# UTILITY COMMITTEE

The Utility Committee Meeting was held on November 13, 2012 at 5:00 p.m. with Councilwoman Williams presiding in the absence of Chairman Bonar. Members present were Mr. Perza and Mr. Blakeman. Mr. Snaman was absent. Members of Council present were Mr. Hutchison, Mr. Lynn (arrived at 5:08 p.m.), and Council President Leary (arrived at 5:05 p.m.). Mayor Carey (arrived at 5:03 p.m.) was also present.

**AGENDA ADDITIONS/DELETIONS**

**Mr. Blakeman moved for approval of the agenda as presented, seconded by Mr. Perza and unanimously carried.**

**Water Quality and Inflow and Infiltration (I & I) Updates**

Members were provided a presentation entitled "Water Quality Update," ***(Attachment #1)***, a City of Dover Water Quality Applicable Expenditures Report ***(Attachment #2)***, a City of Dover Inflow and Infiltration Applicable Expenditures Report ***(Attachment #3)***, and a presentation entitled "Inflow/Infiltration Update" ***(Attachment #4).*** Mrs. Duca reviewed the "Water Quality Update" presentation *(Attachment #1),* providing background information on the origin of brown water issues and explaining steps that have been taken to remedy the situation and find solutions. Referring to the Water Quality Expenses and Complaints graph (Page 4 of the presentation) and the City of Dover Water Quality Applicable Expenditures Report (*Attachment #2*), Mrs. Duca noted that the changes that have been made have brought about significant improvement in terms of stabilizing the water chemistry.

In response to Mrs. Williams inquiry regarding the function of the Wellhead Variable Frequency Drive (VFD) Upgrade referenced in the presentation under "Production Capital Improvements," Mrs. Duca advised that the flow is primarily regulated by pumps rather than gravity, but the VFD allows water to slowly "ramp up" into the system. The VFD controls how quickly water turns on and the pace at which it flows, allowing for less disturbance in the mains.

Mrs. Duca reviewed the Distribution Capital Improvements portion of the presentation (Page 7), identifying various methods that have been implemented to design a more structurally superior pipe system, allowing for ease of locating the pipes at all times and minimizing reactions between the iron and the pipes themselves. She explained the prioritization schedule for water main relining and/or replacement projects to meet industry standards and address water quality concerns. Mrs. Duca reviewed improvements that have been or are being made to address the problem, including upgrades to the water main. She noted that future plans include replacing a minimum of one (1) mile of pipe per year beginning in FY 2014, along with other operational improvements and monitoring plans. She concluded this portion of her presentation by outlining the steps needed to move forward to meet the desired improvement goals to the City's water system, including long-term planning, securing increased long term financial resources and staffing resources, and the utilization of consultants and outside contractors to meet critical timeframes.

Mrs. Duca stated that the City of Dover Inflow and Infiltration Applicable Expenditures Spreadsheet *(Attachment #3*) was created approximately six (6) years ago to track expenses, and explained that the spreadsheet provides a breakdown of the various projects that have been done on both production and distribution sides, including actual expenses from FY 2003 to FY 2012. Also included on the spreadsheet was a total amount for each category, (including the amount budgeted for this fiscal year) which reflected any carry over required, ensuring everything is accounted for when jobs are complete. She stated that operational expenses including staff time, advertising, laundry claims, complaints, etc., are also included on the spreadsheet.

In response to Mrs. Williams regarding the cost of replacing unlined cast iron pipe, Mrs. Duca explained that with staff doing the work, the cost to replace one (1) mile of pipe each year would be under $1M per year since labor is accounted for in the Departments operating expenses. She noted with larger projects, such as the Route 13 project that was recently completed, the expense would exceed $1M per mile. She felt that the time would come when the City's manpower limitation (having only one (1) crew) would require the use of contractors as well. Mrs. Duca explained that within the next five (5) years, as staff encounters water lines that are more appropriate in size, consideration would be given to relining rather than replacing pipe. She noted that this may require expending a three year (3) allocation of funds for the project within one (1) year to obtain the best cost overall. Mrs. Duca noted that staff was still analyzing this project.

In response to Mrs. Williams' concerns regarding leakage into groundwater and the County's sewer system, Mrs. Duca explained that leakage would not necessarily go into the sewer; however, the Department of Natural Resources and Environmental Control (DNREC) had issues regarding slow leaks from the system into the ground. She noted that DNREC had concerns regarding how quickly chlorinated water reaches a receiving body of water; therefore, it was important to keep the City's water loss at a minimum.

Responding to Councilman Hutchison regarding the life expectancy of the new piping that was recommended, Mrs. Duca advised members that the cement-lined ductile iron pipe has had the best field testing and has a life expectancy of approximately 80-100 years. She noted that the existing cast iron lines had been in the ground for approximately 100 years and were manufactured prior to relining technology development. Mrs. Duca explained that the process of replacing pipes in the City began about six (6) or seven (7) years ago and included the replacement of some of the lines that were installed in the early 1800s. She noted that these projects would improve the structural integrity of the system.

Proceeding to the Inflow/Infiltration Update presentation *(Attachment #4),* Mrs. Duca provided an overview of the program and stated that these assessments had not been "on the books" as long as the water quality concerns, so it had taken some time to identify the issues and the best way to address the problem. She reviewed the presentation, outlining specifics pertaining to the City's Inflow & Infiltration system. She attributed much of the problem to the age of the City's pipes and progressive deterioration, which increase the possibility of groundwater entering the system and

resulting in increased cost to the City. Mrs. Duca reminded members that the City pays for what is discharged; however, customers are charged based on their usage.

Referring to Page 4 of the presentation, Mrs. Duca explained that inflow and infiltration can enter the system as a result of broken laterals, mains, manholes, direct connections, and sump pump connections, all of which contribute to the issue of what enters the City's sanitary sewer system and is not directed to the storm drain or other drainage features. She elaborated by displaying a chart representing the increased costs associated with the inflow and infiltration issues. Mrs. Duca presented some of the ways the City is trying to assess the problems and strategies being implemented to work toward resolution, explaining that this is a huge undertaking and requires prioritization based on research regarding the level of damage and structural integrity. She identified several tools which are utilized to accomplish this, including the City's Closed Circuit Television (CCTV) Sewer Truck and staff certification in the Pipeline Assessment Certification Program (PACP) for the use of the GraniteXP software, allowing them to assess each pipe in the system.

Mrs. Duca advised members of the efforts currently in motion to address the problem, including interceptors on Division Street, northwest Loockerman Street, and the St. Jones, as well as main replacements on New and Reed Streets, infrastructure replacement in Morris Estates, and Fox Hall manhole replacement. She stated that the Fox Hall manhole replacement was almost complete and was the last item that would be attributed to City I & I infrastructure; remaining concerns are related to I & I from private sources.

Mrs. Duca concluded her presentation by outlining the resources needed to achieve the desired results, including increased dedicated financial resources, increased and long term staffing resources, and utilization of outside consultants and contractors to meet critical timeframes. She noted that the cost of utilizing contractors to complete the work was much higher on the I & I side due to the specialty relining, as well as the ultimatums on the actual replacement of the sewer line.

Referring to the City of Dover Inflow and Infiltration Applicable Expenditures Report *(Attachment #3)*, Mrs. Duca explained that the report, which dates back to FY 2008 when projects began in an effort to resolve the I & I problem, outlined the expenses involved in the various projects, including the CCTV Sewer Truck investment, staff time, etc. She noted that the cost of doing the work internally by utilizing the truck and internal staff was a fraction of what it would cost to use an outside contractor. Mrs. Duca stated that the City is trying to get Kent County to grant impact fee credits for what is being removed from the system to offset some of the expenses incurred.

Committee action was not required.

**Quarterly Review of Utility Related Capital Investment Plan (CIP) (Electric and Water/Wastewater) *(July, August, and September)***

Due to time constraints, this item was deferred until the next meeting.

**TEA/NAES Report *(August)***
Due to time constraints, this item was deferred until the next meeting.

**Updates - Garrison Oak Technical Park**
Due to time constraints, this item was deferred until the next meeting.

**Mr. Blakeman moved for adjournment, seconded by Mr. Perza and unanimously carried.**

**Meeting Adjourned at 5:30 P.M.**

Beverly C. Williams
Acting Chair

BCW/DD/mk/js/tm
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*Attachment*
*Attachment #1 - Water Quality Update Presentation*
*Attachment #2 - City of Dover Water Quality Applicable Expenditures*
*Attachment #3 - City of Dover Inflow and Infiltration Applicable Expenditures*
*Attachment #4 - Inflow/Infiltration Update Presentation*

# Water Quality Update

## Utility Committee Presentation

November 13, 2012

## Department of Public Works

Utility Committee Meeting November 13, 2012
Attachment #1

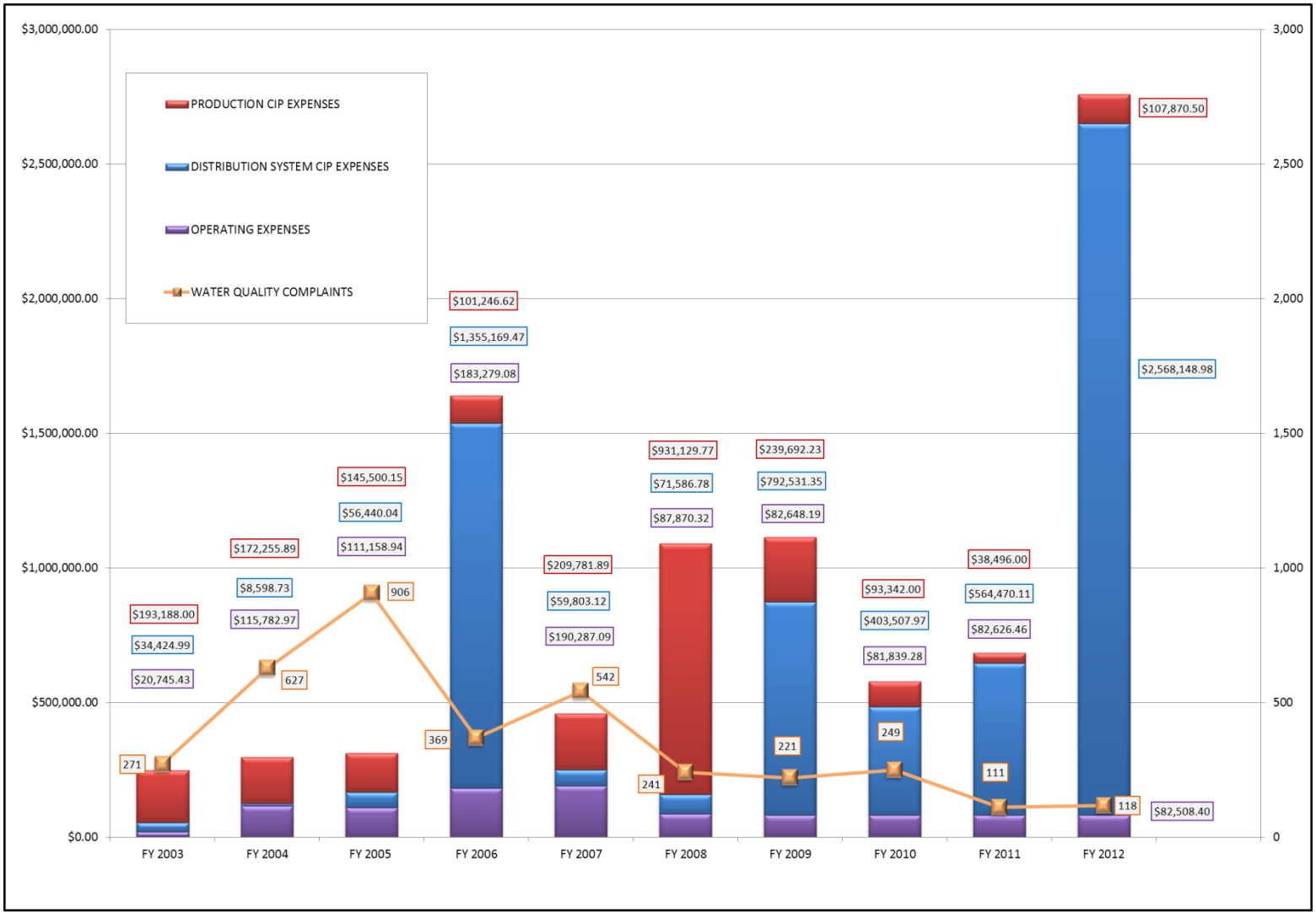
# Water Quality Overview

- Water Quality issues (i.e. brown water) began in 2002 following the implementation of mandated chemical addition.
- As is the case with other systems nationwide, Dover's water system was not designed for chemical addition.
  - Complex system
  - 3 aquifer sources
  - Multiple entry points (1 Water Treatment Plant and 15 unmanned wells with treatment)

# Water Quality Overview

- Consultants have been utilized to assist staff in analyzing the system, finding solutions to brown water issues and designing projects.
- “Magic Pill” or “Textbook” solutions do not exist.
- It will take the dedication of staff time and financial resources to address all components relating to this problem.

# Water Quality Expenses & Complaints



# Addressing the Problem – Production Capital Improvements

- Deep Well Contact Chambers
  - Chambers have been installed at all sites by our in-house Construction Crew
  - Will be required at any future deep well sites
  - Testing by our Water Operators demonstrates that chemical reactions resulting from mandated chemical addition are stabilized





# Addressing the Problem – Production Capital Improvements



- Wellhead Redevelopment Program
  - Annual program to improve capacity and flow
- Wellhead VFD Upgrades
  - Installed at appropriate wells to improve flow control
- Remote Control & Monitor Wells
  - Installed to improve control at all well sites, primarily by our Water Operators

# Addressing the Problem – Distribution Capital Improvements

- Pipe material control
  - Cement-lined DIP
- Water Main Replacement Priority List
  - Developed by our engineering staff to determine prioritization schedule for water main relining and/or replacement projects to meet industry standards and address water quality concerns






# Addressing the Problem – Distribution Capital Improvements

- Water Main Upgrades
  - Since FY 2009 the Department has upgraded 24,842 l.f. (4.7 miles) of undersized and unlined cast iron pipe primarily with our in-house Construction Crew
  - It is planned to replace a minimum of one (1) mile per year starting FY 2014






# Addressing the Problem - Operations

- Additional Monitoring & System Analysis
  - Continuous monitors installed at all well sites by our Water Operators to allow them to receive and respond to water quality parameter changes quickly
  - New radios and antennas also installed by our Water Operators to enable proper equipment functioning





# Addressing the Problem - Operations





- Water System Flushing
  - Continue to conduct two (2), three (3) week long system wide flushing operations
  - Design utilizing water model, perform field testing for and implement Unidirectional Flushing Program for water system to provide the most effective cleaning of the water mains (projected FY 2015)

# Desired Results and Resources

- The improvements desired to the City's water system will require:
  - Increased, dedicated and long term financial resources.
    - FY 2013 Capital Budget = $916,142
  - Increased, dedicated and long term staffing resources.
    - Goals will require time from our 36 Water / Wastewater Utility staff members including engineers, field crews, construction workers, inspectors and water operators.
  - Utilization of consultants and outside contractors to meet critical time frames.





## CITY OF DOVER WATER QUALITY APPLICABLE EXPENDITURES

| PROJECT INFORMATION | FY 2003 | FY 2004 | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | TO DATE | FY 2013 BUD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Production CIP Expenses** | | | | | | | | | | | | |
| **Wellhead Redevelopment Program** | | | | | | | $12,179.00 | | | $52,736.00 | | *SPENT:* |
| *Description*: capacity and flow improvements | | | | | | | WD0801 | | | WD1102 | | $67,675.00 |
| *WQ Recommendation*: n/a | | | | | | | $32,151.00 | | | | | *PENDING:* |
| *Account #*: 417-6800-568.40-31 | $990.00 | $150,961.29 | $143,840.15 | $23,838.98 | | $21,984.00 | WD0904 | $70,238.00 | $6,600.00 | $55,134.50 | $674,695.92 | $2,325.00 |
| *Project #:* | WS0201 | WS0404 | WS0505 | WS0606 | | WD0801 | $36,368.00 | WD1001 | WD1102 | WD1203 | | WD1301 |
| **Water System SCADA Upgrade** | | | | | | | WD0905 | | | | | |
| *Description*: flow control improvements | | | | | | | | | | | | |
| *WQ Recommendation*: data acquisition and storage | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | $192,198.00 | $21,294.60 | | | | | | | | | $213,492.60 | |
| *Project #:* | WS0301 | WS0301 | | | | | | | | | | |
| **Water Quality Evaluation** | | | | | | | | | | | | |
| *Description*: system analysis | | | | | | | | | | | | |
| *WQ Recommendation*: n/a | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-34 | | | $1,660.00 | $77,407.64 | | | | | | | $79,067.64 | |
| *Project #:* | | | WD0504 | WD0504 | | | | | | | | |
| **Water Quality Improvements: WTP Transducer / Analyzers** | | | | | | | | | | | | |
| *Description*: flow control improvements, monitoring | | | | | | | | | | | | |
| *WQ Recommendation*: water quality monitoring (analyzers) | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-34 | | | | | $12,317.10 | | | | | | $12,317.10 | |
| *Project #:* | | | | | WS0502 | | | | | | | |
| **Water Quality Improvements: Well #2 VFD Upgrade** | | | | | | | | | | | | |
| *Description*: flow control improvements | | | | | | | | | | | | |
| *WQ Recommendation*: n/a | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-34 | | | | | $22,655.85 | | | | | | $22,655.85 | |
| *Project #:* | | | | | WS0502 | | | | | | | |
| **Water Quality Improvements: Consulting** | | | | | | | | | | | | |
| *Description*: Deep Well Contact Chamber Design, Stage II Disinfection By-Product Rule Analysis | | | | | | | | | | | | |
| *WQ Recommendation:* deep well contact chambers, preparation for new / pending regulations | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-34 | | | | | $103,765.47 | $35,836.70 | | | | | $139,602.17 | |
| *Project #:* | | | | | WS0502 | WD0811 | | | | | | |
| **Bayard Avenue Contact Chamber: Well #13R** | | | | | | | | | | | | |
| *Description*: chlorine reaction time improvements | | | | | | | | | | | | |
| *WQ Recommendation*: deep well contact chambers | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-34/.40-31 | | | | | $71,043.47 | $8,905.21 | | | | | $79,948.68 | |
| *Project #:* | | | | | WS0707 | WS0707 | | | | | | |
| **Remote Control and Monitor Wells** | | | | | | | | | | | | |
| *Description*: flow control improvements | | | | | | | | | | | | |
| *WQ Recommendation*: n/a | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | $51,135.46 | $63,767.66 | $23,104.00 | $31,896.00 | | $169,903.12 | |
| *Project #:* | | | | | | WD0802 | WD0802 | WD1002 | WD1002 | | | |
| **Water Quality Improvements: Deep Well Contact Chambers Wells #1, #2, #3, #4, #6, #7, #8, #9, #10, #11, #14, #15** | | | | | | | | | | | | |
| *Description*: chlorine reaction time improvements | | | | | | | | | | | | |
| *WQ Recommendation*: deep well contact chambers | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-34/.40-31 | | | | | | $805,753.22 | $95,484.30 | | | | $901,237.52 | |
| *Project #:* | | | | | | WD0811 | WQ0904 | | | | | |
| **Wellhead VFD Upgrades: Well #11** | | | | | | | | | | | | |
| *Description*: flow control improvements | | | | | | | | | | | | |
| *WQ Recommendation*: n/a | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | $2,505.06 | $18,780.94 | | | | $21,286.00 | |
| *Project #:* | | | | | | WD0808 | WD0808 | | | | | |



Attachment #2
Utility Committee Meeting November 13, 2012

## CITY OF DOVER WATER QUALITY APPLICABLE EXPENDITURES

| PROJECT INFORMATION | FY 2003 | FY 2004 | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | TO DATE | FY 2013 BUD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Wellhead VFD Upgrades: Well #13R** | | | | | | | | | | | | |
| *Description*: flow control improvements | | | | | | | | | | | | |
| *WQ Recommendation*: n/a | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | $2,505.06 | $11,717.99 | | | | $14,223.05 | |
| *Project #:* | | | | | | WD0809 | WD0809 | | | | | |
| **Wellhead VFD Upgrades: Well #15** | | | | | | | | | | | | |
| *Description*: flow control improvements | | | | | | | | | | | | |
| *WQ Recommendation*: n/a | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | $2,505.06 | $11,717.99 | | | | $14,223.05 | |
| *Project #:* | | | | | | WD0810 | WD0810 | | | | | |
| **Wellhead VFD Upgrades: Well #3** | | | | | | | | | | | | |
| *Description*: flow control improvements | | | | | | | | | | | | |
| *WQ Recommendation*: n/a | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | $17,960.97 | | | | $17,960.97 | |
| *Project #:* | | | | | | | WD0901 | | | | | |
| **Wellhead VFD Upgrades: Well #9** | | | | | | | | | | | | |
| *Description*: flow control improvements | | | | | | | | | | | | |
| *WQ Recommendation*: n/a | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | $20,262.38 | | | | $20,262.38 | |
| *Project #:* | | | | | | | WD0902 | | | | | |
| **Production CIP Expenses** | **$193,188.00** | **$172,255.89** | **$145,500.15** | **$101,246.62** | **$209,781.89** | **$931,129.77** | **$239,692.23** | **$93,342.00** | **$38,496.00** | **$107,870.50** | **$2,380,876.05** | **$70,000.00** |
| **Distribution System CIP Expenses** | | | | | | | | | | | | |
| **Dead End Water Main Removal** | | | | | | | | | | | | |
| *Description*: flow improvements | | | | | | | | | | | | |
| *WQ Recommendation*: n/a | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-34 | $22,391.79 | | | | | | | | | | $22,391.79 | |
| *Project #:* | WD0306 | | | | | | | | | | | |
| **Division Street Water Main Upgrade** | | | | | | | | | | | | |
| *Description*: unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-34 | $12,033.20 | $8,498.73 | | $1,334,251.51 | | | | | | | $1,354,783.44 | |
| *Project #:* | WD0304 | WD0304 | | WD0304 | | | | | | | | |
| **Misc. Distribution System Improvements** | | | | | | | | | | | | |
| *Description*: capacity and flow improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-34 | | $100.00 | $56,440.04 | $20,917.96 | $36,700.41 | $21,449.28 | $20,206.06 | $21,188.32 | $11,352.86 | $39,772.12 | $228,127.05 | |
| *Project #:* | | WD0401 | WD0503 | WS0602 | WS0706 | WD0806 | WD0903 | WD1004 | WD1101 | WD1201 | | |
| **Water Quality Improvements: Bayard Avenue Connection** | | | | | | | | | | | | |
| *Description*: Division Street Upgrade completion | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-34 | | | | | $23,102.71 | | | | | | $23,102.71 | |
| *Project #:* | | | | | WS0502 | | | | | | | |
| **Water Quality Improvements: Water Main Rehabilitation** | | | | | | | | | | | | |
| *Description*: Surveying and Design | | | | | | | | | | | | |
| *WQ Recommendation: main rehabilitation* | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | $50,137.50 | | | | | $50,137.50 | |
| *Project #:* | | | | | | WD0811 | | | | | | |
| **Water Quality Improvements: Pear St./West St.** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | $321,903.84 | $203,693.63 | | | $525,597.47 | |
| *Project #:* | | | | | | | WQ0902 | WQ0902 | | | | |

## CITY OF DOVER WATER QUALITY APPLICABLE EXPENDITURES

| PROJECT INFORMATION | FY 2003 | FY 2004 | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | TO DATE | FY 2013 BUD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Water Quality Improvements: South St.** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | $37,469.28 | | | | $37,469.28 | |
| *Project #:* | | | | | | | WQ0903 | | | | | |
| **Water Quality Improvements: Washington St./Pennsylvania Ave.** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | $310,063.02 | | | | $310,063.02 | |
| *Project #:* | | | | | | | WQ0901 | | | | | |
| **Water Quality Improvements: Route 13 Water Main** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | *SPENT:* $20,055.68 |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | *PENDING:* |
| *Account #*: 417-6800-568.40-31 | | | | | | | $67,396.65 | $56,599.26 | $40,948.72 | $1,905,647.45 | $2,090,647.76 | $172,544.32 |
| *Project #:* | | | | | | | WQ0907 | WQ0907 | WQ0907 | WQ0907 | | WQ0907 |
| **Water Quality Improvements: Bayard Ave. area Partial Const.** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | $6,490.00 | | $242,720.76 | $255,995.67 | $505,206.43 | |
| *Project #:* | | | | | | | WQ0905 | | WQ0905 | WQ0905 | | |
| **Water Quality Improvements: East of North State Street** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | $29,002.50 | | $147,821.91 | | $176,824.41 | |
| *Project #:* | | | | | | | WQ0906 | | WQ0906 | | | |
| **S. Governors Avenue Water Main Upgrade** | | | | | | | | | | | | |
| *Description*: capacity improvements unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-34 | | | | | | | | $2,664.00 | | $81,534.98 | $84,198.98 | |
| *Project #:* | | | | | | | | WD0807 | | WD0807 | | |
| **Water Quality Improvements: McKee Run Plant WMR** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | | $95,612.76 | | | $95,612.76 | |
| *Project #:* | | | | | | | | WQ1001 | | | | |
| **Water Quality Improvements: Walker Road** | | | | | | | | | | | | |
| *Description*: Surveying and Design | | | | | | | | | | | | |
| *WQ Recommendation: main rehabilitation* | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | | $23,750.00 | | | $23,750.00 | |
| *Project #:* | | | | | | | | WQ1002 | | | | |
| **Water Quality Improvements: Loockerman Plaza** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | | | $104,625.86 | | $104,625.86 | |
| *Project #:* | | | | | | | | | WQ1101 | | | |

## CITY OF DOVER WATER QUALITY APPLICABLE EXPENDITURES

| PROJECT INFORMATION | FY 2003 | FY 2004 | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | TO DATE | FY 2013 BUD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Water Quality Improvements: Ross Street** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | | | $4,250.00 | | $4,250.00 | |
| *Project #:* | | | | | | | | | WQ1103 | | | |
| **Water Quality Improvements: Wesley Campus (N. & S. Bradford)** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | | | | $103,298.32 | $103,298.32 | |
| *Project #:* | | | | | | | | | | WQ1201 | | |
| **Water Quality Improvements: New Street** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | | | | $26,600.00 | $26,600.00 | $87,400.00 |
| *Project #:* | | | | | | | | | | WQ1202 | | WQ1202 |
| **Water Quality Improvements: Silver Lake WMR** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | *SPENT:* $49,145.82 |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | *PENDING:* |
| *Account #*: 417-6800-568.40-31 | | | | | | | | | | $155,300.44 | $204,446.26 | $85,995.73 |
| *Project #:* | | | | | | | | | | WQ1203 | | WQ1203 |
| **Water Quality Improvements: North Street** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | *SPENT:* $33,335.00 |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | *PENDING:* |
| *Account #*: 417-6800-568.40-31 | | | | | | | | | | | $33,335.00 | $11,665.00 |
| *Project #:* | | | | | | | | | | | | WQ1301 |
| **Water Quality Improvements: West Street W Alley** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | | | $4,250.00 | | $4,250.00 | $161,000.00 |
| *Project #:* | | | | | | | | | WQ1105 | | | WQ1105 |
| **Water Quality Improvements: Columbia Avenue** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | | | $4,250.00 | | $4,250.00 | |
| *Project #:* | | | | | | | | | WQ1102 | | | |
| **Water Quality Improvements: William Street** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | | | $4,250.00 | | $4,250.00 | $280,000.00 |
| *Project #:* | | | | | | | | | WQ1104 | | | WQ1302 |
| **Water Quality Improvements: Governors Avenue West Alley** | | | | | | | | | | | | |
| *Description:* capacity improvements, unlined pipe replacement | | | | | | | | | | | | |
| *WQ Recommendation*: main rehabilitation | | | | | | | | | | | | |
| *Account #*: 417-6800-568.40-31 | | | | | | | | | | | $0.00 | $15,000.00 |
| *Project #:* | | | | | | | | | | | | WQ1303 |
| **Distribution System CIP Expenses** | **$34,424.99** | **$8,598.73** | **$56,440.04** | **$1,355,169.47** | **$59,803.12** | **$71,586.78** | **$792,531.35** | **$403,507.97** | **$564,470.11** | **$2,568,148.98** | **$6,017,218.04** | **$916,141.55** |

## CITY OF DOVER WATER QUALITY APPLICABLE EXPENDITURES

| PROJECT INFORMATION | FY 2003 | FY 2004 | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | TO DATE | FY 2013 BUD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Operating Expenses** | | | | | | | | | | | | |
| **Claims Since 12/2002** | | | | | | | | | | | | |
| *Description*: damaged laundry, etc. | | | | | | | | | | | | |
| *WQ Recommendation*: n/a | | | | | | | | | | | | |
| *Account #*: 412-6800-568.20-51 | $1,143.31 | $3,376.00 | $5,586.40 | $2,939.41 | $1,259.93 | $1,888.82 | $417.74 | $1,220.38 | $921.32 | $740.60 | $19,493.91 | $1,000.00 |
| **Distribution System Flushing** | $19,602.12 | $112,406.97 | $105,572.54 | $177,062.77 | $184,505.68 | $82,072.50 | $78,730.45 | $77,118.90 | $78,205.14 | $78,267.80 | $993,544.87 | $81,600.00 |
| *Description*: advertising, labor, supplies | | | | | | | | | | | | |
| *WQ Recommendation*: distribution system flushing program | | | | | | | | | | | | |
| ⇨ **ADVERTISING** | | | | | | | | | | | | |
| *Account #:* 412-6800-568.30-25 | $504.12 | $5,309.70 | $2,974.44 | $9,592.00 | $15,340.30 | $12,156.08 | $9,530.45 | $7,218.90 | $7,105.14 | $5,122.80 | $74,853.93 | $7,500.00 |
| ⇨ **LABOR (in-house)** | | | | | | | | | | | | |
| *Account #:* 412-2600/5600/6800/6900/7600 | $19,098.00 | $106,948.80 | $101,856.00 | $165,516.00 | $168,257.35 | $68,768.64 | $68,100.00 | $68,800.00 | $70,000.00 | $72,045.00 | $909,389.79 | $73,000.00 |
| ⇨ **SUPPLIES - DISTRIBUTION (estimate)** | | | | | | | | | | | | |
| *Account #:* 412-6800-568 | | $148.47 | $742.10 | $777.31 | $598.03 | $892.78 | $800.00 | $800.00 | $800.00 | $800.00 | $6,358.69 | $800.00 |
| ⇨ **SUPPLIES - WTP (estimate)** | | | | | | | | | | | | |
| *Account #:* 412-7600-576 | | | | $1,177.46 | $310.00 | $255.00 | $300.00 | $300.00 | $300.00 | $300.00 | $2,942.46 | $300.00 |
| **System Monitoring** | | | | | | | | | | | | |
| *Description*: sample analysis supplies (est.) | | | | | | | | | | | | |
| *WQ Recommendation*: distribution system monitoring, water quality monitoring program | | | | | | | | | | | | |
| *Account #*: 412-7600-576 | | | | $3,276.90 | $4,521.48 | $3,909.00 | $3,500.00 | $3,500.00 | $3,500.00 | $3,500.00 | $25,707.38 | $3,500.00 |
| **Operating Expenses** | **$20,745.43** | **$115,782.97** | **$111,158.94** | **$183,279.08** | **$190,287.09** | **$87,870.32** | **$82,648.19** | **$81,839.28** | **$82,626.46** | **$82,508.40** | **$1,038,746.16** | **$86,100.00** |
| **WATER QUALITY EXPENSE TOTAL** | **$248,358.42** | **$296,637.59** | **$313,099.13** | **$1,639,695.17** | **$459,872.10** | **$1,090,586.87** | **$1,114,871.77** | **$578,689.25** | **$685,592.57** | **$2,758,527.88** | **$9,436,840.25** | **$1,072,241.55** |
| **WATER QUALITY COMPLAINTS** | **271** | **627** | **906** | **369** | **542** | **241** | **221** | **249** | **111** | **118** | ***2,956*** | |

## CITY OF DOVER WATER QUALITY APPLICABLE EXPENDITURES

| PROJECT INFORMATION | FY 2003 | FY 2004 | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | TO DATE | FY 2013 BUD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PRODUCTION CIP EXPENSES | $193,188.00 | $172,255.89 | $145,500.15 | $101,246.62 | $209,781.89 | $931,129.77 | $239,692.23 | $93,342.00 | $38,496.00 | $107,870.50 | | |
| DISTRIBUTION SYSTEM CIP EXPENSES | $34,424.99 | $8,598.73 | $56,440.04 | $1,355,169.47 | $59,803.12 | $71,586.78 | $792,531.35 | $403,507.97 | $564,470.11 | $2,568,148.98 | | |
| OPERATING EXPENSES | $20,745.43 | $115,782.97 | $111,158.94 | $183,279.08 | $190,287.09 | $87,870.32 | $82,648.19 | $81,839.28 | $82,626.46 | | $82,508.40 | |
| WATER QUALITY COMPLAINTS | 271 | 627 | 906 | 369 | 542 | 241 | 221 | 249 | 111 | 118 | | |

## CITY OF DOVER INFLOW AND INFILTRATION APPLICABLE EXPENDITURES

| PROJECT INFORMATION | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | TO DATE | FY 2013 BUD |
|---|---|---|---|---|---|---|---|
| **CIP Expenses** | | | | | | | |
| **Inflow/Infiltration Removal Program** | | | | | | | |
| *Description* : design, rehabilitation of sanitary sewer with I&I problems | | | | | | | |
| *Account #* : 417-6900-569.40-31 | $5,160.98 | $1,350.52 | $1,767,683.77 | $451,249.04 | $54,612.78 | $2,280,057.09 | $1,122,087.22 |
| *Project #:* | WW0803 | WW0903 | WW1001 | WW1101 | WW1201 | | Various |
| **Inflow/Infiltration Removal - New Street/Reed Street** | | | | | | | SPENT: |
| *Description* : Numerous cracks, reverse flow on main | | | | | | | $43,940.52 |
| *Account #* : 417-6900-569.40-31 | | | | | | $43,940.52 | *PENDING:* |
| | | | | | | | $286,059.48 |
| *Project #:* | | | | | | | II1301 |
| **Inflow/Infiltration Removal - Fox Hall Sewer Rehab** | | | | | | | |
| *Description* : manholes allowing infiltration | | | | | | | |
| *Account #* : 417-6900-569.40-31 | | | | | | $0.00 | |
| | | | | | | | $142,000.00 |
| *Project #:* | | | | | | | II1302 |
| **Inflow/Infiltration Removal - Morris Estates Sewer Rehab** | | | | | | | |
| *Description* : pipe deterioration, causing infiltration | | | | | | | |
| *Account #* : 417-6900-569.40-31 | | | | | | $0.00 | |
| | | | | | | | $276,000.00 |
| *Project #:* | | | | | | | II1303 |
| **Inflow/Infiltration Removal - Wesley College Sewer Rehab** | | | | | | | SPENT |
| *Description* : Various cracks causing infiltration | | | | | | | $7,200.00 |
| *Account #* : 417-6900-569.40-31 | | | | | | $7,200.00 | *PENDING:* |
| | | | | | | | $0.00 |
| *Project #:* | | | | | | | II1304 |
| **Inflow/Infiltration Removal - NRG Sewer Rehab** | | | | | | | |
| *Description* : Inflitration occuring in existing interceptor | | | | | | | |
| *Account #* : 417-6900-569.40-31 | | | | | | $0.00 | |
| | | | | | | | $175,000.00 |
| *Project #:* | | | | | | | II1305 |
| **Inflow/Infiltration Removal - FY13 I & I Design** | | | | | | | *SPENT:* |
| *Description* : consultant review of three sanitary sewer basins | | | | | | | $14,023.90 |
| *Account #* : 417-6900-569.40-31 | | | | | | $14,023.90 | *PENDING:* |
| | | | | | | | $25,976.10 |
| *Project #:* | | | | | | | II1306 |
| **Lepore Road Pump Station Replacement** | | | | | | | |
| *Description* : installing new liner in wet well to prohibit infiltration | | | | | | | |
| *Account #* : 417-6900-569.40-31 | | | | | | $0.00 | |
| | | | | | | | $50,000.00 |
| *Project #:* | | | | | | | WW1104 |
| **CIP Expenses** | **$5,160.98** | **$1,350.52** | **$1,767,683.77** | **$451,249.04** | **$54,612.78** | **$2,345,221.51** | **$1,967,287.22** |



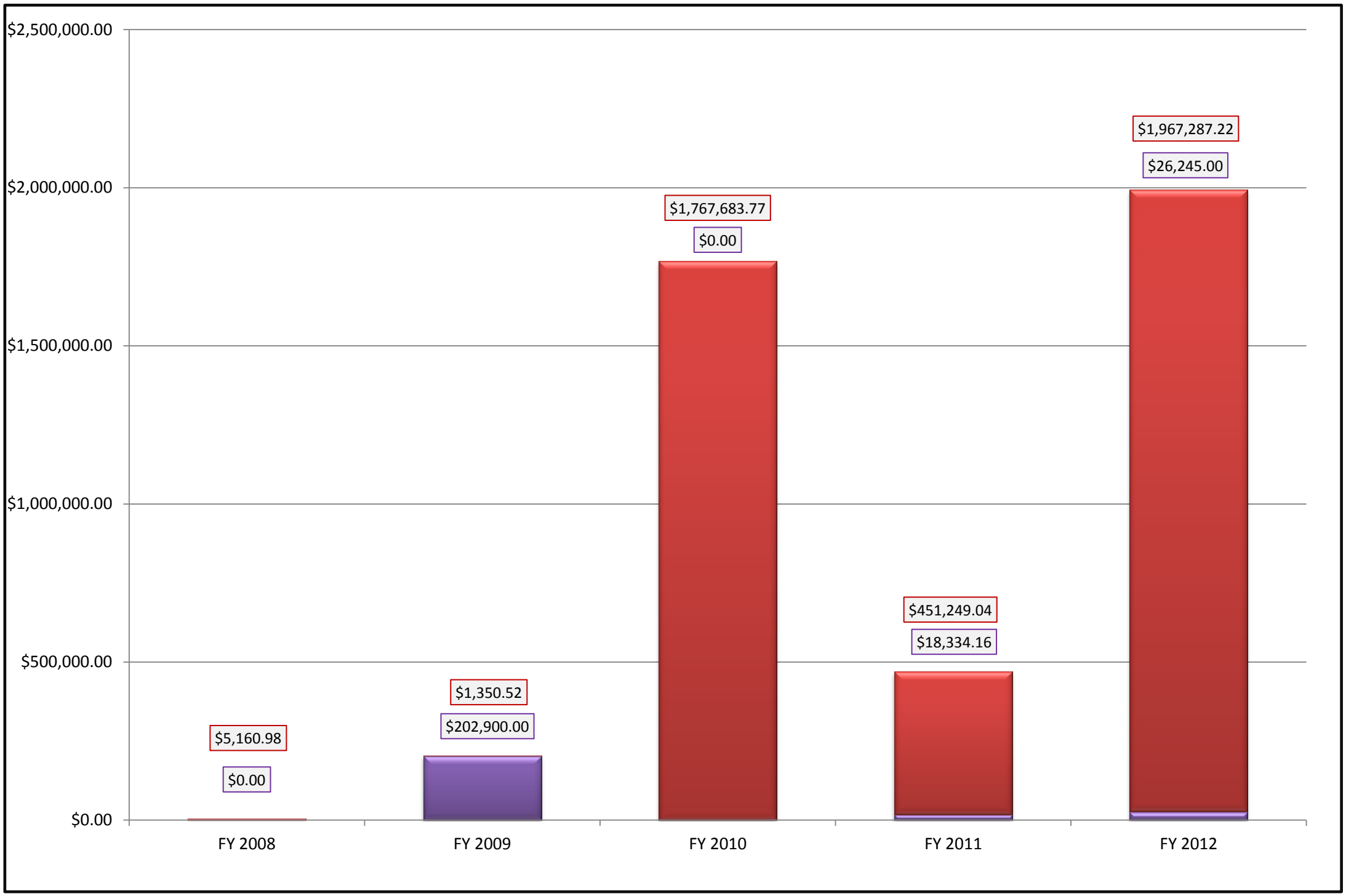
Attachment #3
Utility Committee Meeting November 13, 2012

## CITY OF DOVER INFLOW AND INFILTRATION APPLICABLE EXPENDITURES

| PROJECT INFORMATION | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | TO DATE | FY 2013 BUD |
|---|---|---|---|---|---|---|---|
| **Operating Expenses** | | | | | | | |
| **PACP Certification (10)** | | $3,000.00 | | | | $3,000.00 | |
| *Staff trained to properly identify and rate sanitary sewer condition* | | | | | | | |
| **Recording and Rating Sanitary Sewer Mains** | | | | $14,734.16 | $20,471.08 | $35,205.24 | $22,645.00 |
| *Staff labor hours.* | | | | | | | |
| **GraniteXP Software** | | | | $3,600.00 | $3,600.00 | $7,200.00 | $3,600.00 |
| *Initial software cost and corresponding yearly fee* | | | | | | | |
| **CCTV Camera Truck** | | $199,900.00 | | | | $199,900.00 | |
| **Operating Expenses** | **$0.00** | **$202,900.00** | **$0.00** | **$18,334.16** | **$24,071.08** | **$245,305.24** | **$26,245.00** |
| **INFLOW AND INFILTRATION REMOVAL EXPENSE TOTAL** | **$5,160.98** | **$204,250.52** | **$1,767,683.77** | **$469,583.20** | **$78,683.86** | **$2,590,526.75** | **$1,993,532.22** |

## CITY OF DOVER INFLOW AND INFILTRATION APPLICABLE EXPENDITURES

| PROJECT INFORMATION | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | TO DATE | FY 2013 BUD |
|---|---|---|---|---|---|---|---|



# Inflow / Infiltration Update

## Utility Committee Presentation
November 13, 2012

## Department of Public Works

Utility Committee Meeting November 13, 2012
Attachment #4

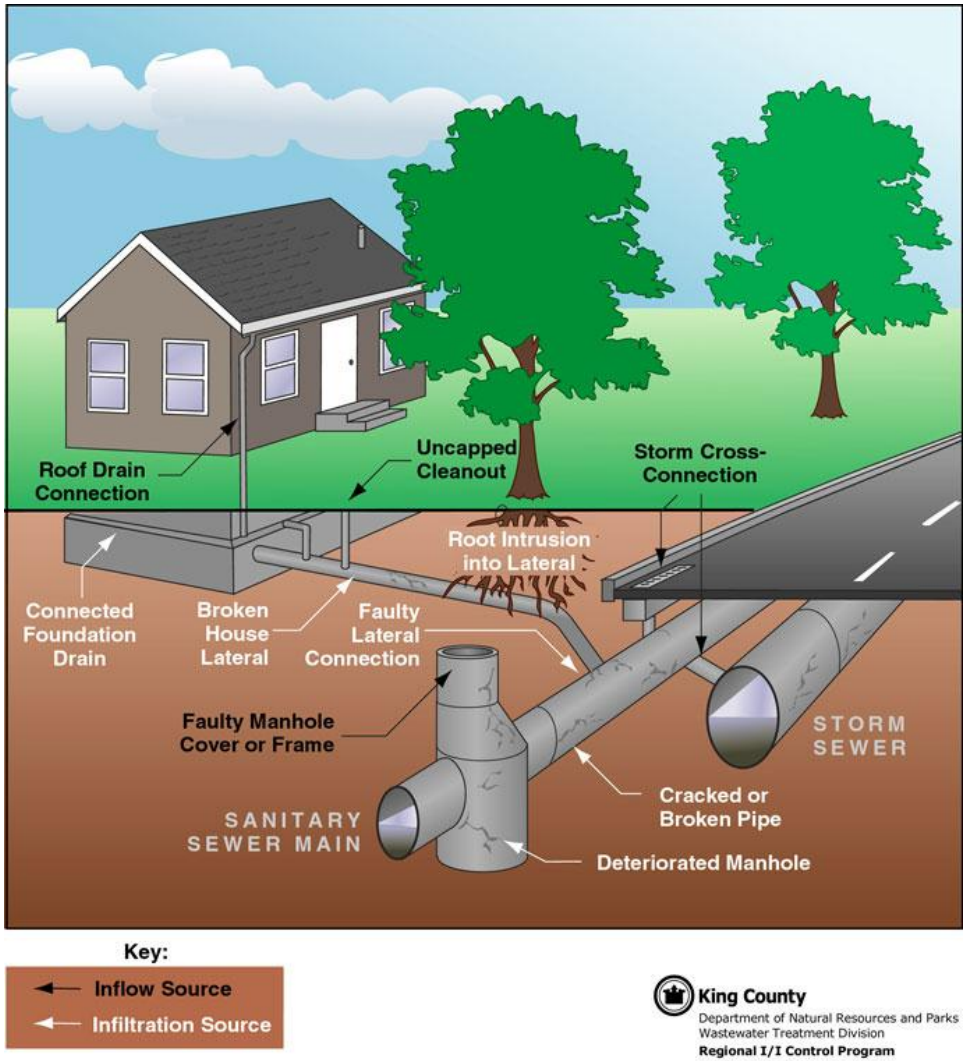
# Inflow and Infiltration Overview

- In FY 2010, the City of Dover experienced its wettest year in recent memory. An estimated 1.97 billion gallons were sent for treatment at the Kent County Wastewater Treatment Plant with 0.26 billion gallons sent in March 2010 alone.
- On average, the annual volume of wastewater sent is approximately 1.58 billion gallons. The monthly average is approximately 0.13 billion gallons.
- At $2.34/1,000 gallons, inflow and infiltration accounts for $304,200 on a monthly basis.

# Inflow and Infiltration Overview

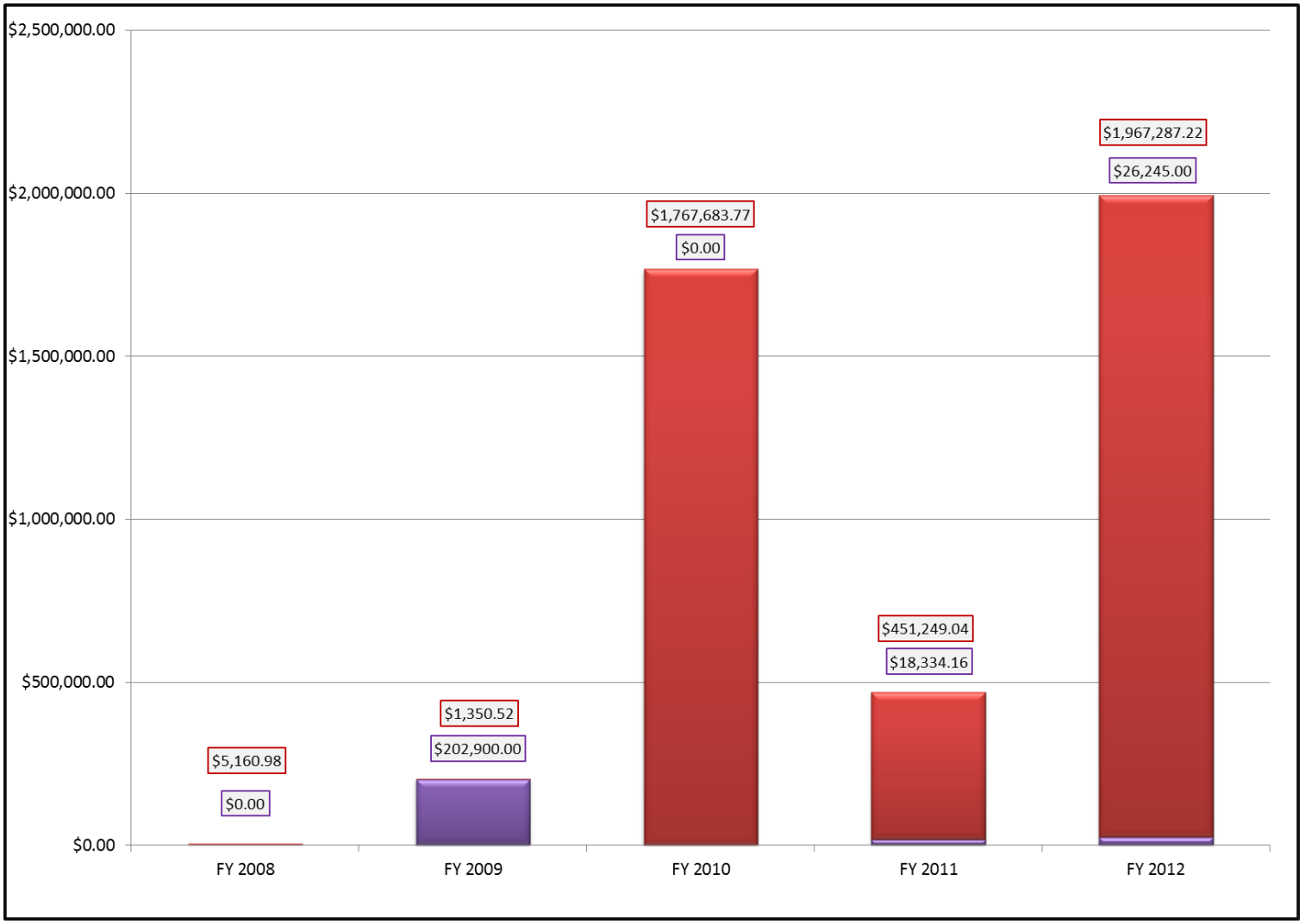
- The threat of infiltration is continuously increasing.  The pipes in the ground are deteriorating, which increases the possibility of groundwater entering our sanitary sewer system.
- Older homes and developments also have illicit connections to sanitary sewer mains, which send rain water / groundwater to our system.
- The City of Dover is a contract user of Kent County and therefore charged by the volume of wastewater sent to the WWTP for treatment.

# Inflow and Infiltration Basics



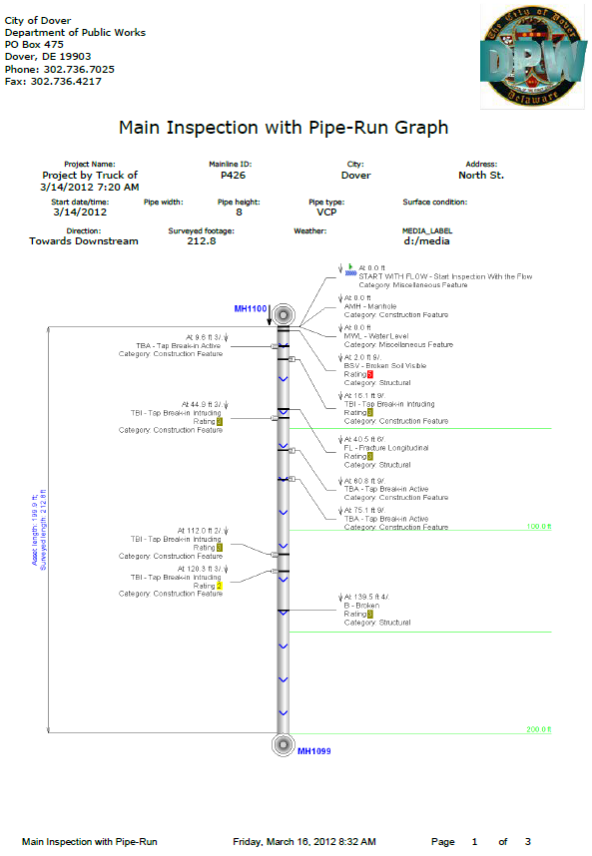

- Inflow Examples
  - Roof Drain Connection to the Sanitary Sewer
  - Uncapped Cleanout, connected to the Sanitary Sewer
  - Storm Sewer Cross Connection
- Infiltration Examples
  - Broken House Lateral
  - Root Intrusion into Lateral
  - Cracked or Broken Sanitary Sewer Pipe

# Inflow and Infiltration Expenses



# Assessing the Problem

- Pump Station Flow Analysis
  - Developed by engineering staff to determine which sanitary sewer basins have the largest inflow and infiltration problem.
  - This analysis is utilized to prioritize the video inspection of the sanitary sewer basins.
- Rehabilitation Methods
  - Ultraviolet Cured Fiberglass reliner
  - Infrastructure replacement



# Assessing the Problem

- Utilization of CCTV Sewer Truck
  - Wastewater Maintenance staff assesses the sanitary basins to record any structural/operational issues.



- Pipeline Assessment Certification Program (PACP)
  - Staff are certified in the PACP methodology. With the use of the GraniteXP software package, staff can rate each pipe in the system, justifying the need for rehabilitation.

# Assessing the Problem – Video Inspections









# Addressing the Problem – Transmission Capital Improvements

- Inflow and Infiltration Rehabilitation
  - Division Street, Northwest, Loockerman Street, St. Jones Interceptor Relining
  - New Street / Reed Street Main Replacement
  - Morris Estates Infrastructure Replacement
  - Fox Hall Manhole Replacement






# Desired Results and Resources

- The improvements desired to the City's water system will require:
  - Increased, dedicated and long term financial resources.
    - FY 2013 Capital Budget = $1,967,287
  - Increased, dedicated and long term staffing resources.
    - Goals will require time from 23 Water / Wastewater Utility staff members including engineers, field crews and inspectors
  - Utilization of consultants and outside contractors to meet critical time frames.