APPROACH

The tasks involved to update the City's storm water master plan include:

1. Review of the current storm water master plans.

2. Review of the status of implementation of each.

3. Field reconnaissance of critical areas and to get an overall feel of the existing conditions as they relate to storm water and surface water.

4. Input from City staff, City wetlands consultant, regulatory agencies, and neighboring communities in regard to present trends, procedures, and opinions.

5. Review of projected storm water flow rates and volumes to evaluate the effectiveness of past and present storm water management policies in relation to identified problem areas.

6. Review of the City ordinance in regard to present storm water management rules.

7. Conclusions of the study tasks 1 through 6 and recommendations for policy revisions and/or capital improvement projects.

*Constructed Wetland in Ingersol District*
NEEDS ASSESSMENT

Present problems identified by City personnel or through field reconnaissance are summarized below. Some items may simply be questions that need to be answered, or comments in regard to the City’s storm water policy. Input received has been divided into the following categories: Problem Areas, Policy Concerns, and Input from Outside Sources.

PROBLEM AREAS

Locations of specific problem areas identified by the City are indicated on the map in Figure 3. Reported problems were categorized by type (flooding and drainage, streambank erosion, sedimentation, and water quality) and are discussed as follows:

FLOODING AND DRAINAGE

The problem areas identified in the 1983 and 1992 Storm Water Master Plans have been resolved for the most part. Current flooding and drainage problems as identified by the City are fairly limited and are shown in Figure 3. These sites include:

1. Twelve-Wixom District: Flooding in the vicinity of 12 Mile Road. Likely a downstream problem in the City of Wixom.

2. Bosco District: Farm drains have filled in. The area has natural springs. The size of the existing wetland is increasing and water backs up along Grand River Avenue.

3. Sump District: Drainage problems south of 8 Mile Road in Northville Township.

4. Orchard Ridge District: Poor drainage in vicinity of 10 Mile Road and Chapman Drain.

5. Stonehenge District: Detention basin undersized or filled in.

6. Meadowbrook Lake District: Flooding along Ingersol
The problems identified in Item Nos. 1 through 5 are all localized drainage problems. All of these areas are located in headwater (upper end of a series of drainage districts) or peripheral drainage districts.

The flooding reported in Item No. 6 occurs at the confluence of three major watercourses — Ingersol Creek, Bishop Creek, and the Walled Lake Branch of the Middle Rouge River. This problem appears to be regional in nature.

**STREAM BANK EROSION**

Current stream bank erosion problems identified by the City are indicated in Figure 3. These sites include:

1. Meadowbrook Lake District: Stream bank erosion along Ingersol Creek.

2. Chase Farm District: Stream bank erosion along the Walled Lake branch of the Middle Rouge River.

Both of these areas are in the vicinity of the reported flooding problems (Item No. 6) at the confluence of the three large tributary streams and are located both upstream and downstream of Meadowbrook Lake. One major cause of stream bank erosion is the flashiness of the flow in response to storm events as reported by the MDEQ (see Appendix 4, Page 4.4, last paragraph). The City’s SWPPI establishes a peak flow target of 8 cubic feet per second (cfs) no more than 10% of the time downstream of Meadowbrook Lake to reduce flow variability. In other words, discharges from Meadowbrook Lake may exceed 8 cfs for a period of up to 36.5 days per year in response to precipitation events. This can be modeled with a continuous simulation model such as Storm Water Management Model (SWMM) with knowledge of seasonal base flow through the installation of a permanent flow measurement device. Reducing the flow variability will not only reduce stream bank erosion, but will improve long-term trends in the health of the stream as measured by the Macroinvertebrate Community (see “Water Quality” below).
SEDIMENTATION

Current sedimentation problems identified by the City are shown in Figure 3. These sites include:


3. Chipmunk District: Sediment has accumulated in Meadowbrook Lake, which is scheduled to be dredged.

4. Village Oaks District: Sediment has accumulated in Village Oaks Lake, which is being studied for possible dredging.

5. Walled Lake: Sediment “sand bars” near storm sewer outlets.

Field observation indicates that the problem is more widespread than the five sites listed above. Sediment is accumulating in several regional detention basins visited during this project, reducing effectiveness. Sediment is accumulating in open drains reducing their capacity to transport storm flows resulting in localized flooding. Observation indicates that some natural wetlands are accumulating sediment to the point that it is reducing the variety and type of desirable flora and fauna. Lakes and impoundments are accumulating sediment to the extent that recreational uses are impaired. Meadowbrook Lake is scheduled for dredging in the winter of 2005. Village Oaks Lake is in the design/study phase to determine the need or extent of a dredging project.
**WATER QUALITY**

Current water quality impairments identified by the City are indicated in Figure 3. These sites include:

1. Chipmunk District: The recreational value of Meadowbrook Lake is impacted as a result of algae growths and sediment accumulation (see “Sedimentation” above).

**POLICY CONCERNS**

**MASTER PLAN STRATEGY**

The change in direction in regard to abandonment of the 1983 and 1992 Storm Water Master Plans has left questions in regard to onsite detention being the best strategy for the City to pursue.

**STORM WATER DESIGN CRITERIA**

The City has requested that their current standards be evaluated during this study to determine if they are adequate to provide for the following:

- Controls against flooding, stream degradation and water quality impairments from urban storm water runoff.
- Protection of recreational lakes and high quality wetlands.

**RECORD KEEPING**

Presently, City records of the storm water management system are deficient in the following areas:

- No detailed information on most basins.
- Some basins show no easements for access.
- Incomplete storm sewer maps.
- Regional basins not clearly delineated in GIS.
- No records of routine maintenance provided.
- No records of identified problems or needs.
- No cost information available regarding maintenance provided.
**MAINTENANCE**

Maintenance needs focused on two main items: detention basins and catch basins.

- The City does not appear to have ownership or easements for several of the regional detention basins making access difficult.

- The basin outlets often accumulate debris and algae interfering with proper operation. Removal of the sediment accumulation is labor-intensive.

- The City does not receive information on the maintenance of privately owned detention basins. The City maintenance staff has anecdotal information that indicates a need for better maintenance on private systems as well as the City systems.

- Catch basins are reportedly failing structurally at a higher than expected rate.

**INPUT FROM OUTSIDE SOURCES**

**INTERVIEWS WITH DOWNSTREAM COMMUNITIES**

In the course of preparing this Storm Water Master Plan Update, the city engineers for Northville and Farmington Hills were interviewed. Neither felt that storm water from Novi was causing any critical problems. Both engineers expressed appreciation at being contacted and expected that any revisions to the plan would only benefit the downstream communities.

**INTERVIEW WITH THE MDEQ**

A meeting was held with MDEQ’s District Supervisor of the Geological and Land Management Division to discuss the apparent changing attitudes of environmental regulatory authorities in regard to open channel cleanout, in-line detention, and the use of natural wetlands for storm water management. The MDEQ is not opposed to the regional detention approach to storm water management, but does usually oppose...
use of natural drainage ways for storm water detention. If the drainage way is usually dry, the MDEQ is not likely to object to its use for detention. However, if the drainage way usually contains water, the MDEQ would need to balance its value as a natural resource with the need for storm water detention. A part of that decision includes an evaluation of alternatives. So the MDEQ would approve use of natural wetlands or watercourses for in-line detention if (1) the need for detention has been demonstrated to protect downstream waters, (2) the environmental value of the wetland or watercourse is low, and (3) there are no other feasible alternatives.

Maintenance of existing in-line storm water detention systems require an MDEQ permit under the Inland Lakes and Streams Section of the Natural Resources and Environmental Protection Act of 1994 (Section 301, Act 451, PA 1994). All earth changing activity (construction) taking place within 500 feet of a wetland or watercourse needs to be permitted by the MDEQ. This includes removing sediment from detention basins. It is anticipated that the MDEQ would readily issue such permits to maintain existing facilities.

**DISCUSSION**

Specific analysis completed during this storm water master plan update consists of the following:

- A quantitative storm water runoff model to perform a hydrologic (flow) and hydraulic (capacity) analysis of the regional drainage system.

- A review of water quality data related to the recreational lakes.

A detailed discussion of this work is included in Appendices 3 and 4, respectively.

A discussion of the evaluation, findings, conclusions, and recommendations in regard to the issues and questions raised in the needs assessment is presented below.