

SOUTHWEST BROWARD/NORTHWEST DADE SUBREGIONAL STUDY
PHASE 1

EXECUTIVE SUMMARY

In August 1988, Council staff assembled a working group to consider information which had been compiled regarding an approximately 200 square mile area in southwest Broward County and northwest Dade County. The study area was chosen because it is a relatively undeveloped part of the region which may experience growth pressures in the future.

This is at least a two phase study. Phase 1 is a compilation of information from available reports and documents regarding infrastructure, natural resources and land use. The working group has met several times and has assisted in the preparation of the final report for Phase 1. Phase 2 will consist of an accumulation and analysis of data which can be used for permitting and land use decisions. The methodologies for completing the Phase 2 study are currently being discussed. The projected completion date for Phase 2 is July 1990.

Following is a brief description of information contained in the Phase 1 report.

Water Resources

The entire study area is underlain by the Biscayne Aquifer, the sole source of potable water for Dade, Broward, Monroe and parts of Palm Beach County. The Dade portion of the study area contains the Northwest Wellfield, Dade County's most pristine water supply. There are two cones of influence for potable wells partially or totally in the Broward portion of the study area. However, as salt water intrudes into the wellfields in the east, more wellfields may need to be planned for the western part of the county. Water quality in the study area is monitored by the counties and the U.S.G.S. The quality is reported to be good throughout most of the study area.

Soils

There are two general types of soils in the study area; Lauderdale-Dania Muck associations and Hallandale-Margate fine sand associations. These are typical of the historic wetlands environment of the area. They pose limitations to construction and usually are removed before any building takes place.

Wetlands

The area is part of the historic Everglades system. Extensive draining, dredging and filling for urban and agricultural development in the area and the surrounding vicinity have lead to significant degradation of the

wetland resources. Invasive exotic plants which outcompete the native vegetation have become established in large portions of the study area. However, the open areas still function in terms of water recharge and habitat. There are extensive wetland regulations in place at the federal, state, regional and local levels, but in the past, there has been little planning effort for the resource. Mitigation attempts have been fairly recent and little is known about the long term effectiveness of such projects.

Other Natural Habitats

Because of the impact of development on wetland resources, a large portion of the study area has taken on upland characteristics. Undeveloped areas serve as habitat for several species of upland animals.

Mineral Resources

The study area is one of the most productive limestone mining areas in the state. Large deposits underlie the entire area. There is an active mining industry in the study area. In Dade County, most of the mining is done on large tracts of land. The mined areas in Broward County tend to be smaller. One important issue with mining is the use of the land after the mining activity is completed. This is an issue with several unresolved questions, especially in terms of impacts on water quality.

Existing and Planned Roadway Network

The north-south roadway network in the study area is generally good, facilitated by an existing expressway system. The north-south arterial system is limited west of I-75 and the Homestead Extension of Florida's Turnpike (HEFT). The east-west arterial network is limited; however, it will be enhanced by the completion of I-595. There are many planned roadway improvement for the study area, including the four and six laning of several facilities currently operating near or at capacity. Several needs for the study area have been identified in the FDOT Strategic Plan.

Mass Transit

Currently, there is no mass transit service in the Dade portion of the study area. The mass transit service in the Broward portion is primarily east of Flamingo Road, except for a small area along Pines Boulevard east of I-75. Approximately 85 percent of the Broward portion of the study area is scheduled to receive mass transit service in the future. A small area in Dade County, near Okeechobee Road and the HEFT is scheduled to receive mass transit service.

Aviation Facilities

There is one active airport in the study area, the Opa-Locka West Airport east of Okeechobee Road and south of the C-9 Canal. This is a limited service airport used mainly for take-off and landing practice. There are two potential air facilities within the study area. The South

Broward General Aviation Airport is being proposed for an area adjacent to the northwest section of the Weston Development of Regional Impact (DRI). Dade County is studying an area for a new air carrier facility to help alleviate some of the air traffic at Miami International Airport. This area is bounded by Okeechobee Road, the county line, U.S. 27 and Levee 30.

Sanitary Sewer and Potable Water Infrastructure

The potable water and sanitary sewer infrastructure in Dade County is provided and maintained on a regional basis by the Metro-Dade Water and Sewer Authority Department (WASAD). Currently, there is limited infrastructure within the Dade portion of the study area because this part of the county is outside of the urban services boundary established by the county commission. The water and sewer infrastructure in Broward County is provided by a variety of agencies including the county, municipalities and private entities. Maintenance is the responsibility of the service provider. As new service is needed, facilities are constructed. Most of the eastern part of the study area in Broward County is serviced by water and sewer infrastructure. The remaining development within the study area is serviced by private wells and septic tanks/package plants.

Surface Water Management

Within the study area, there is a primary drainage system maintained by the South Florida Water Management District (SFWMD). The system is comprised of the main canals which receive water from the smaller secondary drainage canals throughout the study area. There are five primary drainage basins within the study area. At this time, it is known that the C-9 basin poses limitations regarding development because of the low ground elevation and the capacity of the canal. In Broward County, there are five independent drainage districts in the study area which maintain the secondary drainage system; South Broward Drainage District, Central Broward Drainage District, Indian Trace Improvement District, West Lauderdale Drainage District and Bailey Drainage District. In Dade County, the Department of Environmental Resources Management (DERM) maintains the secondary drainage system.

Within the study area, the SFWMD, the independent drainage districts and the counties have permitting authority, depending on the size of the project. The SFWMD is completing a study of the C-11 Basin in the northern part of the study area. From this study, a rule will be promulgated which will set fill encroachment criteria for the western part of the basin.

Solid Waste

The Broward County Interim Sanitary Landfill is the only solid waste facility within the study area. There are several facilities in the vicinity of the study area. Both Dade and Broward Counties are experiencing pressure on existing facilities and have planned for future facilities, primarily resource recovery systems.

Land Use

The primary existing land uses in the study area are agricultural, open land and estate residential. However, the future land use plans for the counties show a significant increase in residential and commercial land uses. These changes occur for the most part in Broward County. There are 13 DRIs and one Florida Quality Development within the study area accounting for almost 19,000 acres of land.

Land use designations may change over time through the local plan amendment process defined in Chapter 163, F.S. It is the intent that information contained within or referenced in this Phase 1 report, along with the results of the Phase 2 study, will be useful in the land use amendment and permitting processes affecting the study area.

SOUTHWEST BROWARD/NORTHWEST DADE SUBREGIONAL STUDY
PHASE 1

INTRODUCTION

South Florida is experiencing rapid growth. In 1980, the population of Dade and Broward Counties was 2.6 million. The 1987 population estimate is 3.0 million; an increase of 12 percent. As this growth occurs, there is an increasing emphasis on development in the western portions of the counties. People choosing to move away from a congested urban environment are moving west to areas considered more open and rural. As development pressures in the west intensify, it is necessary to look at the balance between development, available infrastructure, natural resources, and the quality of life.

The South Florida Regional Planning Council, along with federal, state, regional and local agencies, has recognized the need for a comprehensive assessment of southwest Broward County and northwest Dade County. In a coordinated effort, representatives from these agencies have formed a working group to investigate the area and better understand the systems at work. Appendix 1 contains the working group members and participants for the Phase 1 study. The Regional Planning Council staff, as coordinator of this study, has established a study design which will be refined by the group as the work progresses. The project is at least a two phase study; the first being a gathering and limited analysis of available data and information in terms of infrastructure, land use and natural resources. The second phase will involve the identification and accumulation of additional data needed to make sound land use and permitting decisions for this area.

This report is the result of the first phase of the Southwest Broward/Northwest Dade Subregional Study. Available information has been compiled regarding natural resources, infrastructure, and land use in the study area.

The above referenced studies, as well as information from various agencies, have been used in the development of this report. The result is a compilation of available data in terms of natural resources, infrastructure and land use.

I. DESCRIPTION OF STUDY AREA

The area for the study covers approximately 200 square miles and is depicted in Figure 1. It was chosen because it is relatively undeveloped and primarily still in either agricultural use or open space. The area is bounded on the north by State Road 84, on the west by Water Conservation Areas 3A and 3B, on the south by US 41 (Tamiami Trail), and on the east by the Homestead Extension of the Florida Turnpike in Dade County and Palm Avenue/Nob Hill Road in Broward County. The 1987 estimated population of the study area is approximately 35,000 and is projected to be approximately 75,000 by 2000 (Broward County Office of Planning, Metro-Dade Planning Department, 1988). The majority of the growth will be in the Broward County portion of the study area, since most of the Dade County section is outside of the Urban Services Area for the county.

The portion of the study area in Broward County has extensive tracts of vacant land; however, the major land use designations of low density residential, commercial, and industrial on the 1989 Broward County future land use map indicate that the area will be the site for new development in the county. Most of the study area in Dade County is part of the Dade County Northwest Wellfield and Pennsuco wetlands and is subject to protection by the county through the Northwest Wellfield Protection Plan and the environmental protection land use designation.

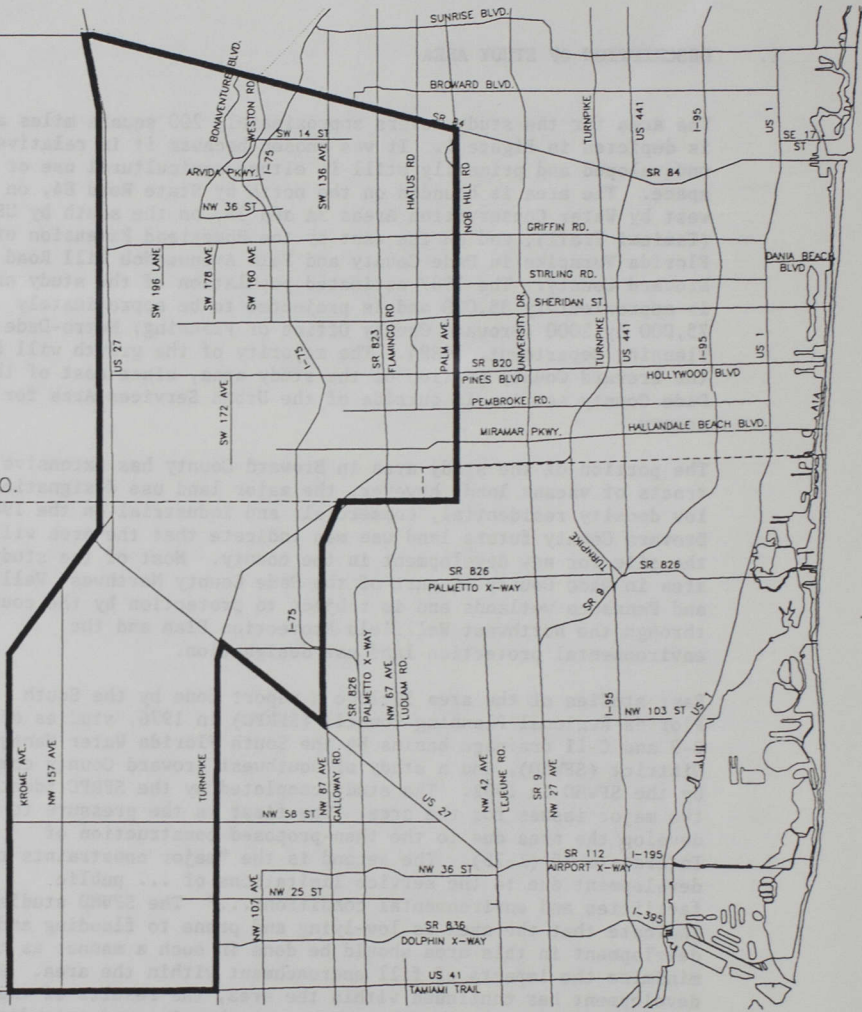
Past studies of the area include a report done by the South Florida Regional Planning Council (SFRPC) in 1976, studies of the C-9 and C-11 drainage basins by the South Florida Water Management District (SFWMD), and a study of southwest Broward County compiled by the SFWMD in 1982. The study completed by the SFRPC identifies two major issues for the area. The first is the pressure to develop the area due to the then-proposed construction of Interstate 75 (I-75). The second is the "major constraints to development due to the service limitations of ... public facilities and environmental conditions..." The SFWMD studies indicate that the area is low-lying and prone to flooding and any development in this area should be done in such a manner as to minimize the impacts of fill encroachment within the area. As development has continued within the area, the results of these studies indicate a need for a more comprehensive understanding of this part of the region.

The above referenced studies, as well as information from various agencies, have been used in the development of this report. The result is a compilation of available data in terms of natural resources, infrastructure and land use.

WATER
CONSERVATION
AREA 3-A

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AREA 3-B



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Southwest Broward/Northwest Dade Subregional Study

Legend: — Study Area

Source: South Florida Regional Planning Council.

FIGURE 1



MILES
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June 1989

II. NATURAL RESOURCES

A. Potable Water Resources

The sole source of potable water in south Florida is the Biscayne Aquifer, a highly permeable limestone, sandstone, and marl formation lying very close to the ground surface. The Biscayne Aquifer is the primary drinking water supply for Dade, Broward and Monroe Counties and part of Palm Beach County. It is recharged by rainfall through the hydrologic cycle. The aquifer covers approximately 3,300 square miles and its high permeability makes it the most productive shallow, non-artesian aquifer in Florida and one of the most permeable in the world (Parker, 1981). The aquifer is thickest near the coast, thinning to the west. While most of the water in the aquifer is fresh and is recharged by rainfall, there are pockets of salt water found in some areas. This is indicative of the fact that at one time sea level was higher than it is today and south Florida was submerged. As sea level receded, the salt water was trapped. The presence of salt water is an important water quality consideration when locating new potable water wells and excavating lakes for commercial and real estate interests.

Because of its high permeability, the aquifer is easily recharged but it is also vulnerable to contamination. Pollution from point and non-point sources can travel through the aquifer relatively quickly and may be difficult to track. Because of its permeability, it is also susceptible to salt water intrusion in the east. Historically, the freshwater in the aquifer formed a hydrologic head which prevented the salt water from the ocean and bay from entering the aquifer. However, as canals were built and water was drawn out of the aquifer in large quantities, the freshwater head receded and salt water intruded into potable water wellfields. As a result, the coastal wellfields have been moved farther inland.

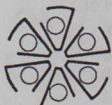
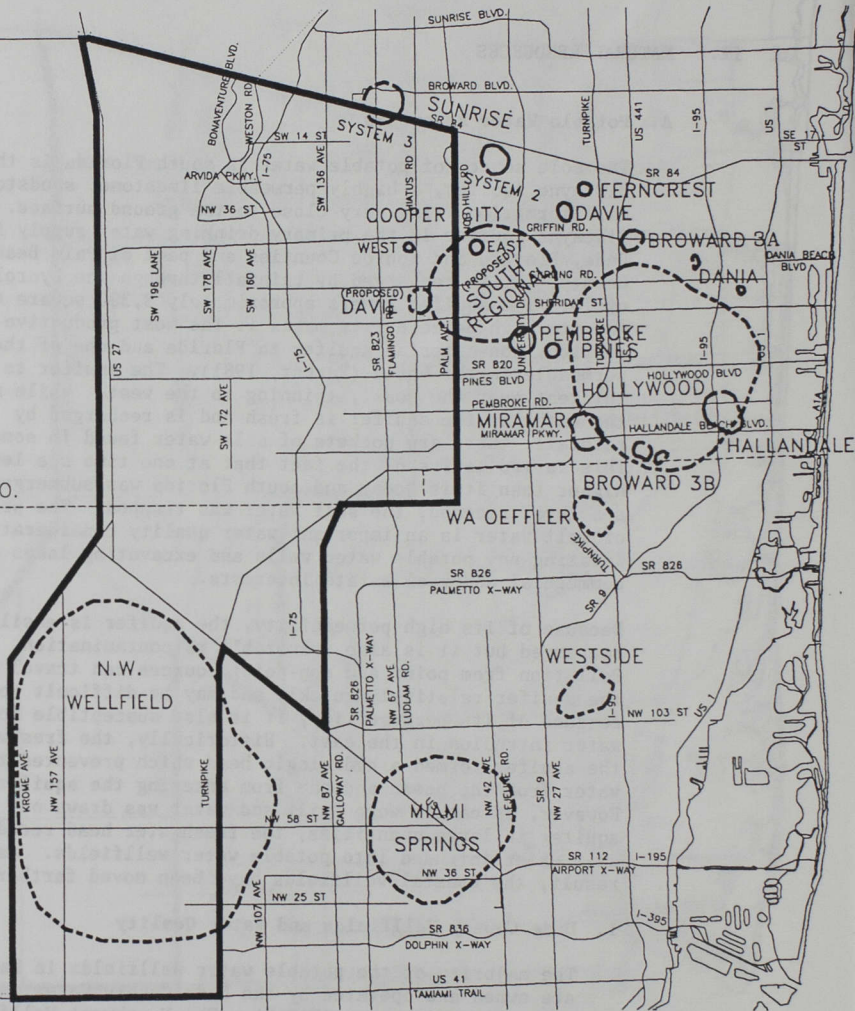
1. Dade County Wellfields and Water Quality

The majority of the potable water wellfields in Dade County are owned and operated by the Dade County Water and Sewer Authority Department (WASAD). The Northwest Wellfield, a major source of potable water for Dade County, is in an area subject to land use restrictions for wellfield protection and extends almost to the Tamiami Canal and the western boundary of the study area (Figure 2). The 1987 average daily demand on the wellfield was 148.36 million gallons per day (MGD) (Dade County Comprehensive Master Development Plan, 1988). Demand in this case refers to rates of pumpage. Most of the water received at the Hialeah/Preston treatment plant is from the Northwest Wellfield.

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Southwest Broward/Northwest Dade Subregional Study Existing and Future Wellfields

Legend: Study Area
 Regulatory Zones of Influence

Sources: Dade County Department of Environmental Resources Management
and Broward County Water Resource Management Division.

FIGURE 2



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June 1989

The Northwest Wellfield is the most pristine water supply in Dade County, subject to stringent regulations regarding land use and hazardous wastes. In Dade County, the cones of influence for public water supply wellfields are used as a basis for regulatory boundaries for additional controls of activity on the land surface above the cone of influence (Dade County Comprehensive Master Development Plan, 1988).

In 1981, the Dade County Commission adopted the Potable Water Supply Well Protection Ordinance, Section 24-12.1, Code of Metropolitan Dade County Code, also known as the Wellfield Protection Program. The program set the framework for the Northwest Wellfield Protection Plan which was adopted by the Dade County Commission on November 26, 1985. Among the concerns highlighted in the plan is the proximity of the wellfield to the resource recovery solid waste facility and the 58th Street landfill. In fact, the primary intent of the water quality program outlined in the plan is to characterize and monitor the movement of toxic contaminants from the county waste facilities towards the Northwest Wellfield and to ensure timely implementation of remedial measures, if necessary (DERM, 1988). The risk is that polluted groundwater in the landfill may eventually be drawn into the drinking water wells. Both the Metro-Dade Department of Environmental Resources Management (DERM) and the United States Geological Survey (USGS) have monitoring wells in the area (Figure 3).

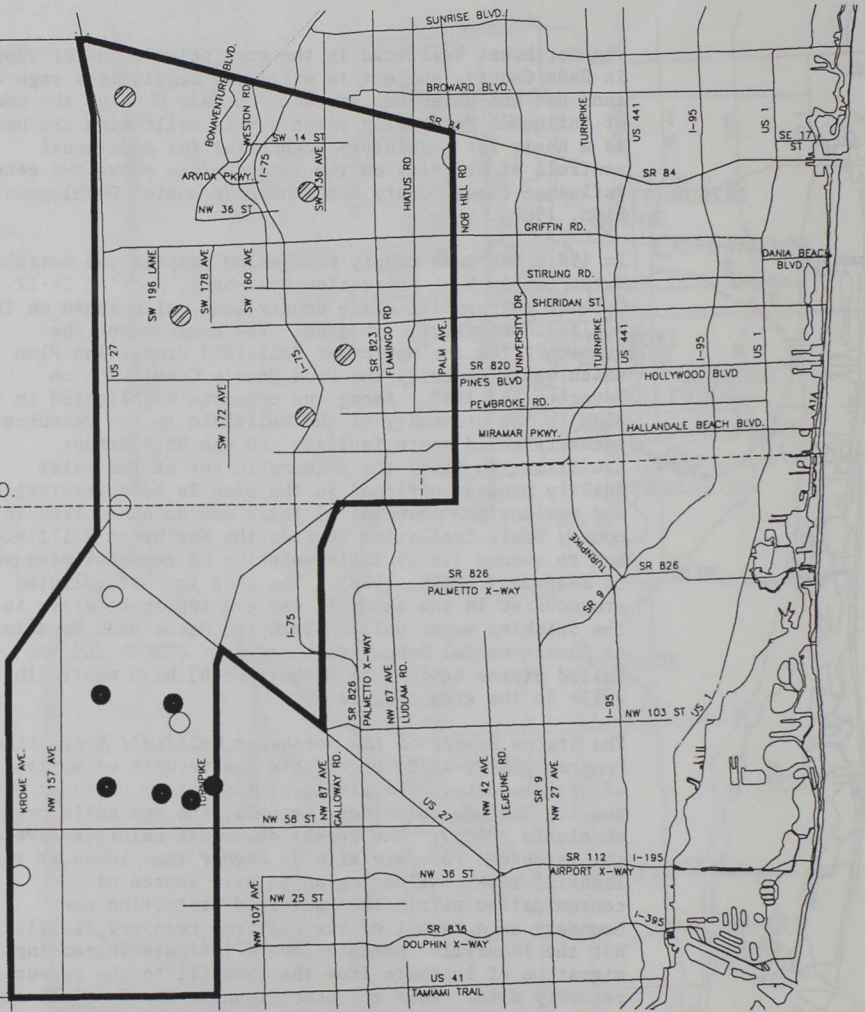
The *Status Report of the Northwest Wellfield Monitoring Program* (DERM, 1988) highlights the results of monitoring efforts to date. The strongest indicators of water quality include chlorides, ammonia, and synthetic organic chemicals (SOCs). The report documents chloride levels at the resource recovery site as higher than those at the landfill site, indicating an on-site source of contamination within the wellfield protection area boundary as a result of the resource recovery facility, not the landfill. Ammonia levels indicate increasing migration of leachate from the landfill to the resource recovery site. SOCs are present under the landfill site but have not yet been detected in the protection boundary.

Remedial recommendations and actions in the Northwest Wellfield Protection Plan outline extensive modifications to the canal network in the area to eliminate the risk of contaminating the drinking water wells. Theoretically, the canals will establish hydrologic barriers along the protection area boundary and retract influence from the resource recovery facility.

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Southwest Broward/Northwest Dade Subregional Study
Existing Ground Water Monitoring Wells

- Legend:
-  United States Geological Survey Wells
 -  Dade County Wells
 -  Broward County/U.S.G.S. Wells

Sources: United States Geological Survey, Dade County Department of Environmental Resources Management and Broward County Environmental Quality Control Board.

FIGURE 3



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June 1989

To further protect the area, the Dade County Comprehensive Development Master Plan (1988) includes the following policy to govern the protection of the wellfield:

The County shall protect the integrity of groundwater within cones of influence by strict adherence to the Wellfield Protection Ordinances, by rigorous enforcement of sanitary sewer requirements, applicable regulations, and by supporting system improvements which are designed to protect or enhance the raw water supply. Wellfields of exceptional quality, such as the Northwest Wellfield, shall be particularly addressed in the regulations to prevent degradation of water quality.

Chloride levels are an element of concern in potable water supplies. The USGS reports a gradual increase in specific conductance with depth suggesting a dilution of ground water near the surface by the infiltration of fresh water (USGS, 1987). The low chloride concentration at lower depths (90 to 220 ft.) indicates that little residual seawater remains in this part of the groundwater system. The report goes on to say that groundwater in northwest Dade County is probably an extension of more mineralized groundwater also found in western Broward County (USGS, 1987). Both the degree of mineralization of the water and the lithology of the surficial aquifer system in northwest Dade County is similar to that in Broward County (USGS, 1987) and reflects similar hydrogeologic conditions.

2. Broward County Wellfields and Water Quality

Broward County does not have a centralized wellfield system like that in Dade County. However, the Broward County Land Use Plan, Natural Resource Map Series (March 1989), showing existing and planned water wells and zones of influence includes the south regional wellfield cone of influence. The actual water well will be located near Stirling Road as discussed in Section II.A.3.

There are two cones of influence for operational wellfields wholly or partially within the Broward County portion of study area, the Cooper City West Wellfield and the Sunrise Wellfield - System 3 (Figure 2). According to *The Study of Water Supply and The Selection of Future Wellfield Sites in Broward County, Florida*, prepared by James M. Montgomery in 1986 (hereinafter the Montgomery Report), the Cooper City West Wellfield pumped an average of 0.77 million gallons per day (MGD) in 1984. The report also projects an increased demand of 2.23 MGD by the year 2020 for this wellfield. The report lists the average daily raw water demand for the Sunrise Systems' service area at 4.66 MGD in 1984, and projects a need of 13.30 MGD in the year 2020.

Although the following wellfields are not located within the study area, they serve populations in the study area. The Montgomery Report states that the Cooper City East Wellfield pumped raw water at an average daily rate of 0.77 MGD in 1984 and will need to increase that rate to 1.38 MGD by 2020. The Miramar Wellfield is reported to pump raw water at an average daily rate of 3.06 MGD in 1984 and will need to increase that rate to 15.42 MGD by 2020. The Pembroke Pines wellfield pumped raw water at an average daily rate of 5.12 MGD in 1984 and will need to increase that rate to 16.4 MGD by 2020 (Montgomery, 1986).

Both the Broward County Environmental Quality Control Board (EQCB) and the USGS monitor and report water quality data from observation wells within the study area (Figure 3). However, most of the EQCB wells were originally sampled and monitored by the USGS. The EQCB is currently preparing a status report of the data collected from 1986 to 1988 for volatile organic compounds (VOCs) and metals. The report should be made available during 1989. Early indications suggest that water quality in the area does not pose any significant threat to the potable water supply of southwest Broward County (EQCB, personal communication, 1989). Preliminary samples from USGS wells located in C.B. Smith Park exhibit low levels of lead and arsenic. The samples show 3.0 parts per billion (ppb) of lead in the shallow well and 1.5 ppb of arsenic in the deep well. The potable water standard for each of these elements is 50.0 ppb. The EQCB staff has cautioned the significance of these minor detections by acknowledging that monitoring for VOCs and metals in southwest Broward has not been going on long enough to prove a significant trend in water quality.

3. Future Wellfields

At this time, there are no future wellfields planned for the Dade portion of the study area. The water quality and quantity for the Northwest Wellfield are such that they meet the needs for the area. The county is now in the process of siting a new west wellfield in the Bird Drive Basin area South of the study area (Metro-Dade Planning, 1988).

For Broward County, the Montgomery Report states that currently there are no water quality problems at either the Miramar or Pembroke Pines Wellfields. However, by 2020, if no alternate supplies are added to serve the county, the existing wellfields where the water table levels are at 0 to +1 feet mean sea level (MSL) could be threatened by saltwater intrusion (Montgomery, 1986). The wellfields nearest the study area that are at 0 to +1 feet MSL include the Miramar and Pembroke Pines Wellfields. Therefore, even though the cones of influence

for the two wellfields are not within the study area, this may affect future water supplies since these two wellfields are projected to serve Miramar and Pembroke Pines through build out (City of Miramar, 1987; City of Pembroke Pines Utilities, personal communications, 1989). The best way to stop saltwater intrusion is to increase the amount of freshwater in the aquifer, not only in the study area, but region-wide as well.

Based upon projections of future demands and the need to close eastern wells to stop the advance of saltwater intrusion, the Montgomery Report identifies several alternatives to meet future potable water needs. One alternative is to locate new wellfield sites in western Broward County to serve both the west and east portions of the county. The Montgomery report identifies four potential future sites. They are the Northern site in the general vicinity of Hillsboro Boulevard between the turnpike and U.S. 441; the Pine Island site bounded by Sunrise Boulevard, Pine Island Road, Broward Boulevard, and Hiatus Road; the Stirling Road site (the proposed South Regional Wellfield); and the South Florida State Hospital site which is bounded by Pines Boulevard, University Drive, Pembroke Road and Douglas Road (Montgomery, 1985).

The Broward County Land Use Plan, Natural Resource Map Series, showing existing and planned water wells and zones of influence, (March, 1989) depicts a south regional water well and cone of influence. This proposed water well and cone of influence will include portions of Cooper City, Pembroke Pines, and unincorporated Broward County (Figure 2). The proposed water well site is located approximately east of Hiatus Road and west of 106th Avenue between Stirling Road and Sheridan Street (Montgomery, 1986). There is also a future Davie wellfield indicated on the map series directly west of the proposed south regional wellfield (Broward County Land Use Plan, 1989).

Another issue influencing ground water quality data is the use of septic tanks in southwest Broward County. The Broward County Comprehensive Plan (1989), states that septic tank usage is concentrated in those areas of the county where densities preclude cost-effective wastewater service extension. Southwest Broward County is dominated by the Hallandale-Margate and Lauderdale-Dania soil classifications which have severe limitations for urban uses and septic tanks. In spite of the naturally existing soil and its limitations for septic tanks, existing technology enables the substitution of soils via fill methods to address the limitations of southwest Broward for septic tank use. Currently, the Florida Department of Health and Rehabilitative Services, through the Broward County Public Health Unit, will permit a septic tank if

existing sewer lines are more than one fourth of a mile from a proposed subdivision or one hundred feet from a single family unit. Broward County reports no measurable negative impacts from septic tanks when designed, installed and located properly (Broward County Comprehensive Plan, 1989). However, because of the high water table in south Florida, the ability of soil to adequately treat septic tank effluent leads to a potential for contamination of the ground water supply (Kirkner and Associates, Inc., 1987).

The Florida Department of Health and Rehabilitative Services (HRS) is in the middle of a three year study of on-site sewage disposal systems. The first report, "Risk Assessment of On-site Sewage Disposal Systems for Selected Florida Hydrologic Regions", was completed in 1987. One of the study areas was Dade and Broward Counties. The results of this part of the project was a method for applying analytical techniques to obtain information regarding the transport of contaminants under various geologic conditions (HRS, 1986).

The *Surface Water Improvement and Management (SWIM) Plan for Lake Okeechobee* (SFWMD, 1989) is an effort currently underway to achieve higher quality and higher dependability of water flow to South Florida. The most applicable goals and objectives of the SWIM plan to the study area are:

- to protect and restore Lake Okeechobee water quality to meet regional environmental, potable water supply and agricultural water supply needs;
- enhance the environmental resources of the Lake Okeechobee study area and downstream areas such as the Water Conservation Areas that depend on the lake for supplemental water to meet resource management needs;
- to maintain adequate water quantity and quality in Lake Okeechobee to meet reasonable and beneficial use requirements; and
- to ensure that adequate flood water storage capacity is maintained.

The SWIM legislation requires the SFWMD to implement a program that results in a reduction of phosphorus loadings to the lake by the amount specified as excess in SFWMD guidelines by July 1, 1992. Further, "the goals for water supply and environmental resources should be addressed in 1990 and the goals for flood protection, navigation and recreation should be addressed in 1991" (SFWMD, 1989).

Through implementation of the goals and objectives stated above, the plan projects a more safe and reliable water source for South Florida.

B. Soils

The soils in the study area are primarily Lauderhill-Dania muck associations in the western portions and Hallandale-Margate fine sand associations in the eastern portions. The Lauderhill-Dania Association is very poorly drained, nearly level organic soils that are less than 40 inches deep to limestone. The Hallandale-Margate association is characterized as poorly drained, nearly level mineral soils that are less than 40 inches deep to limestone (USDA, SCS, 1974).

The soils in the study area are indicative of the historical nature of the area. The muck and sand are remnant of the Everglades wetlands and are high in organic content. They present severe limitations to development in the study area; however, this is usually overcome by removing the limiting soils and backfilling with limestone or other approved fill material, such as a small stone and sand mixture.

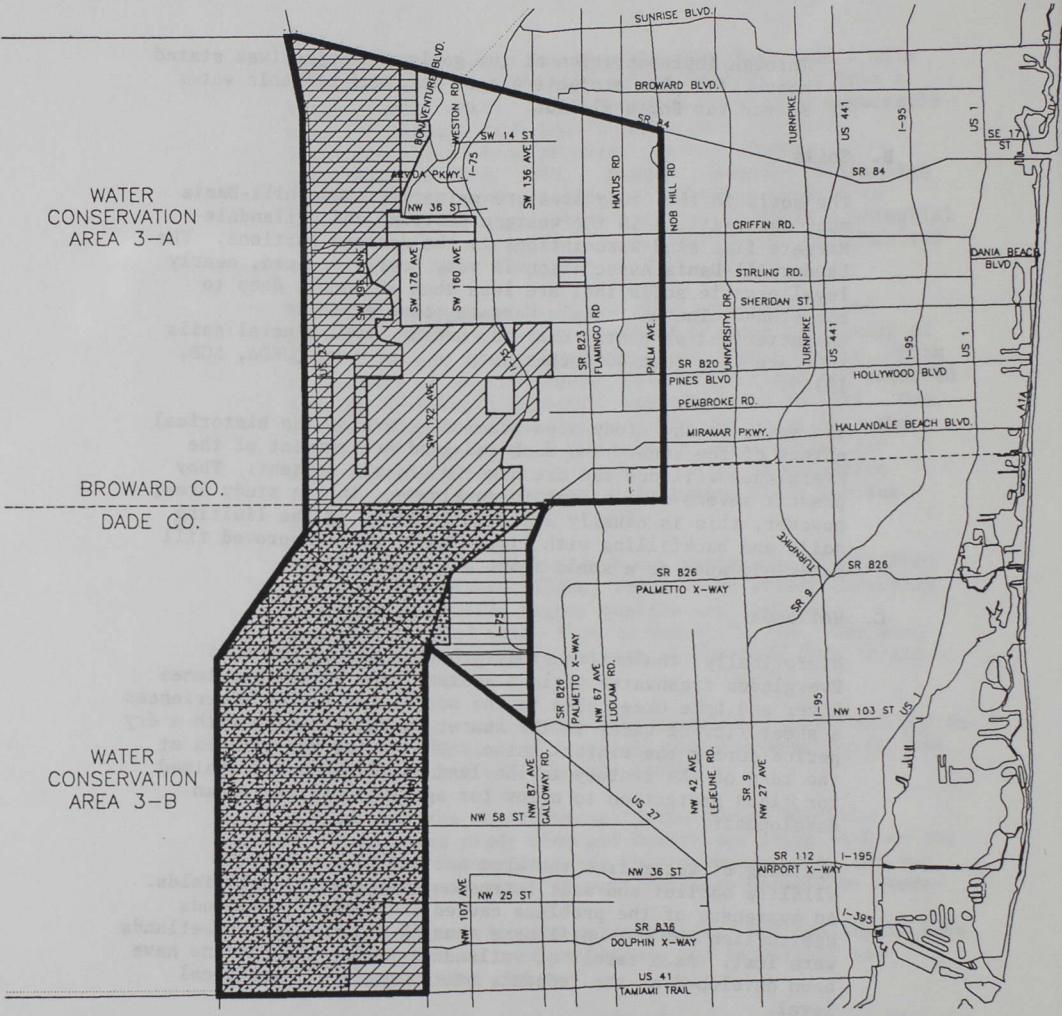
C. Wetlands

Historically, the entire study area belongs to the vast Everglades freshwater wetland system. Fed by the Kissimmee River and Lake Okeechobee to the north, the system experiences a sheet flow of water in the summer or rainy season with a dry period during the winter months. The system was altered at the turn of the century as the land was ditched and drained for flood protection to allow for agricultural and urban development.

Draining of water from the area has led to the loss of wildlife habitat and salt intrusion into coastal wetlands. An awareness of the problems caused a slowing of wetlands destruction but not until more than 50 percent of the wetlands were lost. As a result of wetlands impacts, regulations have been developed at the federal, state, regional, and local level.

Wetlands in south Florida fall under the jurisdiction of various regulatory agencies. Figure 4 indicates approximations of jurisdictional areas in the study area for the USACE, Dade County DERM and FDER. The USACE and FDER portions of the map were compiled by working with the agencies' staff from the local district offices and is not intended to bind the agencies' future actions. Interpretation of aerial photographs, limited ground truthing and permit applications were the main sources of information. The Dade County DFRM jurisdictional information was derived from a map compiled by DERM. Figure 4 is not an inventory of wetland

The FDER and USACE portions of this map were compiled by working with the agencies' district staff. It is not intended to bind the agencies' future actions. Please see text for further explanation. This is not a wetlands resources map.



WATER CONSERVATION AREA 3-A





BROWARD CO.
DADE CO.

WATER CONSERVATION AREA 3-B




**Southwest Broward/Northwest Dade Subregional Study
Jurisdictional Wetlands**

Legend:

-  Study Area
-  Dade County Department of Environmental Resources Management
-  U.S. Army Corps of Engineers
-  Florida Department of Environmental Regulation

Sources: Dade County Department of Environmental Resources Management; U.S. Army Corps of Engineers, Miami Office; Florida Department of Environmental Regulation and South Florida Regional Planning Council.

FIGURE 4



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resources. It was compiled for the purposes of this report only and is not the basis of any binding or non-binding jurisdictional decisions. Broward County EQCB has county-wide wetlands licensing authority. Jurisdictional decisions are made on a case-by-case basis and EQCB staff is not able to provide jurisdictional estimates; however, for the study area, they are likely to have jurisdiction in many of the areas which are indicated on the map as being under the jurisdiction of the USACE and FDER (EQCB, personal communication, 1989).

1. Federal Regulations

The U.S. Army Corps of Engineers (USACE) is the primary agency at the federal level responsible for wetlands regulation. The USACE is responsible for regulating activities in waters of the United States, including wetlands. The definition of wetlands used by the USACE is based on soil types and conditions in an area as the following definition indicates:

"The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adopted for life in saturated soil conditions" (33 CFR, part 328.3(b)).

Over 80 percent of the study area falls under USACE jurisdiction. Most of the areas west of I-75 and the UEFT in the study area which have not been filled or developed would require a USACE permit (USACE, personal communication, 1988). The area is still poorly drained during the wet season and, while exotic plant species dominate a large part of the area, the soils still exhibit wetland characteristics. The Corps jurisdictional wetlands would require a permit unless they fall under the conditions of a nationwide permit. These are wetlands which would, in general, be less than 10 acres in size, are isolated, and do not serve as habitat for endangered or threatened species. The USACE issues permits only for the deposition of fill or dredged material in wetlands. Removal of material from wetlands above mean high water does not require a USACE permit.

The USACE has entered into a Memorandum of Agreement (MOA) with the U.S. Fish and Wildlife Service (USFWS), the Environmental Protection Agency (EPA) and the National Marine Fisheries Service (NMFS) regarding the review of permit applications for dredge and fill activities. The MOA states that the USACE will coordinate with these agencies during application review and consider their concerns when making a decision on a permit application.

During the review period for permit applications, the USACE consults with the USFWS regarding potential impacts of the project on wildlife in the area. The authority for this comes from Section 7 of the Endangered Species Act (ESA). If the USFWS feels that the project will threaten the existence of an endangered or threatened species under the ESA, they will issue a jeopardy opinion on the project and in most instances, the permit will not be granted. The EPA is responsible for ensuring that the quality of waters of the United States is not negatively impacted. According to Section 401 of the Clean Water Act, any person applying for a federal license or permit to conduct activities which may result in the discharge of pollutants into the waters of the United States must comply with all applicable state water quality criteria.

2. State Regulations

The Florida Department of Environmental Regulation (FDER) is responsible for permitting and regulating activities in waters of the state and their connected wetlands. The definition for FDER jurisdictional wetlands is established in Chapter 403, F.S., and Administrative Rule 17-4, F.A.C. The definition is based on dominant vegetation types in an area. A significant amount of the wetlands within the study area appear to be outside FDER jurisdiction and therefore, dredging and filling in such areas would not require an FDER permit. However, FDER does claim jurisdiction in most drainage canals and their connected wetlands.

3. Regional Regulations

Wetlands which are not connected to waters of the state are considered isolated wetlands and fall under the jurisdiction of the SFWMD, pursuant to the Isolated Wetlands Rule (Appendix 7 of the *Basis for Review for Surface Water Management Permit Applications*). The criteria of the rule pertain to wetlands which are not under FDER jurisdiction. The definition of wetlands used in the rule is similar to that used by the USACE in that it depends on soil type and conditions for wetland determination. Unlike FDER and USACE criteria, the Isolated Wetlands Rule distinguishes between disturbed and non-disturbed wetlands; disturbed wetlands being those which have been "altered by drainage, dredge and fill, or invasive exotic plants so that the hydrologic and biological functions are significantly diminished". Under this definition, the majority of the wetlands in the study area are often exempt from SFWMD isolated wetlands permitting. The Isolated Wetlands Rule also only applies to those areas greater than 0.5 acres. If a project will impact an isolated wetland greater than 0.5 acres,

regardless of surface water management permitting criteria, the applicant would need to obtain a permit or exemption from the SFWMD.

4. Local Regulations

Broward and Dade Counties both have wetlands permitting jurisdiction and criteria within the study area. The definitions of wetlands for these agencies are similar to that of the FDER. However, both Dade and Broward Counties address isolated wetlands. Any alterations of wetlands would require a permit or licence from the appropriate county in addition to any federal, state or regional permit required. In Broward County, the EQCB issues dredge and fill licences. In Dade County, wetlands permitting is the responsibility of Dade County DERM.

While most cities usually follow the county, regional, state and federal regulations, they may choose to have additional regulations. These would be enforced as part of their land development codes which are currently being revised as part of the local comprehensive planning process.

5. Wetland Issues

Some of the wetlands in the study area are under special protection through regulation or land use designations. The Northwest Wellfield area is under the control of DERM and is subject to the strict land use requirements of the Dade County Northwest Wellfield Protection Plan. The Pennsuco wetlands, east of L-30 and west of the Dade-Broward Levee are designated for environmental protection on the Dade County Future Land Use Map (1989).

The wetlands in the study area have experienced stress from the lowering of the water table for drainage and infestation of exotic plant species, mainly *Melaleuca* and *Schinus* (Brazilian Pepper). These plants form dense stands, out-competing native plants. They provide little habitat for wildlife and can spread rapidly if not controlled.

When in a moist, uncontrolled environment, *Melaleuca* can spread rapidly and outcompete most native plants. Vast areas of western Broward and Dade which were once covered with sawgrass and other indigenous plant species have been invaded by *Melaleuca*. The infestation of the plant causes loss of habitat for birds, animals and other wildlife. *Melaleuca* is water intensive and can result in increased evapotranspiration in wetlands. The plant species has spread throughout the study area and there are even large stands in the water conservation areas and along the fringe of Everglades National Park. Because it spreads so

rapidly in a moist environment and is tolerable to fire (Lassater, 1974), it is a very difficult species to control. Dade County has implemented an exotic species control program aimed at controlling *Melaleuca* infestation adjacent to Everglades National Park. It is a mitigation program in which developers who are impacting wetland resources may, with County approval, mitigate by contributing to the program (DERM, personal communication, 1988).

Another invasive exotic species which is prevalent in the study area is Brazilian pepper (*Schinus molle*). The red berries produced in the late fall and winter have led to the common name of Florida holly. It has been used as landscaping plant; however, it quickly invades disturbed land and becomes the dominant plant, outcompeting all other vegetation. Brazilian pepper forms such dense stands that it blocks out the light so no other plants can grow (Lassater, 1974). While it may not increase evapotranspiration like *Melaleuca*, it does take over an area, especially if the areas has been disturbed. That is why thick stands of it are found along roads and dredged canals. Eradication of Brazilian pepper is also very difficult. New plants will grow from stumps of cut trees and unless the root system is removed the plant will grow back over time.

Even though the wetlands of the study area have been impacted by drainage and invasive plants, the area still serves an important function in terms of wildlife habitat, water storage, aquifer recharge and flood protection. While it may not be the pristine everglades marsh of a century ago, the functions and values which are lost due to development should be addressed through some form of mitigation.

Freshwater wetland mitigation is a relatively new concept. There are several different methods of mitigation and each agency has different criteria, depending on such things as the quality of the wetlands which are impacted, the area of wetlands destroyed, and other development impacts. Mitigation requirements vary from simply allowing borrow lake slopes to vegetate over time to extensive scrape-down, planting, and water control programs. The success of a freshwater wetland creation program is dependent on the amount of monitoring and maintenance which is done. In order to assure viability of the created system, it should be monitored to assure that invasive species are not outcompeting native wetland species and species diversity is maintained. The level of the ground and surface water is a crucial factor to the success of created and natural wetlands. Fluctuations in the water table occur as land is drained for agricultural and urban development. As discussed previously, a change in water

level will effect any wetland area, created or natural. Because mitigation is relatively new and it takes a few years for wetland areas to establish, the success rate is not known. The EPA is working on a program to monitor the success rate of wetland mitigation projects. The program is scheduled for completion in 1989 (Kentula, 1987).

Very often wetland mitigation for impacts of development is placed along lake and canal banks. While this seems to be a logical place for wetland mitigation, the success of these projects is often limited. Many times the lakes, which are part of the internal drainage system for the project, are deeded over to the drainage district having jurisdiction in the area. Because the drainage districts' emphasis is on maintaining water flow, there is less attention given to the viability of wetland habitat. These areas are subject to extensive weed eradication programs to keep nuisance animals away from residential areas and to maintain water flow. This leads to the loss of areas considered mitigation for wetland loss.

An awareness of some appropriate methods of providing wetland mitigation has developed. When mitigation is required, it is often located away from development activities. This serves to attract wildlife to the mitigation area and reduce impacts to the area due to development. Mitigation is often consolidated into large areas. For example, the developers of the Chapel Trail project have agreed to recreate at least 30 acres of wetland habitat in a conservation area. The Amerifirst development in Sunrise is scheduled to create over 12 acres of wetland habitat to buffer an archaeological site which requires preservation by the Florida Department of State.

D. Other Natural Habitats

The area also contains habitat other than wetlands, especially in areas that have been previously drained. While the wetland functions of these areas may be gone, they serve as habitat for several species of upland animals such as fox, deer, raccoons, etc. These are animals that have taken advantage of the drier yet still undeveloped areas. They are able to use the remaining wetland areas as feeding grounds and are able to live in the "new uplands".

E. Mineral Resources

Most of the limestone used in Florida comes from Dade and Broward Counties. Limestone underlies the whole area and constitutes the principle mineral resource of economic value (USACE, 1982). While the composition of the limestone may vary, most commercial deposits contain 90 percent or more calcium carbonate. Uses of limestone include making cement,

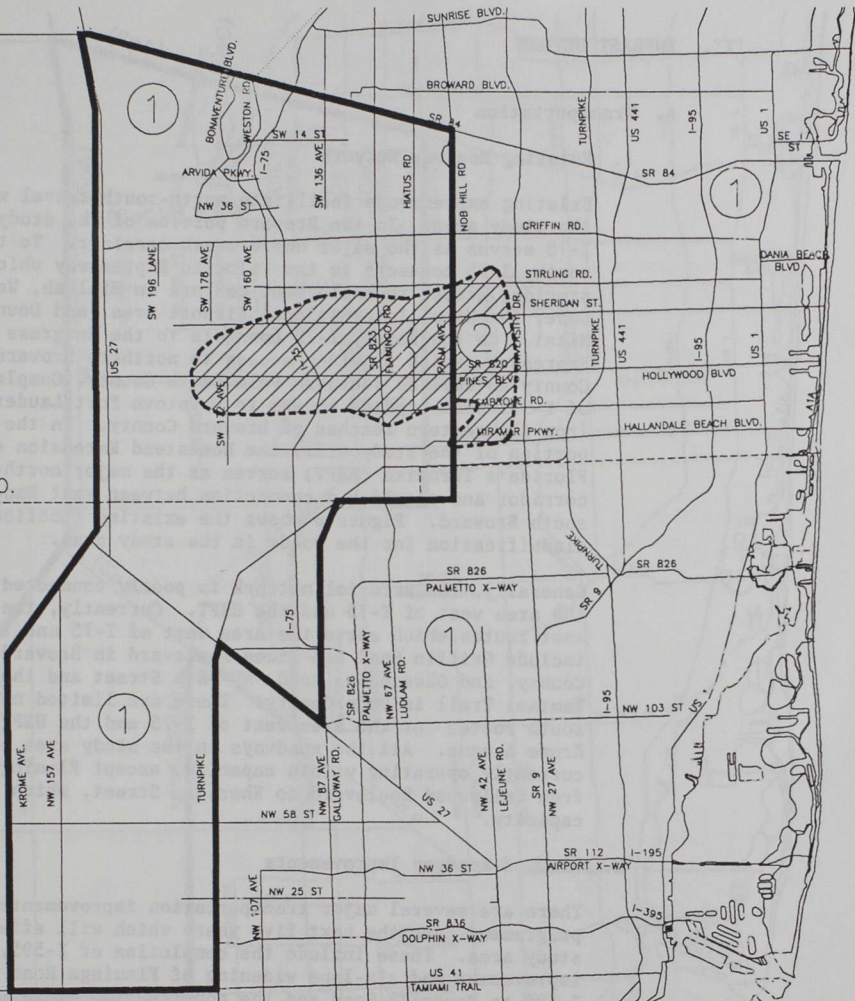
road base material, building stone, general fill and soil conditioner (USACE, 1982). Because of the incompatibility of rock mining with urban development, most mining occurs in the undeveloped western portions of Dade and Broward Counties. Western Broward and Dade are often referred to as the mining belt of the region. Figure 5 shows a general description of the mineral resources in the study area. In Broward County, there are several small limestone mining operations; however, in Dade County, the mining operations are larger.

A major consideration of mining activity in the region is mine reclamation after mining operations are finished. The Florida Department of Natural Resources (FDNR) is responsible for enacting the Resource Extraction Reclamation Act of 1986. The act includes mitigation and reclamation criteria and financial responsibility to ensure that reclamation is carried out. The most common method of limestone mine reclamation is establishing vegetated littoral shelves around the perimeter of the borrow pits. This action also makes the completed mines safer because there is a gradual slope around the perimeter of the lake.

As mining operations draw to a close, consideration must be given to land uses after mining stops. There is a trend towards waterfront residential development around borrow lakes. While it is believed that there is little negative impact on groundwater quality from limestone mining alone (USACE, 1982), the impacts of urban development around these lakes is not known.

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**Southwest Broward/Northwest Dade Subregional Study
Mineral Resources**

Legend:

- Study Area
- Mineral Boundaries
- ① Limestone
- ② Sand Shell and Marl

Source: Florida Department of Natural Resources.

FIGURE 5

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III. INFRASTRUCTURE

A. Transportation

1. Existing Roadway Network

Existing expressways facilitate north-south travel within the study area. In the Broward portion of the study area, I-75 serves as the major north-south corridor. To the south, I-75 connects to the Palmetto Expressway which provides access to employment centers in Hialeah, West Dade, the Miami International Airport area, and Downtown Miami. To the north, I-75 connects to the Sawgrass Expressway which provides access to northern Broward County as well as southern Palm Beach County. Completion of I-595 will provide access to Downtown Fort Lauderdale from the western reaches of Broward County. In the Dade portion of the study area, the Homestead Extension of Florida's Turnpike (HEFT) serves as the major north-south corridor and provides a connection between west Dade and south Broward. Figure 6 shows the existing functional classification for the roads in the study area.

Generally, the arterial network is poorly connected for the area west of I-75 and the HEFT. Currently, the east-west routes which serve the area west of I-75 and the HEFT include Griffin Road and Pines Boulevard in Broward County, and Okeechobee Road, NW 58th Street and the Tamiami Trail in Dade County. There are limited north-south routes for the area west of I-75 and the HEFT to Krome Avenue. All the roadways in the study area are currently operating within capacity, except Flamingo Road from Hollywood Boulevard to Sheridan Street, which is over capacity.

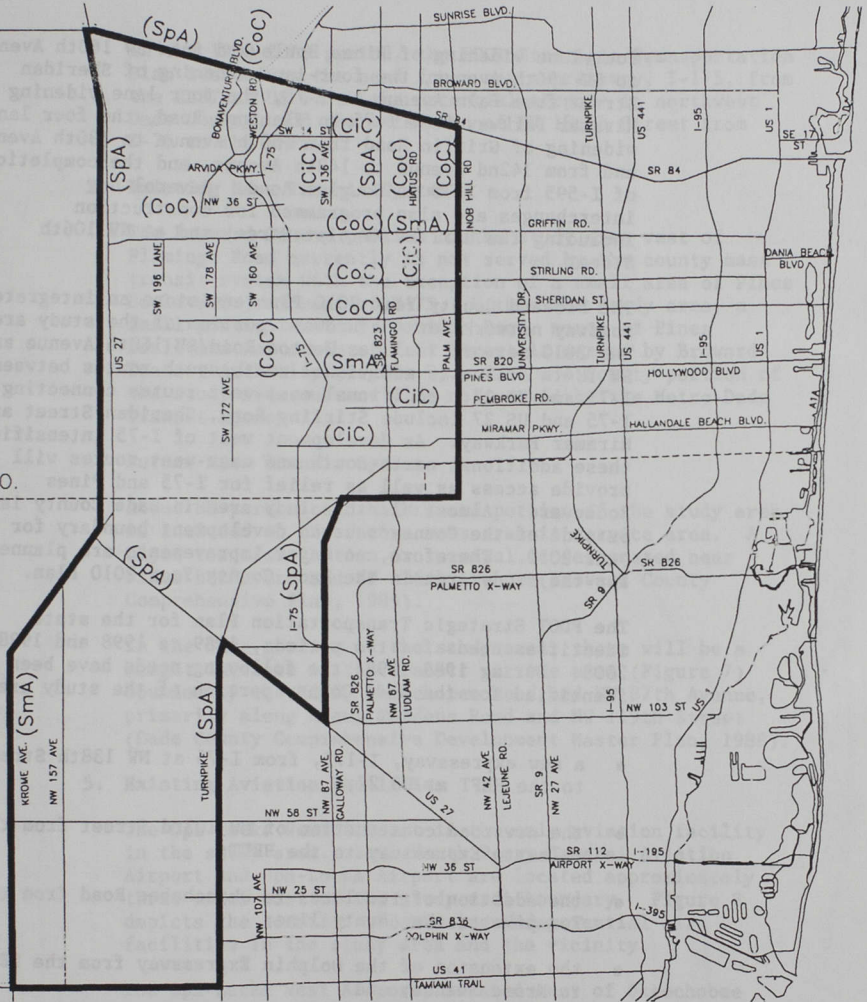
2. Planned Roadway Improvements

There are several major transportation improvements programmed over the next five years which will affect the study area. These include the completion of I-595, improvement and six-lane widening of Flamingo Road from I-595 to Pembroke Road and the construction of new Flamingo Road from Pembroke Road to the Red Road interchange. Flamingo Road from I-595 to Oakland Park Boulevard is scheduled to be widened to six lanes. Palm Avenue/Nob Hill/100th Avenue is to be improved to a four-lane facility extending from I-595 to Pembroke Road except for a three lane divided cross-section between Griffin Road and Stirling Road. Weston Road is also scheduled to be widened to four lanes from Indian Trace Road to South Post Road. These improvements will significantly facilitate north-south travel in western Broward County. Major improvements to the east-west network include the

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Southwest Broward/Northwest Dade Subregional Study
Existing Roadway Functional Classification

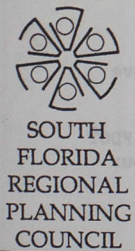
Legend:	—	Study Area
	SpA	State Principal Arterial
	SmA	State Minor Arterial
	CoC	County Collector
	CiC	City Collector

Source: Florida Department of Transportation.

FIGURE 6



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four-lane widening of Pines Boulevard from SW 160th Avenue to SW 196th Avenue, the four-lane widening of Sheridan Street from Palm Avenue to I-75, the four lane widening of Miramar Parkway from I-75 to Flamingo Road, the four lane widening of Griffin Road from 160th Avenue to 180th Avenue and from 142nd Avenue to 148th Avenue, and the completion of I-595 from I-75 to Douglas Road. Several new interchanges are also programmed for construction including the HEFT at NW 41st Street and at NW 106th Street.

The Broward County Year 2010 Plan envisions an integrated roadway network for the Broward portion of the study area. The 2010 network includes Weston Road/SW 160th Avenue and SW 184th Avenue as additional north-south routes between I-75 and US 27. Additional east-west routes connecting I-75 and US 27 include Stirling Road, Sheridan Street and Miramar Parkway. As development west of I-75 intensifies, these additional north-south and east-west routes will provide access as well as relief for I-75 and Pines Boulevard. Almost all the study area in Dade County is outside of the County's urban development boundary for the year 2010. Therefore, no major improvements are planned for the study area in the Dade County Year 2010 Plan.

The FDOT Strategic Transportation Plan for the state identifies needs for two periods, 1989 to 1998 and 1998 to 2008. During 1989-1998, the following needs have been identified for the Dade County portion of the study area:

- a new expressway, I-175, from I-75 at NW 138th Street to the HEFT at US 27;
- the new road construction of NW 103rd Street from the Palmetto Expressway to the HEFT;
- the addition of two lanes to Okeechobee Road from the Turnpike to the county line;
- the extension of the Dolphin Expressway from the HEFT to Krome Avenue; and
- the addition of two lanes to Krome Avenue from US 1 to US 27.

It should be noted that none of these FDOT Strategic Transportation Plan highway improvements mentioned above are included in the Dade County Comprehensive Plan.

For the Broward County portion of the study area, the FDOT Strategic Plan identifies one need, the addition of four lanes to Griffin Road from US 27 to SR 7.

In the 1998-2008 period, the FDOT Strategic Transportation Plan identifies the need for a new expressway, I-175, from the HEFT at US 27 to the potential airport in northwest Dade County, and the extension of NW 186th Street from I-75 to the HEFT.

3. Existing Mass Transit System

The Broward County portion of the study area west of Flamingo Road currently is not served by the county mass transit system with the exception of a small area of Pines Boulevard just east of I-75. Within the study area, a small portion east of Flamingo Road, north of Pines Boulevard and south of Taft Street is served by Broward Transit Authority (Figure 7). The Dade County portion of the study area currently is not served by the Metro-Dade Transit Agency.

4. Future Mass Transit System

About 85 percent of the Broward portion of the study area is included in the future mass transit service area. A major transfer station or terminal is designated near Pines Boulevard and SW 136th Avenue (Broward County Comprehensive Plan, 1989).

In the Dade portion of the study area, there will be a slight increase in the transit service area (Figure 7) bounded by the HEFT, Okeechobee Road and NW 87th Avenue, primarily along Miami Gardens Road and NW 119th Street (Dade County Comprehensive Development Master Plan, 1988).

5. Existing Aviation Facilities

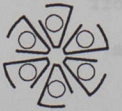
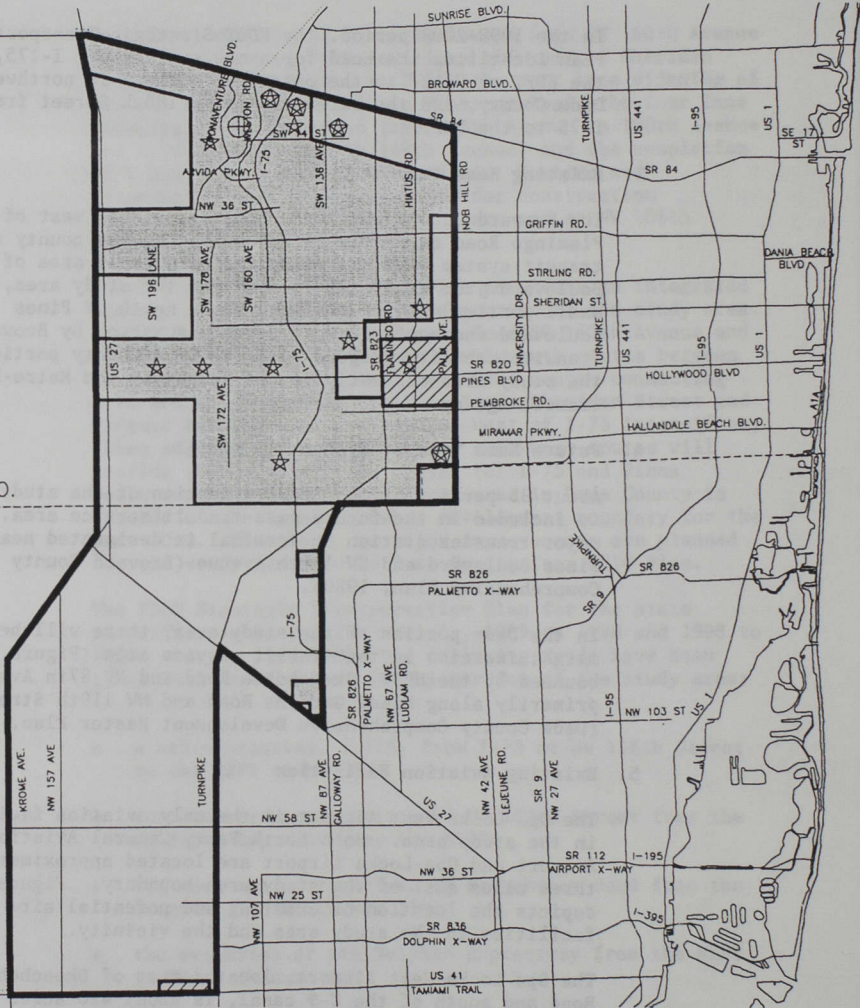
The Opa-Locka West Airport is the only aviation facility in the study area. Both North Perry General Aviation Airport and Opa-Locka Airport are located approximately three miles east of the study area boundary. Figure 8 depicts the location of existing and potential air facilities in the study area and the vicinity.

The Opa-Locka West Airport, located east of Okeechobee Road and south of the C-9 canal, is about 420 acres in area. Opened in 1970 to relieve air traffic congestion at the Opa-Locka Airport, it is primarily used for take-off and landing practice. The airfield consists of two runways, one north-south and the other east-west. The airport is not equipped with any type of electronic approach or navigation aids and the runways are not lighted. There is no air traffic control facility or buildings at the airport. No aircraft is based at this airport.

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

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Southwest Broward/Northwest Dade Subregional Study Mass Transit Service Areas

Legend:

-  Study Area
-  Existing Service Area
-  Future Additional Service Area
-  Major Generator
-  Future Major Generator
-  Future Major Transfer Location or Terminal

Source: Dade County Planning Department and Broward County Office of Planning.

FIGURE 7



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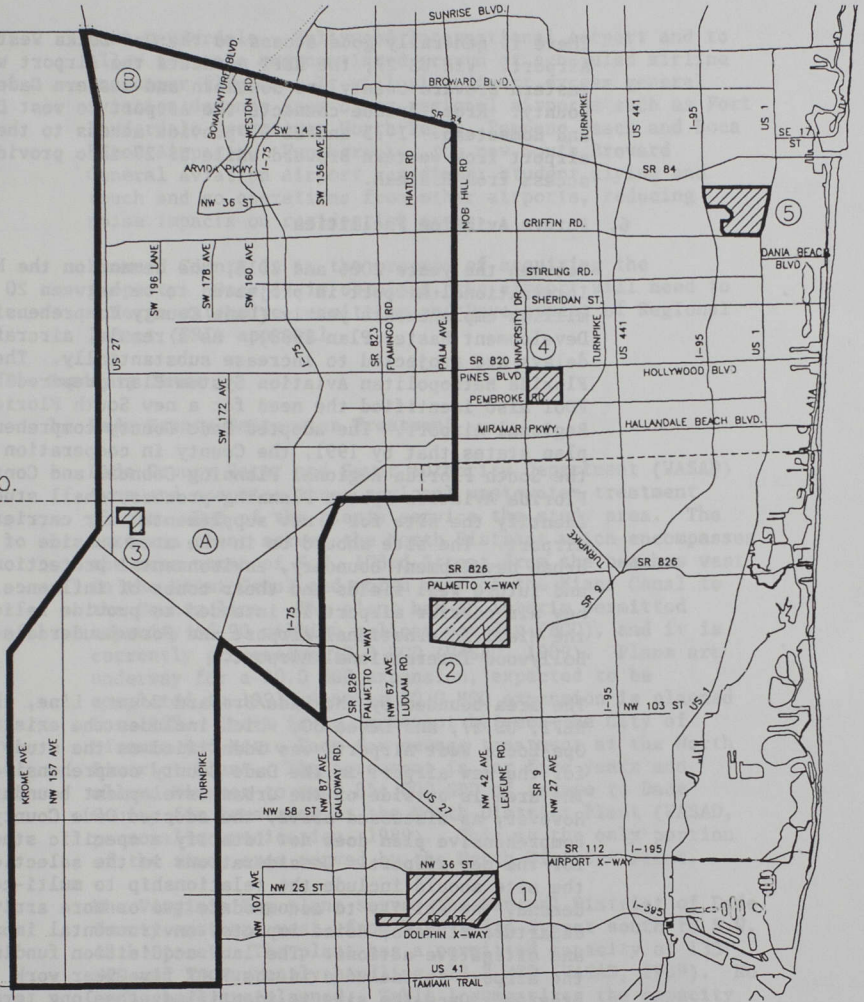
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AREA 3-B



Southwest Broward/Northwest Dade Subregional Study Existing and Potential Airports

- Legend: — Study Area ▨ Existing Airports
- | | |
|--|--|
| 1 Miami International Airport | A Potential Air Carrier Airport |
| 2 Opa-Locka Airport | B Potential South Broward General Aviation Airport |
| 3 Opa-Locka West Airport | |
| 4 North Perry Airport | |
| 5 Ft. Lauderdale-Hollywood International Airport | |

Source: United States Geological Survey and South Florida Regional Planning Council.

FIGURE 8



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There is generally good access to the Opa-Locka West Airport. Via US 27; the HEPT connects the Airport with eastern Broward County and southern and western Dade County. Krome Avenue connects the Airport to west Dade and Homestead. I-75 and US 27 provide access to the airport from western Broward while US 27 also provides access from Hialeah.

6. Future Aviation Facilities

Between the years 2006 and 2015, the demand on the Miami International Airport is projected to be between 20 and 25 million emplanements yearly (Dade County Comprehensive Development Master Plan 1988). As a result, aircraft delays are projected to increase substantially. The South Florida Metropolitan Aviation System Plan prepared by the FDOT also identified the need for a new South Florida Regional Airport. The adopted Dade County comprehensive plan states that by 1991, the County in cooperation with the South Florida Regional Planning Council and Continuing Florida Aviation System Planning process, shall study and identify the site for a new supplemental air carrier airport. The site should be in the area outside of the urban development boundary, environmental protection areas and future well fields and their cones of influence. The new air carrier airport is intended to provide relief for the Miami International Airport and Fort Lauderdale-Hollywood International Airport.

The area bounded by the Dade/Broward County Line, the HEPT, US 27, and Levee 30, which includes the existing Opa-Locka West Airport, was identified as the study area for the new airport in the Dade County comprehensive plan. The area is outside of the urban development boundary. However, as discussed above, the adopted Dade County comprehensive plan does not identify a specific study area for the new airport. Considerations in the selection of the site should include the relationship to multi-county demand, the ability to accommodate two or more arrival and departure streams, noise impacts, environmental impacts, and mitigative actions. The land acquisition funding for the airport is included in the FDOT five-year work program. Once the site is identified, the long term program includes airfield development, terminal development, maintenance facilities construction and ground transportation system construction.

The South Broward General Aviation Airport is proposed within the study area. This airport will be generally bounded by US 27 to the west, State Road 84 to the north, and the Weston development on the south and east. It is planned to accommodate general transport aircraft such as Gulfstream and Lear Aircraft. The new airport is intended to relieve the general aviation operational activity at

Fort Lauderdale - Hollywood International Airport and to allow for safe and continued growth of scheduled airline passenger flights. It will also divert excess general aviation demands from other regional airports such as Fort Lauderdale Executive, North Perry, Pompano Beach and Boca Raton Airports. Furthermore, the new South Broward General Aviation Airport can divert student flying and touch and go operations from other airports, reducing noise impacts on residential areas.

Broward County is in the process of acquiring the property. Once it is obtained, the airport will need to undergo extensive permitting and Development of Regional Impact (DRI) approval.

B. Sanitary Sewer

1. Dade County Wastewater Treatment

Dade County Water and Sewer Authority Department (WASAD) owns and operates three regional wastewater treatment plants. Two of the plants service the study area. The Interama plant serves the North District which encompasses the area north of N.W. 103rd Street from the beaches west to the Miami Canal and north east of the Miami Canal to the County line. The plant has an interim permitted capacity of 90 million gallons per day (MGD), and it is currently processing 78.3 MGD (WASAD, 1989). Plans are underway for a 20.0 MGD expansion, expected to be completed in 1991. Another 20.0 MGD expansion is planned for 1995. There is an agreement between the City of Miramar and Metro-Dade for sewage treatment at the North District Plant. The agreement is for five years and allows Miramar to send 854,000 GPD of sewage to Dade County for treatment at the North District Plant (WASAD, personal communication, 1989). This is the only portion of the study area served by the North District Plant.

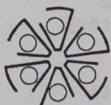
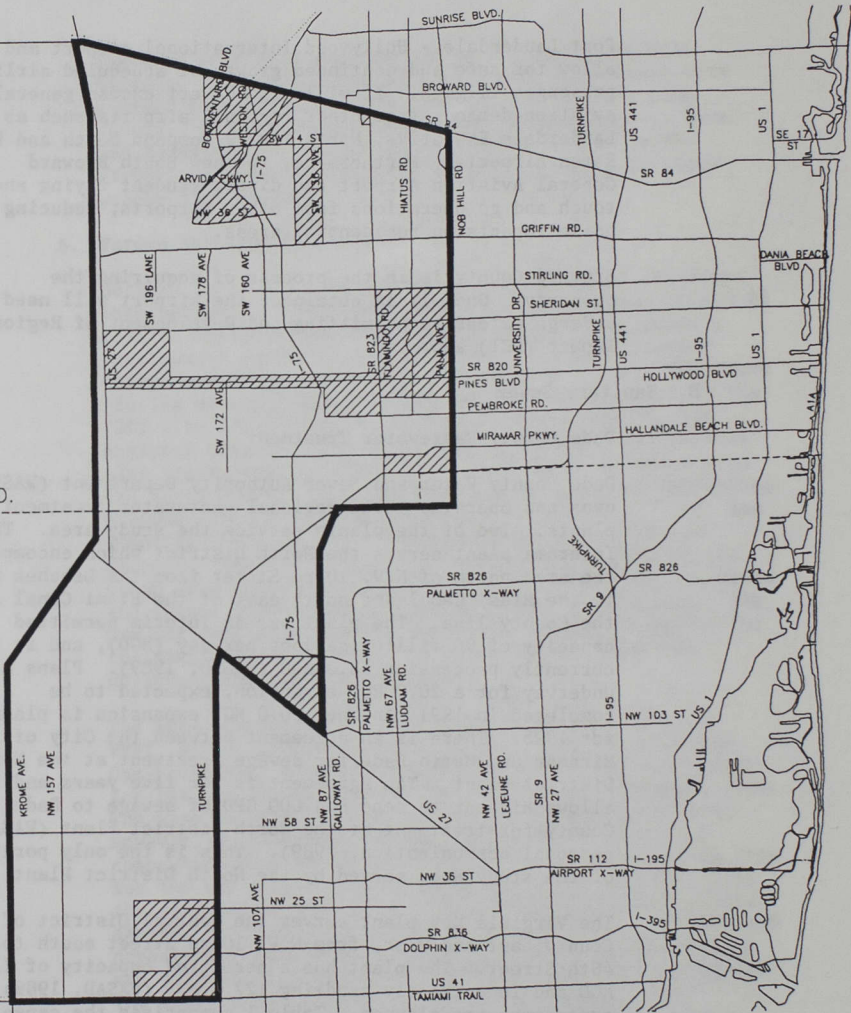
The Virginia Key plant serves the Central District of Dade County east and west, from N.W. 103rd Street south to S.W. 48th Street. The plant has a permitted capacity of 133 MGD and is currently handling 127.2 MGD (WASAD, 1989). No expansions are planned. Table 1 summarizes the capacity for the Dade County sewage treatment plants servicing the study area. Figure 9 illustrates those portions of the study area which are currently served by existing sanitary sewer infrastructure.

While expansions are planned for two of the three plants in Dade County, the adopted future land use map for Metro-Dade shows that most of the study area is outside the Urban Services Boundary. Therefore, none of the planned expansions are anticipated to penetrate the Dade portion of the study area (WASAD, 1986).

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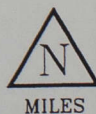
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**Southwest Broward/Northwest Dade Subregional Study
Areas Currently Serviced with Sanitary Sewer Infrastructure**

- Legend:**
- Study Area
 - Areas Currently Serviced with Sanitary Sewer Infrastructure

Source: Metro Dade Water and Sewer Authority Department, Broward County Division of Water Resources, City of Miramar, City of Pembroke Pines, City of Sunrise, City of Cooper City, City of Davie and South Florida Regional Planning Council.

FIGURE 9



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TABLE 1

DADE COUNTY
WASTEWATER TREATMENT PLANTS

	Current Permitted <u>Capacity*</u>	Current Volume <u>Treated**</u>	Planned <u>Expansions</u>
North District Plant	90 MGD	78.3 MGD	20 MGD in 1991 20 MGD in 1995
Central District Plant	133 MGD	127.2 MGD	None

* Metro-Dade Comprehensive Master Development Plan, 1988

** WASAD, personal communication, 1989

2. Broward County Wastewater Treatment

Broward County does not have a centralized sewage treatment system; the study area is serviced by different municipally and privately operated treatment plants. The South Broward plant has a permitted capacity of 0.49 MGD. It is reported that an additional capacity of 0.5 MGD will be requested in the near future. The area that will be served by the additional capacity, if permitted, has not yet been determined. Cooper City has a projected average daily wastewater demand of 2.04 MGD with a design permitted capacity of 4.216 MGD. By the year 2000 the city is projected to have an average daily wastewater demand of 4.6 MGD and a design capacity of 6.5 MGD to accommodate peak flows (Broward County Comprehensive Plan, 1989). The privately owned Cenvill plant in Pembroke Pines is currently permitted to treat 1.33 MGD and is expected to require an additional capacity of 7.5 MGD by 2006. (EQCB, personal communication, 1989). Miramar currently has a large user's agreement with the City of Hollywood for sewage treatment which limits Miramar to 6.43 MGD maximum flow. It is not likely that this capacity can be increased. The Miramar Water and Wastewater Master Plan of 1987 assumes new service in the year 1990 to come from a new wastewater facility which will treat the balance (7.37 MGD) of Miramar's needs through build out.

The City of Sunrise has two plants which service both southeastern and southwestern Sunrise, and portions of Davie. Sunrise also provides wastewater service to a portion of the Indian Trace Municipal Tax District (Sunrise Comprehensive Plan (draft), Volume I, 1989). Sunrise System 2 (South Plant) and Sunrise System 3 (West Broward Plant) currently have a combined average daily wastewater flow of 5.75 MGD with a design permitted capacity of 6.0 MGD. By 1994 the demand is anticipated to reach 9.45 MGD requiring a design capacity of 11.0 MGD (City of Sunrise Comprehensive Plan (draft), 1989).

Davie is served by the city of Sunrise, the South Broward Utilities Company, Ferncrest Utilities, and their own plants. The South Broward Utilities Company (which also services portions of unincorporated Broward County) has a current demand of 0.137 MGD with a facility design capacity of 0.5 MGD (Davie Comprehensive Plan (draft), 1988). Ferncrest Utilities serves unincorporated area residents of Everglades Mobile Home Park, University Mobile Home Park, in addition to portions of Davie. Ferncrest is projected to have an average daily wastewater demand of 0.46 MGD in 1990 with a design permitted capacity of 0.6 MGD. No increased demand is forecasted (Broward County Comprehensive Plan, 1989). The Town of Davie has two wastewater treatment plants with a combined demand of 1.6 MGD (Davie Comprehensive Plan (draft), 1988). Figure 9 shows those portions of the study area currently served with sanitary sewer infrastructure.

Because Pembroke Pines, Cooper City, and Miramar have projected that they will be able to serve their entire populations through build out, only a small portion of unincorporated southwest Broward remains without documented, planned, wastewater treatment service.

C. Potable Water

The following discussion of existing and future potable water supplies largely comes from the draft or adopted local government comprehensive plans prepared as required by Chapter 163, Florida Statutes (The 1985 Growth Management Act).

1. Dade County Potable Water Service

The Hialeah and Preston Plants in Dade County are served from forty-five wells, including the Northwest Wellfield and the Hialeah/Preston on-site wells. The rated treatment capacity of the Hialeah/Preston complex is 225 MGD. The maximum day water demand of the complex is 187 MGD, and the complex has 38 MGD of available capacity (WASAD, personal communication, 1989). Projections of water treatment needs for 2010 are estimated at 219.1 MGD for an average day and 263.0 MGD for a maximum day, both

at the Hialeah/Preston complex (Dade County Comprehensive Development Master Plan, 1988). Similar to the discussion of wastewater, the majority of the study area in Dade County is outside of the Urban Services Boundary, and is not planned to receive additional service from the county. However, the City of North Miami Beach is currently pumping 3.0 MGD of treated water from the Hialeah-Preston plant to the City of Hallandale. The current cross county agreement states that Hallandale can request up to 5.0 MGD. Hallandale has recently requested another 0.3 MGD in addition to the 3.0 MGD they are currently receiving from the Northwest wellfield via their large user agreement with the City of North Miami Beach. This is water which is withdrawn from the Northwest Wellfield within the study area. Figure 10 indicates those areas in the study area currently serviced with potable water infrastructure.

2. Broward County Potable Water Service

In Broward County there are six municipalities whose service areas currently border or fall within the study area: Cooper City, Pembroke Pines, Miramar, Sunrise, Davie and unincorporated Broward County. Broward County's District 3 treatment plants service southwest unincorporated Broward. However, this area is outside the study area (Broward County Comprehensive Plan, 1989).

Among the cities serving the area, Cooper City reports an average day treated water demand for the city (pumped from both the west and east wells) of 2.15 MGD (Cooper City Comprehensive Plan (draft), 1988). The plan anticipates the need to increase treatment capabilities of raw water to 3.16 to accommodate future growth. Figure 10 depicts those areas currently served with potable water infrastructure.

Currently, the City of Pembroke Pines treats 6.0 MGD. The city is permitted (design capacity) to treat 18.0 MGD. The 18.0 MGD capacity is anticipated to supply the future population of the city with potable water through build out.

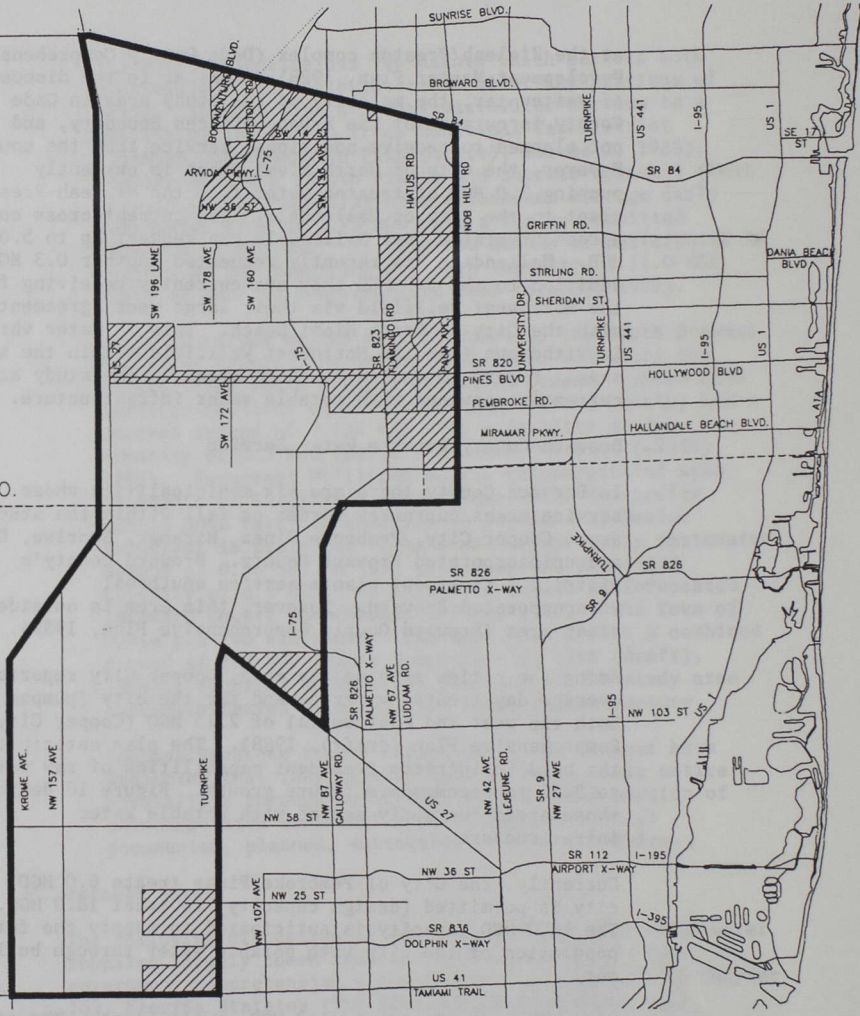
Miramar currently treats 4.3 MGD at its plant. The city is permitted to treat 6.3 MGD and is expected to need an additional 8.5 MGD to serve the population through build out.

The City of Sunrise has a combined water treatment capacity of 21.5 MGD (1989) with an average daily demand of 14.05 MGD. In 1994, demand is projected to reach 18.56 MGD with a total water treatment capacity of 24.50 MGD (Sunrise Comprehensive Plan (draft), 1989).

WATER
CONSERVATION
AREA 3-A

BROWARD CO.
DADE CO.

WATER
CONSERVATION
AREA 3-B



Southwest Broward/Northwest Dade Subregional Study
Areas Currently Serviced with Potable Water Infrastructure

Legend:

- Study Area
- Areas Currently Serviced with Potable Water Infrastructure

Source: Metro Dade Water and Sewer Authority Department, Broward County Division of Water Resources, City of Miramar, City of Pembroke Pines, City of Sunrise, City of Cooper City, City of Davie and South Florida Regional Planning Council.

FIGURE 10

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The Town of Davie is served by the City of Sunrise, the South Broward Utilities Company, Ferncrest Utilities, and themselves. The South Broward Utilities Company (which also services portions of unincorporated Broward County) has a current demand of 0.331 MGD with a facility design capacity of 1.0 MGD. No increase is forecasted (Davie Comprehensive Plan (draft), 1988).

Ferncrest Utilities are projected to have an average daily water treatment demand of 0.40 MGD in 1990 with a design permitted capacity of 1.0 MGD. No increased demand is forecasted (Broward County Comprehensive Plan, 1989). The Town of Davie has two water treatment plants with a combined demand of 2.4 MGD with a design capacity of 7.8 MGD. No expansion is projected (Davie Comprehensive Plan (draft), 1988).

Because Pembroke Pines, Cooper City, and Miramar have projected that they will be able to serve their entire populations through build out, only a small portion of unincorporated southwest Broward remains without documented, planned, potable water treatment service.

D. Drainage Basins and Flood Protection

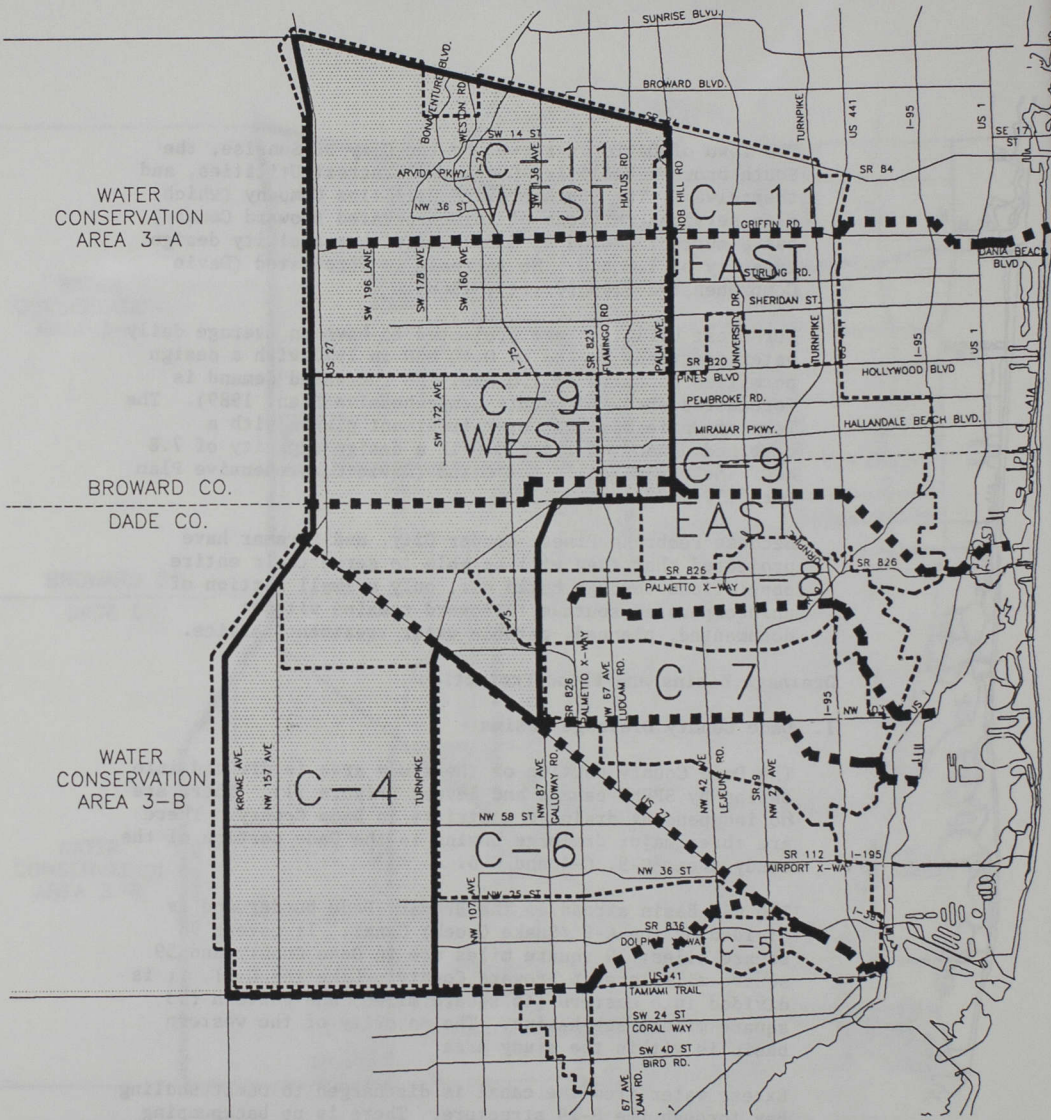
1. Dade County Drainage Basins

The Dade County portion of the study area is divided into basins by SFWMD canals and levees (Figure 11). There are no independent drainage districts in Dade County. There are three major drainage basins in the Dade portion of the study area: C-9, C-4 and C-6.

The C-9 Basin straddles the Broward-Dade border and is divided by the C-9 (Snake Creek) Canal. It covers 98 square miles; 39 square miles are in Dade County and 59 square miles are in Broward County. Like the C-11, it is divided into eastern (45 square miles) and western (53 square miles) sub-basins. The majority of the western basin is within the study area.

Excess water from the canal is discharged to Dumbfoundling Bay through the S-29 structure. There is no backpumping into the WCAs from this basin (SFWMD, 1987).

The eastern half of the C-9 Canal was designed to handle virtually unlimited inflows from the eastern portion of the basin. However, the western sub-basin is very prone to flooding because of low ground surface elevations relative to the eastern sub-basin. Major storms can reverse flow from east to west because of rapid runoff in the east. Allowable pumped inflow to the C-9 Canal in the western sub-basin is limited to 0.75 inches of runoff per day (SFWMD, 1987).



WATER
CONSERVATION
AREA 3-A

BROWARD CO.
DADE CO.

WATER
CONSERVATION
AREA 3-B

Southwest Broward/Northwest Dade Subregional Study
Primary Drainage Basins

- Legend:
- Study Area
 - Drainage Basin Boundaries
 - C -- 4** Primary Basin Name
 - Primary Canals

Source: South Florida Water Management District.

FIGURE 11



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In 1976, the SFWMD completed a water management study for the western C-9 sub-basin. The study aided in the promulgation of special rules the SFWMD uses for evaluating development in the basin (Rule 40E-41, Part I, F.A.C.). The recommendations of the report included limiting discharge to the system to 0.75 inches per day and recommending land uses which have low flood damage potential such as agricultural, recreational, industrial, and commercial activities, provided they are not prohibited by other restrictions (SFWMD, 1976). Development should offer reasonable assurance that established regulatory flood elevations are not be raised (SFWMD, 1976).

The C-4 basin has an area of approximately 60.9 square miles. The C-4 (Tamiami) Canal is the main canal in the basin and discharges to the C-6 Canal upstream of State Road 9. The L-30 Borrow Canal is also a part of the C-4 basin. The basin is divided into two areas: Area A and Area B. Area B is within in the study area and makes up most of the Northwest Wellfield. The area is poorly drained and is being studied by the USACE to determine the feasibility of backpumping runoff from the area into WCA 3B. Currently, water is pumped into the C-4 Canal from WCA 3B to help recharge the Northwest Wellfield and prevent contamination of the potable water supply from the 58th Street Landfill (SFWMD). Dade County DERM, in conjunction with the SFWMD, is currently studying the portion of Area B designated for the most intense development. The study will address drainage problems in the area and methods for handling them (SFWMD, 1989).

The North Trail Basin is part of Area B and is the southern most portion of the study area. The area is subject to specific cut and fill criteria as implemented by Dade County DERM because of severe drainage problems in the area. The criteria were developed to prevent flooding of the eastern portion of the county due to overloading of the primary canal system (DERM, 1987).

The C-6 Basin is the third drainage basin in the Dade portion of the study area. Covering 69 square miles, it has one main canal, the C-6 (Miami) Canal. Historically, the C-6 Canal was used to recharge the Hialeah and Miami Springs wellfields (SFWMD, 1987). However, with the opening of the Northwest Wellfield, the demand on the two wellfields has decreased and the water once diverted to the C-6 Basin from WCA 3B for potable water purposes is now routed to the C-4 Basin (Area B) by way of the L-30 Borrow Canal (SFWMD, 1987).

2. Broward County Drainage Basins

Primary Drainage Basins

The Broward portion of the study area lies within two primary drainage basins controlled by the SFWMD; the C-11 and the C-9 (Figure 11). A small portion of the study area (the West Lauderdale Water Control District) drains to the north to the New river Canal. This area is discussed in the section on secondary drainage systems.

The C-11 Basin is bisected by the South New River (C-11) Canal. The total basin is 104 square miles and is divided into eastern and western sub-basins. The system was designed to provide flood protection and receive up to 0.75 inches of runoff per day (SFWMD, 1987). Excess water in the eastern basin is discharged to the east to the South Fork of the New River by way of the S-13 control structure. Excess water in the western sub-basin is pumped from the C-11 Canal to Water Conservation Area (WCA) 3A through the S-9 structure. If S-13 is not pumping at full capacity, additional discharges of excess water from the western sub-basin can be made to the eastern basin. In times of low natural flow, water can be supplied from the western sub-basin to the eastern sub-basin to maintain optimum stages in the eastern reaches of the basin and prevent saltwater intrusion (SFWMD, 1987).

In the early 1970s, the U.S. Army Corps of Engineers did a feasibility study that indicated a positive cost benefit ratio for increasing the flood protection capacity in the western C-11 sub-basin to 2.5 inches of runoff per day. However, there was an anticipated decline in water quality due to increased runoff which prevented the added flood protection (SFWMD, 1987).

In 1979, The SFWMD completed a water management study of the western C-11 sub-basin which made several recommendations regarding flood protection. Most significant of these is that stormwater removal rates from projects in the western sub-basin should not exceed 1.25 inches per day and that fill encroachment above elevation +3.0 feet which would allow post-development 100-year "no-discharge" flood elevations in new developments to be higher than those computed for that sub-basin by the SFWMD should not be permitted (SFWMD, 1987). The SFWMD is in the process of updating the C-11 basin study. The final report will be available in 1989.

The C-9 Basin straddles the Broward-Dade line and is discussed in the Dade County description. The portion in Broward County covers 59 square miles. As discussed earlier, the western reaches of the C-9 are lower than the eastern portions and are subject to flooding during severe

rain events. Pumped inflow of runoff to the C-9 canal in the western area is limited to three-quarters of an inch per day (SFWMD, 1987). Any development in the western part of the basin is governed by the criteria for the C-9 Basin set by the SFWMD (Rule 40E-41, Part I, F.A.C.)

Secondary Drainage Basins

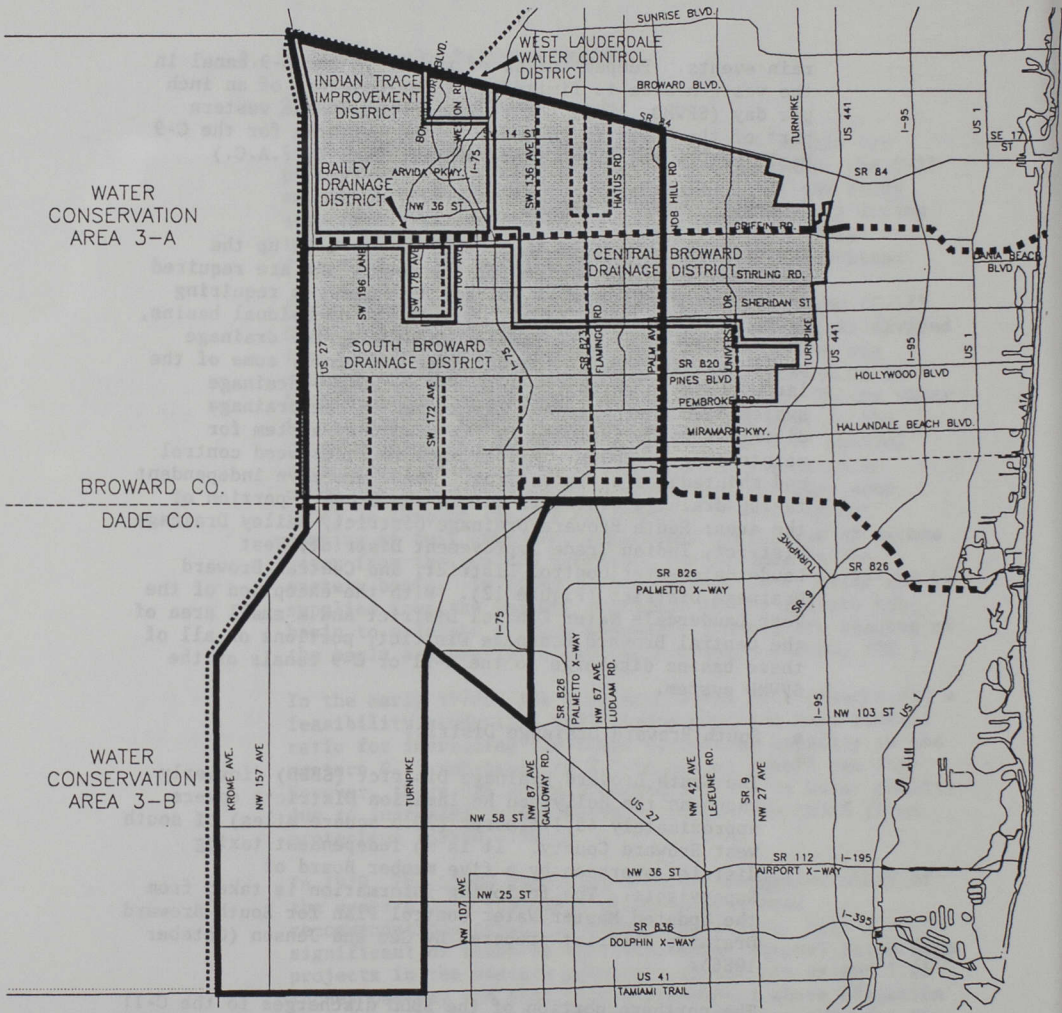
The drainage districts in Broward County make up the secondary drainage system for the county and are required to receive SFWMD permits for any improvements requiring discharge to a SFWMD canal. Within the individual basins, the drainage districts require permitting for drainage projects. In some of the drainage districts, some of the large projects which tie into the secondary drainage system deed their project lakes over to the drainage districts to be included in the secondary system for maintenance purposes. Maintenance includes weed control and maintenance of water flow. There are five independent taxing drainage districts within the Broward portion of the area; South Broward Drainage District, Bailey Drainage District, Indian Trace Improvement District, West Lauderdale Water Control District, and Central Broward Drainage District (Figure 12). With the exception of the West Lauderdale Water Control District and a small area of the Central Broward Drainage District, portions or all of these basins discharge to the C-11 or C-9 canals of the SFWMD system.

- South Broward Drainage District

The South Broward Drainage District (SBDD) (formerly known as the Hollywood Reclamation District) covers approximately 45,174 acres (70.5 square miles) of south west Broward County. It is an independent taxing district overseen by a five member Board of Supervisors. The following information is taken from the Updated Master Water Control Plan for South Broward Drainage District prepared by Gee and Jenson (October 1986).

The northern portion of the SBDD discharges to the C-11 canal; the southern portion to the C-9 Canal. The SBDD currently maintains nine north-south canals; five extending from State Road 820 (Hollywood/Pines Boulevard) to the C-9 Canal; three extending from the north boundary of the district to the C-9 canal; one of which, Flamingo Road, extends from the C-11 Canal to the C-9 Canal. A borrow ditch extending along the west side of U.S. 27 has been deeded over to the SBDD by the Florida Department of Transportation. Several east-west lateral canals exist within the eastern one third of the district. Currently there are 10 secondary pump stations which will be eliminated within the next year

This map illustrates the independent drainage districts in Broward County.
Secondary drainage in Dade County is the responsibility of Dade County DERM.



**Southwest Broward/Northwest Dade Subregional Study
Drainage Districts**

Legend:		Study Area
		Primary Canals
		Secondary Canals
		Levee with Borrow Canal
		District Boundaries

Sources: Broward County Water Resources Management Division.

FIGURE 12

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converting these canals to gravity control into the primary canals which are controlled by pump stations. Four major pump stations within the SBDD serve the area east of SBDD Canal No. 5 (just west of I-75). Approximately 90 major structures, including bridges and culverts, exist in the district; the majority of these are east of I-75.

The SBDD has been divided into 12 separate drainage basins referred to as unit districts. Each unit district or combination of unit districts has or will have its own pump station. Canals within the unit districts are used to convey surface water by gravity to the pump station. The minimum design water elevation (control elevation) varies from 2.5 to 3.0 feet NGVD for systems controlled by the four pump stations which discharge to the C-9 Canal. For those drainage basins which are not controlled by a pump station, the district is proposing a control elevation for its future pump stations at 3.5 feet NGVD. The existing and future pump stations are designed to keep the water level within a minimum and maximum designated elevation. The existing four pump stations will continue to have a maximum discharge capacity at their permitted rate. Future pump station capacities will be based on maximum allowable flows to the C-9 and C-11 Canals.

Planned future surface water management facility construction within the SBDD includes new canals, pump stations, and control structures to be phased over a period of years. There is no time frame for this phasing and much of the construction may be done by developers as part of permit approval. The majority of the new work is proposed for west of I-75; however, there are no anticipated improvements for the Everglades buffer Strip west of U.S. 27.

- Central Broward Drainage District

The Central Broward Drainage District (CBDD) is located north of the SBDD and covers approximately 27,000 acres (42 square miles) (Central Broward Drainage District, 1962). For voting purposes, the area is broken up into six zones. It is a gravity controlled drainage system. All but 800 acres (1.25 square miles) within the district drains into the C-11 Canal; the remaining area (the Shenandoah development) drains north into the North New River Canal. The control elevation west of 100th Avenue is maintained at approximately +4.0 feet, NGVD. The area east of 100th Avenue has a control elevation of approximately +3.0 feet, NGVD (SBDD, personal communication, 1989). The water level in the canals responds to the level of the C-11 Canal, which

is controlled by the SFWMD. The facilities in the CBDD include a series of approximately 80 canals, the majority of which run north and south.

- Indian Trace Community Development District

The Indian Trace Community Development District covers 9,913.9 acres (15.5 square miles) in west central Broward County (Gee and Jenson, 1988). It encompasses most of the Weston and Tishman-Speyer Developments of Regional Impact and is divided into 2 main basins and 16 sectors. Seven of these sectors have not been developed yet and do not have complete water management systems. The control elevation for the district is approximately +4.0 feet, NGVD which is maintained by a series of pumps. These pumps begin operation when the level in the lakes reaches +4.5 feet, NGVD, and stop when the level is brought back down to +4.0 feet, NGVD. The district discharges into the C-11 Canal maintained by the SFWMD at three points (Gee and Jenson, 1988).

- West Lauderdale Water Control District

The West Lauderdale Water Control District (WLWCD) comprises 1237.99 acres (1.9 square miles) adjacent to the south side of State Road 84 in west Broward County. Surrounded by the CBDD on the east side, and the ITCDD on the west and south, the WLWCD primarily serves the Bonaventure development. The district drains into the North New River Canal, which is controlled by the SFWMD, by way of two pumping facilities. The water levels in the canals are maintained at approximately +5.0 feet, NGVD (Gee and Jenson, 1969). Water flows from the site through the project lakes for the Bonaventure development (Gee and Jenson, 1969)

- Bailey Drainage District

The Bailey Drainage District (BDD) is surrounded on three sides by the SBDD and is bordered by the ITCDD on the north. It covers approximately 1,440 acres (2.25 square miles). The BDD has 12 canals and two pump stations which discharge to the New River (C-11) Canal.

E. Solid Waste

1. Dade County Solid Waste Facilities

The Florida Department of Environmental Regulation (FDER) regulates the disposal of solid waste in Florida. Dade County has three primary solid waste disposal sites operated by Metro-Dade and one private facility. None of the sites are located in the study area.

The North Dade Landfill is closest in proximity to the Dade portion of the study area. It is a Class III sanitary landfill meaning it can only accept trash (Dade County Comprehensive Development Master Plan, 1988). The landfill is located near the Dade-Broward line south of the HEFT. Approximately 40 acres of the 268 acre site are currently in operation accepting approximately 1,400 tons of trash per day (TPD) from the north Dade County area. FDER reports that the site has a remaining expected life of 5 years.

The South Dade Waste Disposal Facility is a Class I sanitary landfill on 320 acres south of Old Cutler Road adjacent to the Black Creek Canal. The facility has a solid waste shredding plant which processes approximately 2,600 TPD, a sanitary landfill, and support structures (Dade County Comprehensive Development Master Plan, 1988). FDER reports that the South Dade Landfill has an expected remaining life of 20 years.

The county resource recovery facility is located adjacent to the county's 58th Street landfill. It encompasses 160 acres and is designed to process approximately 2,600 TPD into electrical energy. The plant has a 77 megawatt electrical generating facility. When operating at full capacity, the plant can supply the energy needs for over 41,000 households. It is currently operating at 1,700 TPD. It is expected to run at full capacity by October 1989.

The only private facility in Dade is the United Sanitation Services, Inc. landfill located on NW 89th Avenue. This landfill is currently handling approximately 857 TPD. The facility will close in 1992 per a contract with Dade County. At that time, Dade County will own and operate all solid waste facilities in the county.

The 1988-93 capital improvements program for Dade County includes money for acquisition of one additional major landfill site. Site selection is scheduled to begin in 1989. While the capacity will not be needed for several years, the county feels that it is necessary at this time to purchase land as soon as possible. At this time, the site will most likely be in northern Dade County (Dade County Comprehensive Master Development Plan, 1988).

2. Broward County Solid Waste Facilities

Broward County currently operates two major solid waste facilities. The Central Disposal Sanitary Landfill (CDSL), owned by Waste Management, Inc. is located in Pompano Beach directly east of the turnpike. The CDSL covers approximately 400 acres divided into five landfill cells. Cell 1, with a design capacity of 16.4 million

cubic yards (MCY) is filled and has been closed. Cell 3A is now open with a design capacity of 1.95 MCY. The total design capacity for the CDSL is 34.8 MCY. The FDER reports that the CDSL has a remaining life of 20 years.

The Broward County Interim Contingency Landfill (BCIL), the county's newest facility, is located east of US 27 and west of the Correctional Institution on Sheridan Street. The BCIL is the only facility in the study area and will be operational for another 17 years. The total site covers 588 acres. Of this, 250 acres will be used for solid waste disposal. The remaining 338 acres will be used as a park and potential resource recovery facility (Broward County Office of Resource Recovery, 1989). The BCIL is a seven cell facility with Cell 1 currently operating with a design capacity of 1.4 MCY. The total design capacity is 27.735 MCY. The BCIL is used primarily to accommodate trash and unprocessible waste. It will serve as a back-up when planned resource recovery facilities come on line (Broward County Comprehensive Plan, 1989).

The county has an Office of Resource Recovery which is developing a solid waste resource recovery system. The system will ultimately have two subregional resource recovery facilities (RRFs), a residue and unprocessible waste landfill, and an interim/contingency landfill. The RRFs and the unprocessible waste landfill will be developed, owned, and operated by private corporations.

The northern RRF will be located next to the CDSL in Pompano Beach and is scheduled to come on line in 1990 (Broward County Comprehensive Plan, 1989). It will have an initial design capacity of 1,760 TPD of solid waste. A two module expansion with a design capacity of 880 TPD is also permitted. The initial gross electrical capacity for this facility is 55.5 megawatts; ultimate generating capacity is 83.5 megawatts (Broward County Comprehensive Plan, 1989).

The southern RRF is located at SR 441 and I-595. It will be designed to process 1,913 TPD when it comes on line in 1990 (Broward County Comprehensive Plan, 1989). A one module expansion of 638 TPD is also permitted. The initial generating capacity of this facility is 68.5 megawatts; ultimate generating capacity will be 96.1 megawatts (Broward County Comprehensive Plan, 1989). The Office of Resources Recovery reports that there is also a 20 acre ash fill on the site and a traditional landfill at that location which will be operational for another 20 years.

Pending plat and permit approvals, a composting facility will be constructed in Pembroke Pines. Reuter, Inc. is designing the 160 acre facility to be located at NW 208 St. and Pembroke Road in Pembroke Pines. The cities of Pembroke Pines, Hallandale, Pompano Beach and Dania have entered into agreements with Reuter, Inc. to use the facility. Reuter, Inc. has purchased the land and is currently in the permitting process. It is expected that the facility will be operational in June of 1990 (City of Pembroke Pines, personal communication, 1989).

3. Improper Disposal of Solid and Hazardous Waste

The enforcement division of DERM for Metro-Dade County and the enforcement division of EQCB for Broward County respond to complaints of improper disposal of both hazardous and solid waste. Both counties report that improper disposal is widespread.

The procedure followed by both counties in responding to complaints is similar. Once a complaint of illegally dumped solid waste has been received, an attempt is made to identify the responsible party for the dumping or to pursue the property owner in order to remove the waste. Warnings or violations are issued depending on the seriousness of the situation. When hazardous waste is found at the site, the counties have emergency contractors which retrieve the hazardous waste. The counties pursue the responsible party and fine them. Reimbursement for the cost of properly disposing of the hazardous waste is sought. Sites are reported and cleaned up on a continuing basis so at any one time the actual location of illegal dumping sites is changing (EQCB, DERM, FDER, personal communication, 1989).

The FDER reports that there is only one permitted hazardous waste transfer station in southeastern Florida. Chemical Waste Management, Inc. owns and operates the site in Pompano Beach.

IV. LAND USE

A. Existing Land Use

The study area covers approximately 200 square miles of mostly undeveloped land. Most of the development that has taken place or been proposed for the next decade is in Broward County, where a number of large scale developments are underway or have received governmental approval. Dade County has restricted the area's development by setting its urban services boundary through 2010 at the HEFT. Broward County has not established an urban services boundary.

Broward County adopted a 1977 land use plan that called for growth to be phased with the provision of community services, facilities, and transportation. The plan also called for close scrutiny and monitoring of the environmental impact of all future growth in developing areas in order to preclude unnecessary degradation the area's land, air, and water resources and to prevent irreversible damage to the environmental resources of the region. Dade County's Master Plan at that time designated the area west of the Turnpike as conservation and limited land uses to agriculture and open space except along the Palmetto Expressway and I-75.

The Broward County portion of the study area lies within the jurisdictions of five cities: Miramar, Pembroke Pines, Cooper City, Davie, and Sunrise, and in unincorporated Broward County. Most of the Dade County area is unincorporated and falls within the jurisdiction of the county government. A small portion of the Dade study area is in the cities of Hialeah and Hialeah Gardens.

Table 2 contains the approximate existing land use acreage for the study area. Since Broward and Dade Counties do not use the same land use classifications, the classifications used in this report are a composite of both systems. The figures were derived through consultation with local governments and using planimeter and computer calculations. These figures are estimates.

TABLE 2
EXISTING LAND USE

<u>Land Use</u>	<u>Acreage</u>
Agriculture	17,885
Estate Residential (1 unit/2.5 acres)	11,734
Low Density Residential (1- 6 DU/A*)	4,915
Medium Density Residential (7-25 DU/A)	1,504
High Density Residential (25 DU/ and up)	2,113
Business (Commercial)	701
Industrial (Includes Mining)	10,862
Community Facilities	421
Conservation	498
Parks and Recreation	3,785
Transportation	2,762
Utilities	167
Open Land (Vacant)	<u>84,577</u>
TOTAL	141,924**

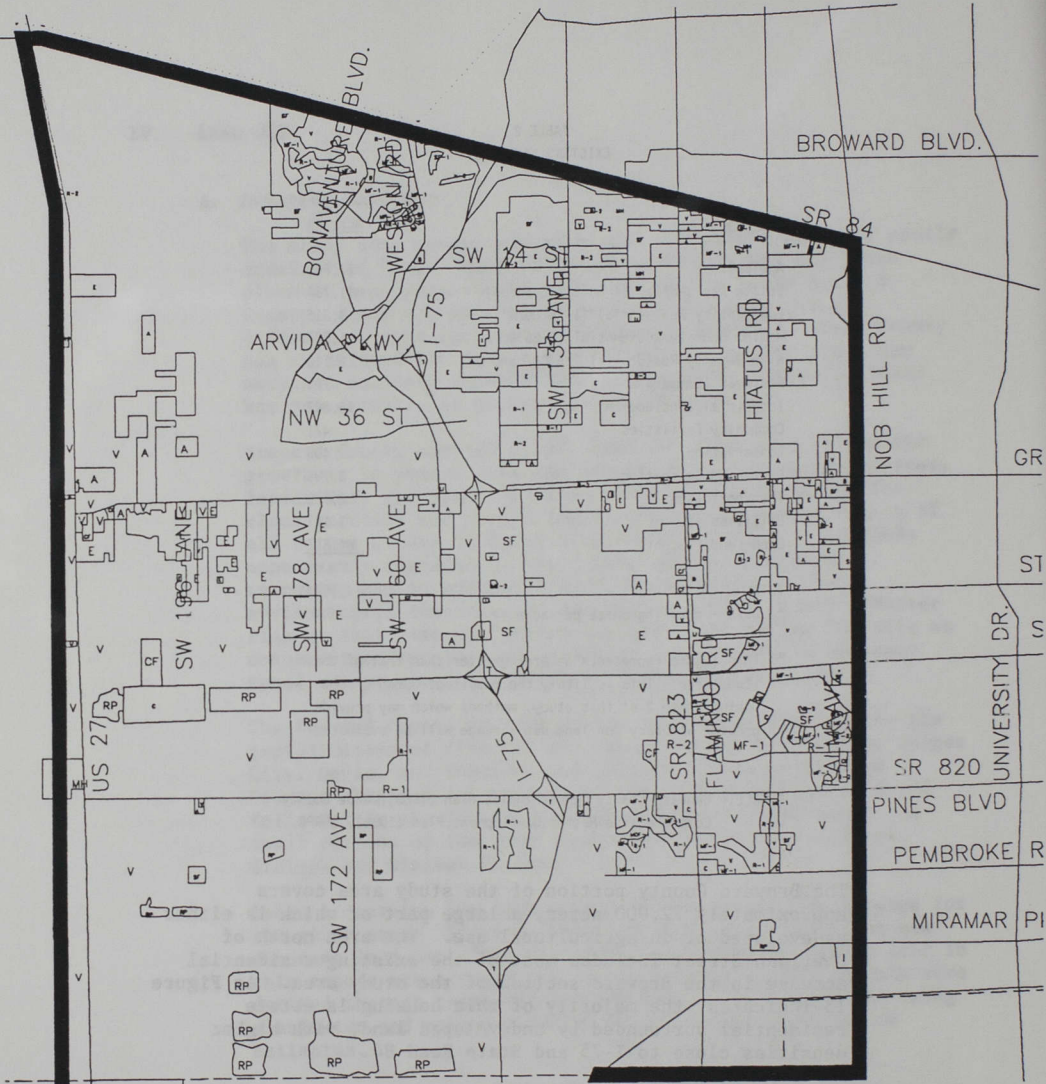
* DU/A - dwelling units per acre

** This figure represents an area greater than that of the study area. This is likely the result of human error. During Phase 2 of this study, methods which may provide greater accuracy for land use acreage will be evaluated.

SOURCE: Broward County Comprehensive Plan (1989), Dade County Comprehensive Master Development Plan (1988), SFRPC.

The Broward County portion of the study area covers approximately 72,000 acres, a large part of which is either undeveloped or in agricultural use. The area north of Sheridan Street includes most of the existing residential acreage in the Broward section of the study area. As Figure 13 indicates, the majority of this housing is estate residential surrounded by undeveloped land, with higher densities close to I-75 and State Road 84.

In the Dade County portion of the study area, most of the land is designated as open land and environmentally sensitive and is part of Dade's northwest wellfield (Figure 14). The Dade County portion of the study area covers approximately 56,000 acres; 75 percent is undeveloped; eight percent is being mined; nine percent is agriculture; and the remaining eight percent includes residential development near Tamiami Trail and Okeechobee Road.



**Southwest Broward/Northwest Dade Subregional Study
Broward County Existing Land Use Plan**

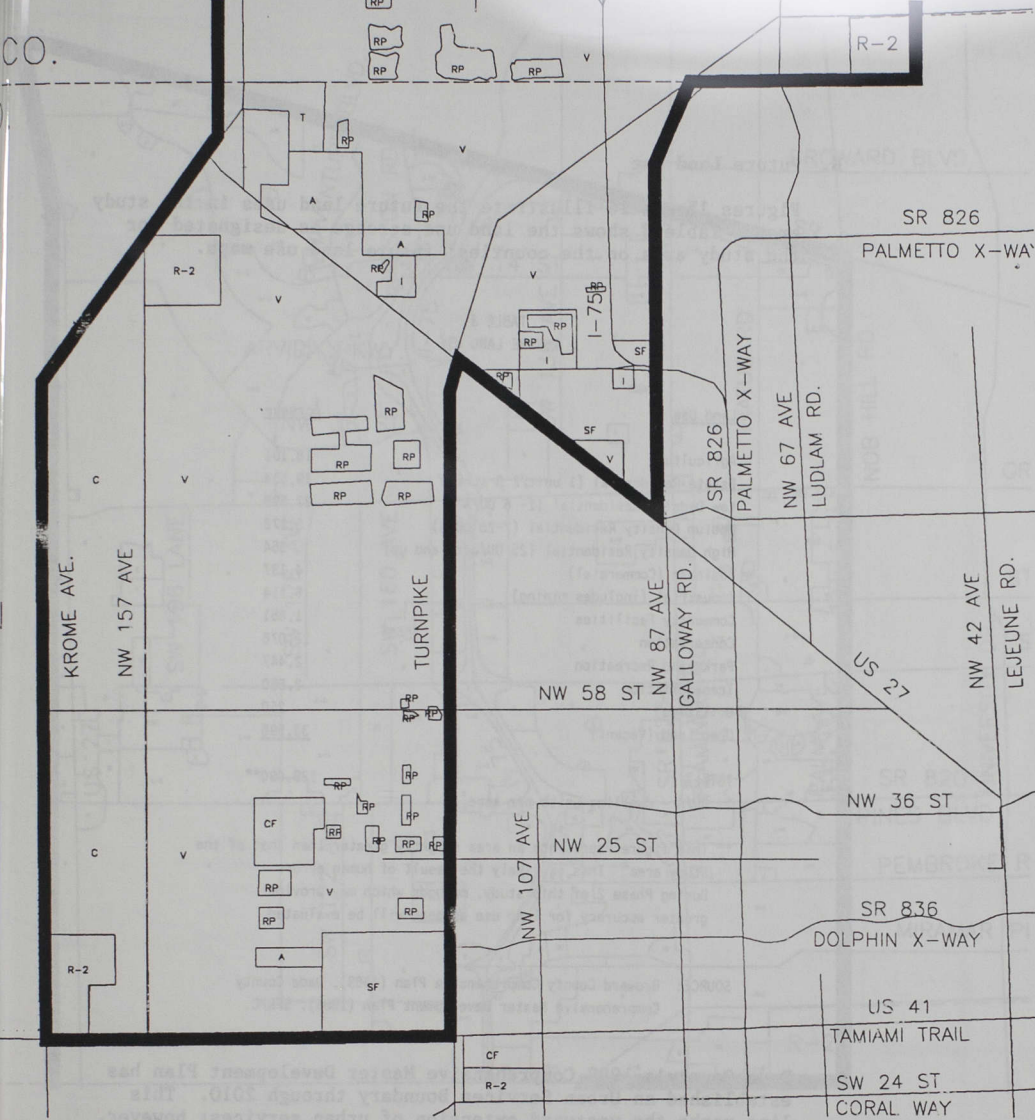
Legend:			Study Area
E	Estate Density Residential	W	Water
SF	Low Density Residential	A	Agriculture
MF-1	Medium Density Residential	V	Open Land
MF-2	High Density Residential	C	Conservation
MH	Mobile Homes	T	Transportation
R-2	Parks & Recreation	U	Utilities
		I	Industrial & Office
		B	Business & Office
		O	Office/Residential
		RP	Rockmining
		CF	Institutional & Public Facility

Source: Broward County Comprehensive Plan 1989.

FIGURE 13

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Southwest Broward/Northwest Dade Subregional Study Dade County Existing Land Use Plan

Legend:		Study Area			
E	Estate Density Residential	W	Water	I	Industrial & Office
SF	Low Density Residential	A	Agriculture	B	Business & Office
MF-1	Medium Density Residential	V	Open Land	O	Office/Residential
MF-2	High Density Residential	C	Conservation	RP	Rockmining
UD-SS	Urban Development Subject to Wetland Basin Study	T	Transportation	CF	Institutional & Public Facility
		R-2	Parks & Recreation		

Source: Dade County Planning Department and South Florida Regional Planning Council.

FIGURE 14



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B. Future Land Use

Figures 15 and 16 illustrate the future land uses in the study area. Table 3 shows the land use acreage as designated for the study area on the counties' future land use maps.

TABLE 3
FUTURE LAND USE

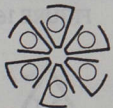
<u>Land Use</u>	<u>Acreage</u>
Agriculture	18,101
Estate Residential (1 unit/2.5 acres)	19,534
Low Density Residential (1- 6 DU/A*)	22,598
Medium Density Residential (7-25 DU/A)	5,172
High Density Residential (25 DU/acre and up)	354
Business (Commercial)	4,137
Industrial (includes mining)	6,114
Community Facilities	1,851
Conservation	12,076
Parks and Recreation	2,447
Transportation	2,860
Utilities	250
Open Land (Vacant)	<u>33,596</u>
TOTAL	129,090**

* DU/A - dwelling units per acre

** This figure represents an area slightly greater than that of the study area. This is likely the result of human error. During Phase 2 of this study, methods which may provide greater accuracy for land use acreage will be evaluated.

SOURCE: Broward County Comprehensive Plan (1989), Dade County Comprehensive Master Development Plan (1988), SFRPC.

Dade County's 1988 Comprehensive Master Development Plan has established an Urban Services Boundary through 2010. This line marks the westward extension of urban services; however, it does not preclude development from occurring there. The majority of the land in the Dade section of the study area is environmentally protected and is designated to remain open land. Although the county's future land use map (Figure 16) does not show it at this time, a major new airport is being considered for the area just south of the Broward-Dade county line. The airport is discussed in the transportation section of this report.



SOUTH
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Southwest Broward/Northwest Dade Subregional Study Broward County Future Land Use Plan

Legend: Study Area

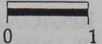
E Residential 1 DU/AC	C Commercial	CR Commercial Recreation
L-2 Residential 2 DU/AC	I Industrial	CF Community Facilities
L-3 Residential 3 DU/AC	A Agricultural	EC Employment Center
L-4 Residential 4 DU/AC	O Office Park	R&O Recreation & Open Space
L-5 Residential 5 DU/AC	U Utilities	RAC Regional Activity Center
LM Residential 10 DU/AC	T Transportation	

Source: Broward County Comprehensive Plan 1989.

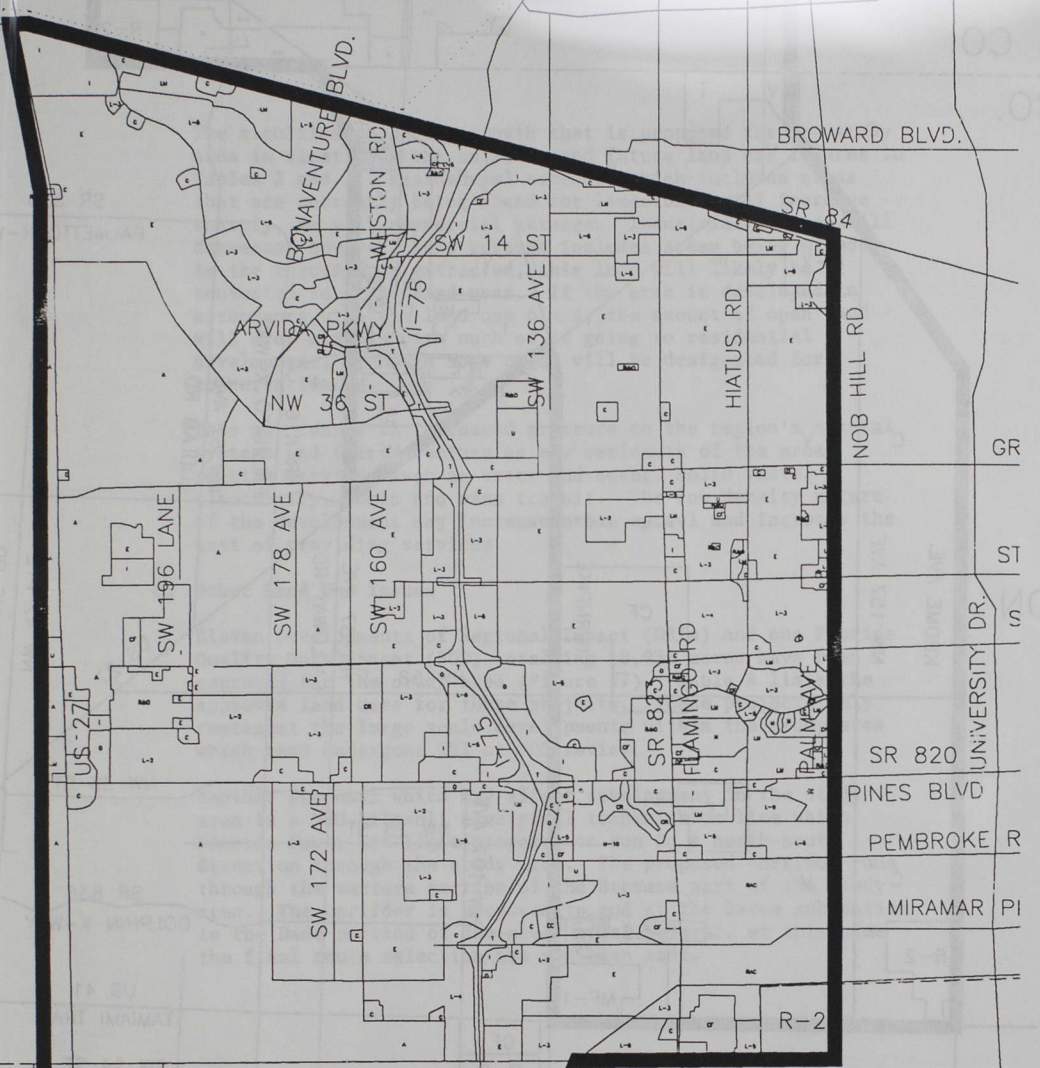
FIGURE 15

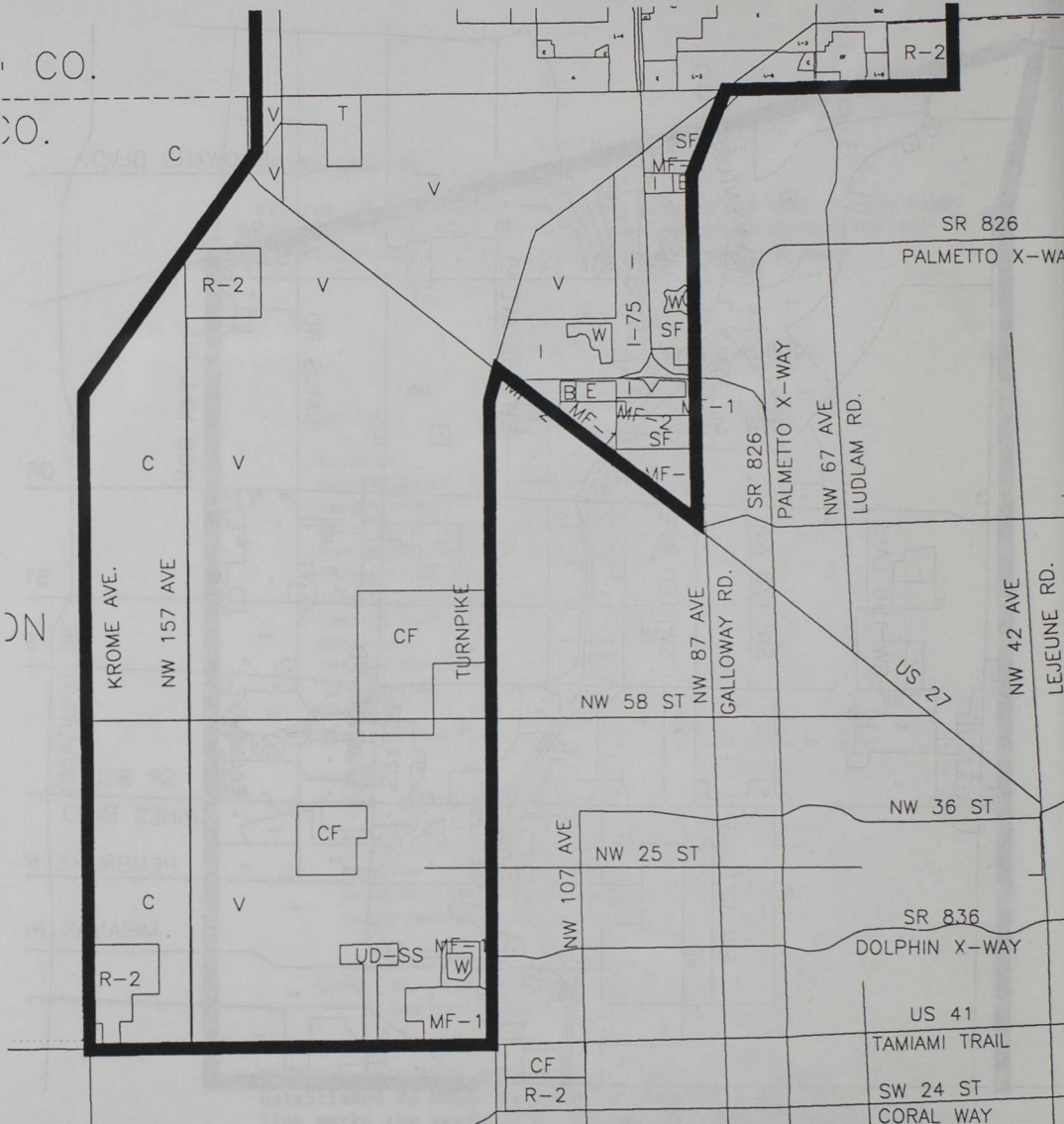


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Southwest Broward/Northwest Dade Subregional Study Dade County Future Land Use Plan

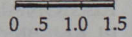
Legend:		Study Area
E	Estate Density Residential	W Water
SF	Low Density Residential	A Agriculture
MF-1	Medium Density Residential	V Open Land
MF-2	High Density Residential	C Conservation
UD-SS	Urban Development Subject to Wetland Basin Study	T Transportation
		R-2 Parks & Recreation
		I Industrial & Office
		B Business & Office
		O Office/Residential
		RP Rockmining
		CF Institutional & Public Facility

Source: Dade County Comprehensive Development Master Plan.

FIGURE 16



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The significance of the growth that is proposed for the study area is clear from the existing and future land use figures in Tables 2 and 3. Residential acreage, which includes areas that are currently being mined for limestone, will increase sharply, as will commercial acreage. Industrial acreage will decrease; however, this acreage includes areas being mined. As the resource is extracted, this land will likely be converted to other land uses. If the area is developed in accordance with the land use plans, the amount of open land will drop sharply with much of it going to residential development, although some of it will be designated for conservation.

This may result in increased pressure on the region's natural systems and infrastructure as new residents of the area require services such as water and sewer, solid waste, electricity, roads and mass transit. The low density nature of the development may increase urban sprawl and increase the cost of providing services.

C. Other Land Use Issues

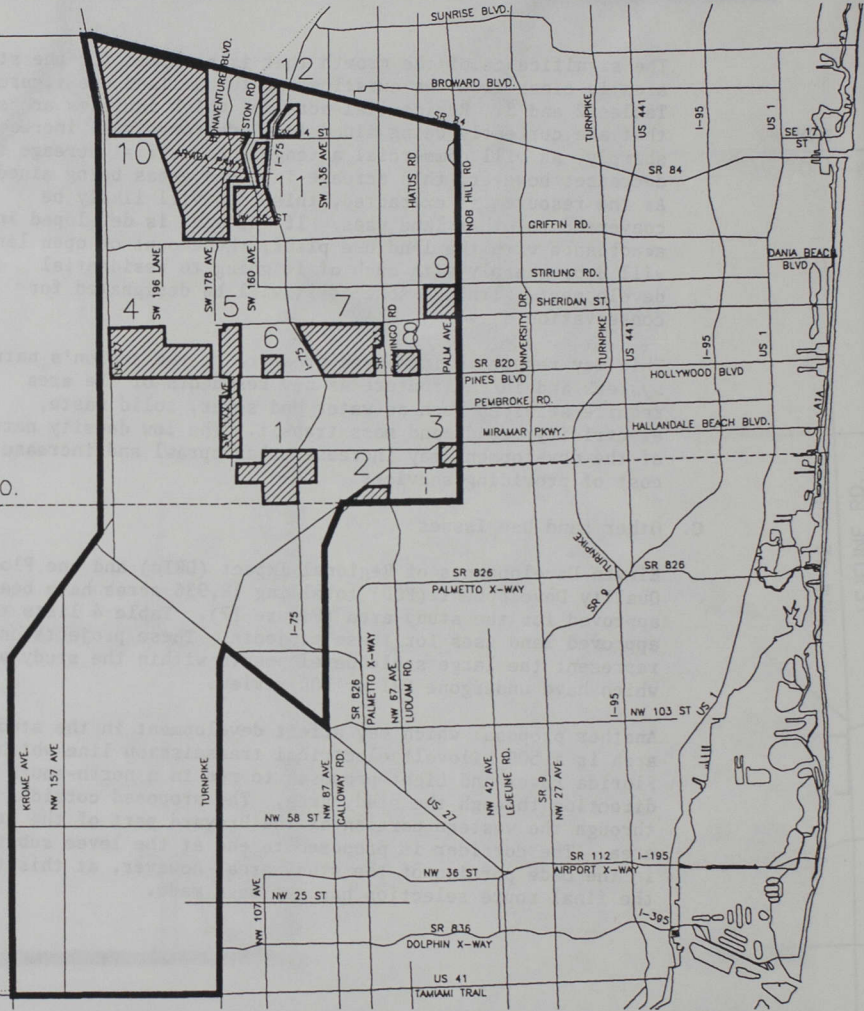
Eleven Developments of Regional Impact (DRIs) and one Florida Quality Development (FQD) totalling 18,936 acres have been approved for the study area (Figure 17). Table 4 lists the approved land uses for these projects. These projects only represent the large scale developments within the study area which have undergone DRI or FQD review.

Another proposal which may affect development in the study area is a 500 kilovolt electrical transmission line which Florida Power and Light proposes to run in a north-south direction through the study area. The proposed corridor runs through the western portion of the Broward part of the study area. The corridor is proposed to end at the levee substation in the Dade portion of the study area; however, at this time the final route selection has not been made.

WATER
CONSERVATION
AREA 3-A

BROWARD CO.
DADE CO.

WATER
CONSERVATION
AREA 3-B



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Southwest Broward/Northwest Dade Subregional Study Developments of Regional Impact

- | | | |
|-----------------------------------|---------------|-----------------------------------|
| Legend: | —— Study Area | DRI Boundaries |
| 1. Country Lakes | | 7. Pembroke Meadows |
| 2. Bluegrass Lakes | | 8. Pembroke Lakes Regional Center |
| 3. Miramar Park of Commerce | | 9. Embassy Lakes |
| 4. Chapel Trail | | 10. Weston |
| 5. Silver Lakes F.Q.D. | | 11. Tishman Speyer - Increment II |
| 6. Pembroke Pines Regional Center | | 12. 84 South |

Source: South Florida Regional Planning Council and Broward County Office of Planning.

FIGURE 17



MILES

0 1 2 3

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TABLE 4

DEVELOPMENTS OF REGIONAL IMPACT AND FLORIDA QUALITY DEVELOPMENTS

<u>Project</u>	<u>Dwelling Units (acres)</u>	<u>Industrial in sq. ft. (acres)</u>	<u>Commercial in sq. ft. (acres)</u>	<u>Office in sq. ft. (acres)</u>	<u>Hotel Rooms (acres)</u>	<u>Other* (acres)</u>	<u>Total Acres</u>
Weston	20,642 (4,836)	105,000 (853)**	2,398,000 (316)	1,027,000 N/A	-	(3,491)	(9,496)
84 South	1,998 (304)	440,000 (68)	579,000 (54)	95,000 N/A	130 (11)	(226)	(663)
Tishman- Speyer	-	5,222,000 (604)**	419,000 N/A	2,134,000 N/A	600 N/A		(604)
Chapel Trail	3,200 (437)	1,274,000 (73)	285,000 (26)	709,000 (42)	-	(723)	(1,301)
Silver Lakes	6,498 (2,166)	-	758,000 (98)	553,000 (66)	300 (19)		(2,349)
Pemb. Pines Reg. Ctr.	-	-	1,300,000 (105)	-	-		(105)
Pembroke Meadows	4,339 (488)	3,116,000 (259)	632,000 (61)	1,019,000 (85)	-	(580)	(1,473)
Pemb. Lakes Reg. Ctr.	900 (40)	-	1,755,000 (46)	575,000 (36)	200 (6)	(40)	(168)
Embassy Lakes	1,796 (365)	-	185,000 (20)	-	-	(247)	(632)
Miramar Pk. of Commerce	-	1,365,000 (127)	-	735,000 (40)	-		(167)
Bluegrass Lakes	2,700 (318)	-	200,000 (20)	-	-	(140)	(478)
Country Lakes	5,100 (531)	1,621,000 (120)	1,142,000 (81)	540,000 (38)	-	(730)	(1,500)
TOTAL	47,173 (9,485)	13,143,000 (2,104)	9,690,000 (827)	7,387,000 (307)	1,230 (36)	(6,177)	(18,936)

* This category includes community facilities, roads, parking, surface water management, rights-of-way, etc.

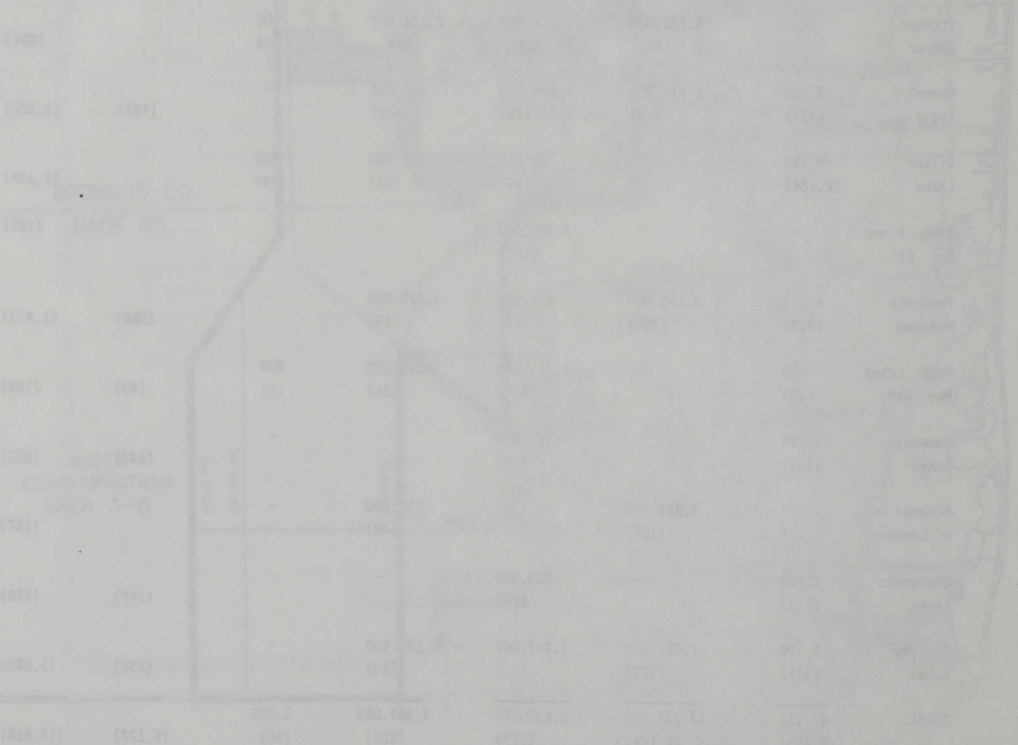
** The land use in the application for development approval (ADA) is shown as Industrial/Office/Commercial (I/O/C).

N/A - The information is not available (see note).

NOTE: These ADAs were submitted before there was an "office" land use category in the Broward County Comprehensive Plan. In this table, "Office" is considered a commercial land use and is included as commercial acreage, unless otherwise indicated.

CONCLUSION

The land uses within the study area may change significantly over the next 20 years. This potential for change justifies the need for the Southwest Broward/Northwest Dade Subregional Study. As presented in this report, Phase 1 of the study provides a foundation in summarizing existing conditions. Phase 2 of the study will compile additional data, examine current and anticipated trends, and present information to assist in decision-making processes to the benefit of the study area and the region as a whole.



Southwest Broward/Northwest Dade Subregional Study

Legend

- 1. County/State
- 2. Planning Lakes
- 3. Planning Park

Southwest Broward/Northwest Dade Subregional Study

Phase I

1990