Reducing Excessive Infiltration/Inflow in Local Sanitary Sewer Systems

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MWRD Board Room

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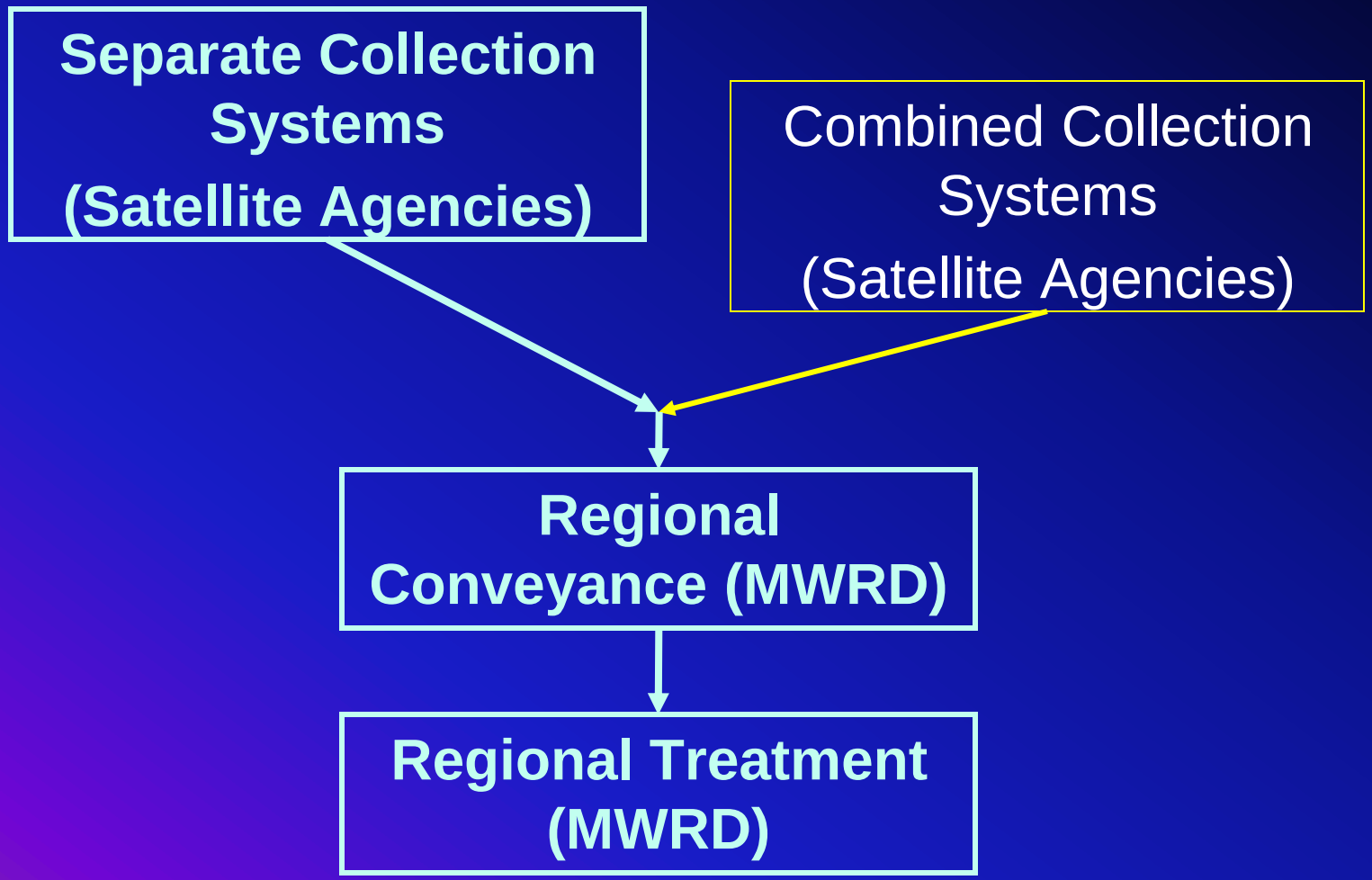
Local and Regional Components of Sewerage Systems



What is Infiltration and Inflow (I/I)?

Infiltration: (Groundwater)

- defective pipes, pipe joints, pipe connections
- leaking manhole walls,

Inflow: (Stormwater)

- illegally connected roof downspouts, yard, area drains,
- footing/foundation drains, sump pumps
- cooling-water discharges,
- drains from springs and swampy areas,
- storm-sanitary cross- connections,

What is Infiltration and Inflow (I/I)?

Unavoidable Infiltration: Due to limits of construction technologies and associated costs, infiltration up to 100 gallons per inch diameter per mile per day is allowed in case of newer sewer systems.

8” x 500 miles x 100 gallons = 400,000 gallons

What is Infiltration and Inflow (I/I)?

Excessive I/I: MWRD facilities are designed to convey and treat flow of 155 gallons per capita per day (gpcpd) average daily flow from separate sewer areas with a peaking factor derived from the 2 Dilution Curve.

In theory there is no difference between theory and practice. In practice there is.
Yogi Berra

Dry Weather Flow To District WRPs

WRP	Dry Weather Flow (MGD)	2010 Population	Dry Weather Per Capita Flow (gpcpd)
Stickney	524	2,113,175	243
Calumet	184	1,005,870	183
North Side	209	1,313,500	159
Kirie	32	264,667	121
Egan	26	160,735	162
Hanover Park	8.4	56,532	150

Impacts of Excessive I/I

Sewers overloaded with excessive I/I can lead to

- basement backups and street flooding
- public health hazards
- waterway pollution through sanitary sewer overflows (SSOs)
- regulatory violations and fines
- additional operation and maintenance (O&M) costs to convey and treat clear water
- deferred maintenance cost and eventual failure of the sewer system

History of MWRD I/I Control Programs

Article 6.5 of the Manual of Procedures

- **100 gpcpd wet weather flow limit (original requirement)**
- **Increased to 150 gpcpd in late 1970s**
- **Sewer Summit Agreement of 1985 offered Infiltration/Inflow Corrective Action Program (ICAP) option as alternative for compliance based on cost-effectiveness analysis**

History of MWRD I/I Control Programs

- USEPA grants offered to wastewater treatment plant owners under Clean Water Act of 1972 were conditioned on removal of excessive I/I

- Article 6.5 of the Manual of Procedures
  - 100 gpcpd wet weather flow limit (original requirement in 1973)
  - Increased to 150 gpcpd in 1976

History of MWRD I/I Control Programs

Early 1980s –

- **Most communities fell short of meeting 150 gpcpd**
- **Some systems measured higher I/I levels after performing rehab work**
- **Regional and municipal conferences appealed to MWRD for an alternative compliance method**
- **Municipal conferences, MWRD, and IEPA mutually decided to set new standards using USEPA cost effectiveness based guidelines**

History of MWRD I/I Control Programs

Sewer Summit Agreement of 1985

- **Offered Infiltration/Inflow Corrective Action Program (ICAP) as an alternative for compliance based on cost-effectiveness analysis**
- **Incorporated into Article 6.5 of the Manual of Procedures**
- **Set target date for compliance by all systems as July 1, 1991**

History of MWRD I/I Control Programs

Current status of compliance of sanitary sewer systems:

- **83% comply under ICAP option**
- **12% comply under 150 gpcpd option**
- **5% have not achieved compliance**

History of MWRD I/I Control Programs

- High wet weather flows at treatment plants due to I/I
- I/I threatens regulatory compliance at MWRD
- Interest in wet weather flow storage facilities (local agencies)
- Simultaneous pump operations at sanitary lift stations
- Current I/I control program has run its course, needs re-tooling

Draft NPDES Permits

- Draft permits require MWRD to address I/I
- Define excessive I/I as wet weather flows >150 gpcpd
- Require action if I/I ***causes or contributes to SSOs or basement backups***
- Such I/I reduction measures will need a new program or significant edits to the existing program
- IEPA has stated the main goal is to ensure communities are taking care of their infrastructure
- THERE MUST BE A MAINTENANCE PROGRAM IN ALL COMMUNITIES

ATP Meetings
Focus of Discussions

Date	Topic
November 18, 2011	Introduction and General
January 18, 2012	Maintenance & Operation of Sewer Systems
March 21, 2012	Funding
May 16, 2012	Private Sector I/I
July 18, 2012	Review of ICAP

ATP Discussions

- Stakeholders dialogue cordial, optimistic
- Subject Matter Experts have contributed
- Proceedings at ATP meetings are well documented and posted on MWRD webpage for public benefit

Summary of ATP Discussions

- Long Term Operation and Maintenance Plan
- Public Sector I/I Removal
- Private Sector I/I Removal
- Sources of Funding
- Enforcement…
- Possibilities and Considerations

Long Term O & M Plan

- IEPA Statement and Consensus of ATP:
  - Communities must take care of the system
  - Long Term Plans – 20 to 30 years
  - Short Term Aspects – 3 to 5 years

Long Term O & M Plan
Minimum Requirements

- Accurate Sewer Atlas – GIS
- Risk based analysis
  - Sewer inspection, cleaning
- Commitment to rehabilitation
  - Annual based on risk - $4000/mile

Long Term O & M Plan
Minimum Requirements

- **Maintenance Plan – Reactive and Proactive**

- **Description of how work is scoped, designed, scheduled and performed**

Long Term O & M Plan
Minimum Requirements

- **Permitting Plan – how do you control system connections and implement private I/I control**

- **Funding Plan**

- **Staffing Plan**
- ****CMOM program guidelines**

Public Sector I/I

- Cross-connections – Stormwater Drains
- Closed lids on areas prone to flooding
- Lining trunk lines under ditches and creeks
- Smoke testing, CCTV, rehabilitation
- Assessment/rehabilitation inventory

Private Sector I/I

- **Biggest challenge – biggest contribution**
- **Roof drains and downspouts**
- **Sump pumps and foundation drains $$**
- **Driveway, yard and window well drains**
- **Cracked and broken laterals**

***** Smoke Testing – Cost Effective Identification***

Funding

- State Revolving Fund

- Local funding through sewer service fees

- Creation of a Special Assessment District
** 20 year bond financed by ad valorem tax

Enforcement

- Expand the Sewer Permit Ordinance and Manual of Procedures
  - Require private sector I/I program
  - Require % of illegal connection inspection
  - Require lateral repair on demo, sale or property improvement

Enforcement

- No Maintenance – Excess Flow Charge (legislation)
- Fines or consent orders - IEPA
- Monetary incentives could be refunded to communities for sewer work

Possibilities and Considerations

1. **Private Property I/I Reduction Program**

   similar to Milwaukee's program (will require legislative changes and funding)

2. **Local Loan Program**

   authority exists since 1999 (legislative)

3. **Special Service Area Program** (local initiative)
4. **Public Information/Education**
5. **Annual Reporting of Fund Utilization**
6. **Targeting High I/I Areas**
7. **Green Infrastructure**
8. **Regional Programs for Economy of Scale**

Recommendations

- Draft a new I/I program with ATP
- Develop economical solutions
- Develop short term and long term goals
- Develop investment guidelines for continued asset management
- Eliminate transport and treat option

Recommendations

Near Term Goal: 3-5 years

- Cost effective inventory of public and private I/I
- Establish minimum long term maintenance plan
- Address low hanging fruit
- Develop private I/I strategy
- Develop funding strategy

Recommendations

Long Term Goal: 20-30 years

- Develop and implement long term plan
- Prioritize and complete projects – cleaning, inspection and rehabilitation
- Reduce basement backups and SSOs

Next Steps

- Incorporate feedback into development of new draft program
- Include discussions with ATP on drafting program elements and ordinance language
- Present to MWRD Board in 2013

It is in the best interest of all stakeholders to continue this forum and dialogue until a framework for a full and final solution is established.


METROPOLITAN WATER RECLAMATION DISTRICT
Questions?