

METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY, NORTH CAROLINA

# CAPITAL IMPROVEMENT PROGRAM

# OVERVIEW



## CAPITAL IMPROVEMENT PROGRAM

FY 2011 thru FY 2020

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**General Manager**

**Ed Bradford, P.E., Director**  
**Capital Improvement Program**



# Metropolitan Sewerage District

OF BUNCOMBE COUNTY, NORTH CAROLINA

**TO: Capital Improvement Program Committee  
Metropolitan Sewerage District of Buncombe County,  
North Carolina**

**FROM: Tom Hartye, P.E., General Manager  
Ed Bradford, P.E., Director of CIP**

**DATE: April 15, 2010**

**SUBJECT: Capital Improvement Program for FY2011-FY2020**

Enclosed are the Fiscal Year 2011 budget recommendations for the District's Capital Improvement Program (CIP), as well as projections for the following nine fiscal years. This plan is updated annually and presented to both the CIP Committee and the District Board in accordance with the Sewer System Consolidation Agreements.

One of the District's primary regulatory requirements is to rehabilitate 250,000 linear feet (LF) of the collection system every five years. This is accomplished by using in-house forces in combination with outside contractors. Twenty-two new collection system projects have been added to the CIP for FY2011 and beyond, all of which are smaller in scope. Within the entire program, collection system projects range in length from 205 LF to over 8,300 LF.

Significant collection system projects underway or completed over the past year are the Town Branch Interceptor and Middle Beaverdam Creek Interceptor projects, which total over 5,300 LF. MSD also received stimulus funding under the American Reinvestment and Recovery Act of 2009, for two collection system projects totaling approximately \$750,000 and over 4,200 LF.

A significant plant project is currently underway for the replacement of the District's aged Intermediate Pumping system. This \$1.7 million project will replace the old and inefficient hydraulically-driven pumps with more efficient electric pumps. The new pumps will save an estimated \$72,000 per year in electric costs.

Additional backup power generators are proposed to be added to the current backup generator at the plant. These generators will provide secure redundancy in the event of a complete power loss to the plant, and will enable all plant processes to continue during such a loss. This project is estimated to cost \$1.4 million.

The upcoming Final Microscreen project will replace the problematic final microscreens with a new micro-filtration system. This \$10.4 million project has been reviewed at several previous MSD Board and Committee meetings, and is fully designed and ready for advertisement.

For your convenience, both a summary sheet and a CD are included in this package. The CD contains a PDF of the entire proposed CIP program, with individual maps and budget data sheets. The PDF is a large file; therefore, *please copy the PDF to your computer's hard drive prior to opening it*. This will significantly increase the access speed. The proposed CIP budget is also posted on the District's website ([www.msdbc.org](http://www.msdbc.org)) for public viewing and comment.

Staff will present significant current and upcoming construction projects at the committee meeting, and will be available to answer questions.

*Special thanks go to the Engineers, Angel Banks, Sharon Walk, and Daniel Marsh for the many hours of preparation necessary to complete the District's CIP budget document.*

***NCDENR-DWQ has requested that the following information be provided in this document, in accordance with the Compliance Inspection Report, Collection System Permit WQCS00004, effective 10/25/07 through the extended date of 9/30/15.***

## **Goal Statement**

The mission of the Capital Improvement Division is to produce, manage, and complete engineering projects for the repair and rehabilitation of the District's collection system and Water Reclamation Facility (WRF). This shall be undertaken in the most efficient and effective manner necessary to ensure the reliable delivery and treatment of wastewater at an equitable price and in an environmentally sensitive manner.

## **Description of Existing Facilities**

### **Collection System**

The MSD service area covers approximately 180 square miles. MSD provides service to areas along the French Broad River Valley and the Swannanoa River Valley as far as Ridgecrest. There are over 960 miles of public sanitary sewer line, 30 pump stations within the collection system and approximately 28,000 manholes system wide. Less than 65 miles are large interceptors with diameters ranging from 24" to 66". One third of the balance is small 6" lines and two-thirds are medium size lines ranging from 8" up to 24". Most of this pipe is between 50 and 100 years old, and is in dire need of rehabilitation or replacement. The Districts 45,000 customers reflect a service population of about 135,000 people.

Approximately 31% of the water treated at the District's Water Reclamation Facility (WRF) is Infiltration (the groundwater that seeps in through cracks in pipes and manholes), and Inflow (rainwater entering through manhole lids and unauthorized storm water connections). The District has embarked on an aggressive program to abate this problem.

### **Water Reclamation Facility (WRF)**

The present Water Reclamation Facility (WRF) is a 40MGD secondary treatment plant serving Buncombe County (specifically Asheville, Biltmore Forest, Black Mountain, Montreat, Weaverville, Woodfin and Buncombe County at large). Overall, the MSD services approximately 45,000 separate sewer customers, a combined customer population of 135,000, and over 30 separately billed industries. The facility treats a current average daily flow of over 16 MGD. The WRF is an attached growth design, comprised of 152 rotating biological contactors (RBC's), which provide full secondary treatment. These RBC's provide 450-500 acres (3+ acres each unit) of surface area for biological growth. It has been said that MSD's facility is the largest RBC plant in the world. The plant consists of:

#### **Preliminary Treatment Components**

- IDI Barscreens (2 units) w/screenings compactor and shaftless screw conveyer
- Influent Pumps (3 units) – 35 MGD rated capacity each
- Aerated Grit Chambers (3 units) w/associated grease removal

#### **Primary Treatment Components**

- Primary Microscreens (7 units) – 250 micron screens

### **Secondary Treatment Components**

- 1<sup>st</sup> Stage RBC's (44 units)
- 2<sup>nd</sup> Stage RBC's (72 units)
- 3<sup>rd</sup> Stage RBC's ( 36 units)
- Intermediate Pumps (3 units) – pump water to clarifier from 3<sup>rd</sup> RBC stage
- Intermediate Clarifier (4 cells – total volume 2 MG)
- Secondary Microscreens (18 units) – 27 micron screens

### **Disinfection Components**

- Sodium Hypochlorite solution – average feed 1000 gallons/day at 8% solution strength

### **Residuals Handling Components**

- Gravity Thickeners (2 units) – 100 foot-diameter each
- 2.5 Meter Belt Presses (2 units)
- Fluidized Bed Incinerator (40DT/day rated)
- Alkaline Stabilization Facility (40DT/day rated)

### **Energy Management Components**

- 2 Megawatt Diesel Generator (full back-up/emergency power for WRF)
- 450 Kilowatt Gas Generators (2 units) – operate on natural, digester or landfill gas
- 850 Kilowatt Hydro Turbines (3 units) – induction units (French Broad River source)

### **Automation Components**

- Foxboro Distributed Control System (DCS) – full automated control of WRF

### **Sludge Management Plan**

- MSD utilizes its fluidized bed incinerator as its primary residual management option, with alkaline stabilization as a secondary management option – as well as maintains an arrangement with the Buncombe County landfill (lined) for emergencies. Presently the facility is managing 12-15 DT's per day of residuals. The facilities are designed for 40DT's per day. Due to the lack of true primary clarifiers, most of the sludge generated at the facility is secondary in nature (i.e. sloughings from the RBC's).

Sludge is thickened in on-site gravity thickeners to a consistency of 4-7% solids at which time it is then pumped to the 2 1/2-meter belt presses. These units dewater the sludge to over 24% solids and then it is pumped to the incinerator. The facility maintains gravity belt thickeners and anaerobic digesters, however these units are presently not being utilized. Air emissions from the incinerator are of excellent quality. Recent air emissions testing place removal efficiency of the air scrubbers at 99+% for regulated parameters. Incinerator ash is thickened on-site via a gravity ash thickener and then pumped to an on-site lagoon. Groundwater is monitored in accordance with NCDENR requirements (up & down gradient). When alkaline stabilization operations are activated, a Class A (Eq.) product is produced and distributed to the public. The alkaline add-mixtures utilized in the process are fly ash, cement kiln dust (CKD) and lime kiln dust (LKD). The process incorporates the use of the "N-Viro" process when these alkaline products are utilized in accordance with the patented mix recipe. Due to the fact that the incinerator operations provide much more cost-effective management, it is utilized as the primary option. Supplementary fuel is required due to the 24% solids content, however landfill gas is utilized in place of more costly natural gas. However natural gas and/or #2 fuel oil can also be utilized. MSD also maintains an "agreement" with the local county landfill (lined) to dispose of dewatered sludge during emergency and/or maintenance/breakdown instances; this provides a 3<sup>rd</sup> residuals management alternative.