1. Executive Summary:

Hurricane Irene was well documented by county and other agencies as severely impacting south Florida. Many homes, public and commercial buildings, farms, and streets were inundated from several days to a couple of weeks. In many cases, the affected areas were only passable with military vehicles. Although the public drinking water system continued to function, electrical outages were plentiful and lasted between two to three days in most areas, and up to a week in other cases.

As a result of Hurricane Irene's countywide impacts, the Miami-Dade County Flood Management Task Force (Task Force) was created on October 19, 1999 by the Board of County Commissioners, through Resolution No. R-1164-99, Appendix A. The Task Force was charged with:

1. Investigating and analyzing the current and proposed flood management system with emphasis on the performance of the system during Hurricane Irene;
2. Recommending public and private sector opportunities to improve flood management; and
3. Seeking ways to minimize the kind of property damage and disruptions such as those caused by Hurricane Irene.

The first meeting of the Task Force took place on November 3, 1999. At that meeting, the Task Force scheduled a series of countywide meetings to gather information from agency and municipal technical presentations and public comments. Altogether, ten (10) meetings were held from November 3, 1999 to May 16, 2000. A list of Task Force members is provided in Appendix B. The meeting agendas and minutes are provided in Appendix C.

Although the flooding from Hurricane Irene was countywide, the extent and duration of flooding were minimized in many areas due to the operation of the water control and stormwater management systems. However, the Task Force has concluded that the following events caused the flooding to be exacerbated countywide:

1. The system of canals in Miami-Dade County is designed to protect against most storm events that do not exceed an average of seven (7) inches of rainfall in 24 hours. However, the canal capacities vary from a 100-year storm to a 10-year storm typically from north to south. Even if all reasonable and prudent measures had been taken, Hurricane Irene's rainfall amounts would have exceeded most canals' capacities countywide. The associated storm tide of Hurricane Irene greatly inhibited the gravity discharge of stormwater during the course of the storm.
2. All storm tracking forecasting projections from up to a week before the storm struck south Florida, indicated that Miami-Dade County was a possible target and that Hurricane Irene would be a very wet storm. Although the South Florida Water Management District (the District) responded when the storm was imminent, it was too late to create any flood water storage capacity for this very wet storm, or to lessen flood duration in southwest Miami-Dade County. There is no formal process to allow county staff to participate in the wet season decision-making by the U.S. Army Corp of Engineers (the Corps) and the District.
3. Water levels in the northern part of the L31-N Canal in western Miami-Dade County were higher for many months preceding Hurricane Irene than the experimental levels that had been agreed upon by the District, the Corps and Everglades National Park. Had the Modified Water Deliveries project and C-111 project been constructed, these antecedent conditions would not have existed and the flooding impacts to south Miami-Dade County would have been reduced.

The Task Force offers the following as recommendations for implementation (detailed recommendations begin on page 6):

1. Adopt a proactive approach to flood protection.
2. Institute wet season procedures.
3. Implement flood control pumping to the east.
4. Evaluate back pumping and new structures for the Tamiami Canal.
5. Complete and implement the Miami-Dade County Stormwater Management Master Plan.
6. Ensure the Experimental Water Deliveries to Everglades National Park does not exacerbate flooding in Miami-Dade County.

7. Expedite completion of Modified Water Deliveries and C-111 Projects.
8. Ensure that the Cape Sable Seaside Sparrow emergency operations does not exacerbate flooding.
9. Improve local flood protection in the Comprehensive Everglades Restoration Plan.
10. Improve conditions in the 8½ Square Mile Area.
11. Support municipal improvement initiatives.
12. Extend Cut and Fill Criteria to flood prone areas.
13. Request updated FEMA insurance rate maps countywide.
14. Investigate options for improving the operational flexibility of the S-197 structure.
15. Establish maintenance plan for the Florida City and North Canals.
16. Identify flood prone areas in the unincorporated County.
17. Investigate the seepage effect in urban and agricultural areas.
18. Improve maintenance in the FEC-Borrow Canal.

On February 25, 2000, the County Commission passed Resolution No. 162-00, requesting that the Corps and the District not increase canal water levels until the Task Force issues and reviews its report. This Resolution may be found in Appendix A.

2. Introduction:

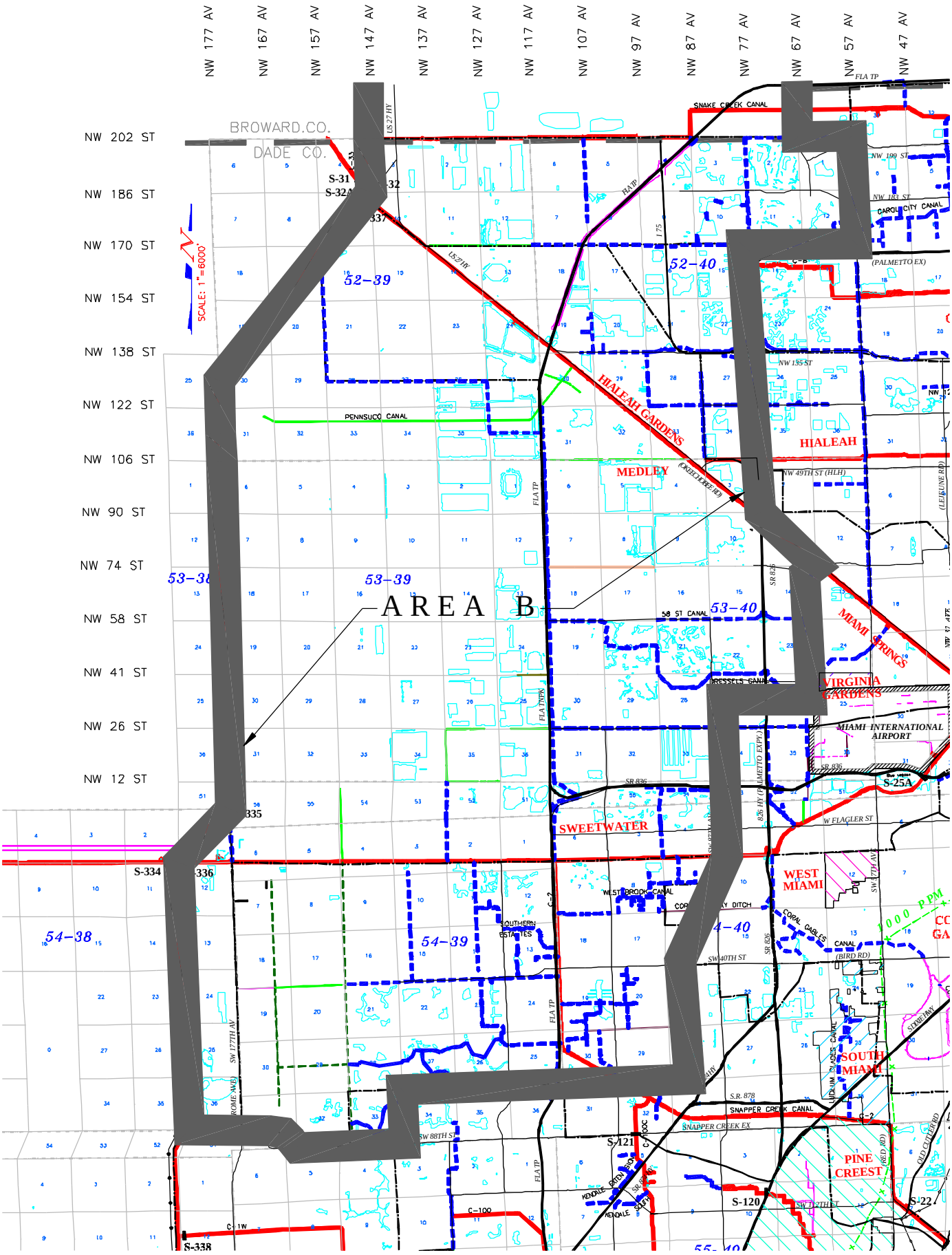
During the early stages of development in Miami-Dade County, the land was frequently inundated for long periods of time due to the flat topography, low land elevations and the high groundwater table in the Biscayne Aquifer. To remedy this situation and to make the land suitable for habitation, various governmental and private entities initiated the construction of the canal system that we have today. However, the excavation of the canal system exposed the Biscayne Aquifer, the county's primary source of drinking water, to saltwater intrusion. In order to stem the flow of salt water into the Biscayne Aquifer, salinity control structures were constructed at the mouths of both secondary and primary canals throughout Miami-Dade County.

However, the early design of the canal system by the Corps did not consider additional inflow from areas on the westerly part of the County (Area B, Figure 1, and as is shown in Appendix F from the Miami-Dade County Water Control Plan). Area B is lower and more flood prone than the older, more heavily urbanized areas of the county to the east. Therefore, drainage from Area B cannot be effectively removed until the areas to the east are drained and room is made available within the canals to drain Area B.

In addition, some of the primary canals within Area A that are presently maintained and operated by the South Florida Water Management District (the District), are inadequate to remove by gravity the relatively large, sudden volume of rainfall, and especially considering large tidal surge that may be associated with tropical storm events.

Today, the canal system in Miami-Dade County is a network of over 616 miles laid out in an approximate one to two mile-wide grid. The canal system is divided into 360 miles of primary canals and 260 miles of smaller secondary canals. The primary system, including most of the salinity control structures, is owned and operated by the District. The secondary system is the responsibility of Miami-Dade County. In general, the secondary canal system connects into the primary system, which connects into Biscayne Bay. Furthermore, the ability to move water in the secondary system is dependent on the available capacity in the primary system, which, in turn, is dependent on the proper operation of the salinity control structures.

FIGURE 1
AREA B



The principal functions of the canal system are as follows:

1) To maintain adequate ground water levels in the Biscayne Aquifer, to provide for water supply and to prevent saltwater intrusion. In general, the canal system re-supplies the Biscayne Aquifer during the dry season when flow is conveyed from Lake Okeechobee and the water conservation areas into the urbanized areas. Conversely, during the wet season, groundwater flows from the aquifer into the canals and is discharged to tide, as needed, to prevent flooding.
2) To provide for drainage during periods of excess rainfall, when the control structures must be operated to prevent overtopping of the canal banks.

Flood protection in Miami-Dade County is provided by filling the land to the minimum Miami-Dade County Flood Criteria elevations, and by the proper operation of the primary and secondary canal systems. Thus, the Water Control Plan for Miami-Dade County consists of two elements. The first is the canal system and all its components such as canals, bridges, culverts and salinity control structures. The second is Chapters 24 and 28 of the Miami-Dade County Code, which contains all the regulations for proper drainage of the land and protection of water resources. The Directors of the Environmental Resources Management and Public Works Departments have the authority to implement Chapters 24 and 28, respectively, of the Miami-Dade County Code.