Water and Wastewater Master Plan
Introductions of Master Plan Team

Facilities Team
- Steve Riley, Master Plan PM
- Juan Aceituno, Condition Assessment and Operations Support PM
- GJ Schers, Water Treatment Technologist
- Jerry Notte, Senior QC

Financial Team
- JD Solomon, Prioritization and Asset Management
- Jaason Englesmith, Economic Modeling
- Dave Green, Rate Analyst

O&M Team
- Chris Catlin, On-Site O&M Support Lead
- Harry Morrow, Senior QC
- Sean Haghighi, Senior leadership and QC
- Steve Meininger, Senior Operations
Presentation Agenda

- Why master planning is important to NMB Water
- Initial system work that led to the Master Plan—what we’ve done and what we’ve learned
  - O&M assistance
  - Condition assessment
- Master Plan
- Infrastructure recommendations
- Operations and maintenance (O&M) recommendations
- Financial recommendations
- Next steps after Master Plan
Why Master Planning is Important to NMB Water
Master planning is key for long-term sustainability

- 38 years since last update to NMB Water’s Master Plan
- Master Plan goals (reviewed during Master Plan update):
  - **Condition**: identify equipment repair/replacement needs
  - **Capacity**: assure facilities can meet current and future demands
  - **Renewal and rehabilitation (R&R)**: develop and implement R&R plan to avoid costly emergency repairs and service interruption
  - **Water quality**: ensure facilities meet or exceed regulatory requirements and customer expectations
  - **O&M**: identify opportunities for potential system optimization and efficiency
  - **Short-term and long-term plan**: develop roadmap to meet future needs
  - **Funding**: prepare a financial plan to fund capital and O&M needs
NMB Master Plan identifies water and wastewater improvements for 15 year planning window (2016-2030)

- Service goals and requirements
- Population, water and wastewater demand projections
- Water supply and treatment
- Water storage, pumping, and transmission
- Wastewater collection, pumping, and transmission
- Capital Improvements Plan (CIP)
Master Plan also identifies future water and wastewater capacity requirements

- Water service area much larger than wastewater service area
- Many customers in service area served by septic tanks
- Projections included impacts from North Miami Beach rezoning to mixed-use (2015) and potential wholesale service to Bal Harbour
NMB Water’s Master Plan is the critical element in the roadmap for the vision of the utility.
What We’ve Done and What We’ve Learned Leading to the Master Plan
Operations and maintenance support services have addressed critical operational issues.
Changes in O&M mindset have promoted awareness and continuous improvement

- **Management**—Developed a environment of accountability and awareness to quality and regulations

- **Development of staff**—Began the early training of staff to understand the water treatment process and regulations and to provide the leadership necessary for their employees to improve performance.

- **Prioritization**—Worked with staff to identify and prioritize urgent projects and needs, preventive maintenance, and best practices
Multiple waste streams from waste trench and lined pit have been rerouted from water system to sewer system.
Out-of-service wells are being repaired and put back on line—predictive maintenance is being implemented

- Up to six wells have been out of service simultaneously due to lack of attention and predictive maintenance.
- As soon as the next well repair is completed, predictive maintenance on the oldest serviceable well will begin, increasing water system reliability.
- This will provide for well cycling and rest periods.
Lack of cleaning finished water tank for 20 years has resulted in >10 cu/yd of sediment build-up

Shutdown of one portion of the plant was not possible due to inoperable valves and limited capacity (*no valve maintenance*)

Cleaning by specially trained divers allowed the plant to remain in service while the tank was cleaned
Numerous chlorine pump failures have threatened the water disinfection process.

Spare pumps and spare parts have been ordered.

Design for complete system replacement was prepared, which involved a multiple-step process to allow continued plant operation during short-term (emergency) repairs and longer-term, more comprehensive renovation.

Chlorine system replacement design will address threats to water disinfection process.
Implementation of routine maintenance and the rehabilitation of equipment is critical at the WTP

- **High-service pumps** – aged pumps need repair or replacement
- **Lime softening WTP** – replace process piping and valves, lime preparation system, and backwash reclaim system
- **Chemical systems** – chlorination, ammonia, carbon dioxide, fluoride, coagulation aid, sulfuric acid, corrosion inhibitor
- **Reliability improvements** – isolation valves, outage bypass pipelines, permanent emergency power generators
- **Safety improvements** – entrance and exit doors, fire alarms, safety showers, elevated walkways
- **Preventive maintenance program**
2016 Norwood WTP condition assessment identified several areas of plant requiring improvements.
2016 Norwood WTP condition assessment identified several areas of the plant requiring improvements.

Lime softening, chemical feed, high service pumping, and SCADA systems and plant infrastructure.
Objective: Assess current condition and recommend critical projects to maintain plant’s current operations

Top priorities: Worker safety, public health, regulatory compliance, continuous drinking water production

Team “on the ground” in 1 week: civil, electrical, I&C, structural, process mechanical, architect

Findings & recommendations: coordinated with Master Plan team

Recommendations

- Identified 17 priority projects – ranked high to low
- Detailed work descriptions prepared for 7 projects:
  - Repair/replace inoperative isolation butterfly and knife gate valves in the Post Treatment Structure 2 $ 891,682
  - I&C spare parts inventory
  - Rebuild/replace the Old High Service Pump Station $ 340,266
  - Lime Softening Water Treatment Plant I&C upgrades $ 582,553
  - Upgrade the plant historian and reporting $ 77,131
  - Replace temporary diesel engine generator $ 1,830,231
  - Clean and repair lime softening clarifiers and steel backwash reclaim tanks and piping $763,961

All projects incorporated into Master Plan CIP
## Norwood WTP Condition Assessment – 17 Priority Projects

<table>
<thead>
<tr>
<th>Priority</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plant-wide – Replace/upgrade disinfection system instrumentation/equipment/facilities</td>
</tr>
<tr>
<td>2</td>
<td>Lime Softening WTP – Chemical Feed Systems – Repair/replace chemical feed equipment/storage tanks/controls/piping</td>
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<tr>
<td>3</td>
<td>Post-Treatment Structure 2 – Investigate subsidence near the structure’s west wall</td>
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<tr>
<td>4</td>
<td>Test/repair interconnection with other utilities</td>
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<tr>
<td>5</td>
<td>Instrumentation and PLC spare part inventory</td>
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<tr>
<td>6</td>
<td>NF/RO WTP – Miscellaneous upgrades to process systems and equipment</td>
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<tr>
<td>7</td>
<td>High service pumps - Repair/replace old high service pumps and develop a preventive maintenance schedule</td>
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<tr>
<td>8</td>
<td>Plant-wide – Plant staff safety/environmental health improvements</td>
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<tr>
<td>9</td>
<td>Lime Softening WTP – I&amp;C upgrades</td>
</tr>
<tr>
<td>10</td>
<td>Lime Softening WTP – Process pump and associated piping upgrades</td>
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<tr>
<td>11</td>
<td>Lime Softening WTP – Upgrade backwash reclaim system</td>
</tr>
<tr>
<td>12</td>
<td>Lime Softening WTP – Upgrade lime storage and slurry preparation systems</td>
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<tr>
<td>13</td>
<td>SCADA – Upgrade the plant historian and reporting</td>
</tr>
<tr>
<td>14</td>
<td>Lime Softening WTP – Temporary diesel engine generator</td>
</tr>
<tr>
<td>15</td>
<td>Lime softening WTP – Repair lime softening units</td>
</tr>
<tr>
<td>16</td>
<td>Repair/replace Well Pumps 3 and 19</td>
</tr>
<tr>
<td>17</td>
<td>Plant-wide – As-built gap analysis</td>
</tr>
</tbody>
</table>
CH2M’s work provides the foundation for NMB Water’s 15-year CIP

- Operations and Maintenance Support
  - Ground Water Rule Compliance Evaluation of Norwood WTP
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- Water and Wastewater Master Plan

- Water Treatment
- Water Supply
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- Wastewater Collection
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- Capital Projects
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- O&M Recommendations

- Capital Project Prioritization
- 15-Year CIP
- Financial Plan and Rate Stabilization
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  - Near-term Master Plan Updates
Water Treatment
**Condition:** Norwood WTP repairs, upgrades, and expansions are essential to keep the plant operational.

- Lime softening plant repairs and upgrades (e.g., lime softening clarifiers, filters, pump stations, chemical feed systems, wells)
- Chemical feed systems need replacement
- Lime softening plant needs major instrumentation and control (I&C) upgrades
- Old high-service pump station and post-treatment structure need critical repairs and upgrades
- Plant-wide SCADA lacks control capabilities
- Plant infrastructure needs critical upgrades (e.g., elevated walkways for health and safety, fix access doors, backup power (lack of preventive maintenance))
**Capacity:** Norwood WTP expansion is needed to meet current and future demands with adequate redundancy.

- **Phase 1 WTP capacity expansion:**
  - Construct fourth 3-mgd membrane skid
  - Expand existing RO skids to 2.5 mgd each

- **Phase 2 WTP capacity expansion:**
  - Construct new lime softening clarifier and rehabilitate the lime softening facilities
  - Add new membrane building with one NF and one RO skid, expandable for future capacity

**Phases 1 and 2 improvements should be implemented as soon as possible to eliminate the gap between customer demands and plant capacity.**
Anticipated expedited planning, design and construction schedule for necessary plant expansion projects.

Current Plant Capacity Risk:
- Lime Softening Firm Capacity: 3.5 MGD (1 skid w/ bypass)
- NF Firm Capacity (with bypass): 10 MGD (10 MGD perm + 1.0 MGD bypass)
- RO Total Capacity (with bypass): 15 MGD

Phase 1:
- Add one new NF skid providing 1.2 MGD of firm capacity (1.2 MGD perm + 2 MGD bypass)
- Add one new RO skid providing 1.5 MGD of firm capacity (10 MGD perm + 1.0 MGD bypass)

Phase 2:
- Add a lime softening clarifier providing 10 MGD of firm capacity

Total Plant Capacity:
- Average Day Demand
- Max Day Demand
- Total Plant Capacity
- Firm Plant Capacity

NF and RO expansion within existing building
Lime softening, NF and RO facilities expansion
Capacity: Phase 1 Norwood WTP expansion and improvements add capacity quickly

New NF skid (+3 mgd)

New pressure vessels (+1.5 mgd)
Capacity: Phase 2 Norwood WTP addresses lime side rehabilitation and adds capacity for fully reliable system

- Implement improvements from lime softening reactor/clarifier performance evaluation
- Repair and modify HVAC systems in membrane building and lime softening plant
- Replace membrane cleaning panels and repair or replace SCADA Panel 2 in RO Process Building
- Construct retreatment system for degasifier odor control
- Expand odor control scrubber stripper cleaning system
Well water quality is good—no indicators of saltwater or bacteriological contamination

Finished water produced at Norwood WTP is currently in compliance with local, state, and federal regulations

Customer complaints are largely color-related

Master plan recommendations to further reduce color in finished water:

- Lime softening system optimization testing to optimize chemical dosing and potential addition of new chemical process to improve clarified water quality and filter performance
- Update existing corrosion control strategy based on optimized lime softening process
O&M: Master plan identified opportunities for potential O&M optimization for NMB Water

- Optimize NF pretreatment dosing for significant savings in sulfuric acid and to improve efficiency
- Optimize lime softening process to reduce customer complaints due to high color and to improve filter performance
- Update corrosion control strategy to protect distribution system, while optimizing chemical use
- Ground Water Rule compliance strategy to streamline recordkeeping and reporting and to facilitate plant operation mode modifications without compromising compliance
Water Supply
**Condition:** Water supply system consists of 20 wells with multiple renewal and replacement needs

**Multiple R&R needs:**
- Condition assessment
- Flow meter modifications
- Flow/capacity testing
- Pipeline hydraulic analysis
- SCADA upgrades to restore capacity
- Improve well balancing and rotation
**Capacity:** Wellfield expansion is needed to meet current and future demands with adequate redundancy

- Achieve additional capacity
- Improve backup supply and reliability

- **Immediate action:** 3 new wells
Water Distribution System
Condition: Water pipeline breaks may increase due to age

- 550 miles of water mains
- Critical pipe materials:
  - Cast iron (17 miles)
  - Asbestos cement (30 miles+)
  - 2-inch galvanized steel (110 miles)
  - Polybutylene service pipes (most replaced)
- Condition of old mains unknown
- Uncased mains beneath roadways
Condition: Water pipeline assessment program is needed to develop an R&R plan

- Inspections
- Risk assessment
- Repair and replacement plan
- Inclusion of pipe R&R projects in CIP
**Capacity:** Water main hydraulic modeling identified need for new pipes and pumping stations

- Hydraulic model created for capacity analysis
- New transmission mains (*shown in red*)
- New booster pump stations: 207 Street site, Myrtle Grove site
- Model calibration needed – major next step
Wastewater Collection System
System in relatively good condition

All 29 pump stations have been rehabilitated (4 left)

Entire collection system has been inspected and tested

Infiltration and inflow reduction complies with regulations

174,000 feet of sewer pipes lined and sealed (42% of all gravity sewers)
**Capacity:** Modifications are needed to adapt to changes in County transmission system

- Hydraulic model created
- County system pressures expected to increase (Outfall Legislation modifications), impacting 6 of the 33 NMB Water pump stations
  - **Larger pumps needed**
- SCADA upgrades are beginning soon
Capital Projects
Safety audit and arc flash study
Conduct safety audit at Norwood WTP to include recommendations for improvement. Conduct electrical arc flash study to identify areas of potential risk and recommendations for improvement for worker safety and equipment protection.

Energy efficiency study
Study to identify energy cost saving opportunities by making modifications to the infrastructure and operational strategies at the Norwood WTP and wellfield, Operations Center, and wastewater pump stations.

Emergency generator backup power
Evaluate system for modification to enable single generators to serve both lime and membrane plant equipment. Develop plan for repurposing temporary generator.

Conduct safety audit at Norwood WTP to include recommendations for improvement. Conduct electrical arc flash study to identify areas of potential risk and recommendations for improvement for worker safety and equipment protection.

WTP finished water metering assessment
Identify deficiencies in metering system and implement improvements from water audit study to improve accuracy of meters.

Onsite sodium hypochlorite evaluation
A potential cost savings option at Norwood WTP is the generation of sodium hypochlorite and discontinuation of bulk product purchase; if the evaluation is favorable, this process could be added to the proposed Maintenance and Chemical Building.

Evaluate lime sludge disposal
Assess the current lime sludge disposal contract; NMB Water should develop a contingency plan in the event the sludge hauling and disposal contractor cannot continue current practices.

WTP I&C and SCADA upgrade
Expand automation functions. Develop I&C and PLC spare parts inventory.
Upgrade plant historian (SCADA-based records maintenance) system.

Capacity analysis report
Norwood WTP MDD exceeds 75% of rated capacity of 32 mgd and has reached threshold necessary to prepare a Capacity Analysis Report conforming to FDEP (DOH) requirements.

NF and RO pretreatment enhancement testing
Testing to optimize chemical pretreatment of sulfuric acid and scale inhibitor and to increase NF recovery to 85 percent.

Evaluate membrane element service life and NF system optimization
Test NF and RO system membranes to establish integrity of the membranes and to develop an estimate of remaining useful life.

Immediate capital projects at Norwood WTP optimize operations
Infrastructure Recommendations
Asset management and preventive maintenance extend useful life of assets and provide long-term cost savings.

- Asset management program development
- Preventive maintenance program development
Asset management provides an integrated approach to maximizing asset life, lowering costs, and stabilizing rates.
Asset management coupled with preventive maintenance focuses efforts on repairs before they become too costly

- Expand use of CityWorks to include tying work orders to assets
- Construct asset hierarchy
- Develop spare parts inventory requirements
- Develop preventive maintenance workplan for all assets (e.g., schedule, procedures, tools and supplies needed, pre-task planning, hazard analysis)
- Develop and use key performance indicators (KPIs) to monitor and improve performance
- Develop and manage staff to implement a preventive maintenance program culture
O&M Recommendations
Our “Top 10” recommendations for improving NMB Water operations

1. **Management (Best Practices)**
   - Application of modern management practice from skilled managers.
   - *AWWA Best Practices* implemented as industry standard

2. **Training**
   - Technical and soft side skills training in multiple areas.

3. **Safety**
   - Procedures for lockout/tagout, confined space, elevated workplace, power tool use, hand tool use, slips, falls and trips, personal protective equipment, chemical safety.

4. **Preventive maintenance**
   - There is a lack of preventive maintenance on much of the equipment; predictive maintenance is also needed, but at a lower priority.

5. **Prioritization of corrective maintenance, repair/replacement/renovation**
   - Low priority work is often completed ahead of higher priority work; also better coordination between capital improvements planning and operational needs.
Our “Top 10” recommendations for improving NMB Water operations

6. Testing protocols
Knowledge required to perform the proper test, interpret the results, and apply corrective action (Operations, Maintenance and Water Quality groups).

7. Documentation
More consistent and accurate recording of activities, parts used, use of standard operating procedures.

8. Implementation of workplace policies
Starting on time, ending on time, time recording, break time, lunch time.

9. Hiring, recruitment, and retention
Ensure the right staff are assigned to the right positions and that they are properly mentored and rewarded.

10. Organizational structure
Appropriate reporting network.
Example: anhydrous ammonia leak at the WTP

- Valves leak or are non-functional, interfering with disinfection process and posing risk to employees and nearby school and residents.
Example: membrane plant online analyzers in pre-fault conditions

- Twenty-four online analyzers require rebuilding or replacement
- Without the analyzers the Norwood WTP membrane plant will go out of service

Prioritization of corrective maintenance, repair/replacement/renovation
Example: WTP isolation valves are locked from lack of exercise

- Valves are currently locked, closed, or partially closed from lack of exercise, preventing effective maintenance and repair.
Example: interconnects with Miami-Dade collection system are inoperable

- Interconnect valves are 8 years old and have never been maintained
- Three of four valves were locked in a closed position and are inoperable
- Require rebuilding
Capital Project Prioritization and 15-year CIP
Capital project prioritization optimizes NMB Water’s investment

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- Plan to Repair High-Risk Processes
Prioritization of NMB Water’s capital projects required a formal process for comparing and ranking projects

- Decision criteria were developed based on NMB Water’s goals
- Criteria measured the effectiveness of each project toward meeting those goals
- Decision analysis process applied a numerical weighting of the individual attributes and CH2M conducted scoring of each project
- Results were entered into a ranking process for final prioritization
- CH2M evaluated results and prepared a recommended prioritization of the 60 candidate CIP projects
- Projects are rank ordered from most important to least important based on the analysis
Multi-criteria ranking process aligns with NMB Water’s values and goals

<table>
<thead>
<tr>
<th>Decision Criteria</th>
<th>Criteria 1</th>
<th>Criteria 2</th>
<th>Criteria 3</th>
<th>Criteria 4</th>
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<tbody>
<tr>
<td>Weightings</td>
<td>$W_{\text{Criteria1}}$</td>
<td>$W_{\text{Criteria2}}$</td>
<td>$W_{\text{Criteria3}}$</td>
<td>$W_{\text{Criteria4}}$</td>
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<tr>
<td>Performance Measures (“ruler”)</td>
<td>$X_1$</td>
<td>$X_2$</td>
<td>$X_3$</td>
<td>$X_4$</td>
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<td>Benefit Scores</td>
<td>$S$</td>
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The total benefit score for each CIP project was quantified as part of the ranking process.
A total of 60 projects were ranked, and 4 projects were identified as requiring “immediate action”.

<table>
<thead>
<tr>
<th>Tier</th>
<th>Rank Within</th>
<th>Category</th>
<th>Priority Group</th>
<th>Rank Within Priority Group</th>
<th>Implementation Schedule</th>
<th>Year to Begin Operation</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>WTP</td>
<td>1</td>
<td>5</td>
<td>2017-2020</td>
<td>2020</td>
<td>$35,600,000</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>WTP</td>
<td>1</td>
<td>3</td>
<td>2017-2020</td>
<td>2020</td>
<td>$500,000/yr. first four years; $200,000/yr. beyond.</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>Enterprise</td>
<td>1</td>
<td>3</td>
<td>2017-2018</td>
<td>2018</td>
<td>$200,000</td>
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<tr>
<td>2</td>
<td>19</td>
<td>WTP</td>
<td>3</td>
<td>1</td>
<td>2017-2018</td>
<td>2018</td>
<td>$2,000,000</td>
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Rate Structure Stabilization
Capital project prioritization optimizes NMB Water’s investment

Operations and Maintenance Support
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Capital Project Prioritization

15-Year CIP
- Financial Plan and Rate Stabilization
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  - Near-term Master Plan Updates

Near-term Master Plan Updates

Plan to Repair High-Risk Processes

Annual CIP Validation/ Prioritization

Financial Plan and Rate Stabilization

Near-term Master Plan Updates

Plan to Repair High-Risk Processes

Annual CIP Validation/ Prioritization

Financial Plan and Rate Stabilization

Near-term Master Plan Updates

Plan to Repair High-Risk Processes

Annual CIP Validation/ Prioritization

Financial Plan and Rate Stabilization

Near-term Master Plan Updates
Financial analysis identified the additional funding required for Master Plan implementation

- Identified more than $209.2M of improvements to NMB Water’s water and wastewater systems
- Master plan CIP average annual outlay is >$16M
- 2014 rate study is based on annual average outlay of $6M per year
Initial rate analysis used the following assumptions to estimate the average marginal increase to implement the CIP

Current rates allow about $4 million annually for water improvements and $1.6 million annually for wastewater improvements

- **Assuming debt funding for CIP in excess of this assumed level of annual rate funding**
- **Assuming 20 year bonds issued annually at 4% interest, 2% issuance cost, 8% bond reserve, and 1.20 coverage factor, level debt service payments, with payments beginning year after bond issuance**
NMB’s estimated water and wastewater bill with updated Master Plan and CIP

- Bills based on 6,750 gallons per month, 5/8” SFR meter
- Bills do not include utility taxes, DERM fees, excise taxes, or outside City surcharges
- Rate adjustments are only to fund proposed CIP; does not consider rate adjustments for other purposes or cost increases
- NMB rate adjustments assume 4% annual water rate increase beginning in FY 2019, and 1 time 0.5% WW increase in FY 2019
As part of the financial plan update, potential funding sources will be thoroughly evaluated.

- Alternative funding from State Revolving Fund, new Water Infrastructure Finance and Innovation (WIFIA) Program, or other sources could help mitigate rate impacts.
- Grants
- Managing financial performance metrics to maintain the utility’s bond rating.
- Scheduling of planned improvements and rate adjustments to manage financial and rate impacts.
- Use of connection or impact fees to fairly apportion costs between current users and future growth.
Next Steps after Master Plan
Completed Master Plan allows for use of planning tools that will increase the utility’s efficiency

- NMB Water Master Plan has provided:
  - *More than 60 well-defined CIP projects*
  - *Defined priorities for each project*
  - *Proposed short, medium, and long-term projects*
  - *Identified capital costs for each projects*
  - *Identified the need for asset management*

- Master Plan “data set” allows for the use of advanced scenario tools to increase utility efficiency and improve decision-making such as:
  - *TACT Strategic Platform*
  - *M2C*
Prioritized projects will be managed as a portfolio for broad optimization of the program

Inputs
- Project Lists
- Funding Opportunities
- Stakeholder Values
- Investment Needs
- Timing Constraints
- Goals / Performance Measures
- Design Needs
- Competing Priorities
- Affordability Limits

Outputs
- Stakeholder-focused solutions and value
- Optimized delivery schedule
- Maximized outside funding opportunities
- Enhanced investment sequencing
- A unified vision and plan for success city-wide

Consensus-built Investment Decisions and Implementation Strategies

Complex and Inter-related Needs

Evaluation

Scheduling

Funding

Optimization

March 9, 2016
TACT is used by large programs for CIP Optimization and to help manage their infrastructure investment

- **Begin with end in mind**: what is implementable both technically and financially from the start
- **Manage complexity**: unknown and uncontrollable variables, program options, impact analysis, decision support
- **Scenario evaluation**: delivery and scheduling options, funding alternatives, scope and cost changes to find minimum cost-maximum benefit
- **Create “smart” CIP**: achieve desired levels of service while operating within funding constraints and understanding risk and sensitivity

**TACT Modules:**
- The Scheduler
- Allocation Engine
- The Levelizer
Similar to NMB Water, scenario analysis was needed to evaluate implementation of asset management program for major CIP.

TACT provided framework for developing an asset management optimization tool for water and wastewater and vertical and linear assets.

Provided City with ability to evaluate economic impacts of several different capital scenarios and maintenance strategies for the CIP.

Using dynamic probabilities of failure related to condition, performance, and maintenance, TACT optimized timing of replacement on hundreds of thousands of assets, minimizing the City’s risk over 40-year planning period.
M2C — Meter to Cash — Provides efficiency, reduces non-revenue water, and increases cash flow

- M2C cycle often spans multiple departments within the utility
- We coordinate with process owners across the organization
  - Utility Director
  - IT
  - Customer service
  - Meter reading
  - Procurement
  - Finance
  - Billing
Typical benefits:

- Reduce bad debt write off (target < 1%); reduce ageing receivables (target < 5%)
- Improved media and political good will; increased first-call resolution
- Staff responsibilities are well defined and actionable; appropriate approvals are in place to ensure controls over adjustments and refunds
- Improved non-revenue water (meter inaccuracies, billing errors, theft, system issues)

Typical findings:

- Large meter testing program; formalized meter replacement program; right sizing and right type of meter for various applications
- Billing audit and anomaly identification (zero consumption, outliers, peer-to-peer)
- CIS upgrade, bill outsourcing
Example: Pembroke Pines M2C Assessment

Understand your Business

Interviews with stakeholders from billing, finance, meter operations, IT, and Asset Management provide context around current practices.

Observations

M2C Process Review

Perform diagnostic on process, policies, systems, and work management. Focus on customer accounts, metering, billing, and collections.

Hypothesis

Identify Gaps

Compare the as-is M2C cycle with industry best practices and general goals for the City to identify gaps, possible areas for improvement, and associated impacts.

Confirmation

Recommendations

Clear recommendations outlining the gaps, impact analysis, and proposed solutions. Prioritized based on relative complexity and strategic impact.

Improvement Plan
Questions?