10. SCENARIO PLANNING AND SIGNPOSTS

SCENARIO PLANNING AND SIGNPOSTS

This project includes the master planning for the MMSD's services and operations over the next 50 years, which is a long planning horizon. To compensate for the uncertain nature of the future, the method of scenario planning was used in the planning process. Based on the results of the scenario planning and other planning efforts, signposts (trigger mechanisms) were identified to provide general guidance for the MMSD's operations and facility planning efforts as the future unfolds. Details of the scenario planning processes are provided in Appendix F, TM6 – Scenario Planning Workshops.

Scenario Planning

Scenario planning is a predictive modeling technique used for risk analysis and planning policy creation. Scenario planning identifies probable outcomes that may result from a combination of factors/planning variables and their associated uncertainties. One of the greatest values of scenario planning lies in its articulation of a common future view to enable coordinated decision-making and action. Though scenario planning does not predict the future, it enables the user to prepare for future outcomes and to identify actions that need to occur to achieve desired outcomes.

The technique grew out of defense planning in the 60's and 70's and was a key element in the successful positioning of Royal Dutch Shell after the Arab oil embargo of the early 70's. Scenario planning has since been successfully used in both the public and private sectors to create situation-specific "alternative futures" while systematically accounting for future uncertainty.

During the master planning process, two scenario planning workshops were conducted with the TAC, MMSD, and consultants to identify factors and uncertainties that could potentially impact MMSD during the 50 year master planning period, with a focus on the far end of the planning period (2030 – 2060). A total of 24 initial planning variables and driving forces were identified in the workshops. These planning variables and driving forces were then ranked for their levels of uncertainty and importance. The following 4 were selected for further evaluation due to their high levels of uncertainty and importance:

- Effluent Discharge and Reuse
- Regulatory
- Public Acceptance
- Protect the Lakes

Based upon the selected planning variables and driving forces, three scenario matrices were developed in the two workshops for group discussions. The variable "Protect the Lakes" is

dependent on the effluent discharge locations, biosolids management alternatives and other planning variables, therefore it is not used as an independent planning variable in the scenario matrices. Workshop attendees had extensive discussion on each of these scenario matrices and their potential implications on the MMSD planning and operations. The discussion is documented in Appendix C of TM6 – Scenario Planning Workshops, which is included in Appendix F of this report.

Future Alternatives and Signposts

The following four long-term alternatives were identified in TM-7 but not recommended for further evaluation due to the strict regulatory constraints, high construction and operation costs, lack of proven technical feasibilities, and potential strong public resistance. However these alternatives may become more viable in the future with changes in the political environment, water resource demand, or improvements in wastewater treatment technologies.

- **Mendota WWTP** – This project includes construction of a new WWTP north of Lake Mendota near the Yahara River to serve the Yahara River watershed north of Lake Mendota. The new plant would discharge high quality effluent into the Yahara River upstream of Lake Mendota. The implementation of this project will be able to alleviate capacity expansion at the NSWTP and to provide a local source of high quality effluent for infiltration, irrigation or reuse.
- **Sun Prairie WWTP Expansion** – This project provides sewer service for the portion of the MMSD's future service area in the Koshkonong Creek watershed by directing flow from this area to the City of Sun Prairie WWTP for treatment. The project will provide relief in the conveyance system and mitigate inter-basin transfers of water.
- **Stoughton WWTP Expansion** – This project would redirect flow from PS 7 and 9 service areas to an expanded existing Stoughton WWTP. Implementation of this project includes the construction of a parallel treatment plant to treat the wastewater diverted from the MMSD system. Biosolids treatment would be provided by expanding the existing biosolids treatment train at the Stoughton WWTP. The implementation of this project will alleviate capacity expansion at the NSWTP and provide a source of high quality effluent for infiltration, irrigation or reuse.
- **Village of Oregon Discharge to PS 11** –This is an operational reserve project for a potential annexation of the Village of Oregon by MMSD with treatment of the Village's wastewater at the NSWTP. This project does not include additional treatment capacity away from the NSWTP.

Signposts and trigger mechanisms were generated to provide MMSD the necessary "early warning" for preparing for future scenarios. The signposts and potential corresponding strategies are presented in Table 10-1.

Table 10-1 Signposts for Future Scenarios

No.	Signposts	Potential Strategies
1	Improvement in wastewater treatment technology for high quality effluent processes	· Discharge to Lake Waubesa, which would reduce effluent pumping costs and simplify operation and maintenance. · Discharge to Yahara River upstream of Lake Mendota to provide additional base flow · Increase effluent discharge to Sugar River to match the groundwater withdrawal from the watershed.
2	Local regional wastewater agencies show interest in joining MMSD. This could happen in the following scenarios: · More stringent future regulatory requirements make the small-scale local operations less cost-effective · Local agencies have financial or technical difficulties in meeting the higher discharge limits · The imbalanced inter-basin water transfer becomes a major concern and requires a regional solution and there is a consensus that MMSD is the appropriate agency to deal with the issue.	· Consider forming partnership with regional wastewater agencies · Determination of the provision of sewerage service structure and service charge rates · Negotiate to achieve win-win situations among multiple parties.
3	Imbalanced inter-basin water transfer becomes a major concern in the future	· A new Sugar River plant discharge to the confluence of the Sugar River and the Badger Mill Creek or/and headwater of the Sugar River will become more convincing. · Consider starting planning process for a Mendota Plant to provide additional base flow in the Yahara River upstream of Lake Mendota. · Increase effluent discharge to Starkweather Creek by constructing a new satellite treatment plant or conveying treated effluent from NSWTP to the area. · Expand the existing Sun Prairie WWTP and increase discharge to Koshkonong Creek.
4	Low public support for effluent reuse	· Target potential industrial effluent users. · Manage effluent discharges and reuse, be adaptive to different future scenarios. · Establish credibility with incremental implementation of effluent reuse alternatives · Identify the lead agency for overall water resources management in the area. Develop good relationships with other water sector agencies · Develop good public education program related to effluent reuse to convince the public and regulatory agencies that effluent reuse alternatives are protective for the public health and the environment. · Monitor the developments in the technical fields associated with effluent reuse · Identify the target environmental groups that would have an interest in water reuse and engage these groups in the water resource management discussions.

No.	Signposts	Potential Strategies
		· Construction of demonstration facilities to show benefits of effluent reuse alternatives and to determine capital and M/O costs.
5	High public support for effluent reuse	· Be selective in which alternatives to be implemented and to adopt the alternatives with high cost efficiency and environmental benefits. · Conduct training and prepare workforce for effluent reuse applications. · Purchase land for additional treatment and conveyance facilities. · Develop lists of potential customers for effluent reuse. · Address the seasonal demand variance for treated effluent. Provide contingency plans for effluent reuse systems.
6	Higher than projected peak flows due to increased precipitation and resulting higher rates of I/I and high groundwater levels	· Harden the conveyance system components to eliminate points of entrance for I/I. · Encourage sound management of collection systems in satellite communities · Increase the capacity of new and rehabilitated conveyance system components.
7	Water resource needs low due to: · Water conservation efforts · Lower than expected growth rate	· Delay construction of additional capacity for the conveyance system and treatment facilities. · Public education to cultivate public acceptance for new effluent discharge locations and reuse alternatives. · Monitor regulatory trends and their impacts on the effluent discharge and reuse alternatives. · Construction of demonstration facilities to determine costs and show benefits of effluent reuse alternatives.
8	Water resource needs high due to: · Higher than expected growth rate · Population shift	· Public education to cultivate public acceptance for new effluent discharge locations and reuse alternatives. · Construction of demonstration facilities to determine costs and show benefits of effluent reuse alternatives. · Conduct training and prepare workforce for effluent reuse applications. · Purchase land for additional treatment and conveyance facilities. · Develop lists of potential customers for effluent reuse. · Promote water conservation efforts · Implement programs to reduce inflow/infiltration, which will delay the need for major capital improvement projects required to expand the capacity of the conveyance system.
9	High regulatory requirements	· Upgrade the existing treatment facilities and effluent pumping system. · Diversify the treated effluent discharge locations and effluent reuse alternatives. · Diversify the biosolids utilization alternatives. · Take proactive action to identify alternative users for biosolids other than agricultural crop land. The production of a Class A biosolids material is critical to assure that a full range of

No.	Signposts	Potential Strategies
		alternate uses can be investigated. · Construction of new satellite treatment plants with high quality effluent processes

The purpose of the 50-Year Master Plan is to provide MMSD with a general guidance tool for providing service in the next 50 year planning period. More detailed Facility Plans will be developed as time progresses (about every 5-10 years). These Facility Plans will review the Master Plan, and evaluate the signposts/trigger mechanisms presented in the Master Plan. Based upon a re-evaluation of these issues, appropriate strategies will be determined. The individual Facility Plans may continue with the plans in the Master Plan or may make some modifications. Essentially, the Master Plan will be a dynamic document and will be reviewed and updated with each Facility Plan and allow MMSD to modify the projects that will be implemented.