goal setting actions are part of the combined Citizens Advisory Council for the MMSD 2020 Facilities Plan and SEWRPC's Regional Water Quality Management Plan Update.

2. What are the results which your agency expected when the deep tunnel project was approved? How did performance during the May wet weather period compare with these expectations? If the system did not

perform as expected what is your opinion why this was so? What have been the expectations of discharge from the MMSD system with regard to overall water quality in the area? Have these expectations been met? What water quality impacts were observed during the wet weather period?

The Water Pollution Abatement Project (WPAP), which included the deep tunnels, had an expectation that all flows at the treatment plants would meet secondary treatment standards; that all SSOs would be eliminated; and that CSOs would be reduced to an average frequency of 1.4 events per year. The overall performance at the treatment plants has been excellent, producing effluent well below secondary treatment standards; the SSOs have had an estimated reduction in volume of 93% (LAB); the CSOs have been reduced from 50 per year to 3 per year, with an associated volume reduction of 78% (LAB). The department is still evaluating the MMSD's compliance during the May events, and will have it's recommendation completed in the next few weeks.

It has been known since the completion of the Estuary Study, prepared by SEWRPC in the late 1980's, that the stream standards for bacteria would not be met unless significant reductions in non-point source pollution were achieved. Bacterial sampling during May was done by UWM and those results will be used in the watershed planning projects to model the impacts of all sources on the receiving waters, and also in evaluating control alternatives.

The underlying cause of the present, and past, concern it that there is too much water entering the wastewater system during wet weather events.

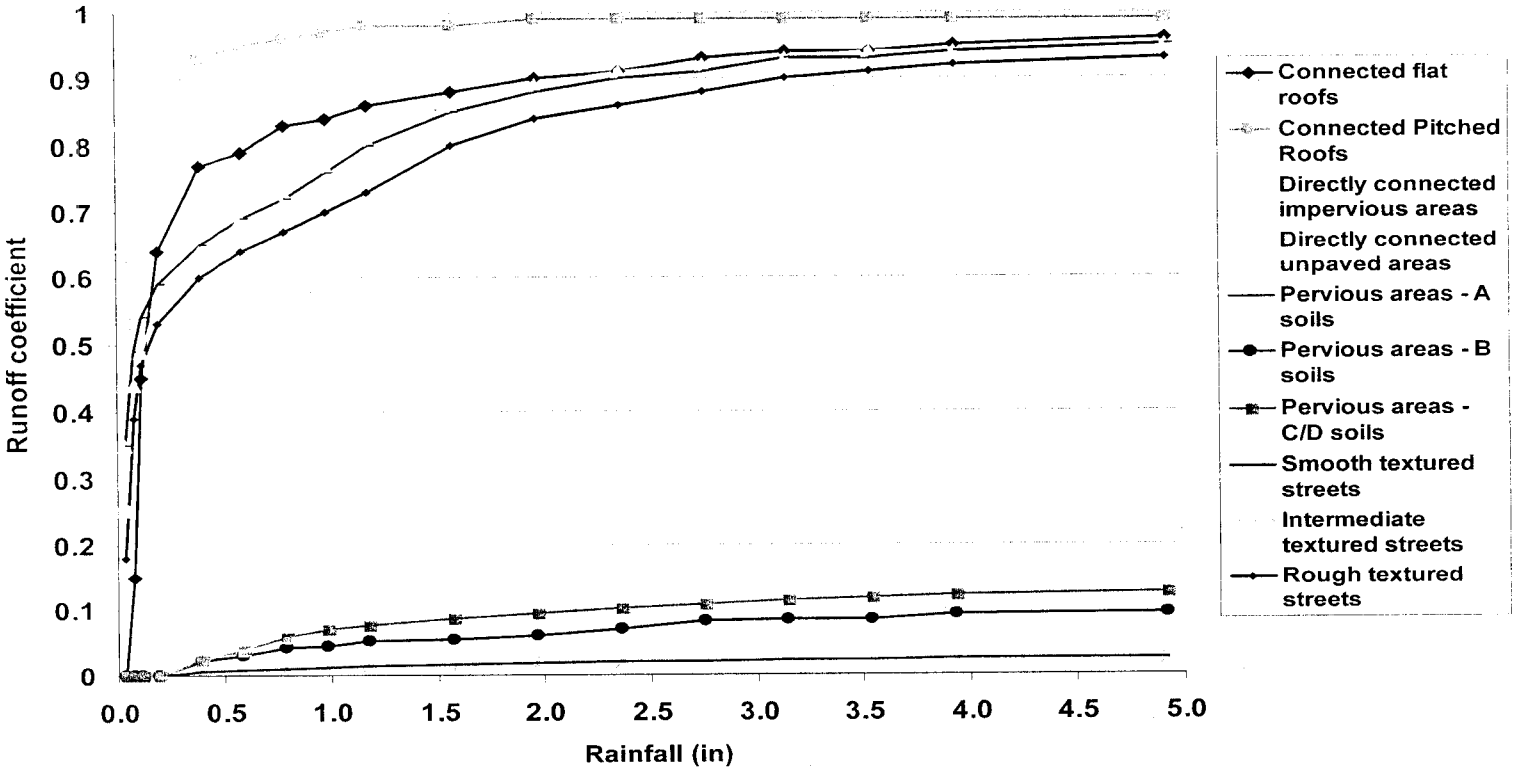
3. At the time of approval of the deep tunnel project, what was the maximum rainfall for which the system was designed to accommodate? How did the May wet weather period compare to this design?

- The storage volume the deep tunnel was designed based on a storm event that occurred in June 1940.
- A multi-step mathematical regression analysis of rainfall data for the period January 1940 to July 1979 (projected to the design year 2002) was used to estimate the required storage volume. The June 1940 event generated the greatest estimated storage volume.
- The storage volume was intended to contain sanitary sewer flows from the separated sewer area and reduce Combined Sewer Overflows to an average of 1.4 events per year.
- In the June, 1940 rainfall event 7.3 inches fell over 4 days with a maximum one-day total of 5.29 inches (measured at Mitchell Field). The total monthly precipitation for June 1940 was 9.04 inches.
- Rainfall recorded at Mitchell Field for May 2004 never exceeded 1.54 inches on any one day. There were however many more consecutive days of measurable rainfall in May 2004 as compared to June 1940. The total precipitation for the month was 8.18 inches.
- The intensity, duration and distribution of rainfall over the 400 square mile MMSD service area can vary significantly making direct comparisons of rain events problematic. According to MMSD rain gauges, total precipitation from May 7-25, 2004 varied from 7.05 inches to 10.93 inches over the service area (with 7.10 inches recorded at Mitchell Field). A comparable system of rain gauges did not exist in 1940.

4. What impact does land use and development have on flooding and overflows in the area? What is your agency doing to control urban sprawl (including freeway expansions) and promote sustainable development to which would prevent overflows and non-point pollution?

Land use and development have a significant and direct impact on flooding and stormwater pollution. Figure 1 shows a summary of runoff monitored from both pervious and impervious sources areas. The monitoring data clearly shows a substantial increase in runoff as land use moves from pervious areas (grass, forest, farmland) to impervious areas (roofs, streets, parking lots).

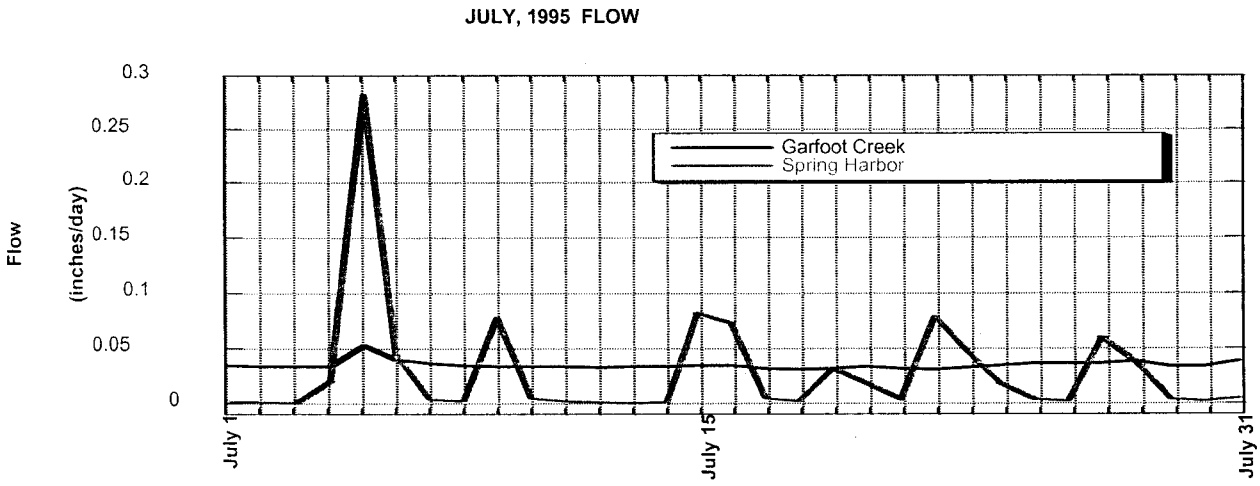
Figure 1: Monitored Runoff Coefficients



Note: Actual runoff = rainfall * runoff coefficient
Source: Roger Bannerman, DNR

When these development impacts are looked at on a cumulative basis they have a huge impact on the hydrologic function of the watershed. Figure 2 shows two watersheds that were monitored during a series of storm events in July 1995. These watersheds are of similar size the only difference being that Garfoot Creek is still rural dominated by farmland, prairie, and forested areas with little impervious area while Spring Harbor is in a urban area with the typical density of impervious areas. The plot shows runoff with the spikes corresponding with potential flooding. While both watersheds have similar total flows, the majority of the flow from Garfoot Creek is in the form of base flow stemming from infiltration while Spring Harbor's flow is dominated by surface runoff and the pollutants transported in the stormwater. The flows from Garfoot Creek are more likely to support a diverse fishery and a healthy stream while the flows from Spring Harbor are likely to cause flooding, stream bank erosion, and habitat degradation.

Figure 2: Flow from Two Watersheds



To address these issues, the DNR recently passed a comprehensive rule package (NR 151) to try and help address issues associated with stormwater runoff. Compliance with NR 151 is being implemented through the NR 216 municipal permits. NR 151 has performance standards that require infiltration and treatment of stormwater. The DNR is also creating a series of technical standards, tools, and guidance documents that pertain to specific best management practices, low impact development methods, and smart / comprehensive land use planning. The DNR also has grant money available for communities to aid in the creation of stormwater management plans to address water quality concerns. However, these resources need to be utilized and implemented by local municipalities and counties. DNR jurisdiction does not extend down the local planning and it is up to the local communities to use available tools and resources within a framework that will best serve them. However, the department does work with the local communities, and the following is the Executive Summary for the Stormwater Management Plan for Marquette Interchange Reconstruction, which was prepared by the Milwaukee Transportation Partners (MTP).

"The reconstruction of the Marquette Interchange required a partnership and commitment from the Wisconsin Department of Natural Resources, Milwaukee Metropolitan Sewerage District and the Wisconsin Department of Transportation in developing a stormwater management plan to treat the freeway surface runoff.

The nine drainage areas within the Marquette Interchange reconstruction limits represent 227 acres. At present only two drainage areas, which represent about 50% of the project drainage area, are directly connected to the MMSD system. The runoff from the remaining drainage areas directly discharges to the rivers. The proposed project will result in a 16% increase in impervious area and a 15% increase in total runoff volume.

The proposed project will result in a significant improvement in surface water quality by providing treatment for low flows that generally carry high concentrations of pollutants. Two new diversion structures will be constructed, and one existing diversion structure will be modified, to carry the low flow from 97% of the project area to the MMSD for treatment. The total suspended solids load from the

project drainage area will be reduced by 66%. There will be a 15% increase in annual runoff volume captured by MMSD. Based on the 1940 major storm, there will be an 18% decrease in volume captured by the MMSD. During major storm events the peak flow captured by the MMSD will be reduced by 61%. The demolition of the Park Freeway resulted in disconnection of 15 acres of combined sewer service area to the MMSD system.

The proposed stormwater management plan will improve surface water quality by treating low flow at the MMSD, while reducing the MMSD peak flow intake during severe storms. The MQIC project will minimize the impact to public and private property, reduce pollution and sediment deposition to receiving water bodies, and minimize the potential for flooding."

5. What action or actions would you have liked to see MMSD undertake during the recent wet weather events of May that the agency did not undertake?

That would be a part of any potential enforcement action and we are not going to discuss it today.

6. Are there long range actions that the MMSD should consider that are not currently being pursued by this organization?

The watershed planning effort should be the focus to determine what long term control options are best for the region, including MMSD. There must be a focus on water quality related issues and what broad ranges of alternatives are available to address the issues. While we must deal with the short term, we can never lose focus on the long term and what is in the best interests of all the citizens of Wisconsin.

7. EPA question - What was the experience of other cities in Region 5 during this wet weather period, especially those with combined sewer systems? Did overflows occur? What was the number and volumes of these overflows?

8. DNR question - What was the experience of other Wisconsin Communities during this recent wet weather period? Did overflows occur? What was the response of your agency?

There are currently 114 communities that have reported SSOs since March 1st of this year. I have attached a list of the communities, but do not have a complete summary of the volumes of overflows that occurred. That summary should be available in a few weeks. The department's enforcement guidance to field staff on SSOs is also attached.

9. What questions or concerns would you recommend that the audit committee keep in mind and address as a part of its work? Do you have any specific recommendations that you would recommend be considered for inclusion in the audit report? What is your opinion of further separation of sewers in the MMSD system?

- Improvement to Area Surface Water Quality Should be a Very High Priority
- Development of solutions should be long term, and should be consistent with current DNR regulations for planning.
- All communities that send wastewater to MMSD must reduce excessive I/I in their local system and implement good O& M of their collections systems.
- All of the communities are contributors to the SSOs from MMSD and need to make sure their sewer systems do not exacerbate the problem

- Expectations on what it will take to "solve" the problems must be determined and communicated to the Public. It is unrealistic to expect the overflows to end immediately. For example if the decision is made to separate the combined sewers in Milwaukee and Shorewood, the public needs to know this will take years not months to accomplish and in the interim overflows will likely occur.
- More factual information on Water Quality issues needs to be communicated to the public.
- All alternatives, including complete sewer separation as well as some partial separation, should be considered. This assessment should consider the water quality impacts plus & minus as well as the costs.
- Public input on the solutions is vital and needs to be sought.