MIAMI-DADE COUNTY
WATER AND SEWER

Miami-Dade
Water and Sewer Department

# Comprehensive Lateral Investigation Program (CLIP)

# Preliminary Draft Report

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*in association with* Cardozo Engineering – Civil-CADD – San Martin Associates

MIAMI-DADE COUNTY WATER AND SEWER

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# Foreword

Little attention was paid to collection system infiltration/inflow issues prior to the promulgation of the Clean Water Act in the early 1970's. Sewer line joint materials were not as effective as they are today and sewer system overflow structures were routinely included in collection system designs. I/I issues were initially addressed with the emergence of the EPA Grant Program where sewer system evaluations were a requirement for grant funding. An emphasis on the elimination of sewer system overflows concurrent with reduced treatment plant funding programs during the past 20 years has created a renewed interest in collection system maintenance issues.

The emergence of new SSES procedures and the development of trenchless technologies has made mainline sewer I/I programs more cost effective. Lateral repair programs, however, continue to be the last portion of the collection system to be addressed. The wastewater industry must now develop procedures to make lateral repair programs more cost effective.

The Miami-Dade Water and Sewer Department (Department) has decreased treatment plant average daily flows over the last 10 years with an effective I/I program. Peak flows, however, continue to exceed treatment capacity during major storm events. Since the laterals were the only collection system component not addressed under the I/I program, a pilot lateral program was developed to evaluate its effectiveness at reducing rainfall dependent infiltration/inflow (RDII) flows.

This report describes the lateral pilot program known as the Comprehensive Lateral Investigation Program (CLIP). The Program can provide a model to assist the Department's volume sewer customers and other utilities to evaluate similar programs.

# Acknowledgement

The information presented in this report reflects the joint efforts of both the Department staff and the members of the Hazen and Sawyer CLIP Team.

Mr. Rodney Lovett, Department Project Manager, provided valuable guidance throughout the Program. Mr. Larry Decker and Mr. Ini Roberts coordinated Department field activities and provided collection system data support. Mr. James Saren and Mr. Juan Bedoya worked closely with the CLIP staff and performed field investigation, lateral testing and lateral repair functions.

The cooperation and professionalism demonstrated by the Department forces was greatly appreciated by the CLIP staff and was critical to the Program success.

Finally, the following CLIP Team subconsulting engineering firms are gratefully acknowledged for their contribution to the Program. These include:

Earth Tech Consulting, Inc.
Cardozo Engineering, Inc.
Civil Cadd Engineering, Inc.
San Martin and Associates

MIAMI-DADE COUNTY WATER AND SEWER

# Section 1.0
# Executive Summary

## 1.1 Background

The Miami-Dade Water and Sewer Department (Department) has conducted an extensive wastewater collection system infiltration/inflow (I/I) program since 1994, to reduce extraneous groundwater and rainwater flows entering the system. Total system flows to the treatment facilities were 325 mgd on an annual average daily flow basis and it was estimated that approximately 40 to 50 percent of the system flows were I/I.

The I/I Program consisted of inspecting manholes, video TV and smoke testing 100 percent of the system and performing repairs on all sewer line defects. The entire collection system was completed under the Program by _____ and a total of 32,194 defects were identified and resolved. Department forces are continuing to evaluate the system on a ten year cycle (10 percent per year).

The I/I Program has been highly successful. The actual flows to the treatment facilities have decreased over the 10 year period since 1995 and it is estimated that approximately 130 mgd of average daily flow has been eliminated from the collection system.

Although the average daily flow reduction is substantial, peak flow during rain events or rainfall dependent infiltration/inflow (RDII) flows continue to be excessive with estimated peak flows exceeding four times the average daily flows. At the end of the initial program, it was concluded that the Program was effective at addressing sewer line leaks below the groundwater table (infiltration) which could be detected by manhole inspection and video TV, but leaks above the normal groundwater table (RDII) were not being properly addressed with the smoke test program. The only part of the system not being addressed under the Program was the laterals which were above the groundwater table.

A lateral pilot program was initialed by the Department in 1999 to address RDII flows and determine the effectiveness of performing lateral inspections. Under the program, three collection basins were selected and 100 percent of the laterals were air pressure tested and identified lateral defects were repaired. Comparing system flows before and after rainfall events indicated that the program was successful.

## 1.2 CLIP Proposal

As a result of the Initial Lateral Pilot Program, the Department proposed to conduct a more extensive program identified as the Comprehensive Lateral Investigation Program (CLIP) to address the RDII issue. The Program was approved by EPA on January 2002

and federal line item matching funds were obtained to partially offset Program costs, since the Program resulted from a Consent Decree requirement which was not anticipated at the time.

CLIP tasks included identifying 30 typical system collection basins, performing air pressure tests on each lateral within the basin and performing repairs on all laterals which failed the pressure test. RDII flows into the basins during peak flow storm events would be quantified before and after the repairs were made to determine the effectiveness of the Program. Program costs would also be monitored and cost effective analyses of the CLIP at reducing system flows would be developed. These costs would then be compared to the cost of other RDII reduction alternatives such as modifying pump station operations to reduce RDII flows and/or increasing the system-wide transmission/treatment capacity to process the RDII flows.

### 1.2.1 Purpose

One of the grant funding requirements was for the Department to issue a CLIP report which describes the program in detail. The purpose of the CLIP was to allow the Department to quantify the potential impact of lateral rehabilitation on the overall peak flow facility requirements. It will provide the information necessary to estimate RDII reductions, quantify costs and determine the cost effectiveness of the Program. In addition, the CLIP Report will provide useful information to assist other utilities in addressing similar RDII issues. The preliminary program findings indicated that lateral repairs will reduce RDII flows at the source, and may well make a cost effective contribution to the overall Department peak flow reduction effort. The Program could reduce the estimated $1.6 billion cost required for peak flow transmission and treatment facility improvements.

The purpose of this report is to define the CLIP and provide data on the cost and effectiveness of a system-wide CLIP. This report is intended to satisfy the requirements of the EPA Grant Funding Program.

## 1.3 Basin Selection

The Department owns and operates approximately 960 sewage pumping stations throughout Miami-Dade County. Approximately 500 of these stations exhibit excess RDII flows during major storm events. The following data were collected on the 500 basins.

- RDII Signature
- Night Flow Quantity
- Land Use
- Sewer Line Repair Status
- Last SSES Data

- Sewer Component Materials
- Number of Laterals
- Location within the County
- Proximity to Surface Water
- Future Development Potential
- Age of System

The system RDII data indicated that the 500 basins contributed over _____ mgd of flow to the treatment facilities during major rain events. An analyses of the 500 basins indicated that _____ percent had clay pipe materials and ____ percent had PVC pipe materials. A total of 52 of the 500 basins, which represented typical stations, were selected for the CLIP. The following Program basin selection criteria were used to facilitate the evaluation and reduce CLIP costs:

- Less than 15,000 feet of sewers
- Constant speed pumps
- Terminal basin with no other basin contributing flows
- Discharge to gravity systems to facilitate flow calculations

Table 1.1, on the next page, lists each of the 52 CLIP basins and their characteristics.

**Table 1.1**
**Basin Characteristics (52 Basins)**

| Basin | Footage | Location | City of Miami | District | Wetwell Field Protection Area | Age | Main Line Material | No of Laterals | No of Stacks | Zoning | Peak Flow Factor 2001 | RDII Signa-ture | Comments Selection Report |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | 4,367 | NW | Yes | 3 | No | 1954 | | 98 | 2 | Commercial | 1.4 | No | |
| 47 | 13,648 | NW | Yes | 3 | No | | | 453 | 193 | Single Family / Multi-Family / Commercial | | No | |
| 58 | 4,767 | CE | No | 3 | No | 1946 | | 95 | 5 | Single Family | 2.4 | No | Tidal Influ-ence |
| 70 | 507 | CW | Yes | 5 | No | | | 16 | 3 | Multi-Family / Commercial | 6 | No | |
| 80 | 20,414 | CW | Yes | 5 | No | | | 379 | 184 | Multi-Family / Government | 3 | No | |
| 82 | 4,906 | CW | Yes | 5 | No | | | 194 | 58 | Single Family / Multi-Family | 7.5 | No | |
| 118 | 4,314 | NW | No | 12 | No | 1972 | | 33 | 4 | Commercial | 1.8 | No | |
| 126 | 1,895 | CW | No | 12 | No | 1986 | | 23 | 4 | Multi-Family / Commercial | 2.7 | No | Sweetwater Area |
| 154 | 3,583 | CW | No | 12 | No | 1981 | | 28 | 4 | Commercial | 2.8 | No | |
| 162 | 5,779 | CW | No | 12 | No | 1995 | | 41 | 1 | Commercial | 6.4 | No | |
| 194 | 10,570 | NW | No | 12 | Yes | 1963 | | 59 | 27 | Commercial | 8.6 | No | |
| 195 | 8,650 | NW | No | 12 | Yes | 1968 | | 61 | 5 | Commercial | 2.4 | No | |
| 336 | 3,572 | NW | No | 13 | No | 1983 | | 26 | 0 | Commercial | 11.7 | No | |
| 350 | 19,167 | NW | No | 1 | No | 1979 | | 535 | 60 | Single Family / Multi-Family | 27 | No | |
| 355 | 16,101 | NW | No | 13 | No | 1960 | | 249 | 27 | Single Family | 4.9 | No | |
| 358 | 1,614 | NW | No | 1 | No | 1957 | | 67 | 1 | Single Family | 7.3 | No | On edge of canal |

**Table 1.1**
**Basin Characteristics (52 Basins)**

| Basin | Footage | Location | City of Miami | District | Wetwell Field Protection Area | Age | Main Line Material | No of Laterals | No of Stacks | Zoning | Peak Flow Factor 2001 | RDII Signa-ture | Comments Selection Report |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 364 | 16,101 | NW | No | 1 | No | 1971 | | 357 | 32 | Single Family | 3.6 | No | |
| 378 | 13,317 | NW | No | 1 | No | 1955 | | 237 | 32 | Single Family | 3.4 | No | |
| 380 | 8,453 | NW | No | 13 | No | 1968 | | 192 | 5 | Single Family | 4 | No | |
| 405 | 1,354 | NW | No | 13 | No | 1967 | | 21 | 2 | Multi-Family | 2.7 | No | |
| 410 | 8,907 | NW | No | 13 | No | 1980 | | 109 | 11 | Single Family / Multi-Family | 6.3 | No | |
| 479 | 19,025 | NW | No | 13 | No | 1991 | | 445 | 22 | Multi-Family | 3.5 | No | |
| 484 | 37,685 | NW | No | 13 | No | | | 915 | 29 | | | No | |
| 509 | 10,595 | CW | No | 10 | Yes | 1989 | | 223 | 21 | Multi-Family | 3.5 | No | |
| 524 | 8,562 | CW | No | 10 | Yes | 1983 | | 120 | 6 | Single Family / Multi-Family / Commercial | 2.9 | No | |
| 525 | 20,488 | CW | No | 10 | Yes | | | 628 | 1 | | | No | |
| 564 | 7,143 | SW | No | 9 | No | 1987 | | 183 | 98 | Single Family | 5.4 | No | On edge of canal |
| 577 | 8,159 | SE | No | 8 | No | 1989 | | 280 | 26 | Multi-Family | 3.1 | No | |
| 603 | 12,482 | SE | No | 8 | No | 1970 | | 56 | 27 | Commercial | 2.7 | No | |
| 608 | 4,603 | SW | No | 9 | No | 1970 | | 91 | 14 | Single Family / Multi-Family / Commercial | 5.8 | No | |
| 615 | 11,273 | CW | No | 10 | Yes | 1956 | | 281 | 145 | Single Family | | No | |
| 681 | 6,750 | SW | No | 9 | No | 1985 | | 41 | 6 | Agricultural | 8.8 | No | |
| 708 | 11,816 | SE | No | 8 | No | 1958 | | 217 | 71 | Single Family | 5.7 | No | |
| 722 | 17,725 | SW | No | 9 | No | 1972 | | 52 | 4 | Single Family | 4 | No | |
| 729 | 5,044 | SW | No | 8 | No | 1970 | | 71 | 37 | Single Family | 6.2 | No | |

**Table 1.1**
**Basin Characteristics (52 Basins)**

| Basin | Footage | Location | City of Miami | District | Wetwell Field Protection Area | Age | Main Line Material | No of Laterals | No of Stacks | Zoning | Peak Flow Factor 2001 | RDII Signa-ture | Comments Selection Report |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 753 | 7,175 | CW | No | 10 | Yes | 1963 | | 111 | 48 | Single Family | 4.8 | No | |
| 763 | 5,594 | CW | No | 7 | Yes | 1972 | | 61 | 5 | Multi-Family | 1.66 | No | |
| 790 | 1,554 | CW | No | 7 | No | 1961 | | 12 | 1 | Commercial | 4.8 | No | |
| 802 | 5,335 | CW | No | 8 | Yes | 1961 | | 118 | 7 | Multi-Family | 5.9 | No | |
| 803 | 15,300 | CW | No | 8 | No | 1960 | | 411 | 117 | Single Family / Multi-Family / Commercial | 2.6 | No | |
| 813 | 1,579 | CW | No | 10 | No | 1958 | | 12 | 7 | Single Family | 5.4 | No | |
| 823 | 9,930 | CW | No | 8 | Yes | 1968 | | 154 | 22 | Single Family | 3.4 | No | |
| 828 | 4,665 | CW | No | 8 | Yes | 1978 | | 80 | 77 | Single Family | 3.1 | No | |
| 829 | 1,527 | CW | No | 8 | Yes | 1968 | | 44 | 1 | Multi-Family | 3.4 | No | |
| 851 | 10,414 | CW | No | 10 | Yes | 1977 | | 258 | 19 | Multi-Family | 1.8 | No | |
| 880 | 14,253 | CW | No | 8 | Yes | 1978 | | 270 | 53 | Single Family | 2.7 | No | Between a canal and lake |
| 885 | 6,581 | CW | No | 8 | Yes | 1979 | | 101 | 18 | Single Family | 2.7 | No | |
| 1004 | 10,340 | SE | No | 8 | Yes | 1953 | | 224 | 39 | Single Family / Multi-Family | | No | |
| 1031 | 4,725 | SW | No | 9 | No | 1989 | | 106 | 41 | Single Family | 9.2 | No | |
| 1032 | 8,075 | SE | No | 9 | No | 1989 | | 193 | 48 | Single Family | 3 | No | |
| 1033 | 9,594 | SE | No | 8 | No | 1990 | | 304 | 43 | Single Family | 3.3 | No | |
| 1063 | 10,594 | SE | No | 8 | No | 1972 | | 155 | 36 | Single Family | 4 | No | |

## 1.4 Public Outreach Program

It was determined that the Department could not test the private side of the laterals without the property owners written permission. A total of 9,202 letters were issued to the CLIP property owners requesting permission to test their lateral. Table 1.2 shows the results of the program.

**Table 1.2**
**Public Outreach Program Results**
**May 26, 2006**

| Description | Quantity | Percent |
|---|---|---|
| Letters Sent | 9,202 | 100.00% |
| **"Yes" Responses** | **6,301** | **68.47%** |
| Letters | 6,197 | |
| Field Responses | 104 | |
| **"No" Responses** | **229** | **2.49%** |
| Letters | 148 | |
| Field Responses | 81 | |
| Total Responses | 6,530 | 70.96% |
| Pending Responses | 2,672 | 29.04% |

The Public Outreach Program was very successful with a 70 percent response rate. Approximately 96 percent or 6,301 of the 6,530 respondents allowed the Department on their property.

## 1.5 Inspection Program

Each lateral in the Program was first air tested to determine its integrity. Private side laterals without owner's permission were not tested. Laterals from the main sewer in the street to the No. 1 Cleanout at the house were first tested. If the line passed the 3 to 5 psi air test, it was considered tight or defect free. If the line failed the test, it was divided into two segments: the public side from the main sewer to Cleanout No. 2 at the property line and the private side from Cleanout No. 2 to Cleanout No. 1 at the house. Each of the line segments were then air tested to determine its integrity.

Table 1.3 shows the results of the air test program.

**Table 1.3**
**Air Test Program Results**

| Sewer Line Tested | Public | | | Private | | | |
|---|---|---|---|---|---|---|---|
| | Pass | Fail | CND | Pass | Fail | CND | N/A |
| 9,292 | | | | | | | |
| Percent | | | | | | | |

*CND – could not do because of field conditions*
*N/A – no authorization to enter property*

A total of _____ public laterals or _____ percent passed the pressure test and a total of _____ or _____ percent of the private laterals passed the test.

Public side laterals which failed the pressure test were televised if they were over six feet deep. It was considered most economical to dig and replace shallow laterals and no TV would be required. Private side laterals which failed were televised and smoke tested to prove to the property owner that they were defective.

## 1.6 Repair Program

The inspection field data was reviewed and repair calls were made. Unit prices for various repair technologies were obtained through a competitive bidding procedure. Point repair, dig and replace and cured-in-place technologies were specified. Table 1.4 lists various repairs used in the Program.

A total of _____ lateral repairs were completed and each line was subsequently pressure tested to confirm the integrity of the repair.

**Table 1.4**
**Program Repairs – May 23, 2006**

| Basin | Current Repairs | Cannot Do | Repair Technology: Excavated Point Repair/ Full Lateral Replacement – MDWASD: Identified | Issued | Completed | Excavated Point Repair/ Full Lateral Replacement – Contractor - Metro: Identified | Issued | Completed | Cured-In-Place Liner: Identified | Issued | Completed | CIP Main Line / Lateral Connection Repair: Identified | Issued | Completed | Repairs Pending Review | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 47 | 224 | | 138 | 138 | 105 | | | | 86 | | | | | | 0 | Ongoing |
| 70 | 10 | | 10 | 10 | 8 | | | | | | | | | | 0 | Ongoing |
| 80 | 27 | | 27 | 27 | 18 | | | | | | | | | | 0 | Ongoing |
| 82 | 15 | | 15 | 15 | 15 | | | | | | | | | | 0 | **Completed** |
| 194 | 30 | | 30 | 30 | | | | | 5 | | | | | | 0 | Ongoing |
| 195 | 13 | | 8 | | | | | | | | | | | | 0 | To be issued |
| 509 | 35 | | 35 | 35 | 23 | | | | | | | | | | 0 | Ongoing |
| 524 | 86 | | | | | | | | | | | | | | 86 | Under review |
| 525 | 23 | | 14 | 13 | 1 | | | | 9 | | | | | | 0 | Ongoing |
| 564 | 12 | | 12 | 12 | 12 | | | | | | | | | | 0 | **Completed** |
| 603 | 6 | | 6 | 6 | | | | | | | | | | | 0 | Ongoing |
| 608 | 34 | | 34 | 34 | 18 | | | | | | | | | | 0 | Ongoing |
| 681 | 11 | | 11 | 11 | 11 | | | | | | | | | | 0 | **Completed** |
| 708 | 100 | | 100 | 100 | 20 | | | | | | | | | | 0 | Ongoing |
| 722 | 19 | | 12 | 12 | | | | | 7 | | | | | | 0 | Ongoing |
| 729 | 4 | | 4 | 4 | | | | | | | | | | | 0 | Ongoing |
| 753 | 50 | | | | | 35 | | | 15 | | | | | | 0 | To be issued |
| 813 | 19 | | 19 | 19 | | | | | | | | | | | 0 | Ongoing |
| 823 | 89 | | 89 | 89 | 74 | | | | | | | | | | 0 | Ongoing |
| 828 | 0 | | | | | | | | | | | | | | 0 | N/A |
| 851 | 23 | | 23 | 23 | 23 | | | | | | | | | | 0 | **Completed** |
| 880 | 6 | | 6 | 6 | | | | | | | | | | | 0 | Ongoing |
| 1004 | 80 | | | | | | | | | | | | | | 80 | Insp. Ongoing |
| 1031 | 6 | | 6 | 6 | 6 | | | | | | | | | | 0 | **Completed** |
| 1033 | 26 | | 26 | 26 | 22 | | | | | | | | | | 0 | Ongoing |
| 1063 | 33 | | 33 | 33 | 33 | | | | | | | | | | 0 | **Completed** |
| **26** | **981** | | **658** | **649** | **389** | **35** | | | **122** | | | | | | **166** | |

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## 1.7 Analysis

Hydrographs or graphs of basin flows over time were developed for each CLIP basin. Basin flows during a two year storm event (4.5 inches in 24 hours) were quantified for storm events before and after the lateral repairs were made. Table 1.5 shows the results of the analysis for each basin. In general, the data indicate the RDII in the CLIP basins was reduced by _____ percent. Based on the 500 RDII basins, a similar flow in each of these basins could reduce the RDII flow by _____ (_____ percent of ___ mgd).

**Table 1.5**
**Basin Analysis**

CLIP basin characteristics were evaluated to determine if certain basin characteristics could contribute to the success of the CLIP program. Table 1.6 lists the CLIP stations by percentage RDII reduction and compares their characteristics.

**Table 1.6**
**Basin RDII Reduction**

## 1.8 Program Costs

The cost of each phase of the CLIP was developed. Table 1.7 lists the Program component and its total cost.

**Table 1.7**
**Program Components and Cost**

The cost of the CLIP was $_____. This resulted in a unit cost of $_____ per mgd of RDII removed which compares favorably with the cost of transmission and treatment facilities which is estimated at $_____ per mgd. It should also be noted that the cost of treatment may well increase with future regulations which may require higher removal rates for high level disinfection or nitrogen reduction criteria.

The 500 high RDII basins have varying RDII flows per lateral and basins with the highest RDII concentrations would be most cost effective to repair. Figure 1-1 is a graph of the RDII per lateral in each of the basins. A 20 year payback period (6 percent cost of money) line based on treatment and transmission cost, is shown in the graph. Basins above the line would be cost effective with a pay back period less than 20 years.

The graph indicates that, based on the 20 year pay back period, it would be cost effective to repair _____ of the basins.

## 1.9 Recommendations

Two ongoing Programs will impact the Department's Peak Flow Master Plan: The CLIP and the Pump Station Optimization Program (PSOP). It has been demonstrated that the PSOP is a low cost capital program that greatly reduces RDII flows during two-year storm events.

The following procedure is recommended to reduce RDII flows in the collection system:

1. The PSOP recommendations are adopted and each pump station be operated under the proposed criteria.

2. Review system operations during a 2-year storm event to identify basins with excessive RDII.

3. Complete a lateral improvement program on the high RDII basins with a 20-year payback period giving priority to the basins with highest RDII concentration per lateral.

4. Continue to implement a reduced lateral improvement program at a maintenance level as part of the Departments ongoing I/I Program.

The recommended four-step program should greatly reduce both RDII flows and system overflows with the lowest capital and O&M expenditure.

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**Figure 1-1**
RDII per Lateral in Each Basin

# Section 2.0
# Introduction

## 2.1 Background

The Miami-Dade Water and Sewer Department (Department) has been engaged in an extensive sanitary sewer system evaluation and rehabilitation program since 1994 in an effort to reduce collection system infiltration/inflow (I/I). Under the I/I Program, the entire sanitary sewer collection system, which represents approximately 12.9 million feet of gravity sewer lines and 58,000 manholes was evaluated by July, 1997. The Program sewer evaluation consisted of cleaning and televising 100 percent of the gravity lines, the visual inspection of each manhole and the smoke testing of the entire system to identify sewer defects. A total of 32,194 defects were identified and repaired. Since the initial program, the Department has continued to monitor the collection system and repair defects on a ten year cycle (10 percent of the system per year).

As indicated in Figure 2-1, the I/I Program has been highly successful with system flows to the regional treatment facilities reduced by approximately 130 mgd. Although the system-wide infiltration was greatly reduced, rainfall dependent infiltration/inflow (RDII) and improvements to the transmission system have continued to increase the peak flows to the treatment facilities during heavy rainfall events. It is estimated that approximately 500 of the 960 pump stations continue to exhibit a RDII signature. Since the mainline sewer components were fully investigated and laterals from the main sewer to the house (house lateral) have only been evaluated in close proximity to the mainline sewer, the sewer house laterals have been identified as the only system component not fully investigated.

The house laterals above the normal water table were, therefore, considered the source of the RDII. The Department initiated a lateral pilot program (Initial Lateral Pilot Program) in 1999, to determine if house laterals could be the cause of the RDII and to quantify the cost and effectiveness of a lateral evaluation and repair program.

## 2.2 Initial Lateral Pilot Program

Three collection basins were selected for the Initial Lateral Pilot Program. Although all main sewers were repaired under the initial I/I Program, the program basin main sewers were re-televised and smoke tested and all manholes were again visually inspected for defects. This ensured that the collection system components other than the laterals were not sources of RDII. The identified repairs were completed and the manholes were sealed to reduce system inflow.

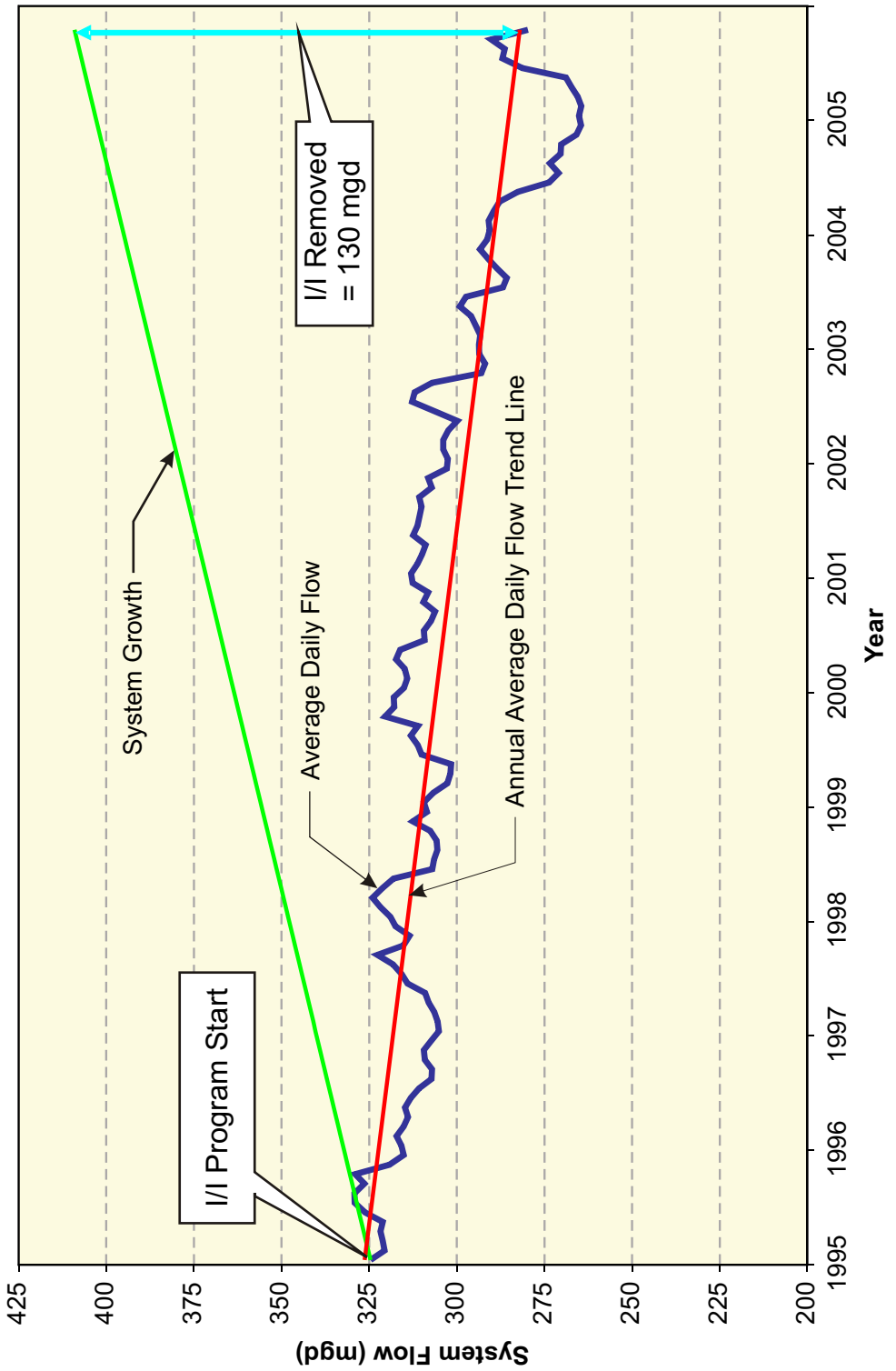


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**Figure 2-1**
I/I Program Results

After a significant rain event, rainfall dependent infiltration/inflow hydrographs were obtained for the "before" repairs baseline flow signatures. Each basin lateral, both public and private sides, were then air pressure tested for leaks and the defects were identified and repaired. Post repair hydrographs indicated that the lateral repairs were effective and the basin RDII signatures were reduced after lateral repairs were made.

## 2.3 CLIP

As a result of the initial pilot program, the Department decided to expand the program to include thirty (30) additional basins. The new Comprehensive Lateral Investigation Program (CLIP), once again, evaluated the effectiveness of the lateral repairs to determine the feasibility of expanding the Program to the remaining 500 basins which exhibited RDII signatures.

Metropolitan Dade County entered into a Consent Decree with the US EPA in June 1994, to address outstanding wastewater issues. Paragraph 17 of the Consent Decree required the Department to develop a Peak Flow Management Study (PFMS) to characterize peak flows for each pump station and evaluate each station's ability to manage the peak flows. The Consent Degree then required the Department to address each station's ability to transmit the required flows. The Department's Wastewater Master Plan estimated that approximately $1.6 billion in capital improvements would be required for transmission and treatment facilities to satisfy existing system peak flow conditions.

Although not specifically required by the Consent Decree, the Department formally requested that the CLIP results be incorporated in the Study in October 2001, since it may cost effectively reduce peak flows and be a key element in the overall peak flow management scheme. The Comprehensive Lateral Investigation Program Action Plan, in Appendix A, was submitted in support of the request. The EPA approved the CLIP in January 2002 and a time extension was granted for the Study in order to incorporate the results of the CLIP. The Department applied for EPA grant funding for the Program and received $1,300,000 in partial grant funding for the CLIP and other programs not anticipated in the Consent Decree to collect data for the Peak Flow Management study.

### 2.3.1 Program Purpose

The CLIP has four basic purposes. These are to:

1. Evaluate Program Effectiveness
2. Assist in satisfying Consent Decree Requirements
3. Satisfy EPA Funding Requirements
4. Provide a Model for Other Utilities

Each of these purposes is described below:

1. Evaluate Program Effectiveness

   The main purpose of the CLIP is to evaluate the feasibility of developing a lateral inspection and repair program to reduce collection system RDII flows. Data obtained under the Program would allow the Department to evaluate the cost effectiveness of reducing RDII flows. The Program cost per gallon would then be compared to other alternative solutions for addressing peak flows.

2. Assist in Satisfying Consent Decree Requirements

   The Department entered into an EPA Consent Decree in June 1994 to resolve several wastewater system issues. Under the Consent Decree the Department was required to develop a Peak Flow Management Study (PFMS) to address peak flow issues. Although it was not required by the Consent Decree, the CLIP became an element of the PFMS since it may be cost effective at reducing peak flows. The PFMS is due to be completed by February 2008**.** Therefore, the CLIP must be completed before the February date.

3. Satisfy EPA Funding Requirements

   The Department received approval for federal line item funding for the CLIP on October 4, 1998. The funding, administrated by EPA, consisted of $1,300,000 in matching funds to defray CLIP and other peak flow program costs. One of the requirements of the EPA funding was that a CLIP report be issued to describe the Program and its effectiveness at reducing peak flows. This report is intended to satisfy the funding requirement.

4. Provide a Model for Other Utilities

   An additional purpose of the Program is to provide information to other utilities with similar peak flow issues to help facilitate their programs. Program procedures and findings are detailed to assist in transferring lessons learned to other utilities. Although the Department's specific conditions are unique, (high groundwater levels where sewers are continuously submerged in the groundwater table and approximately 60 inches of rainfall per year), many of the Program findings can be directly applied to other utility applications. This report is intended to assist the utilities in developing similar Programs.

## 2.4 Report Outline

This report addresses CLIP issues in accordance with the requirements of the EPA grant funding program. The contents of each Section are outlined below:

- Section 2 provides background information, including the development of the Initial Lateral Pilot Program and the EPA Grant Program, and reviews the report contents.
- Section 3 describes the CLIP team organization, and the team members and their responsibilities.
- Section 4 outlines the various Program tasks including basin selection, protocols and lateral investigation and repair procedures. The Public Outreach, Road Moratorium and Work Force Area programs are also described.
- Section 5 describes various tools used in the Program. These include the development of hydrographs, the work order system and the database management system.
- Section 6 outlines administrative tasks associated with the Project. These include a listing of responsibilities for the individual Team members, and the document control, budget and schedule control and Program status reporting systems.
- Section 7 describes the Program analysis methods. It describes the overall program results including percentage of laterals requiring repair, quantity and types of repairs required and the effectiveness of the Program.
- Section 8 summarizes the overall Program costs and determines the cost per lateral repair for each basin type.
- Section 9 uses the data obtained for each pilot basin, applies it to the remaining 500 basins with RDII signatures and determines the overall cost effectiveness of the Program. Cost effective portions of the Program are identified and a recommended Program is defined for the remainder of the collection basins.

# Section 3.0
# Program Organization

The Hazen and Sawyer Team was selected to provide program management services for the CLIP pilot program. As described in the Project scope, the Team was responsible for "managing the Program and the budget of $10 million for the inspection of 3,350 laterals annually resulting in repairs of approximately 1,600 laterals; writing specifications in accordance with established protocol for lateral investigations and repairs; project tracking, scheduling contractor's work; maintaining a database for the information obtained which will be used later in the Peak Flow Model; ensuring compliance with local state and federal regulations and planning and preparing written progress reports including the final report".

## 3.1 Lateral Pilot Team

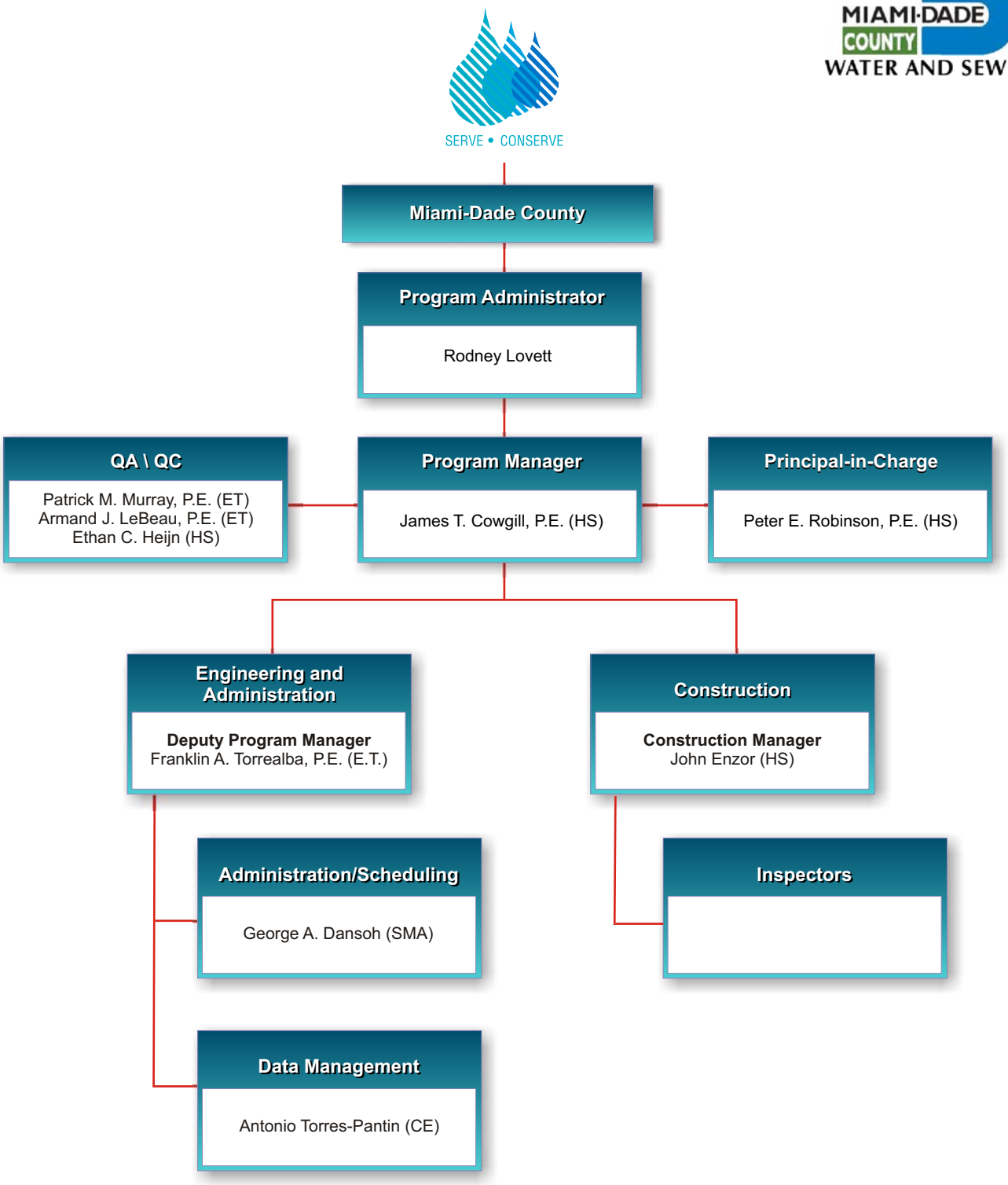
Figure 3-1 shows the organization chart for the Project. Hazen and Sawyer, P.C. was the lead firm responsible for the overall project management including construction management services. Earth Tech Consulting, Inc. provided office management and inspection services, Cordozo Engineering provided database management services, San Martin Associates provided administrative and scheduling services and Civil CADD Engineering, Inc., provided inspection services.

Key employees (Project Manager, Deputy Project Manager, Data Management Specialist) spent one third to one half of their time on the program while other office staff (Administration/Scheduling Manager and two administrative full time staff members) were full time employees. The inspection staff (Construction Manager and Inspectors) spent 100 percent of their time on the Program to supervise the inspection and repair operations. Six inspectors were required for the Project: Two for the lateral investigation work and four for the lateral repair work.

## 3.2 Program Schedule

The program management contract anticipated an expenditure of $2,500,000 over a three year Program period. However, the Consent Decree indirectly required the Program final report be issued by February 2006. Therefore, the Program schedule was initially reduced to a twenty five month period.

The initial schedule anticipated the repairs would be completed by December 2005, and a draft report issued within six weeks. Comments would be received and resolved before the February 2006 date.




HS - Hazen and Sawyer
ET - Earth Tech
SMA - San Martin Associates
CC - Civil - CADD
CE - Cardozo Engineering

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**Figure 3-1**
Comprehensive Lateral Investigation Program
Organization Chart

As the Program progressed it became apparent that additional time would be required and the Program would have to be extended because critical rain events did not occur as anticipated to determine the effectiveness of the repairs. The Department requested a one year time extension on March 2005 and EPA approval for the extension was received on _____. This required that the field work be completed by December 2006 and a draft report issued and comments received and resolved before the February 2007 deadline.

A Program goal of completing the repairs on at least 30 basins by June 2006 was set to allow time for an "after repair" rain event to take place.

## 3.3 Project Office

The Project Control Center was established at the Hazen and Sawyer Coral Gables office at 900 Ponce De Leon Boulevard. The office receptionist provided part time receptionist and secretarial duties and office space for four full time employees was provided. Space was also provided for part-time employees and inspectors who reported to the office as required.

## 3.4 Program Task Assignments

Project staff were assigned to either office or field tasks. The following tasks were assigned to each staff member. Section 4 gives a detailed description of the major tasks.

### 3.4.1 Project Manager

- Overall program responsibility
- Overall coordination of engineering and construction activities
- Coordinate client interface and sub consultant activities
- Provide program overview
- Provide general office administrative management support
- Ensure proper utilization of resources
- Develop, implement and update Program Management Plan including scheduling procedures and analysis, cost controls, administrative reporting and quality control
- Oversee quarterly and yearly cash flow projections
- Oversee reporting to EPA on Consent Decree requirements
- Oversee final program report
- Attend monthly Peak Flow TAC meetings
- Attend weekly construction meetings

### 3.4.2 Deputy PM/Administration /Engineering

- Coordinate the administration/engineering staff
- Review procedures and protocols
- Review and release work issuance reports
- Review Contractors' invoices
- Set up and review document control procedures
- Review basin selection process
- Review databases
- Review hydrographs
- Coordinate Public Outreach Program
- Attend meetings such as Weekly Construction Meeting, Monthly TAC Meeting, etc.
- Review Road Moratorium/Conflict Verifications
- Prepare and review CLIP Monthly Status Report, monthly TAC meeting minutes
- Assist Program Manager with planning, implementing and updating management plan
- Assist Program Manager in monitoring staff productivity and staffing levels
- Prepare specialized reports to assist MDWASD in presentations

### 3.4.3 QA/QC

- Provide QA / QC support
- Provide design, analysis and rehabilitation construction assistance
- Review program reports

### 3.4.4 Administration/Scheduling

- Preparation and update of CLIP Schedule
- Preparation of work order issuances for MWASD's crew and contractor
- Update of database with completed work orders
- Conflict verification of ongoing roadway construction projects by other agencies (FDOT, DERM, FEMA / DORM, CICC, and PWD )
- Update database with outreach program response
- Engineering support (Reports, etc.)
- Clip meetings
  - Attend Monthly TAC meetings, write agenda and minutes
  - Attend CLIP Construction meetings, write agenda and minutes
  - Attend miscellaneous meetings with the client

### 3.4.5 Data Management

- Property Owners database
    - Obtain necessary data to send letters requesting access to perform the inspections on their property
    - Develop necessary reports for the outreach program analysis
    - Keep the Property Owners database updated with new responses received by mail or from the field
- Basins Database
    - Keep the basins database updated
    - Select basins for inspection/repair
- CLIP database
    - Combine data received from Department's database to select the data related to the CLIP program only
    - Review and analysis of TV log database
    - Develop forms to upload data into the database
    - Build queries and reports for the inspection analysis
    - Build queries and reports to follow-up field work
    - Build queries and reports for program costs and analysis
- CLIP meetings
    - Attend Monthly TAC meetings
    - Attend to CLIP Construction meetings
    - Attend miscellaneous meetings with the client
- Hydrographs
    - Select and monitor the most appropriate rain gauge for each basin
    - Select and monitor the most appropriate groundwater level gauge for each basin
    - Collect necessary data to build hydrographs to study the basins selected for the CLIP
    - Update hydrographs monthly:
    - Year-to-data hydrographs
    - 2001-to-date hydrographs
    - Pre/Post mainline repair overlay graphs

### 3.4.6 Document Control/Administration

- Review, track, stamp, copy, file, and distribute all incoming and outgoing documents, including mail, faxes, hand delivered, e-mail, etc.
- Prepare and execute invoices and authorizations
- Download pictures from field and incorporate them into their corresponding Work Order
- Organize Work Order into binders
- Answer phone calls regarding CLIP
- Log all documents relating to engineering and construction activities
- Log in and file all Program videos and photographs
- Retrieve documents as requested
- Provide copies of filed documents as necessary
- Performs work processing tasks
- Coordinate meetings

### 3.4.7 Construction Manager

- Coordinate construction activities
- Review construction group policies and procedures
- Recommend repair calls to engineering
- Coordinate with engineering group assignment of work to contractors
- Review monthly and weekly construction status reports
- Monitor documentation of completed construction work
- Review all contractors' invoices, including pictures, Work Orders, etc.

### 3.4.8 Inspector

- Observe inspection and repair work
- Ensure that all work performed conforms to contract specifications
- Maintain documentation as required by Program policy
- Take and maintain field photographs
- Sign-off on construction work
- Recommend field changes to Construction Manager

# Section 4.0
# Program Tasks

A number of programs were developed in order to administrate the CLIP. The following is a description of some of the major programs.

## 4.1 Basin Selection

The Department operates and maintains approximately 960 sewage pump stations which serve Miami-Dade County, Florida. The purpose of the CLIP was to identify approximately 30 collection basins which exhibited rainfall dependent infiltration/inflow signatures, to identify complete lateral repairs within each basin and to determine the associated cost and effectiveness of the repair Program. The basin selection task consisted of identifying 30 collection basins with excessive RDII which represented a cross-section of the County collection system. The consulting firm of Montgomery Watson Harza performed the basin selection analysis. Appendix B contains the MWH report.

Flow data for the stations were collected for a September 2001 storm event which approximated a 2-year storm event (4.5 inches of rain within 24 hours). The stations were categorized according to stations having RDII signatures, stations with little or no RDII signature and stations with insufficient SCADA data to determine the RDII signature. The data from an October 2001 storm event was also used to classify the stations. Approximately 500 stations were considered RDII stations.

The basins were then ordered according to highest RDII signatures and the high RDII stations were ordered by the size of the collection system. High RDII stations with under 15,000 feet of collection system sewers were selected for the Program in order to reduce Program repair costs. The selection criteria also included terminal basins (non-cascading systems) without other basin flows pumping to the system, and constant speed pump stations discharging to gravity sewers to facilitate flow calculations. The following data were collected for each selected basin:

- RDII Signature
- Night Flow Quantity
- Land Use
- Sewer Line Repair Status
- Last SSES Data
- Sewer Component Materials
- Number of Laterals
- Location in County

- Proximity to Surface Water
- Future Development Potential
- Age of System

Although the Program initially evaluated laterals in 30 basins, a total of 52 basins were selected since some basins may not exhibit RDII signatures after the mainline repairs were completed. Typical basins, along with selective data, are listed on the next page in Table 4.1.

Because of the ongoing I/I Program, the system data was once again evaluated during a _____ storm event. The updated analysis identified _____ stations had excessive RDII. Appendix C lists the results of the analysis.

## 4.2 Basin Evaluation Protocol

Figure 4-1 is a flow chart of the Program procedure for ensuring that mainline sewers and manholes were not contributing to the RDII signature. All collection system repairs were initially completed under the previous I/I program and a RDII signature continued to remain after the mainline repairs were completed. Each basin was then subjected to an additional SSES program to correct any latent mainline defects and the basin manholes were then sealed to reduce system inflow. System flows were then observed during a significant 2 year storm event (4.5 inches in 24 hours) to quantify RDII flows entering the system. The station storm event signature serves as the “before” lateral repair signature. Basins which continued to exhibit storm event signatures were then candidates for the CLIP. These remaining stations had no outstanding mainline repairs and rainwater was not entering the system through the manhole covers.

A lateral inspection contractor was then selected through the competitive bidding process. All laterals in each basin were given a 3 to 5 psi air pressure test. In some instances the air tests were supplemented by hydrostatic tests and/or smoke tests, followed by video inspection. Figure-4-2 shows the lateral pressure test program protocol. Each lateral was first pressure tested from the main sewer to the No. 1 cleanout at the house. Laterals which passed the test were then considered acceptable with no further work required. Laterals which failed the initial full line pressure test were divided into segments and the public side from the street to the property line and the private side from the property line to the house were individually tested. If the public side failed the air test, the line was video televised to locate defects if it was over six feet deep. If it was less than six feet deep, it was not video televised and would automatically be a candidate for the dig and replace technology because of cost considerations. When the private side failed the air test it was then televised and smoke tested to locate the defects. The field data was recorded to notify the private owner of the condition of his lateral. All the field data was then evaluated and public side defect repairs were identified

**Table 4.1**
**CLIP Basin Characteristics**
**December 2000 Rain Event**

| Station | 47 | 50 | 82 | 118 | 162 | 309 | 336 | 371 | 400 | 402 | 450 | 581 | 634 | 763 | 823 | 825 | 851 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Usage | Res | Res | Ind | Res Com | Com | | Res | Res | | | | | | Res | | | |
| Pending Repairs | 11 | 0 | 0 | 15 | 0 | 7 | 0 | 0 | | | 182 | | | 51 | 1 | | 0 |
| GPD1M | 9,679 | 2,213 | 3,971 | | 1,562 | 6,498 | 5,566 | 3,158 | | | 6,333 | | | 8,239 | 1,173 | | 4,380 |
| Length (ft) | 13,650 | Check | 4,900 | 2,720 4,314 | 5,779 | 5,777 | 3,572 | 14,611 | 2,153 | | 14,058 | | | 5,594 | 9,930 | | 10,414 |
| Discharge Gravity | G | G | G | G | FM | G/FM | G | FM* | FM | FM | FM | | | FM | | | |
| End Station | Y | Y | Y | Y | N | | Y | N | | | N | | | Y | | | |
| Location | NCE | SCE | CC | NC | CW | | CN | NNC | | | NC | | | CS | | | |
| Pumps | 2 | 2 | 2 | 2 | 2 | | 2 | 2 | | | | | | 2 | | | |
| Speed | Single | S | S | S | S | | S | S | | | | | | S | | | |
| NAPOT | 5.2 | 1.76 | 2.73 | 2.95 | .5 | | 3.3 | 3.99 | | | 5.67 | | | 3.1 | 1.0 | | 2.5 |
| Dry Flow | 115 | 30 | 10 | | 10 | 25 | 10 | 80 | 7 | | 120 | | 3 | 100 | | | 60 |
| RDII Peak | 350 | 230 | 80 | | 45 | 35 | 30 | 220 | 30 | | 220 | | 20 | 250 | | | 130 |
| PF | 3.04 | 7.66 | 8 | | 4.5 | 1.4 | 3 | 2.25 | 4.3 | | 1.8 | | 6.6 | 2.5 | | | 2.2 |
| Recovery | 1 wk | 2 da | 5 da | | 3 da | | 3 da | 4 da | 4 da | | 2 da | | | 3 da | | | 6 da |
| Age | Old | Old | | | | | | | | | | | | | | | |
| 2nd Pump/ hrs/yr | 39 | 3 | 1 | 8 | .1 | | 13 | 11 | | | | | | <1 | | | 1 |
| Priority | 1 | 2 | 3 | 1 | 2 | 0 | 3 | 0 | 3 | 3 | 0 | 0 | 3 | 1 | 3 | 3 | 1 |
| Well field | N | N | N | N | N | | N | N | | | | | | | | | |
| Elevation | | | | | | | | | | | | | | | | | |
| Tidal | Y | Y | ? | N | N-Canal | | N | | | | | | | N | | | |

**Repump 372*

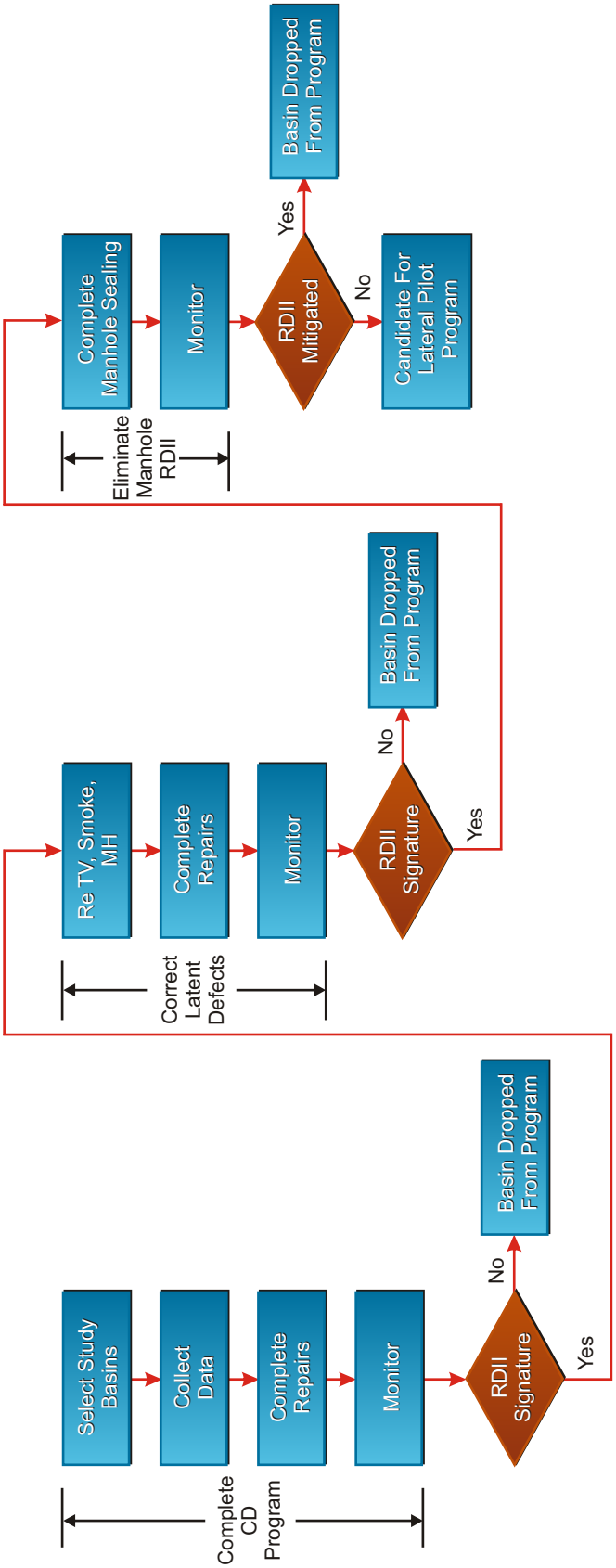


**Figure 4-1**
Basin Preparation Flow Chart

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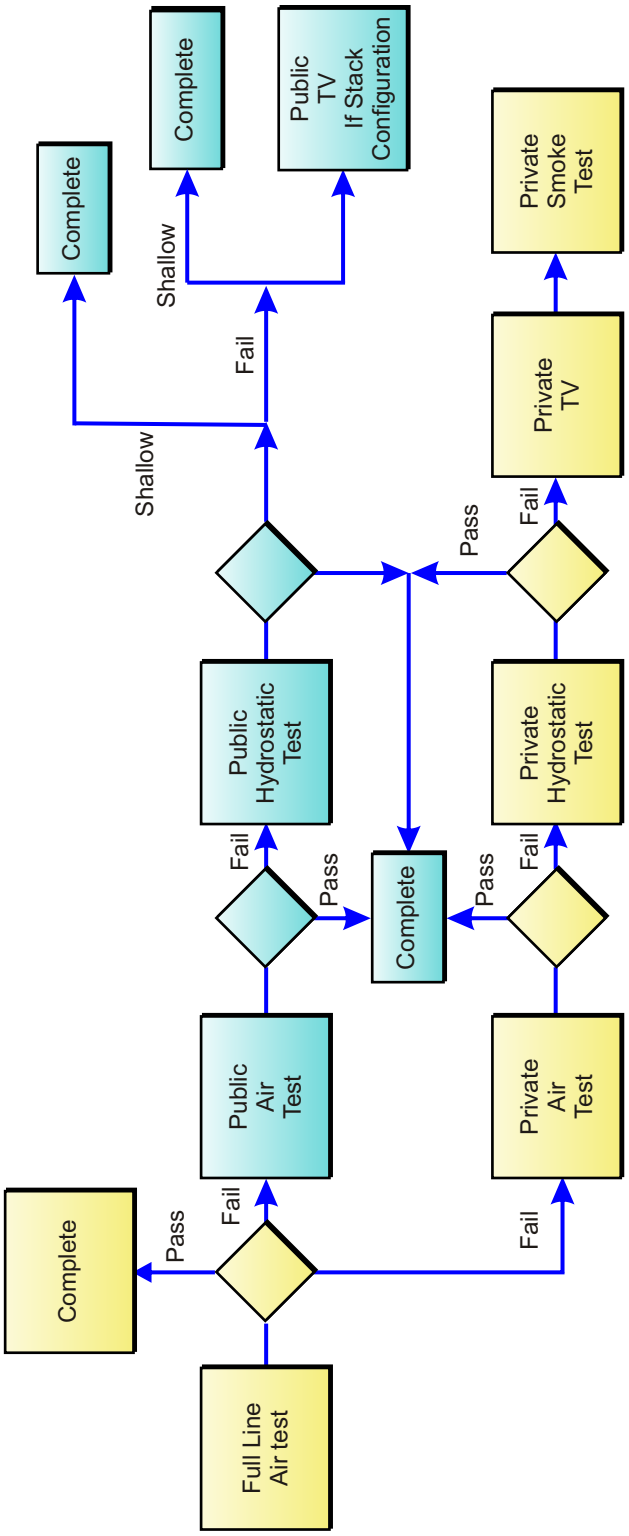


**Figure 4-2**
Lateral Pressure Test Protocol

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and defects located on the private side were referred to DERM for notification of the property owners.

A second RDII signature was then taken and compared to the "before" signature to determine program effectiveness.

### 4.2.1 Inspection Program Results

Each lateral in each basin was located and pressure tested for defects. Table 4.2, on the next page, lists specific data on each of the 52 basins in the CLIP. Under the program, a total of 9,202 laterals were pressure tested. Table 4.3 presents the results of the lateral test program.

**Table 4.3**
**Air Test Program Results**

| | Public | | | Private | | | |
|---|---|---|---|---|---|---|---|
| **Total Sewer Lines Tested: 9,202** | **Pass** | **Fail** | **CND** | **Pass** | **Fail** | **CND** | **N/A** |
| Number: | | | | | | | |
| Percentage: | | | | | | | |

On the public side of the lateral, 55 percent of the laterals passed the pressure test, 41 percent failed and 4 percent of the laterals could not be accessed (CND). On the private side, 38 percent of the laterals passed the pressure test, 21 percent failed and 33 percent could not be accessed (CND). An additional 8 percent could not be accessed because the customer denied access.

**Table 4.2**
**Basin Characteristics (52 Basins)**

| Basin | Footage | Location | City of Miami | District | Wetwell Field Protection Area | Age | Main Line Material | No of Laterals | No of Stacks | Zoning | Peak Flow Factor 2001 | RDII Signa-ture | Comments Selection Report |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | 4,367 | NW | Yes | 3 | No | 1954 | | 98 | 2 | Commercial | 1.4 | No | |
| 47 | 13,648 | NW | Yes | 3 | No | | | 453 | 193 | Single Family / Multi-Family / Commercial | | No | |
| 58 | 4,767 | CE | No | 3 | No | 1946 | | 95 | 5 | Single Family | 2.4 | No | Tidal Influ-ence |
| 70 | 507 | CW | Yes | 5 | No | | | 16 | 3 | Multi-Family / Commercial | 6 | No | |
| 80 | 20,414 | CW | Yes | 5 | No | | | 379 | 184 | Multi-Family / Government | 3 | No | |
| 82 | 4,906 | CW | Yes | 5 | No | | | 194 | 58 | Single Family / Multi-Family | 7.5 | No | |
| 118 | 4,314 | NW | No | 12 | No | 1972 | | 33 | 4 | Commercial | 1.8 | No | |
| 126 | 1,895 | CW | No | 12 | No | 1986 | | 23 | 4 | Multi-Family / Commercial | 2.7 | No | Sweetwater Area |
| 154 | 3,583 | CW | No | 12 | No | 1981 | | 28 | 4 | Commercial | 2.8 | No | |
| 162 | 5,779 | CW | No | 12 | No | 1995 | | 41 | 1 | Commercial | 6.4 | No | |
| 194 | 10,570 | NW | No | 12 | Yes | 1963 | | 59 | 27 | Commercial | 8.6 | No | |
| 195 | 8,650 | NW | No | 12 | Yes | 1968 | | 61 | 5 | Commercial | 2.4 | No | |
| 336 | 3,572 | NW | No | 13 | No | 1983 | | 26 | 0 | Commercial | 11.7 | No | |
| 350 | 19,167 | NW | No | 1 | No | 1979 | | 535 | 60 | Single Family / Multi-Family | 27 | No | |
| 355 | 16,101 | NW | No | 13 | No | 1960 | | 249 | 27 | Single Family | 4.9 | No | |
| 358 | 1,614 | NW | No | 1 | No | 1957 | | 67 | 1 | Single Family | 7.3 | No | On edge of canal |

**Table 4.2**
**Basin Characteristics (52 Basins)**

| Basin | Footage | Location | City of Miami | District | Wetwell Field Protection Area | Age | Main Line Material | No of Laterals | No of Stacks | Zoning | Peak Flow Factor 2001 | RDII Signa-ture | Comments Selection Report |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 364 | 16,101 | NW | No | 1 | No | 1971 | | 357 | 32 | Single Family | 3.6 | No | |
| 378 | 13,317 | NW | No | 1 | No | 1955 | | 237 | 32 | Single Family | 3.4 | No | |
| 380 | 8,453 | NW | No | 13 | No | 1968 | | 192 | 5 | Single Family | 4 | No | |
| 405 | 1,354 | NW | No | 13 | No | 1967 | | 21 | 2 | Multi-Family | 2.7 | No | |
| 410 | 8,907 | NW | No | 13 | No | 1980 | | 109 | 11 | Single Family / Multi-Family | 6.3 | No | |
| 479 | 19,025 | NW | No | 13 | No | 1991 | | 445 | 22 | Multi-Family | 3.5 | No | |
| 484 | 37,685 | NW | No | 13 | No | | | 915 | 29 | | | No | |
| 509 | 10,595 | CW | No | 10 | Yes | 1989 | | 223 | 21 | Multi-Family | 3.5 | No | |
| 524 | 8,562 | CW | No | 10 | Yes | 1983 | | 120 | 6 | Single Family / Multi-Family / Commercial | 2.9 | No | |
| 525 | 20,488 | CW | No | 10 | Yes | | | 628 | 1 | | | No | |
| 564 | 7,143 | SW | No | 9 | No | 1987 | | 183 | 98 | Single Family | 5.4 | No | On edge of canal |
| 577 | 8,159 | SE | No | 8 | No | 1989 | | 280 | 26 | Multi-Family | 3.1 | No | |
| 603 | 12,482 | SE | No | 8 | No | 1970 | | 56 | 27 | Commercial | 2.7 | No | |
| 608 | 4,603 | SW | No | 9 | No | 1970 | | 91 | 14 | Single Family / Multi-Family / Commercial | 5.8 | No | |
| 615 | 11,273 | CW | No | 10 | Yes | 1956 | | 281 | 145 | Single Family | | No | |
| 681 | 6,750 | SW | No | 9 | No | 1985 | | 41 | 6 | Agricultural | 8.8 | No | |
| 708 | 11,816 | SE | No | 8 | No | 1958 | | 217 | 71 | Single Family | 5.7 | No | |
| 722 | 17,725 | SW | No | 9 | No | 1972 | | 52 | 4 | Single Family | 4 | No | |
| 729 | 5,044 | SW | No | 8 | No | 1970 | | 71 | 37 | Single Family | 6.2 | No | |

**Table 4.2**
**Basin Characteristics (52 Basins)**

| Basin | Footage | Location | City of Miami | District | Wetwell Field Protection Area | Age | Main Line Material | No of Laterals | No of Stacks | Zoning | Peak Flow Factor 2001 | RDII Signa-ture | Comments Selection Report |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 753 | 7,175 | CW | No | 10 | Yes | 1963 | | 111 | 48 | Single Family | 4.8 | No | |
| 763 | 5,594 | CW | No | 7 | Yes | 1972 | | 61 | 5 | Multi-Family | 1.66 | No | |
| 790 | 1,554 | CW | No | 7 | No | 1961 | | 12 | 1 | Commercial | 4.8 | No | |
| 802 | 5,335 | CW | No | 8 | Yes | 1961 | | 118 | 7 | Multi-Family | 5.9 | No | |
| 803 | 15,300 | CW | No | 8 | No | 1960 | | 411 | 117 | Single Family / Multi-Family / Commercial | 2.6 | No | |
| 813 | 1,579 | CW | No | 10 | No | 1958 | | 12 | 7 | Single Family | 5.4 | No | |
| 823 | 9,930 | CW | No | 8 | Yes | 1968 | | 154 | 22 | Single Family | 3.4 | No | |
| 828 | 4,665 | CW | No | 8 | Yes | 1978 | | 80 | 77 | Single Family | 3.1 | No | |
| 829 | 1,527 | CW | No | 8 | Yes | 1968 | | 44 | 1 | Multi-Family | 3.4 | No | |
| 851 | 10,414 | CW | No | 10 | Yes | 1977 | | 258 | 19 | Multi-Family | 1.8 | No | |
| 880 | 14,253 | CW | No | 8 | Yes | 1978 | | 270 | 53 | Single Family | 2.7 | No | Between a canal and lake |
| 885 | 6,581 | CW | No | 8 | Yes | 1979 | | 101 | 18 | Single Family | 2.7 | No | |
| 1004 | 10,340 | SE | No | 8 | Yes | 1953 | | 224 | 39 | Single Family / Multi-Family | | No | |
| 1031 | 4,725 | SW | No | 9 | No | 1989 | | 106 | 41 | Single Family | 9.2 | No | |
| 1032 | 8,075 | SE | No | 9 | No | 1989 | | 193 | 48 | Single Family | 3 | No | |
| 1033 | 9,594 | SE | No | 8 | No | 1990 | | 304 | 43 | Single Family | 3.3 | No | |
| 1063 | 10,594 | SE | No | 8 | No | 1972 | | 155 | 36 | Single Family | 4 | No | |

## 4.3 Lateral Repairs

Lateral repairs were identified by basin and grouped by repair type. If possible, they were grouped by location to reduce contractor travel time. Repairs were not issued for basins until they had a qualifying rain signature and the Road Moratorium List was checked to schedule lateral repairs before other road work.

### 4.3.1 Repair Identification

The following procedures for specifying lateral defect repairs were based on the selection of the least expensive repair technology which will affect the repair. The specified repair was based on unit price bids for the various repair technologies and the least expensive repair option was recommended.

The following steps are required before a repair call could be made:

1. Identify failed lateral
2. Review TV, if available
3. Determine mainline material
4. Determine lateral depth
5. Note restoration conditions
6. Identify pipe geometry
7. Determine stack condition

The purpose of each of these tasks is described below:

1. Lateral Identification

   The failed laterals were identified and all related field data was available for review.

2. TV Review

   If video was available it was reviewed along with the TV logs. The TV review identified the type of defects and their location. This provided information to allow the repair calls to be made.

3. Mainline Material

   Most of the mainline sewers were either clay or PVC. However, some of the clay sewers were previously lined under the I/I Program. Lined sewers required special connections when the excavated point repair or dig and replace repairs

were made. Mainline sewers with cured-in-place (CIP) liners require the use of CIP saddle adapters while sewers with U-Liners installed require fused on saddles.

4. Lateral Depth

   The lateral depth could determine the repair call. Laterals with connections up to six feet deep were considered shallow laterals and their repairs were usually completed with the excavated point repair or dig and replace technologies. It was usually most economical to use liner repair methods on deeper laterals with connections below six feet in depth.

5. Restoration Conditions

   The cost of restoring the ground surface above excavations was factored into the repair call analysis. Often it was less expensive to use lining technologies when extensive restoration was required.

6. Piping Geometry

   Some laterals had unique non-standard configurations with bends or fittings which would not accommodate lining technologies. These laterals required excavated point repair or dig and replace technologies.

7. Stack Condition

   Some lateral configurations had stacks at the mainline sewer to provide connections for the laterals. Stack repairs could involve dig and replace or lining repair technologies.

Only laterals which failed the pressure test were considered defective and required repair. Bid prices from repair Contractors were used to determine the repair priorities. The lowest cost repair technology was used to repair defects. The following lateral component repairs were performed under the Program:

- Lateral Point Repairs
- Lateral Connection Repairs
- Full Line Repairs
- Full Line with Crushed Section Repairs
- Stack Repairs

Each of these component repairs are described below:

1. Lateral Point Repairs – Required when the lateral and lateral connection is good but a portion (less than 10 foot length) of the lateral requires repair.

2. Lateral Connection Repair – Required when the lateral is in good condition but the connection to the mainline sewer is defective.

3. Full Lateral Repair – Required when the entire lateral is defective. Full lateral replacement also requires the replacement of the mainline sewer connection.

4. Full Lateral with Crushed Segment Repair – Required when the lateral is deteriorated and a portion of it was crushed. Specified repairs could include the dig and replacement technology and/or liner repairs.

5. Stack Repair – Required when the stack was defective. May be performed in conjunction with other liner system repairs. May require an excavated point repair or liner repair technology.

Unit price bids were obtained through the competitive bid process for the point repair, dig and replace and cured-in-place liner technologies. These technologies were specified under the following conditions:

- Excavated Point Repairs and Full Service Lateral Replacement – Used when trenchless technologies are inappropriate – for collapsed pipe, severe offset joints, dropped pipe and medium to heavy root intrusion. The excavated point repair replaces up to 10 feet of pipe and was sometimes used in conjunction with a liner. The full service lateral replacement included the Y connection and pipe up to Cleanout No. 2 at the property line. This repair was used for over 90 percent of the repairs since defective laterals less than six feet deep were replaced.

- Cured-in-Place Liners – Used for structural damage where excavated point repair or full lateral replacement exceeded liner costs. Depending on the location, amount and severity of breaks or defects, three types of liners were used: 1) Standard CIP liner, 2) Standard CIP liner with mainline connection, and 3) Standard CIP liner with mainline connection and full circle mainline sectional.

- Cured-in-Place Mainline/Lateral Repair System – Same as the CIP liner system except the mainline/lateral liner is a one piece installation and not a three component repair (CIP liner, mainline connection and mainline sectional). This repair technology

cally a monolithic liner with a mainline connection to a full circle mainline sectional. It was used for structural damage where excavated point repair, full lateral replacement or cured-in-place liner component costs exceeded the liner system costs.

### 4.3.2 Repair Protocol Matrix

Table 4.4 lists all possible Program repair call-outs for the various lateral conditions. It indicates the repair type or lateral component requiring repair and the recommended repair for the various lateral conditions. Lateral conditions include the location and extent of the defect, the depth of the repair and the amount of surface restoration required.

In general, shallow laterals were repaired by the excavated point repair or dig and replace technologies as this was the most cost effective solution. Liner technologies were used if the excavated repair plus the restoration cost exceeded the liner technology cost. Liner technologies were specified for deeper laterals where the liner cost was less then the total dig and replacement costs.

Field personnel provided constant feed back to the office personnel and the protocol matrix was modified as required.

**Table 4.4**
**Lateral Repair Protocol Matrix**

| Repair Type | Shallow (<6') | | Deep (>6') | |
|---|---|---|---|---|
| | **Standard Restoration** | **Extensive Restoration** | **Standard Restoration** | **Extensive Restoration** |
| Lateral Point Repair:<br>• Connection good<br>• Lateral good but portion (<10') need repair | Point Repair | Point Report or Standard CIP Liner if lower cost | Standard CIP Liner | Standard CIP Liner |
| Lateral Connection Repair:<br>• Lateral good<br>• Connection to main sewer needs repair<br>• Roots at connection only | Lateral Connection Point Repair:<br>• Clay/PVC: Replace with sleeves<br>• CIP mainline: CIP saddle adapter<br>• U-Liner: Fused on saddle | Lateral Connection Point Repair:<br>• Clay/PVC mainline: Replace with sleeves or top hat if lower cost<br>• CIP mainline: CIP saddle adapter<br>• U-Liner mainline: Fused on saddle | Lateral Connection Point Repair:<br>• Clay/PVC mainline: Top hat (no major roots)<br>• CIP mainline: CIP saddle adapter<br>• U-Liner mainline: Fused on saddle | Lateral Connection Point Repair:<br>• Clay/PVC mainline: Top hat (no major roots)<br>• CIP mainline: CIP saddle adapter<br>• U-Liner mainline: Fused on saddle |
| Full Line Deterioration:<br>• Fully deteriorated lateral<br>• Roots throughout lateral | Dig and Replace Including Connection (see above) | Dig and Replace Including Connection (see above) or Top Hat and liner (no major roots) or T-Liner (no major roots) Depending on lower cost | Top Hat and Liner (no major roots) or T-Liner (no major roots) if lower cost Dig and replace if major roots | Top Hat and Liner (no major roots) or T-Liner (no major roots) if lower cost Dig and replace if major roots |
| Full Line Deteriorated with Crushed Section:<br>• Lateral deteriorated but section crushed | Dig and Replace Including Connection (see above) | Dig and Replace Including Connection (see above) | Dig and Replace Including Connection (see above) or Pont Repair and CIP liner (no major roots) if lower cost | Dig and Replace Including Connection (see above) or Pont Repair and CIP liner (no major roots) if lower cost |
| Deteriorated Stack | Point Repair | Point Repair or CIP liner or T-Liner Depending on lower cost | Point Repair or CIP liner or T-Liner Depending on lower cost | Point Repair or CIP liner or T-Liner Depending on lower cost |
| Lateral configuration not conducive to lining | Dig and Replace | Dig and Replace | Dig and Replace | Dig and Replace |

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### 4.3.3 Implementation

CLIP office staff made the repair calls based on the condition of the lateral and the repair identified in the matrix. If a repair call was made which was contrary to that specified in the matrix, the specified repair was reviewed with the Program Manager and the reason for the modifications documented. Any deviations were also approved by the Department Project Manager in writing. When TV was not available on shallow lines without extensive restoration or no defects were indicated on the video, dig and replace call-outs were made since this was the most cost effective repair technology. If no defects were indicated on deep lines, these lines were deferred to Department forces for further investigations. Replacement technologies were specified for sewer lines with medium or extensive roots present since this was the most cost effective repair technology.

## 4.4 Public Outreach Program

The Public Outreach Program consisted of four sub programs which interfaced with the public. These were the:

1. Door Hanger Program
2. Private Lateral Test Approval Program
3. Defect Notification Program
4. Public Information Program

Each of the tasks are described below:

### 4.4.1 Door Hanger Program

Door hangers were made to notify the public of future field activities in their neighborhood. The purpose of the hangers was to notify the customers of the work to be performed in the field, to provide a contact number, and to provide instructions for the curtailment of sewer usage activities. Department forces and contractors working in the area were required to deliver the hangers 24 hours before the start of field activities. Figure 4-3 is an example of the door hanger distributed for the inspection and repair activities.

### 4.4.2 Private Lateral Test Approval Program

Sewer laterals consist of the “public” portion which runs from the mainline sewer in the street to the property line and the “private” portion which runs from the property line to the structure being served. Department forces are responsible for maintaining the public portion of the sewer and the property owner is responsible for the private portion of the sewer. Since RDII flows could originate from both portions of the lateral, the Department desired to pressure test both sewer sections under the CLIP.

MIAMI-DADE COUNTY

**MIAMI-DADE COUNTY**
**WATER AND SEWER DEPARTMENT**

# LATERAL INSPECTIONS

The Miami-Dade Water and Sewer Department (MDWASD) and/or its representatives will be performing maintenance inspections on the sewer laterals in your neighborhood.

The work could involve minor excavation in the public right-of-way area and in front of your house to gain access to inspect the sewer lateral for defects.

If you have previously consented (signed and returned the letter sent to property owners) to allow MDWASD to inspect the sewer lateral on your private property, please be aware that your home or property may be affected. The inspection work will be done at no cost to the homeowner and your property will be restored to original condition.

We will contact you and ask you to curtail household discharges to the sewer (showers, toilet flushing, sink, etc) when the testing takes place.

Thank you for your cooperation. If you have any questions, please call Ms. Charo Muñoz at (305) 443-4001.

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**Figure 4-3**
Door Hanger Example

It was determined by the County Attorney's Office that the Department must obtain written approval from each sewer customer in order to inspect the private side of the sewer owned by the property owner. Letters addressed to each individual property owner were required in order to request written approval for the private lateral testing.

## Customer Letters

In order to begin identifying the individual property owners it was first necessary to purchase temporary access to an online IRIS database that identified the property information. This service is updated regularly and allows the user to download multiple properties using their graphic interface. The team also used the basin (GIS) maps generated from information provided by the Department. The combination of the IRIS interface and the basin maps, allowed the applicable property data to be identified and downloaded.

A quality control process was also implemented to guarantee that all the properties were identified. To accomplish this goal, the CLIP team relied on the Miami-Dade County Property Appraiser's website. This portal, known as "My Home", uses GIS application to provide Real Property information on individual parcels of land. The website allowed the verification of properties within each basin boundary.

The property data was collected and stored in an MS Access database, called "Property Owners Database". The database provided the necessary tool to issue the letters, and to keep track of the communication needed to monitor the program. A total of 9,202 property owners were identified for the 52 CLIP basins.

A form letter was developed to describe the CLIP and request the property owner's permission to test their private lateral. The letters were written in English, Spanish, and Creole. Figure 4-4 is a typical letter. The letters were mailed out according to the established basin inspection priority sequence. The first 9,202 letters were mailed out by November 2004. An additional 4,393 follow-up letters (typical letter in Figure 4-5**,** were sent to property owners who did not respond to the initial letter. These letters were sent in early February 2005. Figure 4-6 is a typical mailing status report.

## Public Response

Table 4.5 shows the results of the Public Outreach Program. A total of 9,202 letters were mailed to customers requesting access to their laterals. A total of 4,809 of the customers responded with 4,759 or 52 percent allowing access and 50 or 0.5 percent of the customers denying access. The remaining 4,393 customers did not respond to the request. A total of 4,393 follow-up letters were mailed with 1,626 or 36 percent response. Once again, 2,767 customers did not respond to the follow-up letter.

SERVE - CONSERVE

MIAMI-DADE WATER AND SEWER DEPARTMENT
P.O. Box 330316, Miami, Florida 33233-0316 • 3071 S.W. 38th Avenue • Tel: 305-665-7471

August 31, 2004

City of Miami
Dept. Of P&D Asset Management Division
444 SW 2nd Ave Ste 325
Miami, FL 33130-1914

Dear Property Owner(s):

In an effort to prevent groundwater from entering into the Miami-Dade Water and Sewer Department's (Department) sewer system and reduce sewer overflows, the Department is implementing a Sewer Lateral Pilot Test Program, as mandated by the Environmental Protection Agency (EPA). This program will require inspection of both the County-owned and privately-owned sewer laterals that serve individual properties throughout the system. It will be necessary to repair the sewer laterals that are found to be defective. Repairs to the sewer laterals in the public right-of-way will be the responsibility of the County while customers will be responsible for repairs on their private property.

The work includes gaining access to the sewer lateral to perform various tests to check for leaks. The tests will be performed on all sewer laterals in the public right-of-way. With your approval, the Department or its representatives will also perform tests on the sewer lateral on your property at no cost to you. In the event that you do not allow the Department access to your property, you may be asked to inspect the line at your own expense as required by Chapter 24 of the Code of Miami-Dade County, Florida.

Your signature below is required in order for representatives to gain access to your property to inspect the sewer lateral. Please designate your response below and return this signed form to us in the enclosed envelope.

Should you have any questions, please call Mr. David Sayers at (305) 625-4101.

Sincerely,

John W. Chorlog, Jr., P.E.
Deputy Director - Operations
Miami-Dade Water and Sewer Department

*Please complete below by checking only one of the two boxes shown:*

I agree to allow access to my property (Folio #0131120130290) and sewer lateral.
I do not agree to allow access to my property (Folio #0131120130290) and sewer lateral.

_____
(Signature of Property Owner)

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**Figure 4-4**
Owner Request Letter

SERVE - CONSERVE

MIAMI-DADE WATER AND SEWER DEPARTMENT
P.O. Box 330316, Miami, Florida 33233-0316 • 3071 S.W. 38th Avenue • Tel: 305-665-7471

January 28, 2005

Subject: Second Notice for Participation in Program

Dear Property Owner(s):

We previously sent you a letter requesting your participation in our Sewer Lateral Pilot Test Program mandated by the Environmental Protection Agency (EPA). To date, we have not received your response.

Please review the attached letter, check one box indicating either 1) if you agree to allow access to your property or 2) if you do not agree to allow access to your property, and sign and return the letter in the enclosed pre-paid postage envelope.

Should you have any questions, please call Mr. David Sayers at (305) 625-4101.

Sincerely,

John W. Chorlog, Jr., P.E.
Deputy Director - Operations
Miami-Dade Water and Sewer Department

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**Figure 4-5**
Follow-up Owner Request Letter

Miami-Dade Water and Sewer Department

**COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)**
**MAILING STATUS REPORT**

| BATCH | BASINS | LANGUAGE | HS/ET SENT TO MDWASD | | MDWASD SENT LETTERS OUT | |
|---|---|---|---|---|---|---|
| | | | QUANT. | DATE | QUANT. | DATE |
| 1 | 35,154, 195(1), 336, 358, 524(1), 681, 885 | English | 279 | 12-Aug-04 | 279 | 16-Aug-04 |
| 1a | 154, 195(1), 336, 358, 524(1), 681, 885 | English/Spanish | 264 | 14-Sep-04 | 264 | 23-Sep-04 |
| 1b | 35 | English/Creole | 15 | 17-Sep-04 | 15 | 23-Sep-04 |
| 2 | 47 | English/Creole | 156 | 17-Sep-04 | 156 | 23-Sep-04 |
| 3 | 80, 195(2), 364, 524(2), 880 | English/Spanish | 1,200 | 2-Sep-04 | 1,200 | 10-Sep-04 |
| 4 | 378 | English/Spanish | 649 | 8-Sep-04 | 649 | 10-Sep-04 |
| 5 | 410 | English/Spanish | 148 | 9-Sep-04 | 148 | 23-Sep-04 |
| 6 | 479, 509, 525, 603, 615, 708, 722, 729, 753, 802, 803, 813, 823 | English/Spanish | 1,343 | 17-Sep-04 | 1,343 | 23-Sep-04 |
| 7 | 828, 851, 1004, 1031, 1032, 1033, 1063 | English/Spanish | 937 | 21-Sep-04 | 937 | 4-Oct-04 |
| 8 | 194, 608, 350, 380 | English/Spanish | 459 | 21-Sep-04 | 459 | 4-Oct-04 |
| 9(3) | 58, 70, 80, 82, 118, 126, 154, 162, 378, 479, 509, 525, 577, 603, 608, 615, 763, 802, 803, 813, 828, 829, 851, 1031 | English/Spanish | 2,284 | 23-Sep-04 | 2,284 | 4-Oct-04 |
| 10(3) | 35,47 | English/Creole | 123 | 28-Sep-04 | 123 | 4-Oct-04 |
| 11(3) | 350,803 and 790 | English/Spanish | 369 | 28-Sep-04 | 369 | 4-Oct-04 |
| 12 | 484 | English/Spanish | 346 | 12-Oct-04 | 346 | 22-Oct-04 |
| 13 | 484 | English/Spanish | 599 | 14-Oct-04 | 599 | 22-Oct-04 |
| 14 | 350, 405, 509, 763, 829, 851 | English/Spanish | 102 | 14-Oct-04 | 102 | 22-Oct-04 |
| 15 | 35, 58, 126, 763, 813 | English/Spanish | 10 | 15-Oct-04 | 10 | 8-Nov-04 |
| 16 | 564 | English/Spanish | 198 | 2-Nov-04 | 198 | 8-Nov-04 |
| 17 | 80, 355, 364, 410, 524 | English/Spanish | 7 | 3-Nov-04 | *7* | *8-Nov-04* |
| 18 | 47 | English/Creole | 4 | 4-Nov-04 | *4* | *8-Nov-04* |
| **SECOND NOTIFICATIONS** | | | | | | |
| 100 | 1004, 1031, 1033, 1063 | English/Spanish | 304 | 21-Jan-05 | 304 | 25-Jan-05 |
| 101 | 564, 608, 851 | English/Spanish | 234 | 21-Jan-05 | 234 | 25-Jan-05 |
| 102 | 70, 82, 118, 162, 194, 195, 336, 355 | English/Spanish | 357 | 28-Jan-05 | 357 | 1-Feb-05 |
| 103 | 358, 364, 378 | English/Spanish | 336 | 1-Feb-05 | 336 | 4-Feb-05 |
| 104 | 380, 410, 525 | English/Spanish | 423 | 1-Feb-05 | 423 | 4-Feb-05 |
| 105 | 484 | English/Spanish | 478 | 1-Feb-05 | 478 | 4-Feb-05 |
| 106 | 603, 615, 681, 708, 722 | English/Spanish | 301 | 3-Feb-05 | 301 | 8-Feb-05 |
| 107 | 753, 802, 823, 729 | English/Spanish | 223 | 9-Feb-05 | 223 | 25-Feb-05 |
| 108 | 880, 885, 1004, 1032 | English/Spanish | 232 | 9-Feb-05 | 232 | 25-Feb-05 |
| 109 | 58, 80, 126, 154 | English/Spanish | 447 | 9-Feb-05 | 447 | 25-Feb-05 |
| 110 | 405, 479, 509 | English/Spanish | 329 | 9-Feb-05 | 329 | 25-Feb-05 |
| 111 | 524, 577, 763, 803 | English/Spanish | 362 | 10-Feb-05 | 362 | 15-Feb-05 |
| 112 | 813, 829, 851 | English/Spanish | 117 | 10-Feb-05 | 117 | 15-Feb-05 |
| 113 | 35, 47 | English/Creole | 146 | 10-Feb-05 | 146 | 15-Feb-05 |
| 114 | 350, 405, 509 | English/Spanish | 4 | 5-Apr-05 | 4 | 7-Apr-05 |
| 115 | 47 | English/Creole | 1 | 5-Apr-05 | 1 | 7-Apr-05 |
| 116 | 194, 350, 355, 378, 410, 484, 524, 525, 564, 577, 603, 708, 803, 823, 851, 880, 885, 1033, 1063 | English/Spanish | 34 | 5-Apr-05 | 34 | 7-Apr-05 |
| **TOTAL PROCESSED** | | | **9,202** | | **9,202** | |
| **TOTAL PROPERTIES** | | | **9,202** | | **9,202** | |

| | | | |
|---|---|---|---|
| [1] Single Units | "YES" Responses | 6,302 | 68.49% |
| [2] Multiple Units | "NO" Responses | 230 | 2.50% |
| [3] Additional Addresses from Multiple Units | | | |
| | **TOTAL Responses** | **6,532** | **70.98%** |
| | **PENDING Responses** | 2,670 | 29.02% |
| | **TOTAL** | **9,202** | **100.00%** |

HAZEN AND SAWYER Environmental Engineers & Scientists

EARTH TECH A tyco INTERNATIONAL LTD. COMPANY

EarthTech A Tyco International Ltd. Company

CARDOZO ENGINEERING - CIVIL-CADD - SAN MARTIN ASSOCIATES
In association with

40650-000R0024.cdr

**Figure 4-6**
Typical Mailing Status Report

The Public Outreach Program was very successful with 70 percent of the lateral owners responding and 98 percent of the respondents allowing their laterals to be pressure tested. Only 2 percent of the customers denied the Department access to their lateral.

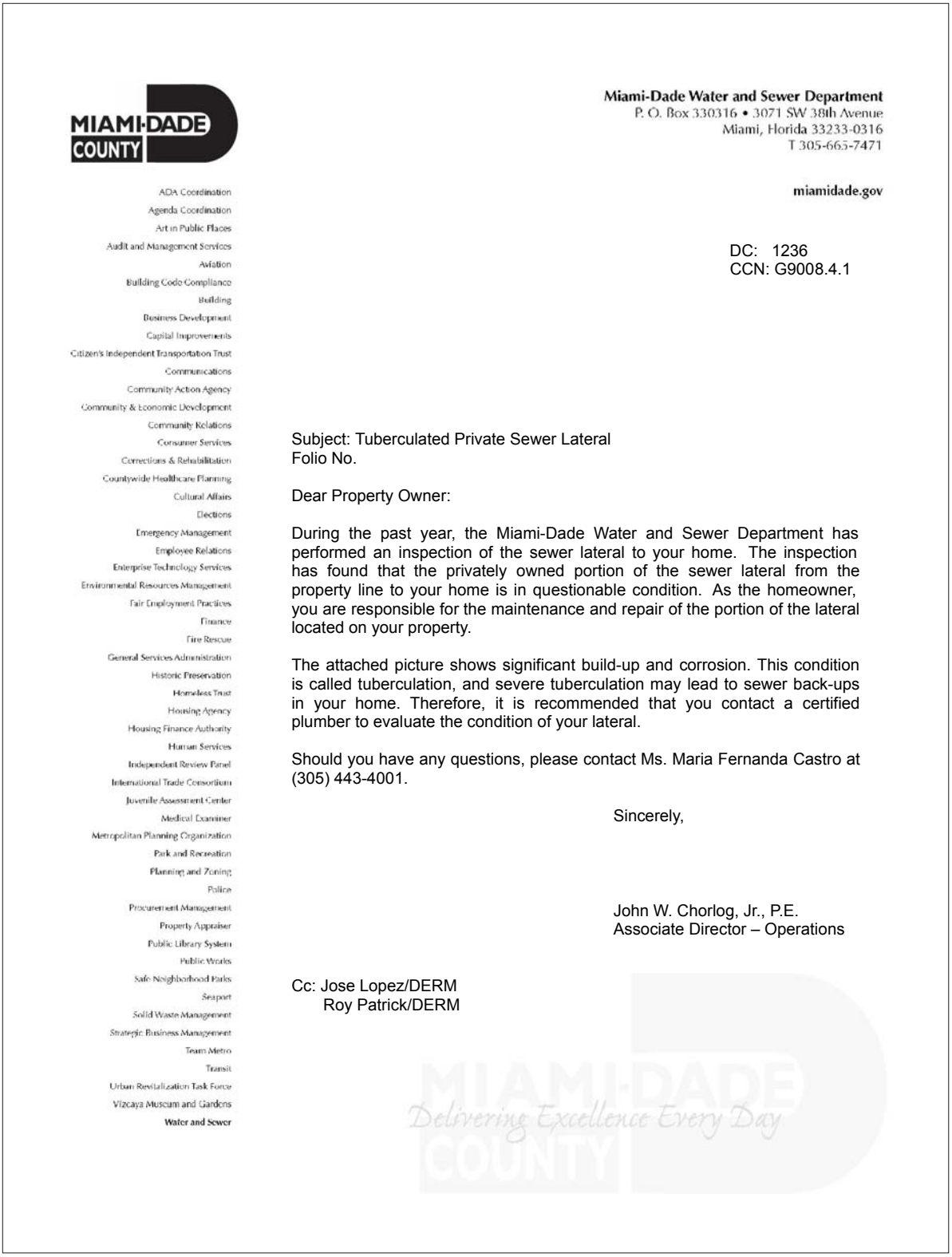
**Table 4.5**
**Public Outreach Program Results**

| Description | Quantity | Percent |
|---|---|---|
| **Initial Letters** | 9,202 | 100.00 |
| "Yes" Responses | 4,759 | 51.72 |
| "No" Responses | 50 | 0.54 |
| Total Responses | 4,809 | 52.26 |
| | | |
| **Follow-Up Letters** | 4,393 | 100.00 |
| "Yes" Responses | 1,542 | 35.10 |
| "No" Responses | 179 | 4.07 |
| Total Responses | 1,721 | 39.18 |
| | | |
| **Outreach Program Results** | | |
| Total Laterals | 9,202 | 100.00 |
| "Yes" Responses | 6,301 | 68.47 |
| "No" Responses | 229 | 2.49 |
| Total Responses | 6,530 | 70.96 |

Field crews were not allowed to test private sewer laterals without written approval. During the field work, however, crews approached the homeowner and received written permission to test an additional 101 laterals. Occasionally the field crews were stopped by the homeowner from testing the private sewer even though they were given written permission. These incidents were small however, and did not substantially affect the Program results.

### 4.4.3 Defect Notification Program

Private laterals which failed the pressure test were televised and smoke tested to confirm the presence of the defect. The homeowner was then notified of the condition of his sewer. Figures 4-7 and 4-8 are copies of the form letters on DERM, the local regulatory agency, letterhead notifying the customers of the status of their lateral.



MIAMI-DADE COUNTY

ADA Coordination
Agenda Coordination
Art in Public Places
Audit and Management Services
Aviation
Building Code Compliance
Building
Business Development
Capital Improvements
Citizen's Independent Transportation Trust
Communications
Community Action Agency
Community & Economic Development
Community Relations
Consumer Services
Corrections & Rehabilitation
Countywide Healthcare Planning
Cultural Affairs
Elections
Emergency Management
Employee Relations
Enterprise Technology Services
Environmental Resources Management
Fair Employment Practices
Finance
Fire Rescue
General Services Administration
Historic Preservation
Homeless Trust
Housing Agency
Housing Finance Authority
Human Services
Independent Review Panel
International Trade Consortium
Juvenile Assessment Center
Medical Examiner
Metropolitan Planning Organization
Park and Recreation
Planning and Zoning
Police
Procurement Management
Property Appraiser
Public Library System
Public Works
Safe Neighborhood Parks
Seaport
Solid Waste Management
Strategic Business Management
Team Metro
Transit
Urban Revitalization Task Force
Vizcaya Museum and Gardens
Water and Sewer

Miami-Dade Water and Sewer Department
P. O. Box 330316 • 3071 SW 38th Avenue
Miami, Florida 33233-0316
T 305-665-7471

miamidade.gov

DC: 1236
CCN: G9008.4.1

Subject: Tuberculated Private Sewer Lateral
Folio No.

Dear Property Owner:

During the past year, the Miami-Dade Water and Sewer Department has performed an inspection of the sewer lateral to your home. The inspection has found that the privately owned portion of the sewer lateral from the property line to your home is in questionable condition. As the homeowner, you are responsible for the maintenance and repair of the portion of the lateral located on your property.

The attached picture shows significant build-up and corrosion. This condition is called tuberculation, and severe tuberculation may lead to sewer back-ups in your home. Therefore, it is recommended that you contact a certified plumber to evaluate the condition of your lateral.

Should you have any questions, please contact Ms. Maria Fernanda Castro at (305) 443-4001.

Sincerely,

John W. Chorlog, Jr., P.E.
Associate Director – Operations

Cc: Jose Lopez/DERM
Roy Patrick/DERM

MIAMI-DADE COUNTY
Delivering Excellence Every Day

40650-000R011.cdr

**Figure 4-7**
Private Lateral Condition Letter
Tuberculated Lateral

MIAMI-DADE COUNTY

ADA Coordination
Agenda Coordination
Art in Public Places
Audit and Management Services
Aviation
Building Code Compliance
Building
Business Development
Capital Improvements
Citizen's Independent Transportation Trust
Communications
Community Action Agency
Community & Economic Development
Community Relations
Consumer Services
Corrections & Rehabilitation
Countywide Healthcare Planning
Cultural Affairs
Elections
Emergency Management
Employee Relations
Enterprise Technology Services
Environmental Resources Management
Fair Employment Practices
Finance
Fire Rescue
General Services Administration
Historic Preservation
Homeless Trust
Housing Agency
Housing Finance Authority
Human Services
Independent Review Panel
International Trade Consortium
Juvenile Assessment Center
Medical Examiner
Metropolitan Planning Organization
Park and Recreation
Planning and Zoning
Police
Procurement Management
Property Appraiser
Public Library System
Public Works
Safe Neighborhood Parks
Seaport
Solid Waste Management
Strategic Business Management
Team Metro
Transit
Urban Revitalization Task Force
Vizcaya Museum and Gardens
**Water and Sewer**

**Miami-Dade Water and Sewer Department**
P. O. Box 330316 • 3071 SW 38th Avenue
Miami, Florida 33233-0316
T 305-665-7471

**miamidade.gov**

DC: 1237
CCN: G9008.4.2

Subject: Failed Private Sewer Lateral Pressure Test
Folio No.

Dear Property Owner:

During the past year, the Miami-Dade Water and Sewer Department has performed an inspection of the sewer lateral to your home. The inspection has found that the privately owned portion of the sewer lateral from the property line to your home is in questionable condition. As the homeowner, you are responsible for the maintenance and repair of the portion of the lateral located on your property.

A pressure test was performed and the private sewer lateral did not pass the test. Please see the attached pressure test results. Therefore, it is highly recommended that you contact a certified plumber to evaluate the condition of your lateral.

Should you have any questions, please contact Ms. Maria Fernanda Castro at (305) 443-4001.

Sincerely,

John W. Chorlog, Jr., P.E.
Associate Director – Operations

Cc: Jose Lopez/DERM
Roy Patrick/DERM



40650-000R012.cdr

**Figure 4-8**
Private Lateral Condition Letter
Non-Tuberculated Lateral

### 4.4.4 Public Information Program

CLIP staff members were available to respond to customer calls during all phases of the Program. The most calls were received during the Private Lateral Test Approval Program. During the program over 800 customer calls were addressed. Table 4.6 (on the next page) is a copy of the call tracking report and Figure 4-9 lists the most common questions asked by the customers.

## 4.5 Conflict Verification Program

The CLIP inspection and repair work may conflict with scheduled or ongoing construction projects by other agencies. The objective of the Conflict Verification Program was to identify other repair work within the CLIP basin areas and to coordinate the CLIP activities with those of the other programs. Often there is a construction moratorium period in areas where previous construction projects have recently paved roads.

Ideally, the CLIP work will be performed before the road work is completed. A request for clearance was received by the Program from various agencies through the Department's Utilities Liaison Division which listed other agency's proposed roadway projects and construction schedules. Each proposed construction project was identified by the CLIP, the boundaries of the individual road projects were identified and plotted on the CLIP Program basin maps and potential conflicts were then identified and highlighted on the maps. The following are the agencies that participated in the conflict verification program:

- Miami Dade Public Works Department
- Florida Department of Transportation
- City of Miami
- FEMA / DORM

Figure 4-10 is a typical Program summary report of other project conflicts.

In order to promote the coordination of the conflict projects with the other agencies, letters were issued by the CLIP staff and sent to each of the agencies with maps showing conflict areas. The letters were updated every two months in order to notify the various agencies of the status of the Program field work.

**Table 4.6**
**Call Tracking Report**

| Index | Date | Persons Taking & (Returning) Phone | | | | | | Total Daily | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | Mary | Carol | Charo | Dave | JoAnn | Helen | | |
| 1 | 9-Sep-04 | 0 | 0 | 0 | 5 | 0 | 0 | **5** | |
| 2 | 10-Sep-04 | 4 | 5 | 0 | 10 | 0 | 0 | **19** | |
| 3 | 13-Sep-04 | 5 | 4 | 5 | 6 | 0 | 0 | **20** | |
| 4 | 14-Sep-04 | 4 | 5 | 8 | 8 | 1 | 0 | **26** | |
| 5 | 15-Sep-04 | 2 | 4 | 4 | 4 | 0 | 1 | **15** | |
| 6 | 16-Sep-04 | 12 | 7 | 7 | 6 | 0 | 0 | **32** | |
| 7 | 17-Sep-04 | 10 | 2 | 10 | 7 | 0 | 0 | **29** | |
| 8 | 20-Sep-04 | 2 | 0 | 5 | 4 | 0 | 0 | **11** | |
| 9 | 21-Sep-04 | 2 | 0 | 2 | 5 | 0 | 0 | **9** | |
| 10 | 22-Sep-04 | 5 | 1 | 1 | 3 | 0 | 0 | **10** | |
| 11 | 23-Sep-04 | 1 | 1 | 1 | 1 | 0 | 0 | **4** | |
| 12 | 24-Sep-04 | 4 | 5 | 5 | 5 | 0 | 0 | **19** | |
| 13 | 27-Sep-04 | 5 | 2 | 7 | 18 | 0 | 0 | **32** | |
| 14 | 28-Sep-04 | 5 | 2 | 3 | 8 | 0 | 0 | **18** | |
| 15 | 29-Sep-04 | 0 | 6 | 13 | 13 | 0 | 0 | **32** | |
| 16 | 30-Sep-04 | 6 | 4 | 23 | 19 | 0 | 0 | **52** | |
| 17 | 1-Oct-04 | 3 | 4 | 6 | 13 | 0 | 0 | **26** | |
| 18 | 4-Oct-04 | 18 | 0 | 6 | 0 | 0 | 0 | **24** | |
| 19 | 5-Oct-04 | 22 | 2 | 10 | 0 | 0 | 0 | **34** | |
| 20 | 6-Oct-04 | 3 | 2 | 5 | 0 | 0 | 0 | **10** | |
| 21 | 7-Oct-04 | 4 | 2 | 2 | 13 | 0 | 0 | **21** | |
| 22 | 8-Oct-04 | 4 | 0 | 4 | 9 | 0 | 0 | **17** | |
| 23 | 11-Oct-04 | 3 | 1 | 2 | 9 | 0 | 0 | **15** | |
| 24 | 12-Oct-04 | 1 | 1 | 0 | 7 | 0 | 0 | **9** | |
| 25 | 13-Oct-04 | 1 | 0 | 1 | 9 | 0 | 1 | **12** | |
| 26 | 14-Oct-04 | 0 | 1 | 0 | 5 | 0 | 0 | **6** | |
| 27 | 15-Oct-04 | 0 | 1 | 0 | 6 | 0 | 0 | **7** | |
| 28 | 18-Oct-04 | 4 | 3 | 3 | 7 | 0 | 0 | **17** | |
| 29 | 19-Oct-04 | 0 | 1 | 0 | 3 | 0 | 0 | **4** | |
| 30 | 20-Oct-04 | 0 | 0 | 1 | 6 | 0 | 0 | **7** | |
| 31 | 21-Oct-04 | 0 | 0 | 6 | 3 | 0 | 0 | **9** | |
| 32 | 22-Oct-04 | 0 | 0 | 3 | 9 | 0 | 0 | **12** | |
| 33 | 25-Oct-04 | 0 | 1 | 2 | 4 | 0 | 0 | **7** | |
| 34 | 26-Oct-04 | 0 | 0 | 0 | 2 | 0 | 0 | **2** | |
| 35 | 27-Oct-04 | 0 | 0 | 1 | 1 | 0 | 0 | **2** | |
| 36 | 28-Oct-04 | 1 | 0 | 1 | 3 | 0 | 0 | **5** | |
| 37 | 29-Oct-04 | 0 | 0 | 0 | 2 | 0 | 0 | **2** | |
| 38 | 1-Nov-04 | 0 | 0 | 0 | 1 | 0 | 0 | **1** | |
| 39 | 2-Nov-04 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | |
| 40 | 3-Nov-04 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | |
| 41 | 4-Nov-04 | 0 | 0 | 3 | 2 | 0 | 0 | **5** | |
| 42 | 5-Nov-04 | 0 | 0 | 0 | 1 | 0 | 0 | **1** | |
| 43 | 8-Nov-04 | 0 | 0 | 1 | 3 | 0 | 0 | **4** | |

**MIAMI-DADE WATER AND SEWER DEPARTMENT**
**Comprehensive Lateral Inspection Program**
**Frequently Asked Questions List as of February 10, 2005**

Q1: Why was **my area** chosen for the pilot test?
A1: Your area is one of the several basins chosen for the pilot test program. The basins were selected based on certain criteria (e.g. age & type of lateral/pipe, zoning and land use, basin size, basin age, basin location, peaking factor, rainfall dependent inflow and infiltration (RDII), among others). All residents and businesses within the selected basins are being contacted.

Q2: What are the **boundaries** of the pilot test area?
A2: There are several pilot test areas, which fall within various WASD management basins. [Yours falls within a basin that was qualified to participate in the pilot test]. There are almost 1000 basins within the MDWASD system, and there are approximately 30 basins selected to participate in the pilot program. These basins are located all over the county, including north, south, central, etc. Every basin is different in size and location.

Q3: A **Smoke Test** was previously done. Why are they testing with **cameras** now?
A3: The smoke test performed might not have provided a clear indication as to the lateral defect and/or location. The camera is just another method to locate and identify a possible lateral defect.

Q4: **When** will the testing begin?
A4: Inspection and Testing has already begun for some drainage basins. However, some inspections may start as late as December 2005. You will be further notified prior to the time actual test. You will be notified 48-hours prior to the day of your test. Notice will be given by door hangers (flyers). A new **Contact Phone Number** will be printed on the hanger (flyer).

Q5: If needed, how **expensive** will the repairs be?
A5: Well, right now, WASD is offering to inspect your sewer laterals at no cost to you**, which is a saving of $250 to $400.** [In the event that you do not allow the Department access to your property, you may be asked to inspect your sewer line at your own expense.] Repair costs will vary, but typical repairs might run approximately $1,000 **[including inspection costs]**. If private repairs are required, it is the sole responsibility of the property owner to secure a licensed plumbing contractor to make the necessary private repairs.

Q6: How can I review **Chapter 24 of the Miami-Dade County Code**?
A6: Miami Dade County Chapter 24 may be accessed at http://www.miamidade.gov/derm/code_ordinances_ch24.asp. Specifically, Section 24-13.1 - "Sanitary Sewer System Collection and Transmission Systems"

Q7: If I have a **septic system** should I still send in a response?
A7: Yes. Please include why you indicate "no access allowed" by writing in: "SEPTIC TANK/SYSTEM."

Q8: Why do you need "access" to my property to do this inspection?
A8: Access to your property is needed to isolate your lateral from the public system for inspection and testing to ensure compliance. This pilot program is part of an EPA mandated program.

Q9: Will you be digging on my property?
A9: MDWASD will try to locate the existing clean outs (COs) and excavate on the public property. If the COs are not located, as a last resort, we may have to excavate on your property to carry out the pilot testing. However, we will return your property to its original state, or better, at no cost to you.

Q10: How many times will you have to be on the property?
A10: Contractors will need to visit your property no more than three times; first for testing/inspection, second for repairs on the "public system" **ONLY if necessary,** and third, for final inspection of the completed repairs.

Q11: Will Miami-Dade Water and Sewer Department provide contractors [or a list of contractors] to conduct repairs?
A11: No. Miami-Dade Water and Sewer Department will **NOT** provide a list of private contractors. The property-owner will contact, select, retain and pay plumbing contractor(s) to complete repairs to their private lateral if necessary.

Q12: In the event that a defect is found in the sewer lateral on the "private side" how soon would the property owner be required to complete repairs?
A12: Currently, Miami-Dade Water and Sewer Department has not finalized the process of notifying and instructing property-owners regarding private repairs. However, property owners will be allowed a reasonable period (e.g., 3 to 9 months???) to effect repairs by a licensed plumber. **[Still under review do NOT use this response]**

Q13: I have a problem that is ongoing and not necessarily related to the Pilot Test Program, whom should I contact?
A13: Basic Customer Service: 305-665-7488
Complaint Unit:: 786-552-8970

Q14: I received a reminder letter. The reminder insert matches my personal and property information (as shown on the envelope) BUT the response form has someone else's (a) name, (b) address, and (c) folio number. How should I respond?
A14: Obtain their information: (a) Name, (b) Mailing Address, and (c) Folio Number (if available); Obtain the other person's (a) Name, (b) Mailing Address, and (c) Folio Number. Instruct them to "toss" the letter and its contents and expect another in the mail with the correct information.

**Figure 4-9**
Commonly Asked Questions

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MIAMI-DADE COUNTY WATER AND SEWER

**MIAMI-DADE WATER AND SEWER DEPARTMENT**
**COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP )**
**MONTHLY CONFLICT VERIFICATION STATUS REPORT**
**April 5, 2005**

| Category | Basin # | Roadway Address | Department | Description | Moratorium Dates | | Atlas Page | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | Start | End | | |
| | 35 | US 1/Biscayne Blvd. NE 78- 87 St. | FDOT | Flexible Pavemt. Rconst. | | | E9 | Jan. '07 |
| B | 47 | NE 2 Ave, 79 St - 86 St | PW | Newly Paved | Aug 03 | Aug 06 | F9 | **Inspection/Testing Completed (100%)** |
| A | 82 | NW 17 St. and NW 35 Ave | MDWASD | New Force Main | | | J13 | **Inspection/Testing Complete (100%)** |
| C | 118 | NW 60 St, 82 - 79 Ave | Fema/Dorm | Resurfacing | | | P10 | Construction Complete |
| B | 162 | NW 25 St, 87 Ave - 89 Pl | Fema/Dorm | Drainage | | | P12 | Construction Underway |
| B | 162 | NW 25 St, 82 Ave - 68 Ave | PW | Construction of Viaduct | | | P12 | Est. Start Date April '06 |
| B | 162 | Intersection of NW 25 St & 82 Ave | PW | Newly Paved | Feb 03 | Feb 06 | P12 | **Moratorium Expired** |
| B | 162 | NW 30 Ter, NW 82 - 87 Ave | Fema/Dorm | Resurfacing | | | P12 | Est. Start Date July '06 |
| B | 162 | NW 25 St, SR 826 - NW 67 Ave | FDOT | Add Lanes | | | P12 | Est. Start Date July '06 |
| B | 162 | NW 25 St, 87 Ave - SR 826 | FDOT | Add Lanes | | | P12 | Est. Start Date July '06 |
| A | 194 | 7209 NW 66 St | PW | Drainage | | | N10 | **Inspection/Testing Complete (100%)** |
| A | 194 | NW 66 St, 72 - 74 Ave | Fema/Dorm | Resurfacing | | | N10 | **Inspection/Testing Complete (100%)** |
| A | 194 | NW 72 Ave, 58 - 66 St | Fema/Dorm | Drainage | | | N10 | **Inspection/Testing Complete (100%)** |
| A | 195 | NW 68 St, 72 - End of road | Fema/Dorm | Moderate damage | | | N10 | **Inspection/Testing Complete (100%)** |
| A | 195 | NW 72 Ave, 66 - 74 St | Fema/Dorm | Drainage | | | N10 | **Inspection/Testing Complete (100%)** |
| C | 358 | NW 167 - 183 St & NW 37-47 Ave | PW | Newly Paved | Jan 05 | Jan 08 | K3 | **Inspection/Testing Complete (100%)** |
| C | 364 | NW 203 Ter, 42 Ct - 47 Ave | Fema/Dorm | Drainage | | | L1 | **Inspection/Testing Complete (100%)** |
| C | 364 | NW 203 Ter, 43 - 47 Ave | Fema/Dorm | Reconstruction | | | L1 | **Inspection/Testing Complete (100%)** |
| C | 364 | NW 205 St, 43 Ct - 43 Pl | Fema/Dorm | Resurfacing | | | L1 | **Inspection/Testing Complete (100%)** |
| C | 364 | NW 207 Dr, 43 Ct - 47 Ave | Fema/Dorm | Resurfacing | | | L1 | **Inspection/Testing Complete (100%)** |
| C | 364 | NW 47 Ave - End of road | Fema/Dorm | Drainage | | | L1 | **Inspection/Testing Complete (100%)** |
| C | 364 | NW 47 Ave, 183 - 215 St | FDOT | Milling & Resurfacing | | | K1 | FDOT Const. Yr. '07-'08 |
| C | 378 | NW 183 St, 27 - 37 Ave | Fema/Dorm | Drainage | | | J2 | |
| C | 378 | NW 183 St, 34 Ct - 32 Ave | Fema/Dorm | Moderate damage | | | J2 | |
| C | 378 | NW 182 St, 32 Ave - 35 Ct | Fema/Dorm | Drainage | | | J3 | |
| C | 378 | NW 183 St, 27 Ave - 37 Ave | Fema/Dorm | Drainage | | | J3 | |
| C | 378 | NW 167 - 183 St & NW 27-37 Ave | PW | Resurfacing | | | J2 | Pending assignment |
| C | 378 | NW 32 Ave, 167 St - 183 St | Fema/Dorm | Drainage | | | J3 | |
| A | 509 | SW 72 St. SW 117 - 107 Ave. | FDOT | Resurfacing | | | S18 | Const.Year '06-'07 **Insp. Completed** |
| A | 525 | SW 88 - 104 St, & 117 - 127 Ave | PW | Newly Paved | Mar 03 | Mar 06 | T20 | **Moratorium Expired** |
| A | 608 | SW 208 St, 118 Pl - 120 Pl | CICC - PW | Drainage | | | T27 | **Inspection/Testing Complete (100%)** |
| A | 608 | SW 122 Ave, 200 - 210 St | Fema/Dorm | Resurfacing | | | T27 | **Inspection/Testing Complete (100%)** |
| A | 615 | SW 40 - 47 St, & 107 - 112 Ave | PW | Resurfacing | | | S17 | Completed |
| A | 615 | SW 48 St - 56 St, & 112 - 117 Ave | PW | Newly Paved | Jan 05 | Jan 08 | S17 | |
| A | 615 | SW 107 Ct, 40 Ter - 43 Ter | Fema/Dorm | Drainage | | | S17 | Resurfacing |
| A | 615 | SW 107 Pl, 40 Ter - 42 St | Fema/Dorm | | | | S17 | Construction Underway |
| A | 615 | SW 107 Ave, 56 St. - 40 St | FDOT | Resurfacing | | | S18 | FDOT Const. Yr.'07 - '08 |
| A | 615 | SW 108 Ave, 40 St - 43 Ln | Fema/Dorm | Drainage | | | S17 | Construction Complete |
| A | 722 | SW 107 Pl, 166 - 167 Ter | Fema/Dorm | Resurfacing | | | S24 | Arterial |
| A | 729 | SW 136, 92 - 97 Ave | CICC - PW | Sidewalk | | | Q22 | **Inspection/Testing Complete (100%)** |
| A | 753 | SW 29 St, 77Ct - 78 Ct | Fema/Dorm | Drainage | | | P16 | Construction Complete |
| A | 753 | SW 29 Ter, 77Ct - 79 Ave | Fema/Dorm | Drainage | | | P16 | Construction Complete |
| A | 753 | SW 32 St, 82 Ave - 77 Ave | Fema/Dorm | Drainage | | | P16 | **Inspection/Testing Complete (100%)** |
| D | 763 | SW 61 Ct - 79 Ave, 74 St - 98 St | PW | Newly Paved | Nov 03 | Nov 06 | P19 | |
| D | 763 | SW 81 St - 81 Dr, 78 - 80 Ave | CICC - PW | Sidewalk | | | P19 | |
| D | 763 | SW 81 - 86 St, 77 - 87 Ave | CICC - PW | Sidewalk | | | P19 | |
| D | 763 | SW 102 St, 87 Ave - 84 Ct. | CICC - PW | Resurfacing | | | P19 | No contract capacity available |
| D | 763 | SW 82 - 83 St, 79 - 87 Ave | CICC - PW | Sidewalk | | | P19 | Also Drainage in area |
| D | 763 | SW 82 - 87 Ave, 88 St - 84 Ter | CICC - PW | Sidewalk | | | P19 | Arterial |
| D | 763 | SW 87 - 77 Ave, 72 St - 88 St | PW | Resurfacing/QNIP | Apr 05 | Apr 08 | P19 | Scheduled for 1st quarter 2005 |
| D | 790 | SW 61 Ct - 79 Ave, 74 St - 98 St | PW | Newly Paved | Nov 03 | Nov 06 | N19 | |
| A | 802 | SW 88 - 104 St, & 77 - 87 Ave | PW | Resurfacing | | | P20 | On Hold By Commissioner |
| A | 802 | SW 61 Ct - 79 Ave, 74 St - 98 St | PW | Newly Paved | Nov 03 | Nov 06 | P20 | |
| B | 803 | SW 88 - 104 St, & 77 - 87 Ave | PW | Resurfacing | | | P20 | On Hold By Commissioner |
| B | 803 | SW 79 Ave, SW 100 St - 104 St | PW | Newly Paved | Mar 03 | Mar 06 | P20 | |
| B | 803 | SW 79 Ave, SW 101 St - 104 St | CICC - PW | Resurfacing | | | P20 | Construction Complete |
| B | 803 | SW 102 St, 82 - 80 Ave | CICC - PW | Drainage | | | P20 | Construction Complete |
| A | 813 | SW 32 - 24 St, 87 - 92 Ave | CICC - PW | Drainage | | | Q16 | |
| A | 813 | SW 32 - 24 St, 87 - 92 Ave | CICC - PW | Sidewalk | | | Q16 | Construction Complete |
| A | 813 | SW 25 St, 87 - 92 Ave | Fema/Dorm | Drainage | | | Q16 | |
| A | 823 | SW 104 St, 89 - 104 Ave | CICC - PW | Sidewalk | | | R20 | **Inspection/Testing Complete (100%)** |
| D | 829 | Kendall Dr. Mills Dr - SW 102 Ave | FDOT | Milling & Resurfacing | | | R20 | Estimated Start Date August 2006 |
| D | 829 | Kendall Dr. SW 77 - 117 Ave | FDOT | Pedestrian Satety Imp. | | | R21 | FDOT Const. Yr. '05-'07 |
| D | 829 | SW 88 St, 77 - 117 Ave | FDOT | Pedestrian Satety Imp. | | | R20 | Est. Start Date, August '06 |
| A | 880 | 11640 SW 128 Ct | PW | Drainage | | | U21 | Construction Complete |
| B | 1004 | SW 292 St, 157 Ave - 158 Ave | MDWASD | New Force Main | | | X32 | In design, const. in 2009 |
| A | 1031 | SW 187 Ave, 357 - 360 St. | Fema/Dorm | Moderate damage | | | Z36 | **Inspection/Testing Complete (100%)** |
| A | 1063 | SW 184 - 190 St, & 80 - 97 Ave | PW | Newly Paved | April 03 | April 06 | Q26 | **Inspection/Testing Completed** |
| | **Total = 27** | | | | **12** | | | |

**Legend**

| | |
|---|---|
| | New Conflicts |
| | Inspection and Testing Complete or Ongoing |
| A | Ready |
| B | Ready, needs review |
| C | Pending Rain Event |
| D | No Signature, Low Peaking Factor |

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**Figure 4-10**
Typical Monthly Conflict Verification Status Report

## 4.6 Work Force Area Identification Program

Under the Miami-Dade County Workforce Program Ordinance, contractors performing work in certain areas are required to hire a percentage of their workforce from the local area. The CLIP work was unique since the inspection and repair work was countywide and not concentrated in a specific area. In order to implement the program, the various basin repairs had to be identified according to specific work force areas highlighted by the County program.

Table 4.7 is a listing of each Commission District associated with the CLIP work areas. This list was to be used to confirm that the ordinance was complied with during the construction phase of the Program.

**Table 4.7**
**Work Force Areas**

| Basin | Commission District | Basin | Commission District |
|---|---|---|---|
| 35 | 3 | 564 | 9 |
| 47 | 3 | 564 | 10 |
| 58 | 3 | 577 | 8 |
| 70 | 7 | 603 | 8 |
| 80 | 7 | 608 | 9 |
| 82 | 7 | 615 | 10 |
| 118 | 12 | 681 | 9 |
| 126 | 12 | 708 | 8 |
| 154 | 12 | 722 | 9 |
| 162 | 12 | 729 | 9 |
| 194 | 12 | 753 | 10 |
| 195 | 12 | 763 | 10 |
| 350 | 1 | 790 | 10 |
| 350 | 4 | 802 | 8 |
| 355 | 13 | 803 | 8 |
| 358 | 1 | 813 | 10 |
| 364 | 1 | 823 | 8 |
| 378 | 1 | 828 | 8 |
| 380 | 12 | 829 | 8 |
| 405 | 12 | 851 | 11 |
| 410 | 12 | 880 | 9 |
| 479 | 12 | 885 | 8 |
| 484 | 12 | 885 | 9 |
| 509 | 10 | 1004 | 8 |
| 524 | 8 | 1031 | 9 |
| 525 | 8 | 1063 | 8 |

It was subsequently determined that the ordinance would not apply to the Program inspection or repair activities.

# Section 5.0
# Program Tools

Three basic Program tools were developed and maintained to facilitate the CLIP. These were the:

- Hydrograph Development Program
- Work Order Program
- CLIP Database Program

Each of these programs are described below:

## 5.1 Hydrograph Development Program

Hydrographs are graphs of collection basin flows over time. They are used to evaluate the flow characteristics of the collection system during both dry and wet weather periods and are specifically used in the CLIP for determining the effectiveness of the Program.

Collection system flow components consist of the wastewater flow component, system infiltration from sewer defects below the normal groundwater table and rainfall induced inflow and additional infiltration due to an elevated groundwater table during a rain event (RDII).

Since the daily wastewater flow component is considered relatively constant throughout the Program, basin flows are impacted by two conditions: the amount of rainfall and the prevailing groundwater elevation. Therefore, hydrographs were developed for each basin and each hydrograph also included local rainfall and groundwater table elevation data.

### 5.1.1 Data Collection

The following data was required for each CLIP basin for the hydrograph development portion of the Program:

- Basin Flow Data
- Local Rainfall Data
- Local Groundwater Elevation Data

Each of these data sets were obtained from ongoing monitoring programs as described below:

### Basin Flow Data

These data were obtained from the collection system supervisory control and data acquisition (SCADA) program. The system allowed the calculation of station flows by measuring the wetwell level change over time when the local pump station pumps were not operating. The flow into the station could therefore be calculated by multiplying the pump station wetwell cross-sectional area times the rate of wetwell rise with the pumping units off.

This system provided excellent data during normal operating conditions, however, in some basins flow data was not available during extreme storm events when the pumping units did not shutdown or the system surcharged, impacting the wetwell cross-sectional area.

### Local Rainfall Data

The South Florida Water Management District (SFWMD) maintains rainfall monitoring stations throughout Miami-Dade County. The CLIP staff matched the closest rainfall gauge station with each Program basin. Figure 5-1 shows the location of the rain gauges used in the CLIP relative to the basin location. Daily rainfall data is obtained from the SFWMD and downloaded into the CLIP database. Each basin hydrograph was checked to ensure that the rainfall data was consistent with the basin flow data.

### Local Groundwater Data

The United States Geological Survey Department (USGS) maintains several groundwater monitoring stations throughout Miami-Dade County. The CLIP staff matched the closest groundwater gauge station with each Program basin. Figure 5-2 shows the location of the groundwater gauges used in the CLIP relative to the CLIP basin locations. Daily groundwater elevation data was obtained from the USGS and downloaded into the CLIP database. Once again, each basin hydrograph was checked to ensure that the groundwater data coincided with the basin flow data.

## 5.1.2 Hydrograph Review

Hydrographs were developed for each CLIP basin. Historical data were obtained for the past 5 year period to provide background flow data.

Figure 5-3 is a typical hydrograph developed under the Program. The graph shows the basin flow, rainfall and groundwater levels during the past five year period. As shown on the graph, rainfall events raise the groundwater table and increase the collection basin flows to the pump station.

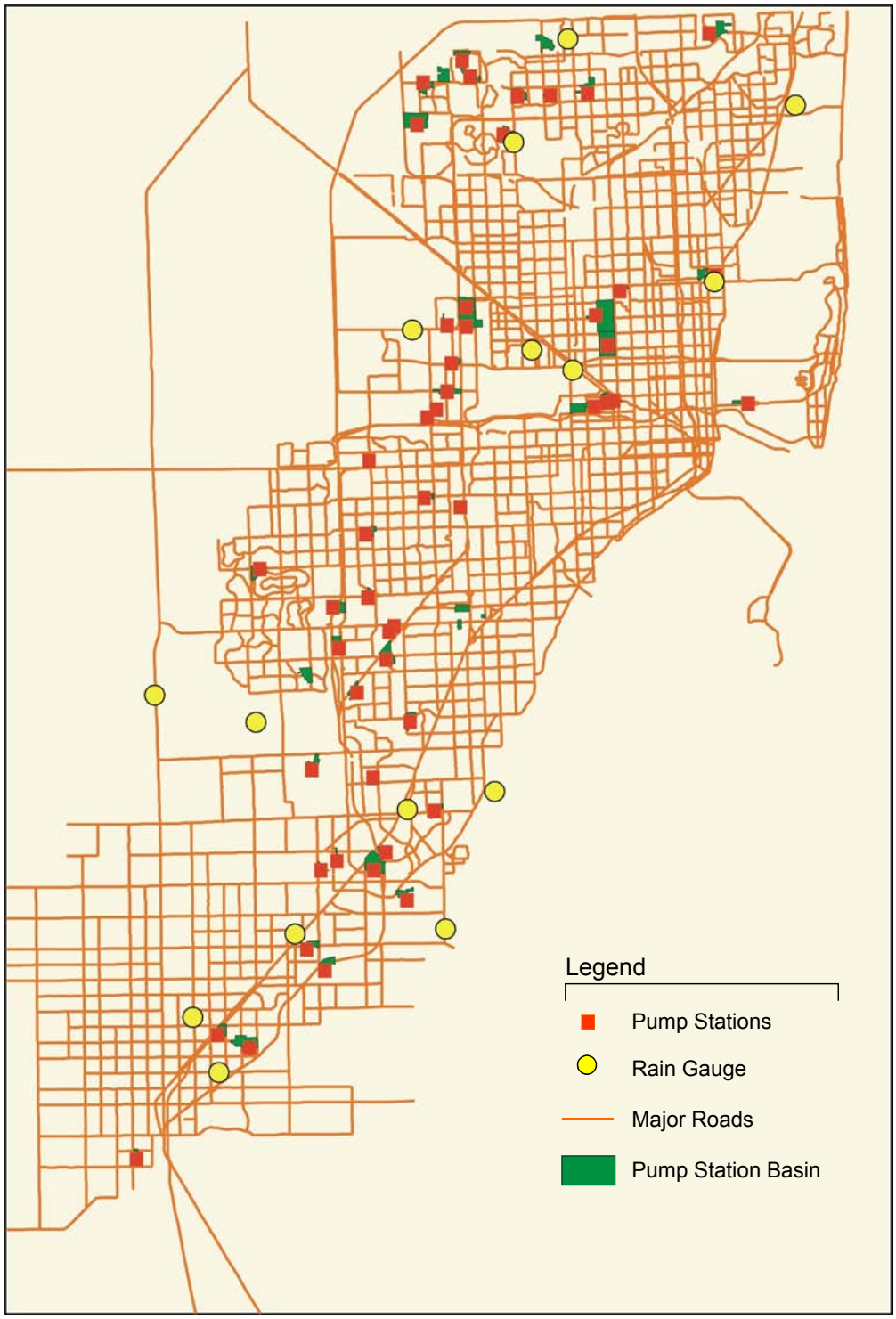


**Figure 5-1**
Rainfall Gauge Locations

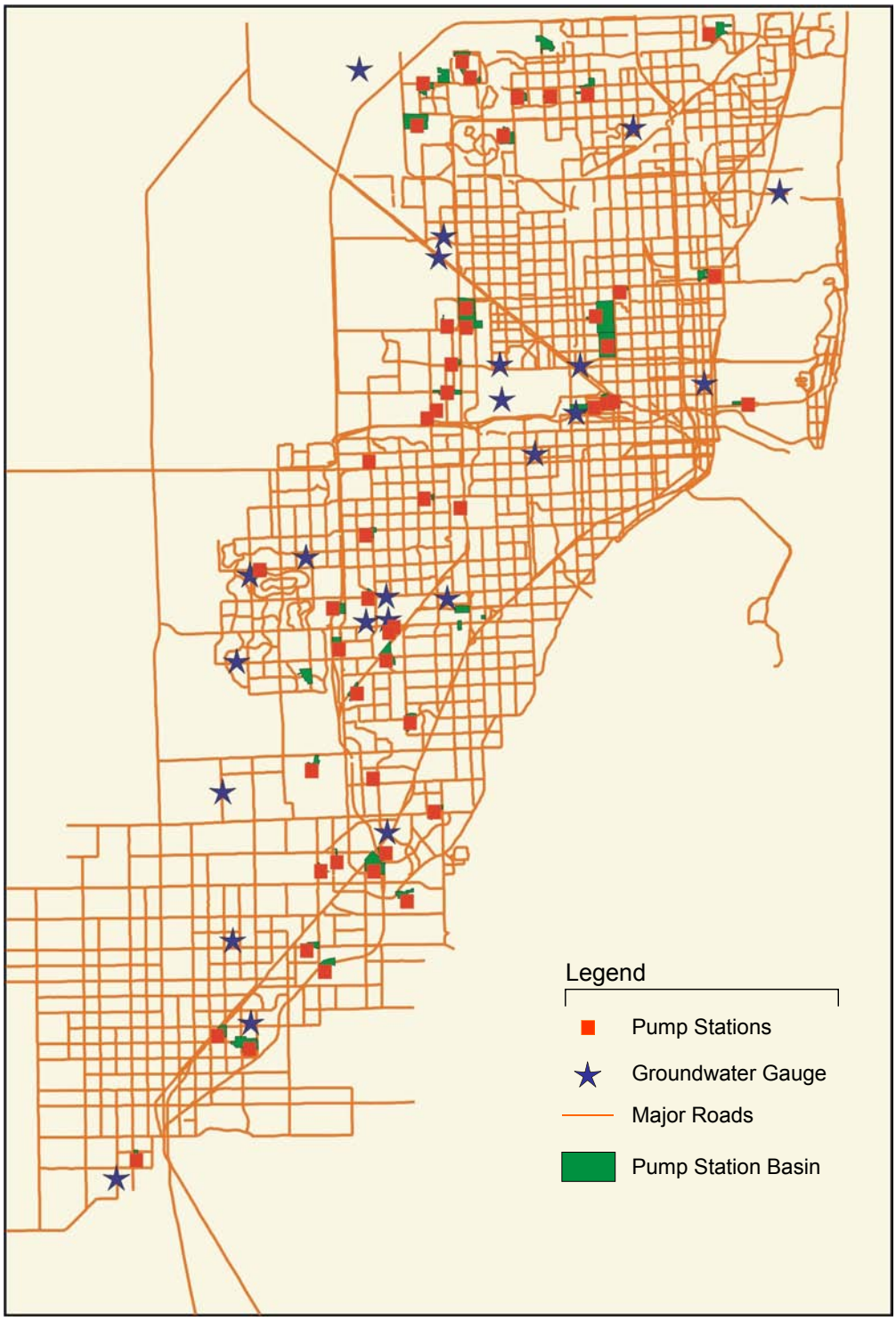


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**Figure 5-2**
Groundwater Level Gauge Locations

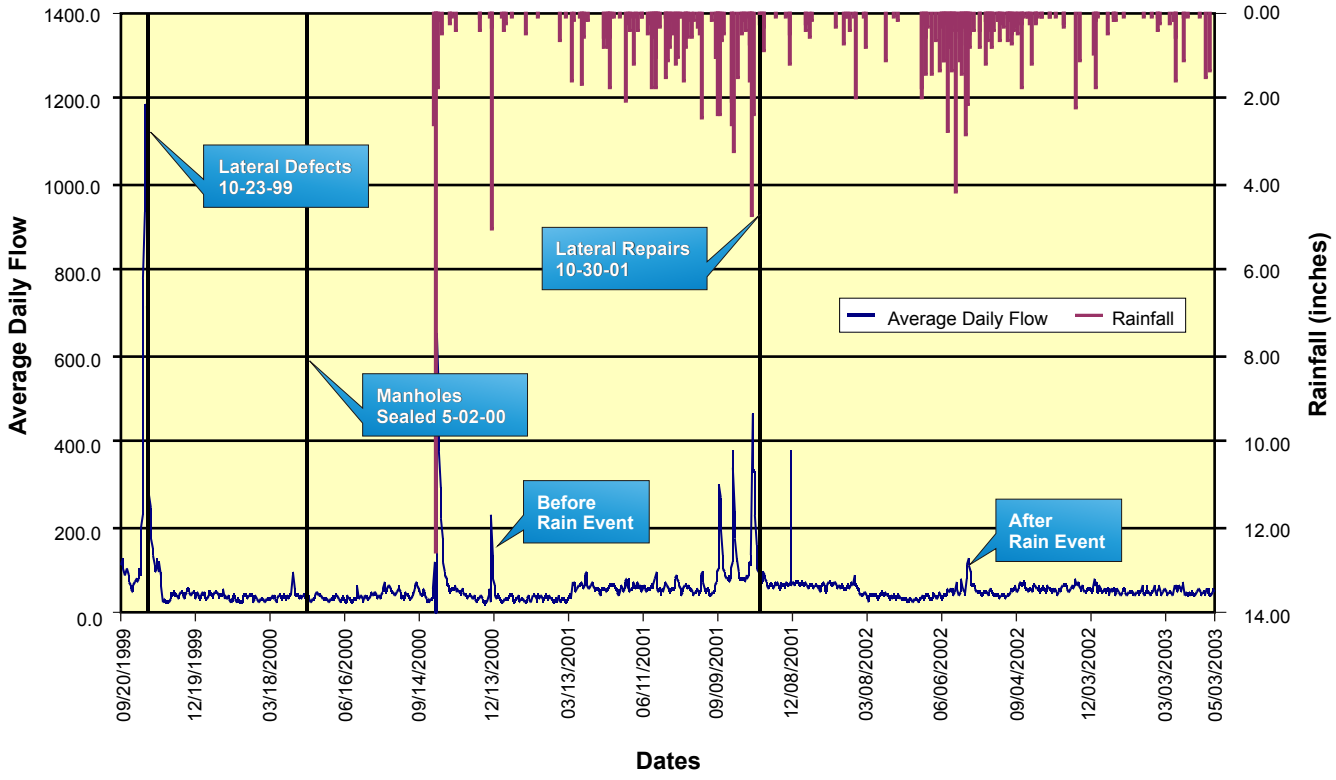


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**Figure 5-3**
Typical Hydrograph

The hydrographs were used to quantify system flows before and after lateral repairs were made to quantify the effectiveness of the CLIP. Appendix D contains the hydrographs for each of the CLIP basins and the hydrograph analysis procedure is included in Section 7.

## 5.2 Work Order Program

Work order systems were developed for both the inspection and repair phases of the Program. The purpose of the work order system was to define the work required of the contractor, to monitor the status of the work, allow the CLIP database to be updated, and provide a written record of the work completed for contractor payment purposes. A work order system was required to keep track of the 9,202 lateral inspection and 1,250 lateral repairs completed under the Program. Work orders were issued to both Department forces and contractors who worked on the Program.

### 5.2.1 Inspection Work Orders

Figure 5-4 shows a typical lateral inspection work order. Each lateral evaluated under the Program was assigned an inspection work order. Each work order was first filled out by the CLIP office staff. A unique work order number was assigned to each work order form. The work order issued to the contractor contained relative lateral information, whether the contractor was allowed on the private property and the projected unit cost items to be used during the investigation. The field inspector could modify the work order requirements if dictated by field conditions only if the modifications were approved by the Construction Manager. The contractor, inspector and Construction Manager then signed off for the work completed and the work order along with other field data (TV and pressure test logs etc.) were returned to the CLIP office for contractor payment, database updating and repair identification purposes.

### 5.2.2 Repair Work Orders

Figure 5-5 shows a typical lateral repair work order. Each individual private side lateral repair under the Program was assigned a work order. Each work order was first filled out by the CLIP office staff. A unique work order number was assigned to each lateral requiring repair. The work order issued to the contractor contained lateral information (location, material, depth, configuration, etc.), required work and the projected unit cost items to be used for the repair. The field inspection confirmed the work order information and monitored the construction work. The inspector could modify the work order requirements if dictated by field conditions only if the modification was approved by the Construction Manager. The contractor, inspector and Construction Manager then signed off for the work completed and the work order, along with other field data (TV and pressure test logs, etc.), were returned to the CLIP office for contractor payment and database updating purposes.

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**Figure 5-4**
Lateral Inspection Work Order

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In association with CARDOZO ENGINEERING - CIVIL-CADD - SAN MARTIN ASSOCIATES

# Work Order

**Inspection and Testing Sanitary Sewer Laterals**

Contract No.

HS No. 40650 | System Owner: MIAMI-DADE WASD | Contractor:

| WO No. | Lot No. | Issue Date | Atlas No. | Basin | Private Property Work Allowed ? Yes / No |
|---|---|---|---|---|---|
| | | | | | |

**Main Line Data**

| USMH NO. | DSMH NO: | US Depth (ft) | DS Depth (ft) | Surface Type | Length (ft) | Dia. (in) | CD No. | Main Line Material |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

**Lateral/CO Location / Characteristics**

| LateralID: | Dist (ft) | Pos. Code | CO #1 Located? | CO #2 Located? | Lateral Address |
|---|---|---|---|---|---|
| | | | | | |

| | Grass | | Asphalt | | Concrete | |
|---|---|---|---|---|---|---|
| **Exposed Lateral** | 0 to 4 ft | 4 to 8 ft | 0 to 4 ft | 4 to 8 ft | 0 to 4 ft | 4 to 8 ft |
| | $480.00 (1) | $750.00 (2) | $850.00 (3) | $1,150.00 (4) | $850.00 (5) | $1,150.00 (6) |
| **Clean Out Installation** | 0 to 4 ft | 4 to 8 ft | 0 to 4 ft | 4 to 8 ft | 0 to 4 ft | 4 to 8 ft |
| | $550.00 (7) | $820.00 (8) | $900.00 (9) | $1,200.00 (10) | $900.00 (11) | $1,200.00 (12) |

| | | | |
|---|---|---|---|
| **Install Sewer Packer/Plugs** | Mainline Packer $135.00 (13) | Lateral Plug $3.00 (14) | Lateral Plug with Rod $3.00 (15) |
| **Test** | Surface Air Test $2.00 (16) | Packer Air Test $20.00 (17) | Air Pressure Test with Smoke $40.00 (18) |
| | | | Hydrostatic Leakage Test $35.00 (19) |
| **Cleaning** | From Mainline Sewer up to 25 ft $250.00 (20) | From Mainline Sewer beyond 25 ft per ft $0.25 (21) | Surface Launch Cleaning $200.00 (22) |
| **Video Inspection** | From Mainline Sewer up to 25 ft $130.00 (23) | From Mainline Sewer beyond 25 ft per ft $1.00 (24) | Surface Launch Television up to 25 ft $63.00 (25) |
| | | | Surface Launch Television beyond 25 ft per ft $1.00 (26) |
| **Video Inspection** | Surface Launch from House Vent $150.00 (27) | **Easement Area** | For Work Performed in Easement Area per Lateral $100.00 (28) |

DATE COMPLETED: _____ SURVEY CD No. : _____ INDEX : _____

COMMENTS : _____

The Quantities Above Accurately Reflect This Inspection/Test

Project Representative Date Contractor Date

Note : Bid item number indicated in bottom right corner

40650-000R013F5-5.cdr

**Figure 5-5**
Lateral Repair Work Order

## 5.3 CLIP Database Program

The CLIP developed a database system to administer the Program. A Microsoft access database program was developed under the initial I/I Program and this program has been maintained by Department Sewer Collection System personnel. A second access database was developed for the CLIP which was compatible with that of the original program.

The CLIP database contains the following information:

- Basin physical data including lateral data
- Lateral investigation status
- Lateral repair status
- Basin hydrograph data

The access database is very flexible and allows specific Program data to be identified and organized for reporting purposes. It was used extensively to generate work orders and reports on the status of system components. The database also has extensive capacity. To date, over _____ items have been included in the database.

# Section 6.0
# Program Administration

The goal of the Program administration function was to effectively utilize available resources to successfully complete the CLIP within both the required Consent Decree schedule and the allotted budget. Three critical Project components must be continuously monitored and managed to produce a successful project. These are:

1. Work Product
2. Schedule
3. Budget

Each of these components are addressed below:

## 6.1 Work Product Management

Each phase of the Program was monitored to evaluate production rates and identify problem areas. Once issues are identified they must be quickly resolved in order to allow the Project to progress. An extensive database and reporting system was developed for the Project. Sections 5 and 6 detail these systems.

Various reports were utilized to monitor progress and trend graphs were developed to compare the progress with schedule requirements. Figures 6-1 and 6-2 summarize the overall status of the Project. A monthly Project status report (see Section 6.5), detailed the Program progress each month. Graphs were also developed to monitor progress trends. Figures 6-3 and 6-4 compare task progress with the proposed schedule requirements.

Each work task was reviewed for quality control purposes. Often parallel reports were generated to check statistics used on other reports. In general, reports were continuously reviewed by multiple Program staff to assure the quality of the work product.

The CLIP team met with the Department staff on a weekly basis to review progress and resolve outstanding issues. Weekly contractor meetings were also scheduled to review field issues, monitor progress and coordinate office/field activities.

## 6.2 Document Control Program

The CLIP Program established a document control system to track incoming and outgoing engineering and construction records which included letters, contracts, work orders,

MIAMI-DADE COUNTY WATER AND SEWER

# MIAMI-DADE WATER AND SEWER DEPARTMENT
# COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

## PROGRAM TASK STATUS

| Item | Quantity | |
|---|---|---|
| | Actual | Proj. Jan '06 |
| Basin Selected | 52 | |
| Latent Defects Completed | 3,659 | |
| Laterals in Program | 9,202 | |
| Basins with Initial Rainfall Signature (After Aug. '05) | 30 | |
| Work Orders Issued | 2,256 | |
| Laterals Inspected and/or Tested | 1,655 | |
| Lateral Repairs Required (@27% Public Fail Rate) | 454 | |
| Basins with Inspection and Testing Completed | 9 | |
| Basins with Repairs Completed | 0 | |
| Basins with Second Rainfall Signature (Pending) | 0 | |

40650-000R017F6-1.cdr

**Figure 6-1**
Program Task Status Summary

## MIAMI-DADE WATER AND SEWER DEPARTMENT
## COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

### STATUS OF TASKS
### (September 2005)

| Task | Status |
|---|---|
| Basin Selection | Completed |
| Database | Ongoing |
| Hydrograph Development | Ongoing |
| Latent Defects | Completed |
| Basins / Inspections | Ongoing |
| Outreach Program | Ongoing |
| Work Force Area Program | Ongoing |
| Conflict Verification Program | Ongoing |
| Work Order Issuance | Ongoing |
| Repair Calls | Ongoing |
| Repair Contract | Awaiting Award |

40650-000R018F6-2.cdr

**Figure 6-2**
Project Task Status Report

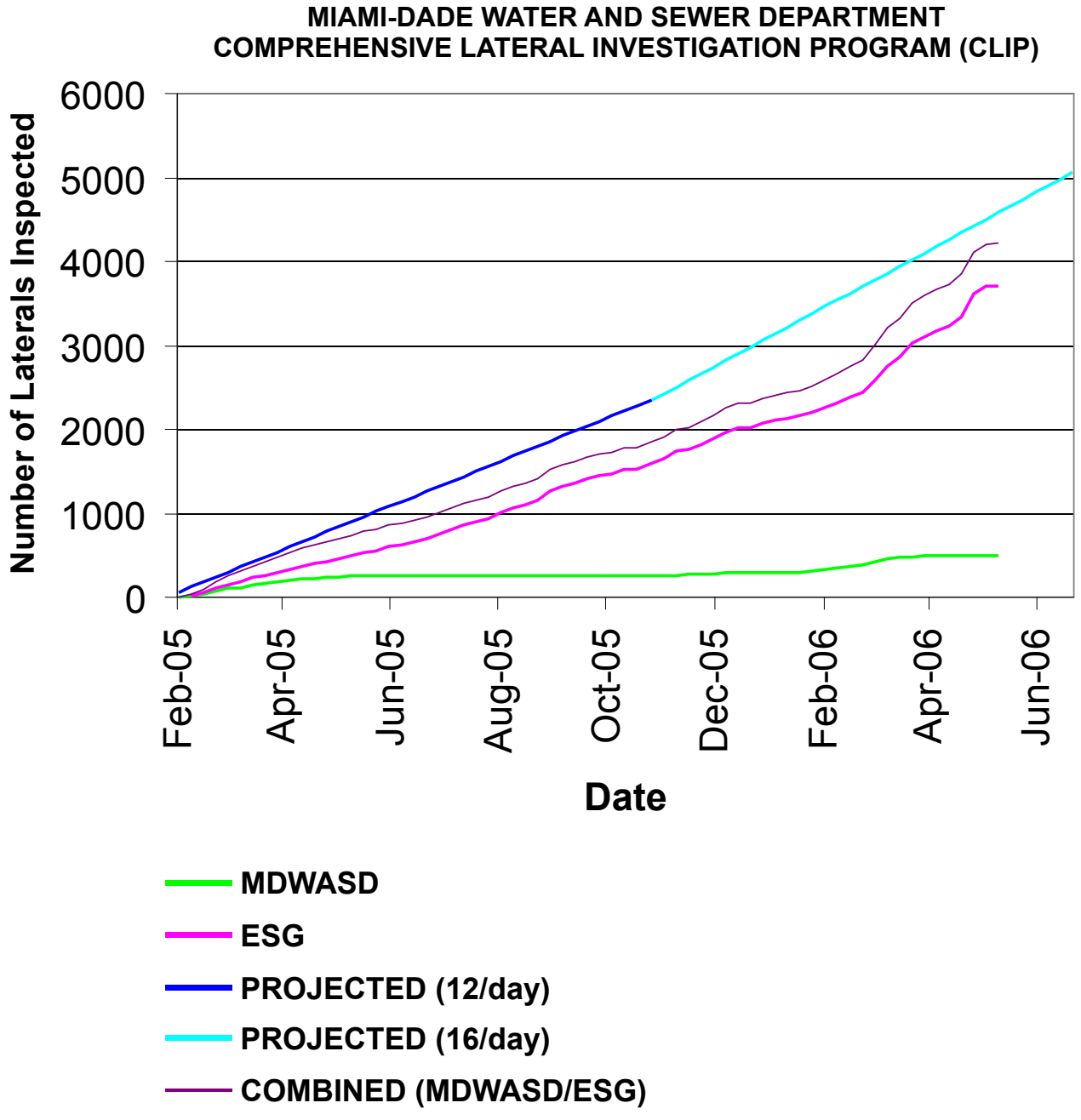


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**Figure 6-3**
Lateral Inspection Trend Graph

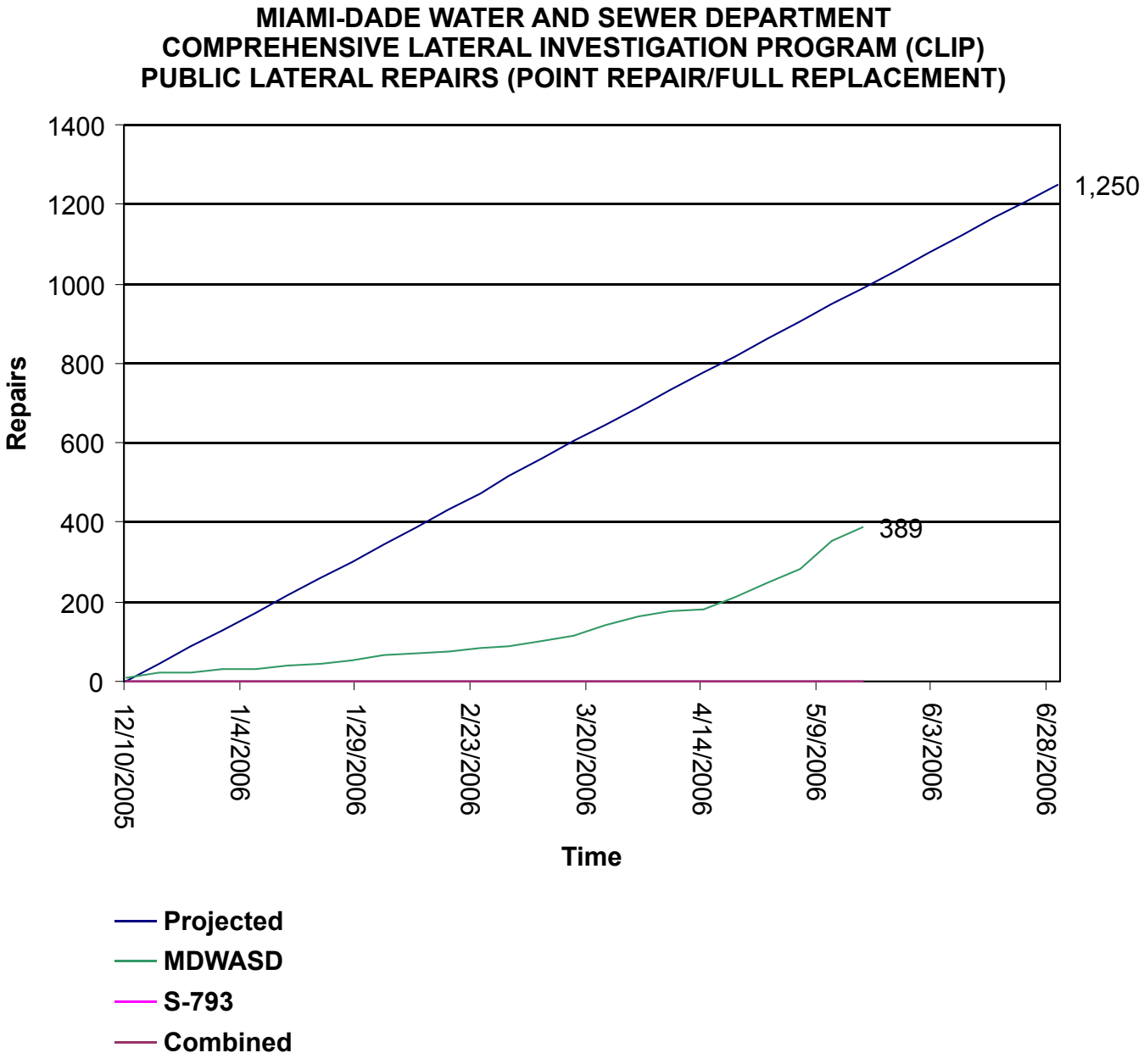


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**Figure 6-4**
Lateral Repair Trend Graph

reports, e-mails, faxes and field pictures. The document control system was standardized to ensure these documents were available and easily accessible to the Program team members. Appendix E is a copy of the Document Control System Index.

All incoming/outgoing communications were processed as follows:

- Documents were stamped in and assigned a unique, sequential Communications Control Number (CCM).
- The document was logged into the document control excel spreadsheet which was part of the CLIP program database.

All documents were stored/retained as follows:

- Each document was photocopied.
- The document was distributed/filed by the unique CCN within each Document Type folder in the files and the CLIP Server for security purposes.

The Document Control Filing System Index was divided into: General File, Engineering File, Bid File, and Construction/Contract File. Each of the categories had sub-divisions and the index was updated as needed.

Maintenance of the Document Control Log was performed on a daily basis, by recording the key information for each project related document or electronic media.

The following are the database fields which facilitated the retrieval of the documents.

- Project Number/Name
- Subject
- Document Type
- Direction
- Document To
- Document From
- Date on Document
- Date Received
- Physical Location

The Document Control log in the database allowed for effective and rapid retrieval of documents by entering key information for the specific document needed.

As of January 6, 2006, there were close to 2,000 documents in the CLIP Log.

## 6.3 Schedule

Figure 6-5 shows the detailed Master Schedule for the Project. This schedule was updated on a monthly basis and reviewed with The Peak Flow Technical Advisory Committee for the Department. The Consent Decree indirectly requires the CLIP to be complete and a final report issued by February 28, 2007. A goal to complete all repair work for 30 basins by July 2006 was set to accommodate an after rainfall event during the 2006 rainy season.

## 6.4 Budget and Cost Management

The CLIP had an initial budget of $17,340,000. Table 6.1 lists the Program budget items, the expenditures to date and the percent budget utilized to date. The table also lists the projected budget expenditure based on the percent of work completed to date. All Program expenditures were below budget and it is anticipated that the overall Program cost will be within the proposed budget.

**Table 6.1**
**Program Budget**

| | | |
|---|---|---|
| **Phase 1** | Mainline inspections (Work performed by MDWASD)[1] | **$462,192.60** |
| **Phase 2** | Mainline repairs, manhole repairs, descale and deroot mainline (Work performed by MDWASD and Contractor)[1] | **$952,492.91** |
| **Phase 3** | Inspection and testing (Work performed by MDWASD)[1] | **$106,018.22** |
| **Phase 3** | Inspection and testing (Work performed by ESG) | **$1,448,361.00** |
| Manhole sealing (Work performed by MDWASD)[1] | | **$93,317.34** |
| PM administration[3] | | **$1,624,021.44** |
| Consultant (Peak flow and clip meetings / protocol development, etc - under previous I/I program task) | | **$254,534.51** |
| | **Grand Total** | **$4,940,938.02** |

[1] *Information as of May 2005.*

[2] *Information from clip database as of May 15, 2006.*

[3] *Information as of March 2006.*

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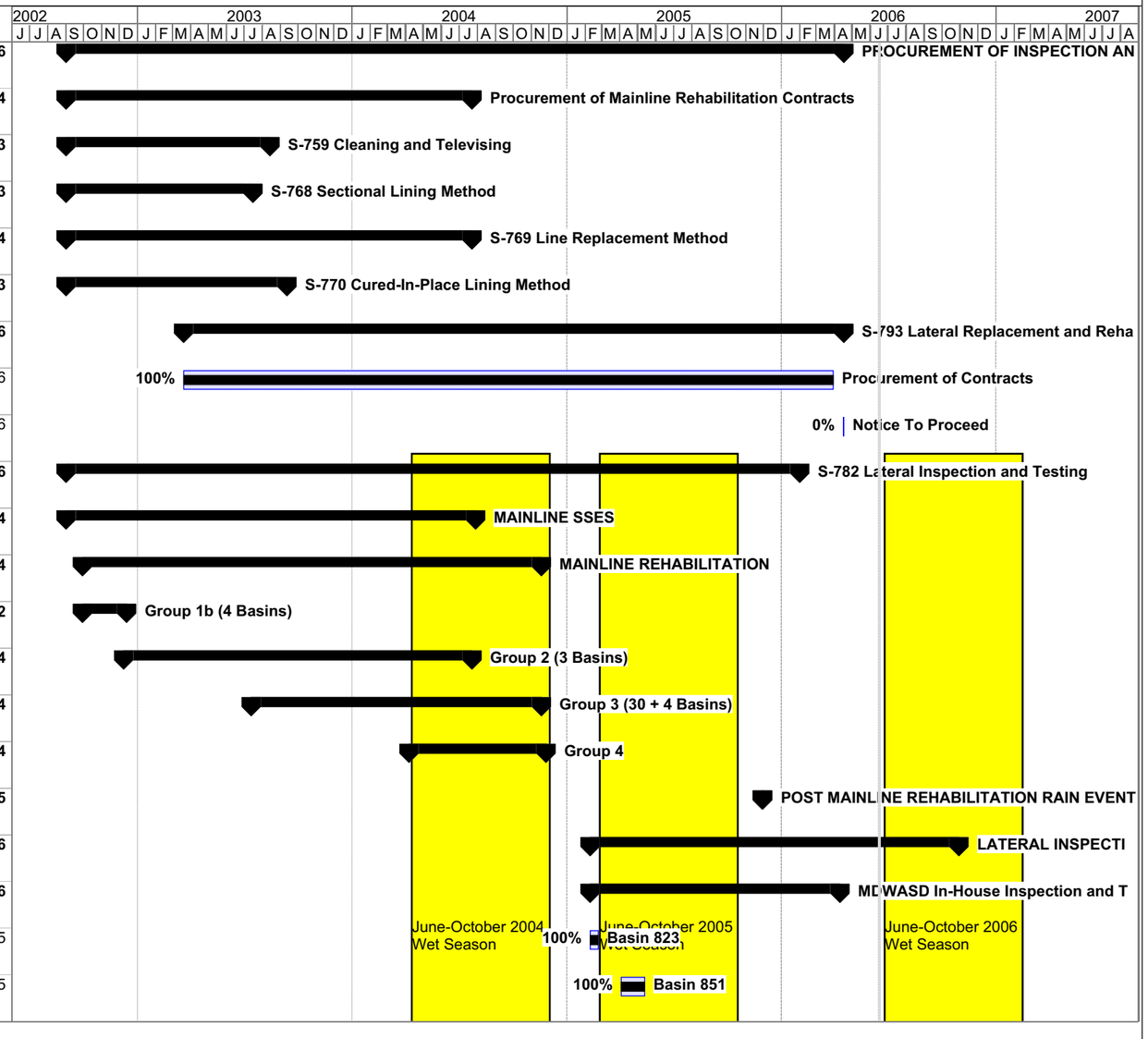
HAZEN AND SAWYER
Environmental Engineers & Scientists

# Miami Dade Water and Sewer Department
# Comprehensive Lateral Investigation Program (CLIP)
# Action Plan Implementation Schedule

MIAMI-DADE COUNTY
WATER AND SEWER

| ID | Task Name | % Complete | Duration | Start | Finish |
|---|---|---|---|---|---|
| 1 | **PROCUREMENT OF INSPECTION AND REHABILITATION CONTRACTS** | **99%** | **189.2 wks** | **Mon 9/2/02** | **Mon 4/17/06** |
| 2 | **Procurement of Mainline Rehabilitation Contracts** | **100%** | **99 wks** | **Mon 9/2/02** | **Fri 7/23/04** |
| 3 | **S-759 Cleaning and Televising** | **100%** | **49.8 wks** | **Mon 9/2/02** | **Thu 8/14/03** |
| 6 | **S-768 Sectional Lining Method** | **100%** | **45.6 wks** | **Mon 9/2/02** | **Wed 7/16/03** |
| 9 | **S-769 Line Replacement Method** | **100%** | **99 wks** | **Mon 9/2/02** | **Fri 7/23/04** |
| 12 | **S-770 Cured-In-Place Lining Method** | **100%** | **54 wks** | **Mon 9/2/02** | **Fri 9/12/03** |
| 15 | **S-793 Lateral Replacement and Rehabilitation** | **99%** | **160.4 wks** | **Fri 3/21/03** | **Mon 4/17/06** |
| 16 | Procurement of Contracts | 100% | 158 wks | Fri 3/21/03 | Thu 3/30/06 |
| 17 | Notice To Proceed | 0% | 0.2 wks | Mon 4/17/06 | Mon 4/17/06 |
| 18 | **S-782 Lateral Inspection and Testing** | **100%** | **178.6 wks** | **Mon 9/2/02** | **Wed 2/1/06** |
| 21 | **MAINLINE SSES** | **100%** | **99.8 wks** | **Mon 9/2/02** | **Thu 7/29/04** |
| 78 | **MAINLINE REHABILITATION** | **100%** | **111.8 wks** | **Mon 9/30/02** | **Thu 11/18/04** |
| 79 | **Group 1b (4 Basins)** | **100%** | **11 wks** | **Mon 9/30/02** | **Fri 12/13/02** |
| 96 | **Group 2 (3 Basins)** | **100%** | **85 wks** | **Mon 12/9/02** | **Fri 7/23/04** |
| 109 | **Group 3 (30 + 4 Basins)** | **100%** | **70.8 wks** | **Mon 7/14/03** | **Thu 11/18/04** |
| 244 | **Group 4** | **100%** | **33.4 wks** | **Thu 4/8/04** | **Fri 11/26/04** |
| 290 | **POST MAINLINE REHABILITATION RAIN EVENT** | **0%** | **0.2 wks** | **Wed 11/30/05** | **Wed 11/30/05** |
| 292 | **LATERAL INSPECTION AND TESTING ANALYSIS** | **73%** | **89.6 wks** | **Thu 2/10/05** | **Mon 10/30/06** |
| 293 | MDWASD In-House Inspection and Testing | **100%** | **60.7 wks** | **Thu 2/10/05** | **Tue 4/11/06** |
| 294 | Basin 823 | 100% | 2 wks | Thu 2/10/05 | Wed 2/23/05 |
| 295 | Basin 851 | 100% | 6 wks | Mon 4/4/05 | Fri 5/13/05 |




Project: CLIP Implementation
Date: Fri 6/16/06

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

**Figure 6-5**
Project Detail Schedule

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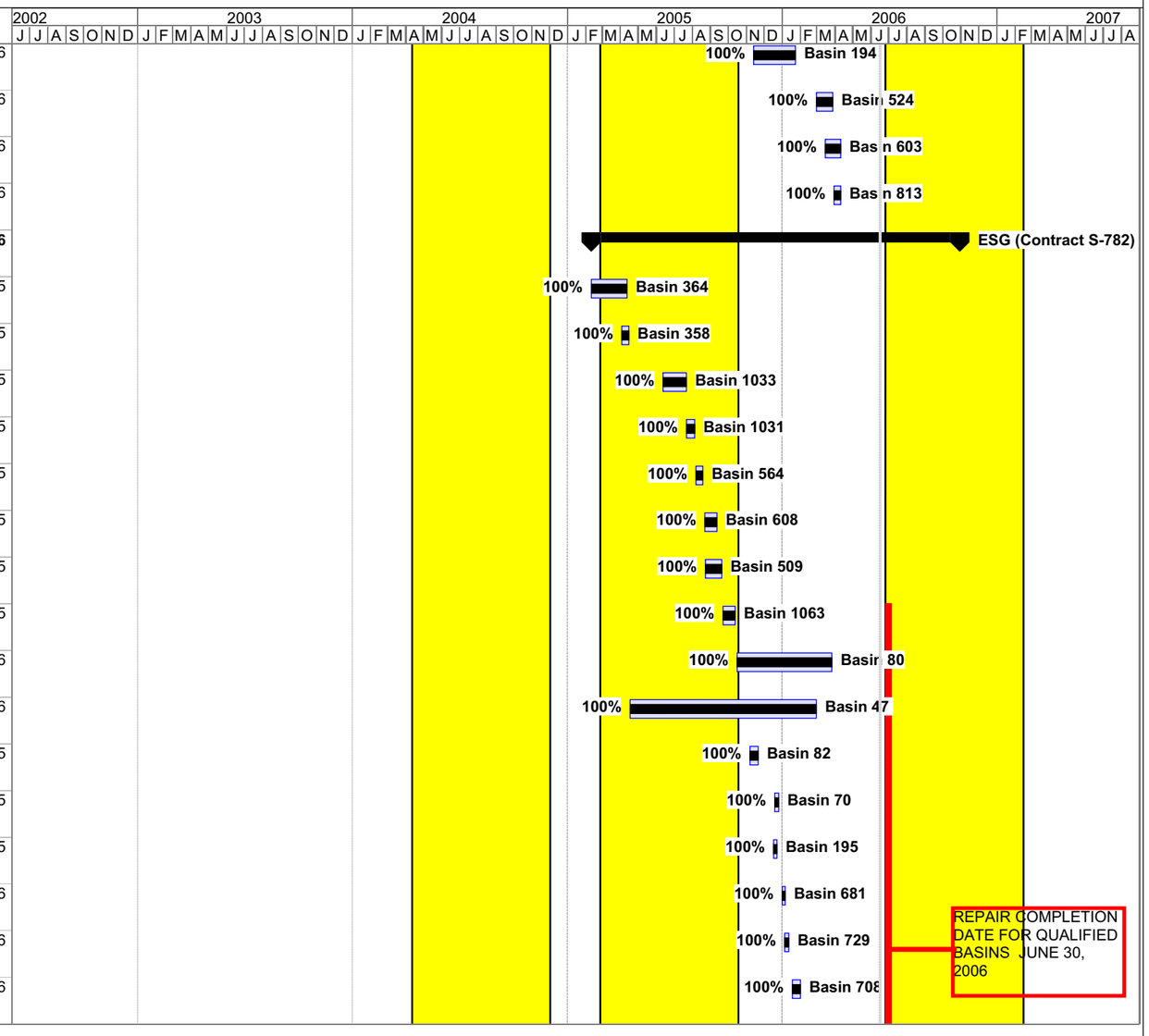
# Miami Dade Water and Sewer Department
# Comprehensive Lateral Investigation Program (CLIP)
# Action Plan Implementation Schedule

MIAMI-DADE COUNTY
WATER AND SEWER

| ID | Task Name | % Complete | Duration | Start | Finish |
|---|---|---|---|---|---|
| 296 | Basin 194 | 100% | 4 wks | Mon 11/14/05 | Tue 1/24/06 |
| 297 | Basin 524 | 100% | 4 wks | Wed 3/1/06 | Tue 3/28/06 |
| 298 | Basin 603 | 100% | 1.5 wks | Thu 3/16/06 | Tue 4/11/06 |
| 299 | Basin 813 | 100% | 1.5 wks | Fri 3/31/06 | Tue 4/11/06 |
| 300 | ESG (Contract S-782) Inspection and Testing | **68%** | **89.4 wks** | **Fri 2/11/05** | **Mon 10/30/06** |
| 301 | Basin 364 | 100% | 8.6 wks | Fri 2/11/05 | Tue 4/12/05 |
| 302 | Basin 358 | 100% | 2 wks | Mon 4/4/05 | Fri 4/15/05 |
| 303 | Basin 1033 | 100% | 6 wks | Mon 6/13/05 | Fri 7/22/05 |
| 304 | Basin 1031 | 100% | 2 wks | Sat 7/23/05 | Fri 8/5/05 |
| 305 | Basin 564 | 100% | 2 wks | Mon 8/8/05 | Fri 8/19/05 |
| 306 | Basin 608 | 100% | 3 wks | Tue 8/23/05 | Mon 9/12/05 |
| 307 | Basin 509 | 100% | 4 wks | Wed 8/24/05 | Tue 9/20/05 |
| 308 | Basin 1063 | 100% | 3 wks | Fri 9/23/05 | Thu 10/13/05 |
| 309 | Basin 80 | 100% | 7.2 wks | Mon 10/17/05 | Mon 3/27/06 |
| 310 | Basin 47 | 100% | 3.16 wks | Mon 4/18/05 | Tue 2/28/06 |
| 311 | Basin 82 | 100% | 2 wks | Tue 11/8/05 | Mon 11/21/05 |
| 312 | Basin 70 | 100% | 1 wk | Tue 12/20/05 | Mon 12/26/05 |
| 313 | Basin 195 | 100% | 1 wk | Sun 12/18/05 | Fri 12/23/05 |
| 314 | Basin 681 | 100% | 1 wk | Mon 1/2/06 | Fri 1/6/06 |
| 315 | Basin 729 | 100% | 1 wk | Fri 1/6/06 | Thu 1/12/06 |
| 316 | Basin 708 | 100% | 2 wks | Thu 1/19/06 | Wed 2/1/06 |




Project: CLIP Implementation
Date: Fri 6/16/06

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

**Figure 6-5**
Project Detail Schedule

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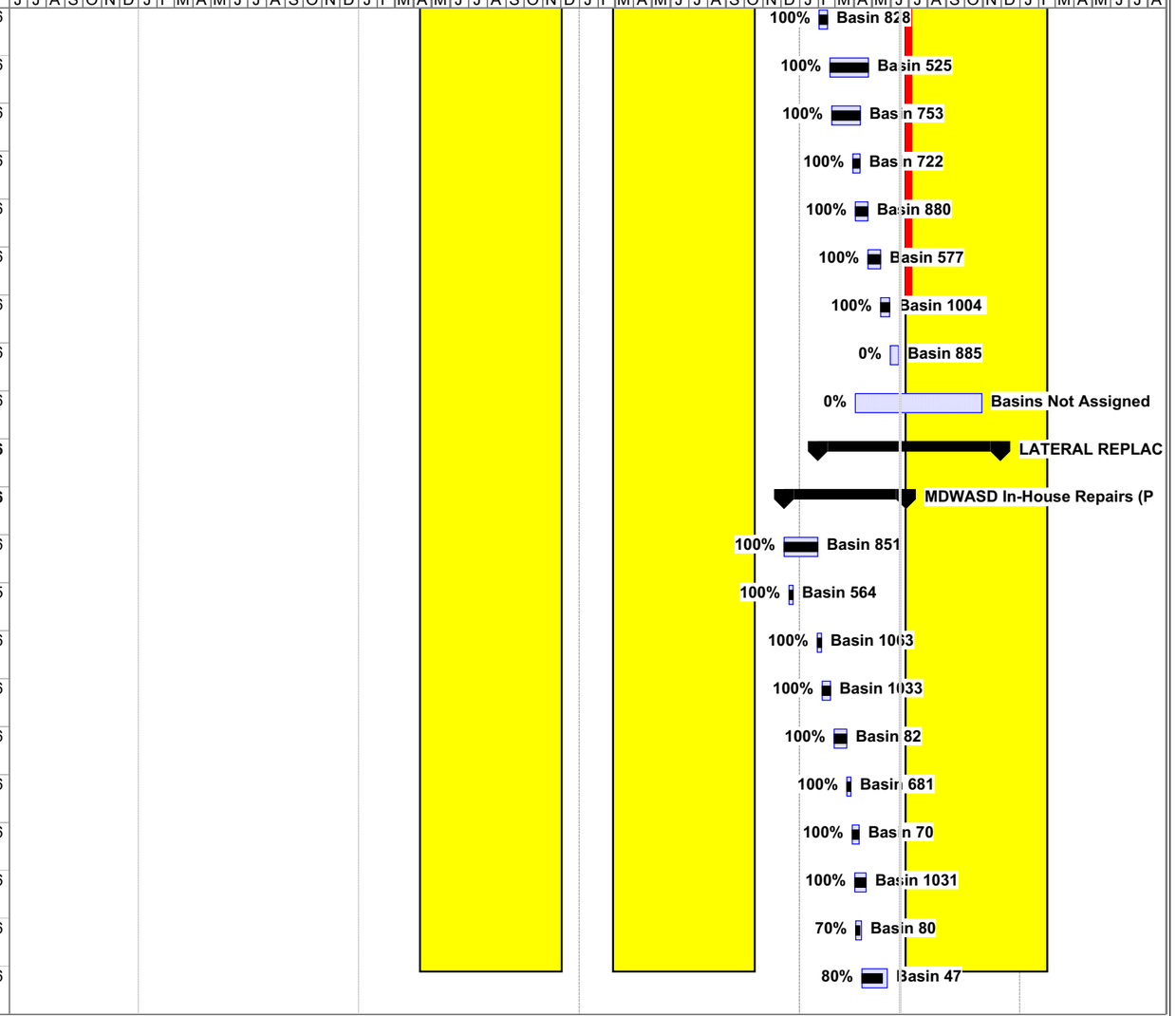
# Miami Dade Water and Sewer Department
# Comprehensive Lateral Investigation Program (CLIP)
# Action Plan Implementation Schedule

MIAMI-DADE COUNTY
WATER AND SEWER

| ID | Task Name | % Complete | Duration | Start | Finish |
|---|---|---|---|---|---|
| 317 | Basin 828 | 100% | 2 wks | Fri 2/3/06 | Thu 2/16/06 |
| 318 | Basin 525 | 100% | 6 wks | Tue 2/21/06 | Tue 4/25/06 |
| 319 | Basin 753 | 100% | 2 wks | Fri 2/24/06 | Wed 4/12/06 |
| 320 | Basin 722 | 100% | 1.6 wks | Fri 3/31/06 | Tue 4/11/06 |
| 321 | Basin 880 | 100% | 3 wks | Tue 4/4/06 | Mon 4/24/06 |
| 322 | Basin 577 | 100% | 3 wks | Tue 4/25/06 | Mon 5/15/06 |
| 323 | Basin 1004 | 100% | 2.2 wks | Tue 5/16/06 | Tue 5/30/06 |
| 324 | Basin 885 | 0% | 2 wks | Thu 6/1/06 | Wed 6/14/06 |
| 325 | Basins Not Assigned | 0% | 30 wks | Tue 4/4/06 | Mon 10/30/06 |
| 326 | **LATERAL REPLACEMENT AND REHABILITATION** | **0%** | **43.3 wks** | **Wed 2/1/06** | **Thu 11/30/06** |
| 328 | MDWASD In-House Repairs (Point Repairs/Lateral Replacement) | **70%** | **28.8 wks** | **Wed 12/7/05** | **Mon 6/26/06** |
| 329 | Basin 851 | 100% | 8 wks | Wed 12/7/05 | Tue 1/31/06 |
| 330 | Basin 564 | 100% | 1 wk | Thu 12/15/05 | Wed 12/21/05 |
| 331 | Basin 1063 | 100% | 1 wk | Tue 1/31/06 | Mon 2/6/06 |
| 332 | Basin 1033 | 100% | 2 wks | Wed 2/8/06 | Tue 2/21/06 |
| 333 | Basin 82 | 100% | 3 wks | Tue 2/28/06 | Mon 3/20/06 |
| 334 | Basin 681 | 100% | 1 wk | Tue 3/21/06 | Mon 3/27/06 |
| 335 | Basin 70 | 100% | 1.5 wks | Thu 3/30/06 | Mon 4/10/06 |
| 336 | Basin 1031 | 100% | 3 wks | Mon 4/3/06 | Fri 4/21/06 |
| 337 | Basin 80 | 70% | 1.5 wks | Tue 4/4/06 | Fri 4/14/06 |
| 338 | Basin 47 | 80% | 6 wks | Sat 4/15/06 | Fri 5/26/06 |




Project: CLIP Implementation
Date: Fri 6/16/06

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

**Figure 6-5**
Project Detail Schedule

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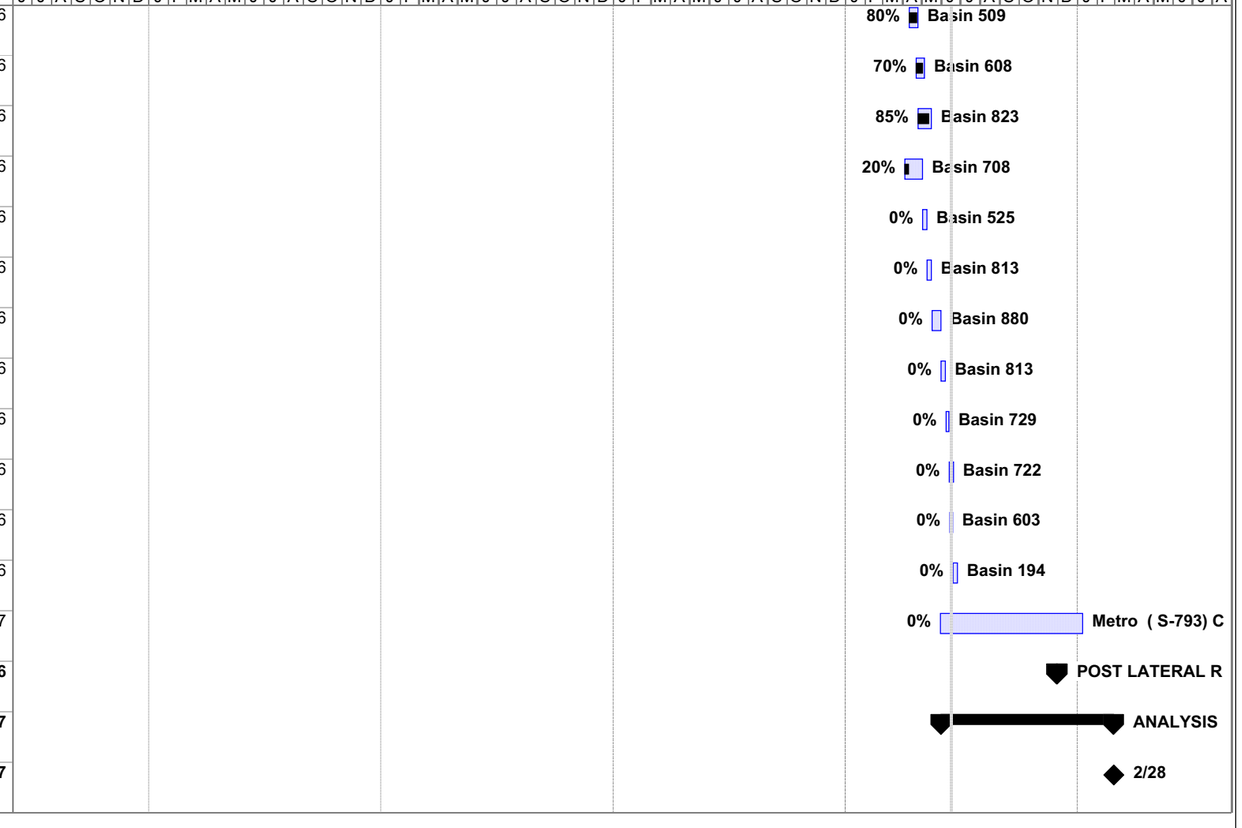
# Miami Dade Water and Sewer Department
# Comprehensive Lateral Investigation Program (CLIP)
# Action Plan Implementation Schedule

MIAMI-DADE COUNTY
WATER AND SEWER

| ID | Task Name | % Complete | Duration | Start | Finish |
|---|---|---|---|---|---|
| 339 | Basin 509 | 80% | 2 wks | Wed 4/12/06 | Tue 4/25/06 |
| 340 | Basin 608 | 70% | 2 wks | Sun 4/23/06 | Fri 5/5/06 |
| 341 | Basin 823 | 85% | 3 wks | Wed 4/26/06 | Tue 5/16/06 |
| 342 | Basin 708 | 20% | 4 wks | Wed 4/5/06 | Tue 5/2/06 |
| 343 | Basin 525 | 0% | 1 wk | Wed 5/3/06 | Tue 5/9/06 |
| 344 | Basin 813 | 0% | 1 wk | Wed 5/10/06 | Tue 5/16/06 |
| 345 | Basin 880 | 0% | 2 wks | Thu 5/18/06 | Wed 5/31/06 |
| 346 | Basin 813 | 0% | 1 wk | Thu 6/1/06 | Wed 6/7/06 |
| 347 | Basin 729 | 0% | 0.5 wks | Fri 6/9/06 | Tue 6/13/06 |
| 348 | Basin 722 | 0% | 1 wk | Wed 6/14/06 | Tue 6/20/06 |
| 349 | Basin 603 | 0% | 0.5 wks | Thu 6/15/06 | Mon 6/19/06 |
| 350 | Basin 194 | 0% | 1 wk | Tue 6/20/06 | Mon 6/26/06 |
| 351 | Metro ( S-793) Contractor Repairs (CIP Liners, CIP Main Line/Point Repairs) | 0% | 32 wks | Wed 5/31/06 | Tue 1/9/07 |
| 352 | **POST LATERAL REPLACEMENT AND REHABILITATION RAIN EVENT** | **0%** | **0.2 wks** | **Thu 11/30/06** | **Thu 11/30/06** |
| 354 | **ANALYSIS AND REPORT** | **0%** | **38.7 wks** | **Thu 6/1/06** | **Tue 2/27/07** |
| 362 | **EPA SUBMITTAL** | **0%** | **1 day** | **Wed 2/28/07** | **Wed 2/28/07** |




Project: CLIP Implementation
Date: Fri 6/16/06

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

**Figure 6-5**
Project Detail Schedule

Figure 6-6 is a cash flow trend graph for the program management portion of the Project. The graph shows that the expenditures closely track the new trend line established when the Program was extended by one year.

## 6.5 Meetings

Periodic Program meetings were required to inform the Department of the Program status and to review outstanding issues. Weekly Program staff meetings were established to coordinate staff activities, review Program status and resolve outstanding issues. Weekly inspection and construction contractor meetings were also required to address field issues.

Special meetings were also called as needed. Department and regulatory special meetings were called to address issues such as the Public Outreach Program, the Road Moratorium Program, and private property repair issues.

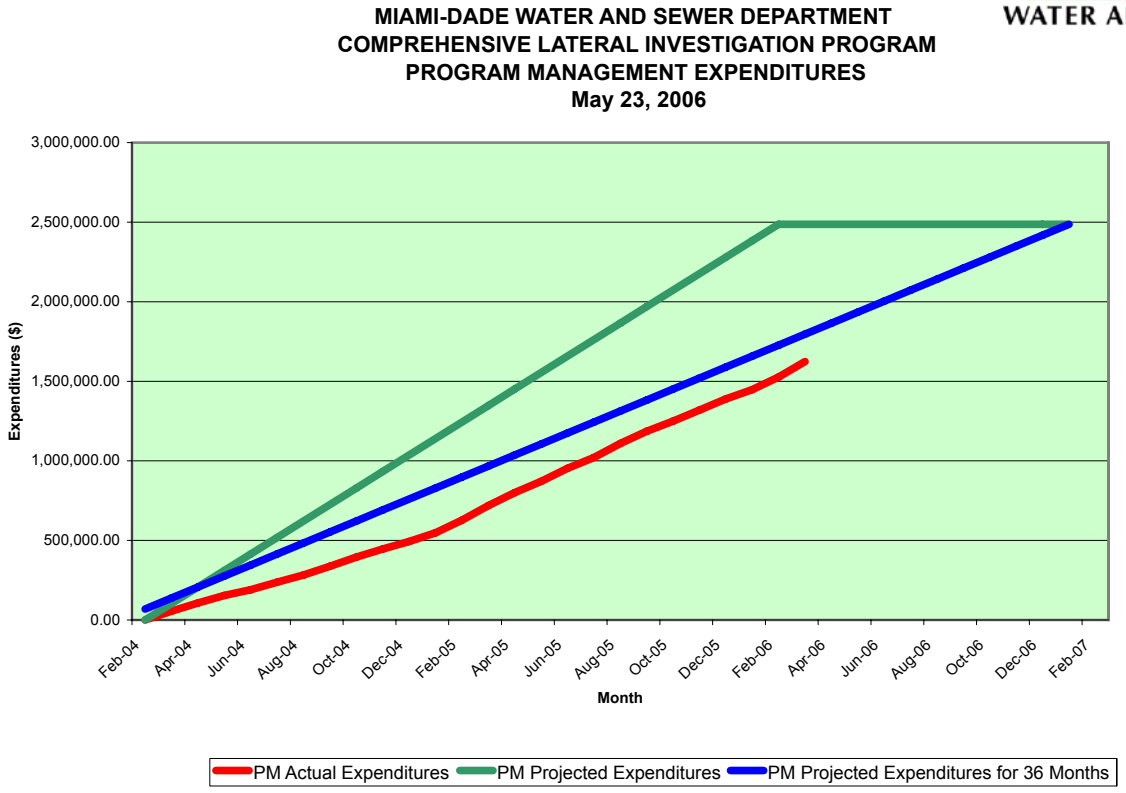
## 6.6 Monthly Status Reports

A monthly CLIP report was generated to document Program status and accomplishments over the period. A copy of a typical status report is included in Appendix F. The report detailed the progress made for all program tasks. It provided a brief description of each task, the status of the task and work accomplished during the monthly period.

## 6.7 Other Program Reports

Several reports were generated under the program to document basin and lateral physical data, document system conditions, and monitor program status. The access database tracking system allowed for the rolling up of any of the stored information to provide custom reports. Appendix G contains typical reports generated under the program to define field conditions, predict trends, estimate workloads and project costs and provide the status of the various Program components.

Table 6.2 lists typical reports generated in the CLIP and describes their purpose. The CLIP reporting database was a valuable tool which allowed the staff to track all program activities.



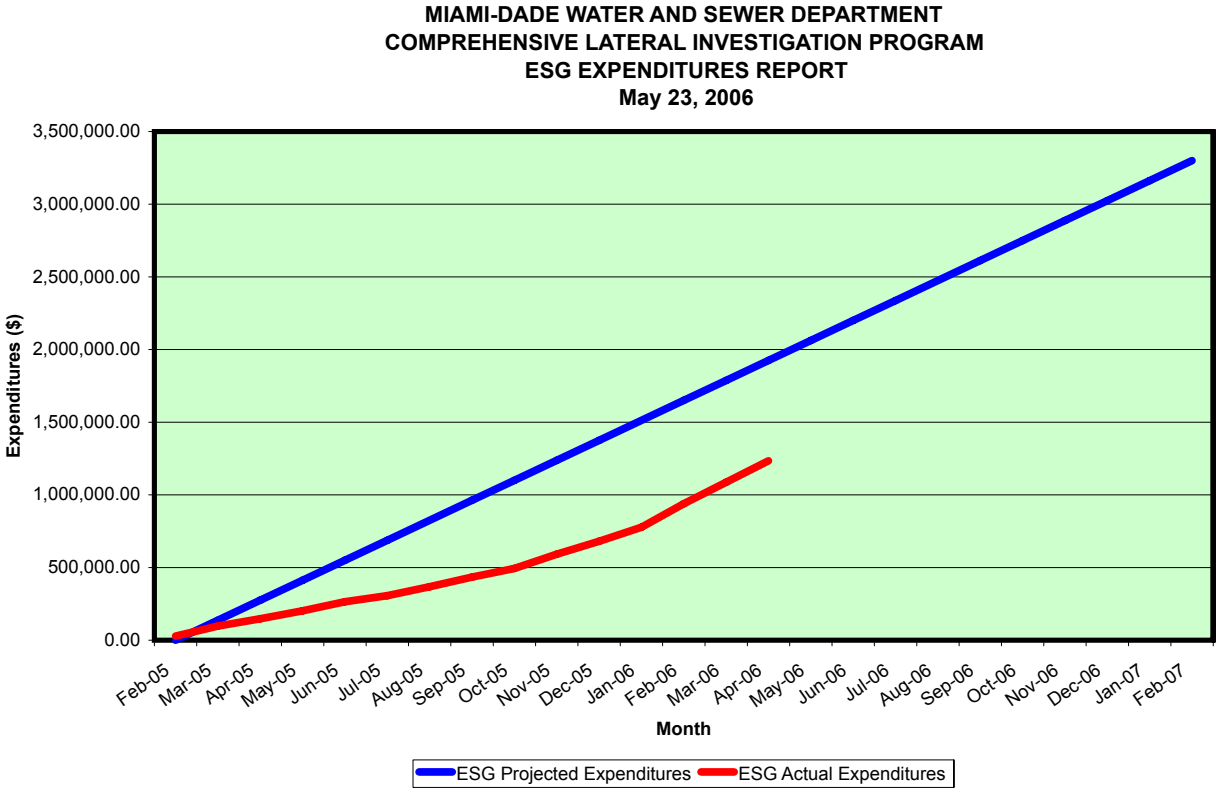




**Figure 6-6**
Cash Flow Trend Graphs

40650-000R022.cdr

**Table 6.2**
**Typical CLIP Reports**

| Report Name | Location | Purpose |
|---|---|---|
| CLIP Basin RDII Data Report | Appendix G | Reports RDII flows throughout program |
| Latent Defect Repair Status Report | Appendix G | Track status of lateral defect activities |
| Latent Defect Summary Report | Appendix G | Summarizes results of lateral defect program |
| Rainfall/Groundwater Assignment Report | Appendix G | Identifies gauges used for basin hydrographs |
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# Section 7.0
# Program Analysis

Hydrographs or graphs of basin flows over time were developed for each CLIP basin. Basin flows during a two year storm event (4.5 inches in 24 hours) were quantified for storm events before and after the lateral repairs were made. Table 7.1 shows the results of the analysis for each basin. In general, the data indicate the RDII in the CLIP basins was reduced by _____ percent. Based on the 500 RDII basins a similar flow reduction in each of these basins could reduce the RDII flow by _____ (_____ percent of ___ mgd).

CLIP station characteristics were evaluated to determine if certain characteristics could contribute to the success of the CLIP program. Table 7.2 lists the CLIP stations by percentage RDII reduction and compares their characteristics.

**Table 7.1**

**Table 7.2**

# Section 8.0
# Program Costs

The cost of each phase of the CLIP was developed. Table 8.1 lists the Program component and its total cost. A total of $_____ was required for the CLIP.

This results in a unit cost of $_____ per mgd of RDII removed, which compares favorably to the cost of transmission and treatment facilities estimated at $_____ per mgd. It should also be noted that the cost of treatment may well increase with future regulations which may require higher removal rates for high level disinfection or nitrogen reduction criteria.

The 500 high RDII basins have varying RDII flows per lateral and basins with the highest RDII concentrations would be most cost effective to repair. Figure 8-1 is a graph of the RDII per lateral in each of the basins versus 20 year payback period based on treatment and transmission costs.

The graph indicates that based on a 20-year pay back period it would be cost effective to repair _____ of the basins.

**Table 8.1**

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**Figure 8-1**
Basin RDII Results Graph

# Section 9.0
# Recommendations

Two ongoing Programs will impact the Department's Peak Flow Master Plan: the CLIP and the Pump Station Optimization Program (PSOP). It has been demonstrated that the PSOP is a low cost capital program which greatly reduces RDII flows during two year storm events.

The following procedure is recommended to reduce RDII flows in the collection system:

1. The PSOP recommendations be adopted and each pump station be operated under the proposed criteria.

2. Review system operations during a 2-year storm event to identify basins with excessive RDII.

3 Complete a lateral improvement program on the high RDII basins with a 20-year payback period, giving priority to the basins with highest RDII concentration per lateral.

4 Continue to implement a reduced lateral improvement program at a maintenance level as part of the Departments ongoing I/I Program.

The recommended four step program should greatly reduce both RDII flows and system overflows with the lowest capital and O&M expenditure.

MIAMI-DADE COUNTY
WATER AND SEWER

# Appendix A

# CLIP
# Action Plan

40650B001.CDR

HAZEN AND SAWYER
Environmental Engineers & Scientists

MIAMI-DADE COUNTY
WATER AND SEWER

# Appendix B

# MWH Basin Selection Report

40650B001.CDR

HAZEN AND SAWYER
Environmental Engineers & Scientists


Miami Dade County Water and Sewer Department

# Basin Selection for CLIP Pilot

FINAL REPORT – Task 4
March 19, 2004

MWH

MWH
MONTGOMERY WATSON HARZA

March 18, 2004 0403037

Howard J. Fallon, Jr., P.E.
Miami-Dade Water and Sewer Department
3071 S.W. 38th Avenue
Miami, Florida 33146

Subject: Task 4 – Basin Selection for CLIP Pilot Final Report

Dear Mr. Fallon:

MWH is pleased to submit five copies of the Basin Selection for the CLIP Pilot Final Report for Miami Dade Water and Sewer Department (MDWASD). Comments on the draft report submitted in July 2003 were received and have been addressed herein. This submittal represents 100 percent complete of the scope of work.

The preparation of this report has involved the efforts of many individuals. In particular, MWH wishes to acknowledge and express our gratitude to the staff of MDWASD for their assistance and cooperation during the preparation of this report. Additional basins are being evaluated, under separate authorization, to expand the program.

MWH looks forward to working with MDWASD on future projects. Please do not hesitate to contact us if we may be of additional service.

Very truly yours,

**MWH**

Glenn R. Humphrey
Vice President

Enclosure

cc: Harold Aiken, MWH/FTL-1
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# Section 1
# Introduction and Executive Summary

## 1.1 BACKGROUND

Following extensive main-line repairs, Miami-Dade Water and Sewer Department's (MDWASD) wastewater system continued to experience high inflow and infiltration (I/I) primarily during rainfall events. This increase in flow during rainfall events is known as Rainfall Dependent Inflow and Infiltration (RDII). Part of this RDII may be resulting from groundwater submerging public and private portions of the sewer laterals (public) and service lines (private) where defects in the laterals and service lines provide for groundwater entry points. Other Utilities have documented RDII reductions following sewer lateral repairs. Since part of the sewer laterals (the service lines) are buried on private property (from street right-of-ways to the home or business connection) making repairs in this private portion of the sewer collection system is problematic for Public Utilities.

To estimate the potential peak flow RDII reductions which may be achieved by repairing laterals, MDWASD conducted a limited study beginning in 2001 where the sewer mains and lateral connections were repaired within pump station basins 116, 191 and 203. The study results were encouraging and helped result in a negotiated Consent Decree time extension with EPA to complete a more extensive lateral pilot study. MDWASD designed the Comprehensive Lateral Investigation Program (CLIP) to include repairs of defective service laterals including where possible, the portions on private property. Additional pump station basins will be selected with varying physical characteristics to evaluate these factors on the volume of peak flow RDII reduction and cost effectiveness of the program. The CLIP action plan was published by MDWASD on October 26, 2001.

## 1.2 STATEMENT OF PROBLEM

MDWASD operates and maintains approximately 1,000 sewage pump stations servicing the metropolitan area of Miami-Dade County. A systematic approach was needed to select the pump station basins, referred to herein as basins, to be used in the CLIP. The goal for basin selection was to identify a representative sample of basins that allows MDWASD to reasonably quantify peak flow RDII reduction and guide future system wide investigation and rehabilitation criteria.

## 1.3 SUMMARY OF THE APPROACH

### 1.3.1 Basin Selection Protocol

The focus of the CLIP is to repair laterals within the gravity sewer system of each pump station basin that receives excessive flows during rainfall events or in other words, has an "RDII signature". During an initial RDII evaluation, a technical advisory committee

determined that a representative group of pump station basins should be evaluated. They estimated that about 30 basins would assure that a variety of characteristics such as land use, soil type and service lateral material would be represented. A protocol was proposed as a tool for selecting the RDII basins for the CLIP. The draft protocol was discussed in a working meeting with MDWASD staff on October 11, 2002 resulting in a final protocol (see **Appendix A**).

### 1.3.2 Database of Pump Station Basins

After the basin RDII selection protocol was developed a Microsoft Access™ database was generated to capture the characteristics identified in the protocol for each basin. The database was sorted and queried on parameters indicated in the protocol. Results of the queries provided a rational reduction of the number of basins selected for the CLIP.

### 1.3.3 Data Evaluation

An important part of the CLIP and RDII determination is evaluating the hydrograph for each pump station. MDWASD has a SCADA system that electronically monitors when the pumps in a pump station operate. Flow through each pump station is calibrated using pump station wet well size and the measured change of the water level in the wet well with time. These computed flows are then plotted on a hydrograph. MDWASD hydrographs indicate flow into a pump station and currently are only based on wet well size and level change vs. time. Pump curve data and system pressure are not currently used by MDWASD for hydrograph development. These hydrographs can then be used to determine if a pump station has an RDII signature and further evaluated as part of the CLIP.

### 1.3.4 Basin Selection

Ten basins were selected for inclusion in the CLIP prior to the preparation of the selection protocol. Three of these basins were used for the initial lateral pilot and are referred to as Group 1a (116, 191, 203). The other seven basins are referred to as Groups 1b, (47, 118, 763 and 851) and 2 (35, 615 and 1004). The basins selected through the protocol process are referred to as Group 3.

## 1.4 OTHER DATABASE USES

The RDII Database can also be used to identify basins for additional repairs, additional basins for lateral repairs, prioritization of basins, and to review existing information. A list and a figure of all of the basins selected for the CLIP is provided in **Appendix B**.

# Section 2
# Basin Selection Protocol Development

## 2.1 BASIN SELECTION PROTOCOL DEVELOPMENT DETAILS

The October 2002 CLIP Basin Selection Protocol was written to provide a systematic approach to reduce Miami-Dade's total number of approximately 1,000 basins to a manageable number for the Comprehensive Lateral Investigation Program (CLIP). The goal is to study the gravity service area for about 30 pump station basins referred to herein as basins. The CLIP Selection Protocol can also be used to prioritize future basins selected for lateral repair if the pilot program proves effective and is expanded. The CLIP Selection protocol is provided in **Appendix A**. A CLIP Selection flow chart is provided in **Figure 2-1**.

MDWASD requested that the following criteria be considered to select the basins and to include these items in the protocol:

- Rainfall Dependent inflow and infiltration (RDII)
- Peaking Factor
- Basin Size
- Basin Age
- Basin Location

## 2.2 HYDROGRAPHS

The hydrographic response is the primary tool used to evaluate the impact of rainfall on a pump station. Therefore, the majority of the protocol addresses the generation and evaluation of hydrographs.

Hydrographs are generated with data collected by MDWASD's Supervisory Control and Data Acquisition (SCADA) system, which electronically monitors when the pumps in a pump station operate. Using information about the change in water elevation within the wet well over time and the wet well cross-section; the flow into the pump station is plotted on a chart with time on the horizontal axis and flow on the vertical axis. An example of a hydrograph is shown in **Figure 2-2**.

### 2.2.1 Generating Hydrographs

The first step in developing the protocol was determining conditions for evaluating the pump station's performance. The primary goal of the CLIP is to reduce the amount of RDII flow that is pumped and treated during rainfall events that produce approximately 4.5 inches of rain during a 24-hour period. In a Consent Decree with the Environmental Protection Agency (EPA), MDWASD agreed to meet several

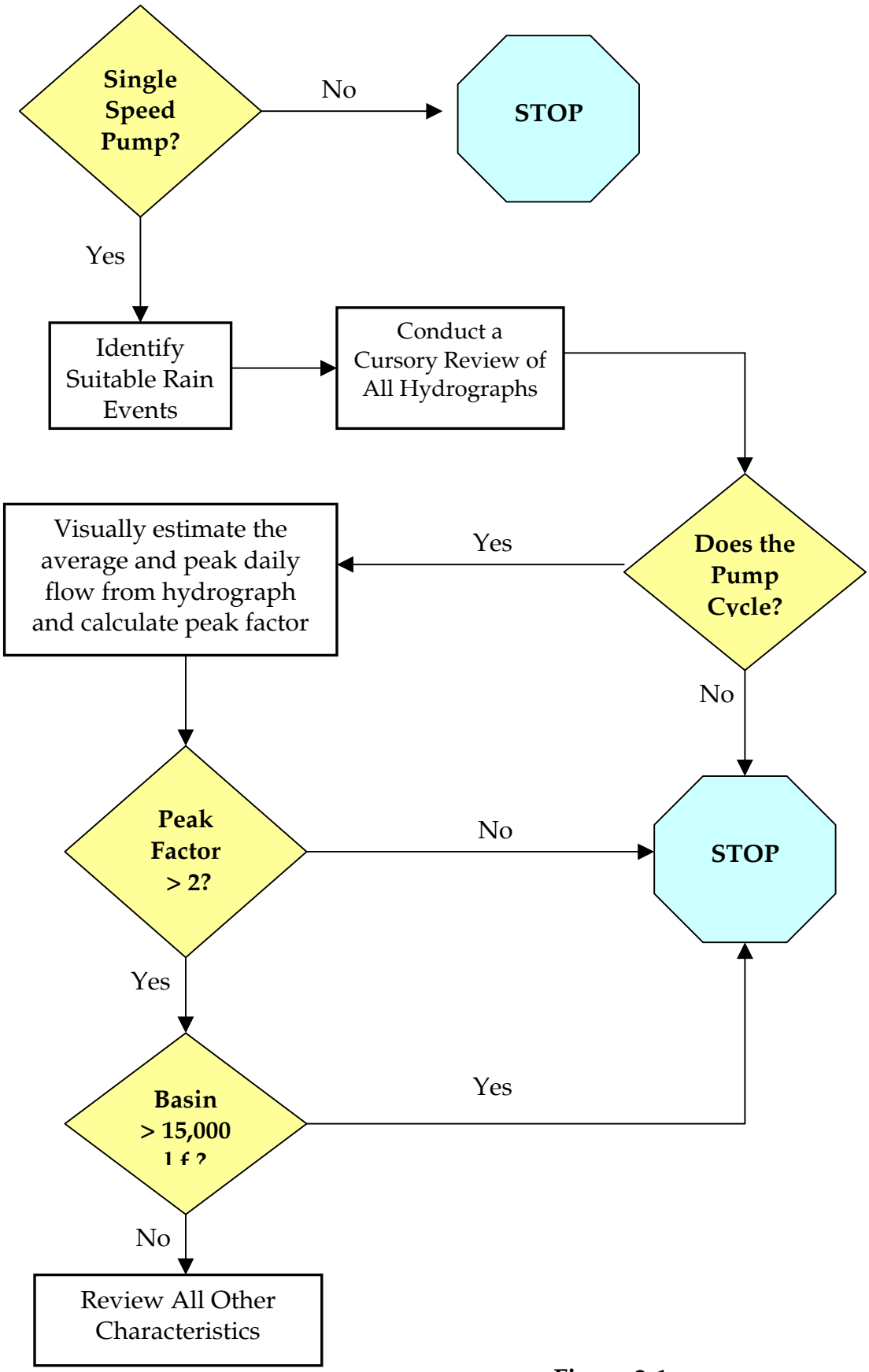
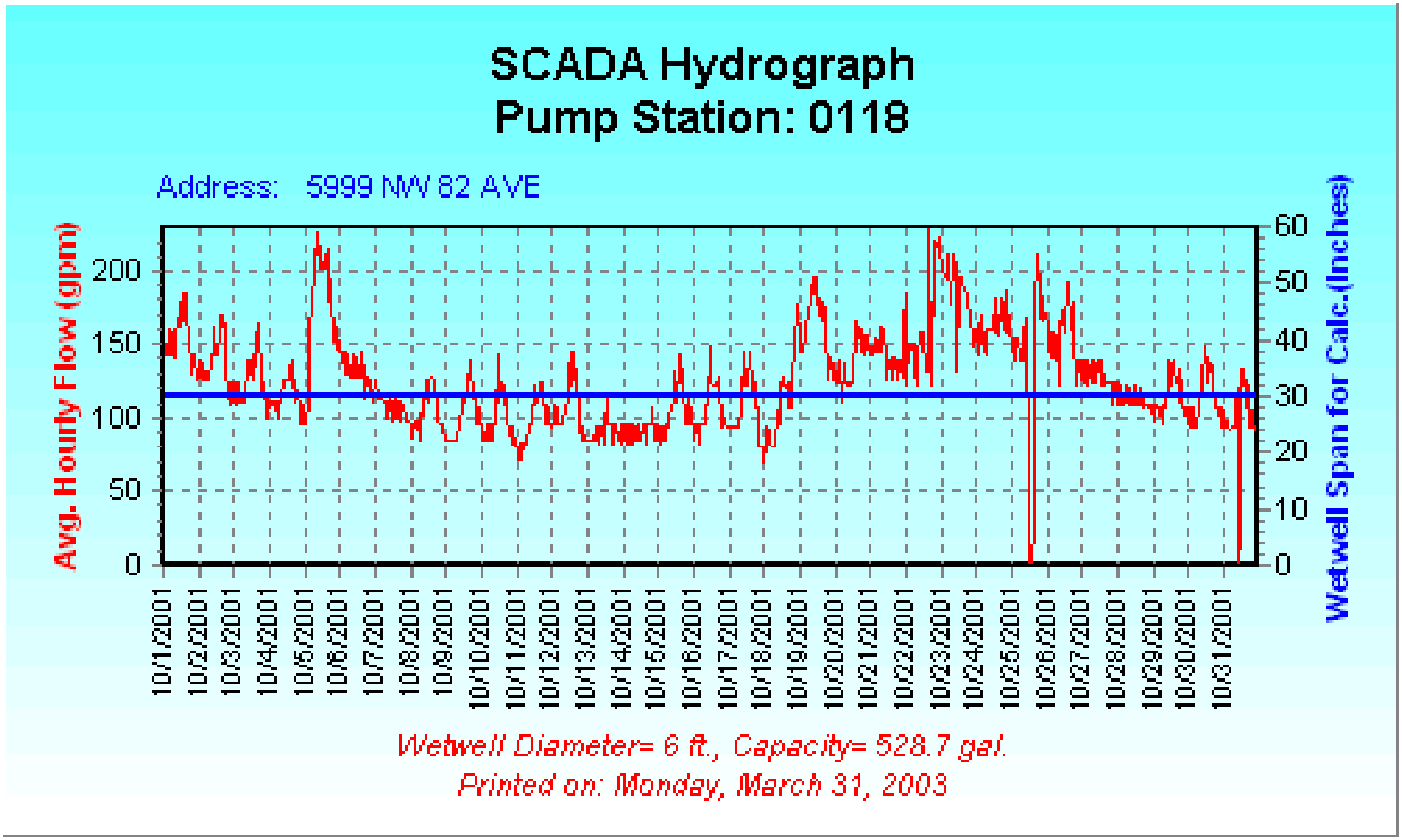



**Figure 2-1**
**CLIP Basin Selection Protocol Flow Sheet**

**Figure 2-2**
**Hydrograph**



performance standards for their pump stations during these rainfall events. For the Miami-Dade area, such rain events have a statistical return frequency every 2 years.

The hydrograph can be used to determine if a pump station is affected by RDII. Hydrographs will be generated for similar rainfall events for each basin selected for the CLIP. These hydrographs will be evaluated for rain events before and after repairs to the mainlines and laterals are made to gauge the effectiveness in reducing the overall RDII response.

Based on this information, the decision was made to evaluate the pump station performance during a 4.5 inch rainfall received in a 24-hour period or a similar rainfall intensity. The protocol requires a user to generate hydrographs for a timeframe that brackets these events. Some alternate rainfall intensities include:

- 4 inches of rain during a 24-hour period
- 5 inches of rain during a 72-hour period
- 6 inches of rain during a 72-hour period

Accurate hydrographs can not always be generated. The computer program is unable to convert run times to flow if the pumps are multi-speed pumps. Additionally, when the pumps operate continuously or if all pumps operate, the hydrograph is either not accurate or the data is not generated properly. Therefore, the protocol requires a user to eliminate basins with multi-speed pumps and pumps that operated continuously throughout the rain event.

### 2.2.2 Interpreting Hydrographs

The next step in the protocol is to conduct a thorough review of the hydrographs. A user can read the hydrograph and estimate the pump station average flow prior to or after a rain event and the daily peak flow that occurred during a rain event. Once the rain induced peak daily flow and average flow are determined, a peaking factor is calculated by dividing the peak flow by the average flow.

### 2.2.3 "Signature Criteria"

After developing data from the hydrographs, the next step in the protocol is to limit the stations to those with an RDII signature. MDWASD has regional wastewater plants, each designed to treat daily peak flows approximately two times their average capacity, thus, a pump station with a peak factor above two for the design storm is identified as having an RDII signature.

### 2.2.4 Re-Pump Stations

Some of MDWASD's pump stations receive flow from other pump stations as well as their own gravity system. These stations are referred to as re-pump stations in this report. The RDII signature concept is to evaluate the performance of a pump station gravity system during the rainfall event. Therefore, flow contributed to a re-pump station from another pump station must be subtracted from the re-pump station hydrograph to provide meaningful information. Steps for evaluating re-pump stations are included in the Protocol, but using re-pump stations was not preferred.

## 2.3 PUMP STATION CHARACTERISTICS

Once information is obtained from the hydrographs and the list of basins has been reduced to those with an RDII signature, additional factors are considered. In the CLIP plan, MDWASD agreed to select basins with a variety of characteristics. The plan is to evaluate the effect of a variety of characteristics on the reduction of RDII to determine which characteristics have more or less of an impact on the success of the repairs.

### 2.3.1 Number of Laterals per Basin

In order to make the CLIP manageable, MDWASD staff requested that the pump station basins be reduced to those with less than 15,000 linear feet of main line sewer piping. Logically, smaller basins will usually have fewer lateral connections needing repair.

### 2.3.2 Basin Location

The basin location is expected to have an affect on the success of the CLIP. The protocol includes the consideration of various location factors such as north, central, south, east or west orientation, proximity to a wellfield protection zone and proximity to surface water bodies. Factors that will vary by location include soil type, land elevation, depth to ground water, ground water flow direction, tidal influences, land use, zoning, population density and age of development.

### 2.3.3 Lateral Age

This parameter is an important factor in the evaluation of the CLIP results. The lateral age is related to the material used to construct the lateral. Older laterals are more likely to be constructed of Orangeburg, Vitrified Clay or Cast Iron whereas newer laterals are likely to be constructed of Polyvinyl Chloride (PVC). Orangeburg and Vitrified Clay piping are much more prone to defects because of material deterioration, joint inadequacy, and brittleness. Orangeburg pipe is comprised of cellulose fibers impregnated with hot coaltar pitch. The joints are gasketless. The pipe often softens and deforms with age, allowing infiltration and root intrusion. Two varieties of Orangeburg pipe exist: one with solid (homogeneous) walls and one with laminated

walls. Vitrified clay pipe, manufactured from fired clay, is susceptible to cracks and breakage due to differential settlement and inappropriate structural loading. These pipe material were widely used in house laterals for over 70 years, until PVC won wide acceptance in the industry.

### 2.3.4 Zoning and Land Use

This parameter is also specifically noted in the CLIP protocol. The type of zoning will have an impact on the number and length of each lateral. Residential zoning will have a greater number of short laterals. In commercial or industrial zoned areas, buildings are typically larger and spaced further apart and are often located further from the right-of-way boundary, resulting in fewer, but longer laterals as compared to residential areas.

### 2.3.5 Other Factors

Other protocol criteria included: the population within a basin, the Nominal Average Pump Operation Time (NAPOT), night time flow and weekly flow patterns. Once the number of pump station basins has been reduced using the protocol, it was anticipated that these factors may impact the final selection for the CLIP.

# Section 3
# RDII Database Development

## 3.1 IMPLEMENTING THE PROTOCOL

To streamline the implementation of the October 2002 CLIP Basin Selection Protocol, a Microsoft Access™ database was developed to store and rank information about each basin. This database, called the MDWASD RDII Database, was used to create a list of suitable basins.

## 3.2 GENERATING HYDROGRAPHS

The first step in the protocol is to generate hydrographs for a two year rain event (4.5 inches of rain in 24 hours) or a similar event.

### 3.2.1 Rainfall Events

Rain events were evaluated from 1998 to 2002. Two appropriate rain events were identified and both occurred in 2001. Approximately 7.9 inches of rain was measured at the Miami International Airport (MIA) on September 27 to September 29, 2001 and approximately 4.7 inches of rain was measured at MIA over 24 hours on October 21, 2001. The decision was made to obtain September and October 2001 hydrographs to bracket each rainfall event. The rainfall information and hydrograph request was submitted to MDWASD in a memo dated September 30, 2002.

### 3.2.2 Suitable Data

A hydrograph was generated for each pump station for the September 2001 rainfall event and given a cursory review to determine if the data quality allowed for interpretation. About one-third of the hydrographs appeared to have been generated with suitable data. The remaining charts had no data for the day of the rainfall event or showed a data anomaly such as extreme spikes or flat lines. This information is documented in a memorandum dated July 10, 2002 to MDWASD. October 2001 hydrographs were generated for those pump stations with usable data from the September 2001 hydrographs.

## 3.3 INTERPRETING HYDROGRAPHS

The amount of data that is used to generate hydrographs for 1,000 pump stations is too large to transfer electronically or to utilize with traditional computer programs such as Microsoft Excel™. MDWASD is using a computer program that allows them to mass produce and print hydrographs, but does not allow for the transfer and evaluation of the raw data. These hydrographs are adequate for the purpose of selecting basins but it requires a person to visually estimate data from a printed chart.

All of the SCADA hydrographs were reviewed in accordance with the protocol. An average flow was visually estimated for each pump station during the days prior to the rainfall event and when not affected by other rainfall. A daily peak flow was visually estimated for the timeframe during and immediately following the rainfall event. These results were entered into an Excel™ spreadsheet called *Hydrograph Evaluation*.

The peak flow for each rainfall event and each pump station was calculated by dividing the average peak flow by the average flow. Excel™ was also used to calculate if the pump station displayed an RDII signature for each rainfall event and both events.

The *Hydrograph Evaluation* spreadsheet was imported and linked in Access™. This provides the user with an efficient way to compare and sort the data with Access™ and use the data with Excel™ to generate charts and perform calculations. Modifications are made to the Excel™ spreadsheet which automatically updates the Access™ database.

### 3.3.1 Determining Average Flow

Generally the flows occurring prior to the rain event were used to determine the average flow because it typically takes hours and sometimes days for a pump station flow to return to average after a rain event. Some of the pump stations had a data pattern indicating the flows differ on the weekday verses the weekend. This is particularly true for basins in areas zoned for commercial or industrial use. For these basins, the day of the week that the rain event occurred was identified. If the rain event occurred on a weekend, only the weekend flow prior to the storm was used to determine the average flow.

### 3.3.2 Determining Peak Flow

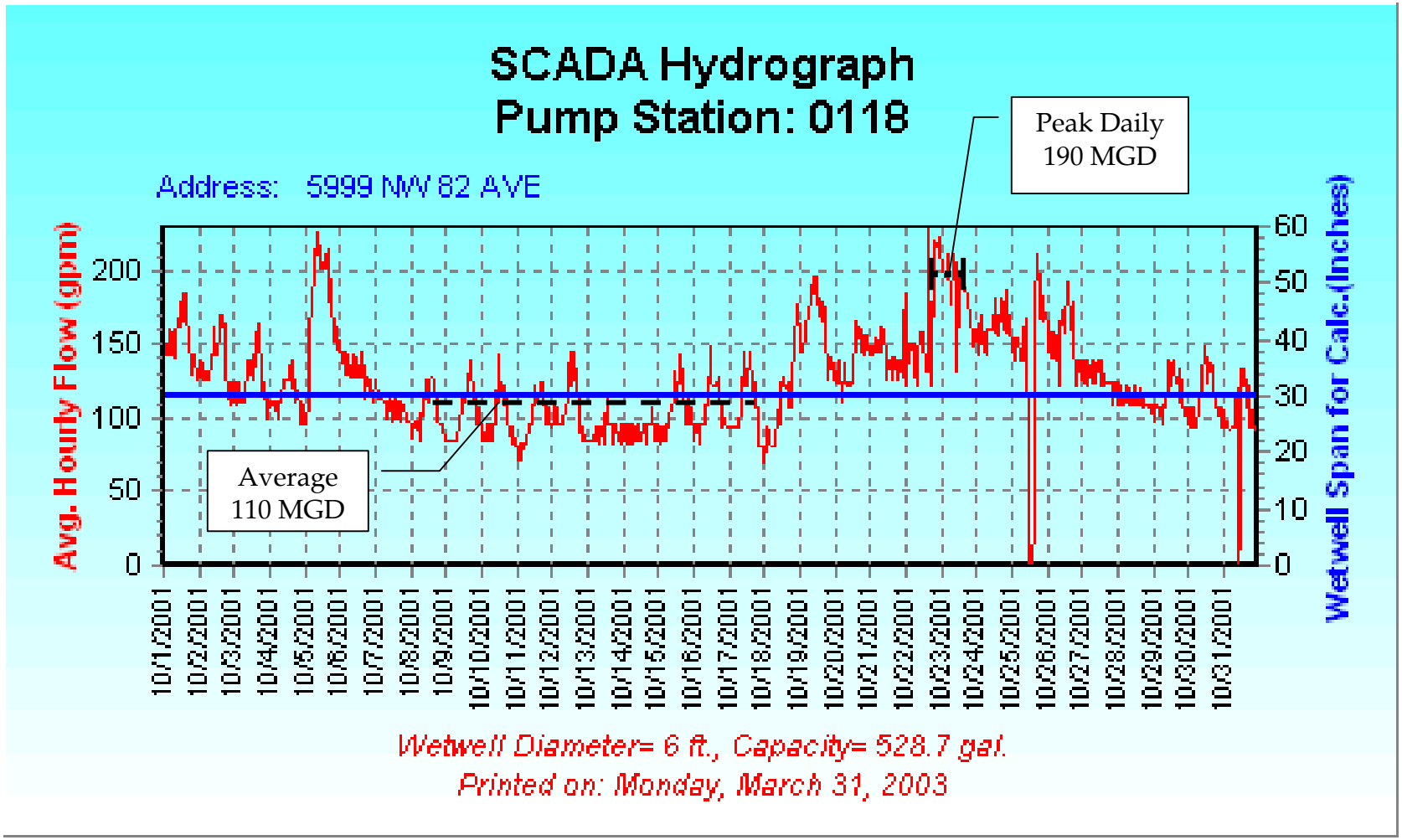
Generally, the hydrographs spiked on the day of the rain event. The protocol requires the determination of the peak daily flow, not a peak instantaneous flow. Therefore, the reviewer estimated an average flow from the maximum portion of the flow spike spanning a 24-hour period from the hydrograph. **Figure 3-1** contains a hydrograph with the average and average peak flow identified.

### 3.3.3 Data Corrections

The flow data entered into the *Hydrograph Evaluation* spreadsheet was evaluated for errors. The October 2001 peaking factor was subtracted from the September 2001 peaking factor. All peaking factors that differed by 1.0 or more were reviewed for a second time.

During this process, it was discovered that the timing of the two rainfall events was causing a problem with estimating the average flow and resulting in a variable peak

**Figure 3-1**
**Hydrograph with Average and Peak Daily Flow Indicated**



factor. The September and October hydrographs were evaluated separately. The average flow was estimated from the graph prior to the rainfall event.

For nine of the pump stations, the October 2001 average flow prior to the storm was greater than the September 2001 average flow, but the peak flow during both flows was not much different. The difference in the average flow reading occurred because these pump stations did not recover after the first rainfall event before the second occurred. The result was a lower peak factor for the October 2001 rainfall event. These errors were corrected by setting the average flow for October 2001 as equal to the September 2001 average flow. **Table 3-1** summarizes the pump stations that were corrected in this manner.

**Table 3-1**
**Pump Stations with Slow Recovery**

| Pump Station | 09/01 Average Flow (gpm) | Initial 10/01 Average Flow (gpm) | Corrected 10/01 Flow (gpm) |
|---|---|---|---|
| 115 | 70 | 400 | 70 |
| 116 | 14 | 29 | 14 |
| 191 | 19 | 70 | 19 |
| 194 | 35 | 90 | 35 |
| 336 | 12 | 40 | 12 |
| 481 | 6 | 15 | 6 |
| 729 | 13 | 20 | 13 |
| 813 | 18 | 14 | 18 |

A second problem identified during this process is related to the span used to calculate the flow on the hydrograph. For some of the pump stations, the two hydrographs were generated using different spans. In addition, at least twenty pump stations did not have the span indicated on one of the hydrographs. Eighteen of the pump stations with hydrographs calculated using different spans were selected for the CLIP.

When the span is changed on the hydrograph, it changes the scale and the estimated average and peak flow. Since both flows will change at the same incremental rate, the peak factor is still a true number. To ensure the raw data is comparable for each pump station, the hydrographs should be generated using the same span, and the span information should be indicated on the hydrograph. Details about the pump stations with different spans or missing information are provided in **Appendix C.**

### 3.3.4 Re-Pump Stations

The CLIP Selection Protocol calls for the identification of re-pump stations. To determine if a pump station qualifies as a re-pump station, MWH utilized two Access™ databases provided by MDWASD. One Access™ database called *Upstream PS List* contains a list of all pump stations and any upstream pump stations and its upstream level. The other database called *tblUpstreamPaths* provided the wastewater plant and all pump stations including re-pump stations in tabular form.

The *Upstream PS List* database was modified slightly to make it easier to filter for those pump stations that were re-pumping flow. The re-pump station numbers were entered into the UpStream column and a zero was entered into the UpstreamLev column. This allows an Access™ user to filter or query on the UpStream column for all records that contain data which also have a zero in the Upstream Lev column. This filter or query will return all re-pump stations.

The *Re-Pump Query* was developed with the *Upstream PS List* using the method previously described. The query was created to show all pump stations and to identify those that re-pumped flow. A calculating column was added in the query which returns either a Yes or No display indicating if the pump station re-pumps flow. This query is used in the other queries to avoid creating a duplicate field in the *RDII Database*. A query was created to merge the *RDII Database* table with *the Re-Pump Query* entitled *RDII Database and Re-Pump.*

While reviewing the re-pump station databases it was observed that several pump stations were shown as re-pump stations even though they were no longer operating in this manner. Additional reviews were conducted on the database and corrections were made. **Appendix C** contains details about the corrections.

## 3.4 PUMP STATION CHARACTERISTICS

Once the information is obtained from the hydrographs and the list of pump station basins has been reduced to those with an RDII signature, additional factors are considered. In the CLIP plan, MDWASD agreed to select basins with a variety of characteristics. This will allow them to study the effect of these characteristics on the reduction of RDII to determine which have more or less of an impact on the success of the repairs. These characteristics were entered into several tables within the RDII Access™ database. Using a variety of basin selections also allows representation of the entire MDWASD system. The following sections provide additional details about the characteristic data.

### 3.4.1 Basin Size

MWH obtained basin size data from MDWASD in an Access™ table along with night flow information. MWH added this table into the MDWASD RDII Database and named

it *Basin Characteristics*. The information in the table was not evaluated for accuracy or altered.

### 3.4.2 Basin Location

MWH created an Access™ table called *RDII Database* to store the characteristics indicated in the protocol that was not found in other Access™ tables.

The CLIP Selection Protocol requires the identification of each basin location. Three fields were created in the *RDII Database* table to capture information about the proximity of each lift station that could be sorted and evaluated. Conditions were entered to limit the data that could be entered for consistency. One field indicates if the pump station is generally located in the Northern, Central or Southern section of the County. The second field indicates if the basin is generally located East or West of US-1. The third field indicates if the basin is located in a wellfield protection area.

The North, Central or South field is designed so a user may only enter a "N" for North, "C" for Central, "S" for South. If a pump station is north of NW 58th Street, Hialeah Drive or NW 54th Street, the value "N" should be entered in the field. If the pump station is south of SW 136th Street, the value "S" should be entered in the field. All other stations should be entered as "C" for Central. A map of the pump stations was used to determine the correct value for each station.

The East or West field is a "Yes/No" data type, but the results will appear as either East or West. The default value is No or West. If a pump station is east of US-1, a user should change West to East. Using their GIS data, MDWASD generated a list of Stations that were located east of US-1 for MWH to use to enter the data in the table.

The Wellfield Protection Area field is also a "Yes/No" data type with a default value of No. MDWASD provided MWH with a list of pump stations located in a wellfield protection area.

The CLIP Selection Protocol required the identification of pump station basins near water bodies. MWH attempted to create a "Yes/No" field in the *RDII Database* table to indicate if a pump station is adjacent to a body of water. The information that could be generated from MDWASD GIS data was investigated. It was determined that a list of pump station basins located within a specified distance from a water body could not be obtained. Using a map provided by MDWASD, MWH visually located pump stations that appeared to be adjacent water bodies. However, while reviewing the results, it was determined that the data was too arbitrary since there was no distance or water body criteria. For example, a list of criteria such as size and depth had not been established to define as a water body. Therefore, this field was removed from the *RDII Database* table.

### 3.4.3 Private Service Lateral Age

The private service lateral age is an important characteristic identified within the CLIP Selection Protocol. A field was created in the *RDII Database* table to capture information about the approximate age of the laterals within the pump station basin. Using a map of the pump station basins and the Miami-Dade County Property Appraiser's website, the average construction age of the buildings within the basin was estimated and entered into the table. There are limitations to this approach. Some of the older structures may have had their service lateral replaced. When a pump station basin was found to have a majority of buildings built prior to 1945, the lateral age field was left blank.

### 3.4.4 Lateral Zoning

A field was created in the *RDII Database* table to capture information about the average zoning characteristics for the property within each pump station basin. Using a map of the basins and the Miami-Dade County Property Appraiser's website, the zoning characteristic was estimated.

In order to allow a user to sort for zoning characteristics, the data entry of the zoning description was standardized. Where several characteristics were found in one basin, all characteristics were listed in order of estimated prevalence. The total list of characteristics provided by the Property Appraiser was also reduced to make data entry and comparison more manageable. The term Commercial was used for both Commercial and Industrial zoned areas since both generally indicate larger buildings with longer laterals. The term Multi-Family was used as a general term to include townhouses, condominiums and similar structures. The term Single Family was used for both single family homes and estates. **Table 3-2** provides the list of standardized zoning descriptions.

**Table 3-2**
**Standardized Zoning Descriptions for Data Entry**

| Standard Zoning Descriptions |
|---|
| Commercial |
| Commercial / Government |
| Commercial / Multi-Family |
| Commercial / Single Family |
| Government |
| Multi-Family |
| Multi-Family / Commercial |
| Multi-Family / Commercial / Government |
| Multi-Family / Government |

| Standard Zoning Descriptions |
|---|
| Multi-Family / Single Family |
| Multi-Family / Single Family/ Commercial |
| Single Family |
| Single Family / Commercial |
| Single Family / Commercial / Multi-Family |
| Single Family / Multi-Family |
| Single Family / Multi-Family / Commercial |
| Single Family / Multi-Family / Government |

### 3.4.5 Other Factors

Information about the piping material or population was not available for each basin. Therefore, these fields were left blank in the *RDII Database*.

## 3.5 SELECTION PROCESS

After the tables and queries were created, the data was sorted and filtered to generate a short list of basins with less than 15,000 linear feet. The query is called *RDII < 15000 feet* and provides a short list of 54 basins and their characteristics. A working group reviewed the short list and reduced it from 54 basins to a final list of 34 basins. The following information describes the process used to reduce the short list. A list of all the basins selected for the CLIP is provided in **Appendix B**.

### 3.5.1 Small Basins

Three of the basins on the short list had less than 1,300 linear feet of gravity collection sewers and a low average daily flow. These small basins had hydrographs which were difficult to interpret. The working group agreed these basins should not be selected for the CLIP.

### 3.5.2 Hydrograph Data

Accurate hydrographs are required to analyze the CLIP results. The September and October 2001 hydrographs show the baseline conditions for each selected basin prior to lateral improvements. Therefore the hydrograph quality was deemed the most important consideration in its selection for inclusion in the CLIP. The working group agreed that basins with questionable hydrographs should not be selected for the CLIP.

At the time this project was being conducted, MDWASD was mass producing hydrographs from a computer program with limited capabilities. Hydrographs with erratic data would have to be corrected with a different computer program on an individual basis. Therefore, the working group wanted to avoid basins with problematic hydrographs.

The SCADA for six of the pump station basins generated hydrographs that were difficult to read or had questionable data. Some of the hydrographs had peak flow spikes so intense that it skewed the scale making it difficult to read the average flow. For example, a pump station with an average flow of 10 gpm was plotted on a chart with flow ranging from 0 to 1,000 gpm because of one erratic spike. These pump stations were removed from the final list.

### 3.5.3 RDII Signature

After the small basins and basins with questionable hydrographs were removed from the list, the remaining basins were evaluated. In addition to reviewing their hydrographs for both rainfall events; the pump station basin characteristics, night flows and NAPOT data was also reviewed. Ultimately, the quality of the hydrograph and its RDII signature generally determined if a basin remained on the final list.

Seven of the pump station basins had hydrographs that indicated the RDII duration was not severe or the station appeared to have an I/I problem but not an RDII signature. These basins were considered low priority and would remain on the list only if 30 pump station basins with an obvious RDII signature could not be identified. Once the review was complete, the final list had greater than 30 stations, so the low priority stations were completely removed prior to submittal. **Table 3-3** provides information about the 20 pump station basins that were removed from the short list.

**Table 3-3**
**Pump Stations Removed from Short List**

| Basin Number | Basin Footage (lf) | 9/01 Peak Factor | 10/01 Peak Factor | Notes |
|---|---|---|---|---|
| 70 | 507 | 23.0 | 3.0 | Basin size is too small |
| 82 | 4,906 | 20.0 | 8.8 | Hydrograph problems with spikes |
| 90 | 5,915 | 2.1 | 3.4 | Hydrograph shows RDII is moderate |
| 180 | 3,767 | 5.8 | 8.4 | Hydrograph shows RDII is a low priority, has a quick spike |
| **Basin Number** | **Basin Footage (lf)** | **9/01 Peak Factor** | **10/01 Peak Factor** | **Notes** |
| 222 | 38 | 2.1 | 2.0 | Basin size is too Small |
| 322 | 4,083 | 2.1 | 3.3 | Hydrograph shows RDII is a low priority, has a quick spike |
| 371 | 14,611 | 3.8 | 2.7 | Poor hydrograph data |
| 381 | 8,086 | 2.8 | 3.0 | Hydrograph shows RDII is a low priority |
| 400 | 2,153 | 4.6 | 2.2 | Hydrograph shows RDII is a low priority |
| 407 | 8,412 | 2.4 | 2.0 | Hydrograph indicates an in-flow problem |

| Basin Number | Basin Footage (lf) | 9/01 Peak Factor | 10/01 Peak Factor | Notes |
|---|---|---|---|---|
| 481 | 4,441 | 9.5 | 15.0 | Poor Hydrograph |
| 567 | 6,434 | 2.9 | 3.6 | Wellfield Protection Area, hydrograph problem with span or scale |
| 585 | 5,958 | 4.3 | 2.2 | Wellfield Protection Area, poor hydrograph data |
| 1012 | 5,904 | 2.9 | 4.7 | Hydrographs indicate an I/I problem, not an RDII problem |
| 1085 | 1,211 | 3.2 | 4.5 | Wellfield Protection Area, Basin size is too small |

## 3.6 PREVIOUSLY SELECTED BASINS

Ten basins were selected prior to the development and use of the protocol and Access™ database. Six additional basins were selected before the Access™ database was complete. The selection criteria used to identify these basins are described below.

### 3.6.1 Group 1 and 2 CLIP Basins

MDWASD began the CLIP program in 1999. To select the initial basins, referred to as Group 1 and 2, a "5-year", 72-hour rainfall event, which occurred September 16 through 18, 1998, was identified for study. Pump stations were selected for the CLIP if the September 1998 hydrograph showed a RDII signature and the pump station did not re-pump flow, had a small basin size, discharged to a gravity system and had adequate SCADA data. "RDII Signature" is defined as a peak factor of 2.0 or greater in a two year storm event.

**Table 3-4** provides information about these basins:

**Table 3-4**
**Pump Stations Selected for Phase I Pilot Study**

| Pump Station No. | Group | Pending Repairs | Basin Footage (lf) | No. of Laterals | 09/01 Peak Factor | 10/01 Peak Factor | RDII Signature |
|---|---|---|---|---|---|---|---|
| 35 | 2 | Mainline Contractor | 4,367 | | 2.1 | 1.4 | N |
| 47 | 1b | private laterals | 13,648 | | graph cuts off | data problem | Y |
| 116 | 1a | private laterals | 1,548 | 12 | 8.6 | 11.9 | Y |
| 118 | 1b | private laterals | | | | 1.8 | N |
| 191 | 1a | private laterals | 6,958 | 68 | 14.2 | 16.8 | Y |

| Pump Station No. | Group | Pending Repairs | Basin Footage (lf) | No. of Laterals | 09/01 Peak Factor | 10/01 Peak Factor | RDII Signature |
|---|---|---|---|---|---|---|---|
| 203 | 1a | private laterals | 5,639 | 39 | 5.0 | 3.3 | Y |
| 615 | 2 | Mainline Contractor | 5,594 | | 8.67 | did not cycle | Y |
| 763 | 1b | Private laterals | | | | | Y |
| 851 | 1b | Private laterals | 10,414 | | 2.59 | 2.17 | Y |
| 1004 | 2 | Mainline Contractor | 10,340 | | 4.44 | did not cycle | Y |

### 3.6.2 Basins Selected January 2003

In December 2002, MDWASD was completing their repairs to the Group 1 and 2 basins mainlines and wanted to begin work on additional basins. At the same time, the MDWASD RDII database was still under construction, and only the East/West basin location data had been generated. The hydrograph review had been completed and the *Hydrograph Evaluation* table had been constructed. Also, the basin size information was available. Using the incomplete data, the basins were sorted for those with a RDII signature and a basin size less than 15,000 linear feet. This list was reduced further by sorting for basins with high peak factors. Next the September and October 2001 hydrographs were briefly reviewed and the proximity of each basin was determined. Basins that were located near basins that had already been selected were removed from the list. A list of six basins was submitted to MDWASD on January 17, 2003 and are shown in **Table 3-5** below. These pump station basins were later reviewed by the working group and all were suitable to remain on the Group 3 final list.

**Table 3-5**
**Pump Stations Selected January 2003**

| Pump Station No. | Basin Footage (lf) | No. of Laterals | 09/01 Peak Factor | 10/01 Peak Factor | RDII Signature |
|---|---|---|---|---|---|
| 336 | 3,572 | | 8.3 | 3.5 | Y |
| 378 | 13,317 | | 4.1 | 3.4 | Y |
| 564 | 7,143 | 170 | 4.8 | 6.3 | Y |
| 729 | 5,044 | | 8.1 | 4.0 | Y |
| 753 | 7,175 | 92 | 5.8 | 3.7 | Y |
| 885 | 6.581 | | 4.2 | 2.7 | Y |

# Section 4
# MDWASD RDII Database Additional Uses

## 4.1 SORTING THE LIST OF SELECTED BASINS

### 4.1.1 Similar Basins

After the 34 selected pump station basins were identified, it was noted that four pairs of pump station basins had similar characteristics. The hydrographs for each pair were reviewed and the preferred stations were identified. This was documented in a letter dated March 24, 2003 to MDWASD. **Table 4-1** provides information about the four pairs of basins. The shaded pump stations are the stations that should be prioritized over the other similar basin.

**Table 4-1**
**Similar Basins in Final Selection**

| Pump Station | Basin Footage | Number of Laterals | 09/01 Peak Factor | 10/01 Peak Factor | North Central or South | Lateral Age | Zoning Characteristics |
|---|---|---|---|---|---|---|---|
| **194** | **10,570** | | **7.4** | **8.6** | **N** | **1963** | **Commercial** |
| 195 | 8,650 | | 4.0 | 2.4 | N | 1968 | Commercial |
| **509** | **10,595** | **154** | **2.4** | **3.6** | **C** | **1989** | **Multi-Family** |
| 524 | 8,562 | | 3.6 | 2.9 | C | 1983 | Single Family / Multi-Family |
| 828 | 4665 | | 3.4 | 3.1 | C | 1978 | Single Family / Multi-Family |
| **829** | **1,527** | | **4.2** | **3.4** | **C** | **1968** | **Multi-Family** |
| 1032 | 8,075 | | 2.1 | 3.6 | S | 1989 | Single Family |
| **1033** | **9,594** | | **2.5** | **3.3** | **S** | **1990** | **Single Family** |

### 4.1.2 Scheduling

Miami-Dade desires to complete the pump station basins located within wellhead protection zones first. In addition, because of budget limitations and a desire to complete as many basins as possible, the decision was made to repair the smaller basins first. The list of selected basins was sorted by location in a wellhead protection zone and then by size. There are eight pump stations located within wellhead protection zones. A query and report was created in the Microsoft Access™ database called *RDII*

*2003 Final List* which shows the selected pump station basins excluding the four similar pairs and sorts the basins by size.

## 4.2 OTHER USES FOR THE MDWASD RDII DATABASE

The MDWASD RDII Database can be used for a variety of MDWASD projects and to view select information. The database can be linked to other databases MDWASD uses to track repairs and SSES work. The first page of each report discussed below is provided in **Appendix D.**

### 4.2.1 Identifying Additional Basins for Lateral Repairs

If the CLIP is successful, the program may be expanded. The database can be used to identify additional basins for lateral repairs. Several queries and reports have been created to show basins that had an RDII signature and their characteristics. The *RDII < 15000 feet* query was used to generate the short list of basins. As additional hydrographs are reviewed and added to the database, additional basins less than 15000 feet can be identified for lateral repairs.

Additional data is not needed to identify more basins for lateral repairs. A query was created called *RDII > 15000 < 20000 feet* which identifies basins that are larger than 15,000 linear feet but smaller than 20,000 linear feet. Without additional data, these basins would be the next logical group of basins to use for lateral repairs.

### 4.2.2 Identifying RDII Basins

The database can be used to identify basins with adequate hydrographs and an RDII signature. These basins could be prioritized over others for repairs. Two queries and reports were created to show RDII basins and their characteristics. The *RDII Pump Stations and Characteristics* query and report shows basic characteristics such as address, basin size and peak factors for basins with an RDII signature. The *RDII Pump Stations and Night Flows* report shows limited hydrograph information with the night flow data.

### 4.2.3 Reviewing Night Flow Data

Night flow was a parameter of interest indicated in the October 2002 CLIP Basin Selection Protocol. The database can be used to review night flows for all pump stations and compare it to the RDII data. The *Night Flows* report shows every pump station basin, cycling pump information, peak factors and night flows.

### 4.2.4 Identifying Re-Pump Stations and Multi-Speed Stations

The database can be used to identify pump stations that re-pump flow to another pump station, pump stations with multi-speed pumps and re-pump station paths. Two

queries and three reports were created for this purpose. The *Repump Query* query and report and the *Multi Speed Pumps* query and report provide a list of stations with the indicated characteristic. The *Repump Upstream Paths* report provides the user with a report showing each wastewater plant and pump station receiving flow from another pump station.

### 4.2.5 Identifying Pump Stations with Adequate Capacity

The database may be used to identify pump stations that continued to operate properly during rainfall events. When the pumps in a station continue to turn on and off in response to the float controls and the liquid level in the wet well, it can also be called a cycling pump station. At this time, two events are entered into the RDII database, the September 27 to 29, 2001 event, a five year three-day storm, and the October 3, 2000 event which was a 100 year rainfall event. The *Non-Cycling Pump Stations* shows all pump stations that did not cycle for either event. The *Cycles 09/01* and *Cycles 10/00* queries and reports shows all of the pump stations that cycled during the respective rainfall events.

### 4.2.6 Identifying Inconsistent Databases

The database can be used to identify pump stations that do not have records in the Basin Characteristics database. The pump station basins listed in the RDII database table come from several MDWASD sources. *The RDII Database w/o Matching Basin Inventory* query and report lists all of the pump stations which are not found in the *Basin Inventory* table. This list of stations should be verified to identify those stations that no longer exist and stations that should be entered into the Basin Inventory table.

### 4.2.7 Developing System Wide Peak Factor Charts

The hydrograph evaluation data was kept in a Microsoft Excel™ spreadsheet to allow a user to perform calculations and create system wide peak factor charts from the data. Modifications and additions must be made to the Excel™ spreadsheet.

## 4.3 UPDATING THE DATABASE

As more rainfall events or additional characteristics are identified for study, the resulting data could be entered into the database. Due to the way Access™ operates, the queries and reports will need to be added or modified to show the new data.

### 4.3.1 Forms

A form was created for each table to improve and simplify data entry. The *RDII Database* form includes option buttons and list boxes for yes/no and restricted fields. A pick list is provided for the zoning characteristic field to ensure consistency in the way

the data is entered. Instructions are also provided on the form to assist the user. Instructions are also provided with the *Upstream PS List Tabular Entry* form.

# Section 5
# RDII Database Structure

## 5.1 DATABASE STRUCTURE

Microsoft Access™ stores data in several major objects including tables, queries, Form and reports. Tables are used to store raw data and Queries are used to analyze the data contained in one or more Tables or found in other Queries. Forms are used to simplify data entry and Reports are used to print data from tables or queries. The MDWASD RDII Database is made up of the objects described in **Table 5-1**.

**Table 5-1**
**Database Objects**

| Object | Name | Description |
|---|---|---|
| Table | Basin Inventory | Created by MDWASD staff, includes Night Flows and Basin Size |
| Table | Hydrograph Evaluation | Imported from Microsoft Excel™, this table includes the data read from the September 2001 and October 2001 hydrographs and calculated data. |
| Table | RDII Database | Table created to store information identified in the CLIP Basin Selection Protocol. |
| Table | tblUpstreamPaths | Created by MDWASD staff to show pump stations paths to each wastewater plant |
| Table | Upstream PS List | Created by MDWASD staff to show pump stations and their upstream stations. The Table was slightly modified to make it easier to identify re-pump stations. |
| Query | Basin Characteristics | Combines data from two tables, Basin Characteristics and RDII Database and the RePump Query |
| Query | Cycles 09/01 | Limits data from the RDII Database table to pump stations that cycled during the target September 2001 rainfall event |
| Query | Cycles 10/00 | Limits data from the RDII Database table to provide a list of pump stations that cycled during the October 3, 2000 rainfall event |
| Query | Group 1 and 2 Selected Basins | Limits data from the RDII Database table to provide a list of pump stations that were selected prior to 2003 for the CLIP |
| Query | Group 3 Selected Basins | Limits data from the RDII < 15000 feet to provide the list of basins selected in 2003 for the CLIP |
| Query | Multi Speed Pumps Query | Limits data from the RDII Database table to provide a list of pump stations with multi-speed pumps |
| Query | Non-Cycling Pump Stations | Limits data from the RDII Database table to provide a list of pump stations that did not cycle during both the September 2001 and October 2000 rainfall events |
| Query | Pump Station Night Flows | Combines data from the Basin Characteristics and RDII Database tables and shows peak factors and night flows |

| Object | Name | Description |
|---|---|---|
| Query | RDII < 15000 feet | This query is used to implement the CLIP Basin Selection Protocol. It combines data from three tables and one query and limits data to pump stations with a RDII signature and a basin size less than 15,000 feet |
| Query | RDII > 15000 < 20000 feet | Same as RDII < 15000 feet but limits the pump stations to basins with 15,000 to 20,000 feet |
| Query | RDII Database and Re-Pump | Combines all data from the RDII Database table and the RePump Query |
| Query | RDII Database Without Matching Basin Inventory | Provides a list of pump stations found in the RDII database table but are not found in the Basin Inventory table |
| Query | RDII Final List | Limits the RDII < 15000 feet query to only the stations selected for the CLIP |
| Query | RDII Pump Stations and Characteristics | Same as RDII < 15000 feet but shows all basins with a RDII signature |
| Query | RDII Pump Stations and Night Flows | Combines data from three tables and one queries and shows Basin and Night Flow information for pump stations with a RDII Signature |
| Query | RePump Query | Limits the data from the Upstream PS List Table to show each pump station and calculates if the station re-pumps flow. This is a critical Query and is used in many of the other Queries including the one used to select the CLIP basins. |
| Query | RePump Stations | Limits the data from the RePump Query to provide a list of pump stations that re-pump flow |
| Form | Basin Inventory | Provides a data entry interface for the corresponding table |
| Form | RDII Database | Provides instructions and a data entry interface for the corresponding table |
| Form | tblUpstreamPaths | Provides a tabular data entry sheet for the corresponding table |
| Form | Upstream PS List | Provides a tabular data entry sheet for the corresponding table |
| Report | Basin Characteristics | Allows the user to print data from the Basin Characteristics query. The data is arranged so information for each pump station is displayed individually per page. |
| Report | Basin Characteristics – Table | Allows the user to print data from the Basin Characteristics query. The data is displayed in tabular form. |
| Report | Cycles 09/01 | Allows the user to print data from the corresponding query. The data is displayed as a list. |
| Report | Cycles 10/00 | Allows the user to print data from the corresponding query. The data is displayed as a list. |
| Report | Group 1 and 2 Selected Basins | Allows the user to print data from the corresponding query. The data is displayed in tabular form |
| Report | Group 3 Selected Basins | Allows the user to print data from the corresponding query. The data is displayed in tabular form |

| Object | Name | Description |
|---|---|---|
| Report | Hydrograph Evaluation | Allows the user to print data from the corresponding table. The data is displayed in tabular form. |
| Report | Multi Speed Pumps | Allows the user to print data from the corresponding query. The data is displayed as a list. |
| Report | Night Flows | Allows the user to print data from the corresponding query in tabular form. |
| Report | Non-Cycling Pump Stations | Allows the user to print data from the corresponding query. The data is displayed as a list. |
| Report | RDII < 15000 feet | Allows the user to print data from the corresponding query in tabular form. |
| Report | RDII > 15000 < 2000 feet | Allows the user to print data from the corresponding query in tabular form. |
| Report | RDII Database w/o matching Basin Inventory | Allows the user to print data from the corresponding query. The data is displayed as a list. |
| Report | RDII Pump Stations and Characteristics | Allows the user to print data from the corresponding query in tabular form. |
| Report | Repump Stations | Allows the user to print data from the corresponding query. The data is displayed as a list. |
| Report | Repump Upstream Paths | Allows the user to print data from the tblUpstreamPaths |

### 5.1.1 Tables

Each Access™ table consists of a Field Name and Data Type. Data Types include numbers, dates and text. For some fields, the data entry has been restricted. A user can view information about the datafields in each table in the design view.

Three tables were obtained from the MDWASD staff and only one, the *Upstream PS List*, was slightly modified. The *Upstream PS List* database was modified to make it easier to sort and identify the pump stations that were re-pumping flow. The Pump Station Number field was changed from a text field to a number field because the Basin Number field in the *RDII Database* table was also a number. This makes it possible for a user to cross check the fields between both tables. To ease the identification of re-pump stations, if the station was a re-pump station, its number was entered into the UpStream column and a zero was entered into the UpstreamLev column.

Two tables were created for this project, the *RDII Database* table and the *Hydrograph Evaluation* table. **Table 5-2** provides details about the *RDII Database* table. **Table 5-3** provides details about the Hydrograph Evaluation table.

**Note – Changing a Table field name or data type will create errors in Queries, Forms and Reports based on the Table.**

**Table 5-2**
**RDII Database Table Details**

| Field Name | Data Type | Information |
|---|---|---|
| Basin Number | Number | This is the primary key field and contains the unique number that corresponds to each pumping station. This field is formatted as a numeric number to facilitate sorting. |
| Single Speed | Yes/No | The data automatically defaults to "Yes", all variable speed pumps have been changed to "No". |
| Cycles during 9/01 Storm Event | Text | Indicates if the pump station cycled during the 9/27 through 9/29/01 storm event, a three-day, five-year rainfall event. The field is restricted, a Y is entered for Yes, N for No or C for close. The field may also be left blank. |
| Cycles during 10/00 Storm Event | Text | Indicates if the pump station cycled during the 10/03/2000 storm event, a one-day, one-hundred year rainfall event. The field is restricted, a Y is entered for Yes, N for No or C for close. The field may also be left blank. |
| North, Central or South | Text | This field indicates the north, central or south physical proximity of the station and is not related to the wastewater plants' service area. The field is restricted, a user may only enter N for North, C for Central or S for South. A pump station is considered North if it is located north of N.W. 58th Street, N.W. 54th Street or Hialeah Drive. A station is considered South if it is located south of S.W. 136th Street and all other pump stations are Central. |
| East or West | Yes/No | This field indicates the east or west physical proximity of the station. The data automatically defaults to "West", all pump stations east of US-1 have been changed to "East". |
| Wellfield Protection Area | Yes/No | The data automatically defaults to "No", all pump stations located in wellfield protection areas have been changed to "Yes". |
| Pump Station Area Zoning | Text | This field provides the average zoning for the properties within the basins. |
| Basin Population | Number, Long Integer | The population served by each basin. |
| Pipe Material | Text | The pipe material of the gravity collection system within the basin. |

| Field Name | Data Type | Information |
|---|---|---|
| Estimated Lateral Age | Date | This field provides the average date the buildings within the basin were constructed which is assumed to be the year the lateral was constructed. |

**Table 5-3**
**Hydrograph Evaluation Table Details**

| Field Name | Data Type | Information |
|---|---|---|
| Basin Number | Number | This is the primary key field and contains the unique number that corresponds to each pumping station. This field is formatted as a numeric number to facilitate sorting. |
| 9/01 Average Flow Rate (gpm) | Number, Long Integer | Average flow visually estimated from the 9/01 hydrograph |
| 10/01 Average Flow Rate (gpm) | Number, Long Integer | Average flow visually estimated from the 10/01 hydrograph |
| 9/01 Peak Flow Rate (gpm) | Number, Long Integer | Average Peak Flow visually estimated from the 9/01 hydrograph |
| 10/01 Peak Flow Rate (gpm) | Number, Long Integer | Average Peak Flow visually estimated from the 10/01 hydrograph |
| 9/01 Peak Factor | Number, Single | The 9/01 Peak Flow divided by the 9/01 Average Peak Flow |
| 10/01 Peak Factor | Number, Single | The 10/01 Peak Flow divided by the 10/01 Average Peak Flow |
| RDII Signature for 9/01 Event | Text | Calculated Field, enters Y for Yes if the Peak Factor is greater than 2 for the September 27-29, 2001 rainfall event, otherwise enters N for No |
| RDII Signature for 10/01 Event | Text | Calculated Field, enters Y for Yes if the Peak Factor is greater than 2 for the October 21, 2001 rainfall event, otherwise enters N for No |
| RDII Signature | Text | Calculated Field, enters Y for Yes if the Peak Factor is greater than 2 for the September and October 2001 rainfall events, otherwise enters N for No |

### 5.1.2 Queries

Several custom Queries have been developed. **Table 5-4** provides details about these queries. When field criteria were used to limit the data shown in the query, the field and criteria are included in the Table.

**Note – The RePump Query was created to avoid duplicate data entry. This Query is used in subsequent Queries and should not be altered or deleted.**

**Table 5-4**
**Query Details**

| Query | Data Sources | Field | Criteria |
|---|---|---|---|
| Basin Characteristics | RDII Database Table<br>Basin Inventory Table<br>Repump Query | No Criteria Selected | |
| Cycles 09/01 | RDII Database Table | No Criteria Selected | |
| Cycles 10/00 | RDII Database Table | No Criteria Selected | |
| Group 1 and 2 Selected Basins | RDII Database Table | Basin No. | = 35 or 47 or 116 or 118 or 191 or 203 or 615 or 767 or 851 or 1004 |
| Multi Speed Pumps Query | RDII Database Table | Single Speed | No |
| Non-Cycling Pump Stations | RDII Database Table | Cycles During 09/01 Storm Event | Is Null or N |
| | | Cycles During 10/00 Storm Event | Is Null or N |
| Pump Station Night Flows | RDII Database Table<br>Basin Inventory Table | No Criteria Selected | |
| RDII < 15000 feet | RDII Database Table<br>Hydrograph Evaluation<br>Basin Inventory Table<br>Repump Query | Single Speed | Yes |
| | | Basin Footage | < 15001 |
| | | Peak Factor 9/01 | > 2.00 |
| | | Peak Factor 10/01 | > 2.00 |
| RDII > 15000 < 2000 feet | RDII Database Table<br>Hydrograph Evaluation<br>Basin Inventory Table<br>RePump Query | Single Speed | Yes |
| | | Basin Footage | > 15000 < 20001 |
| | | Peak Factor 9/01 | > 2.00 |
| | | Peak Factor 10/01 | > 2.00 |
| RDII Database and Re-Pump | RDII Database Table<br>RePump Query | No Criteria Selected | |
| RDII Database Without Matching Basin Inventory | RDII Database Table<br>Basin Inventory Table | Basin Number | Is Null |
| Group 3 Selected Basins | RDII < 15000 feet | Basin No. | = (list of stations) |
| RDII Pump Stations and Characteristics | RDII Database Table<br>Hydrograph Evaluation<br>Basin Inventory Table<br>RePump Query | Single Speed | Yes |
| | | Peak Factor 9/01 | > 2.00 |
| | | Peak Factor 10/01 | > 2.00 |

| Query | Data Sources | Field | Criteria |
|---|---|---|---|
| RDII Pump Stations and Night Flows | RDII Database Table<br>Hydrograph Evaluation<br>Basin Inventory Table<br>RePump Query | Single Speed | Yes |
| | | Peak Factor 9/01 | > 2.00 |
| | | Peak Factor 10/01 | > 2.00 |
| RePump Query | Upstream PS List Table | Upstream | Is Not Null<br>Is Null |
| | | UpstreamLev | 0 |
| | | Re-Pump Station: Format([Upstream PS List]![UpStream] Is Not Null,"Yes/No") | |
| Re-Pump Stations | RDII Database Table<br>RePump Query | Re-Pump Station | Yes |

## 5.2 REPORTS

Queries are used to filter, evaluate and compare data from one or more Tables on the computer. Queries are not print ready. Therefore a custom Report has been generated for each Query and a description of each are found in **Table 5-5**.

**Table 5-5**
**Report Details**

| Report | Description |
|---|---|
| Basin Characteristics | This report shows all of the data that is contained in the Basin Characteristics Query. Each page contains all of the available data for a single pump station. This report is for a user that wants to review data for a few stations or view all available data for one station. |
| Basin Characteristics-Table | This report shows all of the data that is contained in the Basin Characteristics Query in tabular form on 11 by 17 paper. For some of the fields, results of interest are given in bolded red text. This report is for a user that wants to see data for a large number of pump stations. |

| Report | Description |
|---|---|
| Cycles 09/01 | This report shows a list in 3 columns of the pump stations that cycled during the September 27-29, 2001 rainfall event and the total number of pump stations is shown on the last page of the report. The report prints on 8.5 by 11 sized paper. |
| Cycles 10/00 | This report shows a list in 3 columns of the pump stations that cycled during the October 3, 2000 rainfall event and the total number of pump stations is shown on the last page of the report. The report prints on 8.5 by 11 sized paper. |
| Group 1 and 2 Selected Basins | This report shows the list of group 1 and 2 basins selected prior to 2003 for the CLIP in tabular form and prints on 11 by 17 sized paper. The basins are s sorted by name. For some of the fields, results of interest are given in bolded red text. |
| Group 3 Selected Basins | This report shows the list of group 3 basins selected in 2003 for the CLIP in tabular form and prints on 11 by 17 sized paper. The basins found in wellfield protection areas are listed first and then the basins are sorted by size. For some of the fields, results of interest are given in bolded red text. |
| Hydrograph Evaluation | This report shows all of the data that is contained in the Hydrograph Evaluation Table in tabular form on 8.5 by 11 paper. For some of the fields, results of interest are given in bolded red text. |
| Multi Speed Pumps | This report shows a list in 3 columns of the pump stations that have multi-speeds and the total number of pump stations is shown on the last page of the report. The report prints on 8.5 by 11 sized paper. |
| Night Flows | This report shows all basins and their night flow data in tabular form on 8.5 by 11 paper. For some of the fields, results of interest are given in bolded red text. |
| RDII < 15000 feet | This report shows all basins with a RDII Signature and a basin size that is less than 15,000 linear feet in tabular form on 11 by 17 sized paper. This is the query that was used to select the basins for the CLIP. For some of the fields, results of interest are given in bolded red text. |

| Report | Description |
|---|---|
| RDII > 15000 < 20000 feet | This report shows all basins with a RDII Signature and a basin size that is greater than 15,000 linear feet but less than 20,000 linear feet in tabular form on 11 by 17 sized paper. This query was generated for use in the event a sufficient number of basins could not be selected from the RDII < 15000 feet list. |
| RDII Database | This report shows all of the data that is contained in the RDII Database Table in tabular form on 11 by 17 sized paper. For some of the fields, results of interest are given in bolded red text. |
| RDII Database w/o matching Basin Inventory | This report shows a list in 3 columns of the pump stations that have records in the RDII Database Table but not in the Basin Inventory Table. The report prints on 8.5 by 11 sized paper. |
| RDII Pump Station and Night Flows | This report provides information from the query by the same name in tabular form and prints on 11 by 17 sized paper. For some of the fields, results of interest are given in bolded red text. |
| RDII Pump Stations and Characteristics | This report provides the information from the query of the same name and prints in tabular form on 11 by 17 sized paper. For some of the fields, results of interest are given in bolded red text. |
| RePump Stations | This report shows a list in 3 columns of the pump stations that re-pump flows and the total number of pump stations is shown on the last page of the report. The report prints on 8.5 by 11 sized paper. |
| Repump Upstream Paths | This report shows data from the Upstream PS List Table in tabular form and prints on 8.5 by 11 sized paper. |


# APPENDIX A
# CLIP BASIN SELECTION PROTOCOL

MWH

# Appendix A
# CLIP Basin Selection Protocol

The following protocol shall be conducted for each applicable Miami-Dade Water and Sewer Department Pump Station to determine if the station has a Rainfall Dependent Infiltration and Inflow (RDII) signature for the Comprehensive Lateral Investigation Program (CLIP).

Step 1: Review the databases for all pump stations and identify all of the pump stations that are designed to operate less than 24 hours per day, 7 days per week (essentially single speed pump stations). Only these pump stations will be evaluated further for part of the Lateral Pilot Study.

Step 2: Identify two storm events (S.E.) that display the characteristics of a 24-hour rainfall event with about a 2-year return frequency. When data can not be obtained for a storm with this specific characteristic, a 72-hour rainfall event with a 2 or 1-year return frequency or a 24-hour rainfall event with a 1-year return frequency shall suffice.

Step 3: Generate a hydrograph for each pump station identified in Step 1 and each storm event identified in Step 2. Each hydrograph should bracket, where possible, a 30-day period with the S.E. occurring around the middle of the timeframe chosen. The hydrograph shall represent the flow rate into the station and the change in the liquid level of the wetwell (span).

Step 4: Review the hydrographs generated as part of Step 3 and determine if the pumps in the station cycled during the storm event. Only these pump stations will be evaluated further for inclusion in the Lateral Pilot Study.

Step 5: For all pump stations identified in Step 4, review the hydrograph during the days the storm event did not appear to influence flow and estimate the average flow rate. Assume that this is the average daily flow rate during non S.E. conditions and record the average value.

Step 6: For all pump stations identified in Step 4, review the hydrograph both during and immediately after the days the storm occurred and estimate the average flow during a 24-hour period. Assume that this is the peak daily flow rate during S.E. conditions and record the average peak flow value.

Step 7: Calculate the RDII peaking factor for each pump station identified in Step 4 by dividing the peak daily flow rate obtained in Step 6 with the average daily flow rate obtained in Step 5.

a. If the RDII peaking factor is equal to or greater than 2, continue the evaluation.
b. If the peaking factor is less than 2, the pump station will be considered as having no RDII signature for the purposes of this study.

Step 8: For each pump station identified in Step 7a; review the pump station atlas, map and repump list, to determine if the pump station is a repump station.

a. If the pump station is not a repump station and has its own public collection system, continue the evaluation.
b. If the pump station is a repump station and it receives flow from a public collection system, continue the evaluation.
c. If the pump station is a repump station, but it does not receive flow from its own public collection system, the pump station will be considered as having no RDII signature for the purposes of this study.

Step 9: For all pump stations identified in Step 8b, subtract the upstream pump station flow contribution from the repump station for both average and peak daily flow. Assume that the adjusted flow represents the S.E. conditions for the repump station gravity system. Calculate the adjusted RDII peaking factor by dividing the adjusted peak daily flow with the adjusted average daily flow.

a. If the RDII peaking factor greater than 2.0, continue the evaluation.
b. If the RDII peaking factor is less than 2, the pump station will be considered as having no RDII signature for the purposes of this study.

Each pump station identified in Step 8a and Step 9a will be considered as having a RDII signature. To complete the CLIP, a representative sample of the various types of RDII pump station basins (RDII basins) will be selected. These pump stations will be ranked according to the following criteria in the order indicated.

1. Pump Station Basin Size:

The number of RDII basins will be reduced by sorting the list by small or medium sized basins, those with less than 15,000 linear feet of gravity sewer. The number will be reduced to increase the variety of RDII basins that can be studied.

2. Pump Station Basin Location:

After the RDII basins have been reduced, RDII basins that represent various geographical areas of Miami-Dade County will be selected. The following location categories will be considered:

a) North District
b) Central District
c) South District
d) Type of Zoning
e) Coastal (East of US-1)
f) Inland (West of US-1)
g) Within potable water wellfield protection zone
h) Adjacent to primary surface water body such as the Miami River

3. Pump Station Basin Gravity System Condition:

After the RDII basins have been sorted by size and location, the condition of the gravity system will be the considered. These criteria will include:

a) Age
b) Pipe Material

4. Pump Station Basin Other Criteria

Other criteria that may be considered to select RDII basins for the CLIP are:

a) Population
b) NAPOT Data
c) Night flow data and GPIDPM calculations
d) Flow patterns that change from work week to weekend
e) Soil Conditions
f) Groundwater Elevation

# Appendix A
# CLIP Basin Selection Protocol

The following protocol shall be conducted for each applicable Miami-Dade Water and Sewer Department Pump Station to determine if the station has a Rainfall Dependent Infiltration and Inflow (RDII) signature for the Comprehensive Lateral Investigation Program (CLIP).

Step 1: Review the databases for all pump stations and identify all of the pump stations that are designed to operate less than 24 hours per day, 7 days per week (essentially single speed pump stations). Only these pump stations will be evaluated further for part of the Lateral Pilot Study.

Step 2: Identify two storm events (S.E.) that display the characteristics of a 24-hour rainfall event with about a 2-year return frequency. When data can not be obtained for a storm with this specific characteristic, a 72-hour rainfall event with a 2 or 1-year return frequency or a 24-hour rainfall event with a 1-year return frequency shall suffice.

Step 3: Generate a hydrograph for each pump station identified in Step 1 and each storm event identified in Step 2. Each hydrograph should bracket, where possible, a 30-day period with the S.E. occurring around the middle of the timeframe chosen. The hydrograph shall represent the flow rate into the station and the change in the liquid level of the wetwell (span).

Step 4: Review the hydrographs generated as part of Step 3 and determine if the pumps in the station cycled during the storm event. Only these pump stations will be evaluated further for inclusion in the Lateral Pilot Study.

Step 5: For all pump stations identified in Step 4, review the hydrograph during the days the storm event did not appear to influence flow and estimate the average flow rate. Assume that this is the average daily flow rate during non S.E. conditions and record the average value.

Step 6: For all pump stations identified in Step 4, review the hydrograph both during and immediately after the days the storm occurred and estimate the average flow during a 24-hour period. Assume that this is the peak daily flow rate during S.E. conditions and record the average peak flow value.

Step 7: Calculate the RDII peaking factor for each pump station identified in Step 4 by dividing the peak daily flow rate obtained in Step 6 with the average daily flow rate obtained in Step 5.

a. If the RDII peaking factor is equal to or greater than 2, continue the evaluation.
b. If the peaking factor is less than 2, the pump station will be considered as having no RDII signature for the purposes of this study.

Step 8: For each pump station identified in Step 7a; review the pump station atlas, map and repump list, to determine if the pump station is a repump station.

a. If the pump station is not a repump station and has its own public collection system, continue the evaluation.
b. If the pump station is a repump station and it receives flow from a public collection system, continue the evaluation.
c. If the pump station is a repump station, but it does not receive flow from its own public collection system, the pump station will be considered as having no RDII signature for the purposes of this study.

Step 9: For all pump stations identified in Step 8b, subtract the upstream pump station flow contribution from the repump station for both average and peak daily flow. Assume that the adjusted flow represents the S.E. conditions for the repump station gravity system. Calculate the adjusted RDII peaking factor by dividing the adjusted peak daily flow with the adjusted average daily flow.

a. If the RDII peaking factor greater than 2.0, continue the evaluation.
b. If the RDII peaking factor is less than 2, the pump station will be considered as having no RDII signature for the purposes of this study.

Each pump station identified in Step 8a and Step 9a will be considered as having a RDII signature. To complete the CLIP, a representative sample of the various types of RDII pump station basins (RDII basins) will be selected. These pump stations will be ranked according to the following criteria in the order indicated.

1. Pump Station Basin Size:

The number of RDII basins will be reduced by sorting the list by small or medium sized basins, those with less than 15,000 linear feet of gravity sewer. The number will be reduced to increase the variety of RDII basins that can be studied.

2. Pump Station Basin Location:

After the RDII basins have been reduced, RDII basins that represent various geographical areas of Miami-Dade County will be selected. The following location categories will be considered:

a) North District
b) Central District
c) South District
d) Type of Zoning
e) Coastal (East of US-1)
f) Inland (West of US-1)
g) Within potable water wellfield protection zone
h) Adjacent to primary surface water body such as the Miami River

3. Pump Station Basin Gravity System Condition:

After the RDII basins have been sorted by size and location, the condition of the gravity system will be the considered. These criteria will include:

a) Age
b) Pipe Material

4. Pump Station Basin Other Criteria

Other criteria that may be considered to select RDII basins for the CLIP are:

a) Population
b) NAPOT Data
c) Night flow data and GPIDPM calculations
d) Flow patterns that change from work week to weekend
e) Soil Conditions
f) Groundwater Elevation


# APPENDIX B
# BASINS SELECTED FOR THE COMPREHENSIVE LATERAL IMPROVEMENT PROGRAM

MWH

# Appendix B
# Basins Selected for the Comprehensive Lateral Improvement Program

All the pump stations selected for Group 3 have single speed motors, less than 15,000 linear feet and peak factors greater than 2.0 for both storms.
None of the pump stations re-pump flow

The pump stations highlighted in grey are similar to another pump station basin in size, location and area zoning.

North – all pump stations north of NW 58th St, Hialeah Dr and NW 54th St
Central – all pump stations that are not north or south
South – all pump stations south of SW 136 Street
East – all pump stations east of US-1, Note that if the pump station is also south, the station is not likely to be tidally influenced, in sandy soil or affected by chlorides

**Table B-1**
**Selected Basins**

| Pump Station No | Group | Basin Footage (lf) | Number Laterals | Sept. 2001 Peak Factor | Oct. 2001 Peak Factor | RDII Signature | North Central South | East West | Wellfield Protection Area | Zoning Characteristics Adjacent to the Pump Station | Estimated Year Lateral Constructed | Pump Station Address | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 116 | 1a | 1,548 | | 8.6 | 5.9 | Yes | C | West | No | Commercial | 1979 | 8720 NW 13 Terr | Initial Selection for mini pilot |
| 191 | 1a | 6,958 | 60 | 14.2 | 4.8 | Yes | N | West | No | Commercial / Multi-Family | | 7598 NW 24 Ave | Early pilot |
| 203 | 1a | 5,639 | | 5.0 | 4.1 | Yes | C | West | No | Commercial | 1995 | 1400 NW 84 Ave | Early pilot |
| 47 | 1b | 13,648 | 327 | | Did not cycle | | N | West | No | | | 8109 NE 3 PL | Has P.F.>3; but did not cycle |
| 118 | 1b | 4,314 | | 6.7 | 1.8 | No | N | West | No | Commercial | 1972 | 5999 NW 82 Ave | High antecedent flow in Oct. reduced P.F.; selected prior to hydrograph review |
| 763 | 1b | 5,594 | | 2.0 | 2.0 | No | C | West | Yes | Multi-Family | 1972 | 8351 SW 79 Ave | |
| 851 | 1b | 10,414 | | 2.6 | 2.2 | No | C | West | Yes | Multi-Family | 1977 | 14402 SW 59 St | |
| 35 | 2 | 4,367 | 97 | 2.1 | 1.6 | No | N | West | No | Commercial | 1954 | 8090 NE 4 PL | Selected prior to hydrograph review. |
| 615 | 2 | 11,273 | 215 | 8.7 | Did not cycle | | C | West | Yes | Single Family | 1956 | 4147 SW 108 CT | Has P.F.>5; but did not cycle in Oct. 01 S.E. |
| 1004 | 2 | 10,340 | | 4.4 | Did not cycle | | S | East | Yes | Single Family / Multi-Family | 1953 | 15794 SW 292 St | Has P.F.>2; but did not cycle in Oct.01 S.E.; had span or wet well problem |
| 58 | 3 | 4,767 | | 3.2 | 2.4 | Yes | C | East | No | Single Family | 1946 | 930 Venetian Causeway | Tidal influence |
| 126 | 3 | 1,895 | | 2.2 | 2.7 | Yes | C | West | No | Multi-Family / Commercial | 1986 | 10725 SW 3 St. | Sweetwater Area |
| 154 | 3 | 3,583 | | 4.0 | 2.8 | Yes | C | West | No | Commercial | 1981 | 3901 NW 79 Ave. | |
| 162 | 3 | 5,779 | | 16.4 | 6.4 | Yes | C | West | No | Commercial | 1995 | 8164 NW 25 St. | |
| 194 | 3 | 10,570 | | 7.4 | 4.7 | Yes | N | West | Yes | Commercial | 1963 | 6101 NW 74 Ave. | Similar to 195, recommend using 194 |

| Pump Station No | Group | Basin Footage (lf) | Number Laterals | Sept. 2001 Peak Factor | Oct. 2001 Peak Factor | RDII Signature | North Central South | East West | Wellfield Protection Area | Zoning Characteristics Adjacent to the Pump Station | Estimated Year Lateral Constructed | Pump Station Address | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 195 | 3 | 8,650 | | 3.7 | 2.7 | Yes | N | West | Yes | Commercial | 1968 | 7351 NW 70 St. | Similar to 194, recommend using 194 |
| 336 | 3 | 3,572 | | 8.3 | 4.1 | Yes | N | West | No | Commercial | 1983 | 15701 NW 59 Ave. | Selected 1/2003 |
| 358 | 3 | 1,614 | | 6.7 | 7.3 | Yes | N | West | No | Single Family | 1957 | 4401 NW 178 Dr. | On edge of canal |
| 378 | 3 | 13,317 | | 4.1 | 3.4 | Yes | N | West | No | Single Family | 1955 | 18041 NW 32 Ave. | Selected 1/2003, high base flow |
| 380 | 3 | 8,453 | 153 | 4.8 | Did not cycle | Yes | N | West | No | Single Family | 1968 | 8420 NW 186 St. | Problem with Oct. data; P.F.>4 |
| 405 | 3 | 1,354 | | 2.6 | 2.7 | Yes | N | West | No | Multi-Family | 1967 | 6860 Brookline Dr. | |
| 410 | 3 | 8,907 | | 8.0 | 6.3 | Yes | N | West | No | Single Family /Multi-Family | 1980 | 19771 E Oakmont Dr. | |
| 509 | 3 | 10,595 | 154 | 2.4 | 3.4 | Yes | C | West | Yes | Multi-Family | 1989 | 10810 SW 72 St. | Similar to 524, recommend using 509 |
| 524 | 3 | 8,562 | | 3.6 | 3.4 | Yes | C | West | Yes | Single Family / Multi-Family / Commercial | 1983 | 119 Ave. & SW 80 St. | Similar to 509, recommend using 509 |
| 564 | 3 | 7,143 | 170 | 4.8 | 7.6 | Yes | S | West | No | Single Family | 1987 | 212 St. SW & 125 CT. Rd. | Selected 1/2003, On edge of canal |
| 577 | 3 | 8,159 | | 4.0 | 3.5 | Yes | S | East | No | Multi-Family | 1989 | SW 97 Ave. at 224 St. | |
| 603 | 3 | 12,482 | | 3.1 | 2.7 | Yes | S | East | No | Commercial | 1970 | 10800 SW 211 St. | Flattened peaks on hydrograph |
| 608 | 3 | 4,603 | | 5.4 | 5.8 | Yes | S | West | No | Single Family / Multi-Family / Commercial | 1970 | SW 206 St. at 119 Ave. | |
| 681 | 3 | 6,750 | | 60.0 | 8.8 | Yes | S | West | No | Commercial | 1985 | 15840 SW 127 Ave. | |
| 708 | 3 | 11,816 | 118 | 5.3 | 5.7 | Yes | S | East | No | Single Family | 1958 | 10491 SW 202 Terr. | |
| 729 | 3 | 5,044 | | 8.1 | 5.0 | Yes | S | West | No | Single Family | 1970 | 9520 SW 136th St. | Selected 1/2003 |
| 753 | 3 | 7,175 | 92 | 5.8 | 4.8 | Yes | C | West | Yes | Single Family | 1966 | 3037 SW 78 CT | Selected 1/2003 |
| 790 | 3 | 1,554 | | 5.3 | 6.4 | Yes | C | West | No | Commercial | 1961 | SW 73 Ave. at 83 St. | |
| 802 | 3 | 5,335 | 92 | 6.1 | 5.9 | Yes | C | West | Yes | Single Family | 1961 | 9200 SW 79 Ave. | |
| 813 | 3 | 1,579 | | 3.1 | 5.4 | Yes | C | West | No | Single Family | 1958 | 9090 SW 24 St. | |
| 823 | 3 | 9,930 | 124 | 4.3 | 3.8 | Yes | C | West | Yes | Single Family | 1968 | 10210 SW 104 St. | Quick recovery |
| 828 | 3 | 4,665 | | 3.4 | 3.6 | Yes | C | West | Yes | Single Family | 1978 | 10240 SW 91 Terr. | Similar to 829, recommend using 829 |
| 829 | 3 | 1,527 | | 4.2 | 4.5 | Yes | C | West | Yes | Multi-Family | 1968 | 9988 SW 88 St. | Similar to 828, recommend using 829 |
| 880 | 3 | 14,253 | | 4.4 | 3.0 | Yes | C | West | Yes | Single Family | 1978 | 11250 SW 127 Ave. | Between a canal and lake |
| 885 | 3 | 6,581 | | 4.2 | 3.2 | Yes | C | West | Yes | Single Family | 1979 | 12255 SW 113 Ave. | Selected 1/2003 |
| 1031 | 3 | 4,725 | | 5.9 | 10.8 | Yes | S | West | No | Single Family | 1989 | 18510 SW 356 St. | |
| 1032 | 3 | 8,075 | | 2.1 | 3.1 | Yes | S | East | No | Single Family | 1989 | 25783 SW 123 Pl. | Similar to 1033, recommend using 1033 |

| Pump Station No | Group | Basin Footage (lf) | Number Laterals | Sept. 2001 Peak Factor | Oct. 2001 Peak Factor | RDII Signature | North Central South | East West | Wellfield Protection Area | Zoning Characteristics Adjacent to the Pump Station | Estimated Year Lateral Constructed | Pump Station Address | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1033 | 3 | 9,594 | | 2.5 | 3.9 | Yes | S | East | No | Single Family | 1990 | 25000 SW 130 Ave. | Similar to 1032, recommend using 1033 |
| 1063 | 3 | 10,594 | | 4.7 | 4.0 | Yes | S | East | No | Single Family | 1972 | 18407 SW 89 Pl. | |

# Appendix B
# Basins Selected for the Comprehensive Lateral Improvement Program

All the pump stations selected for Group 3 have single speed motors, less than 15,000 linear feet and peak factors greater than 2.0 for both storms.
None of the pump stations re-pump flow

The pump stations highlighted in grey are similar to another pump station basin in size, location and area zoning.

North – all pump stations north of NW 58th St, Hialeah Dr and NW 54th St
Central – all pump stations that are not north or south
South – all pump stations south of SW 136 Street
East – all pump stations east of US-1, Note that if the pump station is also south, the station is not likely to be tidally influenced, in sandy soil or affected by chlorides

**Table B-1**
**Selected Basins**

| Pump Station No | Group | Basin Footage (lf) | Number Laterals | Sept. 2001 Peak Factor | Oct. 2001 Peak Factor | RDII Signature | North Central South | East West | Wellfield Protection Area | Zoning Characteristics Adjacent to the Pump Station | Estimated Year Lateral Constructed | Pump Station Address | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 116 | 1a | 1,548 | | 8.6 | 5.9 | Yes | C | West | No | Commercial | 1979 | 8720 NW 13 Terr | Initial Selection for mini pilot |
| 191 | 1a | 6,958 | 60 | 14.2 | 4.8 | Yes | N | West | No | Commercial / Multi-Family | | 7598 NW 24 Ave | Early pilot |
| 203 | 1a | 5,639 | | 5.0 | 4.1 | Yes | C | West | No | Commercial | 1995 | 1400 NW 84 Ave | Early pilot |
| 47 | 1b | 13,648 | 327 | | Did not cycle | | N | West | No | | | 8109 NE 3 PL | Has P.F.>3; but did not cycle |
| 118 | 1b | 4,314 | | 6.7 | 1.8 | No | N | West | No | Commercial | 1972 | 5999 NW 82 Ave | High antecedent flow in Oct. reduced P.F.; selected prior to hydrograph review |
| 763 | 1b | 5,594 | | 2.0 | 2.0 | No | C | West | Yes | Multi-Family | 1972 | 8351 SW 79 Ave | |
| 851 | 1b | 10,414 | | 2.6 | 2.2 | No | C | West | Yes | Multi-Family | 1977 | 14402 SW 59 St | |
| 35 | 2 | 4,367 | 97 | 2.1 | 1.6 | No | N | West | No | Commercial | 1954 | 8090 NE 4 PL | Selected prior to hydrograph review. |
| 615 | 2 | 11,273 | 215 | 8.7 | Did not cycle | | C | West | Yes | Single Family | 1956 | 4147 SW 108 CT | Has P.F.>5; but did not cycle in Oct. 01 S.E. |
| 1004 | 2 | 10,340 | | 4.4 | Did not cycle | | S | East | Yes | Single Family / Multi-Family | 1953 | 15794 SW 292 St | Has P.F.>2; but did not cycle in Oct.01 S.E.; had span or wet well problem |
| 58 | 3 | 4,767 | | 3.2 | 2.4 | Yes | C | East | No | Single Family | 1946 | 930 Venetian Causeway | Tidal influence |
| 126 | 3 | 1,895 | | 2.2 | 2.7 | Yes | C | West | No | Multi-Family / Commercial | 1986 | 10725 SW 3 St. | Sweetwater Area |
| 154 | 3 | 3,583 | | 4.0 | 2.8 | Yes | C | West | No | Commercial | 1981 | 3901 NW 79 Ave. | |
| 162 | 3 | 5,779 | | 16.4 | 6.4 | Yes | C | West | No | Commercial | 1995 | 8164 NW 25 St. | |
| 194 | 3 | 10,570 | | 7.4 | 4.7 | Yes | N | West | Yes | Commercial | 1963 | 6101 NW 74 Ave. | Similar to 195, recommend using 194 |

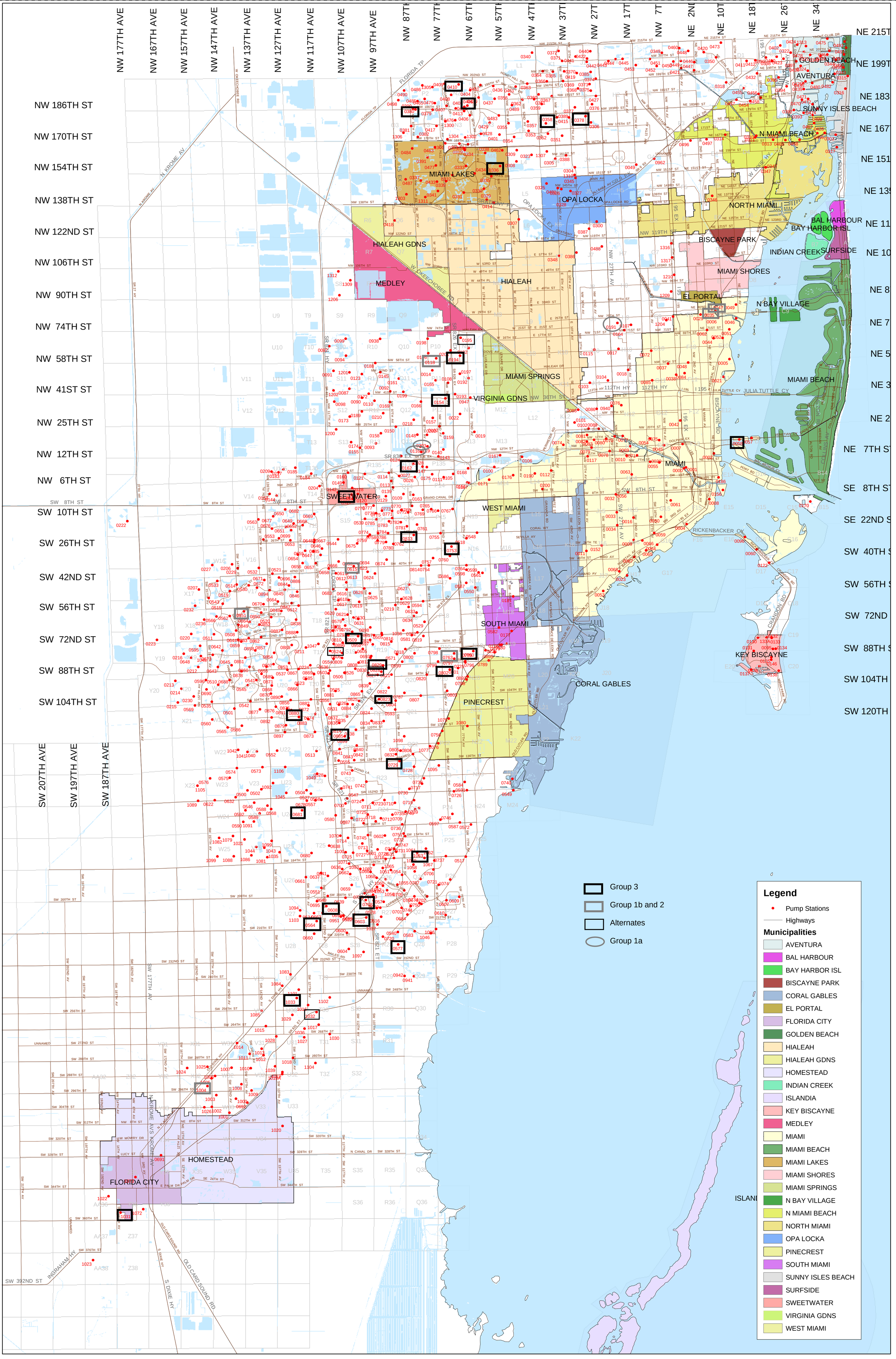
| Pump Station No | Group | Basin Footage (lf) | Number Laterals | Sept. 2001 Peak Factor | Oct. 2001 Peak Factor | RDII Signature | North Central South | East West | Wellfield Protection Area | Zoning Characteristics Adjacent to the Pump Station | Estimated Year Lateral Constructed | Pump Station Address | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 195 | 3 | 8,650 | | 3.7 | 2.7 | Yes | N | West | Yes | Commercial | 1968 | 7351 NW 70 St. | Similar to 194, recommend using 194 |
| 336 | 3 | 3,572 | | 8.3 | 4.1 | Yes | N | West | No | Commercial | 1983 | 15701 NW 59 Ave. | Selected 1/2003 |
| 358 | 3 | 1,614 | | 6.7 | 7.3 | Yes | N | West | No | Single Family | 1957 | 4401 NW 178 Dr. | On edge of canal |
| 378 | 3 | 13,317 | | 4.1 | 3.4 | Yes | N | West | No | Single Family | 1955 | 18041 NW 32 Ave. | Selected 1/2003, high base flow |
| 380 | 3 | 8,453 | 153 | 4.8 | Did not cycle | Yes | N | West | No | Single Family | 1968 | 8420 NW 186 St. | Problem with Oct. data; P.F.>4 |
| 405 | 3 | 1,354 | | 2.6 | 2.7 | Yes | N | West | No | Multi-Family | 1967 | 6860 Brookline Dr. | |
| 410 | 3 | 8,907 | | 8.0 | 6.3 | Yes | N | West | No | Single Family /Multi-Family | 1980 | 19771 E Oakmont Dr. | |
| 509 | 3 | 10,595 | 154 | 2.4 | 3.4 | Yes | C | West | Yes | Multi-Family | 1989 | 10810 SW 72 St. | Similar to 524, recommend using 509 |
| 524 | 3 | 8,562 | | 3.6 | 3.4 | Yes | C | West | Yes | Single Family / Multi-Family / Commercial | 1983 | 119 Ave. & SW 80 St. | Similar to 509, recommend using 509 |
| 564 | 3 | 7,143 | 170 | 4.8 | 7.6 | Yes | S | West | No | Single Family | 1987 | 212 St. SW & 125 CT. Rd. | Selected 1/2003, On edge of canal |
| 577 | 3 | 8,159 | | 4.0 | 3.5 | Yes | S | East | No | Multi-Family | 1989 | SW 97 Ave. at 224 St. | |
| 603 | 3 | 12,482 | | 3.1 | 2.7 | Yes | S | East | No | Commercial | 1970 | 10800 SW 211 St. | Flattened peaks on hydrograph |
| 608 | 3 | 4,603 | | 5.4 | 5.8 | Yes | S | West | No | Single Family / Multi-Family / Commercial | 1970 | SW 206 St. at 119 Ave. | |
| 681 | 3 | 6,750 | | 60.0 | 8.8 | Yes | S | West | No | Commercial | 1985 | 15840 SW 127 Ave. | |
| 708 | 3 | 11,816 | 118 | 5.3 | 5.7 | Yes | S | East | No | Single Family | 1958 | 10491 SW 202 Terr. | |
| 729 | 3 | 5,044 | | 8.1 | 5.0 | Yes | S | West | No | Single Family | 1970 | 9520 SW 136th St. | Selected 1/2003 |
| 753 | 3 | 7,175 | 92 | 5.8 | 4.8 | Yes | C | West | Yes | Single Family | 1966 | 3037 SW 78 CT | Selected 1/2003 |
| 790 | 3 | 1,554 | | 5.3 | 6.4 | Yes | C | West | No | Commercial | 1961 | SW 73 Ave. at 83 St. | |
| 802 | 3 | 5,335 | 92 | 6.1 | 5.9 | Yes | C | West | Yes | Single Family | 1961 | 9200 SW 79 Ave. | |
| 813 | 3 | 1,579 | | 3.1 | 5.4 | Yes | C | West | No | Single Family | 1958 | 9090 SW 24 St. | |
| 823 | 3 | 9,930 | 124 | 4.3 | 3.8 | Yes | C | West | Yes | Single Family | 1968 | 10210 SW 104 St. | Quick recovery |
| 828 | 3 | 4,665 | | 3.4 | 3.6 | Yes | C | West | Yes | Single Family | 1978 | 10240 SW 91 Terr. | Similar to 829, recommend using 829 |
| 829 | 3 | 1,527 | | 4.2 | 4.5 | Yes | C | West | Yes | Multi-Family | 1968 | 9988 SW 88 St. | Similar to 828, recommend using 829 |
| 880 | 3 | 14,253 | | 4.4 | 3.0 | Yes | C | West | Yes | Single Family | 1978 | 11250 SW 127 Ave. | Between a canal and lake |
| 885 | 3 | 6,581 | | 4.2 | 3.2 | Yes | C | West | Yes | Single Family | 1979 | 12255 SW 113 Ave. | Selected 1/2003 |
| 1031 | 3 | 4,725 | | 5.9 | 10.8 | Yes | S | West | No | Single Family | 1989 | 18510 SW 356 St. | |
| 1032 | 3 | 8,075 | | 2.1 | 3.1 | Yes | S | East | No | Single Family | 1989 | 25783 SW 123 Pl. | Similar to 1033, recommend using 1033 |

| Pump Station No | Group | Basin Footage (lf) | Number Laterals | Sept. 2001 Peak Factor | Oct. 2001 Peak Factor | RDII Signature | North Central South | East West | Wellfield Protection Area | Zoning Characteristics Adjacent to the Pump Station | Estimated Year Lateral Constructed | Pump Station Address | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1033 | 3 | 9,594 | | 2.5 | 3.9 | Yes | S | East | No | Single Family | 1990 | 25000 SW 130 Ave. | Similar to 1032, recommend using 1033 |
| 1063 | 3 | 10,594 | | 4.7 | 4.0 | Yes | S | East | No | Single Family | 1972 | 18407 SW 89 Pl. | |

# MIAMI - DADE WATER AND SEWER DEPARTMENT

## Pump Stations By Municipality

SERVE • CONSERVE




# APPENDIX C
# DETAILS ABOUT THE DATA

MWH

# Appendix C
# Details about the Data

## C.1 HYDROGRAPH DIFFERENCES

For some of the pump stations there were differences between the September and October 2001 hydrographs. **Table C-1** shows 71 pump stations with spans that differed by more than 2 inches or did not indicate the span on at least one of the hydrographs.

**Table C-1**
**Differences in Span**
**(larger than 2 inches)**

Note – the shaded pump stations were selected for the CLIP

| Pump Station | Span for 09/01 Hydrograph (inches) | Span for 10/01 Hydrograph (inches) | Notes |
|---|---|---|---|
| 32 | 14-18 | 15 | |
| 42 | None given | 38 | |
| 60 | 39-42 | 42 | |
| 70 | 7-13 | 7 | |
| 82 | 8-10 | 7 | |
| 90 | 26-33 | 29 | |
| 107 | None given | none given | |
| 118 | None given | 30 | Group 1 Basin |
| 162 | 32-36 | 27 | |
| 182 | None given | none given | |
| 191 | None given | none given | Initial Basin |
| 194 | 7 | 9 | |
| 203 | 15-16 | 35 | Initial Basin |
| 310 | 18-19 | 23 | |
| 312 | 10-15 | 15 | |
| 313 | 25-28 | 30 | |
| 315 | 6-7 | 10 | |
| 322 | 33-40 | 37 | |
| 323 | 16-21 | 17 | |
| 326 | 10-13 | 8 | |
| 331 | 20-22 | 38 | |
| 336 | 28-31 | 32 | |
| 339 | 20-22 | 24 | |
| 367 | 15 | 24 | |

| Pump Station | Span for 09/01 Hydrograph (inches) | Span for 10/01 Hydrograph (inches) | Notes |
|---|---|---|---|
| 371 | 16-20 | 28 | |
| 390 | 26-30 | 21 | |
| 400 | 12-14 | 10 | |
| 402 | 19-21 | 18 | |
| 410 | 17-19 | 31 | |
| 417 | None given | none given | |
| 423 | None given | none given | |
| 424 | None given | none given | |
| 450 | 32 | 28 | |
| 459 | 15-20 | 7 | |
| 477 | None given | none given | |
| 481 | 29 | 26 | |
| 484 | 32-36 | 30 | |
| 501 | None given | none given | |
| 510 | None given | none given | |
| | 23-30 | 26 | |
| 528 | 31-35 | 35 | |
| 535 | None given | none given | |
| 577 | 30-32 | 29 | |
| 601 | None given | none given | |
| 608 | 8-12 | 11 | |
| 622 | 24-28 | 27 | |
| 634 | 10-14 | 11 | |
| 666 | None given | none given | |
| 681 | 18-21 | 8 | |
| 684 | 18-20 | 24 | |
| 685 | None given | none given | |
| 704 | None given | none given | |
| 729 | 18-20 | 22 | |
| 790 | 32-36 | 26 | |
| 813 | 26-32 | 29 | |
| 822 | 22-25 | 21 | |
| 880 | 26-28 | 22 | |
| 885 | 17-21 | 16 | |
| 1004 | None given | 16 | Group 2 Basin |
| 1012 | 17-21 | 18 | |
| 1023 | None given | none given | |
| 1026 | 18-24 | 19 | |

| Pump Station | Span for 09/01 Hydrograph (inches) | Span for 10/01 Hydrograph (inches) | Notes |
|---|---|---|---|
| 1029 | 54-59 | 55 | |
| 1032 | 17-20 | 19 | Group 3 Alternative Basin |
| 1063 | 16-20 | 34 | |
| 1078 | 37 | 28 | |
| 1085 | 20 | 15 | |
| 1089 | None given | 23 | |
| 1098 | 20-26 | 21 | |
| 1302 | 35-38 | 34 | |
| 1305 | 35-38 | none given | |

**Table C-2** provides information for the pump stations missing data.

**Table C-2**
**Pump Stations with Missing Data**

| Pump Station | Month Missing Data | Problem with Hydrograph |
|---|---|---|
| 23 | Sept. 2001 | Not enough data |
| 45 | Oct. 2001 | Questionable data |
| 98 | Oct. 2001 | Missing |
| 141 | Oct. 2001 | Missing |
| 149 | Oct. 2001 | Missing |
| 173 | Oct. 2001 | Missing |
| 226 | Oct. 2001 | Missing |
| 230 | Oct. 2001 | Missing |
| 388 | Oct. 2001 | Missing |
| 418 | Oct. 2001 | Missing data |
| 420 | Sept. 2001 | Questionable data |
| 436 | Sept. 2001 | Does not cycle |
| 445 | Oct. 2001 | Questionable data |
| 446 | Sept. 2001 and Oct. 2001 | Incorrect Scale |
| 468 | Oct. 2001 | Missing |
| 525 | Sept. 2001 Peak Flow | Error |
| 563 | Oct. 2001 | Questionable data |
| 582 | Oct. 2001 | Questionable data |

| Pump Station | Month Missing Data | Problem with Hydrograph |
|---|---|---|
| 597 | Oct. 2001 | Missing |
| 615 | Oct. 2001 | Does not cycle |
| 628 | Oct. 2001 | Missing |
| 634 | Sept. 2001 Peak Flow | Questionable data |
| 659 | Oct. 2001 | Missing |
| 684 | Oct. 2001 Peak Flow | Questionable data |
| 686 | Oct. 2001 Peak Flow | Questionable data |
| 706 | Oct. 2001 | Missing |
| 709 | Sept. 2001 and Oct. 2001 | Questionable data |
| 721 | Oct. 2001 | Missing |
| 737 | Oct. 2001 | Missing |
| 749 | Sept. and Oct. 2001 | Questionable data |
| 879 | Oct. 2001 | Missing |
| 938 | Oct. 2001 | Missing |
| 952 | Oct. 2001 | Missing |
| 1004 | Oct. 2001 | Did not cycle |
| 1007 | Oct. 2001 | Missing part of the graph |
| 1090 | Oct. 2001 | Missing |
| 1097 | Oct. 2001 | Missing |
| 1101 | Oct. 2001 | Missing |
| 1204 | Oct. 2001 | Missing |
| 1301 | Oct. 2001 | Missing |
| 1306 | Oct. 2001 | Missing |

## C.2 REPUMP STATION CORRECTIONS

**Table C-3** summarizes the pump stations that were removed from the re-pump databases.

**Table C-3**
**Re-Pump Station Corrections**

| Re-Pump Station | Upstream Pump Station | Modification |
|---|---|---|
| 8 | 156 | Corrected two database tables to show this station does not re-pump flow |
| 27 | 113<br>114 | Corrected two database tables to show this station does not re-pump flow |

| Re-Pump Station | Upstream Pump Station | Modification |
|---|---|---|
| 55 | 20 | Corrected two database tables to show this station does not re-pump flow |
| 58 | 57 | Corrected two database tables to show this station does not re-pump flow |
| 308 | 309 | Corrected two database tables to show this station does not re-pump flow |
| 318 | 350<br>420<br>472<br>473 | Corrected two database tables to show this station does not re-pump flow |
| 326 | 325 | Corrected two database tables to show this station does not re-pump flow |
| 366 | 363 | Corrected two database tables to show this station does not re-pump flow |
| 410 | 409 | Corrected two database tables to show this station does not re-pump flow |
| 335 | 434 | Corrected two database tables to show this station does not re-pump flow from pump station 434. This station remains a re-pump station as it pumps flow from pump station 336 |
| 491 | 493 | Corrected two database tables to show this station does not re-pump flow |
| 618 | 619 | Corrected two database tables to show this station does not re-pump flow |
| 704 | 702<br>734 | Corrected two database tables to show this station does not re-pump flow |
| 713 | 714 | Corrected two database tables to show this station does not re-pump flow |
| 760 | 753 | Corrected two database tables to show this station does not re-pump flow |
| 793 | 791<br>792 | Corrected two database tables to show this station does not re-pump flow |
| 801 | 788 | Corrected two database tables to show this station does not re-pump flow |
| 815 | 505<br>816<br>817 | Corrected two database tables to show this station does not re-pump flow |
| 830 | 839 | Corrected two database tables to show this station does not re-pump flow |
| 835 | 836 | Corrected two database tables to show this station does not re-pump |

| Re-Pump Station | Upstream Pump Station | Modification |
|---|---|---|
| | | flow |
| 852 | 849 | Corrected two database tables to show this station does not re-pump flow |
| 857 | 859 | Corrected two database tables to show this station does not re-pump flow |
| 1008 | 1034 | Corrected two database tables to show this station does not re-pump flow |
| 1054 | 1055<br>1056<br>1057 | Corrected two database tables to show this station does not re-pump flow |
| 1061 | 1062 | Corrected two database tables to show this station does not re-pump flow |
| 1071 | 1070 | Corrected two database tables to show this station does not re-pump flow |

**Table C-4** summarizes additional pump stations that may need to be removed from the database.

**Table C-4**
**Re-Pump Stations that should be Confirmed**

| Re-Pump Station | Upstream Pump Station | Modification |
|---|---|---|
| 14 | 118 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 33 | 32<br>34 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 48 | 37<br>38<br>84 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 112 | 74 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 130 | 132 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 310 | 312<br>314 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 383 | 384 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |

| Re-Pump Station | Upstream Pump Station | Modification |
|---|---|---|
| 392 | 393 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 408 | 407 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 701 | 744 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 844 | 845<br>847<br>886 | Confirm if pump station 844 is re-pumping flow from pump station 886 and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 1055 | 1056<br>1057 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 1056 | 1057 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |
| 1063 | 1067 | Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables. |


# APPENDIX D
# FIRST PAGES OF REPORTS

MWH

# PUMP STATION BASIN CHARACTERISTICS

**Basin Number** 1

| | | | |
|---|---|---|---|
| **Single Speed:** | No | **Cycles during 9/01 Storm Event:** | Y |
| **Re-Pump Station:** | Yes | **Cycles during 10/00 Storm Event:** | Y |

**ADDRESS:** 390 NW N RIVER DR

**Pump Station Area Zoning:**

**Estimated Lateral Age:**

| North Central or South | East or West | Wellfield Protection Area |
|---|---|---|
| C | East | No |

| Basin Footage (lf) | Number of Segments | Number of Manholes | Number of Laterals |
|---|---|---|---|
| 526,013 | 2,501 | 2,501 | 12,722 |

**Date of last repair:** 5/4/2002 **Date of Last SSES:**

# Pump Station Basin Characteristics

| Basin No. | Single Speed | Re-Pump Station | Cycles 10/00 Storm | Cycles 9/02 Storm | Address | Area Zoning | Estimated Lateral Age | North Central or South | East or West | Wellfield Protection Area | Basin Footage (lf) | Number of Segments | Number of Laterals | Number of Manholes | Last Repair | Last SSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | No | Yes | Y | Y | 390 NW N RIVER DR | | | C | East | No | 526,013 | 2,501 | 12,722 | 2,501 | 5/4/2002 | |
| 2 | No | Yes | N | N | 925 NE BISCAYNE BLVD | | | C | West | No | 470,910 | 2,194 | 11,105 | 2,194 | 1/1/2002 | 7/17/1997 |
| 4 | Yes | No | N | N | 65 SE 25 RD<br>(BRICKELL AVE & SE 25 RD) | | | C | West | No | 27,368 | 118 | 394 | 118 | 11/12/2001 | |
| 5 | Yes | No | N | N | 740 NE 55 TERR | | | N | East | No | 35,186 | 150 | 578 | 150 | 1/6/2002 | |
| 6 | Yes | Yes | N | N | 500 NE 77 ST | | | N | West | No | 54,414 | 244 | 1,172 | 244 | 12/26/2000 | 8/13/1997 |
| 7 | Yes | No | N | N | 621 NW 14 ST | | | C | West | No | 22,446 | 110 | 382 | 110 | 9/11/2000 | 6/30/1997 |
| 8 | No | No | Y | Y | 1109 SE BRICKELL AVE | | | C | East | No | 28,188 | 133 | 393 | 133 | 1/1/2002 | 4/30/1997 |
| 9 | No | Yes | Y | Y | SW 22ND AVE & 26 LANE | | | C | West | No | 140,257 | 601 | 158 | 601 | 4/19/2002 | |
| 10 | Yes | Yes | N | N | 1055 NW 23 AVE | | | C | West | No | 62,924 | 265 | | 265 | 4/24/2002 | |
| 11 | Yes | No | N | N | 3668 SW 28 ST<br>(DOUGLAS PARK) | Multi-Family / Government | 1956 | C | West | No | 101,322 | 420 | 2,492 | 420 | 12/27/2000 | |
| 14 | No | Yes | N | N | 8340 NW 54 ST | | | C | West | No | 32,039 | 107 | 244 | 107 | 7/6/2001 | 8/19/1997 |
| 16 | Yes | Yes | N | N | 2190 SW 19 ST | | | C | West | No | 143,430 | 576 | 222 | 576 | 4/16/2002 | |

# PUMP STATIONS THAT CYCLED DURING THE SEPTEMBER 27-29, 2001 STORM

| Pump Station Number | Pump Station Number | Pump Station Number |
|---|---|---|
| 1 | 90 | 195 |
| 2 | 95 | 203 |
| 8 | 96 | 218 |
| 9 | 98 | 221 |
| 11 | 100 | 222 |
| 27 | 107 | 224 |
| 28 | 109 | 226 |
| 32 | 112 | 230 |
| 35 | 115 | 305 |
| 37 | 116 | 308 |
| 42 | 117 | 310 |
| 44 | 118 | 312 |
| 45 | 126 | 313 |
| 48 | 127 | 315 |
| 49 | 143 | 317 |
| 52 | 146 | 319 |
| 58 | 149 | 320 |
| 59 | 151 | 321 |
| 60 | 154 | 322 |
| 63 | 162 | 323 |
| 64 | 168 | 324 |
| 67 | 173 | 326 |
| 68 | 180 | 327 |
| 70 | 181 | 329 |
| 75 | 186 | 330 |
| 80 | 191 | 331 |
| 82 | 192 | 332 |
| 84 | 194 | 333 |

# PUMP STATIONS THAT CYCLED DURING THE OCTOBER 3, 2000 STORM

| Pump Station Number | Pump Station Number | Pump Station Number |
|---|---|---|
| 1 | 399 | 635 |
| 8 | 400 | 660 |
| 9 | 405 | 666 |
| 27 | 417 | 667 |
| 35 | 423 | 669 |
| 49 | 424 | 683 |
| 52 | 434 | 685 |
| 60 | 468 | 704 |
| 63 | 474 | 706 |
| 75 | 480 | 728 |
| 84 | 489 | 820 |
| 96 | 490 | 879 |
| 112 | 497 | 940 |
| 115 | 498 | 952 |
| 117 | 501 | 974 |
| 127 | 510 | 975 |
| 149 | 531 | 1004 |
| 151 | 535 | 1005 |
| 173 | 553 | 1014 |
| 218 | 563 | 1023 |
| 315 | 568 | 1031 |
| 317 | 570 | 1037 |
| 327 | 578 | 1072 |
| 341 | 582 | 1078 |
| 342 | 585 | 1080 |
| 349 | 593 | |
| 377 | 601 | |
| 390 | 615 | |

# MULTI-SPEED PUMP STATIONS

| Pump Station Number | Pump Station Number | Pump Station Number |
|---|---|---|
| 1 | 347 | 666 |
| 2 | 348 | 667 |
| 8 | 414 | 668 |
| 9 | 415 | 669 |
| 14 | 416 | 683 |
| 19 | 417 | 685 |
| 26 | 418 | 691 |
| 27 | 421 | 692 |
| 49 | 422 | 704 |
| 55 | 423 | 709 |
| 101 | 424 | 728 |
| 107 | 425 | 742 |
| 109 | 426 | 755 |
| 112 | 428 | 761 |
| 115 | 429 | 1007 |
| 117 | 446 | 1072 |
| 121 | 501 | 1073 |
| 145 | 510 | 1310 |
| 177 | 516 | |
| 182 | 517 | |
| 187 | 522 | |
| 192 | 535 | |
| 300 | 536 | |
| 301 | 553 | |
| 306 | 559 | |
| 307 | 563 | |
| 318 | 568 | |
| 345 | 572 | |
| 346 | 601 | |

# PUMP STATIONS WITH RECORDS IN THE RDII DATABASE BUT NO RECORDS IN BASIN INVENTORY

| Pump Station Number | Pump Station Number | Pump Station Number |
|---|---|---|
| 23 | 692 | |
| 178 | 721 | |
| 182 | 731 | |
| 187 | 746 | |
| 300 | 756 | |
| 306 | 788 | |
| 307 | 1073 | |
| 345 | 1209 | |
| 346 | 1310 | |
| 347 | 1316 | |
| 348 | 1317 | |
| 388 | | |
| 416 | | |
| 418 | | |
| 421 | | |
| 422 | | |
| 425 | | |
| 426 | | |
| 469 | | |
| 522 | | |
| 536 | | |
| 557 | | |
| 558 | | |
| 559 | | |
| 570 | | |
| 605 | | |
| 606 | | |
| 691 | | |

# Pump Station Night Flows

| Basin Number | Cycles 10/00 Rain | Cycles 9/01 Rain | Night Flow Dry 2001 | Night Flow Wet 2001 | Night Flow Dry 2002 | Night Flow Wet 2002 | dia-in | GPDIM |
|---|---|---|---|---|---|---|---|---|
| 1 | Y | Y | 0 | 5 | | | 1,627 | |
| 2 | N | Y | 5 | 7 | 5,558 | 17,000 | 1,115 | 11,314 |
| 4 | N | N | 1 | 1 | 217 | 244 | 66 | 4,982 |
| 5 | N | N | 8 | 2 | 223 | 149 | 63 | 3,309 |
| 6 | N | N | 4 | 8 | 243 | 1,000 | 100 | 11,958 |
| 7 | N | N | 0 | 55 | 26 | 151 | 42 | 6,039 |
| 8 | Y | Y | 1 | 2 | | 222 | 61 | 5,633 |
| 9 | Y | Y | 51 | 50 | | | 263 | 1,934 |
| 10 | N | N | 3 | 0 | 40 | 444 | 113 | 2,615 |
| 11 | N | Y | 0 | 0 | 135 | 275 | 210 | 1,335 |
| 14 | N | N | 7 | 1 | | | 53 | 6,345 |
| 16 | N | N | 9 | 0 | 286 | 1,178 | 249 | 1,846 |
| 17 | N | N | 141 | 74 | 46 | 92 | 44 | 2,173 |
| 18 | N | N | 0 | 3 | 247 | | 177 | 2,600 |
| 19 | N | N | 6 | 13 | | | 24 | |
| 20 | N | N | 26 | 38 | 83 | | 16 | 7,429 |
| 21 | N | N | 38 | 30 | 0 | 0 | 39 | 128 |
| 22 | N | N | 436 | 655 | 78 | 155 | 29 | 6,207 |
| 23 | N | N | | | | | | |
| 26 | N | N | 120 | 43 | 533 | 300 | 33 | 29,142 |
| 27 | Y | Y | 5 | 44 | | 600 | 25 | 38,467 |
| 28 | N | Y | 0 | 20 | 41 | 34 | 5 | 10,428 |

# PUMP STATIONS THAT DID NOT CYCLE DURING THE OCTOBER 3, 2000 AND SEPTEMBER 27-29, 2001 STORMS

| Pump Station Number | Pump Station Number | Pump Station Number |
|---|---|---|
| 4 | 57 | 103 |
| 5 | 61 | 104 |
| 6 | 62 | 105 |
| 7 | 65 | 106 |
| 10 | 66 | 108 |
| 14 | 69 | 110 |
| 16 | 71 | 111 |
| 17 | 72 | 113 |
| 18 | 74 | 114 |
| 19 | 76 | 119 |
| 20 | 77 | 120 |
| 21 | 78 | 121 |
| 22 | 79 | 122 |
| 23 | 81 | 123 |
| 26 | 83 | 124 |
| 29 | 85 | 125 |
| 33 | 86 | 128 |
| 34 | 87 | 129 |
| 38 | 88 | 130 |
| 41 | 89 | 131 |
| 46 | 91 | 132 |
| 47 | 92 | 133 |
| 50 | 93 | 134 |
| 51 | 94 | 135 |
| 53 | 97 | 136 |
| 54 | 99 | 137 |
| 55 | 101 | 138 |
| 56 | 102 | 139 |

# REPUMP STATIONS

| Pump Station Number | Pump Station Number | Pump Station Number |
|---|---|---|
| 1 | 333 | 613 |
| 2 | 335 | 626 |
| 6 | 345 | 629 |
| 9 | 371 | 637 |
| 10 | 383 | 642 |
| 14 | 392 | 653 |
| 16 | 399 | 655 |
| 19 | 403 | 678 |
| 33 | 408 | 683 |
| 48 | 414 | 685 |
| 54 | 415 | 692 |
| 62 | 416 | 698 |
| 68 | 417 | 701 |
| 78 | 421 | 703 |
| 79 | 422 | 709 |
| 80 | 423 | 716 |
| 83 | 424 | 718 |
| 102 | 425 | 719 |
| 112 | 426 | 725 |
| 117 | 448 | 728 |
| 125 | 449 | 731 |
| 130 | 450 | 735 |
| 177 | 452 | 752 |
| 187 | 454 | 755 |
| 190 | 516 | 757 |
| 300 | 517 | 761 |
| 301 | 522 | 762 |
| 310 | 571 | 765 |
| 311 | 600 | 772 |

# Upstream Paths for Each Pump Station

| Plant | Upstream 1 | Upstream 2 | Upstream 3 | Upstream 4 | Upstream 5 |
|---|---|---|---|---|---|
| CDWWTP | 0001 | | | | |
| CDWWTP | 0001 | 0004 | | | |
| CDWWTP | 0001 | 0007 | | | |
| CDWWTP | 0001 | 0009 | | | |
| CDWWTP | 0001 | 0009 | 0065 | | |
| CDWWTP | 0001 | 0009 | 0066 | | |
| CDWWTP | 0001 | 0009 | 0067 | | |
| CDWWTP | 0001 | 0009 | 0068 | | |
| CDWWTP | 0001 | 0009 | 0068 | 0053 | |
| CDWWTP | 0001 | 0010 | | | |
| CDWWTP | 0001 | 0010 | 0069 | | |
| CDWWTP | 0001 | 0010 | 0071 | | |
| CDWWTP | 0001 | 0011 | | | |
| CDWWTP | 0001 | 0016 | | | |
| CDWWTP | 0001 | 0016 | 0033 | | |
| CDWWTP | 0001 | 0016 | 0033 | 0032 | |
| CDWWTP | 0001 | 0016 | 0033 | 0034 | |
| CDWWTP | 0001 | 0017 | | | |
| CDWWTP | 0001 | 0018 | | | |
| CDWWTP | 0001 | 0045 | | | |
| CDWWTP | 0001 | 0050 | | | |
| CDWWTP | 0001 | 0054 | | | |
| CDWWTP | 0001 | 0054 | 0072 | | |
| CDWWTP | 0001 | 0054 | 0076 | | |
| CDWWTP | 0001 | 0054 | 0085 | | |
| CDWWTP | 0001 | 0055 | | | |
| CDWWTP | 0001 | 0055 | | | |
| CDWWTP | 0001 | 0056 | | | |
| CDWWTP | 0001 | 0059 | | | |

MIAMI-DADE COUNTY
WATER AND SEWER

# Appendix C

# Basin Storm Analysis

## Storm Event

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# Appendix D

# CLIP Basin Hydrographs

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# Appendix E

# Document Control Filing System Index

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HAZEN AND SAWYER
Environmental Engineers & Scientists

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# Filing System Index
**May 22, 2006**

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| G1002.2 | Document Control |
| G1002.3 | Articles/Conference Papers |
| G1002.4 | Construction Policies |
| G1002.5 | CLIP Video Review Procedures |
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| G1004.3 | EPA Meetings |
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| G1004.3.2 | March 24, 2005 |
| G1004.3.3 | March 20-24, 2006 |
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| **G1100** | **Office Operations** |
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| G1101.2 | Cash Flow Analysis |
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| **G1110** | **CLIP Program Sub consultants** |
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| G1110.1A | Hazen and Sawyer Agreement |
| G1110.2 | Earth Tech Correspondence |
| G1110.2A | Earth Tech Agreement |
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| E1007.3 | Basin 58 |
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| E1007.6 | Basin 82 |
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| E1007.8 | Basin 118 |
| E1007.9 | Basin 126 |
| E1007.10 | Basin 154 |
| E1007.11 | Basin 162 |
| E1007.12 | Basin 191 |
| E1007.13 | Basin 194 |
| E1007.14 | Basin 195 |
| E1007.15 | Basin 203 |
| E1007.16 | Basin 336 |
| E1007.17 | Basin 350 |
| E1007.18 | Basin 355 |
| E1007.19 | Basin 358 |
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| E1007.21 | Basin 378 |
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| E1007.23 | Basin 405 |
| E1007.24 | Basin 410 |
| E1007.25 | Basin 479 |
| E1007.26 | Basin 484 |
| E1007.27 | Basin 509 |
| E1007.28 | Basin 524 |
| E1007.29 | Basin 525 |
| E1007.30 | Basin 564 |
| E1007.31 | Basin 577 |
| E1007.32 | Basin 603 |
| E1007.33 | Basin 608 |
| E1007.34 | Basin 615 |
| E1007.35 | Basin 681 |
| E1007.36 | Basin 708 |
| E1007.37 | Basin 722 |
| E1007.38 | Basin 729 |
| E1007.39 | Basin 753 |
| E1007.40 | Basin 763 |
| E1007.41 | Basin 790 |
| E1007.42 | Basin 802 |
| E1007.43 | Basin 803 |
| E1007.44 | Basin 813 |
| E1007.45 | Basin 823 |

| | |
|---|---|
| E1007.46 | Basin 828 |
| E1007.47 | Basin 829 |
| E1007.48 | Basin 851 |
| E1007.49 | Basin 880 |
| E1007.50 | Basin 885 |
| E1007.51 | Basin 1004 |
| E1007.52 | Basin 1031 |
| E1007.53 | Basin 1032 |
| E1007.54 | Basin 1033 |
| E1007.55 | Basin 1063 |

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|---|---|
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| B1000.2 | Quantity Estimates |
| B1200 | Prebid Meeting |
| B1300 | Advertisement of Bid |
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| B2002 | CLIP Correspondence (Written by PM) |
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| B2004 | Review Agencies |
| B2005 | Other Correspondence |
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C1000.3 S – 793 (Countywide Two-Year Contract for Removal/Replacement and Rehabilitation of Sanitary Sewer Laterals)
C1000.4 Hazen and Sawyer and Earth Tech Agreement
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C1002 Contract Extension
C1003 Utility Permit
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**C2000 Correspondence**
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C5004 Certificate of Insurance
C5004.1 Owners Protective Liability Insurance
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C5005 Technical Submittal
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C5102 Change Orders
C5103 Authorization to Make Payment Under Contract Allowance Account
C5103.1 Authorization # 1
C5103.2 Authorization # 2
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C5104.01 Invoice Tracking Sheet
C5104.02 WOSR
C5104.1 Invoice # 1 2/1/05 – 2/25/05
C5104.2 Invoice # 2 2/26/05 – 3/25/05
C5104.3 Invoice # 3 3/26/05 – 4/25/05
C5104.4 Invoice # 4 4/26/05 – 5/25/05
C5104.5 Invoice # 5 5/26/05 – 6/25/05
C5104.6 Invoice # 6 6/26/05 – 7/25/05
C5104.7 Invoice # 7 7/26/05 – 8/25/05
C5104.8 Invoice # 8 8/26/05 – 9/25/05
C5104.9 Invoice # 9 9/26/05 – 10/25/05
C5104.10 Invoice # 10 10/26/05 – 11/25/05
C5104.11 Invoice # 11 11/26/05 – 12/25/05
C5104.12 Invoice # 12 12/26/05 – 1/25/06
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C5301.01 CLIP-CND Laterals #1 (6/8/05)
C5301.02 CLIP-CND Laterals # 2 (8/9/05)
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C5301.2 CLIP-02 (Basin 823)
C5301.3 CLIP-03 (Basin 851)
C5301.4 CLIP-04 (Basin 194)
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C5302.3 S782-03 (Basin 47)
C5302.4 S782-04 (Basin 1033)

C5302.5 S782-05 (Basin 1031)
C5302.6 S782-06 (Basin 564)
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C5302.9 S782-09 (Basin 80)
C5302.10 S782-10 (Basin 70)
C5302.11 S782-11 (Basin 1063)
C5302.12 S782-12 (Basin 82)
C5302.13 S782-13 (Basin 195)
C5302.14 S782-14 (Basin 681)
C5302.15 S782-15 (Basin 729)
C5302.16 S782-16 (Basin 708)
C5302.17 S782-17 (Basin 603)
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C5401.5 MDLR-05 (Basin 708)
C5401.6 MDLR-06 (Basin 681)
C5401.7 MDLR-07 (Basin 70)
C5401.8 MDLR-08 (Basin 80)
C5401.9 MDLR-09 (Basin 82)
C5401.10 MDLR-10 (Basin 509)
C5401.11 MDLR-11 (Basin 608)
C5401.12 MDLR-12 (Basin 823)
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C5401.14 MDLR-14 (Basin 1031)
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C5501 Delays and Claims

**C5600** **Reports**
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C5603 ESG's Revenue/Billed Report
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**C7000** **Inspectors**
C7100 Daily Inspectors Reports (By month/year)
C7200 Inspector Meeting Minutes
C7300 Weekly Progress Reports (Meetings between Contractors & Construction)
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**C8000** **Warranty Program**
G8000.1 Warranty Program Correspondence

MIAMI-DADE COUNTY
WATER AND SEWER

# Appendix F

# Typical Monthly Reports

40650B001.CDR

HAZEN AND SAWYER
Environmental Engineers & Scientists

# Comprehensive Lateral Investigation Program
# (CLIP)
# Status Report
# April 2006

In addition to the administrative tasks associated with the Comprehensive Lateral Investigation Program (CLIP), the CLIP Team has performed the following specific tasks:

**1. TAC Meeting**

A monthly Peak Flow Technical Advisory Committee (TAC) Meeting, which includes the Comprehensive Lateral Investigation Program (CLIP) meeting, was held to coordinate all aspects of MDWASD Peak Flow Issues, including lateral pilot program issues.

**Work Performed This Month**

- Attended the April 7, 2006 TAC meeting.

**2. Basin Selection**

Montgomery Watson Harza (MWH) worked with the Peak Flow TAC to develop criteria for the selection of Program collection basins. Initially 32 basins were selected for the Program. Nine and then eleven additional basins were later added to the Program. This provided flexibility in the event that basins needed to be dropped because of a lack of wet weather response or other issues. A total of 52 basins are now included in the lateral pilot program. MWH provided a report describing the station selection process.

**Work Performed This Month**

- No work performed this month.

**3. Basins Database**

A Program database was developed to store the data related to the basins. This database includes the Basins Selection Criteria, Flow and Span per basin, Rainfall and Ground Water Level data, and program status. Different queries allow the Engineering Team to evaluate the hydrographs, perform peak flow analysis and review Program Status. Inspection and Testing Work Orders issuances, testing results, Repair Work Orders issuances, and repairs results are prepared and stored in the basins database.

**Work Performed This Month**

- Updated the Basin Analysis and Selection Report to select next Basins to inspect, test and repair.

**4. Hydrograph Development**

Hydrographs are used to document Program results and to estimate any resulting peak flow reductions. Hydrographs were developed for each of the 52 basins in the Program. They document station historical data over the last four years including station flows, groundwater levels and amount of rainfall. A major effort was required to select the closest appropriate groundwater and rainfall gauge location and obtain the data from United States Geological Survey (USGS) and the South Florida Water Management District (SFWMD). We now have a documented record of the "before" condition (before mainline repairs) during

rain events. The hydrographs will be periodically updated as the Program continues. Also, requested additional gauges to be installed at five stations.

**Work Performed This Month**

- Updated hydrographs for the 55 basins (3 from previous programs).
- Updated CLIP Rainfall Graphs for all Rain Gauges.
- QA/QC SCADA data and Span for 13 basins.

**5. Initial Basin Inspection/Repairs (SSES)**

Department forces conducted SSES evaluations on each of the 52 basins in the Program. These evaluations consisted of 100% TV, smoke and manhole inspections. Main sewer defects were identified and scheduled for repairs. After repairs were completed in each basin, each manhole was sealed to eliminate a potential inflow source into the system. This work theoretically eliminated I/I sources in the main sewers and manholes and allowed the Program to focus on the individual laterals. Program personnel worked with the Department staff to schedule, monitor and report the inspection and repair work. To date, the Department has completed the SSES portion of the Program and all mainline repairs. Manholes in all 52 basins have been sealed.

**Work Performed This Month**

- No further work required.

**6. Lateral Inspection Contract**

Specifications for obtaining a contractor to inspect the laterals in the Program basins were developed under the previous I/I Reduction Program. Contract S-782 was bid. The low responsive bidder, EnviroWaste Services Group, Inc. (ESG), had a bid of $3,894,838. The bids were reviewed and ESG was recommended for an award in the amount of $3,300,000.

**Work Performed This Month**

- No further work required.

**7. Outreach Program, including Letters to Property Owners**

It was determined by the County Attorney's Office that the Department must obtain approval from each sewer lateral customer in order to inspect the private side of their lateral. The owners were identified for each of the laterals in the Program. A service to identify customers within the basin area was purchased. Letters requesting permission were prepared in English, Spanish, and Creole and then sent to each customer. The Department will only inspect the private side of the laterals when permission is granted from the customer.

**Work Performed This Month**

- The owners and mailing addresses were identified for 9,202 customers. Letters have been distributed to all identified property owners (9,202). The following are the responses received to date: 6,311 (68.58%) YESs, and 214 (2.33%) NOs.
- Continued updating the Property Owners database.
- Continued handling property owner's complaints.

**8. Identification of Work Force Program Areas**

Some Lateral Pilot Program repairs will be within the Miami-Dade Work Force Program areas and the contractor will be obligated to hire workers within the work area. The Work Force areas were matched with the collection basin areas and it was determined that a total of 13 basins were within Work Force Program areas. Since the contractor's work is investigative in nature, the County has ruled that the Work Force Program does not apply to the Inspection and Testing phase of this program.

**Work Performed This Month**

- No further work required.

**9. Road Moratorium/Construction Conflict Areas**

CLIP repair areas could conflict with scheduled or ongoing construction projects by other agencies. Often there is a construction moratorium in areas where previous construction projects have recently paved roads. The Department must coordinate their Program with these agencies to reduce construction conflicts. Master plans and construction schedules were received from the Florida DOT, County Public Works Department, Department of Environmental Resources Management, CICC/OCI, and FEMA/DORM. Each construction project was identified and plotted on Program basin maps. Letters were issued to each of the agencies with maps showing the conflict areas and every two months additional letters will be issued to update the agencies of the status of the Program.

**Work Performed This Month**

- Updated the "Monthly Conflict Verification Status Report".
- A total of 27 construction program conflicts were identified.
- Bi-monthly Conflict Notification Letters were not sent out to various agencies this month.

**10. Work Order Issuance**

A work order system was developed to identify the work area and define the work required from the contractor and MDWASD. Each of the laterals in the Program will have a unique work order. The contractor will be issued the work order, perform the test and the inspection and then sign-off on the work performed. Field data from the SSES program will be used to identify the laterals and specific inspection requirements. As work progresses in the field, the inspector may modify the work order if additional inspections and tests are required.

**Work Performed This Month**

- Updated the Evaluation Lateral Report.
- Prepared an automatic Lateral Inspection and Testing Analysis Report (CND).
- QA/QC Televised laterals.
- Continued to update database with completed work orders.
- QA/QC Completed Work Orders updates.

**11. Inspection and Testing Work**

Work Orders are being issued to ESG's crews and MDWASD's crews to perform the inspections and testing of the sewer laterals.

**Work Performed This Month**

- The following tests were completed during the month.

| Basin | Laterals Inspected | Public | | | | | | Private | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pass | | Fail | | CND | | Pass | | Fail | | CND | |
| 722 (ESG) | 39 | 7 | 18% | 19 | 49% | 11 | 28% | 6 | 15% | 8 | 21% | 25 | 64% |
| 880 (ESG) | 214 | 204 | 95% | 4 | 2% | 6 | 3% | 170 | 79% | | | 44 | 21% |
| 577 (ESG) | 30 | 30 | 100% | | | | | 30 | 100% | | | | |

*Difference due to "wye" connections

| Basin | Laterals Inspected | Public | | | | | | Private | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pass | | Fail | | CND | | Pass | | Fail | | CND | |
| 813 (MDWASD) | 26 | 5 | 19% | 19 | 73% | 2 | 8% | 3 | 12% | 3 | 12% | 20 | 76% |

- A total of seven complaints were handled. These complaints were mostly in regards to restoration and were documented in the CLIP's Complaints database and given to the Contractor for resolution.

**12. Weekly Construction Meeting**

Weekly Construction Meetings are held to coordinate and update the CLIP "Inspection and Testing" and Repairs" activities performed by MDWASD and ESG.

**Work Performed This Month**

- Prepared and attended the meetings of:
  - April 3, 2006
  - April 10, 2006
  - April 17, 2006
  - April 24, 2006

**13. CLIP Report**

A CLIP Report will be prepared to present program progress and findings up to date. This report will also be submitted to the EPA for review to satisfy grant requirement.

**Work Performed This Month**

- The Draft CLIP report is 80 % completed.

**14. Undersized CIP Liner Review**

The main sewer cured-in-place liner contractor, SOS Construction, notified the Department that several installed liners were below the minimum thickness required by the specifications. Liner samples were measured and 66 liners available for testing were undersized. Preliminary tapes of these liners were reviewed and 25 liners indicated that they might have structural issues. The samples for the 25 liners were sent to the test laboratory for analysis. Hazen and Sawyer completed a report which helped resolve the issue with the Contractor.

**Work Performed This Month**

- No further work required.

**15. Retardant Approval**

The liner contractor, SOS construction, requested the use of an inhibitor during the liner installation process. Hazen and Sawyer was asked to review the request. A memorandum recommending against the case of an inhibitor was given to the Contractor.

**Work Performed This Month**

- No further work required.

**16. Review of Liners Pin Holes**

A total of 15 installed liners exhibited pinholes. Hazen and Sawyer was requested to review the tapes and make a recommendation. The 15 tapes were reviewed, and it was recommended that an additional thin liner be installed in the lines.

**Work Performed This Month**

- No further work required.

**17. EPA Meeting**

A meeting with EPA staff was set for December 8, 2004 in Atlanta. A special presentation was developed in order to show program progress during the first 10 months of the program, and that a one year extension would be needed due to lack of rain. EPA will consider request. A follow up meeting was held on March 24, 2005 at MDWASD Douglas facility.

**Work Performed This Month for Presentation**

- Prepared a presentation for the EPA meeting
- A meeting with EPA was held on March 24, 2006

**18. ESG Invoice Processing**

The CLIP Team reviews ESG's monthly invoice. A Contractor invoicing review and approval system has been developed. Also, the invoicing process has been closely coordinated with MDWASD's invoicing procedures to ensure accurate and expedited review of ESG's invoices.

**Work Performed This Month**

- Continued collecting and classifying Inspector's field pictures per Work Orders.
- Started to develop protocol to review Work Orders automatically.
- **Invoice # 11:**
  - Informed ESG Invoice # 11 had been sent to accounts payable on April 12th, 2006.
  - Invoice # 11 paid on April 28th, 2006.
- **Invoice # 12:**
  - Informed ESG Invoice # 12 had been sent to accounts payable on April 12th, 2006.
  - Invoice # 12 paid on April 28th, 2006.
- **Invoice # 13:**
  - Submitted Invoice # 13 to MDWASD on April 7th, 2006.
  - Invoice # 13 paid on April 28th, 2006.
- **Invoice # 14:**
  - ESG resubmitted Invoice # 14 on April 13th, 2006.
  - CLIP Team rejected Invoice # 14 on April 18th, 2006.

- ESG resubmitted Invoice # 14 on April 20th, 2006.
- Submitted Invoice # 14 to MDWASD on April 28th, 2006.

**19. Repair (Call) Identification**

Video recordings/CD of line segments that fail pressure test are reviewed in-house and repair recommendations are made according to the repair technologies specified in the repair contract documents. Also, Lateral Inspection field reports and field data is reviewed by CLIP staff and repair calls are made for each lateral, both public and private segments.

**Work Performed This Month**

- Continued reviewing inspection field reports and made repair recommendations.
- Updated reversed setup information for basins 47, 70, 80, 82 and 577 for the repair contractor
- Updated the Lateral Repair database
- Design the Field Repair Information Report

**20. Repair Specification**

Specifications for the repair of the laterals were developed. The specifications provide for the unit pricing of the various repair procedure anticipated under the program.

**Work Performed This Month**

- Attended the February 21, 2006, pre-construction meeting.
- Addressed issues raised at the pre-construction meeting in conjunction with MDWASD specifications.

**21. Public Lateral Repairs**

Repair Work Orders are being issued to MDWASD repair crews to perform excavated point repairs and full service lateral replacement.

**Work Performed This Month**

- Prepared report to track the repairs of public laterals by MDWASD.
- The following are the repairs completed and pending to date:

| Basin | Total Repairs | Completed | Pending |
|---|---|---|---|
| 823 | 89 | 64 | 25 |
| 1033 | 26 | 22 | 4 |
| 1063 | 33 | 28 | 5 |
| 564 | 11 | 11 | - |
| 708 | 100 | 20 | 80 |
| 70 | 10 | 8 | 2 |
| 80 | 23 | 18 | 5 |
| 82 | 15 | 15 | |
| 509 | 33 | | 33 |
| 608 | 34 | 4 | 30 |
| 681 | 11 | 11 | |

| Basin | Total Repairs | Completed | Pending |
|---|---|---|---|
| 47 | 39 | 17 | 22 |
| 194 | 30 | | 30 |
| 729 | 4 | | 4 |
| 851 | 23 | 23 | |
| 1031 | 6 | 6 | |
| **Total** | **487** | **247** | **240** |

**22. Private Lateral Defects**

During the course of lateral inspection and testing, various defects are observed in private laterals. Some defects are visible and can be documented via video and/or pictures (smoke testing). Other defects are not visible. For the CLIP program to be effective, these private defects need to be repaired by the property owners. A meeting was scheduled with DERM to discuss enforcement procedures. Letters were developed to notify the property owners of the test results.

**Work Performed This Month**

- Continued to identify private laterals with visible defects.
- MDWASD and DERM met on a weekly basis to coordinate and revise the enforcement protocols.
- The following three Private Sewer Lateral letters were prepared and signed by John Chorlog:
    - Tuberculated Private Sewer Lateral without proof (no video or smoke testing). A typical picture of a tuberculated pipe will be included.
    - Failed Private Sewer Lateral without proof (only pressure test record to be included).
    - Tuberculated Private Sewer Lateral with owner's lateral picture.
- Currently approximately 250 of these letters are being prepared to be mailed out.

MIAMI-DADE COUNTY
WATER AND SEWER

# Appendix G

# Typical Program Reports

40650B001.CDR

HAZEN AND SAWYER
Environmental Engineers & Scientists

**LATENT DEFECT SUMMARY REPORT**
**CLIP Basin Summary**

| Basin Number | Last Repair Completed Date | Number of Repairs | Manholes Sealed Date |
|---|---|---|---|
| 35 | February 22, 2004 | 64 | March 4, 2004 |
| 47 | May 21, 2003 | 406 | April 4, 2004 |
| 58 | June 17, 2004 | 105 | January 18, 2005 |
| 70 | June 21, 2004 | 13 | **October 4, 2004** |
| 80 | August 4, 2004 | 118 | **October 5, 2004** |
| 82 | September 24, 2004 | 41 | January 13, 2005 |
| 118 | November 14, 2002 | 44 | **November 21, 2002** |
| 126 | October 28, 2003 | 35 | **November 3, 2003** |
| 154 | January 27, 2004 | 30 | February 4, 2004 |
| 162 | February 27, 2004 | 20 | March 4, 2004 |
| 194 | July 14, 2004 | 38 | July 24, 2004 |
| 195 | May 24, 2004 | 20 | **May 31, 2004** |
| 336 | May 27, 2004 | 16 | **June 4, 2004** |
| 350 | September 10, 2004 | 123 | December 6, 2004 |
| 355 | September 24, 2004 | 183 | January 13, 2005 |
| 358 | August 12, 2004 | 23 | September 4, 2004 |
| 364 | September 24, 2004 | 149 | December 9, 2004 |
| 378 | August 16, 2004 | 155 | **October 4, 2004** |
| 380 | August 5, 2004 | 109 | January 13, 2005 |
| 405 | June 10, 2004 | 28 | July 4, 2004 |
| 410 | May 24, 2004 | 112 | June 4, 2004 |
| 479 | July 23, 2004 | 94 | December 9, 2004 |
| 484 | July 16, 2004 | 60 | December 6, 2004 |
| 509 | July 1, 2004 | 35 | August 5, 2004 |
| 524 | May 1, 2004 | 6 | June 4, 2004 |
| 525 | August 19, 2004 | 29 | September 14, 2004 |
| 564 | November 8, 2003 | 50 | **December 3, 2003** |
| 577 | May 7, 2004 | 92 | August 11, 2004 |
| 603 | July 19, 2004 | 52 | August 11, 2004 |
| 608 | May 1, 2004 | 32 | August 11, 2004 |
| 615 | June 2, 2004 | 331 | August 13, 2004 |
| 681 | August 20, 2004 | 40 | October 19, 2004 |
| 708 | August 30, 2004 | 110 | October 19, 2004 |
| 722 | August 20, 2004 | 26 | September 21, 2004 |
| 729 | April 17, 2004 | 27 | May 4, 2004 |
| 753 | May 12, 2004 | 90 | September 24, 2004 |
| 763 | October 24, 2002 | 74 | **October 31, 2002** |
| 790 | January 8, 2004 | 7 | August 11, 2004 |
| 802 | May 5, 2004 | 36 | August 11, 2004 |
| 803 | October 4, 2004 | 102 | October 19, 2004 |
| 813 | September 6, 2002 | 1 | **September 13, 2002** |
| 823 | March 16, 2004 | 114 | April 4, 2004 |
| 828 | May 1, 2004 | 33 | August 20, 2004 |
| 829 | March 7, 2003 | 3 | **August 20, 2003** |
| 851 | November 13, 2002 | 49 | **November 20, 2002** |
| 880 | April 26, 2004 | 41 | August 23, 2004 |
| 885 | January 13, 2004 | 64 | February 4, 2004 |
| 1004 | November 13, 2003 | 81 | **December 3, 2003** |
| 1031 | Televised on May 29, 2003 | 0 | **June 5, 2003** |
| 1032 | November 26, 2003 | 52 | **December 3, 2003** |
| 1033 | April 28, 2004 | 40 | August 23, 2004 |
| 1063 | July 13, 2004 | 56 | **August 24, 2004** |
| | **Total Repairs** | **3,659** | |

**LATENT DEFECT SUMMARY REPORT**
**CLIP Basin Summary**

| Basin Number | Last Repair Completed Date | Number of Repairs | Manholes Sealed Date |
|---|---|---|---|
| 35 | February 22, 2004 | 64 | March 4, 2004 |
| 47 | May 21, 2003 | 406 | April 4, 2004 |
| 58 | June 17, 2004 | 105 | January 18, 2005 |
| 70 | June 21, 2004 | 13 | **October 4, 2004** |
| 80 | August 4, 2004 | 118 | **October 5, 2004** |
| 82 | September 24, 2004 | 41 | January 13, 2005 |
| 118 | November 14, 2002 | 44 | **November 21, 2002** |
| 126 | October 28, 2003 | 35 | **November 3, 2003** |
| 154 | January 27, 2004 | 30 | February 4, 2004 |
| 162 | February 27, 2004 | 20 | March 4, 2004 |
| 194 | July 14, 2004 | 38 | July 24, 2004 |
| 195 | May 24, 2004 | 20 | **May 31, 2004** |
| 336 | May 27, 2004 | 16 | **June 4, 2004** |
| 350 | September 10, 2004 | 123 | December 6, 2004 |
| 355 | September 24, 2004 | 183 | January 13, 2005 |
| 358 | August 12, 2004 | 23 | September 4, 2004 |
| 364 | September 24, 2004 | 149 | December 9, 2004 |
| 378 | August 16, 2004 | 155 | **October 4, 2004** |
| 380 | August 5, 2004 | 109 | January 13, 2005 |
| 405 | June 10, 2004 | 28 | July 4, 2004 |
| 410 | May 24, 2004 | 112 | June 4, 2004 |
| 479 | July 23, 2004 | 94 | December 9, 2004 |
| 484 | July 16, 2004 | 60 | December 6, 2004 |
| 509 | July 1, 2004 | 35 | August 5, 2004 |
| 524 | May 1, 2004 | 6 | June 4, 2004 |
| 525 | August 19, 2004 | 29 | September 14, 2004 |
| 564 | November 8, 2003 | 50 | **December 3, 2003** |
| 577 | May 7, 2004 | 92 | August 11, 2004 |
| 603 | July 19, 2004 | 52 | August 11, 2004 |
| 608 | May 1, 2004 | 32 | August 11, 2004 |
| 615 | June 2, 2004 | 331 | August 13, 2004 |
| 681 | August 20, 2004 | 40 | October 19, 2004 |
| 708 | August 30, 2004 | 110 | October 19, 2004 |
| 722 | August 20, 2004 | 26 | September 21, 2004 |
| 729 | April 17, 2004 | 27 | May 4, 2004 |
| 753 | May 12, 2004 | 90 | September 24, 2004 |
| 763 | October 24, 2002 | 74 | **October 31, 2002** |
| 790 | January 8, 2004 | 7 | August 11, 2004 |
| 802 | May 5, 2004 | 36 | August 11, 2004 |
| 803 | October 4, 2004 | 102 | October 19, 2004 |
| 813 | September 6, 2002 | 1 | **September 13, 2002** |
| 823 | March 16, 2004 | 114 | April 4, 2004 |
| 828 | May 1, 2004 | 33 | August 20, 2004 |
| 829 | March 7, 2003 | 3 | **August 20, 2003** |
| 851 | November 13, 2002 | 49 | **November 20, 2002** |
| 880 | April 26, 2004 | 41 | August 23, 2004 |
| 885 | January 13, 2004 | 64 | February 4, 2004 |
| 1004 | November 13, 2003 | 81 | **December 3, 2003** |
| 1031 | Televised on May 29, 2003 | 0 | **June 5, 2003** |
| 1032 | November 26, 2003 | 52 | **December 3, 2003** |
| 1033 | April 28, 2004 | 40 | August 23, 2004 |
| 1063 | July 13, 2004 | 56 | **August 24, 2004** |
| | **Total Repairs** | **3,659** | |

# RAINFALL/GROUNDWATER GAUGE ASSIGNMENT REPORT

MIAMI-DADE COUNTY WATER AND SEWER

**Miami-Dade Water and Sewer Department**
**Comprehensive Lateral Investigation Program**

| Basin Number | Footage (ft) | Location | Relationship | | | Full Data | | |
|---|---|---|---|---|---|---|---|---|
| | | | Rain | GWL | Flow | Rain | GWL | Flow |
| 823 | 9,930 | CW | P | P | P | G | G | G |
| 729 | 5,044 | SW | G | G | G | G | G | G |
| 829 | 1,527 | CW | P | P | P | G | G | G |
| 162 | 5,779 | CW | G | G | G | G | G | G |
| 722 | 17,725 | SW | G | G | G | G | G | G |
| 118 | 4,314 | NW | G | G | P | G | G | P |
| 763 | 5,594 | CW | G | P | G | G | G | G |
| 194 | 10,570 | NW | P | G | G | G | G | G |
| 378 | 13,317 | NW | G | P | G | G | G | G |
| 1031 | 4,725 | SW | G | G | G | G | G | G |
| 753 | 7,175 | CW | G | G | G | G | G | G |
| 813 | 1,579 | CW | P | P | P | G | G | G |
| 608 | 4,603 | SW | G | A | G | G | G | G |
| 364 | 16,101 | NW | G | P | G | G | G | P |
| 82 | 4,906 | CW | G | G | G | G | G | G |
| 1004 | 10,340 | SE | G | G | P | G | G | P |
| 1063 | 10,594 | SE | G | G | G | G | G | G |
| 525 | 66,830 | CW | G | P | G | G | G | G |
| 803 | 15,300 | CW | G | A | G | G | G | G |
| 47 | 13,648 | NW | G | G | G | G | G | G |
| 790 | 1,554 | CW | G | P | P | G | G | P |
| 802 | 5,335 | CW | G | P | G | G | G | G |
| 615 | 11,273 | CW | G | G | G | G | G | P |
| 336 | 3,572 | NW | G | P | G | G | P | G |
| 358 | 1,614 | NW | G | G | P | G | G | G |
| 405 | 1,354 | NW | G | G | G | G | G | G |
| 35 | 4,367 | NW | G | G | G | G | G | G |
| 70 | 507 | CW | G | G | G | G | G | G |
| 126 | 1,895 | CW | G | G | G | G | G | G |
| 154 | 3,583 | CW | G | P | G | G | G | G |
| 195 | 8,650 | NW | G | P | G | G | G | G |
| 58 | 4,767 | CE | G | G | G | G | G | G |
| 380 | 8,453 | NW | P | G | G | G | G | P |
| 681 | 6,750 | SW | G | G | G | G | G | G |
| 524 | 8,562 | CW | P | P | P | G | G | G |
| 410 | 8,907 | NW | G | G | G | G | G | P |
| 885 | 6,581 | CW | G | G | G | G | G | G |
| 851 | 10,414 | CW | G | G | P | G | G | G |
| 509 | 10,595 | CW | P | P | P | G | G | G |
| 479 | 19,025 | NW | G | G | G | G | G | G |
| 577 | 8,159 | SE | G | G | G | G | G | G |
| 603 | 12,482 | SE | P | G | P | G | G | G |
| 355 | 16,101 | NW | G | P | G | G | G | G |
| 484 | 116,896 | NW | G | G | G | G | G | G |
| 1033 | 9,594 | SE | G | G | G | G | G | G |
| 1032 | 8,075 | SE | G | G | G | G | G | G |
| 880 | 14,253 | CW | G | G | G | G | G | G |
| 350 | 19,167 | NW | G | P | G | G | G | G |
| 708 | 11,816 | SE | G | G | G | G | G | G |
| 828 | 4,665 | CW | P | P | P | G | G | G |
| 564 | 7,143 | SW | A | A | A | G | G | P |
| 80 | 20,414 | CW | G | G | G | G | G | P |

MIAMI-DADE COUNTY WATER AND SEWER

# QUALIFIED BASIN REPORT

## MIAMI-DADE WATER AND SEWER DEPARTMENT
## COMPREHENSIVE LATERAL INVESTIGATION PROGRAM

| CAT | Basin | Location | City of Miami | Age | RDII Signature | Average Flow | Peaking Factor | Max Rain (inch) | Max Rain Date | No of Laterals | Inspection Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 47 | NW | Yes | | Yes | 170 | 1.84 | 4.27 | 6/21/2005 | 453 | Completed |
| A | 70 | CW | Yes | | No | 3 | 2.67 | 4.27 | 6/21/2005 | 16 | Completed |
| A | 80 | CW | Yes | | Yes | 130 | 2.72 | 4.89 | 6/21/2005 | 379 | Completed |
| A | 82 | CW | Yes | | Yes | 7 | 3.71 | 4.18 | 8/26/2005 | 194 | Completed |
| A | 194 | NW | No | 1963 | Yes | 30 | 3.57 | 4.89 | 6/21/2005 | 59 | Completed |
| A | 195 | NW | No | 1968 | Yes | 30 | 2.37 | 4.89 | 6/21/2005 | 61 | Completed |
| A | 509 | CW | No | 1989 | Yes | 125 | 0.98 | 5.83 | 9/28/2004 | 223 | Completed |
| A | 524 | CW | No | 1983 | Yes | 28 | 3.25 | 7.71 | 8/26/2005 | 120 | Completed |
| A | 525 | CW | No | | Yes | 65 | 6.52 | 7.71 | 8/26/2005 | 628 | Completed |
| A | 564 | SW | No | 1987 | Yes | 25 | 5.28 | 5.3 | 10/15/2004 | 183 | Completed |
| A | 577 | SE | No | 1989 | Yes | 110 | 4.56 | 4.57 | 8/26/2005 | 280 | Completed |
| A | 603 | SE | No | 1970 | Yes | 75 | 2.71 | 5.3 | 10/15/2004 | 56 | Completed |
| A | 608 | SW | No | 1970 | Yes | 13 | 2.77 | 5.3 | 10/15/2004 | 91 | Completed |
| A | 615 | CW | No | 1956 | Yes | 50 | 3.24 | 7.71 | 8/26/2005 | 281 | To be issued |
| A | 681 | SW | No | 1985 | Yes | 5 | 93 | 7.71 | 8/26/2005 | 41 | Completed |
| A | 708 | SE | No | 1958 | Yes | 15 | 5.8 | 4.57 | 8/26/2005 | 217 | Completed |
| A | 722 | SW | No | 1972 | Yes | 8 | 9.38 | 9.65 | 8/26/2005 | 52 | Completed |
| A | 729 | SW | No | 1970 | Yes | 15 | 4.27 | 9.65 | 8/26/2005 | 71 | Completed |
| A | 753 | CW | No | 1963 | Yes | 25 | 5.32 | 4.89 | 6/21/2005 | 111 | Completed |
| A | 802 | CW | No | 1961 | Yes | 16 | 17.69 | 9.65 | 8/26/2005 | 118 | To be issued |
| A | 813 | CW | No | 1958 | Yes | 30 | 8.23 | 4.18 | 8/26/2005 | 12 | Completed |
| A | 823 | CW | No | 1968 | Yes | 28 | 3.29 | 9.65 | 8/26/2005 | 154 | Completed |
| A | 828 | CW | No | 1978 | Yes | 15 | 3.8 | 9.65 | 8/26/2005 | 80 | Completed |
| A | 851 | CW | No | 1977 | Yes | 60 | 1.72 | 5.83 | 9/28/2004 | 258 | Completed |
| A | 880 | CW | No | 1978 | Yes | 60 | 2.83 | 7.71 | 8/26/2005 | 270 | Completed |
| A | 885 | CW | No | 1979 | Yes | 20 | 3.15 | 7.71 | 8/26/2005 | 101 | To be issued |
| A | 1031 | SW | No | 1989 | Yes | 27 | 8.3 | 4.71 | 10/15/2004 | 106 | Completed |
| A | 1033 | SE | No | 1990 | Yes | 50 | 1.74 | 5.39 | 10/15/2004 | 304 | Completed |
| A | 1063 | SE | No | 1972 | Yes | 24 | 4.79 | 5.3 | 10/15/2004 | 155 | Completed |
| A | 1004 | SE | No | 1953 | Yes | 55 | 2.18 | 5.93 | 10/15/2004 | 224 | **Ongoing** |

**Total Basins: 30**

**Total: 5,298 26 Basins**
**Laterals Inspected (Including tested and unable to test): 4,436 Completed**
**Total Laterals To Be Inspected by June 30, 2006: 862**

**TV Inspection: 5/06 - 06/06**

**Inspection Rate @ 22 Laterals Per Day**
**8 Weeks (June 30, 2006)**

**Next Issuance-Qualified Basins**
**Production Rate**

| | High | Low |
|---|---|---|
| 1 | 885 | 615 |
| 2 | 802* | |

*(Newly paved private community, to be inspected last)

**Summary**

| | |
|---|---|
| Basins Completed | 26 |
| Basins Issued/Ongoing | 1 |
| Basins Pending Issuance | 3 |

MIAMI-DADE COUNTY WATER AND SEWER

**FIELD INSPECTION REPORT**

**MIAMI-DADE WATER AND SEWER DEPARTMENT**
**COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)**

| Basin Number | Footage (ft) | Location | Atlas Page | Comm. District | No. of Stacks | No. of Laterals | Comments / Field Observations | WASD Field Observations | Scale |
|---|---|---|---|---|---|---|---|---|---|
| 35 | 4,367 | NW | E9 | 3 | 2 | 98 | Half of system serves shopping plaza on NE 79 St & 4Pl. Most of the clean-outs for this plaza are located in the rear paved alley. The rest of the system consists of 2 story apartment buildings with multiple units. FDOT permit required for open-cut repairs. | Half of system serves shopping plaza on NE 79 St & 4Pl. Most of the clean-outs for this plaza are located in the rear paved alley. The rest of the system consists of 2 story apartment buildings with multiple units. FDOT permit required for open-cut repairs. | 2 |
| 47 | 13,648 | NW | E9 | 3 | 192 | 452 | FDOT permit required for open-cut repairs | 50/50 Mix of Single Family Homes and 2 Story Apt. Buildings | 2 |
| 58 | 4,767 | CE | E13 | 3 | 5 | 95 | | Single Family / With some Apt Bldgs. | 2 |
| 70 | 507 | CW | H13 | 5 | 3 | 23 | FDOT permit required for open-cut repairs | Non Typical / Future Construction | 2 |
| 80 | 20,414 | CW | J13 | 5 | 184 | 379 | FDOT permit required for open-cut repairs | Sigle Family Homes /49% Stacks | 2 |
| 82 | 4,906 | CW | J13 | 5 | 14 | 194 | | Single Family Homes | 1 |
| 118 | 4,314 | NW | P10 | 12 | 4 | 33 | | This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs. | 3 |
| 126 | 1,895 | CW | S14 | 12 | 4 | 23 | This system is 100% 2-story apartment buildings. | Apts and Retail Stores / Not Favorable | 2 |
| 154 | 3,583 | CW | P12 | 12 | 4 | 28 | This system is located at NW 36 St and 79 Ave. This is a very heavy traffic/commercial area. Most of this station would have to be done at night during low traffic hours. Very long runs between the property line and buildings. Many 5+ story office buildings. | This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs. | 3 |
| 162 | 5,779 | CW | P13 | 12 | 1 | 41 | | This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs. | 3 |
| 194 | 10,570 | NW | N10 | 12 | 27 | 65 | FDOT permit required for open-cut repairs | This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs. | 3 |
| 195 | 8,650 | NW | N10 | 12 | 5 | 51 | This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs. | This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs. | 3 |
| 336 | 3,572 | NW | M4 | 13 | 0 | 26 | Hold | Warehouses / Not favorable | 2 |
| 350 | 19,167 | NW | E1 | 1 | 57 | 535 | | 100% Apt and condos / Non Favorable | 3 |
| 355 | 16,101 | NW | L3 | 13 | 27 | 249 | Hold, FDOT permit required for open-cut repairs | Single Family Homes | 1 |
| 358 | 1,614 | NW | K3 | 1 | 1 | 65 | No visible clean-outs available, half the system is located in backyards. | Backyard / Not Favorable | 2 |
| 364 | 16,101 | NW | K1 | 1 | 30 | 314 | FDOT permit required for open-cut repairs. FDOT Construction year '07-'08. To be given first priority. | 50/50 Mix of Single Family Homes and 2 Story Apt. Buildings | 1 |
| 378 | 13,317 | NW | J3 | 1 | 32 | 238 | FDOT permit required for open-cut repairs | 100% Backyard / Big Basin / Non Favorable | 3 |
| 380 | 8,453 | NW | P3 | 13 | 5 | 192 | Hold | PSN Not Favorable | 3 |
| 405 | 1,354 | NW | N2 | 13 | 2 | 21 | Hold | 3 Story Apt Bldgs. / Not Favorable | 2 |
| 410 | 8,907 | NW | N2 | 13 | 11 | 109 | Hold | 50/50 Mix of Single Family Homes and 2 Story Apt. Buildings | 1 |

MIAMI-DADE COUNTY WATER AND SEWER

**FIELD INSPECTION REPORT**

**MIAMI-DADE WATER AND SEWER DEPARTMENT**
**COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)**

| Basin Number | Footage (ft) | Location | Atlas Page | Comm. District | No. of Stacks | No. of Laterals | Comments / Field Observations | WASD Field Observations | Scale |
|---|---|---|---|---|---|---|---|---|---|
| 479 | 19,025 | NW | P2 | 13 | 22 | 446 | Hold | 50/50 Mix of Single Family Homes and 2 Story Apt. Buildings | 1 |
| 484 | 37,685 | NW | P4 | 13 | 29 | 915 | | Single Family Homes | 1 |
| 509 | 10,595 | CW | S18 | 10 | 21 | 223 | FDOT permit required for open-cut repairs | 50/50 Mix of Single Family Townhomes and 3 Story Apt. Buildings | 2 |
| 524 | 8,562 | CW | T19 | 10 | 6 | 120 | Some clean-outs identified, 2-3 story office buildings. Best candidate of seven proposed basins. 4 block area with 100% clean-outs located in paved driveways. | Mix of single family homes / New Construction / 3 Story office buildings | 2 |
| 525 | 20,488 | CW | T20 | 10 | 1 | 628 | | Single Family Homes / Favorable | 1 |
| 564 | 7,143 | SW | T27 | 9 | 98 | 183 | | 54% Stacks / Construction | 3 |
| 577 | 8,159 | SE | R28 | 8 | 26 | 280 | | 50/50 Mix of Single Family Homes and 2 Story Apt. Buildings | 2 |
| 603 | 12,482 | SE | S27 | 8 | 27 | 56 | FDOT permit required for open-cut repairs | Cutler Ridge Mall / Not Favorable | 3 |
| 608 | 4,603 | SW | T27 | 9 | 14 | 114 | | Single Family Homes / Area has new construction | 2 |
| 615 | 11,273 | CW | S17 | 10 | 145 | 281 | | 1005 Backyard / 52% Stacks / Not Favorable | 3 |
| 681 | 6,750 | SW | U24 | 9 | 6 | 41 | This system serves the Richmond Naval Air Station. It contains many empty lots with no visible clean-outs available. This area is not typical. We will end up excavating most of these laterals at the property line to test. | This system serves the Richmond Naval Air Station. It contains many empty lots with no visible clean-outs available. This area is not typical. We will end up excavating most of these laterals at the property line to test. | 2 |
| 708 | 11,816 | SE | R27 | 8 | 66 | 233 | | Single Family Homes / Favorable | 1 |
| 722 | 17,725 | SW | S24 | 9 | 3 | 52 | | Single Family Homes / Backyard, If need to do Backyard station this one favorable due to low % of stacks | 2 |
| 729 | 5,044 | SW | Q22 | 8 | 37 | 71 | | Single Family Homes / Favorable | 2 |
| 753 | 7,175 | CW | P16 | 10 | 48 | 125 | | Back Yard / 38% Stacks / Not Favorable | 3 |
| 763 | 5,594 | CW | P19 | 7 | 5 | 61 | | 100% Apt Bldgs | 3 |
| 790 | 1,554 | CW | N19 | 7 | 1 | 12 | | Dadeland Mall / High domestic flow / Difficult | 2 |
| 802 | 5,335 | CW | P20 | 8 | 7 | 118 | | Mostly 2 & 3 Story Apt Buildings | 3 |
| 803 | 15,300 | CW | P20 | 8 | 10 | 411 | | Mixed Single Family and Townhomes with some Commercial. | 2 |
| 813 | 1,579 | CW | Q15 | 10 | 7 | 12 | | 2 Story Apt Bldgs. | 3 |
| 823 | 9,930 | CW | R20 | 8 | 22 | 149 | | Single Family Homes / Favorable | 1 |
| 828 | 4,665 | CW | R20 | 8 | 77 | 80 | | Single Family Homes / 96% Stacks | 3 |
| 829 | 1,527 | CW | R19 | 8 | 1 | 44 | FDOT permit required for open-cut repairs. FDOT construction year '05-'06. To be given first priority. | 2 Story Apt Bldgs. | 2 |
| 851 | 10,414 | CW | V18 | 10 | 19 | 258 | | Mostly Single Family Homes / Some 3 Story Apt Buildings | 2 |
| 880 | 14,253 | CW | U21 | 8 | 53 | 270 | FDOT permit required for open-cut repairs | Single Family Homes / Favorable | 1 |
| 885 | 6,581 | CW | S22 | 8 | 18 | 101 | This basin fits typical scenario. Single family homes and small. | Single Family Homes / Favorable | 1 |
| 1004 | 10,340 | SE | X32 | 8 | 39 | 224 | | Single Family Homes / Favorable, Labor Camp | 1 |
| 1031 | 4,725 | SW | Z36 | 9 | 41 | 106 | | Single Family Homes / Favorable, Labor Camp | 2 |
| 1032 | 8,075 | SE | T30 | 9 | 48 | 193 | | Single Family Homes / Favorable | 1 |
| 1033 | 9,594 | SE | U30 | 8 | 42 | 311 | | Single Family Homes / Favorable | 1 |
| 1063 | 10,594 | SE | Q26 | 8 | 37 | 157 | | Single Family Homes / Favorable | 1 |

MIAMI-DADE COUNTY WATER AND SEWER

**LATERAL ASSIGNMENT ANALYSIS REPORT**

**Miami-Dade Water and Sewer Department**
**Comprehensive Lateral Investigation Program**

| Basin Number | Footage (ft) | Location | Comments / WASD Field Observations | Difficulty | No. of Laterals | No. days | Weeks | No. of Stacks |
|---|---|---|---|---|---|---|---|---|
| 126 | 1895 | **CW** | This system is 100% 2-story apartment buildings. Apts. And Retail Stores / Not Favorable | 2 | 23 | 2 | 0 | 4 |
| 509 | 10595 | **CW** | 50/50 Mix of Single Family Townhomes and 3 Story Apt. Buildings. FDOT permit required for open-cut repairs | 2 | 223 | 19 | 4 | 21 |
| 524 | 8562 | **CW** | Some clean-outs identified, 2-3 story office buildings. Best candidate of seven proposed basins. 4 block area with 100% clean-outs located in paved driveways. Mix of single family homes / New Construction / 3 Story office buildings | 2 | 120 | 10 | 2 | 6 |
| 525 | 20488 | **CW** | Single Family Homes / Favorable | 1 | 628 | 52 | 10 | 1 |
| 615 | 11273 | **CW** | 1004 Backyard / 52% Stacks / Not Favorable | 3 | 281 | 23 | 5 | 145 |
| 763 | 5594 | **CW** | 100% Apt Bldgs | 3 | 61 | 5 | 1 | 5 |
| 813 | 1579 | **CW** | 1 Story Apt Bldgs. | 3 | 12 | 1 | 0 | 7 |
| 823 | 9930 | **CW** | Single Family Homes / Favorable | 1 | 149 | 12 | 2 | 22 |
| 829 | 1527 | **CW** | 2 Story Apt Bldgs.FDOT permit required for open-cut repairs. FDOT construction year '05-'06. To be given first priority. | 2 | 44 | 4 | 1 | 1 |
| 851 | 10414 | **CW** | Mostly Single Family Homes / Some 3 Story Apt Buildings | 2 | 258 | 22 | 4 | 19 |
| 880 | 14253 | **CW** | Single Family Homes / Favorable. FDOT permit required for open-cut repairs | 1 | 270 | 23 | 5 | 53 |
| SUBTOTAL | | | | 3 | 2069 | 172 | 34 | 284 |
| 364 | 16101 | NW | 50/50 mix of single family homes and 2 story apt. buildings. FDOT permit required for open-cut repairs. FDOT Construction year '07-'08. To be given first priority. | 1 | 314 | 26 | 5 | 30 |
| 410 | 8907 | NW | Hold, 50/50 Mix of Single Family Homes and 2 Story Apt. Buildings | 1 | 109 | 9 | 2 | 11 |
| 484 | 37685 | NW | Hold, Basin too large. Single Family Homes | 1 | 915 | 76 | 15 | 29 |
| 35 | 4367 | NW | Half of system serves shopping plaza on NE 79 St & 4Pl. Most of the clean-outs for this plaza are located in the rear paved alley. The rest of the system consists of 2 story apartment buildings with multiple units. | 2 | 98 | 8 | 2 | 2 |
| 47 | 13648 | NW | 50/50 mix of Single Family Homes and 2 Story Apt. Buildings.FDOT permit required for open-cut repairs | 2 | 452 | 38 | 8 | 192 |
| 336 | 3572 | NW | Warehouses / Not favorable. Hold | 2 | 26 | 2 | 0 | 0 |
| 358 | 1614 | NW | No visible clean-outs available, half the system is located in backyards. Not favorable | 2 | 65 | 5 | 1 | 1 |
| 405 | 1354 | NW | Hold, 3 Story Apt Bldgs. / Not Favorable | 2 | 21 | 2 | 0 | 2 |
| 350 | 19167 | NW | 100% Apt and condos / Not Favorable. | 3 | 535 | 45 | 9 | 57 |
| 378 | 13317 | NW | 100% Backyard / Big Basin / Non Favorable. FDOT permit required for open-cut repairs | 3 | 238 | 20 | 4 | 32 |
| SUBTOTAL | | | | | 2773 | 231 | 46 | 356 |
| 577 | 8159 | **SE** | 50/50 Mix of Single Family Homes and 2 Story Apt. Buildings | 2 | 280 | 23 | 5 | 26 |
| 603 | 12482 | **SE** | Cutler Ridge Mall / Not Favorable. FDOT permit required for open-cut repairs | 3 | 56 | 5 | 1 | 27 |
| 1033 | 9594 | **SE** | Single Family Homes / Favorable | 1 | 311 | 26 | 5 | 42 |
| 1063 | 10594 | **SE** | Single Family Homes / Favorable | 1 | 157 | 13 | 3 | 37 |
| SUBTOTAL | | | | 3 | 804 | 67 | 13 | 132 |
| 564 | 7143 | SW | 54% Stacks / Construction | 3 | 183 | 15 | 3 | 98 |
| 608 | 4603 | SW | Single Family Homes / Area has new construction | 2 | 114 | 10 | 2 | 14 |
| 729 | 5044 | SW | Single Family Homes / Favorable | 2 | 71 | 6 | 1 | 37 |
| 1031 | 4725 | SW | Single Family Homes / Favorable. Labor Camp | 2 | 106 | 9 | 2 | 41 |
| SUBTOTAL | | | | | 474 | 40 | 8 | 190 |
| | | | | | 6120 | 510 | 102 | 962 |

# LATERAL INSPECTION STATUS REPORT
**May 23, 2006**

MIAMI-DADE COUNTY WATER AND SEWER

## MIAMI-DADE WATER AND SEWER DEPARTMENT
## COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

### MDWASD

| Basin | Sewer Lines Tested | Private | | | | Public | | | Status |
|---|---|---|---|---|---|---|---|---|---|
| | | Pass | Fail | CND | N/A | Pass | Fail | CND | |
| 823 | 144 | 56 | 60 | 27 | 1 | 54 | 89 | 1 | **Completed** |
| 851 | 172 | 78 | 26 | 69 | 1 | 92 | 25 | 57 | **Completed** |
| 194 | 60 | 21 | 5 | 33 | 1 | 25 | 30 | 5 | **Completed** |
| 524 | 160 | 101 | 31 | 27 | 1 | 66 | 86 | 8 | **Completed** |
| 603 | 43 | 5 | 8 | 30 | | 16 | 8 | 19 | **Completed** |
| 813 | 30 | 5 | 3 | 22 | | 6 | 22 | 2 | **Completed** |
| Total | 609 | 266 | 133 | 208 | 4 | 253 | 260 | 92 | |

### ENVIROWASTE SERVICES GROUP, INC

| Basin | Sewer Lines Tested | Private | | | | Public | | | Status |
|---|---|---|---|---|---|---|---|---|---|
| | | Pass | Fail | CND | N/A | Pass | Fail | CND | |
| 364 | 328 | 106 | 30 | 157 | 35 | 181 | 127 | 20 | **Completed** |
| 358 | 48 | 14 | 15 | 19 | | 23 | 19 | 6 | **Completed** |
| 47 | 349 | 52 | 58 | 209 | 30 | 85 | 232 | 32 | **Completed** |
| 1033 | 297 | 207 | 23 | 60 | 7 | 252 | 26 | 19 | **Completed** |
| 1031 | 109 | 76 | 3 | 28 | 2 | 90 | 9 | 10 | **Completed** |
| 564 | 195 | 139 | 8 | 48 | | 182 | 12 | 1 | **Completed** |
| 608 | 75 | 35 | 6 | 33 | 1 | 27 | 37 | 11 | **Completed** |
| 509 | 204 | 115 | 5 | 84 | | 140 | 35 | 29 | **Completed** |
| 1063 | 166 | 88 | 27 | 51 | | 126 | 33 | 7 | **Completed** |
| 80 | 371 | 214 | 2 | 152 | 3 | 322 | 28 | 21 | **Completed** |
| 82 | 127 | 76 | 2 | 48 | 1 | 109 | 15 | 3 | **Completed** |
| 70 | 17 | | 6 | 11 | | 1 | 11 | 5 | **Completed** |
| 195 | 47 | 15 | 7 | 25 | | 33 | 13 | 1 | **Completed** |
| 681 | 29 | 9 | 1 | 19 | | 16 | 11 | 2 | **Completed** |
| 729 | 52 | 23 | | 27 | 2 | 33 | 6 | 13 | **Completed** |
| 708 | 216 | 46 | 83 | 86 | 1 | 16 | 108 | 35 | **Completed** |
| 828 | 81 | 67 | 2 | 11 | 1 | 81 | | | **Completed** |
| 753 | 144 | 33 | 18 | 91 | 2 | 39 | 50 | 55 | **Completed** |
| 525 | 598 | 491 | 2 | 94 | 11 | 591 | 23 | 16 | **Completed** |
| 722 | 39 | 6 | 8 | 25 | | 7 | 19 | 11 | **Completed** |
| 880 | 214 | 170 | | 41 | 3 | 204 | 6 | 6 | **Completed** |
| 577 | 438 | 396 | 1 | 39 | 2 | 422 | 10 | 6 | **Completed** |
| 1004 | 181 | 30 | 164 | 7 | | 29 | 149 | 3 | Ongoing |
| Total | 4,325 | 2,408 | 471 | 1,365 | 101 | 3,009 | 979 | 312 | 27 |

Grand T 4,934

**Legend**

N/A : Access not granted.

CND : Could not do / tuberculated lines / could not access via cleanout / other

**LATERAL INSPECTION SUMMARY REPORT**
**May 23, 2006**

**MIAMI-DADE WATER AND SEWER DEPARTMENT**
**COMPREHENSIVE LATERAL INSPECTION PROGRAM (CLIP)**

| Total Sewer Lines Tested | | Public | | | Private | | | |
|---|---|---|---|---|---|---|---|---|
| | | Pass | Fail | CND | Pass | Fail | CND | N/A |
| 4,934 | | 3,262 | 1,239 | 404 | 2,674 | 604 | 1,573 | 105 |
| **Percentage / Public*** | 4,905 | 67% | 25% | 8% | | | | |
| **Percentage / Private*** | 4,956 | | | | 54% | 12% | 32% | 2% |
| **Total Percentage** | | 67% | 25% | 8% | 54% | 12% | 32% | 2% |

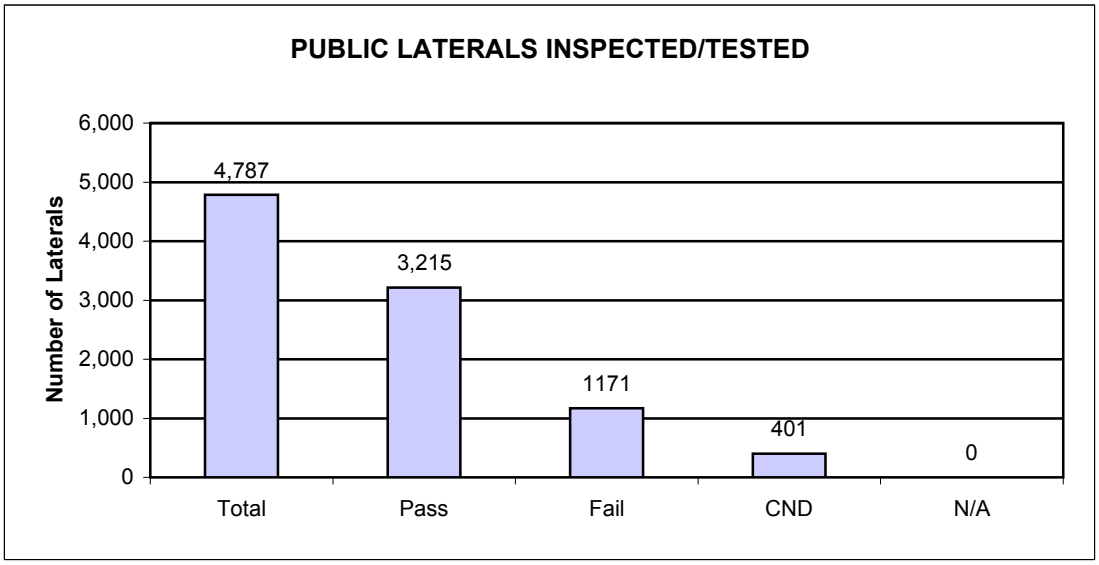
* Difference due to wye connections

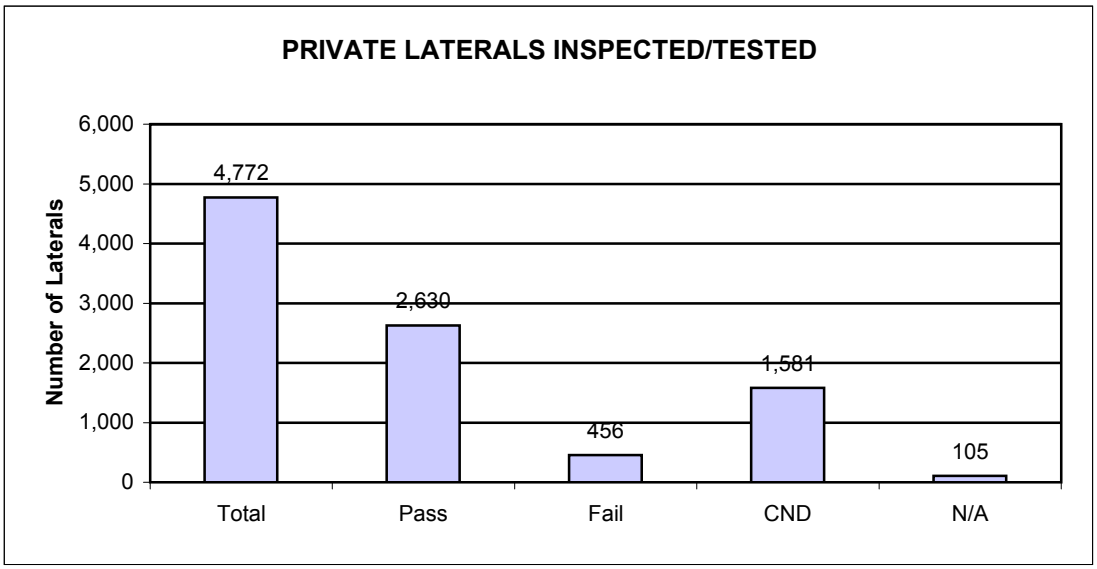
**Legend**
N/A : Access not granted.
CND : See below

| **Public** | | | **Private** | | |
|---|---|---|---|---|---|
| Authorization pending | 0 | 0.00% | Authorization pending | 323 | 6.52% |
| Bend in Line | 4 | 0.08% | Bend in Line | 76 | 1.53% |
| Capped | 18 | 0.37% | Capped | 225 | 4.54% |
| Could not locate cleanout / | 57 | 1.16% | Could not locate cleanout / service | 84 | 1.69% |
| Could not push plug | 18 | 0.37% | Could not push plug | 170 | 3.43% |
| Deep manhole | 3 | 0.06% | Deep manhole | 6 | 0.12% |
| Did not do (DND) | 15 | 0.31% | Driveway / Pavers | 150 | 3.03% |
| Driveway / Pavers | 96 | 1.96% | Heavy flow | 4 | 0.08% |
| Heavy flow | 4 | 0.08% | Long sweep | 3 | 0.06% |
| Long sweep | 0 | | No Access | 127 | 2.56% |
| No Access (gate locked, parked car, dog in yard, etc.) | 78 | 1.59% | No room to excavate | 58 | 1.17% |
| No room to excavate | 32 | 0.65% | Owner refused excavation | 44 | 0.89% |
| Owner refused excavation | 14 | 0.29% | Roots | 5 | 0.10% |
| Roots | 1 | 0.02% | Tuberculation | 183 | 3.69% |
| Tuberculation | 18 | 0.37% | Utility conflict | 40 | 0.81% |
| Utility conflict | 29 | 0.59% | Did not do (DND) | 18 | 0.36% |
| Other | 14 | 0.29% | Other | 65 | 1.31% |
| | **401** | **8.18%** | | **1,581** | **31.90%** |

MIAMI-DADE COUNTY WATER AND SEWER

## MIAMI-DADE WATER AND SEWER DEPARTMENT
## COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)



# Miami-Dade Water and Sewer Department

## COMPREHENSIVE LATERAL INVESTIGATION PROGRAM

## BASIN INSPECTION ANALYSIS REPORT

| Cat. | Basin | Loc. | City of Miami | Age: | Conflict Verification | RDII Sig | Peaking Factor 2001 | Avg. Flow (gpm) | Peak Flow 2004/05 (gpm) | Peaking Factor 2004/05 | Peak Flow Date | Max Rain (inch) | Max Rain Date | # Stacks | # Laterals | Difficulty | Original Basins | Inspection Testing Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0813 | CW | ☐ | 1958 | FEMA/DORM CICC-PW | ☑ | 5.4 | 30 | 247 | 8.23 | 8/28/2005 | 4.18 | 8/26/2005 | 7 | 12 | 3 | ☑ | Completed | CLIP |
| | 0070 | CW | ☑ | | None | ☐ | 6 | 3 | 8 | 2.67 | 10/26/2004 | 4.27 | 6/21/2005 | 3 | 16 | 2 | ☐ | Completed | CLIP |
| | 0828 | CW | ☐ | 1978 | None | ☑ | 3.1 | 15 | 57 | 3.80 | 8/27/2005 | 9.65 | 8/26/2005 | 77 | 80 | 1 | ☐ | Completed | CLIP |
| | 0753 | CW | ☐ | 1963 | FEMA/DORM | ☑ | 4.8 | 25 | 133 | 5.32 | 6/21/2005 | 4.89 | 6/21/2005 | 48 | 111 | 3 | ☐ | Completed | CLIP |
| | 0524 | CW | ☐ | 1983 | None | ☑ | 2.9 | 28 | 99 | 3.54 | 8/27/2005 | 7.71 | 8/26/2005 | 6 | 120 | 2 | ☑ | Completed | CLIP. |
| | 0823 | CW | ☐ | 1968 | CICC-PW | ☑ | 3.4 | 28 | 92 | 3.29 | 8/26/2005 | 9.65 | 8/26/2005 | 22 | 154 | 1 | ☑ | Completed | CLIP |
| | 0082 | CW | ☑ | | MDWASD | ☑ | 7.5 | 7 | 26 | 3.71 | 8/27/2005 | 4.18 | 8/26/2005 | 58 | 194 | 1 | ☐ | Completed | CLIP |
| | 0509 | CW | ☐ | 1989 | FDOT | ☑ | 3.5 | 125 | 123 | 0.98 | 9/28/2004 | 5.83 | 9/28/2004 | 21 | 223 | 2 | ☑ | Completed | CLIP |
| | 0851 | CW | ☐ | 1977 | None | ☑ | 1.8 | 60 | 103 | 1.72 | 9/28/2004 | 5.83 | 9/28/2004 | 19 | 258 | 2 | ☑ | Completed | CLIP |
| | 0880 | CW | ☐ | 1978 | PW | ☑ | 2.7 | 60 | 170 | 2.83 | 8/29/2005 | 7.71 | 8/26/2005 | 53 | 270 | 1 | ☑ | Completed | CLIP |
| | 0080 | CW | ☑ | | None | ☑ | 3 | 130 | 354 | 2.72 | 6/21/2005 | 4.89 | 6/21/2005 | 184 | 379 | 2 | ☐ | Completed | CLIP |
| | 0525 | CW | ☐ | | PW | ☑ | | 65 | 424 | 6.52 | 8/28/2005 | 7.71 | 8/26/2005 | 1 | 628 | 1 | ☑ | Completed | CLIP |
| | 0194 | NW | ☐ | 1963 | FEMA/DORM PW | ☑ | 8.6 | 30 | 107 | 3.57 | 6/21/2005 | 4.89 | 6/21/2005 | 27 | 59 | 3 | ☐ | Completed | CLIP. |
| | 0195 | NW | ☐ | 1968 | FEMA/DORM | ☑ | 2.4 | 30 | 71 | 2.37 | 6/21/2005 | 4.89 | 6/21/2005 | 5 | 61 | 3 | ☐ | Completed | CLIP |
| | 0047 | NW | ☑ | | PW | ☑ | | 170 | 313 | 1.84 | 6/21/2005 | 4.27 | 6/21/2005 | 193 | 453 | 2 | ☑ | Completed | CLIP |
| | 0603 | SE | ☐ | 1970 | None | ☑ | 2.7 | 75 | 203 | 2.71 | 10/15/2004 | 5.3 | 10/15/2004 | 27 | 56 | 3 | ☑ | Completed | CLIP |
| | 1063 | SE | ☐ | 1972 | PW | ☑ | 4 | 24 | 115 | 4.79 | 10/15/2004 | 5.3 | 10/15/2004 | 36 | 155 | 1 | ☑ | Completed | CLIP |
| | 0708 | SE | ☐ | 1958 | None | ☑ | 5.7 | 15 | 87 | 5.80 | 8/28/2005 | 4.57 | 8/26/2005 | 71 | 217 | 1 | ☐ | Completed | CLIP |
| | 0577 | SE | ☐ | 1989 | None | ☑ | 3.1 | 110 | 502 | 4.56 | 8/26/2005 | 4.57 | 8/26/2005 | 26 | 280 | 2 | ☐ | Completed | CLIP |
| | 1033 | SE | ☐ | 1990 | None | ☑ | 3.3 | 50 | 87 | 1.74 | 10/16/2004 | 5.39 | 10/15/2004 | 43 | 304 | 1 | ☑ | Completed | CLIP |
| | 0681 | SW | ☐ | 1985 | None | ☑ | 8.8 | 5 | 465 | 93.00 | 8/26/2005 | 7.71 | 8/26/2005 | 6 | 41 | 2 | ☐ | Completed | CLIP |
| | 0722 | SW | ☐ | 1972 | FEMA/DORM | ☑ | 4 | 8 | 75 | 9.38 | 8/29/2005 | 9.65 | 8/26/2005 | 4 | 52 | 2 | ☐ | Completed | CLIP |
| | 0729 | SW | ☐ | 1970 | CICC-PW | ☑ | 6.2 | 15 | 64 | 4.27 | 8/27/2005 | 9.65 | 8/26/2005 | 37 | 71 | 2 | ☑ | Completed | CLIP |
| | 0608 | SW | ☐ | 1970 | FEMA/DORM CICC-PW | ☑ | 5.8 | 13 | 36 | 2.77 | 10/16/2004 | 5.3 | 10/15/2004 | 14 | 91 | 2 | ☑ | Completed | CLIP |
| | 1031 | SW | ☐ | 1989 | FEMA/DORM | ☑ | 9.2 | 27 | 224 | 8.30 | 10/15/2004 | 4.71 | 10/15/2004 | 41 | 106 | 2 | ☑ | Completed | CLIP |
| | 0564 | SW | ☐ | 1987 | None | ☑ | 5.4 | 25 | 132 | 5.28 | 10/15/2004 | 5.3 | 10/15/2004 | 98 | 183 | 3 | ☑ | Completed | CLIP |
| A | 0885 | CW | ☐ | 1979 | None | ☑ | 2.7 | 20 | 63 | 3.15 | 8/28/2005 | 7.71 | 8/26/2005 | 18 | 101 | 1 | ☐ | Completed | CLIP |
| A | 0802 | CW | ☐ | 1961 | PW | ☑ | 5.9 | 16 | 283 | 17.69 | 8/27/2005 | 9.65 | 8/26/2005 | 7 | 118 | 3 | ☐ | | CLIP/Hold/Pavement |
| A | 0615 | CW | ☐ | 1956 | FEMA/DORM PW FDOT | ☑ | | 50 | 162 | 3.24 | 8/27/2005 | 7.71 | 8/26/2005 | 145 | 281 | 3 | ☑ | Issued | CLIP |
| A | 0803 | CW | ☐ | 1960 | CICC-PW | ☑ | 2.6 | 100 | 114 | 1.14 | 10/15/2004 | 5.3 | 10/15/2004 | 117 | 411 | 2 | ☐ | Ongoing | CLIP |
| A | 0118 | NW | ☐ | 1972 | FEMA/DORM | ☐ | 1.8 | 25 | 144 | 5.76 | 5/16/2006 | 8.47 | 5/16/2006 | 4 | 33 | 3 | ☐ | Issued | CLIP |
| A | 1004 | SE | ☐ | 1953 | MDWASD | ☑ | | 55 | 120 | 2.18 | 10/19/2004 | 5.93 | 10/15/2004 | 39 | 224 | 1 | ☐ | Completed | CLIP |
| C | 0058 | CE | ☐ | 1946 | None | ☑ | 2.4 | 130 | 505 | 3.88 | 8/26/2005 | 2.19 | 8/26/2005 | 5 | 95 | 2 | ☐ | | Pending Rain Event. Pumps to Biscayne Bay Interceptor |
| C | 0336 | NW | ☐ | 1983 | None | ☑ | 11.7 | 25 | 99 | 3.96 | 6/24/2005 | 1.45 | 6/21/2005 | 0 | 26 | 2 | ☑ | | Pending Rain Event |
| C | 0358 | NW | ☐ | 1957 | PW | ☑ | 7.3 | 20 | 40 | 2.00 | 6/24/2005 | 1.37 | 6/24/2005 | 1 | 67 | 2 | ☑ | Completed | Pending Rain Event/Under Review (Hydrograph) |
| C | 0035 | NW | ☑ | 1954 | None | ☑ | 1.4 | 70 | 149 | 2.13 | 6/21/2005 | 3.15 | 6/21/2005 | 2 | 98 | 2 | ☑ | | Pending Rain Event |
| C | 0410 | NW | ☐ | 1980 | None | ☑ | 6.3 | 30 | 90 | 3.00 | 6/24/2005 | 1.37 | 6/24/2005 | 11 | 109 | 1 | ☑ | | Pending Rain Event |
| C | 0380 | NW | ☐ | 1968 | None | ☐ | 4 | 14 | 26 | 1.86 | 6/24/2005 | 1.37 | 6/24/2005 | 5 | 192 | 3 | ☐ | | Pending Rain Event |
| C | 0378 | NW | ☐ | 1955 | FEMA/DORM PW | ☐ | 3.4 | 80 | 175 | 2.19 | 9/11/2005 | 2.33 | 9/11/2005 | 32 | 237 | 3 | ☑ | | Pending Rain Event |
| C | 0355 | NW | ☐ | 1960 | None | ☑ | 4.9 | 63 | 180 | 2.86 | 6/24/2005 | 1.37 | 6/24/2005 | 27 | 249 | 1 | ☐ | | Pending Rain Event |
| C | 0364 | NW | ☐ | 1971 | FEMA/DORM FDOT | ☑ | 3.6 | 60 | 129 | 2.15 | 6/24/2005 | 1.37 | 6/24/2005 | 32 | 357 | 1 | ☑ | Completed | Pending Rain Event |
| C | 0479 | NW | ☐ | 1991 | None | ☑ | 3.5 | 65 | 149 | 2.29 | 6/24/2005 | 2.01 | 6/24/2005 | 22 | 445 | 1 | ☐ | | Pending Rain Event/No Signature |
| C | 0350 | NW | ☐ | 1979 | None | ☑ | 27 | 110 | 220 | 2.00 | 9/11/2005 | 2.33 | 9/11/2005 | 60 | 535 | 3 | ☑ | | Pending Rain Event |
| C | 0484 | NW | ☐ | | None | ☐ | | 135 | 185 | 1.37 | 9/5/2004 | | 9/5/2004 | 29 | 915 | 1 | ☑ | | Pending Rain Event/Under Review (Hydrograph) |
| C | 1032 | SE | ☐ | 1989 | None | ☐ | 3 | 58 | 71 | 1.22 | 8/28/2005 | 6.02 | 8/26/2005 | 48 | 193 | 1 | ☐ | | O&M Issue |
| D | 0790 | CW | ☐ | 1961 | PW | ☐ | 4.8 | 4 | 4 | 1.00 | 8/28/2005 | 9.65 | 8/26/2005 | 1 | 12 | 2 | ☐ | | Lowest Priority |
| D | 0126 | CW | ☐ | 1086 | None | ☑ | 2.7 | 35 | 122 | 3.49 | 6/23/2005 | 4.89 | 6/21/2005 | 4 | 23 | 2 | ☑ | | CLIP. Corrected Latent Defects |
| D | 0154 | CW | ☐ | 1981 | None | ☐ | 2.8 | 55 | 67 | 1.22 | 6/20/2005 | 4.89 | 6/21/2005 | 4 | 28 | 3 | ☐ | | CLIP. Corrected Latent Defects |
| D | 0162 | CW | ☐ | 1995 | FEMA/DORM PW | ☐ | 6.4 | 25 | 47 | 1.88 | 6/21/2005 | 4.89 | 6/21/2005 | 1 | 41 | 3 | ☐ | | CLIP. Corrected Latent Defects |
| D | 0829 | CW | ☐ | 1968 | FDOT | ☐ | 3.4 | 30 | 40 | 1.33 | 8/28/2005 | 9.65 | 8/26/2005 | 1 | 44 | 2 | ☑ | | CLIP. Corrected Latent Defects |
| D | 0763 | CW | ☐ | 1972 | CICC-PW | ☐ | 1.66 | 90 | 131 | 1.46 | 6/21/2005 | 2.49 | 6/21/2005 | 5 | 61 | 3 | ☑ | | CLIP. Corrected Latent Defects |
| D | 0405 | NW | ☐ | 1967 | None | ☑ | 2.7 | 36 | 46 | 1.28 | 8/2/2004 | 3.52 | 8/1/2004 | 2 | 21 | 2 | ☑ | | CLIP. Corrected latent Defect |

**Legend/Summary**

| | |
|---|---|
| A Ready | 32 |
| B Ready but needs review | 0 |
| C Pending Rain Event | 14 |
| D No Signature/Low Peaking Factor/Flow extremely low | 6 |
| TOTAL | 52 |

| | |
|---|---|
| Original Basins | 29 |
| Additional Basin | 23 |
| TOTAL | 52 |

**Location**

| | |
|---|---|
| Central East | =1 |
| Central West | =22 |
| North West | =16 |
| South East | =7 |
| South West | =6 |

**Difficulty**

1 Favorable: Single Family Home
2 Less Favorable:: Townhomes / 2 Story Apt Bldg
3 Difficult: Apt and condos/ Backyard / Conflicts

Basins.mdb

# MIAMI-DADE WATER AND SEWER DEPARTMENT
# COMPRENHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)
## RECOMMENDED REPAIRS REPORT

| Basin | Date Inspected | Work Order | DS MH Depth | Property Access Allowed | Air Tests | | | Hydrostatic Tests | | | Smoke Tests | | Lateral Material | | Surface Type | | Repair Recommended |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Full System | Public | Private | Full System | Public | Private | Public | Private | Public | Private | CO1 | CO2 | |
| 358 | 4/12/2005 | 2561 | 5.4 | Yes | | Fail | CND | | | | | | Clay | Cast Iron | | | Dig and Replace |
| 358 | 4/12/2005 | 2560 | 5.4 | Yes | | Fail | Fail | | | | | | Clay | Cast Iron | | | Dig and Replace |
| 358 | 4/12/2005 | 2559 | 5.4 | Yes | | Pass | Fail | | | | | | Clay | Cast Iron | Grass | | Dig and Replace |
| 358 | 4/13/2005 | 2554 | 5.4 | Yes | Fail | Fail | Fail | | | | | | Clay | PVC | Grass | | Dig and Replace |
| 358 | 4/13/2005 | 2550 | 5.2 | Pending | | Fail | CND | | | | | | | | | | Dig and Replace |
| 358 | 4/13/2005 | 2551 | 5.2 | Yes | Fail | CND | CND | | | | | | Clay | | | | Dig and Replace |
| 358 | 4/13/2005 | 2553 | 5.4 | Yes | | Fail | Pass | | | | | | Clay | PVC | Grass | | Dig and Replace |
| 358 | 4/13/2005 | 9588 | 5.4 | Yes | Fail | Fail | Fail | | | | | | Clay | PVC | Grass | Grass | Dig and Replace |
| 358 | 4/13/2005 | 2555 | 5.4 | Yes | Pass | Pass | Pass | | | | | | Clay | PVC | Grass | Grass | Dig and Replace |
| 358 | 4/13/2005 | 2557 | 5.4 | Yes | | Fail | Fail | | | | | | Clay | Cast Iron | | Grass | Dig and Replace |
| 358 | 4/13/2005 | 2552 | 5.2 | Pending | | Fail | CND | | | | | | Clay | | | | Dig and Replace |
| 358 | 4/14/2005 | 2514 | 1 | Yes | Fail | Pass | Fail | | | | | | Clay | Cast Iron | Grass | | Dig and Replace |
| 358 | 4/14/2005 | 2516 | 1 | Pending | | Fail | Fail | | | | | | Clay | PVC | Grass | | Dig and Replace |
| 358 | 4/14/2005 | 2515 | 1 | Yes | Pass | Pass | Pass | | | | | | Clay | Cast Iron | | | Dig and Replace |
| 358 | 4/14/2005 | 2520 | 1 | Pending | | Fail | CND | | | | | | Clay | Cast Iron | Grass | | Dig and Replace |
| 358 | 4/14/2005 | 2522 | 1 | Yes | | Fail | Fail | | | | | | Clay | Cast Iron | Grass | | Dig and Replace |
| 358 | 4/14/2005 | 2500 | 1 | Yes | | Pass | Fail | | | | | | Clay | Cast Iron | Grass | | Dig and Replace |
| 358 | 4/14/2005 | 2512 | 1 | Pending | | Fail | CND | | | | | | Clay | Cast Iron | | | Dig and Replace |
| 358 | 4/14/2005 | 2558 | 6.8 | Yes | | Fail | CND | | | | | | Clay | Cast Iron | | | |
| 358 | 4/14/2005 | 2501 | 1 | Yes | Pass | Pass | Pass | | | | | | Clay | Cast Iron | | | Dig and Replace |
| 358 | 4/14/2005 | 2506 | 1 | Yes | Pass | Pass | Pass | | | | | | | | Grass | | Dig and Replace |
| 358 | 4/15/2005 | 9587 | 4 | Yes | Fail | Fail | Fail | | | | | | Clay | PVC | | | Dig and Replace |
| 358 | 4/15/2005 | 2546 | 4 | Yes | Fail | Pass | Fail | | | | | | Clay | Cast Iron | | | Dig and Replace |
| 358 | 4/15/2005 | 2549 | 4 | Yes | Pass | Pass | Pass | | | | | | Clay | PVC | Grass | Grass | Dig and Replace |
| 358 | 4/15/2005 | 2548 | 4 | Pending | | CND | CND | | | | | | | | | | Dig and Replace |
| 358 | 4/18/2005 | 2530 | 6.8 | No | | Fail | CND | | | | | | | | | | |
| 358 | 4/18/2005 | 2526 | 6.8 | Yes | | Fail | Pass | | | | | | Clay | PVC | | | |
| 358 | 4/18/2005 | 2527 | 6.8 | Yes | Pass | Pass | Pass | | | | | | | | | | |
| 358 | 4/18/2005 | 2529 | 6.8 | Yes | Fail | Pass | CND | | | | | | Clay | Cast Iron | | | |
| 358 | 4/18/2005 | 2531 | 6.8 | Yes | Fail | Pass | CND | | | | | | Clay | Cast Iron | | | |
| 358 | 4/18/2005 | 2532 | 6.8 | Yes | Pass | Pass | Pass | | | | | | Clay | Cast Iron | Grass | | |
| 358 | 4/18/2005 | 2533 | 6.8 | Yes | Pass | Pass | Pass | | | | | | Clay | Cast Iron | Grass | | |

| Basin | Date Inspected | Work Order | DS MH Depth | Property Access Allowed | Air Tests | | | Hydrostatic Tests | | | Smoke Tests | | Lateral Material | | Surface Type | | Repair Recommended |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Full System | Public | Private | Full System | Public | Private | Public | Private | Public | Private | CO1 | CO2 | |
| 358 | 4/18/2005 | 2534 | 6.8 | Pending | Pass | Pass | Pass | | | | | | Clay | Cast Iron | | | |
| 358 | 4/18/2005 | 2535 | 6.8 | Yes | | CND | CND | | | | | | Clay | Cast Iron | | | |
| 358 | 4/18/2005 | 2528 | 6.8 | Yes | Fail | Pass | CND | | | | | | Clay | Cast Iron | | | |
| 358 | 4/19/2005 | 2539 | 5.4 | Yes | Fail | Fail | Pass | | | | | | Cast Iron | PVC | | | Dig and Replace |
| 358 | 4/19/2005 | 2540 | 5.4 | Yes | Pass | Pass | Pass | | | | | | Cast Iron | PVC | | Grass | Dig and Replace |
| 358 | 4/19/2005 | 2541 | 5.4 | Yes | Pass | Pass | Pass | | | | | | Cast Iron | PVC | | | Dig and Replace |
| 358 | 4/19/2005 | 2538 | 5.4 | Yes | | CND | CND | | | | | | | | | | Dig and Replace |

# REPAIR ISSUANCE REPORT

MIAMI-DADE WATER AND SEWER DEPARTMENT
COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

## PUBLIC LATERALS ASSIGNED TO MDWASD FOR EXCAVATED POINT REPAIRS AND FULL SERVICE LATERAL REPLACEMENT

| Basin | Current Repairs | REPAIR TECHNOLOGY | | | | | | | | | Repairs Pending Review | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Excavated Pt. Repair / Full Lateral Replacement - MDWASD | | | Cured-In-Place Liners | | | CIP Main Line / Lateral Connection Repair | | | | |
| | | Identified | Issued | Completed | Identified | Issued | Completed | Identified | Issued | Completed | | |
| 47 | 224 | 138 | 138 | 105 | 86 | | | | | | 0 | Ongoing |
| 70 | 10 | 10 | 10 | 8 | | | | | | | 0 | Ongoing |
| 80 | 27 | 27 | 27 | 18 | | | | | | | 0 | Ongoing |
| 82 | 15 | 15 | 15 | 15 | | | | | | | 0 | **Completed** |
| 194 | 30 | 30 | 30 | | | | | | | | 0 | Ongoing |
| 195 | 13 | 8 | | | 5 | | | | | | 0 | To be issued |
| 509 | 35 | 35 | 35 | 23 | | | | | | | 0 | Ongoing |
| 524 | 86 | | | | | | | | | | 86 | Under review |
| 525 | 23 | 14 | 13 | 1 | 9 | | | | | | 0 | Ongoing |
| 564 | 12 | 12 | 12 | 12 | | | | | | | 0 | **Completed** |
| 603 | 6 | 6 | 6 | | | | | | | | 0 | Ongoing |
| 608 | 34 | 34 | 34 | 18 | | | | | | | 0 | Ongoing |
| 681 | 11 | 11 | 11 | 11 | | | | | | | 0 | **Completed** |
| 708 | 100 | 100 | 100 | 20 | | | | | | | 0 | Ongoing |
| 722 | 19 | 12 | 12 | | 7 | | | | | | 0 | Ongoing |
| 729 | 4 | 4 | 4 | | | | | | | | 0 | Ongoing |
| 753 | 50 | | | 35 | 15 | | | | | | 0 | To be issued |
| 813 | 19 | 19 | 19 | | | | | | | | 0 | Ongoing |
| 823 | 89 | 89 | 89 | 74 | | | | | | | 0 | Ongoing |
| 828 | 0 | | | | | | | | | | 0 | N/A |
| 851 | 23 | 23 | 23 | 23 | | | | | | | 0 | **Completed** |
| 880 | 6 | 6 | 6 | | | | | | | | 0 | Ongoing |
| 1004 | 80 | | | | | | | | | | 80 | Insp. Ongoing |
| 1031 | 6 | 6 | 6 | 6 | | | | | | | 0 | **Completed** |
| 1033 | 26 | 26 | 26 | 22 | | | | | | | 0 | Ongoing |
| 1063 | 33 | 33 | 33 | 33 | | | | | | | 0 | **Completed** |
| **26** | **981** | **658** | **649** | **424** | **122** | | | | | | **166** | |

* **Includes 60 Completed Grout Repairs** **6 Completed**

** **Includes 17 Grout Repairs**

MIAMI-DADE COUNTY WATER AND SEWER

# REPAIR STATUS REPORT
**May 23, 2006**

## MIAMI-DADE WATER AND SEWER DEPARTMENT
## COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

| Basin | Current Repairs | Cannot Do | REPAIR TECHNOLOGY | | | Repairs Pending Review |
|---|---|---|---|---|---|---|
| | | | Repair/Full Lateral Replacement | Cured-In-Place Liners | Line/Lateral Connection Repair | |
| | | | Identified | Identified | Identified | |
| 47 | 224 | | 138 | 86 | | 0 |
| 70 | 10 | | 10 | | | 0 |
| 80 | 27 | | 27 | | | 0 |
| 82 | 15 | | 15 | | | 0 |
| 194 | 30 | | 30 | | | 0 |
| 195 | 13 | | 8 | 5 | | 0 |
| 509 | 35 | | 35 | | | 0 |
| 524 | 86 | | | | | 86 |
| 525 | 23 | | 14 | 9 | | 0 |
| 564 | 12 | | 12 | | | 0 |
| 603 | 6 | | 6 | | | 0 |
| 608 | 34 | | 34 | | | 0 |
| 681 | 11 | | 11 | | | 0 |
| 708 | 100 | | 100 | | | 0 |
| 722 | 19 | | 12 | 7 | | 0 |
| 729 | 4 | | 4 | | | 0 |
| 753 | 50 | | 35 | 15 | | 0 |
| 813 | 19 | | 19 | | | 0 |
| 823 | 89 | | 89 | | | 0 |
| 828 | 0 | | | | | 0 |
| 851 | 23 | | 23 | | | 0 |
| 880 | 6 | | 6 | | | 0 |
| 1004 | 80 | | | | | 80 |
| 1031 | 6 | | 6 | | | 0 |
| 1033 | 26 | | 26 | | | 0 |
| 1063 | 33 | | 33 | | | 0 |
| **26** | **981** | | **693** | **122** | | **166** |

# Miami-Dade Water and Sewer Department
## COMPREHENSIVE LATERAL INVESTIGATION PROGRAM
## PROGRAM STATUS (June 2, 2006)

| Basin | Rain Event 1 (2001) | Mainline SSES/ Repairs | Rain Event 2 (2-year Storm Event) | Qualified RDII | Lateral Inspection | Lateral Repair | Rain Event 3 (2-year Storm | Final Assessment |
|---|---|---|---|---|---|---|---|---|
| 47 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 70 | ☑ | ☑ | ☑ | Yes | **Completed** | Completed | ☐ | ☐ |
| 80 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 82 | ☑ | ☑ | ☑ | Yes | **Completed** | Completed | ☑ | ☐ |
| 118 | ☑ | ☑ | ☑ | Yes | To Be Issued | | ☐ | ☐ |
| 194 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 195 | ☑ | ☑ | ☑ | Yes | **Completed** | To Be Issued | ☐ | ☐ |
| 509 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 524 | ☑ | ☑ | ☑ | Yes | **Completed** | To Be Issued | ☐ | ☐ |
| 525 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 564 | ☑ | ☑ | ☑ | Yes | **Completed** | Completed | ☐ | ☐ |
| 577 | ☑ | ☑ | ☑ | Yes | **Completed** | To Be Issued | ☐ | ☐ |
| 603 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 608 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 615 | ☑ | ☑ | ☑ | Yes | To Be Issued | | ☐ | ☐ |
| 681 | ☑ | ☑ | ☑ | Yes | **Completed** | Completed | ☐ | ☐ |
| 708 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 722 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 729 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 753 | ☑ | ☑ | ☑ | Yes | **Completed** | To Be Issued | ☐ | ☐ |
| 802 | ☑ | ☑ | ☑ | Yes | To Be Issued | | ☐ | ☐ |
| 803 | ☑ | ☑ | ☑ | Yes | **Ongoing** | | ☐ | ☐ |
| 813 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 823 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 828 | ☑ | ☑ | ☑ | Yes | **Completed** | Completed | ☐ | ☐ |
| 851 | ☑ | ☑ | ☑ | Yes | **Completed** | Completed | ☐ | ☐ |
| 880 | ☑ | ☑ | ☑ | Yes | **Completed** | **Ongoing** | ☐ | ☐ |
| 885 | ☑ | ☑ | ☑ | Yes | **Ongoing** | | ☐ | ☐ |
| 1004 | ☑ | ☑ | ☑ | Yes | **Completed** | To Be Issued | ☐ | ☐ |
| 1031 | ☑ | ☑ | ☑ | Yes | **Completed** | Completed | ☐ | ☐ |
| 1033 | ☑ | ☑ | ☑ | Yes | **Completed** | Completed | ☐ | ☐ |
| 1063 | ☑ | ☑ | ☑ | Yes | **Completed** | Completed | ☐ | ☐ |
| 126 | ☑ | ☑ | ☑ | No | N/A | N/A | ☐ | ☐ |
| 154 | ☑ | ☑ | ☑ | No | N/A | N/A | ☐ | ☐ |
| 162 | ☑ | ☑ | ☑ | No | N/A | N/A | ☐ | ☐ |
| 763 | ☑ | ☑ | ☑ | No | N/A | N/A | ☐ | ☐ |
| 790 | ☑ | ☑ | ☑ | No | N/A | N/A | ☐ | ☐ |
| 829 | ☑ | ☑ | ☑ | No | N/A | N/A | ☐ | ☐ |
| Sub-Total | 38 | 38 | 38 | Yes: 32<br>No: 6 | Completed 27<br>Ongoing 2<br>To Be Issued 3<br>N/A 6 | Completed 9<br>Ongoing 13<br>To Be Issued 5<br>N/A 6 | 1 | 1 |

# Miami-Dade Water and Sewer Department
## COMPREHENSIVE LATERAL INVESTIGATION PROGRAM
## PROGRAM STATUS (June 2, 2006)

| Basin | Rain Event 1 (2001) | Mainline SSES/ Repairs | Rain Event 2 (2-year Storm Event) | Qualified RDII | Lateral Inspection | Lateral Repair | Rain Event 3 (2-year Storm | Final Assessment |
|---|---|---|---|---|---|---|---|---|
| 35 | ☑ | ☑ | ☑ | | | | ☐ | ☐ |
| 58 | ☑ | ☑ | ☑ | | | | ☐ | ☐ |
| 336 | ☑ | ☑ | ☐ | | | | ☐ | ☐ |
| 350 | ☑ | ☑ | ☐ | | | | ☐ | ☐ |
| 355 | ☑ | ☑ | ☐ | | | | ☐ | ☐ |
| 358 | ☑ | ☑ | ☐ | | **Completed** | | ☐ | ☐ |
| 364 | ☑ | ☑ | ☐ | | **Completed** | | ☐ | ☐ |
| 378 | ☑ | ☑ | ☐ | | | | ☐ | ☐ |
| 380 | ☑ | ☑ | ☐ | | | | ☐ | ☐ |
| 405 | ☑ | ☑ | ☑ | | | | ☐ | ☐ |
| 410 | ☑ | ☑ | ☐ | | | | ☐ | ☐ |
| 479 | ☑ | ☑ | ☑ | | | | ☐ | ☐ |
| 484 | ☑ | ☑ | ☐ | | | | ☐ | ☐ |
| 1032 | ☑ | ☑ | ☐ | | | | ☐ | ☐ |
| Sub-Total | 14 | 14 | 4 | Yes: 0<br>No: 0 | Completed 2<br>Ongoing 0<br>To Be Issued 0<br>N/A 0 | Completed 2<br>Ongoing 0<br>To Be Issued 0<br>N/A 0 | 0 | 0 |
| Total | 52 | 52 | 42 | Yes: 32<br>No: 6 | Completed 27<br>Ongoing 2<br>To be Issued 3<br>N/A 6 | Completed 9<br>Ongoing 13<br>To Be Issued 5<br>N/A 6 | 1 | 1 |