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Solid Waste Authority of Palm Beach County
North County Resource Recovery Facility Site

Unique & Innovative Facilities

- Recycle waste-water and lime sludges using landfill gas into fertilizer and quicklime products for beneficial uses
- Concurrently eliminates sludge disposal to our fragile and precious environment

Lime Recalcination and Biosolids Pelletization Facilities

Request for an Amendment Leading to a Modification of Power Plant Site Certification PA84-20

Second Revision to Include Project Updates and Information Requested in FDEP Letter Dated April 8, 2003

October 2003

Volume I: Main Volume and Appendices

2678-39378-064

Siting File

SOLID WASTE AUTHORITY OF PALM BEACH COUNTY
NORTH COUNTY RESOURCE RECOVERY FACILITY SITE

REQUEST FOR AN AMENDMENT LEADING TO A MODIFICATION OF POWER PLANT SITE CERTIFICATION PA84-20

Second Revision to Include Project Updates and Information Requested in FDEP Letter Dated April 8, 2003

LIME RECALCINATION AND BIOSOLIDS PELLETIZATION FACILITIES

Volume I of III

Submitted to:
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SITING COORDINATION OFFICE
TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

Prepared for:
Solid Waste Authority of Palm Beach County
7501 North Jog Road
West Palm Beach, Florida 33412

Prepared by:
Camp Dresser & McKee Inc.
1601 Belvedere Road, Suite 211 South
West Palm Beach, Florida 33406

October 2003

10/14/03
Alex H. Makled, P.E., DEE
Florida Registered Engineer
Engineer Number 45935

Contents

Section 3 - The Proposed Facilities and Directly Associated Elements

Figures

Tables

Executive Summary

The Solid Waste Authority of Palm Beach County (SWA) is currently responsible for processing and disposing of the solid waste collected in all 37 Palm Beach County municipalities and the unincorporated area of Palm Beach County. Recently, SWA has been approached by several of these municipalities regarding the growing need for alternative methods to manage lime softening and wastewater sludges from their water and wastewater plants, respectively.

SWA has proposed the construction of two facilities to address the concerns of these municipalities. A lime recalcination facility (LRF) will recycle lime sludge into hydrated lime, for reintroduction into the water softening process. A biosolids pelletization facility (BPF) will process wastewater sludge by drying it and producing a potentially marketable pelletized product. These facilities will provide environmental benefits by processing waste products for beneficial re-use and by receiving energy from landfill gas that is normally flared. These facilities will be located at the 1,320-arce North County Resource Recovery Facility (NCRRF) at 7501 N. Jog Road in West Palm Beach, FL. Specifically, they will occupy 15 acres of the 31-acre site located at the southeast corner of Jog Road and 45th Street. This parcel of land is owned by SWA, and is currently permitted as part of the overall SWA site.

Power Plant Siting Act Certification

The Power Plant Siting Act (PPSA) provides for the certification of steam, electric or solar power plants which are 75 megawatts or larger in size. This certification also includes facilities that are directly associated with a power plant, or facilities that lie on a site already certified by the PPSA, as is the case for the LRF and BPF. The original PPSA, Case No. PA 84-20, was issued in 1986 and has since been modified six times between 1992 to 2000. The existing Conditions of Certification are included in **Appendix A**.

The construction of the LRF and BPF will require various environmental permits, including this Request for an Amendment Leading to a Modification of the PPSA Certification. The PPSA Request for Amendment addresses aspects of both facilities, as well as underground utilities, including water supply, industrial supply well (ISW) water, sanitary and process wastewater, natural gas, and landfill gas infrastructure. In addition to the PPSA Certification, previously obtained permits include wastewater disposal via deep injection wells and an Air Operating Permit to upgrade the landfill gas system flare for the Class I and Class III landfills.

The PPSA process is a consolidated permitting program for electrical power plants. Therefore, it incorporates the Prevention of Significant Deterioration (PSD) Air Permit, Title V Operating Air Permit, National Pollutant Discharge Elimination System (NPDES) permit, and the Underground Injection Control program permit for SWA's deep well injection system. SWA's solid waste facilities, gas collection and control system, and the industrial water supply wells are also covered under the PPSA site certification.

Description of Facilities

Lime Recalcination Facility

In an effort to develop and implement a long term solution to dispose of the lime sludge generated at the various lime softening water treatment plants (WTPs) in the Palm Beach County area, SWA has proposed a 100 tons per day Lime Recalcination Facility (LRF) which will receive lime sludge from the WTPs and convert it into hydrated lime. Landfill gas from SWA landfill will serve as a fuel source to operate a high temperature kiln. This hydrated lime will then be reused at the WTPs. Currently, approximately 50 percent of the WTPs stockpile their sludge on site for drying and disposal via landfills or other end-uses. Stockpiling the sludge is of great concern to the WTPs because they are simply running out of room to store it. The proposed facility will minimize need for sludge storage as well as produce quicklime for the WTPs.

The LRF will process lime sludge from the following nine utilities:

- Palm Beach County Water Utilities Department
- City of Boca Raton
- Seacoast Utility Authority
- Town of Jupiter
- City of Delray Beach
- City of Lake Worth
- City of Riviera Beach
- Village of Royal Palm Beach
- City of West Palm Beach

Biosolids Pelletization Facility

Biosolids generated by wastewater treatment facilities located in Palm Beach, Martin and St. Lucie counties are currently disposed of via land application, which is permitted by the Florida Department of Environmental Protection. The wastewater sludge is discharged at permitted sites within the Lake Okeechobee, Everglades, and Indian River Lagoon basins.

The primary objective of the Biosolids Pelletization Facility (BPF) is to eliminate the disposal of wastewater sludge into the environmentally sensitive Lake Okeechobee, Everglades, and Indian River Lagoon basins, by the 13 cooperating utilities that are associated with this facility. The BPF will convert wastewater sludges into a usable fertilizer by-product that could potentially be used by urban, landscape and agricultural users located throughout the state and the southeastern United States.

The primary benefit of the BPF is the subsequent improvement in stormwater quality due to the removal of phosphorus loading to environmentally sensitive basins in south Florida. The BPF will be a model design that other communities may use for elimination of their landspreading activities. It will also be cost-efficient through its use of landfill gas as a fuel source. Furthermore, the construction of the BPF, and the educational programs associated with its implementation, will inform the public and professionals alike about the importance of such a facility and the environmental benefits it provides.

The BPF will accept wastewater sludge from the following 13 utilities:

- Palm Beach County Water Utilities Department
- City of Boca Raton
- South Central Regional Wastewater Treatment Facility (Cities of Delray Beach and Boynton Beach)
- Seacoast Utilities (Cities of Jupiter, Palm Beach Gardens, and North Palm Beach)
- Village of Wellington
- Village of Royal Palm Beach
- St. Lucie County Utilities
- Port St. Lucie Utilities
- Fort Pierce Utility Authority
- Martin County Utilities
- City of Stuart
- City of South Bay
- Loxahatchee River Environmental Control District

Approximately 400 wet tons per day of wastewater sludge will be received from these utilities at approximately 12 to 15 percent solids, and be processed to produce a dry pelletized product. This product can potentially be sold for use in the fertilizer manufacturing process, and other markets throughout the country.

Description of Directly Associated Elements (Common to Both Facilities)

The BPF and LRF will share many common elements. These elements include:

- Site access, easements and rights of way;
- Onsite surface water management;
- Landfill gas and natural gas supply;
- Potable and industrial water supply;
- Wastewater disposal;
- Electrical utilities; and
- Landfill gas pressurization system and three flares (a 1,000 scfm, 2,000 scfm and a 3,500 scfm flares)

Contents of Request for Amendment

This Request for an Amendment Leading to a Modification of Power Plant Site Certification PA 84-20 has been prepared in accordance with the requirements of Section 403.516 Florida Statutes and applicable conditions of SWA's existing power plant certification. It sets forth the following:

- The proposed modification;
- The factual reasons asserted for the modification; and
- The anticipated effects of the proposed modification on the applicant, the public, and the environment.

This Request consists of three volumes as follows:

- Volume I: Main Volume and Appendices;
- Volume II: Consolidated Air Permit Application Electronic Submission of Application (ELSA) Forms for Modification of Prevention of Significant Deterioration (PSD) Permit No. PSD-FL-108, and Title V Air Operating Permit No. 0990234-003-AV; and
- Volume III: Application Text for Modification of PSD Air Permit No. PSD-FL-108.

Section 1
Description of the Proposed Facilities

The Solid Waste Authority of Palm Beach County (SWA) is currently responsible for processing and disposing of the solid waste collected in all 37 Palm Beach County municipalities and the unincorporated area of Palm Beach County. Recently, SWA has been approached by several of these municipalities regarding the growing need for alternative disposal methods of processing both lime softening and wastewater sludges from their water and wastewater plants, respectively.

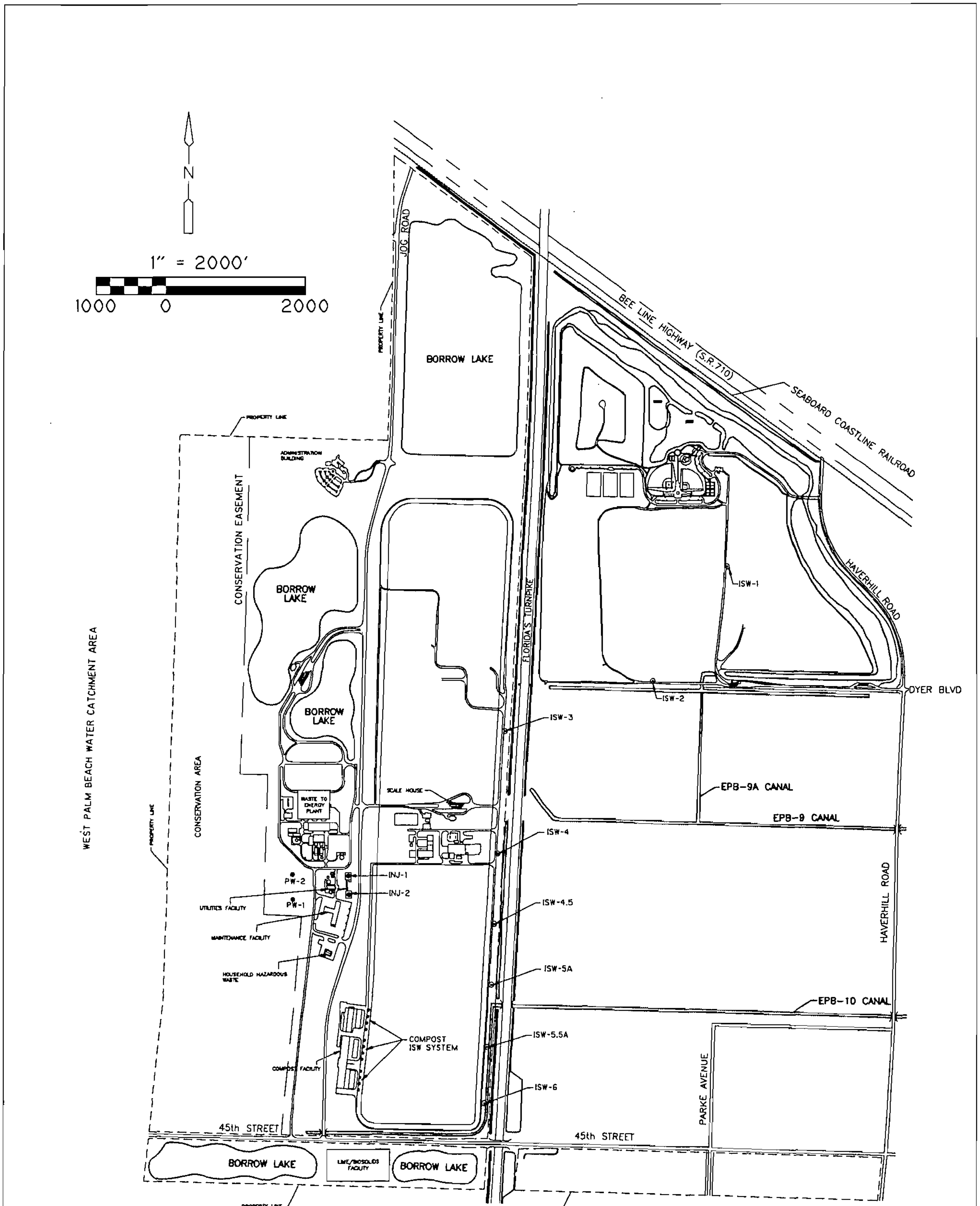
SWA has proposed the construction of two facilities to address the concerns of these municipalities. A lime recalcination facility will recycle lime sludge into hydrated lime, for reintroduction into the water softening process. A biosolids pelletization facility will process wastewater sludge by drying it and producing a potentially marketable pelletized product. These facilities will be located at the 1,320-acre North County Resource Recovery Facility (NCRRF) at 7501 N. Jog Road in West Palm Beach (WPB), see **Figure 1-1**. Specifically, they will occupy 15 acres of a 31-acre site, located at the southeast corner of Jog Road and 45th Street. The site is owned by SWA, and is currently permitted for landfill use. The facilities are described in further detail in the following sections.

1.1 Lime Recalcination Facility

In an effort to develop and implement a long term solution to dispose of the lime sludge generated at the various lime softening water treatment plants (WTPs) in the Palm Beach County area, SWA has proposed a 100 ton per day Lime Recalcination Facility (LRF) which will receive lime sludge from the WTPs and convert it into hydrated lime. Landfill gas from SWA's landfill will serve as a fuel source to operate a high temperature kiln. This hydrated lime will then be reused at the WTPs. Currently, approximately 50 percent of the WTPs stockpile their sludge on site for drying and disposal to landfills or other end-uses. Stockpiling the sludge is of great concern to the WTPs because of space requirements to store it. The proposed facility would minimize need for sludge storage as well as produce quicklime for the WTPs.

The LRF will process lime sludge from the following nine utilities:

- Palm Beach County Water Utilities Department
- City of Boca Raton
- Seacoast Utility Authority
- Town of Jupiter
- City of Delray Beach
- City of Lake Worth



Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

J:\2678\:Lime_Biosolids\Report\WaterUse\ fig2-1sitemap.dwg 05/16/02 16:16:47 DesmaraisTR

Figure 1-1
Site Location Map

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- City of Riviera Beach
- Village of Royal Palm Beach
- City of West Palm Beach

The feasibility of constructing a LRF at the North County Resource Recovery Facility (NCRRF) site was evaluated in two phases.

Phase I included a feasibility study that was conducted in 1997 to determine the following:

- The necessary size of the facility;
- Which WTPs would participate in this project;
- The amount of lime sludge that would be contributed by each of those facilities; and
- The amount of product lime that each municipality would purchase from the facility.

The feasibility study focused on establishing the basis for the negotiation of lime sludge supply agreements with the above local utilities. The scope of work for Phase I was completed and SWA has negotiated agreements with key participants within the Palm Beach County area.

To better assess the feasibility of implementing a recalcining operation at NCRRF, Phase II of the program included evaluating the technical issues associated with the lime sludge recalcining process. A Lime Sludge Testing and Recalcination Study was conducted to establish certain base design parameters that would be applicable to a full-scale facility. Due to the number of facilities that could be potential participants in the recalcination project and the variations between the sludges produced at the various facilities, testing of the sludges for compatibility and processibility was warranted. Extensive sampling and analyses were performed on the sludge in two parts.

The first part of sampling, testing and analyses consisted of obtaining small samples of sludge from each of the potential participating entities and analyzing for basic properties and recalcining abilities. Lime sludge samples were collected from the individual water plants and analyzed for the following parameters:

- Solids % By Dry Weight Basis
- Nitrogen % TKN By Dry Weight Basis

▪ Phosphorus	% P By Dry Weight Basis
▪ Potassium	% K By Dry Weight Basis
▪ Sulfur	% S By Dry Weight Basis
▪ Calcium	% Ca By Dry Weight Basis
▪ Magnesium	% Mg By Dry Weight Basis
▪ Sodium	% Na By Dry Weight Basis
▪ Iron	% Fe By Dry Weight Basis
▪ Aluminum	% Al By Dry Weight Basis
▪ Magnesium	% Mg By Dry Weight Basis
▪ Copper	% Cu By Dry Weight Basis
▪ Zinc	% Zn By Dry Weight Basis
▪ Available CaCO3 content	% By Dry Weight Basis
▪ Total Hydroxide content (Mg(OH)2, Fe(OH)2, Al(OH)3	% By Dry Weight Basis
▪ SiO2 content	% By Dry Weight Basis
▪ FeCl3 content	% By Dry Weight Basis
▪ Clay content	% By Dry Weight Basis
▪ Loss of Ignition	% By Dry Weight Basis

The results indicated that the sludges were probably good candidates for inclusion in a full-scale lime recalcination project. Based on the favorable results of the first part of sampling, a pilot scale recalcination study was initiated as the second part.

A pilot-scale, 3 foot diameter by 30 foot long, rotary kiln, equipped to feed, recalcine, collect and control sludge through a recalcination run, was used. The pilot test was run by FFE Minerals, Inc. in Bethlehem, PA. Instrumentation and environmental controls were installed to gather data on recalcination process parameters, emissions and recalcined product quality. Samples collected from the various WTPs were mixed together in proportion to the quantity of sludge available to obtain a composite sample that will closely represent the mixture ratio at the full-scale facility. The composite sample was fed to the pilot-scale kiln for recalcination. Finished lime product was analyzed for the following parameters:

- Available Calcium Oxide (Average)
- Available Calcium Oxide (Minimum)
- Pebble size
- Insoluble material (Max.)
- Loss of Ignition (Max.)
- Silicon Dioxide (Max.) SiO_2 as mg/Kg
- Magnesium Oxide (Max.) MgO as mg/Kg
- Aluminum Oxide (Max.) Al_2O_3 as mg/Kg
- Iron Oxide (Max.) Fe_2O_3 as mg/Kg
- Sulfur (Max.) S as mg/Kg

These measured quantities were used to prepare finished lime product specifications to be included as part of the negotiated agreements.

The results of the pilot-scale test indicated that a good, usable quality lime can be consistently produced using lime sludges from the nine potential participating entities as feedstock. Available lime in the product material was well within acceptable commercial parameters and only minor problems with elevated levels of inert material, particularly silica oxides, were discovered.

In addition to the above work, a survey of the above nine water treatment plants was conducted in July of 2000 to assist in gathering basic information on the quantity, characteristics, production and storage methods and quality of the various plants' sludges. Information obtained through the survey process indicated that a total of approximately 160 wet tons of sludge were available per day from the plants. The survey results also indicated that the facilities, combined, use approximately 100 tons of fresh lime per day.

The project economics are based on the sale of recycled lime sludge to the participating utilities, as well as to SWA's Waste-to-Energy (WTE) Facility on the NCRRF site.

1.2 Biosolids Pelletization Facility

Biosolids generated by wastewater treatment facilities located in Palm Beach, Martin and St. Lucie counties are currently being disposed by land application, which is permitted by the Florida Department of Environmental Protection (FDEP). The wastewater sludge is discharged at permitted sites within the Lake Okeechobee, Everglades, and Indian River Lagoon basins.

Recent concerns surrounding phosphorus loading in the 4,600 square mile drainage basin of Lake Okeechobee, as well as the 1,140 square mile Indian River Lagoon, have prompted the wastewater utilities in the aforementioned counties to seek alternatives to land spreading their biosolids. The result of that concern is the proposed Biosolids Pelletization Facility (BPF) in Palm Beach County. The BPF will help to reduce nonpoint source pollutants that are reaching Lake Okeechobee. The Total Maximum Daily Load (TMDL) desired for runoff into Lake Okeechobee is 40 parts per billion (ppb) phosphorus (P). This is equivalent to a load of 135 tons of P discharged into the Lake on an annual basis. Currently, the discharge concentration into Lake Okeechobee averages about 107 ppb, which on a load basis amounts to over 500 tons of P pollution in the Lake. Removing this nutrient loading will help in meeting TMDLs for the Lake. In the past two years, 120,724 tons of biosolids were discharged by cooperating organizations into the Lake Okeechobee basin with a P load of approximately 4,526 tons.

SWA, acting on behalf of the major utilities in the tri-county area of Palm Beach, Martin and St. Lucie counties, enlisted Camp Dresser & McKee Inc. (CDM) to develop a BPF that will eliminate their phosphorus loading of the Lake Okeechobee drainage basin and other environmentally sensitive basins due to wastewater sludge disposal.

The BPF will accept wastewater sludge from the following 13 utilities:

- Palm Beach County Water Utilities Department
- City of Boca Raton
- South Central Regional Wastewater Treatment Facility (Cities of Delray Beach and Boynton Beach)
- Seacoast Utilities (Cities of Jupiter, Palm Beach Gardens, and North Palm Beach)
- Village of Wellington
- Village of Royal Palm Beach
- St. Lucie County Utilities
- Port St. Lucie Utilities
- Fort Pierce Utility Authority

- Martin County Utilities
- City of Stuart
- City of South Bay
- Loxahatchee River Environmental Control District

The facility is intended to reduce phosphorus loading in the Lake Okeechobee Watershed (HUC 03090201). Other affected watersheds include the Everglades Watershed (HUC 03090202) and the Indian River Lagoon (Vero Beach/St. Lucie Watershed) (HUC 03080203). The affected water bodies include Lake Okeechobee, the Everglades and the Indian River Lagoon, all of which have been declared priority water bodies for the State of Florida.

The project began with a formal survey of the 13 interested wastewater utilities to determine the following:

- The necessary size of the facility;
- Which wastewater treatment plants would participate in this project;
- The quantity and quality of sludge that would be contributed by each of those facilities; and
- The amount of product pellets that would be produced.

The survey results indicated that the participating utilities would deliver approximately 400 wet tons (12 to 15 percent solids) of biosolids per day, and produce 80 tons of dry pelletized product.

The primary benefit of the BPF is the subsequent improvement in stormwater quality due to the removal of phosphorus loading to environmentally sensitive basins in south Florida. The BPF will be a model design that other communities may use for elimination of their landspreading activities. It will also be cost-efficient through its use of landfill gas as a fuel source. Furthermore, the construction of the BPF, and the educational programs associated with its implementation, will inform the public and professionals alike about the importance of such a facility and the environmental damage that can be avoided.

1.3 Description of Directly Associated Elements (Common to Both Facilities)

The BPF and LRF will be located on a 31-acre site on the southeast corner of 45th Street and Jog Road. The facilities will occupy a combined total of approximately 15 acres of this site (See Figure 1-1). The BPF and LRF will share several common elements. These elements include:

- Site access, easements and rights of way;
- On site stormwater management;
- Landfill gas and natural gas supply;
- Potable and industrial water supply;
- Wastewater disposal;
- Electrical utilities; and
- Landfill gas pressurization system and three flares (a 1,000 scfm, 2,000 scfm and a 3,500 scfm flares)

These shared components of the facilities are discussed in further detail in Section 3.4.

1.4 Permits and Permitting Approach

1.4.1 Introduction

This section discusses the permit requirements for the LRF and BPF. As described below, the majority of the state and federal permits will be reviewed and coordinated by the FDEP Siting Coordination Office. Several other agencies, including Palm Beach County and the South Florida Water Management District (SFWMD), will be reviewing and providing comments through the power plant site certification process.

1.4.2 Power Plant Site Certification

In accordance with the requirements of Chapter 62-701, Florida Administrative Code (FAC) and applicable conditions of the site's power plant certification, this document constitutes a request for an "amendment leading to modification of Power Plant Siting Act certification."

This power plant site certification request for amendment includes relevant information and updates to the original site certification application and subsequent amendments.

The Power Plant Siting Act (PPSA) (ss. 403.501-.518, F.S.) provides a program for consolidated permitting and licensing of power plants that have 75 megawatts (MW) or greater electricity generation capacity. The program is administered by FDEP's Siting Coordination Office under Chapter 62-17, FAC. Certification is a single unified umbrella permit for an entire site containing a power plant, and for all of the activities on the site needing state, regional or local permits. SWA's Power Plant Siting Certification for NCRRF incorporates the Prevention of Significant Deterioration

(PSD) Pre-construction Air Permit and the Title V Air Operating Permit and the Underground Injection Control (UIC) program permit for SWA's deep well injection disposal system. A list of permits currently held by SWA for existing facilities at the NCRRF site is provided in **Table 1-1**.

Table 1-1 SWA Existing Permits with FDEP Relating to BPF and LRF

Permit Title	Permit Number	Date of Issuance	Expiration Date
Operation Permit for Injection Well	78189-001-UO	11/19/99	11/18/04
Operation Permit for Injection Well	78189-002-UO	11/18/99	11/18/04
Title V Air Operating Permit	0990234-003-AV	10/30/00	10/30/05
PSD Air Permit	PSD-FL-108(E)	12/12/86, modified 9/11/02	N/A

All permit applications for any new facilities or modifications on the NCRRF site will be centrally managed by FDEP's Siting Coordination Office. Therefore, the following permit applications are included as part of this amendment request and are discussed further below:

- Modifications to PSD and Title V Permits (Appendix F; Volumes II and III)
- NPDES Multi-Sector Permit for Stormwater Discharges Associated with Industrial Activities (**Appendix B**)

Palm Beach County currently has a Class I Injection Well System at NCRRF, which is permitted through FDEP. Any changes to this system, or to the waste being discharged to the system, will require a modification or amendment to the existing UIC permit. Changes to the existing system are not anticipated at this time. Therefore, no modification or amendment is being sought.

1.4.2.1 Air Permits

The Clean Air Act (CAA) was amended in 1977 to incorporate a PSD program. To carry out the policies of the 1977 CAA amendments, U.S. Environmental Protection Agency (EPA) adopted revised PSD regulations on June 19, 1978. These revised regulations contained the PSD increments mandated by Congress and identified the types of emission sources subject to the PSD regulations (40 CFR 52.21, incorporated at 62-212.400, FAC).

For PSD purposes, a major stationary source is defined by the EPA in two main ways. One definition of a major stationary source includes any source belonging to a list of 28 specified categories, which has the potential to emit 100 tons per year (tpy) or more of any criteria pollutants regulated under the CAA. The NCRRF is classified, for PSD purposes, as a municipal waste incinerator capable of charging more than 50 tons of refuse per day, which is one of the 28 major source categories, in Section 169 of Title I of the CAA. Since the existing NCRRF has the potential to emit more than 100 tpy of at least one regulated pollutant, the NCRRF, together with all other SWA-controlled emissions units on the same property and in the same major two-digit Standard Industrial Classification (SIC) Code, is an existing major stationary source for PSD purposes. The NCRRF and other air emissions sources (the Class I and III Landfills, ash handling facilities, lime and chemical storage silos, Materials Recycling Facility, auto spray booth, and Composting Facility), have the following major-source air permits and approvals:

- PSD Permit No. PSD-FL-108, originally issued December 12, 1986. This permit has been modified as listed below:
  - PSD-FL-108(A), January 14, 1992 – upgrades to NCRRF
  - PSD-FL-108(B), February 21, 1996 – Class I and III Landfills gas system expansion
  - PSD-FL-108(C), August 14, 1997 – Waiver for testing beryllium and fluoride emissions at NCRRF
  - PSD-FL-108(D), May 11, 1999 - Class I and III Landfills gas system expansion
  - PSD-FL-108(E), September 11, 2002 – Change in Class III Landfill Surface Methane Monitoring Requirement
- Title V Air Operating Permit, Permit No. 0990234-003-AV, issued October 30, 2000.

A modification to an existing major source is subject to PSD regulations if it is located in a PSD attainment area and it is a major modification. The project site and vicinity are currently considered to be in attainment with air quality standards for all PSD pollutants (40 CFR 81.310 and Rule 62-204, FAC). A major modification is a physical change or a change in method of operation of a major source which would result in a "significant net emissions increase" of a regulated pollutant. In this case, the physical change is the addition of the LRF, BPF and three flares (the flares are described further in Section 3.4). Each proposed modification at the NCRRF site is required to take into account all other permitted air emission increases and decreases that have occurred in the five years prior to the proposed modification. Since the LRF, BPF and flares would all be built within five years of each other, they must be considered together in the PSD applicability determination. Similarly, the decommissioning of the existing 1,800 scfm flare at the Class I Landfill would occur with these projects. The rules for calculating the "net emissions increase" for these projects state that maximum potential emission rates be used for the new sources, and actual annual average emission rates (over the most recent two years) be used for the calculation of decreases for the decommissioned sources. The existing 1,800 scfm flare must be decommissioned before the LRF or BPF commence full-scale operation in order to take credit for the net reduction in emissions. The calculated net emissions increases for all PSD pollutants are shown in **Table 1-2**. The maximum potential annual emission rates presented in Table 1-2 for the new sources were calculated with the assumption that each unit could operate 365 days per year at 100 percent load. As explained in Section 1.0 of Volume III, three flares (3,500 scfm, 2,000 scfm and 1,000 scfm each) are proposed to be installed at the Class I Landfill in the same five-year period as these projects. These three flares are exempt from PSD permitting. However, because they are contemporaneous projects with the BPF and LRF, their emission rates are included in the first total shown in Table 1-2. The second total in Table 1-2 shows that the net emissions increase for the LRF and BPF projects alone would exceed the PSD "significant net emissions increase" threshold (Rule 62-212.400, FAC, Table 212.400-2) for nitrogen oxides (NO_X). The proposed LRF and BPF projects, therefore, are subject to PSD requirements, and a "major" modification to the NCRRF site's existing PSD permit must be prepared.

In general, a PSD permit application (including modifications) must contain the following basic components:

- A complete description of the nature and operation of the source;
- A Best Available Control Technology (BACT) review for those pollutants emitted at or above the "significant net emissions increase" rates;
- An analysis of existing ambient air quality;
- An impact assessment demonstrating that emissions from the new source will not cause a violation of ambient air quality standards or PSD increments; and
- An assessment of the project's impact on air-quality-related values, including soils, vegetation, and visibility.

Volume III of this application addresses these requirements. Section 4.0 (Volume III) presents the BACT analysis. As shown in Table 1-2, a formal BACT analysis is required only for NO_X emissions. Section 5.0 (Volume III) reviews existing ambient air quality and meteorology near the NCRRF Site. Air quality modeling analyses are performed in Section 6.0 (Volume III) to show that applicable ambient air quality standards and PSD increments will be met. Section 7.0 (Volume III) presents the additional impact analyses required as part of the PSD review.

A source modification is subject to non-attainment New Source Review (NSR) if the modification results in a significant net emission increase of a pollutant for which the source is major and for which the area is designated as non-attainment. Since the project site and all nearby areas are considered to be in attainment of the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants, and since the project will not cause a significant net emissions increase, the NSR requirements do not apply.

Table 1-2 SWA Lime Recalcination Facility, Biosolids Pelletization Facility, and Class I Landfill Flares Proposed Maximum Potential Controlled Emission Rates and PSD Applicability

PSD Pollutant		Air Pollutant Emission Rates, By Emissions Unit													
		Lime Recalcination Facility (LRF)				Biosolids Pelletizing Facility (BPF)					Flares				
		Rotary Lime Kiln (a)	Cross-Bar Lime Product Cooler (b)	Two Hydrated Lime Storage Silos (c)	LRF Subtotal (tons/year)	Two Rotary Dryers (d)	Four Fertilizer Pellet Storage Silos (c)	Two Recycle Bins (e)	Two Cooling Towers (f)	BPF Subtotal (tons/year)	3,500-scfm, 1,000-scfm, and 2,000-scfm Flares (g)	Existing 1,800-scfm Flare to be Replaced (g)	LRF, BPF and Flares TOTAL (h)	LRF and BPF Only TOTAL	PSD Significant Net Emissions Increase (i)
Carbon Monoxide (CO)	Basis	150 ppmv @ 10% O_2	---	---	---	0.39 lb/hr each	---	---	---	---	0.37 lb/MMBtu	750 lb/10^6 dscf CH_4			
	Tons/Year	*38.9*	---	---	*38.9*	*3.4*	---	---	---	*3.4*	*362.7*	*-101.6*	**261.1**	42.3	100
Nitrogen Oxides (NO_X)	Basis	0.44 lb/MMBtu	---	---	---	2.24 lb/hr each	---	---	---	---	0.068 lb/MMBtu	40 lb/10^6 dscf CH_4			
	Tons/Year	*63.6*	---	---	*63.6*	*19.6*	---	---	---	*19.6*	*39.1*	*-5.4*	**116.9**	**83.2**	40
Sulfur Dioxide (SO_2)	Basis	100 ppmv sulfur in gas	---	---	---	0.93 lb/hr each	---	---	---	---	100 ppmv sulfur in gas	100 ppmv sulfur in gas			
	Tons/Year	*6.1*	---	---	*6.1*	*8.1*	---	---	---	*8.1*	*16.7*	*-3.8*	27.1	14.2	40
Particulate Matter (total) (PM)	Basis	0.005 gr/dscf @ 10% O_2	0.005 gr/dscf @ 10% O_2	0.015 gr/dscf actual	---	0.78 lb/hr each	0.015 gr/dscf actual	0.015 gr/dscf actual	0.019 lb/10^3 gal drift	---	17 lb/10^6 dscf CH_4	17 lb/10^6 dscf CH_4			
	Tons/Year	*2.5*	*0.3*	*0.0021*	*2.8*	*6.8*	*1.32E-03*	*3.0*	*3.00E-03*	*9.8*	*9.5*	*-2.3*	19.8	12.6	25
Particulate Matter < 10 Microns (PM_{10})	Basis	0.005 gr/dscf @ 10% O_2	0.005 gr/dscf @ 10% O_2	0.015 gr/dscf actual	---	0.78 lb/hr each	0.015 gr/dscf actual	0.015 gr/dscf actual	0.019 lb/10^3 gal drift	---	17 lb/10^6 dscf CH_4	17 lb/10^6 dscf CH_4			
	Tons/Year	*2.5*	*0.3*	*0.0021*	*2.8*	*6.8*	*1.32E-03*	*3.0*	*3.00E-03*	*9.8*	*9.5*	*-2.3*	**19.8**	12.6	15
Volatile Organic Compounds (VOC)	Basis	20 ppmv @ 3% O_2	---	---	---	0.3 lb/hr each	---	---	---	---	98% DRE	98% DRE			
	Tons/Year	*9.71*	---	---	*9.7*	*2.6*	---	---	---	*2.6*	*2.42*	*-0.6*	14.2	12.3	40
Lead (Pb)	Basis	---	---	---	---	8.3E-05 lb/hr each	---	---	---	---	---	---			
	Tons/Year	---	---	---	---	*7.27E-04*	---	---	---	*7.27E-04*	---	---	7.27E-04	7.27E-04	*0.6*
Mercury (Hg)	Basis	2.92E-04 ppmv in gas	---	---	---	2.17E-06 lb/hr each	---	---	---	---	2.92E-04 ppmv in gas	2.92E-04 ppmv in gas			
	Tons/Year	*3.46E-05*	---	---	*3.46E-05*	*1.90E-05*	---	---	---	*1.90E-05*	*2.35E-04*	*-3.18E-05*	2.03E-04	5.36E-05	0.1 (j)
Hydrogen Sulfide (H_2S)	Basis	---	---	---	---	0.026 lb/hr ea	---	---	---	---	---	---			
	Tons/Year	---	---	---	---	*0.23*	---	---	---	*0.23*	---	---	0.23	0.23	10
Total Hazardous Air Pollutants (HAPs)	Tons/Year	0.13	---	---	0.13	0.18	---	---	---	0.18	0.85	-0.12	0.73	0.31	25 (j)

Notes: See Section 3.0 and Appendix A for bases and calculations. Section 3.0 also describes air pollution control equipment. For conservatism, all PM is assumed to be PM10.

(a) Lime kiln emission rates are from vendor guarantees for CO and PM. NOx emission rate is BACT for a low-NOx burner (see Section 4.0). SO2, Hg, and total HAPs emission rates are based on AP-42 for landfill gas. VOC is the NMOC emissions limit from NSPS for MSW Landfills.

(b) PM emission rates from the cross-bar lime cooler are based on vendor-guaranteed PM outlet concentration for the baghouse and design air flow rate.

(c) PM emission rates from the silos are based on vendor-guaranteed PM outlet concentrations for baghouses on the exhaust vents, and on the volume of air estimated to be displaced from each silo in a year.

(d) Biosolids dryer emission rates are from upper-bound vendor estimates (see Appendix A) for all pollutants except NOx and total HAPs. NOx emission rate is BACT for a low-NOx burner (see Section 4.0). Total HAP emission rates are based on AP-42 for landfill gas, and on vendor estimates of sludge metals content.

(e) PM emission rates from the biosolids pellet recycle bin are based on vendor-guaranteed PM outlet concentration for baghouse and design air flow rate.

(f) PM emission rate is based on AP-42 for cooling towers, and design water circulation rate.

(g) Flare emission rate calculations are based on AP-42 for all pollutants. The flares are required to achieve a 98% destruction removal efficiency (DRE) for NMOC (VOC) by the NSPS for MSW Landfills.

(h) The flares only combust landfill gas not being used by the LRF and BPF. Therefore, the total maximum potential emission rates are not the sum of the maximum potential emission rates of the the LRF, BPF, and 3 Flares, but are based on the worst-case operating condition for each pollutant. The worst case for CO and total HAPs is all landfill gas going to the Flares with the LRF and BPF not operating. For all other pollutants the worst case is the LRF and BPF operating at capacity, with the Flares combusting only the remaining gas flow rate of 3,800 scfm. The total also reflects the reduction in actual emissions resulting from decomissioning the existing 1,800-scfm flare.

(i) Rule 62-212.400, F.A.C., Table 212.400-2.

(j) The Clean Air Act Amendments Section 112(b)(6) exempts listed HAPs from PSD review.

The Title V Air Operating Permit Program (40 CFR 70) is also administered by FDEP, and incorporated into Chapter 62-213, FAC. A modified major source is not required to revise the existing Title V permit before construction, but the application for the permit revision must be made within 12 months after commencing operation. Rather than containing any new requirements, the Title V Operating Permit collects into one document all of the pre-construction permit requirements, all other air regulatory requirements, and provides consolidated monitoring, record keeping, testing, reporting, and enforcement provisions. The definition of a "source" is similar to that in the PSD rules: a single permit is issued for all emissions units on contiguous or adjacent property under common control. A Title V Operating Permit revision is required for any new or modified emissions units at the major source, whether the change itself is major or minor. A Title V permit revision application must include a listing of all applicable air regulatory requirements (See Section 2.0 of Volume III). Because the Title V permit will incorporate these requirements, and the requirements of the PSD permit modification, it will not be addressed any further in this volume. The Title V permit application forms have been included in Volume II, however.

1.4.2.2 NPDES Multi-Sector Generic Permit for Stormwater Discharge Associated with Industrial Activities

Federal law at 40 CFR Part 122 prohibits point source discharges of stormwater associated with industrial activity without a NDPES permit. Under the state of Florida's delegated authority to administer the NPDES program, operators that have stormwater discharge associated with industrial activity to surface waters of the state must file for and obtain either coverage under an appropriate generic permit contained in Chapter 62-621, FAC or an individual permit issued pursuant to Chapter 62-620, FAC. For this project, a Multi-Sector Generic Permit for Stormwater Discharge Associated with Industrial Activity (MSGP) is required for stormwater discharges from industrial activities. The application for the NPDES permit is included in Appendix B.

The NPDES process requires that the applicant submit a Notice of Intent (NOI) to Discharge and prepare a Stormwater Pollution Prevention Plan to address stormwater control on the site. The proposed facilities and related surface water management features are totally independent of the existing NCRRF located to the north of the project parcel. Therefore, a new NPDES permit will be required before the LRF and BPR become operational. Note that an NPDES general permit for stormwater discharge during construction will be obtained by the contractor prior to the start of construction activities.

Currently, a wet retention pond exists on the eastern portion of the site. This pond will be reshaped to provide adequate surface water management for the proposed site. Stormwater controls are addressed further in Section 2.3.4 and **Appendix C**.

1.4.3 Other Reviews of this Request for Amendment

In addition to the NPDES and PSD/Title V permits, for which applications are included herein, there are other regulatory reviews conducted by FDEP on the basis of information provided within this request for amendment, but for which no separate applications are provided and no separate permits will be issued because they are incorporated into the PPSA process. These approvals include an Environmental Resource Permit (ERP) and an increase in the water use allocation for industrial supply purposes (similar to a Consumptive Use Permit). Each of these approvals is described below.

1.4.3.1 Environmental Resource Permit

The ERP program regulates the construction, alteration, maintenance, removal, modification, and operation of all activities in uplands, wetlands and other surface waters that will alter, divert, impede, or otherwise change the flow of surface waters. The program is designed to ensure that activities do not degrade water quality (from the discharge of untreated stormwater runoff) or cause flooding (from a change in offsite runoff characteristics). In addition, the ERP program regulates dredging and filling activities, which often requires a permit from the Army Corps of Engineers (ACOE) also. No dredging or filling is proposed for this project; therefore, no permit is needed from the ACOE.

The ERP program is implemented by either FDEP or the SFWMD, depending on the activity. Power plants and associated facilities (such as this project) are reviewed by FDEP, through the PPSA process.

This request for amendment contains comprehensive information for review under the ERP program (see Appendix C). Therefore, no separate permit application will be submitted to FDEP. FDEP will also verify that the project is in compliance with local regulations promulgated by SFWMD/FDEP, through the PPSA process.

1.4.3.2 Water Use Allocation

SWA currently has a permitted average water allocation of 1.74 million gallons per day (mgd) for the entire site. An increase of approximately 1.75 mgd in the daily water budget for industrial supply wells (ISW) is requested to safely meet the demands of the new facilities. SWA is requesting a new permitted average water allocation of 3.49 mgd. No specific permit will be issued for the ISW allocation, although the review process will be similar to that conducted for a Consumptive Use Permit (CUP).

CUP applications are reviewed by the SFWMD under Chapter 40E-2 FAC. The SFWMD typically issues two types of CUP: individual and general water use permits. Based on the proposed daily and annual flows as well as the location within the district, either an individual or general water use permit is issued. CUP applications must demonstrate that several assurances are provided for approval of the permit.

Although the actual permit is not issued under the PPSA, these assurances are presented for justification of the allocation increase. These standards include, but are not limited to, the following: 1) will not cause harm or pollution of the water resources, environment or offsite land uses, 2) provides a reasonable and beneficial use, 3) is consistent with the public interest, and 4) will not interfere with existing legal users.

For the current flows and proposed increase, an individual water use permit for industrial purposes would be applicable on a non-PPSA site. However, under the initial PPSA certification, no separate CUP was issued. Therefore, no CUP is required for this PPSA amendment. Appendix D provides the information that would be required for the individual (industrial) water use permit application for review by SFWMD and FDEP for the proposed allocation increase and approval under the PPSA process.

1.4.4 Other Permits Outside the PPSA Process

There are a number of other permits that will be submitted for review outside the PPSA process. These permits are summarized in the following subsections.

1.4.4.1 NPDES Permit for Construction Activities

The construction contractor will submit a NPDES Notice of Intent (NOI) for construction activities to FDEP within a minimum of 2 days before the commencement of construction and/or earthwork activities. Although some of the information pertaining to construction stormwater management and mitigation (i.e., pond areas, locations, erosion control features, etc.) is included in Section 4 and **Appendix C**, the specific Stormwater Pollution Prevention Plan (SWPPP) and NOI will be prepared by the contractor prior to the start of construction.

The contractor will develop a SWPPP for construction activities that will include implementation of erosion and sediment control measures, monitoring of surface water for turbidity, and protection of any threatened and endangered species. The SWPPP will be kept on site at all times to provide guidance on stormwater discharges during construction and comply with the conditions of the NPDES construction stormwater permit.

The PPSA requires that these condition be met prior to lowering of water levels in excavation sites:

- Withdrawal rates, and depending on the methods proposed well construction details, well and pump capacities and locations, and the data from the groundwater monitoring network shall be provided to the District for review and written approval;
- The impacts of the proposed withdrawals shall be assessed and provided to the SFWMD;

- No dewatering discharge shall be allowed to drain from the property; and
- The SFWMD concurs in writing that there will be no adverse impacts as a result of the proposed withdrawals under sections 373.223(A) - (C) of the Florida Statutes.

The contractor is responsible for obtaining any and all permits for construction and dewatering activities that are not covered under the PPSA. The management of surface water runoff during construction activities will be in accordance with the final design plans and will be consistent with the information presented in this Request for Amendment.

1.4.4.2 Construction Dewatering

Before the commencement of construction operations the construction contractor shall apply for a construction dewatering permit from SFWMD. The contractor shall comply with all other ordinances pertaining to construction dewatering for this project.

1.4.4.3 Industrial Wastewater to City of West Palm Beach Wastewater Treatment Plant

The BPF will generate both process and sanitary wastewater, while the LRF will generate sanitary wastewater only. The centrate from the LRF will be recycled back to the slurry tanks, therefore eliminating any industrial wastewater. Water from the truck wash down area will be treated on site with an oil/water separator, and disposed of through the sanitary sewer. The wastewater (BPF sanitary and industrial, and LRF sanitary) will be removed from the site by a lift station to be constructed in the proposed utility corridor, and will be conveyed to the City of WPB East Central Regional Wastewater Treatment Plant (WWTP). The City has indicated that, barring any changes in design, it should be able to accept these discharges at the plant. This permit will address the discharges to the plant.

1.4.4.4 Local Building Permit

A City of WPB building permit for a non-residential structure will need to be obtained by the contractor for the construction of the new LRF and BPF. This permit is typically processed simultaneously by the following review groups:

1. Permit Technician/Site Planner
2. Building Plan Review/Fire Review
3. The Health Unit
4. Landscaping
5. Addressing

6. Land Development

Addressing assigns the street address for the overall parcel and buildings on the parcel. All other submittal packages will be required for the project. As part of the land development submittal package, a drainage review application will need to be completed. Once project approval has been granted, a construction contractor may apply for a building permit.

Section 2
Site and Vicinity Characterization

2.1 Site and Associated Facilities Delineation

The location of the North County Resource Recovery Facility (NCRRF) in Palm Beach County is illustrated in Figure 1-1. The 1,320-acre site is bordered on the north by the Beeline Highway, on the east by Florida's Turnpike, on the south by a line approximately 610 feet south of 45th Street, on the west by the City of West Palm Beach (WPB) Water Catchment Area, and on the northwest by the Ironhorse Residential Development.

The transmission corridor to the existing Florida Power and Light Company (FPL) transmission lines traverses the south side of the 31-acre site west of Florida's Turnpike and south of 45th Street (**Figure 2-1**). The site location for proposed Biosolids Pelletization Facility (BPF) and Lime Recalcination Facility (LRF) is described in Section 2.1.1.

2.1.1 Proposed Site Location

The BPF and LRF will be located on a 31-acre site of land on the southeast corner of 45th Street and Jog Road. Specifically, both facilities will occupy a combined total of approximately 15 acres of this site.

The 15-acre parcel is described as "A parcel of land lying in a portion of the north on half (N ½) of Section 3, Township 42 South, Range 42 East, being more particularly described as follows:

> Commence at the southwest corner of the north on half (N ½) of Section 3, Township 42 South, Range 42 East and run on an assumed bearing of S88°33'36"E along the south line of the north one half of said Section 3 for a distance of 2639.82 feet to a point on the east right-of-way line of Jog Road being 120 feet of right-of-way per that certain document recorded in official records book 6499 at page 2 of the Public Records of Palm Beach County, Florida, said point also being the point of beginning of the following described parcel of land: Thence run N01°C26'24"E along the said east right of way line of Jog Road for a distance of 570 feet; Thence run N46°26'24" east for 42.43 feet to a point on the south right-of-way line of 45th Street (S.R. 702) being 120 feet of right-of-way per that certain warranty deed recorded in official records book 6499 at page 47 of the Public Records of Palm Beach County, Florida, thence run S88°33'36"E along the said south right-of-way line for a distance of 600.00 feet to a point on the south line of the north one half of Section 3, Township 42 South, Range 42 East; Thence N88°40'27"W along the south line of the north one half of said Section 3, Township 42 South, Range 42 East for a distance of 1104.13 to the point of beginning.

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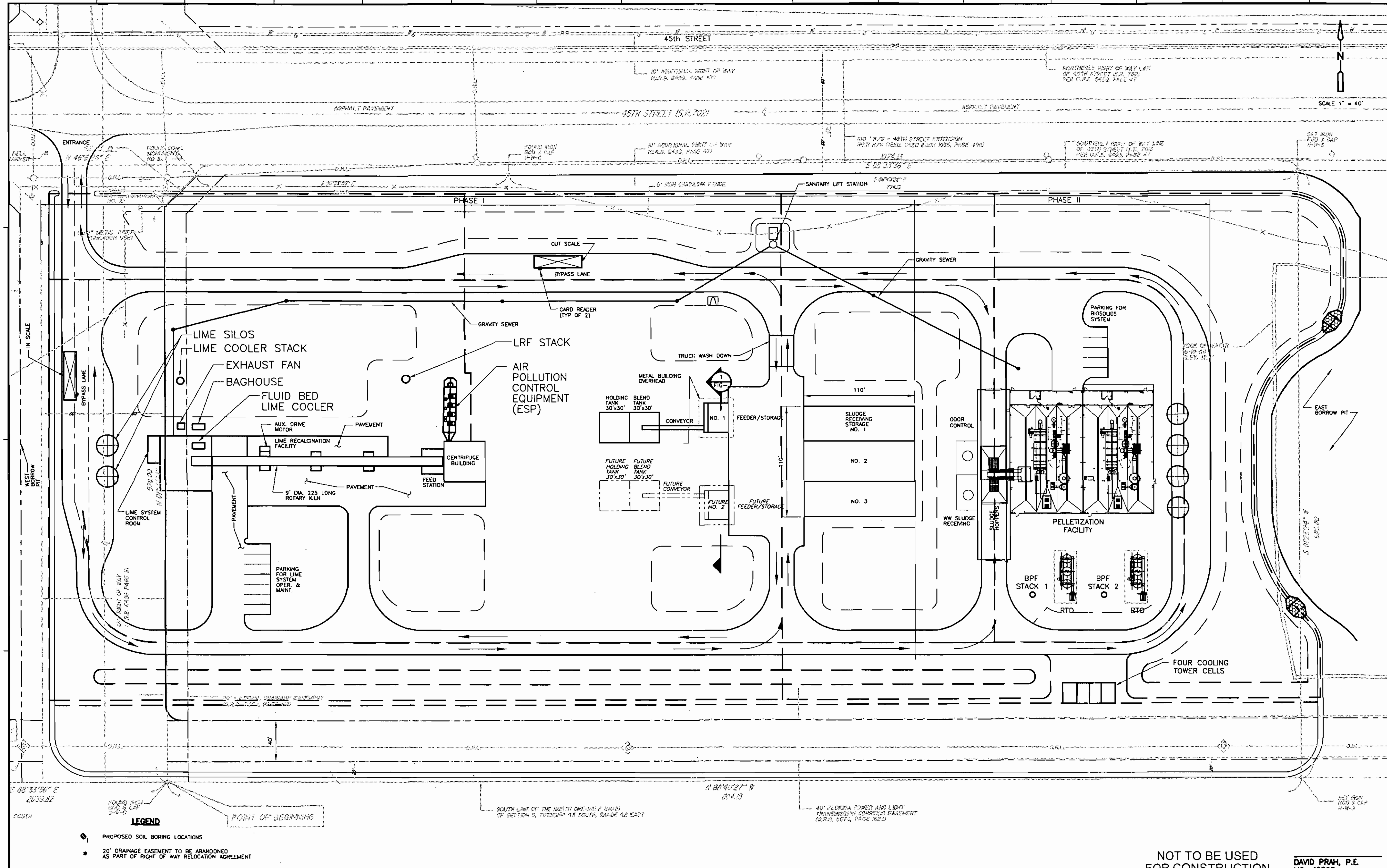


NOT TO BE USED FOR CONSTRUCTION

DAVID PRAH, P.E. NO. 43393

DESIGNED BY:	J. HILL
DRAWN BY:	O. AUST
SHEET CHK'D BY:	D. PRAH
CROSS CHK'D BY:	M. LEWIS
APPROVED BY:	D. PRAH
DATE:	JULY 2003

REV. NO.	DATE	DRWN	CHKD	REMARKS

CDM Camp Dresser & McKee Inc.
2310 Maitland Center Parkway, Suite 300 Maitland, Florida 32751 Tel: 407-660-2552 Cert. of Authorization No. 20

SOLID WASTE AUTHORITY OF PALM BEACH COUNTY
7501 NORTH JOG ROAD

LIME RECALCINATION AND BIOSOLIDS PELLETIZATION FACILITY

PRELIMINARY SITE PLAN

PROJECT NO. 2678-39373
FILE NAME: FIGURE13.DWG

SHEET NO.

FIGURE 2-1

2.1.2 Existing Uses

The existing Power Plant Certified Site consists of a Waste-to-Energy (WTE) facility, a Composting facility, active Class I and Class III landfill cells, a Household Hazardous Waste Facility, a Ferrous Handling Facility, and a Materials Recycling Facility. The 15-acre parcel that will be occupied by the LRF and BPF was originally a borrow lake that was filled in June 2000 (Army Corps of Engineers [ACOE] Permit No. 198-52-1054 [1P-TM]). There are no existing structures on the 15-acre parcel. There is a wetland mitigation area along the eastern shore of the lake to the east of the parcel, which is not currently monitored. There is also a wetland mitigation area and radio tower located on the adjacent property to the west of the 31-acre site, which will remain undisturbed by the implementation of the LRF and BPF.

2.1.3 Site Modifications

Modifications to the above referenced 15-acre parcel will include the following:

- 100 dry tons per day LRF
- 400 wet tons per day BPF
- On site surface water management
- Common roadways
- Vehicle scales
- Landfill gas pressurization system and three flares (a 1,000 scfm, 2,000 scfm and a 3,500 scfm flares), located north of the Compost Facility

The proposed site plan for the facilities is shown on Figure 2-1.

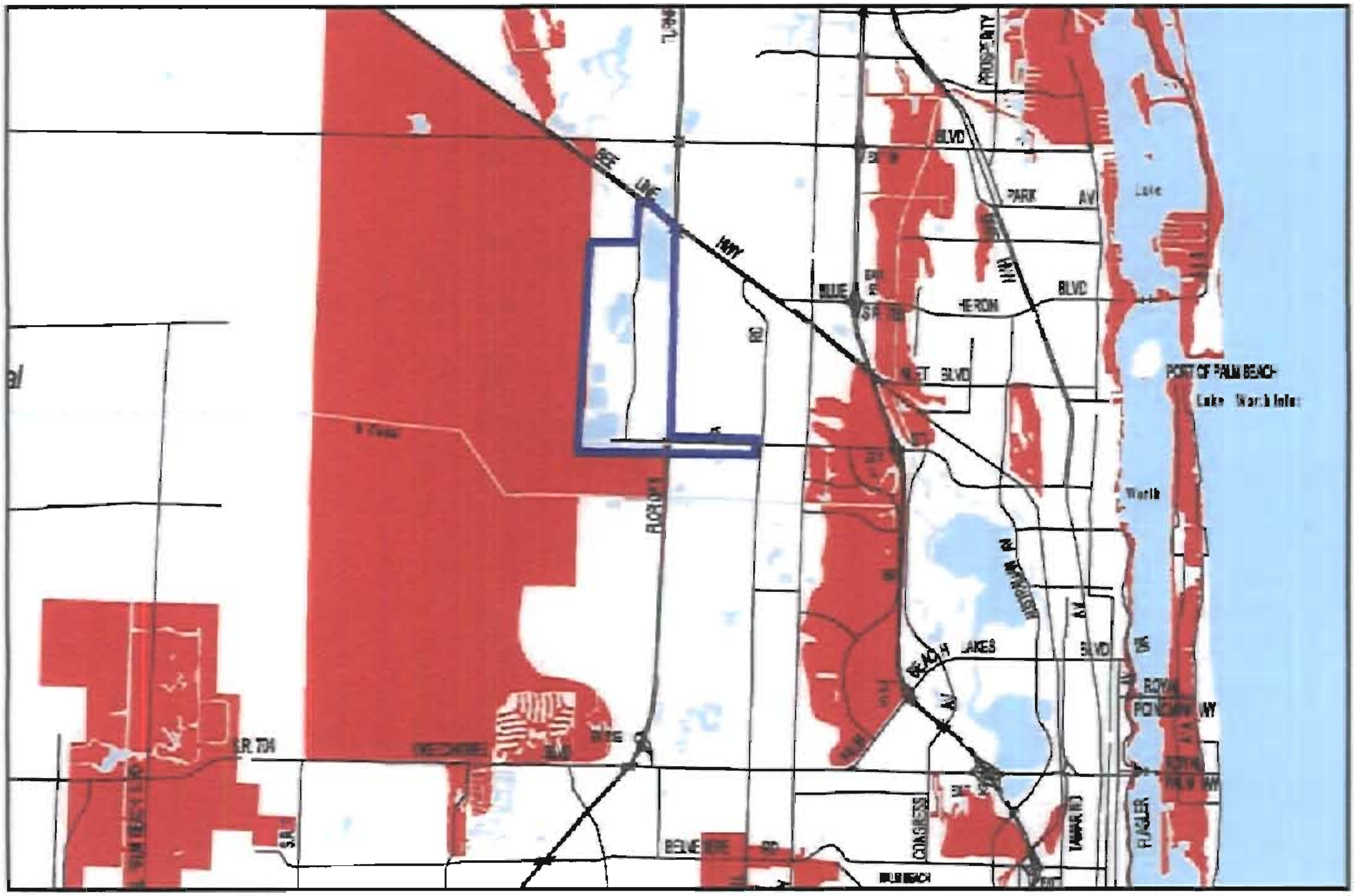
2.1.4 100 Year Flood Zone

As indicated in **Figure 2-2**, none of the proposed site lies within a 100-Year Flood Zone.

2.2 Socio-Political Environment

2.2.1 Governmental Jurisdictions

The site was annexed into the City of West Palm Beach. Other than the annexation, the governmental jurisdictions have not changed since the original application was submitted in 1985. There was an addition of a County park that lies within three miles of the site. The Dyer Landfill was closed and became Dyer Park, which is managed as a Palm Beach County Park.



MAP LU 6.1

FLOOD PLAINS in Palm Beach County, Florida

Waterbodies

A and V Flood Zones (Areas inundated by 100-year flooding)

9J-5.006(4)(b)3

PALM BEACH COUNTY COMPREHENSIVE PLAN MAP SERIES

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Figure 2-2
100 Year Flood Zone Map

2.2.2 Zoning and Land Use Plans

The site was annexed into West Palm Beach and therefore the City's zoning ordinance and comprehensive plan are now applicable to the site.

Palm Beach County adopted its Comprehensive Plan, Palm Beach County Ordinance 80-8, effective August 4, 1980. In 1989 the County developed a new Comprehensive Plan and substantially amended this plan in 1996 and 1997. Within this Comprehensive Plan, there are individual plan elements, which include the Land Use Plan. The Land Use Plan provides a system of growth management for Palm Beach County based on land use and residential densities related to the ability of the County to provide adequate community facilities. Some land uses are not specifically regulated by the Plan, including public or semi-public activities, utilities, public recreation, and agriculture. These are regulated by the Zoning Ordinance. **Figure 2-3** shows the existing zoning in the vicinity of SWA's property. Under the zoning ordinance, the property is zoned for Public Ownership (PO). Permitted uses for PO properties, as applicable to the 15-acre parcel, include:

- Electrical power facility
- Recycling center
- Water or wastewater treatment plant
- Composting facility
- Utility, minor

The PO district corresponds to all land use categories in the Future Land Use Element of the Palm Beach County Comprehensive Plan. Areas within a mile radius from the BPF and LRF are classified as "Conservation" (W), "General Commercial" (GC), or "Residential, Medium Density" (RM). The RM property is located approximately one half mile from the project site.

2.2.3 Demography and Ongoing Land Use

2.2.3.1 Existing Populations

The existing populations of towns and cities at least partially within 5 miles of the LRF and BPF site are depicted in **Table 2-1**. A map showing the location of these municipalities can be found as **Figure 2-4**.

Table 2-1 Municipality Populations

Municipality	2000 Census
Palm Beach Gardens	35,058
North Palm Beach	12,064
Lake Park	8,721
Riviera Beach	29,884
Mangonia Park	1,283
West Palm Beach	82,103
Golfview	0
Total	169,113

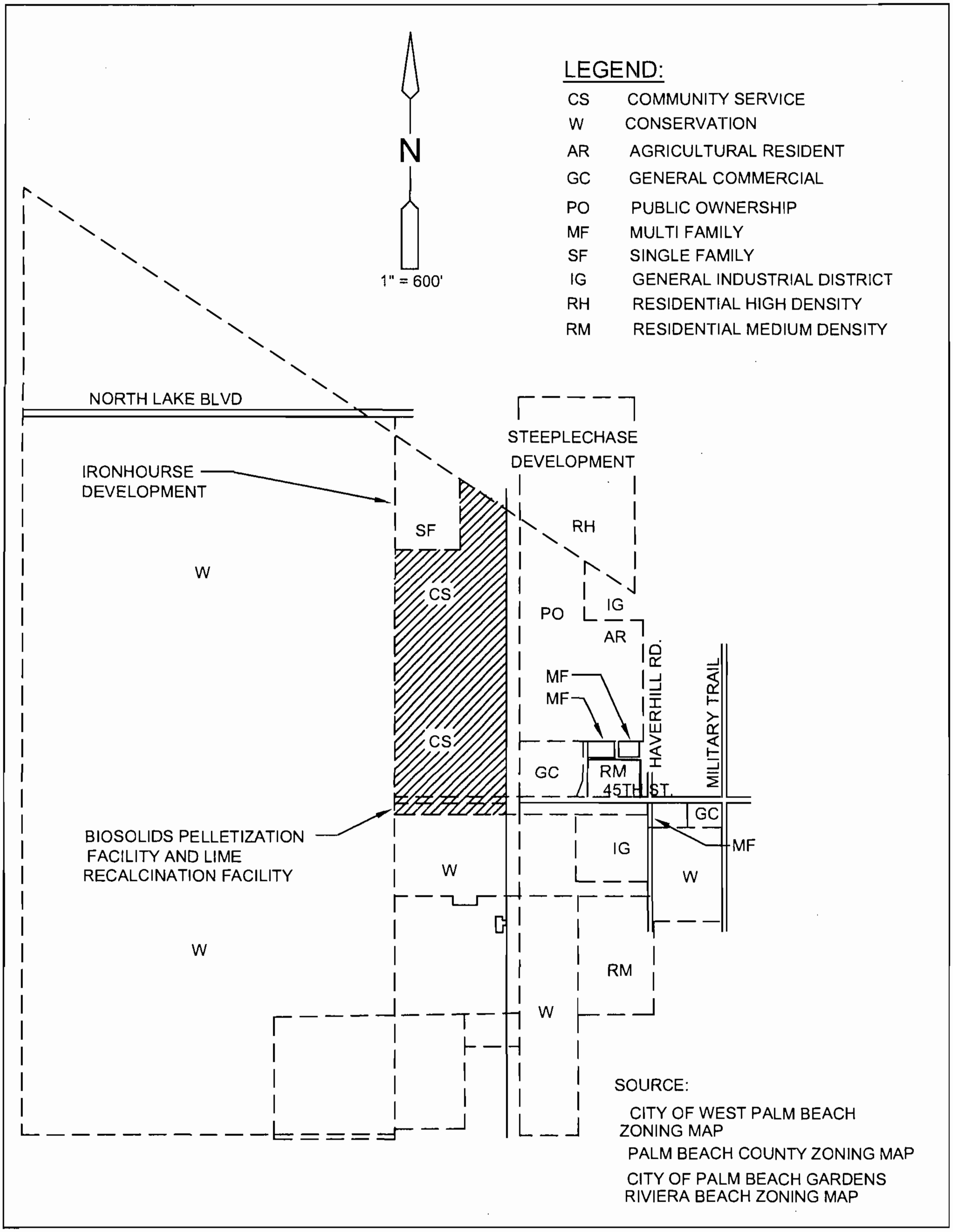

Figure No. 2-3
Solid Waste Authority of Palm Beach County
Existing Zoning in Vicinity of Biosolids Pelletization Facility And Lime Recalcination Facility

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L:\2678\33750\Lime\30P\REPORT\FIG1-1 05/07/02 14:32:58 3:56:48 AUSTJD

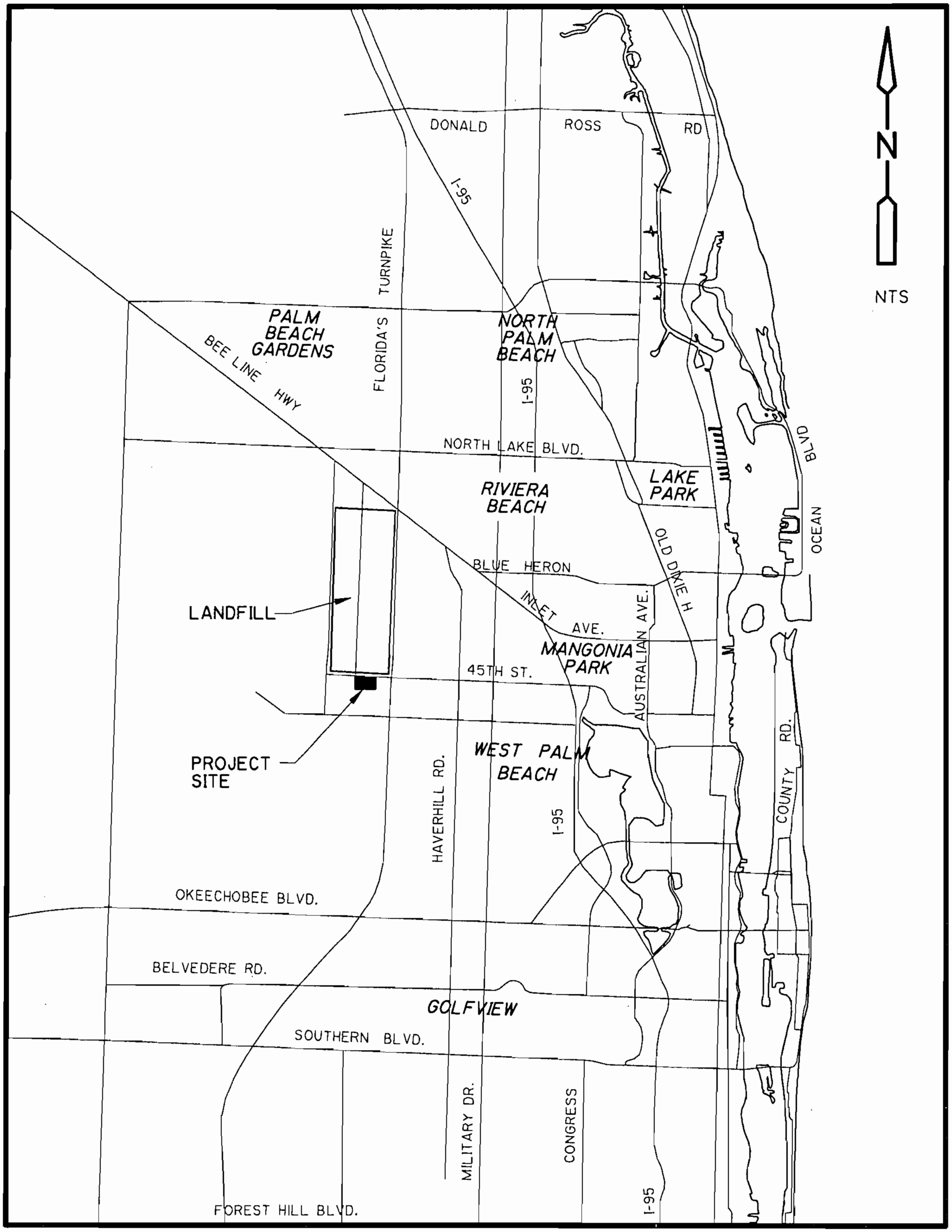

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Figure No. 2-4
Municipality Location Map

2.2.3.2 Existing Land Use

The existing land use for the entire Solid Waste Authority (SWA) property is categorized as "Utilities/Transportation". Other areas within a mile radius of the BPF and LRF site are classified as mostly "Conservation" or "Vacant Land". There are several single-family homes within a one mile radius. **Figure 2-5** shows the generalized Existing Land Uses according to the Palm Beach County Comprehensive Plan.

2.2.3.3 Projected Land Uses and Trends

Figure 2-6 shows the generalized Future Land Use in the vicinity of the LRF and the BPF site according to the Palm Beach County Comprehensive Plan. There are no major changes in the anticipated future land use around the site. The BPF and LRF are categorized under Public Ownership Land Use, housing Community Buildings and Facilities. Land within a one-mile radius of the parcel is classified as Conservation and Recreational. A previously vacant area located northeast from the site has a future use designation as Commercial land (as it has been zoned for).

2.2.3.4 Public Service and Utilities

A summary of the number and type of facilities found within a three-mile radius of the site can be found in **Table 2-2**.

Table 2-2 Summary of Public Services within a Three Mile Radius of the Site

Facility	Distance from Site		
	1 mile	2 miles	3 miles
Schools	0	4	8
Hospitals	0	0	2
Golf Course	0	1	5
Park	0	0	1

2.2.4 Easements, Title, Agency Works

Design of the LRF and the BPF involves the Right of Way (ROW) abandonment and rededication between SWA and Palm Beach County (PBC). In addition, coordination with FPL may be necessary to explore the possibility of using the 40 foot easement on the south side of the property for surface water management purposes.

There are several easements impacting the site. There is a 20 foot wide lateral drainage easement running north and south between the site and the western Jog Road ROW. The southern side of the property has a 40 foot wide FPL easement running east-west located between 20 feet and 60 feet north of the southern property line.

Based on the information obtained from the PBC Records (ORB 5670, page 1628), it is observed that no portion of the easement may be modified, excavated, surfaced, or paved without written permission from FPL. Meetings will be held between SWA and FPL staff to discuss issues regarding the potential usage of this area. Permission

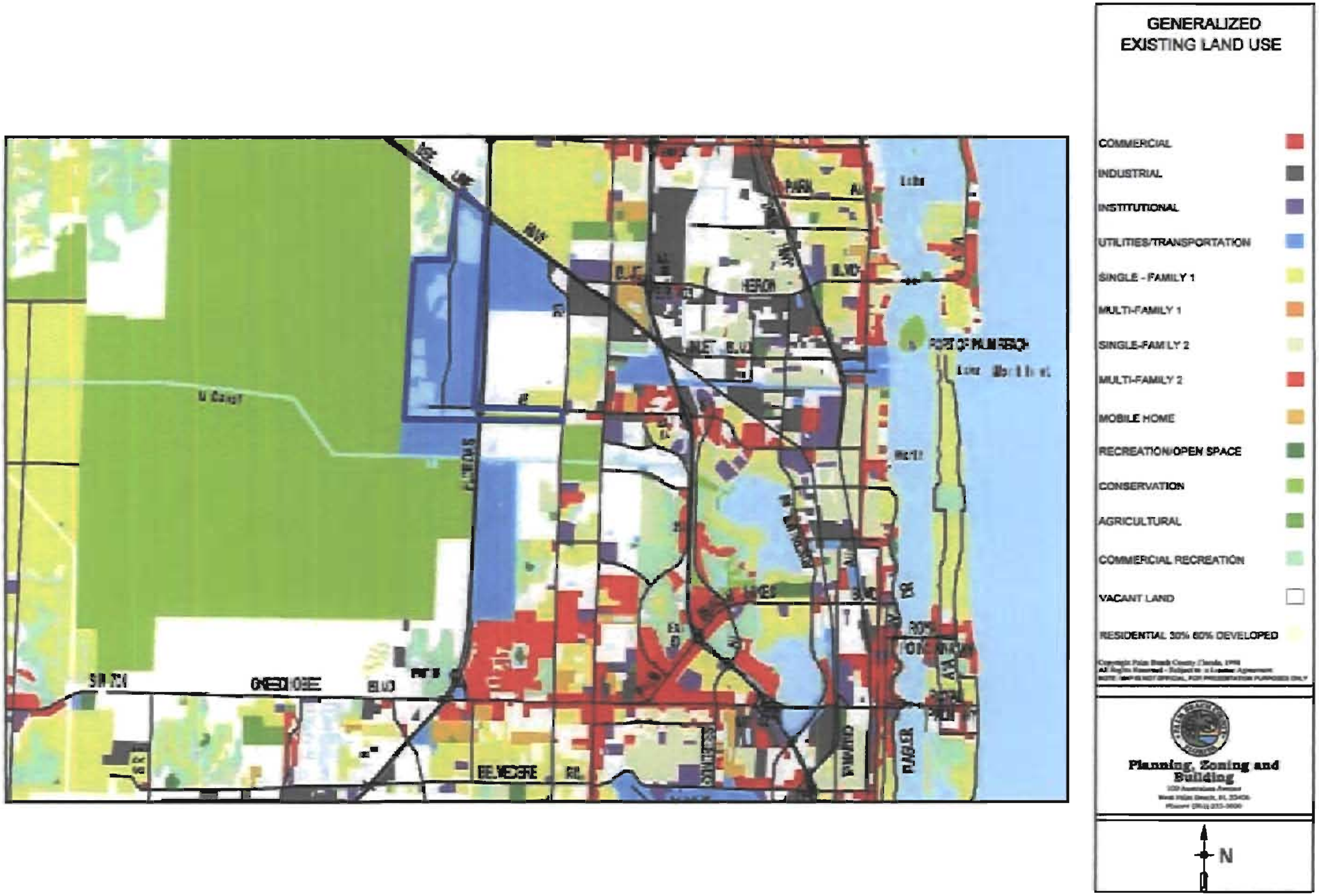

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Figure 2-5
Existing Land Use Map

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Figure 2-6
Future Land Use Map

is being sought from FPL to use the 40 foot wide easement for surface water management purposes.

There is a 25 foot wide utility easement with water and natural gas located along the northern property line approximately 630 feet west of the eastern property line. This easement may be continued to the west to accommodate a proposed utility corridor to bring the utilities on site. However, this easement extension is dependent on the actual location of the natural gas line extension, which may be brought in under 45th Street. No construction is planned in the existing easement.

2.3 Bio-Physical Environment

2.3.1 Hydrogeology

In general, the major hydrogeologic units in PBC are, in descending order:

- A highly transmissive surficial aquifer;
- The Hawthorn Group (aquitard); and
- The Floridan aquifer system.

The surficial aquifer consists primarily of sand, shell, sandstone and limestone in distinctive geologic layers. According to Shine, *et al.* (1989), the surficial aquifer in eastern PBC ranges in thickness between 420 feet in the Atlantic coastal ridge to 120 feet in the sandy flatlands. The overall trend is that the surficial aquifer thickens from west to east.

At the site, there are three distinct hydrogeologic units in the surficial aquifer. Each unit has different lithologic and hydraulic properties. The shallowest unit consists of the sand and shell of the Pamlico Formation. The intermediate depth unit is composed of the sand, shell, and limestone of the Turnpike aquifer. The deepest hydrogeologic unit consists of shell, sand, limestone, and marl of the Ft. Thompson and Caloosahatchee Formations, underlying the Turnpike aquifer. Based on published information (Shine, *et al.*, 1989), the surficial aquifer ranges in thickness between 230 and 270 feet at the sites. Additionally, the cavity-riddled zone (Turnpike aquifer) is 20 to 30 feet thick. The Turnpike aquifer extends to the west where it pinches out along the western border. Additionally, the Turnpike aquifer pinches out just north of the NCRRF.

The Hawthorn Group underlies the surficial aquifer deposits at the site at a depth of about 330 feet below ground surface (Fischer, 1980). The Hawthorn Group is a regional confining unit for the Floridan aquifer system. This unit is reported to be approximately 500 feet thick beneath the NCRRF and is considered to be relatively impermeable.

The Hawthorn Group sediments are underlain by a thick sequence of permeable limestone and dolomite that comprise the Floridan aquifer system. The Floridan aquifer system is greater than 3,000 feet thick. The water in the Floridan aquifer is generally non-potable (Class G-III) and is used mainly for agricultural purposes in southeastern Florida.

2.3.2 Subsurface Hydrology and Geotechnical Considerations

Tierra, Inc., a geotechnical and materials engineering firm conducted a subsurface investigation of the site. The result of the exploration indicates that the subsurface conditions at the site are generally suitable for the use of shallow foundation or deep foundation for support of the proposed structures. There were some areas noted that may require ground improvement.

The subsurface conditions were explored using standard penetration tests (SPT) and auger borings. Thirty-nine SPT borings were conducted in the proposed building locations. The topsoil within these areas was about two to three inches thick. The materials encountered typically consisted of fine sand (SP) with varying amounts of shell fragments (SP) and clayey sand (SC) in accordance with USCS. At several borings refusal was encountered due to concrete/construction debris. The SPT in the sands indicates the material to be in loose to very dense conditions.

Groundwater levels were measured in the borings upon completion of the drilling activities. The depths to free water at the time of drilling (April/May 2002) ranged between 4.0 and 6.5 below the ground surface for the SPT bore holes. The depth to water in the auger borings ranged from 0.5 to 4.8 feet and may represent a perched condition within the fill material. Dewatering will be required where excavations fall beyond a depth of four feet below ground surface.

Three borehole permeability tests were performed as part of the geotechnical investigation. The open-hole, constant head method was used to determine the hydraulic conductivities of 8.07E-4, 7.28E-4, and 7.41E-4 cfs/ft^2 per foot of induced head.

The subject site is located in a zone where potential earthquake and sinkhole activity is unlikely to occur. However, since part of the site was backfilled with concrete, subterranean erosion is possible and could lead to settlement. Therefore, the geotechnical engineer recommended further test pits and ground improvement prior to foundation design in certain areas.

2.3.3 Site Water Budget and Area Uses

2.3.3.1 Industrial Supply Well System Water Allocation

The current water allocation for SWA's NCRRF and Dyer Boulevard Landfill site is set forth in the Power Plant Siting Act (PPSA) site certification. The allocation is divided among three separate water supply sources: industrial supply wells at the eastern boundary of NCRRF, potable water wells in the western portion of site, and industrial supply wells at Dyer. The total water allocation for the site is the sum of each of water supply sources.

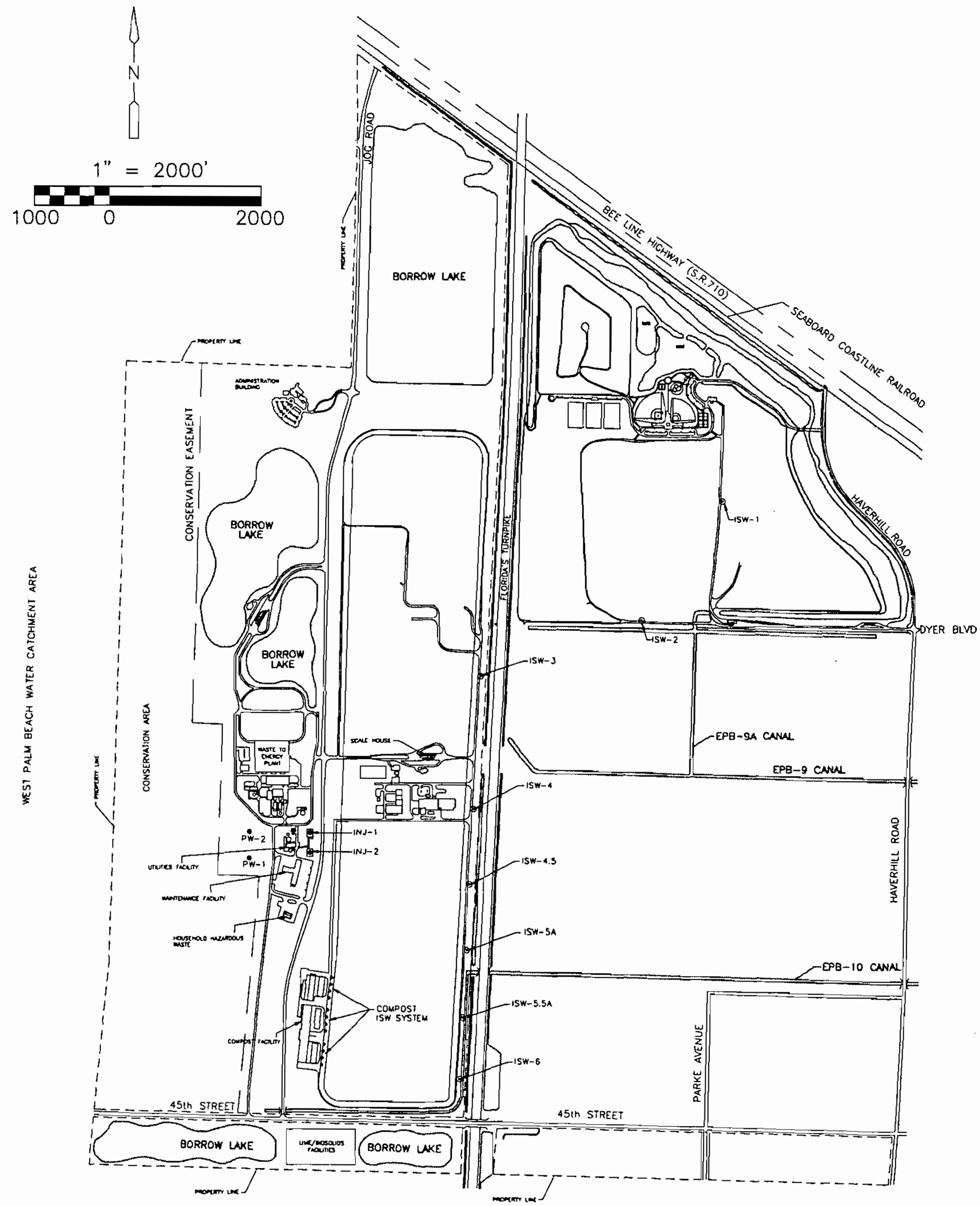
The majority of the water allocation is from the NCRRF Industrial Supply Well (ISW) system. The original PPSA certification identified six wells (ISW-1, -2, -3, -4, -5, and -6). A modification was completed in 1989 to include two additional wells (ISW-4.5 and 5.5). Additionally, in 1997, two replacement wells (ISW-5A and -5.5A) were added after ISW-5 and 5.5 were abandoned due to landfill expansion. The wells (ISW-5 and 5.5) were abandoned after the proposed Florida Turnpike interchange at 45th Street was abandoned and the land was acquired by SWA.

The water allocation for the site is set forth under condition XVI-F of the PPSA conditions of certification. The current average water allocation for the site is 1.74 million gallons per day (mgd). The allocation for the NCRRF industrial supply wells is 1,635,000 gallons per day (gpd) on an average basis. The two potable water wells, located near the WTE facility, were constructed but never implemented in the water use. The water allocation for these wells is 91,600 gpd. The Dyer ISWs (ISW-1 and ISW-2) are independent of the NCRRF ISW system with an estimated water use of 10,000 gpd. Therefore, the total average water allocation for the site is 1,736,600 gpd or 1.74 mgd. This total is applied to the site as a whole, and not to the individual water supply sources.

The ISW system is divided into two independent systems serving either the WTE plant (NCRRF) or Dyer Park (Dyer Boulevard Landfill). Wells ISW-1 and ISW-2 are located at Dyer Landfill as shown on **Figure 2-7**. The wells are six-inch diameter wells approximately 125 feet deep. ISW-1 was shallowed previously such that the screen interval was from -27 to -52 feet National Geodetic Vertical Datum (NGVD) (previously screened from -27 to -97 feet NGVD). ISW-2 is screened from approximately -32 to -102 feet NGVD.

Wells ISW-3, -4, -4.5, -5A, -5.5A and -6 are located on the eastern boundary of NCRRF alongside the Florida Turnpike as shown on **Figure 2-8**. The wells vary in both diameter and depth. ISW-3 is a dual cased well of 6 inch and 12 inch diameter.

However, the only screen portion is the 6-inch diameter casing located 55 to 125 feet below land surface (bls) (-36 to -106 feet NGVD). ISW-4 and ISW-6 are similar wells of approximately 114 feet in depth. The wells have dual screens of 6 and 12-inch diameters. The screens occur from 22 to 42 feet bls (12 inch diameter) and 62 to 112 feet bls (6 inch diameter). Finally, ISW-4.5, -5A, and -5.5A are similar wells approximately 55 feet in depth and screened approximately 15 to 45 feet bls. However, ISW-4.5 is 12 inches in diameter and screened from 20 to 40 feet bls while 5A and 5.5A are 14 inches in diameter.



Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

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Figure No. 2-7
NCRRF and Dyer Blvd Landfill Existing Water Use Map

CDM

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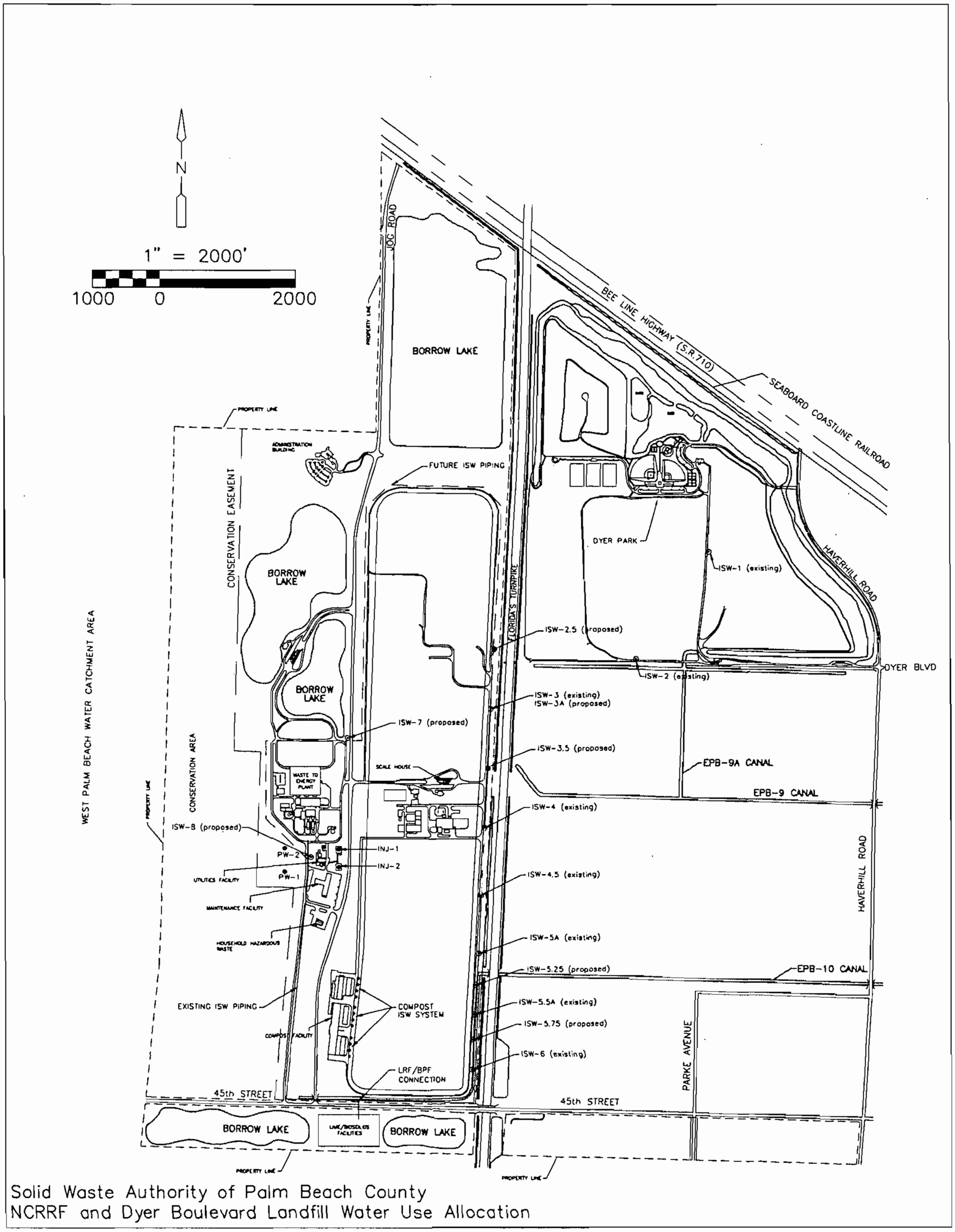


CDM

Figure No. 2-8
Proposed Industrial Supply Wells and Piping

As previously mentioned, the Dyer ISW and NCRRF ISW systems are independent of each other and supply water to separate users. The NCRRF ISW system supply line runs along the eastern boundary at each supply well. The line then turns to the west as it runs along 45th Street to the WTE access road west of Jog Road. The line runs north to the WTE plant-cooling tower located on the west side of the WTE. The compost facility wells are described in Section 2.3.3.3.

Currently, design of system modifications is underway to provide better hydraulic gradient control on the eastern NCRRF boundary. This will be accomplished by adding four additional supply wells (ISW-2.5, -3.5, 5.25 and 5.75) and shallowing three existing deep supply wells (ISW-2, 4 and 6). At the time of this revision, ISW-6 has already been shallowed. ISW-3, due to its design, cannot be shallowed and consequently will be replaced (ISW-3A) at the same location. Modifications will also be made to the system operation such that a more proportional amount of water is extracted from each well. Under current operations, ISW-4 and ISW-6 supply the WTE plant with the majority of the water.

In addition, a separate supply line will be installed to provide the WTE plant with a redundant supply of water for emergency purposes. With the use of isolation valves, SWA will have more flexibility in providing the WTE (and LRF/BPF) with water. The system will essentially consist of a loop around the NCRRF landfill. The proposed piping layout is provided on Figure 2-8.

Finally, in order to provide operational flexibility and limit impacts to surrounding wetlands, two additional wells (ISW-7 and 8) will be added concurrently with construction of the proposed LRF/BPF. These two wells, located at the northern and western portions of the site, are presented in **Appendix D**.

2.3.3.2 Solid Waste Authority North County Resource Recovery Facility and Dyer Water Budget

The water use portion of the PPSA, Case No. PA84-20, covers both the NCRRF and Dyer Boulevard Landfill. SWA extracts groundwater from several industrial supply wells for use primarily at the WTE plant for cooling purposes. The locations of the industrial supply wells and pertinent facilities are shown on Figure 2-8. A summary of the current water budget for the site is provided in **Table 2-3**.

2.3.3.3 Water Withdrawal

All groundwater at the NCRRF and Dyer Blvd. Landfill is withdrawn by one of three systems. These include the NCRRF ISW system, the Dyer ISW system, and the NCRRF Compost Facility ISW system.

The Compost Facility ISW system consists of twelve shallow wells (50 feet bls) located adjacent to the western boundary of the Class I landfill cells. The system will be used to supply the compost facility with a water supply for irrigation and humidification. The maximum water withdrawal for the system is 504 gallons per minute (gpm), which equals 42 gpm per well, or 0.725 mgd. There are no anticipated changes to the system in the future.

Table 2-3 SWA NCRRF and Dyer Existing and Future Water Budget Summary (Without LRF and BPF)

Maximum Water Withdrawal Possible (wells pumping 24 hours per day)

	Existing	Future
Industrial Supply Wells		
NCRRF[A]	3.60	7.20
Dyer[B]	0.65	0.65
Compost Facility[C]	0.55	0.55
Total	**4.80**	**8.40**

Water Use

	Existing		Future	
	Average	**Maximum**	**Average**	**Maximum**
WTE Plant[D]	1.64	2.16	1.64	2.16
Dyer Park[E]	0.01	0.01	0.15	0.25
Compost Facility Biofilters[F]	0.08	0.21	0.05	0.07
Proposed RO Plant[G]	0.00	0.00	0.10	0.10
Irrigation[H]	0.01	0.01	0.01	0.01
Total[I]	**1.74**	**2.39**	**1.95**	**2.59**

All Units in MGD

A Withdrawal capacity based on pumping 24 hours per day; existing pumping rates based on observed readings; future withdrawal capacity based on proposed design flow rates

B ISW-1 operated by Palm Beach County Parks Dept; ISW-2 currently not used - potential use as golf course irrigation

C Withdrawal based on pumping 24 hours per day at 32 gpm per well

D Existing water use from original water demand at full build-out; no expected increase

E Existing water use based on original water demand; future water use based on current water demands for irrigation at Dyer Park and proposed future junior golf course

F Existing average and maximum water use based on current pumping data; Future water use based on system providing water for compost facility only

G Proposed RO plant at WTE plant

H Water demand for landscape irrigation requirements at NCRRF

I Maximum water use total assumes each water user has maximum use on same day

Currently, the NCRRF ISW system can potentially withdraw approximately 3.6 mgd when pumped 24 hours per day. The actual withdrawal is less as the pumps operate between 5 to 8 hours per day, depending on demand. With the proposed changes to the system, the final system will consist of thirteen wells capable of pumping between 200 to 600 gpm each and a total maximum withdrawal of 7.20 mgd.

The Dyer Blvd. Landfill ISW system can potentially withdraw 0.65 mgd. There are no anticipated changes to the system, however a greater withdrawal is necessary for irrigation of a existing junior golf course on the closed landfill.

Overall, currently a total of 4.8 mgd could be withdrawn from the system. Once modifications to the NCRRF ISW system are completed, the total withdrawal could approach 8.4 mgd. It should be noted that this assumes pumping at 24 hours per day for each system.

2.3.3.4 Water Use

The WTE plant uses the groundwater extracted at NCRRF for cooling water, ash quenching and other processes. The maximum flow for the plant at full capacity is approximately 2.16 mgd. Even though there are no current plans for expansion at the plant, the increase in water use allocation is based on flow at the plant's maximum capacity due to the potential for expansion.

The compost facility ISW system currently supplies the compost facility with irrigation and humidification water. Based on initial water use, the system uses 0.08 and 0.21 mgd. The future average and maximum water use for the facility is expected to decrease to approximately 0.05 and 0.07 mgd. The system may also be used in the future for landfill irrigation.

Dyer Park water use is strictly for irrigation purposes at the Dyer Blvd. Landfill. Water is supplied from ISW-1 as the pump and piping were modified from the original design and installation. ISW-2 is currently not in use however, with the potential expantion of a junior golf course at Dyer Park, it may be used for water supply purposes. The future average and maximum water use (for both Dyer Park and the junior golf course) is 0.15 and 0.25 mgd, respectively.

Future users of the industrial supply well water include a possible reverse osmosis (RO) plant at the WTE plant. The RO plant is in the preliminary design/planning stages and the final decision to build the plant has not been made. The plant demand, if constructed, is expected to be between 0.06 and 0.1 mgd (depending on amount of reject water).

The average daily water use at the site is 1.74 mgd with a maximum daily water use of 2.39 mgd. The total future maximum water use, shown on Table 2-3 is 2.59 mgd where each water user uses the maximum on the same day. (Section 5.1 discusses water use with the proposed LRF/BPF.)

2.3.3.5 Groundwater Elevations and Quality

For purposes of this report, only the surficial aquifer groundwater elevations are discussed. The surficial aquifer is the primary groundwater supply source in the area and impact to the groundwater due to activities at the site would likely only occur in the surficial aquifer. In general, the groundwater elevations in the Floridan aquifer are higher than in the surficial aquifer. However, the thick low permeability sediments of the Hawthorn group sediments minimize the upward leakage of water into the surficial aquifer.

The average water table elevation at the location of the proposed facilities is approximately +16.4 feet NGVD. From 1995 through 2002, the water table elevation varied from a maximum of +17.5 to a minimum of +15.0 feet NGVD. Water levels are generally a few feet bls. During the wet season, the water table elevations are typically one to two feet higher than average conditions. Groundwater level measurements in the upper surficial aquifer monitoring wells showed that the general direction of groundwater flow in the upper surficial aquifer was from west to east across the site. During drier periods, the hydraulic gradient is from the west to the east-southeast, and during wetter periods, the hydraulic gradient becomes more west to east.

The hydraulic gradient in the upper portion of the surficial aquifer (water table) at the site is relatively flat except in the vicinity of the ISWs. Based on measurements in the onsite monitoring wells, the hydraulic gradient of the water table is approximately 10^{-3} to 10^{-4} feet per foot. The surface water features in and around the site (canals, ditches, and borrow pits) influence the water table elevations at the site.

Based on groundwater level measurements in the deep monitoring wells, the direction of groundwater flow in this portion of the surficial aquifer appears to be from the west to the east, regardless of the amount of rainfall. Typically the upper portion of the aquifer is much more sensitive to rainfall and surface water control features than the deeper portion of the surficial aquifer. As with the shallow surficial aquifer, the hydraulic gradient is relatively flat. The vertical head difference between the upper and lower portions of the surficial aquifer (vertical hydraulic gradient) is typically very close to zero in the northern half of the site, ranging from -0.04 feet to 0.01 feet for the wells within the current monitoring network. However, in the southern half of the site, the vertical hydraulic gradient typically flows downward (-0.07 to 1.43 feet for the wells within the current monitoring network). The larger differences in head are probably due to pumping of the CRB-West wellfield and the ISW system.

An extensive groundwater monitoring network is currently in place at the site for compliance with landfill regulations. The NCRRF Class I landfill cells are double lined while the Class III cells are single lined. Compliance monitoring wells for these cells have shown some deteriorations in groundwater quality, however, there have been no exceedances of the primary drinking water standards. The Dyer Boulevard Landfill is unlined and groundwater studies have shown some elevated constituents attributed to the landfill leachate. However, the highly mineralized groundwater has remained beneath the landfill and has not migrated offsite.

Background water quality for the site does show some elevated levels of some secondary drinking water standards. Typically, iron, TDS and pH have exceeded these levels (as is typical in most surficial aquifers in Florida). Iron levels vary from below detection limit (0.02 to 0.04 mg/L) to as high as 7.7 mg/L. TDS levels vary from less than 200 mg/L to as high as 720 mg/L. Values for pH varied from 6.4 to 7.4 with an average pH of 6.8.

Overall, with the exception of a few areas beneath Dyer Boulevard Landfill, the surficial groundwater quality at the site is considered good and is consistent with typical Florida groundwater quality. In addition, activities conducted at the site over the years of operation have not greatly affected (or reduced) the quality at the site.

2.3.4 Surface Water Management

The proposed surface water management system was designed to meet the regulatory requirements of the South Florida Water Management District (SFWMD) and the Florida Department of Environmental Protection (FDEP). There is currently a wet retention pond measuring approximately 9 acres on the eastern portion of the 15-acre parcel. Based on available information, it is assumed that this pond is approximately 18 feet deep. Section 5.2.1 describes the proposed surface water management system.

2.3.5 Ecology and Land Use

NCRRF includes a 300-acre conservation area, including one of the top 100 wading bird rookeries in Florida. In compliance with the facility permit requirements, SWA has undertaken an intensive monitoring program of the rookery, as required by the ACOE dredge and fill permit. The monitoring program was completed in 1993, although SWA continues to conduct a monthly bird monitoring program which consists of evening counts for various species, dawn counts, nest counts and egg censuses.

The NCRRF rookery is located in the conservation area west of the landfill (Jog Road) and south/south west of the WTE facility. The rookery was originally located primarily in the central borrow pit, but over the years the white ibis have expanded into the southern and eastern shell pits to nest. The snail kites still roost in the central borrow pit.

Several endangered (E), threatened (T) and species of special concern (SSC) have been observed at the NCRRF rookery in recent years, including:

- Snail Kite (E)
- White Ibis (SSC)
- Glossy Ibis (SSC)
- Wood Stork (E)
- Bald Eagle (T-State, E-Federal)
- Sandhill Crane (T)

- Little Blue Heron (SSC)
- Tricolor Heron (SSC)
- Snowy Egret (SSC)
- Limpkin (SSC)
- Roseate spoonbill (SSC-state),

A count of the rookery's principal species was conducted in September 2000. The species observed, and the number of individuals counted, are outlined in **Table 2-4.**

Table 2-4 NCRRF Rookery Bird Count (September 2000).

Bird Species (Scientific Name)	Bird Species (Common Name)	Number Counted (9/2000)	% of Colony
Rostrhamus sociabilis	Snail Kite	27	<1%
Eudocimus albus	White Ibis	3727	61%
Bubulcus ibis	Cattle Egret	1272	28%
Egretta caerulea	Little Blue Heron	300	5%
Casmerodius albus	Great Egret	76	1%
Anhinga anhinga	Anhinga	3	<1%
Ardea herodias	Great Blue Heron	3	<1%
Egretta tricolor	Tricolor Heron	201	2%
Egretta thula	Snowy Egret	5	<1%
Plegadis falcinellus	Glossy Ibis	31	<1%
Nycticorax nycticorax	Black Crown Night Heron	4	<1%
Butorides virescens	Green Heron	1	<1%
	TOTALS	**5650**	**100%**

Within the last 5 years, wood storks have been nesting in the NCRRF rookery, however, they do not roost in the rookery on a regular basis. The white ibis, little blue heron, tricolor heron, and snowy egrets are regular users of the NCRRF rookery.

The conservation area is also home to a large population of alligators (SSC -state listing; Threatened -Federal listing), river otters, bobcat, and deer.

An ecological evaluation was performed on the 15-acre parcel to determine if any listed species (i.e. state and federally listed threatened and endangered flora and fauna, or species of special concern) occur on the project parcel. The complete ecological report is in **Appendix** E. Environmental constraints, such as the presence of listed threatened and endangered species, are part of the review process in determining suitability for the proposed facilities and stormwater pond location.

An onsite investigation was also conducted to determine whether this parcel contains nesting or denning sites, or is being used intermittently to forage or roost, and the type and condition of the vegetative community. The project parcel is sparsely covered with ruderal grasses, bahaia grass, and sand as groundcover. No listed plants were observed onsite. No listed animals were observed onsite. Wildlife typical of this flat, barren habitat that were observed during the survey include the Carolina wren, six lined skinks, and armadillo tracks and burrows, deer tracks, and cattle egrets.

In summary, the project parcel has limited suitable habitat for listed plants and animals. Field surveys indicated that no listed plant or animal species were observed on site. This is because the small parcel was recently filled with sand and development surrounds half of the boundary that restricts species migration.

2.3.6 Meteorology and Ambient Air Quality

According to Federal and Florida Prevention of Significant Deterioration (PSD) regulations (40 Code of Federal Regulations (CFR) 51.166 and 62-212.400, Florida Administrative Code (FAC)), an applicant for a PSD permit is required to conduct an air quality analysis to demonstrate that the emissions from the new project will not cause or contribute to a violation of any applicable ambient air quality standard or PSD increment. The PSD permit application with complete details regarding existing ambient air quality and meteorology is included in Volume III (**Appendix F**) of this application.

2.3.6.1 Ambient Air Quality Status

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for certain "criteria" pollutants, as mandated by the Clear Air Act Amendments of 1970. These standards have been set at two levels. Primary NAAQS are designed to protect public health with an adequate margin of safety. Secondary NAAQS are designed to protect the public welfare, including property, materials, and plant and animal life. The State of Florida has adopted State AAQS (FAAQS) that are at least as stringent as the NAAQS and incorporate both the Federal Primary and Secondary standards (62-204.240 FAC). The sulfur dioxide FAAQS for annual and 24-hour averaging periods are more stringent (lower) than the NAAQS. These National and Florida ambient air quality standards are shown in **Table 2-5**. The six criteria pollutants with National and Florida ambient air quality standards are sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), fine particulate matter less than 10 micrometers in diameter (PM_{10}), lead (Pb), and ozone (O_3). The ambient air quality standards for PM_{10} replaced the standards for total suspended particulates (TSP) in 1987 at the Federal level and in March 1996 at the State level.

Table 2-5 National and Florida Ambient Air Quality Standards

Pollutant	Avg. Time	Florida Standard	National Primary Standard	National Secondary Standard	Significant Impact Level	PSD Increments Class II	PSD Increments Class I
NO_2 (µg/m³)	Annual	100	100	100	1	25	2.5
SO_2 (µg/m³)	3-Hr	1300	-	1300	25	512	25
	24-Hr	260	365	-	5	91	5
	Annual	60	80	-	1	20	2
CO (µg/m³)	1-Hr	40000	40000	-	2000	-	-
	8-Hr	10000	10000	-	500	-	-
Pb (µg/m³)	Qtr	1.5	1.5	1.5	-	-	-
O_3 (ppm)	1-Hr	0.12	0.12	0.12	-	-	-
PM_{10} (µg/m³)	24-Hr	150	150	150	5	30	8
	Annual	50	50	50	1	17	4

Notes:
All short-term (1-hour, 3-hour, and 24-hour) standards except ozone are not to be exceeded more than once per 12 month period.
Annual standards are 12-month arithmetic means, never to be exceeded. Quarterly standards are also never to be exceeded.
The 1-hour ozone standard should not be exceeded more than an average of one day per year over three years.
Note that the National NO_2 standard is promulgated at 0.053 ppm.
1 ppm NO_2 = 1887 µg/m³ NO_2
1 ppm CO = 1140 µg/m³ CO
1 ppm O_3 = 1961 µg/m³ O_3

Palm Beach County is part of the Southeast Florida Intrastate Air Quality Control Region (AQCR), which also includes Broward, Dade, Indian River, Martin, Monroe, Okeechobee, and St. Lucie Counties (40 CFR 81.49). The attainment status of the facility site and of Palm Beach County for each criteria pollutant is shown in **Table 2-6**.

Table 2-6 Attainment Status[1] for Areas Including the SWA

Pollutant	State Designation [2]	Federal Designation [3]
Total Suspended Particulate Matter (TSP)	Attainment (62-204.340(4)(b)1 F.A.C.)	Attainment (40 CFR 81.310)
Particulate Matter with Diameter Less Than 10	Unclassifiable (entire state 62-204.340(3)(a) F.A.C.)	Cannot be Classified
Sulfur Dioxide (SO_2)	Unclassifiable (62-204.340(3)(b)3 F.A.C.)	Attainment (40 CFR 81.310)
Nitrogen Dioxide (NO_2)	Attainment (entire state 62-204.340(1)(e) F.A.C.)	Cannot be classified or attainment (40 CFR 81.310)
Carbon Monoxide (CO)	Attainment (entire state 62-204.340(1)(d) F.A.C.)	Unclassifiable or Attainment (40 CFR 81.310)
Ozone (O_3)	Maintenance Area (62-204.340(4)(a)3 F.A.C.)	Unclassifiable or Attainment (40 CFR 81.310)
Lead (Pb)	Unclassifiable (entire state 62-204.340(3)(c) F.A.C.)	Not Designated (40 CFR 81.310)

Notes:
(1) Florida Administrative Code (F.A.C.) Chapter 62-204 and Code of Federal Regulations (CFR) Title 40, Part 81.31. EPA defines Palm Beach County as part of the Southeast Florida Intrastate Air Quality Control Region (40 CFR 81.49).
(2) As of March 13, 1996
(3) As of July 20, 2000

2.3.6.2 Ambient Monitoring and Background Pollutant Concentrations

According to 40 CFR 51.166(I)(8) and 62-212.400(5)(f), FAC, an analysis of air quality in the area of the facility shall be provided to FDEP. Information on the preconstruction modeling analysis can be found in Section 6.3, Screening Modeling

Analysis of Volume III (**Appendix F**). Table 6-4 located in that section demonstrates the proposed SWA modifications would meet the criteria for an exemption from preconstruction monitoring.

The PSD application uses available Florida monitoring reports for 1999 to 2001 to develop background concentrations of PSD criteria pollutants in the vicinity of SWA site. This period represents the most recent three-year period for which complete ambient monitoring data is available. As discussed in the PSD appendix, Pb was no longer monitored in Palm Beach County after 1999. In the three previous years before monitoring ended (1997 to 1999), Pb levels were negligible, most likely leading to the end of Pb monitoring in the area. For purposes of this analysis, the last three years of available Pb monitoring data (1997-1999) are used.

Background concentrations from various locations in PBC, used in the air quality analysis of the PSD application are presented in **Table 2-7**.

2.3.6.3 Meteorological Data

Five years of meteorological data has been made available for use by FDEP. This set of five years of meteorological data, from 1987 to 1991 was used for all refined and cumulative source modeling performed with Industrial Source Complex, Short-Term, version 3 (ISCST3) and the CALPUFF model. Surface observations, along with mixing height observations, are from the National Weather Service observing station (WBAN number 12844) at the WPB (FL) International Airport (Morrison Field). WPB Airport is located seven miles southeast of the project site.

A windrose depicting the five years of WPB Airport meteorological data (wind direction and velocity) is shown in **Figure 2-9**. As illustrated, winds are predominately out of the east and southeast at an average of 5 m/s. The average ambient temperature at the NWS station is approximately 75°F, with an average relative humidity of 73 percent.

2.3.7 Noise

2.3.7.1 Noise Descriptors

Noise is measured in decibels (dB), which are equivalent to the sound pressure level. The human ear perceives sound, which is mechanical energy, as pressure on the ear. The sound pressure is the logarithmic ratio of sound pressure to a reference pressure and is expressed in decibels. Sounds are typically reported as observed with the A-weighting network of the sound level meter. A-weighted sound levels emphasize the middle frequency sounds, and de-emphasize lower and higher frequency sounds. A-weighted sound levels are reported in decibels designated as dBA. As a point of reference for sound levels presented in this section, common sound levels encountered in the outdoors and indoors are shown in **Figure 2-10**.

Table 2-7 Ambient Air Quality Summary

Pollutant	Averaging Time	National Ambient Air Quality Standards	Florida Ambient Air Quality Standards	Monitoring Station	Approximate Distance from SWA (miles)	Maximum Concentration (1) 1999	Maximum Concentration (1) 2000	Maximum Concentration (1) 2001	Second Highest Concentration (2) 1999	Second Highest Concentration (2) 2000	Second Highest Concentration (2) 2001	Three year summary High	Three year summary 2nd High
Carbon Monoxide	1-hour	35 ppm	35 ppm	Palm Beach 3700 Belevedere Road	8.75	4.2	3.8	3.3	4	3.8	3.1	4.2	4.0
	8-hour	9 ppm	9 ppm			3.3	2.7	2.5	2.8	2.6	2.2	3.3	2.8
Nitrogen Dioxide	Annual Mean	0.053 ppm	0.053 ppm	Palm Beach 3700 Belevedere Road	8.75	0.01	0.02	0.02	NA	NA	NA	0.02	NA
Sulfur Dioxide (3)	3-hour	1300 $\mu g/m^3$	1300 $\mu g/m^3$	Riviera Beach 1050 15th Street W	6.5	44.2	33.8	13.0	36.4	31.2	10.4	44.2	36.4
	24-hour	365 $\mu g/m^3$	260 $\mu g/m^3$			33.8	26.0	7.8	33.8	20.8	7.8	33.8	33.8
	Annual Mean	80 $\mu g/m^3$	60 $\mu g/m^3$			2.6	2.6	2.6	NA	NA	NA	2.6	NA
Particulate Matter (PM_{10})	24-hour	150 $\mu g/m^3$	150 $\mu g/m^3$	Delray Beach 345 S. Congress Ave	26	47	40	49	33	38	42	49.0	42.0
	Annual Mean	50 $\mu g/m^3$	50 $\mu g/m^3$			20.1	19	25.8	NA	NA	NA	25.8	NA
Lead	Calendar Quarter	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	Palm Beach Co. Jog Road & Beeline Highway	1	0.001			0.001			0.001	
Ozone	1-hour	0.12 ppm	0.12 ppm	Delray Beach 210 NW 1st Avenue	25	0.108	0.096	0.102	0.104	0.093	0.098	0.108	0.104

Source: The EPA AIRSData website (http://www.epa.gov/airsdata). No stations in Palm Beach County had Pb data past 1999.

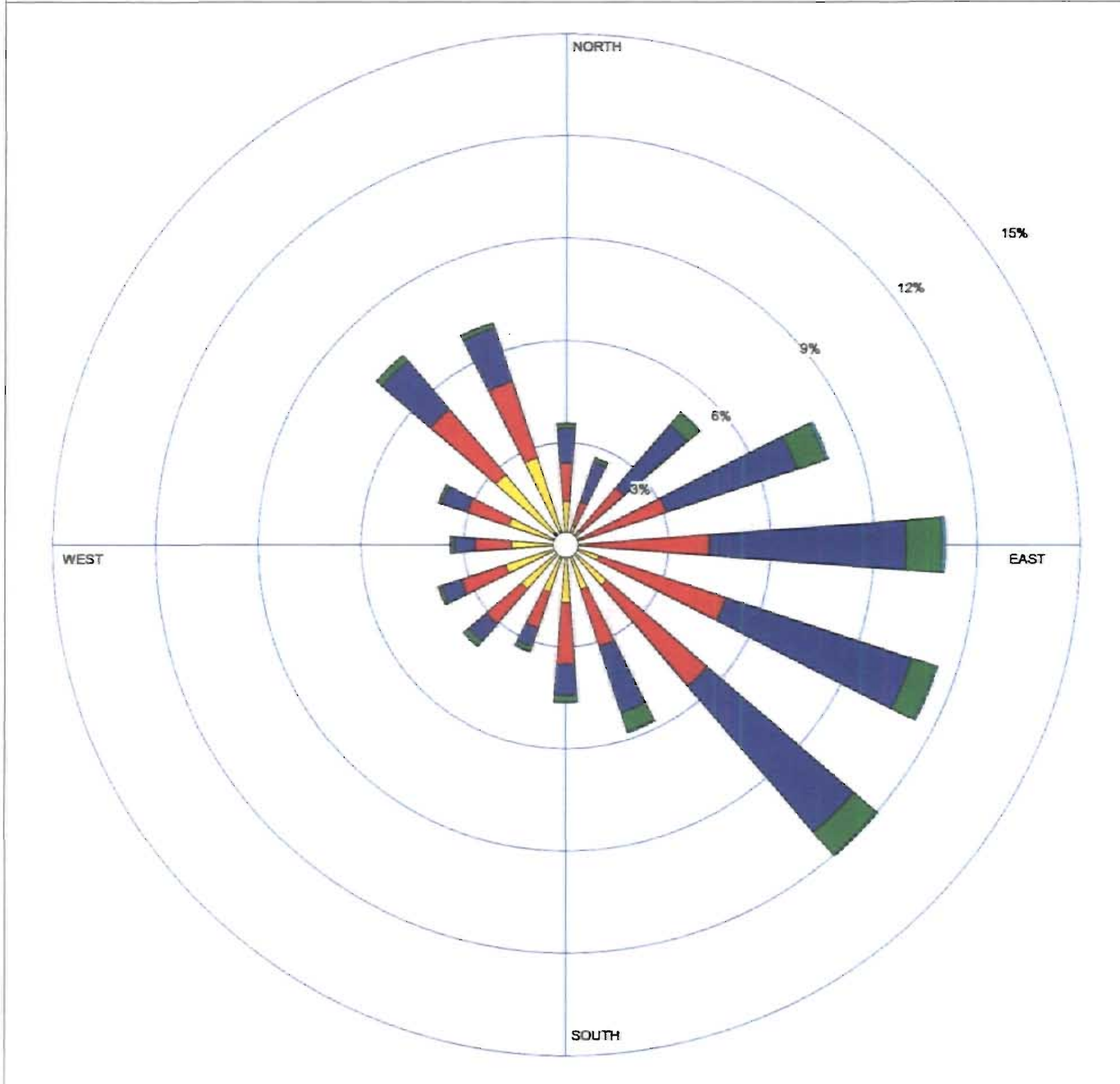
(1) Concentration units for a given pollutant are the same as those shown for the corresponding federal standard.

(2) Concentration units for a given pollutant are the same as those shown for the corresponding federal standard. "NA" means not applicable; there is only one average annual concentration

(3) Reported in ppm. Converted to $\mu g/m^3$ using 1 ppm SO_2 = 2601 $\mu g/m^3$ SO_2.

WIND ROSE PLOT

Station #12844 - WEST PALM BEACH/INT'L ARPT, FL



Wind Speed (m/s)			
	MODELER **T. Raine**	DATE **4/26/02**	COMPANY NAME **CDM**
> 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80	DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS **5 years met data. Surface and mixing height data both from WPB Airport.**
	AVG. WIND SPEED **5.15 m/s**	CALM WINDS **2.69%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1987 1988 1989 1990 1991 Jan 1 - Dec 31 Midnight - 11 PM**	PROJECT/PLOT NO. **2678-33752**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

Figure 2-9
5-Year Meteorological Data

COMMON OUTDOOR NOISES	Sound Pressure (uPa)	Sound Pressure (dB)	COMMON INDOOR NOISES
Jest Fly Over at 300 feet	6,324,555	110	Rock Band at 15 feet
Gas Lawn Mower at 3 feet	2,000,000	100	Inside Subway Train (New York)
Diesel Truck at 50 m	632,456	90	Food Blender at 3 feet
Noisy Urban Daytime	200,000	80	Garbage Disposal at 3 feet Shouting at 3 feet
Gas Lawn Mower at 100 feet Commercial Area	63,246	70	Vacuum Cleaner at 10 feet Normal Speech at 3 feet
	20,000	60	Large Business Office
Quiet Urban Daytime	6,325	50	Dishwasher Next Room
Quiet Urban Nighttime Quiet Suburban Nighttime	2,000	40	Small Theatre, Large Conference Room Library
Quiet Rural Nighttime	632	30	Bedroom at Night Concert Hall (Background)
	200	20	Broadcast and Recording Studio
	63	10	Threshold of Hearing
	20	0	

Source: FHWA, Noise Fundamentals Training Document, "Highway Noise Fundamentals, " September 1980.

Figure 2-10

Common Indoor and Outdoor Noises

Because noise varies with time, it cannot simply be described with a single number. Noise is either expressed in terms of equivalent level or exceedance levels. The equivalent level or, L_{eq}, is the level of a hypothetical steady sound, which would have the same energy as the actual fluctuating sound observed. The L_{eq} is mostly determined by occasional loud, intrusive noises. The day-night sound level, or L_{dn}, is a special kind of equivalent level determined by adding a 10-dBA penalty to sounds occurring at night between the hours of 10:00 p.m. and 7:00 a.m. The L_{dn} is a useful metric of community noise impact because people in their homes are more sensitive to noise at night, when they are relaxing or sleeping, than they are to noise in the daytime. The day-night sound level is favored by the EPA and other agencies for rating community noise impacts.

Exceedance levels are values from the cumulative amplitude distribution of all of the noise levels observed during a measurement period. Exceedance levels are designated L_n, where n can have any value from 0 to 100 percent.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during a measurement. The L90 is close to the lowest sound level observed.
- L_{10} is the sound level exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. It is caused by occasional louder noises, like those from passing motor vehicles.

2.3.7.2 Noise Regulations and Guidelines

Regulations

The City of WPB, under Chapter 14, Article V, has established noise control regulations. Section 14-128 specifies noise levels for a specific area defined as the "Downtown Area." The streets that define the boundaries of the downtown area include Banyan Boulevard, Tamarind Avenue, North Flagler Drive and Okeechobee Boulevard. Uninvited noise is considered loud if it is plainly audible at a distance greater than 100 feet away from the property line of the sound source. Because the LRF/BPF parcel is not located in this defined area, this noise control regulation is not applicable.

Although the PBC noise regulations do not directly apply to the project parcel, the PBC ordinance was used for comparison purposes. PBC regulates noise under Article 7: Site Development Standards, Section 7.8 A. 4. a. (1), which specifies that the following activities are prohibited:

- Horns, signaling devices, except those required by law or as a warning;

Public streets and parks –operating or playing radios, televisions, phonographs, musical instruments or similar devices on public rights-of-way or in public parks in a manner that is audible 100 feet from the source at any time;

- Street sales advertising - prohibits the use or operation of any loudspeakers, sound amplifiers or musical instruments which is emitted upon public streets and sidewalks for the purpose of commercial advertising or attracting public attention which may be audible across any inhabited residential land;

- Machinery construction work - prohibits the operation of any machinery, demolition equipment, construction equipment, excavating equipment, power tools, equipment of semi-mechanical devices or conduct construction work which emits sound across inhabited residential property lines between the hours of 10:00 p.m. and 7:00 a.m., Monday through Saturday with no construction permitted on Sunday. This does not apply to pumps or machinery which required to operate 24-hours per day, and

- Lawn equipment - prohibits the use of lawn or garden equipment, which emits sound across inhabited residential property lines between the hours of 10:00 p.m. and 7:00 a.m.

Section 7.8 A. 4. a. (2) General Prohibitions prohibits the use of any source of sound from any location which will create a sound level that exceeds the limits presented in **Table 2-8** for inhabited residential and commercial land more than 10 percent of any measurement period, and that period shall not be less than 10 minutes when measured at or within the boundary of the complaining landowner.

Table 2-8 Palm Beach County Maximum Permissible Sound Levels

Receiving Land	Noise Source	Time of Day	Sound Level Limit
Residential	Fixed mechanical equipment	Any time	60 dB
Residential	All other sources	7 AM to 8 PM	60 dB
		8 PM to 11 PM	55 dB
		11 PM to 7AM	50 dB
Commercial	All sources	Any time	70 dB

Guidelines

The EPA recommends that noise levels in residential areas not exceed an L_{dn} level of 55-dBA to "protect the public health and welfare with an adequate margin of safety (EPA, 1974)." For a continuously operating, steady noise source this is the same as a steady noise level of 49-dBA. The EPA guideline for L_{dn}, less than or equal to 55-dBA, is not intended to be a regulatory limit and the EPA has no regulatory authority to establish such a limit.

The United States Department of Housing and Urban Development (HUD) has established regulations limiting the noise environment at locations where federal-aid housing is to be built (24 CFR Part 51). According to the HUD regulations, sites where the L_{dn} does not exceed 65-dBA are acceptable for housing; sites where the L_{dn} is between 65 and 75-dBA are normally unacceptable, but may be approved under special circumstances; and sites where L_{dn} exceeds 75-dBA are unacceptable. It is assumed that HUD considered the potential sleep disturbance in establishing these regulatory limits for housing sites. Technical and economic considerations, including the fact that most HUD-assisted housing is in urban areas, led HUD to set higher levels than those recommended in the EPA guideline.

In addition to evaluating potential noise impacts based on comparing predicted noise levels from the facility at the nearest inhabited residences and comparing them to the PBC noise ordinance (see Section 2.3.7), noise impacts were also evaluated using annoyance criteria. Well-documented studies on human perception to changes in L_{eq} noise levels indicate that a 3-dBA to 5-dBA increase in noise level is normally judged as perceptible and noticeable (FWHA, 1973). **Table 2-9** presents the impact criteria used to assess noise impacts for this analysis.

Table 2-9 Average Ability to Perceive Changes in Noice Levels

Human Perception of Sound	Change (dBA)
Barely Perceptible	2-3
Readily Noticeable	5
A Doubling in Loudness	10
A Dramatic Change	20

Source: Fundamental and Abatement of Highway Traffic Noise, NTIC No. PB-222-703, 1973.

2.3.7.3 Existing Conditions

Existing noise levels were measured on April 30th and May 1st, 2002 at the following four monitoring locations:

- Location 1 – Proposed facilities site property boundary
- Location 2 – Residences at Park Avenue/Eadie Place
- Location 3 – Residence at Park Avenue/45th Street
- Location 4 – School at 47th Place

Figure 2-11 shows the monitoring locations. Monitoring was conducted during the day (2:30 p.m. to 4:30 p.m.) and the night (11:30 p.m. to 1:00 a.m.) to collect data that would represent daytime and nighttime existing noise levels. A-weighted sound levels were collected over a 15-minute period at each monitoring location. Noise measurements were taken when the weather was favorable for measuring the lowest ambient noise conditions (i.e., dry conditions and wind speeds less than 12 miles per hour).

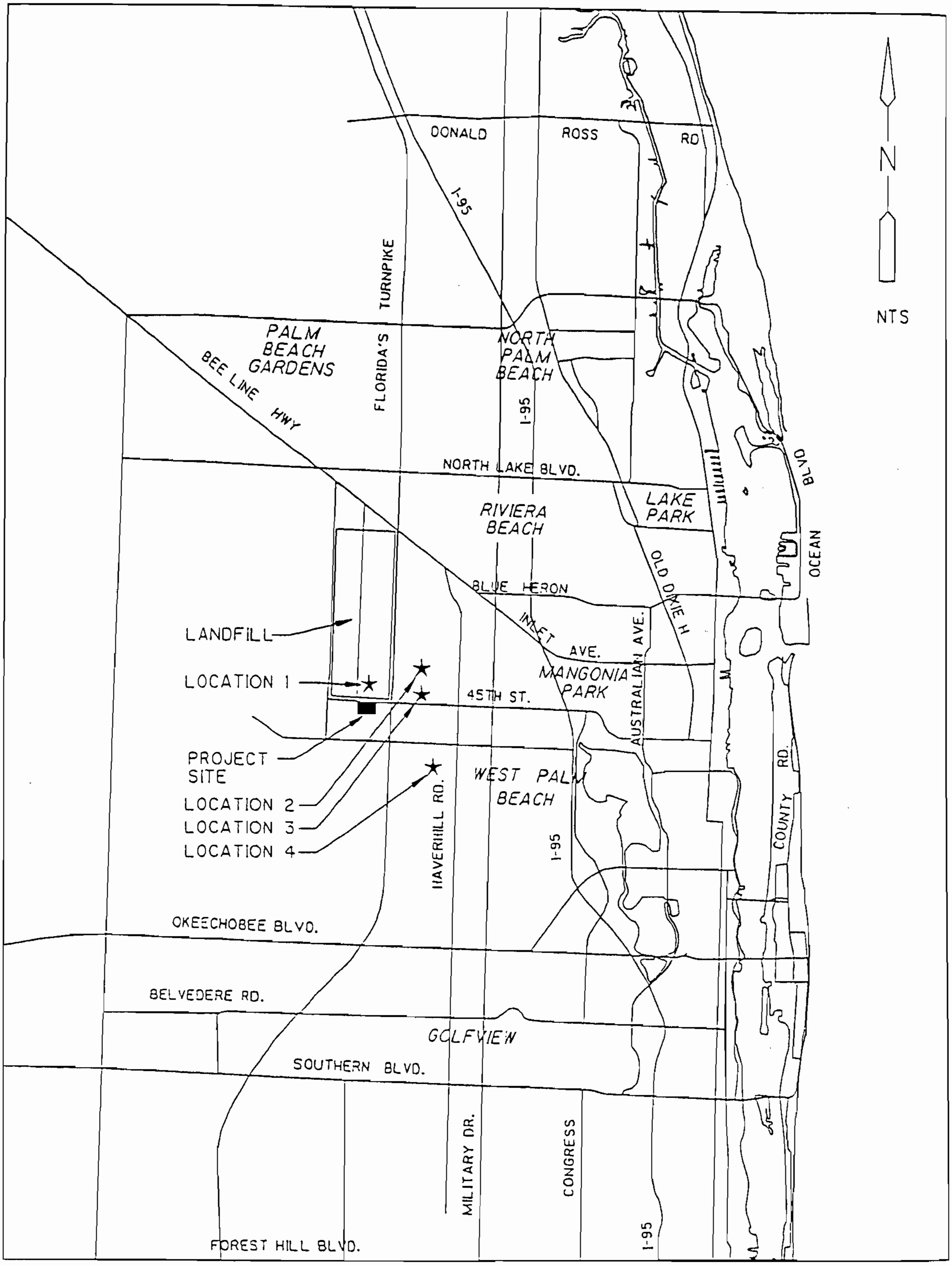


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Figure No. 2-11
Noise Monitoring Location Map
Palm Beach County

A Quest Technologies 1900 (Type 1) sound level meter was used to measure existing background noise levels. This sound level meter was equipped with a wind screen, and placed on a tripod approximately 5 feet above ground and not less than 40 feet away from the edge of the roadway at each monitoring location. The sound level meter was equipped with a "random-incidence" microphone. This microphone captures uniform weighted frequency and sound pressure levels for incoming sound from all directions simultaneously when aimed straight up (90^{o} incidence to the sound field). The sound level meter was set for automatically timed integration mode at slow response.

Because the PBC noise ordinance is based on L_{10} sound limits, both the daytime L_{eq} and L_{10} sound levels are used to define the baseline conditions, which are presented in **Table 2-10**. The daytime background L_{eq} sound levels ranged from 48-dBA at the intersection of Park Avenue and Eadie Place (Location 2) to 59-dBA at the NCRRF site property boundary (Location 1) and at the intersection of Park Avenue and 45th Street (Location 3). The daytime L_{10} sound levels ranged from 49-dBA at Location 2 to 63-dBA at Locations 1 and 3. The higher sound levels measured at Locations 1 and 3 are attributed to traffic along 45th Street and landfill operations at SWA's Class I landfill adjacent to the proposed facilities site. The other major sources of background noise were occasional airplane flyovers, air conditioners, and a wastewater pump station in the distance.

Table 2-10 Existing Noise Levels

Monitoring Locations		Noise Levels (dBA)			
Id.	Location	Daytime L_{10}	Daytime L_{eq}	Nighttime L_{10}	Nighttime L_{eq}
1	Site Property Boundary	63	59	46	45
2	Park Avenue/Eadie Place	49	48	45	44
3	Park Avenue/45th Street	63	59	49	47
4	47th Place/School	51	49	50	48

The nighttime background L_{eq} sound levels ranged from 44-dBA at Location 2 to 48-dBA at 47th Place adjacent to a school (Location 4). The nighttime L_{10} sound levels ranged from 45-dBA at Location 2 to 50-dBA at Locations 4. The higher sound levels measured at Locations 4 is attributed to animal activity (frogs and crickets) and a plane flying overhead. The major sources of background noise include air conditioners, traffic, and the Class I landfill flare.

Appendix G presents the noise monitoring field data sheets.

Section 3
Proposed Facilities and Directly Associated Elements

3.1 Introduction

The proposed Lime Recalcination Facility (LRF) and the Biosolids Pelletization Facility (BPF) will be located on the same 15-acre parcel, and will share many common elements. The following sections describe both the independent facility components of the LRF and BPF, and the common, or shared elements.

3.2 Lime Recalcination Facility

3.2.1 Introduction

As part of an effort to develop and implement a long term solution to dispose of the lime sludge generated at the various water treatment plants (WTPs) in the Palm Beach County (PBC) area, the Solid Waste Authority (SWA) has proposed a 100 dry tons per day (dtpd) LRF which will receive lime sludge from the WTPs and convert it into a quicklime product, using landfill gas from SWA's landfill as a fuel source. This quicklime will then be reused at the participating WTPs.

Lime sludge from various WTPs will be received at this facility in dump trucks. The sludge will be stored either in dry form or mixed with water to a 30 percent slurry to achieve optimum homogenization of its consistency and characteristics. The sludge will centrifuged to approximately 65 percent solids, and fed to a rotary kiln. The kiln will be operated at a temperature of about 1,250° C. At this temperature, the sludge, mainly consisting of calcium carbonate ($CaCO_3$), will be converted into quicklime (CaO) through the expulsion of carbon dioxide (CO_2) gas. Landfill gas produced at the adjoining SWA landfill will be piped to this facility to serve as the primary fuel to fire the burner of the rotary kiln. The lime product obtained from this process will be cooled and stored in silos on site for distribution to the various entities participating in this project. **Figure 3-1** presents the overall process flow schematic for the LRF.

3.2.2 Operations Summary

The LRF will consist of six major components:

- Sludge receiving area
- Sludge mixing/blending tanks
- Sludge dewatering
- Rotary kiln

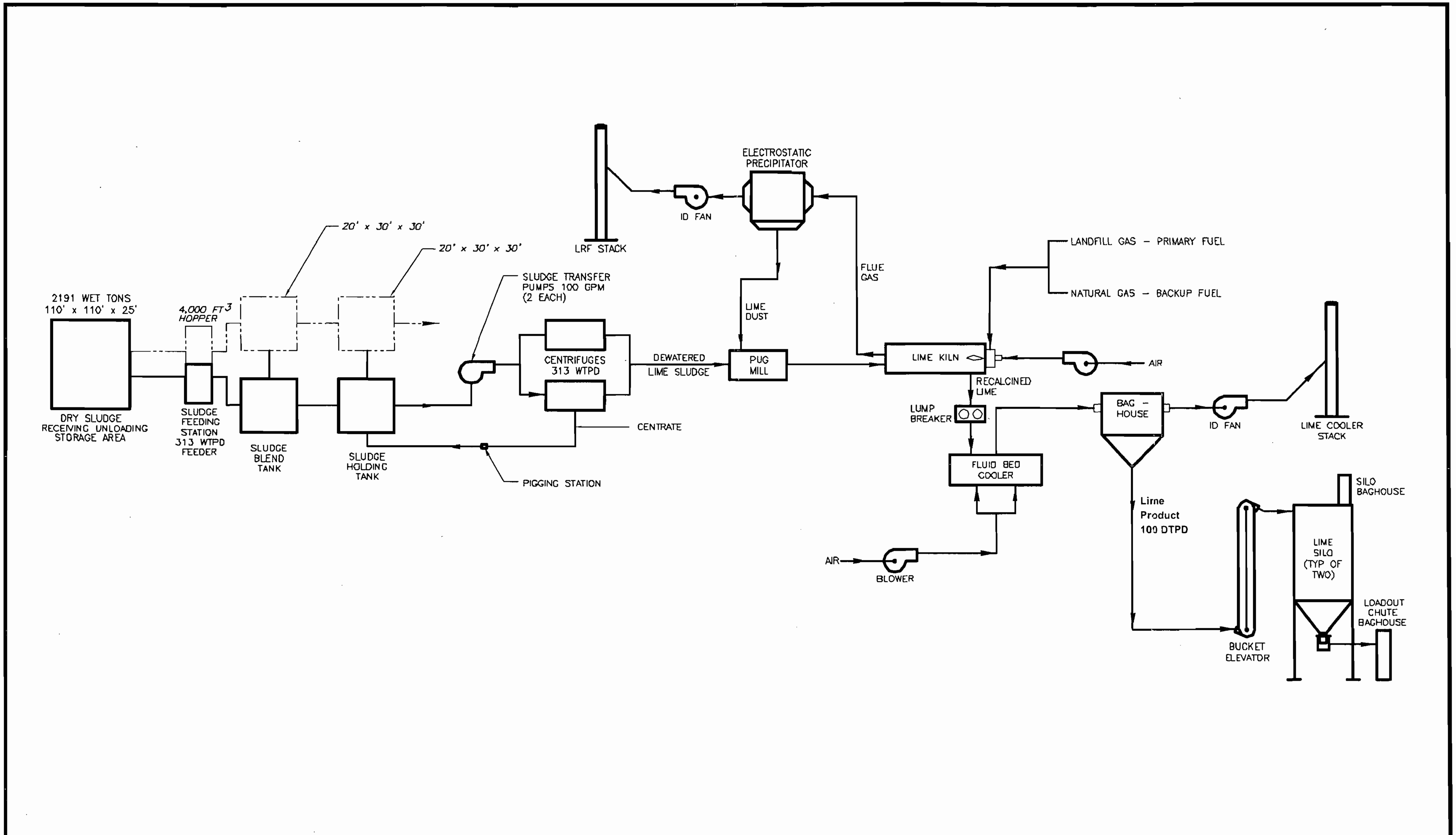

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Figure No. 3-1
Lime Recalcination Process Flow Schematic
7 Days Dry Storage w/Redundant Process Train
Solid Waste Authority of Palm Beach County

- Lime storage silos
- Control and maintenance building

The lime sludge will be transported to the LRF via dump truck in most instances. The existing method of transportation in use by the participating entities is generally open-bed dump trucks. The existing trucking systems are anticipated to be compatible with the receiving process at the LRF.

Lime sludge will be received at the LRF and weighed as it enters. Weighing will be accomplished via a permanently installed truck scale. The scale will be an above ground, load cell actuated, platform type scale. Exiting trucks will either be weighed, or accounted for by established tare weights, if known. Each incoming load of sludge will be subject to testing. All loads will be tested for the first year to two years to establish a baseline of sludge quality for each entity.

Once the sludge is received, it will be stored in concrete walled bunkers until the testing analysis is complete. Comparable and compatible sludges will be stored together. Sludge loads that require mixing or blending will be isolated in the sludge receiving area and fed into the system stream as they can be accommodated. The sludge feeders will be covered by metal overhead buildings to protect the feed stream from the elements. From the storage bunkers, sludge will be moved with front-end loaders into internally agitated blending tanks to be prepared for feed into the kiln. The blending tanks will be constantly agitated to keep the sludge in a pumpable state. No effluent will be generated from the blending of the sludge. The blending and storage tanks will be designed to hold sufficient quantities of sludge to accommodate the operating schedule of the facility. This design will allow for flexible operating conditions, which will accommodate changes in sludge characteristics.

Sludge will be fed from the blending tanks into a centrifuge for additional dewatering. The centrifuge will achieve a minimum of 65 percent cake solids. From here, the sludge will be ready to be fed into the rotary kiln. A variable speed pug mill will provide a steady flow to the feed end of the kiln optimizing the reactions within the kiln. The 225-foot long, 9-foot diameter rotary kiln will facilitate the decarbonation process, and reconvert the lime sludge into quicklime. The kiln is sloped at 2.5 percent, and rotates at a speed of 1.0-1.35 rotations per minute. The kiln will be fired by a landfill gas fueled burner. The burner system will consist of a long flame burner mounted in a firing hood located beyond the discharge end of the kiln tube.

When the feed reaches the discharge end of the kiln, it will be between 2,102°F and 2,282°F. Once discharged from the kiln, the product lime will be cooled via a cross-bar cooler. Exhaust air will be treated by baghouse. After discharge from the cooler, the lime will be conveyed to steel storage silos and the air stream from the cooler will go through a baghouse for treatment. The two storage silos will be sized to provide a

10-day lime inventory that will accommodate the processing schedule and the supply requirements to the plants. These storage silos will also be equipped with baghouses. The method of conveyance from the coolers to the silos has not yet been determined, but will be totally enclosed to minimize airborne lime dust. The recalcined product will be a free flowing, powdery material. The product lime will be discharged from the silos through screw conveyors and rotary airlocks. The lime will discharge into enclosed lime tanker trucks and be hauled to the participating entities. All tankers will be weighed empty as they enter the plant, and weighed on exit to determine the weight of lime each truck removes from the silos.

This LRF will produce 100 dtpd of quicklime product, for reintroduction into the water softening process. The plant's availability is estimated based on the expected outages for scheduled and unscheduled maintenance. The LRF will operate 24 hours per day, and will undergo an annual shutdown for inspection and repair of refractories in the kiln. These scheduled shutdowns can take upwards of two weeks. Based on the kiln manufacturer, the recalcination system's (kiln, air pollution control equipment, fans, and materials handling equipment) availability is estimated at 90 percent.

The entire facility will be controlled by a central, computerized system. The rotary kiln will be controlled through the use of programmable logic controllers (PLC). Facility operators will have the capability of generating reports at various levels of access and accountability. The computerized system will store the following information:

- Sludge weights and origins
- Sludge blend characteristics
- Kiln operating parameters
- Product quality and quantity
- Product shipping and billing
- Maintenance frequencies and costs
- Permit status and periodic reports

3.2.3 Fuel /Source Energy

Section 3.4.4 addresses the use of landfill gas and natural gas as fuel for the rotary kiln burner. The following subsections focus on the facility power requirements and sources.

3.2.3.1 Design Criteria for the Electrical System

The electrical distribution system design criteria for the new LRF will include considerations for reliability, maintainability and safety. To provide for a reliable operation, the LRF and BPF will be designed with two independent sources of power. A utility service will be provided for normal power to the facility. Standby emergency power will be provided for the LRF kiln from an onsite diesel engine driven generator.

To provide a maintainable electrical distribution system, portions of the system must be able to be taken out of service for routine maintenance (cable meggering, bus meggering, circuit breaker inspection/testing, etc.). To meet this criteria, a dual-ended secondary selective design will be provided. With this design, the distribution is divided into two parallel systems that have interconnecting tie breakers. In the normal mode of operation, each system or main feeder provides power for roughly one half of all the plant electrical loads; however, all critical plant loads could be carried by a single feeder if required to do so. This arrangement allows for system maintenance with minimal or no interruption of plant operations or process. In addition, this distribution system offers protection from common mode failures. Common mode failures occur when a single fault or loss of power causes a disruption to the power distribution.

The considerations for safety are directly related to maintainability. If plant maintenance personnel can service the equipment and provide preventative maintenance, the possibility of failures, temporary connections and equipment damage will be reduced. The secondary selective distribution system design provides maximum reliability, flexibility and maintainability while minimizing system downtime and providing a safe work environment for maintenance personnel.

3.2.3.2 Normal Power

The LRF electrical system design criteria will be based on processing 100 dtpd of CaO finished product. The load requirements for the process equipment are shown in **Table 3-1.**

The new process equipment will be served at 480-volt, 3 phase, 3 wire from new Florida Power and Light (FPL) transformer. The electrical distribution system will employ a single ended simple radial type distribution design. Based on preliminary load information, a 1600-2000-amp switchboard will be provided. The new switchboard will distribute the incoming power to the motor control centers (MCCs) and VFDs located in the main electrical room. The 480-volt switchboard, MCCs, and electrical equipment will be located in a new climate controlled electrical room located in the LRF electrical room.

Table 3-1 Lime Recalcination Facility Electrical Load List

Item No.	Equipment	Number	Horsepower	Equipment Description
1.	Triple feeder w/VFD drive (One hopper/feeder will be standby unit)	1	7.5	The feeder shall have a 7.5 Hp, 1800 RPM, Design C, TEFC motor.
2.	Screw conveyors – Horizontal screw (one will be standby unit)	1	5	Storage hopper with triple feeder will feed this screw conveyor with lime sludge and shall have a drive motor of --- Hp. Sized to handle 450ft^3/hr of sludge with 65% solids (i.e. 113 lb/ft^3) or approximately 26 tons/hr.
3.	Screw conveyors – Inclined screw (one will be standby unit)	1	40	Horizontal screw conveyor will feed the inclined screw conveyor. The inclined screw conveyor shall have an angle of inclination of 40 degrees and shall have a drive motor of --- Hp. Sized to handle 450ft^3/hr of sludge with 65% solids (i.e. 113 lb/ft^3) or approximately 26 tons/hr.
4.	Lime Slurry Blend Tanks mixers	1	100	100 Hp, dual impeller mechanical mixer.
5.	Lime Slurry holding Tanks with mixers	1	50	50 Hp, single impeller mechanical mixer.
6.	Lime slurry transfer pumps (Two duty/ two standby)	2	40	1 duty/(1 standby) 100 gpm progressing cavity pumps will feed 30% lime slurry to the centrifuges.
7.	Centrifuges (One duty/one standby unit)	2	75	The centrifuge will have a 75 primary motor with a 30 Hp backup drive.
8.	Mixing Screw Conveyor	1	25	25 Hp, 18" diameter by 12' long cantilevered screw conveyor.
9.	Rotary Kiln	1	75	The kiln shall have a primary drive motor of 75 Hp and a auxiliary gasoline engine of 10 Hp to rotate the kiln on roller supports.
10.	Primary Air fan	1	10	A 10 Hp primary air fan shall supply appropriate air t the burner.
11.	Lump breaker	1	10	The lump breaker will have a water cooled housing and a 10 Hp drive motor.
12.	Cooler blower	1	150	The cross-bar cooler assumed to be a 150 Hp blower.
13.	Cooler Baghouse induced draft fan	1	50	A 50 Hp draft fan shall induce the necessary flow through the baghouse out of the cross-bar cooler.
14.	Electrostatic Precipitator with induced draft fan	1	50	A 50 Hp draft fan shall induce the necessary from through the ESP from the feed end of the rotary kiln.

3.2.3.3 Standby Power

Emergency stand-by power will not be provided for this facility, with the exception of a gas driven engine to rotate the kiln in the event of loss of normal power. Maximum fuel storage for the engine will be 500 gallons.

3.2.4 Air Emissions and Controls

The feed end of the kiln, the cross-bar cooler, and the dry finished lime storage silos are all points of air emissions for the LRF. The lime kiln will emit products of landfill and natural gas combustion, such as:

- Nitrogen oxides (NO_X)
- Carbon monoxide (CO)
- Sulfur dioxide (SO_2)
- Fine particulate matter (PM_{10})

The LRF will include an Electrostatic Precipitator (ESP) to remove PM_{10} from the kiln exhaust and a baghouse to remove particulate matter from the cross-bar cooler exhaust. The ESP will be designed to a PM10 emission rate of 0.005 grains/dscf. The lime storage silos will also emit PM_{10} and will be equipped with baghouses. Upper bound emissions estimates were obtained from a vendor, FFE Minerals USA Inc., for PM_{10}, NO_X and CO. The sulfur content of SWA's landfill gas was taken into account separately in calculating the SO_2 emissions.

The Prevention of Significant Deterioration (PSD) permit sets forth emissions thresholds that are allowable by each of the proposed facilities. The LRF and BPF will together be permitted as a "major" modification to the NCRRF Site's existing PSD Permit. Based on vendor predictions and guaranteed emissions rates, nitrogen oxide (NO_X) emissions for the LRF and BPF facilities will be above the "significant increase" threshold in the PSD rules. All parameters which exceed the PSD "significant increase" threshold will require a Best Available Control Technology (BACT) Analysis. The PSD permit would require that BACT be installed for NO_X emissions from the new facilities.

3.2.5 Facility Water Use

3.2.5.1 Industrial Supply Well Water

Section 3.4.5 addresses the source of industrial supply well (ISW) water from the NCRRF site, which is common to both the LRF and BPF. The LRF has the potential to use 240 gallons per minute (gpm) of industrial supply water, as shown in **Table 3-2.** See Section 3.4.5 for greater detail.

Table 3-2 LRF ISW Water Requirements

Description	Flow (gpm)
Truck Washdown Area	15
Site Irrigation	225
Total	240

Originally, the use of potable water for the lime slurry tank make-up water seemed necessary to prevent possible contamination of the lime. However, since the lime is spent treating raw water at the water treatment plants, it may not be necessary to use potable water to make the lime slurry. SWA is looking into the water quality data to determine if the raw ISW water would suffice for the slurry water. This would result in a possible 200 gpm reduction in the amount of potable water required as shown in **Table 3-3.** This would substantially reduce the operating cost associated with purchasing potable water.

Table 3-3 LRF Facility Potable Water Requirements

Description	Number	Fixture Units*	Total (FU)	Flow (gpm)
Lavatory	2	2	4	
Kitchen Sink	1	1.4	1.4	
Water closet	2	10	20	
Hose Bibs	6	2	12	
Subtotal			37.4	45
Lime Make-up Water				200
Total				245

3.2.5.2 Potable Water Systems

Section 3.4.5 addresses the offsite source of potable water, which is common to both the LRF and BPF.

Table 3-3 represents the potable water peak flow requirements estimated at this time for the LRF facility. Also, as stated in the previous section, the amount of potable water could be greatly reduced by as much as 200 gpm if ISW water can be used as a suitable substitution.

3.2.5.3 Fire Protection Water Systems

Fire hydrants will be necessary on site. The actual location and number of hydrants will be determined by the PBC Fire Marshal. Fire hydrant water will be supplied by the City of WPB system. Fire flow protection is best maintained by a municipal water system.

3.2.5.4 Waste Stream Management System

The wastewater (BPF sanitary and industrial, and LRF sanitary) will ultimately be combined for offsite treatment and disposal, as described in Section 3.4.6. Wastewater will be removed from the site through a sanitary lift station, to be constructed in the proposed utility corridor, as shown in **Table 3-4.** See Section 3.4.6 for more details.

Table 3-4 LRF Plant Wastewater Discharge to Sanitary Sewer

Description	Maximum Flow (GPM)
Sanitary Wastewater	45
Truck Washdown	15
Total	60

3.3 Biosolids Pelletization Facility

3.3.1 Introduction

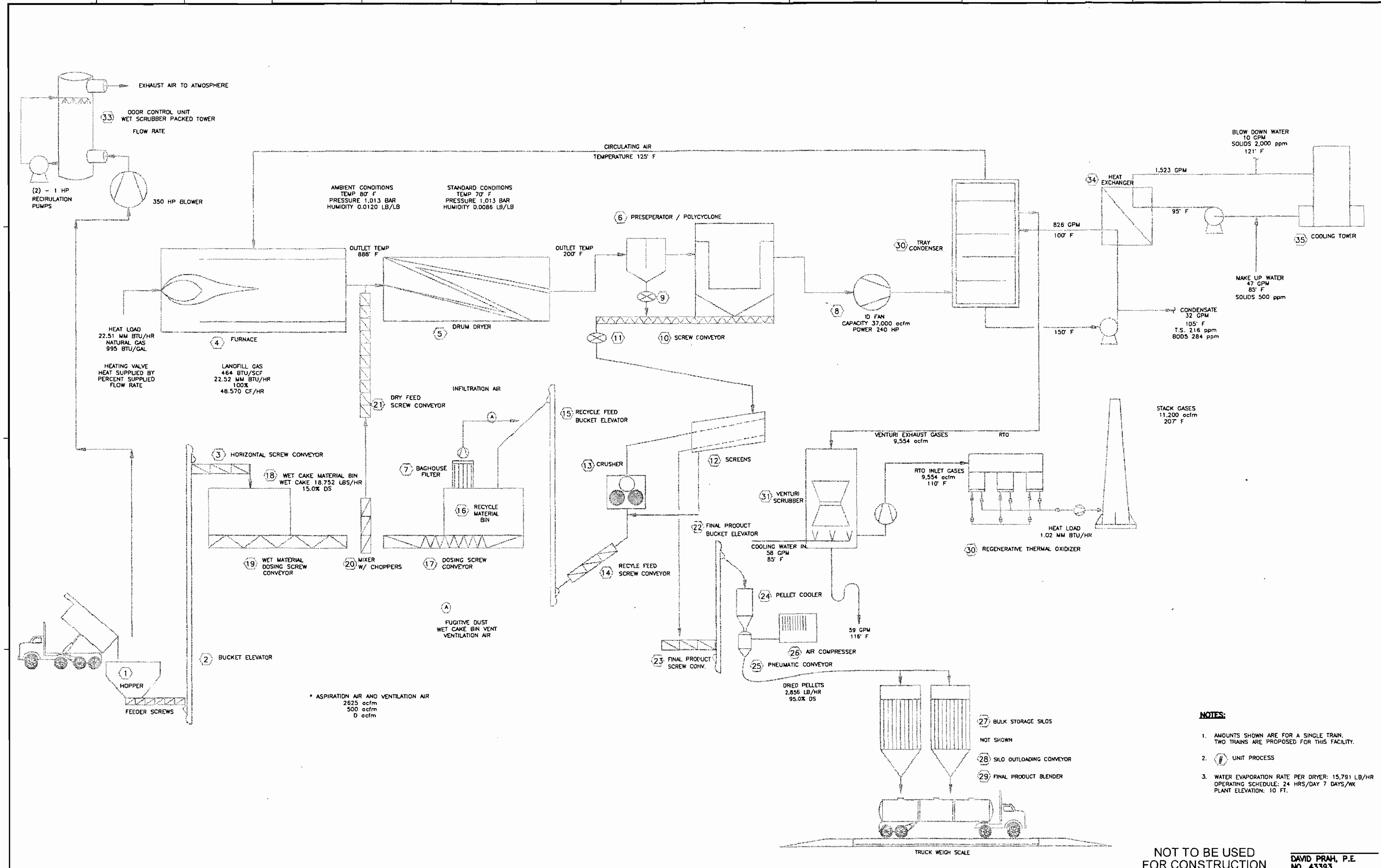
SWA proposes to develop a BPF that will help eliminate phosphorus loading in the Lake Okeechobee drainage basin and other environmentally sensitive basins due to the land application of wastewater sludge.

It is proposed that a drum drying system (DDS) be used to dry wastewater sludge cake to produce a marketable biosolids pellet for use as a safe agricultural fertilizer. The DDS is a direct heat drying technology that mixes heated air with biosolids in a rotating drum, evaporates water and produces a dry hard pellet of a specific size. The facility can utilize either natural gas or landfill gas as fuel, with the latter being the primary source of energy for this facility.

The proposed drying system is a proven process with many years of successful processing experience, which will address the need to reduce total facility air emissions and odor potential. The system proposed is an Andritz-Ruther Inc. or equal DDS, which consists of the following major sub-systems/processes:

- Generation of heat
- Preparation of sludge mixture for drying
- Evaporation of moisture from sludge mixture
- Separation of dried sludge
- Handling of dried sludge
- Treatment of process air stream

Figure 3-2 represents a process flow diagram of two 200 wet tpd drum drying systems. The BPF will contain two 200 wet tpd trains, for a total throughput of 400 wet tpd. The unit processes illustrated on that sheet are numbered which correspond to the numbers in parenthesis throughout this section.



NOTES:

1. AMOUNTS SHOWN ARE FOR A SINGLE TRAIN. TWO TRAINS ARE PROPOSED FOR THIS FACILITY.
2. (#) UNIT PROCESS
3. WATER EVAPORATION RATE PER DRYER: 15,791 LB/HR OPERATING SCHEDULE: 24 HRS/DAY 7 DAYS/WK PLANT ELEVATION: 10 FT.

NOT TO BE USED FOR CONSTRUCTION

DAVID PRAH, P.E. NO. 43393

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. HILL
DRAWN BY: J.L. GERTH
SHEET CHK'D BY: D. PRAH
CROSS CHK'D BY: M. LEWIS
APPROVED BY: D. PRAH
DATE: JULY 2003

CDM Camp Dresser & McKee Inc.
2310 Maitland Center Parkway, Suite 300 Maitland, Florida 32751 Tel: 407-660-2552 Cert. of Authorization No. 20

SOLID WASTE AUTHORITY OF PALM BEACH COUNTY
7501 NORTH JOG ROAD

LIME RECALCINATION AND BIOSOLIDS PELLETIZATION FACILITY

BIOSOLIDS PROCESS FLOW DIAGRAM AND MASS & HEAT BALANCE SCHEMATIC PER TRAIN

PROJECT NO. 2678-39373
FILE NAME: FIGURE3-2.DWG

SHEET NO.
FIGURE 3-2

3.3.2 Operations Summary

The design for the biosolids pelletization is based on a treatment capacity of 400 wet tons of sludge per day at approximately 12 to 15 percent solids concentration. The process equipment and corresponding sizes and loading rates shown are based on information provided by manufacturers.

The BPF will include the following major buildings/structures and associated process areas:

- Sludge receiving area
- Process equipment building
- Electrical room
- Control room
- Pellet storage silos
- Odor control
- Regenerative Thermal Oxidizer (RTO)
- Cooling tower

Sludge from the participating entities will be delivered to the site in the form of a cake sludge with 12 to 15 percent solids content. It is anticipated that the sludge will need to be hauled in dump trucks or trailer trucks that can easily be emptied. The receiving area will be equipped with storage hoppers designed to allow dump trucks to off-load the sludge within a self-contained storage facility. The two storage hoppers will be sized to hold 200 wet tons of sludge each. The steel hoppers will be constructed within a concrete vault below grade and will be arranged to allow sludge delivery from either side of the building (north and south). The receiving area will be isolated from the rest of the biosolids facility and will be constructed with an odor control system.

The DDS system uses a portion of the already-dried material as an additive to the dewatered sludge cake to get it past the sticky phase. When mixed, the cake, or "wet" material, coats the dried particles, or "recycled" material, to obtain a non-sticky mixture, usually in the 50 to 70 percent dry solids content range. The added benefit to this process is that the heat energy now needs only to be spent on removing moisture from the surface of each particle, while the core of the particle is already dry.

The evaporation process in the DDS actually takes place within the triple-pass, rotating drum. The sludge is conveyed through the rotating drum via flights mounted on the drum walls, until such time as it is dry enough and, therefore light enough to be lifted and pneumatically-conveyed out of the drum. DDS technology significantly limits over-drying of material, which is where odors are created.

At the exit of the drying drum, the high-speed airstream carries dried particles and the evaporated moisture. The DDS uses a two-stage separation process to remove the solids from the air. Following the stages, the airstream is more than 98 percent clear of particulates.

The material exiting the rotary valve following the separation devices is an agglomerate of particles of all sizes. Many beneficial reuse options require a uniform distribution of particle size. For this reason, it may be necessary to classify the particles by size prior to discharge as final product.

3.3.3 Fuel/Source of Energy

The DDS can use different types of fuels such as natural gas or landfill gas/methane. It is the intent of this design to use the landfill gas as the primary source with natural gas as a backup. The gas will fuel the burner to warm the recycled process air via a heat exchanger before it enters the furnace.

3.3.4 Air Emissions and Controls

Odors of wastewater origin are often formed as a result of bacterial action on wastes when insufficient dissolved oxygen is available to the bacteria, or when anaerobic bacteria are part of the unit process as anaerobic digestion. One way of treating this odor is to collect and treat the odorous gases. There are several methods of treatment and one proven technology is wet scrubbing (absorption) such as packed tower scrubbers. Two separate odor control systems are proposed to include packed tower scrubbers for incoming sludge and a regenerative thermal oxidizer (RTO) for reduction of odors from the process air train.

The packed tower scrubber receives air from the building area to be treated, which enters the bottom of the tower. A scrubbing liquid such as sodium hypochlorite is sprayed over the top of the packing material, creating a large liquid surface area at the liquid-gas interface. The odorous gas is absorbed by the scrubbing liquid and air, free of these contaminants, will either discharge to the atmosphere or to a second stage packed tower via a mist eliminator. The scrubbing liquid is captured in a sump at the bottom of the scrubber tower where it is pumped back to the top of the scrubber tower. The addition of sodium hydroxide and sodium hypochlorite solutions to the recycling scrubbing liquid will be required to provide a constant inflow of fresh scrubbing chemicals for optimum scrubber performance. Make-up water will be added continuously to maintain a constant water supply. Spent scrubbing liquid will overflow to the onsite wastewater pump station to be pumped to the East Central Regional Wastewater Treatment Plant for further treatment. Sodium hypochlorite is anticipated to be stored in a 5,000 gallon, above ground tank, located on the pad to the west of the biosolids loading area. This will be surrounded by containment walls. The sodium hydroxide, used for pH control, will be stored in smaller quantities (55-gallon drums, or similar).

Hot combustion gases will flow through the BPF dryer with the biosolids, driving off water, odors and volatile organic compounds in the sludge. At the dryer exhaust end, a preseparator and polycyclone will remove the pellets and heavier dust particles from the gas stream and send these to screens for size sorting. The exhaust gases, containing products of combustion, particulate matter (dust), odor and volatile organic compounds, will then go through a tray condenser and venturi scrubber. These devices will remove particulate matter that could otherwise clog the heat exchange media in the downstream regenerative thermal oxidizer (RTO). The gases will then go through the RTO to combust the odors and volatile organic compounds before exiting the exhaust stack.

As discussed above for the LRF, the SWA is required to apply for a major modification to their existing NCRRF Site PSD Permit due to emissions from the new BPF and LRF. More specific details regarding the air emissions from the dryer stack can be found in the PSD application contained in Appendix F (Volumes II and III).

3.3.5 Facility Water Use

3.3.5.1 Industrial Supply Well Water

Section 3.4.5 addresses the offsite source of ISW water, which is common to both the LRF and BPF. The BPF has the potential use to 546 gpm of industrial supply water as shown in **Table 3-5.**

Table 3-5 BPF ISW Water Requirements

Description	Flow (gpm)
Dryer Pellet Cooler	66
Venturi Scrubber	118
Cooling Tower Make-up Water	122
Truck Washdown Area	15
Odor Control	225
Total	546

3.3.5.2 Potable Water Systems

Section 3.4.5 addresses the offsite source of potable water, which is common to both the LRF and BPF. **Table 3-6** represents the potable water peak flow requirements estimated at this time for the BPF facility.

Table 3-6 BPF Facility Potable Water Requirements

Description	Number	Fixture Units*	Total (FU)	Flow (gpm)
Restroom Sink	2	2	4	
Kitchen Sink	1	1.4	1.4	
Water closet	2	10	20	
Hose Bibs	4	2	12	
Subtotal			33.4	43
Total				43

3.3.5.3 Fire Protection Water Systems

Fire hydrants will be necessary on site. The actual location and number of hydrants will be determined by the PBC Fire Marshal. Fire hydrant water will be supplied by the City of WPB system. Fire flow protection is best maintained by a municipal water system.

3.3.5.4 Waste Stream Management System

The wastewater from the LRF and BPF will ultimately be combined for offsite treatment and disposal at the East Central Regional WWTP, as described in Section 3.4.6. The expected flows will be from restrooms, truck wash-down areas, and process wastewater, among other sources from the BPF. See **Table 3-7** and Section 3.4.6 for more details.

Table 3-7 BPF Facility Wastewater Discharge to Sanitary Sewer

Description	Flow (GPM)	Total Solids (ppm)	CBOD5 (ppm)
Dryer Condenser Circuit Blow Down	66	216	284
Venturi Scrubber	118	216	284
Cooling Tower Make-up Water	22	2000	
Wash Water Under Dryer Condenser	100		
Odor Control	225		
Truck Washdown Water	15		
Sanitary Wastewater	43		
Total	589		

3.4 Common Elements

3.4.1 Introduction

The proposed design of the LRF and the BPF involves the Right of Way (ROW) abandonment and rededication between SWA and PBC. In addition, coordination with FPL may be necessary to explore the possibility of using the 40-foot easement on the south side of the property for surface water management purposes.

The primary utility requirements for the LRF and the BPF will be electricity, potable water, wastewater, natural gas and landfill gas. The construction of the offsite utilities will be a separate construction project from the LRF and BPF facilities. Additional detailed design of the utilities project will be filed with the local FDEP Southeast District office as it becomes available, if requested. The sizing of the infrastructure is critical to supply the levels of service required for the implementation of this project. It is suggested that all of the offsite utilities be brought on site in a utility corridor to clarify the distinction between the onsite/offsite utilities. The off site utilities will precede the construction of the LRF and the BPF in order to simplify said projects.

The common elements to both the LRF and the BPF include:

- Site access,
- On site surface water management,
- Landfill gas and natural gas supply,
- Potable and industrial water supply,
- Wastewater disposal,
- Electrical utilities; and
- Landfill gas pressurization system and three flares (Landfill gas pressurization system and three flares (a 1,000 scfm, 2,000 scfm and a 3,500 scfm flares)

3.4.2 Site Access, Easements, and Road Right-of-Way

The development of the site will be facilitated by the potential relocation of the Jog Road right-of-way (ROW) south of 45th Street. A public hearing was held on September 28, 2000 regarding three possible locations for Jog Road in this area. The most favored route would bring Jog Road across the eastern part of the site instead of immediately west of the site. Therefore, SWA proposed trading ROW's with the Palm Beach County Public Works Department (PBCPWD). The trade would give the eastern portion of the SWA site to the PBCPWD in exchange for the existing Jog Road ROW south of 45th Street.

The proposed ROW relocation will take place in two phases. The ROW of Jog Road south of 45th Street along with the 45th Street ROW west of Jog Road will be abandoned initially. The eastern portion of the BPF/LRF site will be dedicated as ROW to the PBCPWD at the same time for the new Jog Road alignment. The remaining portion of the Jog Road-45th Street intersection will be abandoned when the new curve is built to replace the intersection. Through discussions with PBCPWD Roadway Production Division Engineers, the proposed facility driveway connection to the south of the 45th Street- Jog Road intersection would be permitted with a simple driveway connection permit application.

There are several easements impacting the site. There is a 20-foot wide lateral drainage easement running north and south between the site and the current western Jog Road right of way. This easement should be abandoned as part of the Jog Road realignment swap agreement described above. The southern side of the property has a 40-foot wide FPL easement running east-west located between 20 feet and 60 feet north of the southern property line.

Information obtained from the PBC Records (ORB 5670, page 1628), indicates that no portion of the easement may be modified, excavated, surfaced, or paved without written permission from FPL. Meetings will be held between SWA and FPL staff to discuss issues regarding the potential usage of this area. Availability of this area for surface water management may provide immense benefits to the proposed site and enhance the management of water quality and quantity. FPL has been asked for permission to use the 40-foot wide easement for surface water management purposes.

3.4.3 Onsite Surface Water Management

Currently, a wet retention pond measuring approximately 9 acres exists on the eastern portion of the site. Based on as-built excavation grading plans, this pond is approximately 18 feet deep. The western portions of the east lake will be regraded to accommodate the two spillway weirs and the berms, without any increase from its current size. This regrading will not disturb the vegetation around the peripheral areas of the east lake, and will provide adequate surface water management for the proposed site.

3.4.4 Landfill Gas and Natural Gas Supply

Landfill gas is extracted from the landfill through a series of extraction wells and collection header piping. The gas currently passes through the header piping to a central point where it is combusted in an open flare. The Class I landfill and the Class III landfill are each equipped with similar, but independent, extraction, collection and flaring systems.

To be successfully operated with landfill gas as a fuel source, both the LRF and BPF will require landfill gas which is of a quality capable of stable operation when fired through a gas burner. The quality must be consistent on a day-to-day, as well as a long term basis. The quantity, quality and availability of the landfill gas extracted from the landfills have varied widely over the life of the existing extraction and collection systems. However, the trend which is exhibited in the collected gas data shows that in 2001, gas quality and flow had substantially stabilized. This is primarily due to increased operating efficiency which was brought about by physical improvements and an expansion of the gas system.

For the Class I landfill, the collection efficiency in the period of 1996 through 2000 averaged approximately 61 percent of the predicted available gas generated within the landfill. In 2001, the collection efficiency rose to approximately 78 percent. The amount of available landfill gas was predicted through the use of the U.S. Environmental Protection Agency (EPA) LANDGEM gas generation model. Data obtained from the 2001 SWA Landfill Depletion Model was used to run this model. The Landfill Depletion Model assumes a "Maximize Class I scenario" that consists of approximately 230 and 105 acres of Class I and Class III space, respectively. These conditions are referenced hereafter as "Class I Landfill build-out conditions" and are depicted in **Figure 3-4**." The LANDGEM model historically predicts gas generation rates, which, in many cases, significantly exceed the actual, field observed flow rates. The collection efficiency is the percentage of that predicted flow which is actually collected by the extraction and collection system and delivered to the flare.

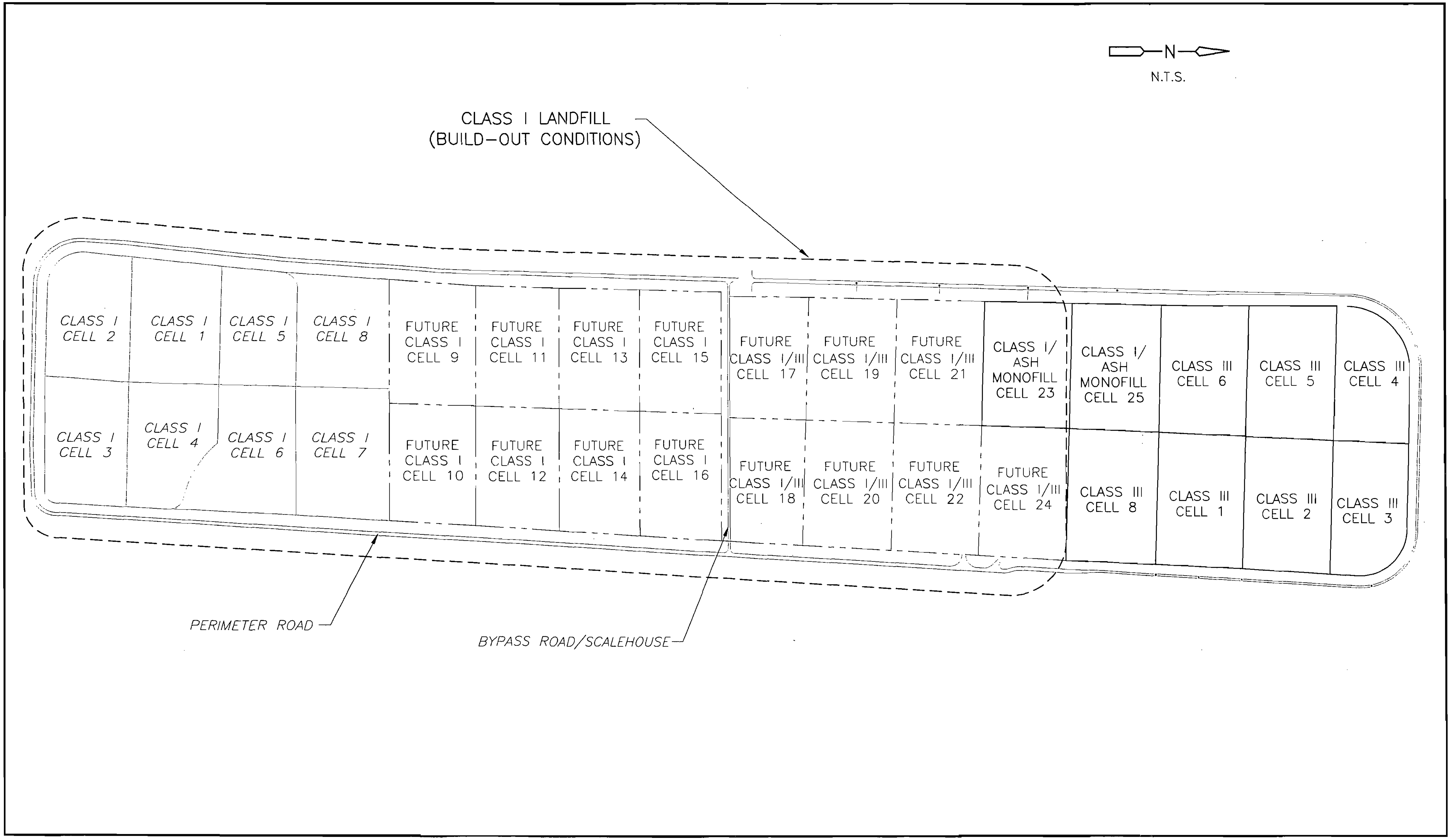


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Figure 3-3
Landfill Build-Out Conditions

The 5-year average methane content of the gas is approximately 55 percent, while the 2000 average was approximately 57 percent and the 2001 average was nearly 60 percent. These figures show a trend of increasing methane content as the gas system ages. The most recent averages are significantly above the industry average of 45 to 55 percent.

The combined firing capacity of the LRF and BPF is 81 million Btu per hour (MMBtu/hr). Using a conservative average methane concentration of 50 percent, a total of 2,700 standard cubic feet per minute (scfm) of landfill gas would be required to meet the demand. The use of landfill gas in the proposed burner systems is possible using existing technology. It appears that sufficient flow of landfill gas, with an adequate heat content, will be available to the project at startup. The landfill gas will enter the site through a single pressurized pipe, and then branch on the south side of 45th Street to each of the two facilities.

A natural gas connection to the site will be maintained to allow uninterrupted operation during any short-term landfill gas interruptions. An existing six-inch natural gas pipeline is located adjacent to the site that feeds the North County Resource Recovery Facility's (NCRRF) WTE plant. The pipeline comes from the east approximately 650 feet on the south side of 45th Street, crosses under to the north side and continues west. The pipeline is under 100 psi pressure and is capable of 80,000 scfm, providing enough gas for both of the facilities to run simultaneously. The natural gas line would be sized to provide a total of 81 MMBtu/hr, which is the amount of energy required to run both facilities simultaneously under maximum flow conditions.

Florida Public Utilities owns the pipeline and has stated that there is a monthly charge for the standby capacity. There is also a usage charge of $4.80/MMBtu of gas consumed, which coincides with the NCRRF's current fuel rate. Florida Public Utilities prepared a detailed cost proposal for running the pipeline to the site and facilities.

3.4.5 Potable and Industrial Water Supply

To accommodate the potable water demands for the proposed facilities, it will be necessary to connect to the existing 20-inch diameter water line on the south side of 45th Street to bring the water onto the site. The estimated potable water peak flow requirements for both facilities are represented in Tables 3-3 and 3-6. As indicated a total of 288 gpm (peak), 245 gpm required by the LRF and 43 gpm required by the BPF, could be expected for a short duration; however, the actual usage per day will be quite low. The peak flow of 288 gpm has been used to size the incoming piping to the facilities. The City of West Palm Beach (WPB) utilities indicated the proposed flows would be handled by a new booster pump station planned for that area.

A 16-inch diameter industrial supply water main is located along the southern side of 45th Street. The utilization of industrial supply water would be ideal for non-potable needs such as truck wash down and cooling make-up water. The industrial supply water would be discharged to the sanitary sewer. The facilities have the potential to use a total demand of 786 gpm (See Tables 3-2 and 3-5), 240 gpm for the LRF and 546 gpm for the BPF. Industrial supply water may also be used for irrigation for the site. The industrial supply water line would be brought under 45th Street as part of a separate contract for utilities work.

Water supply for the LRF/BPF will be provided by tapping into the 16-inch supply line (existing) along 45th Street. As part of the LFR/BPF design, the details of the connection will be determined with any required control valves, tanks, or other appurtenances. The approximate location for the LRF/BPF water supply connection is shown on Figure 2-1.

3.4.6 Wastewater Treatment and Disposal

Wastewater from the BPF (industrial and sanitary) and LRF (sanitary) will be removed from the site through a sanitary lift station, to be constructed in the proposed utility corridor. The expected flows will be from restrooms and truck wash-down areas at the LRF and BPF, and process wastewater from the BPF. The use of an electrostatic precipitator as the main air pollution control device will eliminate a side stream from the LRF. Centrate from the LRF will be recycled back into the slurry tanks. Therefore, there will be no industrial wastewater stream from the LRF.

The facilities will have a total combined maximum flow of 649 gpm, 60 gpm from the LRF and 589 gpm from the BPF. The wastewater will be disposed of through a sanitary sewer leading to the East Central Regional Wastewater Treatment Plant for further treatment.

3.4.7 Electrical Utilities

FPL transmission lines are adjacent to the site. A letter was written to FPL regarding the availability of power for the proposed LRF and BPF. Through conversations with the commercial power administrator at FPL, a letter was provided on March 18, 2002 stating that power will be available for the proposed facilities.

3.4.8 Landfill Gas Pressurization System

In addition to the above elements, both the LRF and BPF will utilize a common gas pressurization system. The gas pressurization system is required because both facilities will have low NO_X burners which require a relatively high gas pressure. The pressurization system will compress the landfill gas to approximately 20 psig. The pressurization system will be located north of the existing Compost Facility on the north side of Route 45, as shown in **Figure 3-3**. The pressurization system will consist of two multi-stage centrifugal blowers in series with an intercooler (gas to air heat exchanger) and an aftercooler. The pressurization system will be designed for the combined maximum burner firing rate of both facilities plus some safety factor: approximately 3,000 scfm.

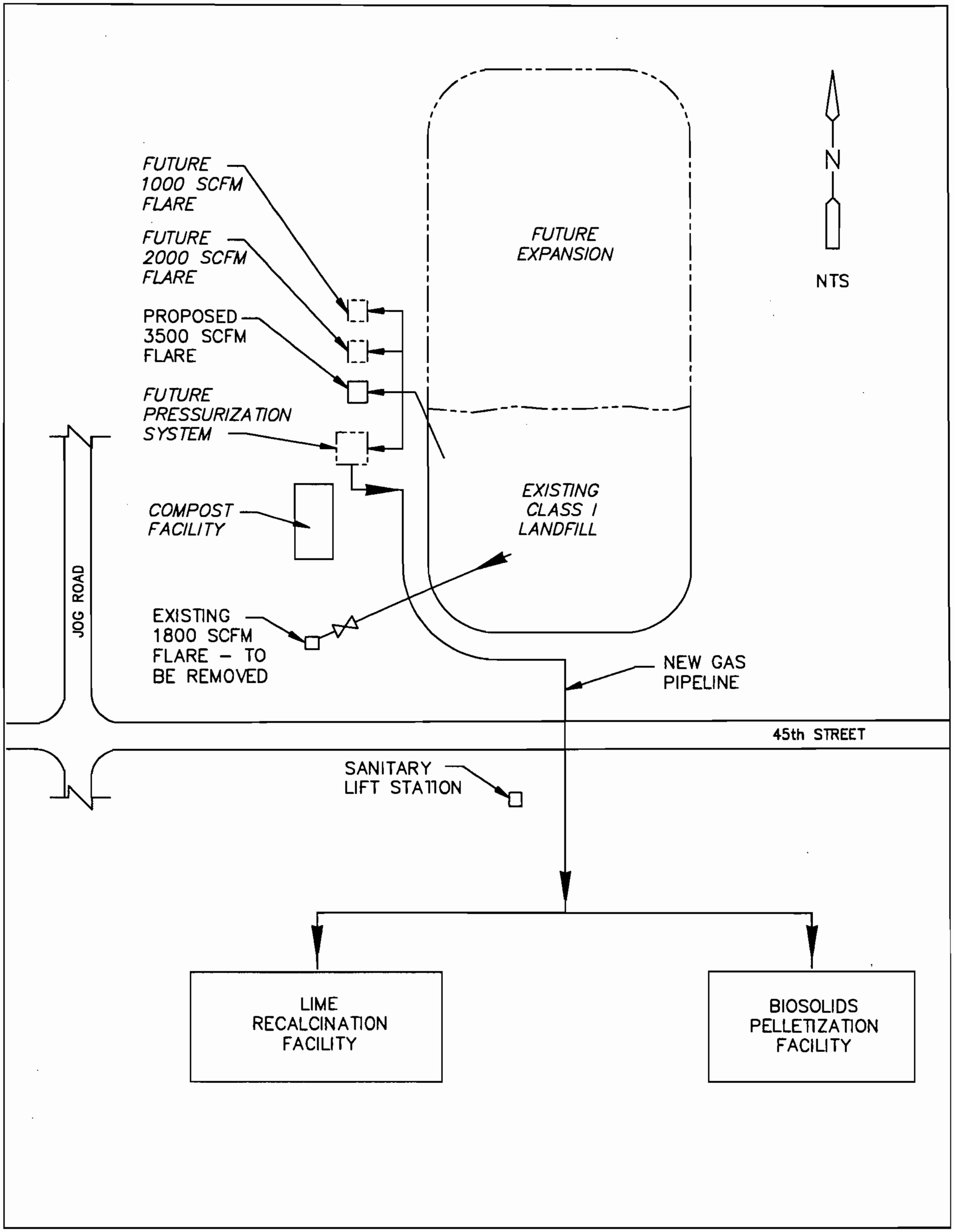

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Figure No. 3-4
Tie-in of Landfill Gas
Collection to the LRF and BPF

Located next to the Pressurization System, there will be three flares: a 1,000 scfm flare, a 2,000 scfm flare and a 3,500 scfm flare. These flares are necessary to dispose of the landfill gas which will not be used by the LRF and BPF in the future. The combined capacity of the three flares (without the LRF and BPF) will handle the future maximum landfill gas generation rate. Thus, if the LRF and BPF are not constructed (or if both facilities were down for maintenance for an appreciable period of time), these flares will be required to control landfill gas emissions. From the Pressurization System a new landfill gas pipeline will be constructed to the LRF and BPF, as shown in Figure 3-3.

3.5 Cost and Implementation

3.5.1 Lime Recalcination Facility

Capital costs, including construction cost, general condition (bonds, insurance, etc.) costs, project contingency and related technical services are presented in **Table 3-8.** All construction costs are in 2002 dollars. The general condition costs, contingency, and related technical and other services (15 percent of total construction cost) were established using similar sized projects and established engineering practices.

3.5.2 Biosolids Pelletization Facility

Capital costs, including construction cost, general condition (bonds, insurance, etc.) costs, project contingency and related technical services are presented in **Table 3-9**. All construction costs are in 2002 dollars. The general condition costs, contingency, and related technical and other services (15 percent of total construction cost) were established using similar sized projects and established engineering practices.

Table 3-8 LRF Estimated Capital Construction Cost

Item	Description	Total Installed Cost
1	Site Work	$325,461
2	Underground Utilities	$85,500
3	Sludge Receiving Area	
	3a. Dry Storage Area	$643,222
	a. Structural	$0
	b. Equipment	$32,161
	c. Electrical	$675,383
	Subtotal	
	3b. Sludge Feeder/Hopper	
	a. Structural	$58,750
	b. Equipment	$537,600
	c. Electrical	$26,880
	d. Instrumentation	$13,440
	Subtotal	$636,670
	3c. Sludge Storage Tanks	
	a. Structural	$74,306
	b. Equipment	$249,000
	c. Electrical	$12,450
	d. Instrumentation	$6,225
	Subtotal	$341,981
4	Sludge Dewatering/Handling	
	4a. Dewatering/Handling Building	
	a. Structural	$0
	b. Equipment	$700,000
	c. Electrical	$35,000
	d. Instrumentation	$17,500
	e. HVAC/Plumbing	$17,500
	Subtotal	$770,000
5	Rotary Kiln	
	a. Structural	$0
	b. Equipment	$9,000,000
	c. Electrical	$0
	d. Instrumentation	$0
	Subtotal	$9,000,000
6	Control Building (1)	
	a. Structural	$0
	b. Equipment	$0
	c. Electrical	$0
	d. Instrumentation	$0
	e. HVAC/Plumbing	$0
	Subtotal	$0
7	Product Storage	
	a. Structural	$8,333
	b. Equipment	$324,620
	c. Electrical	$16,231
	d. Instrumentation	$8,116
	Subtotal	$357,300
8	Yard Electrical	$654,669
9	Yard Instrumentation	$294,533
10	Truck Scales	$47,222
11	Subtotal	$13,188,719
12	General Conditions 3%	$395,662
13	OH & P 9%	$1,186,985
14	Subtotal	$14,771,365
15	Contingency 15%	$2,215,705
16	**Total Construction Cost**	**$16,987,070**

(1) Included in the rotary kiln price quote by Metso Minerals Inc.

Table 3-9 BPF Estimated Capital Construction Cost

Item	Description	Total Cost
1	Sitework* (including excavation, backfill, roadway, dewatering and stormwater piping & manholes)	$385,000
2	Underground Piping	$90,000
3	Mechanical Equipment	$13,667,700
4	Concrete/dewatering	$592,750
5	Metal Building(s) with Frame	$1,445,250
6	Electrical (other than Biosolids processing equipment, i.e. lighting, bridge crane, site lighting, etc.)	$1,200,000
7	Instrumentation and Computers	$390,500
8	Fence	$30,000
9	Miscellaneous Metals	$100,000
	Subtotal	$17,901,200
10	General Conditions (3%)	$537,000
	Subtotal	$18,438,200
11	OH&P (9%)	$1,659,400
	Subtotal	$20,097,600
12	Contingency (15%)	$2,009,800
	Subtotal	$22,107,400
13	Technical Services: Engineering, Procurement, Acceptance Testing and Start Up Services (10%)	$2,210,700
	Grand Total	**$24,318,100**

Section 4
Environmental Effects of Site Preparation, and Plant and Associated Facilities Construction

4.1 Introduction

During the construction of virtually any new project, potential impacts may result from the movement of earth, materials, and equipment to and from (and also within) the construction site. In this section, the possible impacts from the construction of the Lime Recalcination Facility (LRF) and the Biosolids Pelletization Facility (BPF) are identified. As necessary, mitigation measures to control the effects are proposed. With the appropriate mitigation, as described in this section, construction-related impacts will be reduced to acceptable levels. All construction activities will be controlled to meet the applicable Conditions of Certification for the North County Resource Recovery Facility (NCRRF), Case No. PA 84-20. As required by those Conditions, an environmental control program will be established under the supervision of a qualified individual to ensure that all construction activities conform to applicable environmental regulations and the applicable conditions of certification.

4.2 Land and Surface Water Impacts

Excavation activities during construction will result in the movement of large quantities of soil that could lead to erosion and sedimentation of adjacent wetlands and water bodies if not properly controlled. The Conditions of Certification for the NCRRF state, "necessary measures shall be utilized to settle, filter, treat, or absorb silt-containing or pollutant-laden surface water to ensure against spillage or discharge of excavated material that may cause turbidity…."

The following erosion control measures will be implemented as needed to reduce soil erosion and siltation during construction, meet the applicable Conditions of Certification, and comply with Chapter 62-302, Florida Administrative Code (FAC) and 40F-4:

- Using standard measures such as hay bales and siltation fences to prevent the movement of soil beyond a work area;

- Leaving erosion control barriers in place until the work area is permanently stabilized;

- Maintaining a stockpile of silt fence and hay bales on site under a protective cover for routine maintenance and emergency repairs;

- Filtering water from dewatering operations to remove sediment prior to discharge;

- Stabilizing all disturbed areas upon completion of work, including re-seeding vegetated areas to the extent possible;

- Maintaining and refueling vehicles and equipment in designated areas only, located as far from wetlands and water bodies as possible;

- Storing fuel, oil, solvents, etc. in original containers, or in containers manufactured for storing such material that are clearly labeled as to the contents of the container. Fuel, oil and similar materials must be located, stored and maintained in compliance with applicable laws for mobile and/or stationary storage tanks and containers;

- Immediately cleaning up all spills of fuel, oil, or other potentially hazardous materials. Spills will be reported to the proper authorities;

- Backfilling or removing excavated material from the site efficiently to minimize the quantity of soil exposed and the duration of exposure;

- Redirecting surface water runoff to reduce the velocity and quantity of runoff with temporary controls, such as water bars, check dams, and filter strips;

- Lining all channels with grass;

- Establishing vegetation and other permanent erosion control measures throughout the work area as soon as possible after the completion of construction;

- Preventing direct discharges of surface water to vegetated wetlands and water bodies throughout the work area by use of floating boom or other measures; and

- As required by the NPDES Construction Permit, the construction contractor will inspect the surface water management and construction areas regularly. Thorough inspections will occur after storm events and faulty controls will be repaired and/or replaced as necessary.

As described in Section 1.4.4, a Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activities Under a National Pollutant Discharge Elimination System (NPDES) General Permit will be submitted to the Florida Department of Environmental Protection (FDEP). As a condition of that general permit, a Stormwater Pollution Prevention Plan (SWPPP) will also be prepared to address surface water controls during construction. The construction contractor will be responsible for preparing and complying with the SWPPP. The construction specifications will require that the SWPPP be prepared in accordance with the surface water protection measures discussed in this section and the subsequent modified conditions of certification for Case No. 84-20, if any.

A plan for dewatering will also be included in the SWPPP with specific controls developed during design. The dewatering system design will incorporate the following mitigation measures to ensure that the discharge of water does not violate water quality standards:

- Maintaining a dry, undisturbed subgrade at all times; and
- Accommodating large volumes of water and maintaining stability of excavations;
- Monitoring the construction groundwater drawdown from dewatering in nearby wetlands and water supply wells, as necessary; and
- Discharging groundwater to upland areas or through haybales/silt fence that are set back from surface waters or vegetated wetlands.

The surface water management system for the temporary phases of construction was designed to provide the pre-treatment for runoff to meet the South Florida Water Management District (SFWMD)/FDEP regulations. The runoff from the site will be ultimately discharged to the existing wet retention pond (borrow pond) located along the eastern periphery of the site (east of the 15-acre parcel). The entire system was designed to retain the runoff from the 25-year 72-hour storm, and maintain adequate freeboard inside the perimeter berms.

During construction phases, adequate erosion and sediment control measures will be implemented by the construction earthwork contractor, as required by SFWMD/FDEP.

Vegetative communities within the existing site consist of barren open flat land that would be classified as disturbed land. Bahia grass (*Paspalum notatum*), broomsedge, (*Andropogon* sp.), finger grass (*Eustachys glauca*), rustweed (*Polypremum*), and other ruderal grasses, sedges, and forbs that are present are considered pioneer plants that colonize a disturbed site. Outside the perimeter berm are wetland communities. The area along the north side of the site consists of a palustrine forest (PFO) with shrub scrub (PSS) layer and palustrine emergent marsh (PEM) community. Species include Cypress trees (*Taxodium ascendens*), cocoa plum (*Chrysobalanus icaco*), wax myrtle (*Myrica cerifera*) shrubs, and herbaceous groundcover. Dominant herbaceous plants consist of beakrush (*Rhynchospora* sp.), spikerush (*Eleocharis* sp.), white top sedge (*Dichromena* spp.), and torpedo grass (*Panicum repens*). Several species of vines include the catbriar (*Smilax* sp.), love vine (*Cassytha filiformis*), and the climbing hempvine (*Mikania scandens*). The borrow pond located on the east boundary is dominated with torpedo grass. The cypress community located on the south boundary is dominated by species similar to the wetland on the north side of the site. The western boundary of the site is another borrow pond (open water).

Construction activities will include the removal of the recently planted Bahia grass and other colonized vegetation that occurs inside the perimeter berm area. However, the site's existing plant community is considered poor. Many of these plants are considered undesirable nuisance plants or weeds. Some of the plants such the torpedo grass, melaleuca tree (*Melaleuca quinquenervia*), climbing hempvine, Japanese climbing fern (*Lygodium japonicum*) are on the FDEP exotic undesirable plant list. Therefore, replacing the existing vegetation with desirable native trees, shrubs and herbaceous plants will improve the site significantly.

Areas outside the perimeter berm area include wetlands and encroachment into these areas would require an Environmental Resource Permit (ERP) with the Army Corps of Engineers (ACOE) and FDEP. With the exception of the entrance roadway, no work associated with this project is currently planned outside the perimeter berm.

4.3 Air Quality and Noise

There may be temporary air quality impacts associated with dust generated from construction activities such as clearing, excavation, grading, fill placement, and truck travel on unpaved roads. These activities can generate airborne dust (suspended particulate matter). Particulate matter less than 10 microns in diameter (PM_{10}) has the potential to be a health hazard as well as a nuisance. Testing conducted for the EPA has found that the dominant source of construction PM_{10} emissions is not passive wind erosion, but movement of heavy vehicles over unpaved surfaces or construction excavation activities. These emissions are a function of vehicle activity, weights, speeds, number of wheels, and soil silt and moisture content.

Measures to control these impacts include:

- Street sweeping on paved streets adjacent to the site;
- Paving staging area entrance roads, or lining them with gravel;
- Covering trucks with tarpaulins and ensuring tightly fitting tailgates;
- Restricting construction equipment and material storage to identified areas on the site; and
- Regular watering of construction areas.

Variable construction noise impacts are anticipated as a result of the movement and use of construction equipment and vehicles. The Conditions of Certification for the NCRRF specify, "construction noise shall not exceed either local noise ordinance specifications, or those noise standards imposed by zoning."

Mitigation measures to control construction noise impacts include:

- Requiring contractors to use the most quiet and practical construction techniques, such as replacing standard pile drivers with vibratory or sonic drivers to eliminate noise from the hammer hitting the pile;

- Using effective intake and exhaust mufflers on internal combustion engines;

- Conducting truck loading, unloading, and hauling operations in a manner that keeps noise and vibration to a minimum;

- Making stationary equipment that will operate during nighttime hours, such as pumps, generators, and compressors more quiet by using mufflers and enclosures; and

- Restricting construction activities to daytime hours.

4.4 Traffic

The movement of large construction machinery and equipment to and from the work is not expected to interfere with local traffic flow around the project area. It is estimated that an average of approximately 80 construction vehicles per day will make round trip to/from the site during the 24-month construction period. The following mitigation measures, as required, will be used to address potential impacts associated with construction traffic:

- Requiring the contractors to monitor parking of construction personnel's private vehicles;

- Maintain free vehicular access to and through parking areas;

- Prohibit parking on or adjacent to access roads or in non-designated areas; and

- Establishing and adhering to truck routes.

Section 5
Effects of Facility Operation

5.1 Industrial Water Use

Justification for increasing the water use allocation under the Power Plant Siting Act Request for Amendment (PPSA) (provided in Appendix D) was developed following the requirements of an industrial water use permit per South Florida Water Management District (SFWMD) regulations. Current water uses at the North County Resource Recovery Facility (NCRRF) and Dyer Boulevard Landfill are the Waste-to-Energy (WTE) plant, irrigation, and the compost facility biofilters. Future users include the Lime Recalcination Facility (LRF)/Biosolids Pelletization Facility (BPF) and a potential reverse osmosis (RO) plant at the WTE plant. The LRF/BPF will have an average and maximum water use of 1.54 and 1.69 million gallons per day (mgd), respectively. This flow is based on maximum potential build-out of the BPF. The maximum build-out is estimated to be three times the current planned size (200 wet tons per day). The RO plant is in the preliminary design/planning stages and the final decision to build the plant has not been made. The RO plant demand, if constructed, is expected to be between 0.06 and 0.1 mgd depending on amount of reject water. A summary of the current and future water users at NCRRF and Dyer Boulevard Landfill is provided in **Table 5-1**.

The current average and maximum day water allocation at the site is 1.74 and 2.39 mgd, respectively. With future water users, the average and maximum day water use will be 3.49 and 4.28 mgd, respectively. An increase of approximately 1.75 mgd in the average daily water allocation for the Industrial Supply Wells (ISW) is required to safely meet the demands of the new facilities. The Solid Waste Authority of Palm Beach County (SWA) is requesting a new permitted maximum water allocation of 4.28 mgd and an average day allocation of 3.49 mgd. The total maximum water use shown in the Table 5-1 (4.28 mgd) represents the water use if all users use the maximum on the same day.

The impact of the increased pumping at the NCRRF supply wells is insignificant to environmentally sensitive areas, surrounding water bodies, and adjacent water users. The impact of the increased pumping does not create any significant additional drawdown at any wetlands, water bodies, or known hazardous waste sites. With the inclusion of proposed modifications to the NCRRF supply well system, the additional drawdown at the City of Riviera Beach Western Wellfield (CRB-WEST) is less than six inches. More drawdown will occur at the new NCRRF wells but they are strategically located to minimize drawdown impacts at CRB-WEST and environmentally sensitive areas.

Table 5-1 SWA NCRRF and Dyer Existing and Future Water Budget Summary (With LRF and BPF)

Maximum Water Withdrawal Possible (wells pumping 24 hours per day)

	Existing	Future
Industrial Supply Wells		
NCRRF[A]	3.60	7.20
Dyer[B]	0.65	0.65
Compost Facility[C]	0.55	0.55
Total	**4.80**	**8.40**

Water Use

	Existing		Future	
	Average	**Maximum**	**Average**	**Maximum**
WTE Plant[D]	1.64	2.16	1.64	2.16
Dyer Park[E]	0.01	0.01	0.15	0.25
LRF/BPF[F]	-	-	1.54	1.69
Compost Facility Biofilters[G]	0.09	0.21	0.05	0.07
Proposed RO Plant[H]	-	-	0.10	0.10
Irrigation[I]	0.01	0.01	0.01	0.01
Total[J]	**1.74**	**2.39**	**3.49**	**4.28**

All Units in MGD

A Withdrawal capacity based on pumping 24 hours per day; existing pumping rates based on observed readings; future withdrawal capacity based on proposed design flow rates

B ISW-1 operated by Palm Beach County Parks Dept; ISW-2 currently not used - potential use as golf course irrigation

C Withdrawal based on pumping 24 hours per day at 32 gpm per well

D Average existing water use from historical pumping data (2000-2002); Maximum existing water use estimated; Future water use is original PPSA water use

E Existing water use based on original water demand; future water use based on current water demands for irrigation at Dyer Park and proposed future junior golf course

F Proposed Lime Recalcination Facility (LRF) and Biosolids Pelletization Facility (BPF) industrial water needs; max use based on peak flows over a 24 hour period

G Existing average and maximum water use based on current pumping data; Future water use based on system providing water for compost facility only

H Proposed RO plant at WTE plant

I Water demand for landscape irrigation requirements at NCRRF

5.2 Impacts on Water

5.2.1 Surface Water Management

The surface water management system will be designed to retain the 25-year 72-hour storm (design storm) on site with no discharge, as required by Section 6.3 of the "Basis of Review for Environmental Resource Permit Applications Within the South Florida Water Management District" [SFWMD, 1996]. The 2-year, 24-hour rainfall depth has been used for calculating the time of concentration (T_c) for each hydrologic unit.

The proposed system consists of a series of dry retention basins and hydraulic structures to convey the runoff between them. The dry retention basins were designed to provide the pre-treatment for runoff to meet the SFWMD/Florida Department of Environmental Protection (FDEP) regulations. The runoff from the parcel will be ultimately discharged to the onsite East Lake (existing wet retention pond) located along the eastern periphery of the parcel. The entire system was designed to retain the runoff from the 25-year 72-hour storm, and maintain adequate freeboard inside the perimeter berms. In addition, the system was analyzed for the 100-year 72-hour storm to estimate the peak flood elevations. The floor pads were located above the peak flood elevations from the 100-year 72-hour storm, to provide adequate protection to the structures within the proposed LRF and BPF.

Hydrologic and Hydraulic (H&H) analysis for designing the system was performed using the Advanced Interconnected Channel and Pond Routing (Interconnected Channel and Pond Routing Version 2.20) computer program. The design calculations, modeling input, and output are presented in Appendix C.

5.2.1.1 Design Considerations

Design Storm and Rainfall Distribution

The 2-year, 24-hour design storm depth is 5.0 inches, as shown in Figure C-2 of Appendix C [USDA-NRCS, 1986]. The 25-year 24-hour design storm depth is 10.3 inches, as shown in Figure C-3 of Appendix C [SFWMD, 1996]. The rainfall depth for the 25-year 72-hour storm event is 14.0 inches. The SFWMD 72-hour distribution (shown in Figure C-5 of Appendix C) is used in this application for the hydrologic simulations.

Groundwater Elevation

The wet season groundwater elevation was obtained from historical data for the NCRRF site located to the north of the proposed LRF/BPF. Based on the information available from previous studies, the wet season groundwater elevation was identified as 18.0 feet, National Geodetic Vertical Datum (NGVD). The bottom of the dry retention basins for the proposed surface water management system will be located at least 1 foot above the wet season groundwater elevation (i.e., at 19.0 feet, NGVD), as required by the SFWMD design guidelines.

Treatment Volume For Dry Retention Basins

The treatment volume that will be used for the design of dry retention basins is the greater of 1 inch of runoff from the entire tributary area to the dry retention basins, or 2.5 inches times the impervious area tributary to the dry retention basins.

According to the SFWMD guidelines, if the impervious areas are greater than 40 percent of the tributary area, the volume from 2.5 inches of runoff over impervious areas will be greater than the volume from 1-inch of runoff over the entire tributary area. The value calculated will be the treatment volume for the site. Dry retention will be provided in open channels located along the perimeter of the site. Pre-treated discharge from the dry retention basins will be routed to the wet retention basin that already exists on site.

5.2.2 Surface Water

The most significant impact related to surface water is beneficial. Biosolids generated by wastewater treatment facilities in Palm Beach, Martin, and St. Lucie counties are currently being disposed of by land application. The proposed BPF will address concerns with phosphorus loading in the 4,600 square mile drainage basin of Lake Okeechobee, as will as the 1,140 square mile Indian River Lagoon by providing an alternative to landspreading of biosolids. The BPF will help to reduce non-point source pollutants that are reaching Lake Okeechobee. The existing wet retention pond on the site will be modified (reshaped, without any increase in size) to provide adequate surface water management for the proposed site.

Impacts to area surface water bodies and wetlands due to increased ground water withdrawals (for industrial water supply) are not anticipated since the wells are located away from these areas. As presented in Appendix D, modeling has been conducted under average and drought conditions and demonstrates no significant impacts.

5.2.3 Groundwater

It is not currently anticipated that wastewater from the proposed facilities will be disposed of via injection wells. Therefore, no water quality degradation will occur as a result of deep well injection.

Modeling will be conducted to ensure that increased water withdrawals from the industrial supply wells will not impact groundwater levels, flow patterns, or quality. Preliminary modeling information can be found in Appendix D.

5.2.4 Drinking Water

Potable water will be supplied by connecting to the 20-inch diameter water line on the south side of 45th Street. A total of 320 gallons per minute (gpm) (peak) could be expected for a short duration; however, the average daily consumption is not expected to exceed 800 gallons per day for both facilities. The City of West Palm Beach utilities indicated that the proposed flows would be handled by a new booster pump station planned for that area. No impacts are anticipated as a result of the potable water use by the new facilities.

5.3 Solid/Hazardous Waste Disposal Impacts

5.3.1 Solid Waste

Currently, approximately 50 percent of the water treatment plants (WTPs) in the Palm Beach County (PBC) area stockpile their lime sludge on site for drying and disposal in a landfill, or other uses. The proposed LRF will have a beneficial impact on waste disposal by minimizing the need for lime sludge storage and disposal, as well as recycling lime for use at WTPs.

The BPF will reduce the amount of wastewater sludge which is currently land-applied in the Lake Okeechobee, Everglades, and Indian River Lagoon basins.

Solid waste generated by facility operations (employee refuse, packaging materials, etc.) will be collected in receptables located throughout the site and fed into the main solid waste stream.

5.3.2 Hazardous Waste

It is not anticipated that hazardous waste will be generated by the facilities, per 40 CFR. However, there will be equipment fuel and chemicals stored on site during the construction and operation of the facilities.

5.4 Sanitary and Other Waste Disposal Impacts

Wastewater from the BPF and the LRF will be removed from the site through a sanitary lift station, to be constructed in the proposed utility corridor. The expected flows will be from restrooms, truck wash-down areas, and process wastewater from the BPF. The use of an electrostatic precipitator as the main air pollution control device will eliminate a wastewater stream from the LRF. The City of West Palm Beach has indicated that, barring any changes in design, it should be able to accept these discharges at its East Central Regional Wastewater Treatment Plant. No significant impacts are anticipated as a result of these flows.

5.5 Air Quality Impact Assessment

The proposed LRF, BPF and combined flare maximum expected air pollutant emission rates, based on regulatory requirements, vendor information, and the results of the Best Available Control Technology (BACT) analysis are summarized in Table 1-1 of Volume III. The LRF and BPF will both employ BACT for nitrogen oxide (NOx) emissions, which has been found to be low-NOx burners (see Section 4.0 of Volume III). They will also use a bag house for control of particulate matter (PM) emissions from the cross-bar lime cooler. The LRF will have an electrostatic precipitator (ESP) on the kiln exhaust, and fabric filters on the lime storage silo vents. The BPF will have a venturi scrubber and regenerative thermal oxidizer on the dryer exhaust, and fabric filters on the recycle bin and pellet storage silo exhausts.

An air quality impact assessment was conducted for pollutant emissions from the LRF, BPF and associated landfill gas flares. The Industrial Source Complex, Short-Term, Version 3 (ISCST3) dispersion model was used to predict the potential air quality impacts, in accordance with the modeling protocol submitted to FDEP on May 13, 2002. A comparison was conducted of the maximum predicted ground-level concentrations and the background concentrations to the Florida and National Ambient Air Quality Standards. This comparison demonstrated that the LRF, BPF and flare projects together will not violate ambient air quality standards. In fact, maximum ground-level concentrations due to these projects alone is estimated to be no more than one percent of any of the standards. When project concentrations are added to existing background pollutant concentrations, the resulting maximum concentration will be no more than 52 percent of any of the standards. A comparison of the maximum air quality impacts to the Prevention of Significant Deterioration (PSD) Class II increments demonstrates that the LRF, BPF and flare projects will have an insignificant impact on Class II increment consumption, by consuming no more than four percent of any applicable increment.

The predicted pollutant ground-level concentrations were also compared to PSD de minimis monitoring levels. The highest predicted impacts were below the de minimis monitoring levels. Therefore, in accordance with 40 Code of Federal Regulation (CFR) 52.21(i)(8), SWA requests that FDEP concur with the determination that pre-construction monitoring is not required for the LRF and BPF projects.

An analysis was also conducted of project impacts at the nearest Class I (pristine) air quality area: the Everglades National Park, 128 km (80 miles) south-southwest of SWA's facilities. The results show that less than 0.1 percent of any Class I increment will be consumed there, and that visibility (clarity of the air) at this area will not be impaired. A similar analysis was conducted for the Big Cypress National Preserve, which although not an officially designated Class I Area, is a sensitive area slightly nearer to the project site: 112 km (70 miles) southwest of SWA's facilities. The modeled results for this location show that the projects will consume no more than 0.2 percent of any Class I increment, and will not impair visibility. A detailed discussion of air quality impacts from the proposed LRF, BPF and flare projects is provided in Sections 6.0 and 7.0 of Volume III.

5.6 Noise from Onsite Sources

This section summarizes the results of the noise impact analysis for the operations of the proposed LRF, BPF and three candlestick flares. This noise impact analysis has been conducted to evaluate noise impacts from both operations. Existing ambient noise levels were measured at four locations surrounding the site. These data were used to characterize existing conditions and to assess potential noise impacts from the project without and with mitigation measures. These predicted noise level increases were then compared to noise impact criteria and the PBC noise ordinance.

5.6.1 Methodology

The LRF and BPF will have various mechanical and processing equipment that would generate noise. This equipment would include conveyors, crushers, pumps, fans, mixers, kiln, and furnaces. Uncontrolled maximum sound levels would range from 80 to 103 A-weighted decibels (dBA) measured 3 feet away. Noise levels from each three candlestick would be 85 dBA at 3 feet away. Noise level data were collected for each piece of equipment based on manufacturer and literature information. Estimates of the overall total sound level for each facility was obtained by logarithmically summing the sound levels for each piece of equipment and accounting for attenuation of noise level from buildings and enclosures. The majority of the mechanical and process equipment for the BPF would be housed within a concrete and metal building capable of reducing noise by approximately 20-dBA. The LRF will have the majority of its equipment outside; therefore, the overall sound level emitted from this facility would be greater than the BPF.

The total sound levels for the LRF and BPF were estimated to be 82-dBA and 77-dBA at 50 feet, respectively. The total noise level from the flares would be 66 dBA. It was conservatively assumed that both facilities and flares would operate 24 hours per day. **Tables 5-2** and **5-3** present summaries of the equipment and sound levels for each facility.

A conventional hemispheric wave divergence equation was used to estimate the sound pressure level at a receptor based on the initial sound levels and various attenuation factors (Harris, 1991). The equation is:

$$L_{p(r)}=L_{p(s)}-(A_{div}+A_{enclosure})$$

where:

$L_{p(r)}$ = A-weighted sound level at the receptor location (dB)

$L_{p(s)}$ = Initial A-weighted sound level at the source (dB)

A_{div} = Attenuation due to geometrical divergence of sound from a source (dB)

$A_{control}$ =Attenuation from buildings and enclosures (dB)

For each receptor, the resultant sound level (sound reaching the receptor) was predicted using the above formula. The sound levels from both facilities were added to estimate the total sound level at the site property boundary and offsite monitoring locations.

Table 5-2 Lime Recalcination Facility Noise Sources

Equipment	No. of Units	Size (hp)	Location	Noise Level per unit @ 3ft (dBA)	Total Controlled Noise Level (dBA)
Front End Loader[1]	1	--	Open	100	100
Dump Trucks[1]	--	--	Open	102	102
TEFC Motor	1	7.5	Enclosed	80	60
Common Belt Conveyor	1	40	Enclosed	93	73
Inclined Bucket Elevators	2	15	Enclosed	88	71
Dual impeller mechanical mixer	2	100	Open	84	87
Impeller mechanical mixer	8	50	Open	81	90
Cavity feed pumps	4	50	Enclosed	86	72
Centrifuges	2	75	Enclosed	89	72
Rotary Kiln Motor	1	75	Open	89	89
Mixing Screw Conveyor	1	25	Enclosed	97	77
Lump Crusher	1	10	Enclosed	100	80
Cooler Blower	1	150	Open	90	90
Baghouse Blower Blower fan		7.5	Open	92	92
Cooler-Induced Draft Fan	1	50	Open	86	86
ESP screw conveyor	1	5	Open	83	83
Kiln Induced Draft Fan	1	50	Open	80	80
Combustion System	1	--	Enclosed	90	70
Primary Air Fan	1	10	Open	96	96
ESP induced draft fan	1	50	Open	80	80
Horizontal screw conveyors	4	5	Enclosed	83	69
Emergency diesel generator	1		Open	100	100
Total Facility Noise Level at 50 ft.					**82**

[1]Noise levels include a 5-dBA increase for backup alarms.

Table 5-3 Biosolids Pelletization Facility Noise Sources

Equipment	No. of Units	Size (hp)	Location	Total Uncontrolled Noise Level (dBA)	Total Controlled Noise Level (dBA)
Horizontal Screw Conveyor	6	8	Enclosed	86	66
Furnace Burners with Blower	2	30	Enclosed	93	73
Drum Dryer Motor	2	100	Enclosed	103	83
Baghouse Dust Collector Fan	2	20	Outside	92	72
Induced Draft Fan	2	250	Enclosed	101	101
Polycyclone Discharge Screw Conveyor	2	15	Enclosed	91	71
Vibrating Screen	2	10	Enclosed	93	73
Screw Conveyor	2	15	Enclosed	91	71
Crusher	2	50	Enclosed	103	83
Recycle Feed Screw Conveyor	2	15	Enclosed	91	71
Recycle Feed Bucket Elevator	2	15	Enclosed	91	71
Recycle Bin with Activator	2	15	Enclosed	91	71
Recycle Dosing Screw Conveyor	2	15	Enclosed	91	71
Wet Material Dosing & Feed Screw Conveyor	4	3	Enclosed	86	66
Mixer	2	150	Enclosed	88	68
Containment with Choppers	8	8	Enclosed	86	66
Dry Feed Screw Conveyors	2	8	Enclosed	86	66
Final Product Bucket Elevator	2	5	Enclosed	86	66
Final Product Screw Conveyor	2	8	Enclosed	86	66
Pellet Cooler	2	3	Enclosed	83	63
Pneumatic Conveyor	2	8	Enclosed	86	66
Air Compressor	2	100	Enclosed	94	74
Dryer for Pneumatic Conveyors	2	8	Enclosed	86	66
Bin Activators	4	2	Enclosed	86	66
Truck Loading Chutes	4	1	Enclosed	93	73
Silo Outloading Conveyors	2	10	Enclosed	86	66
Final Product Blending	2	30	Enclosed	96	76
RTO	2	125	Outside	93	73
Odor Control Unit	2	350	Outside	96	76
Cooling Tower	2		Outside	96	76
Venturi Pak Pump	2	15	Enclosed	86	66
Venturi Pak Blower	2	75	Enclosed	92	72
Chemical Pump	4	1	Enclosed	83	63
Fugitive Dust System Fan	2	20	Enclosed	89	69
Silo Area Fan	2	8	Enclosed	86	66
Silo Dust Collector Airlock	2	1	Enclosed	86	66
Fugitive Dust Conveyor	2	2	Enclosed	86	66
Total Facility Noise Level at 50 ft.				**85**	**77**

Sound, in a free field (no obstruction), is radiated in spherical waves. The attenuation of sound due to wave is related to the distance from the source to the receptor by the equation:

$$A_{div} = -20 \log (d/d_{ref})$$

Where d is the distance from the source to the receptor, and d_{ref} is the reference distance or the distance from the source in feet. This equation assumes that noise from a source radiates equally in all directions, the equation indicates that a doubling of distance reduces the sound level by 6-dBA.

The noise impacts were calculated using the following methodology:

- Measure the distance from each facility footprint to each monitoring location; and
- Determine the noise loss due to divergence using a formula that results in a 6-dB loss for each doubling of distance; and
- Add the projected noise levels for each facility to the existing L_{eq} noise level to determine projected noise level at the receptor and the increase above the existing L_{eq} noise level and compare them to noise impact criteria. In addition, compare projected noise levels to the PBC maximum permissible L_{10} sound levels to determine potential noise impacts.

5.6.2 Impacts

During normal operations of both facilities and candlestick flares, the projected Day L_{eq} sound levels would not increase at any of the offsite locations. The projected Night L_{eq} sound levels would increase by only 1 to 2-dBA at Locations 2 and 3 (see Figure 2-12) when both facilities and candlestick flares are operating simultaneously. The existing Day L_{eq} sound levels at the site property boundary could increase up to 10-dBA and the existing Night L_{eq} sound levels could increase up to 21-dBA (single facility operating) or 24-dBA (all sources operating simultaneously). A 10-dBA increase in existing sound levels is considered a doubling of loudness and a 21- to 24-dBA sound level increase is considered a dramatic change, according to Federal Highway Administration noise impact criteria (See Table 2-9). Although these are significant noise increases, they occur at the site property boundary, and there are no residential or sensitive receptors adjacent to the site.

The projected L_{10} sound levels were compared to the PBC maximum permissible sound levels for both residential and commercial land uses. As discussed in Section 2, the PBC noise ordinance may not apply to the facilities but was used for comparison purposes. Because the noise generated from both facilities will be primarily from stationary mechanical equipment, the L_{10} level of 60-dBA was used for residential land uses for the offsite receptors. The L_{10} sound level limit of 70-dBA was used for commercial land uses for the site property boundary.

The projected Day L_{10} sound levels with both facilities operating simultaneously will range from 49-dBA at Location 2 to 63-dBA at Location 3. It should be noted that existing Day L_{10} noise level at Location 3 was above the L_{10} maximum allowable sound level due to existing traffic conditions. The proposed facilities did not increase the existing L_{10} level; therefore, Location 3 is in compliance with the PBC noise ordinance. The projected Day L_{10} sound levels would be below L_{10} level of 60-dBA at the other two-offsite locations. The projected Night L_{10} sound levels at all three offsite locations would be below the 60-dBA sound level limit. The projected Day L_{10} sound level at the site property boundary would be 70-dBA, which would be at the 70-dBA sound level limit. The Night L_{10} sound level of 69-dBA would be below the 70-dBA sound level limit.

Tables 5-4 through **5-6** present the results of the noise impact analysis.

Table 5-4 Projected Facilities L_{eq} Sound Levels

Receptor Locations		Distances From Facilities (ft)		Existing L_{eq} Levels (dBA)		Projected L_{eq} Levels (dBA)					
						Lime Facility		Biosolids		Total	
Id.	Description	Lime	Biosolids	Day	Night	Day	Night	Day	Night	Day	Night
1	Property Boundary	386	165	59	45	66	64	67	66	69	69
2	Park Avenue/Eadie Place	5,248	4,920	48	44	49	46	48	45	49	46
3	Park Avenue/45th Street	6,013	5,685	59	47	59	48	59	47	59	48
4	47th Place/School	7,653	7,216	49	48	49	49	49	48	49	49

Table 5-5 Projected L_{eq} Sound Level Increases

Receptor Locations		Projected L_{eq} Level Increases					
		Lime Facility		Biosolids		Total	
Id.	Description	Day	Night	Day	Night	Day	Night
1	Property Boundary	6	20	8	21	10	24
2	Park Avenue/Eadie Place	1	2	0	1	1	2
3	Park Avenue/45th Street	0	1	0	0	0	1
4	47th Place/School	0	0	0	1	0	1

Table 5-6 Projected Facilities L_{10} Sound Levels

Receptor Locations		Total Projected L_{10} Levels		Palm Beach County Noise Ordinance		Compliance?
Id.	Description	Day	Night	Day	Night	Yes/No
1	Property Boundary	70	69	70	70	Yes
2	Park Avenue/Eadie Place	50	47	60	60	Yes
3	Park Avenue/45th Street*	63	50	60	60	Yes
4	47th Place/School	51	50	60	60	Yes

Note: * Location 3 existing Day L_{10} noise level was above the L_{10} maximum allowable sound level due to existing traffic conditions. The proposed facility did not increase the existing L_{10} level; therefore, it is compliance with the Palm Beach County noise ordinance.

5.6.3 Conclusions

The operations of the LRF and BPF separately or together are not anticipated to generate perceptible noise at offsite locations. Sound levels at the site property boundary would increase significantly; however, there are no residential or sensitive receptors adjacent to the site. In addition, projected L_{10} sound levels would meet the PBC residential and commercial maximum permissible sound level limits.

5.7 Changes in Non-Aquatic Species Populations

5.7.1 Impacts

No wetland impacts are anticipated as a result of the project and these facilities are expected to have minimal impact on the rookery activities. A detailed report on wetlands and endangered species is provided in Appendix H.

5.8 Other Facilities Operation Effects

5.8.1 Transportation

This section summarizes the results of the traffic impact analysis for the operations of the proposed LRF and BPF. This traffic impact analysis was conducted to evaluate traffic impacts from both operations. Existing average daily traffic volumes were obtained from the PBC Metropolitan Planning Organization (MPO). These data were used to characterize existing conditions, to estimate future traffic baseline conditions and to evaluate potential traffic impacts from the project in 2004 (facilities begin operation) and 2009 (horizon year).

5.8.1.1 Existing Conditions

The portion of 45th Street between Jog Road and Haverhill is approximately 1.5 miles long. The roadway is a two-lane arterial road that is relatively flat, and straight with a width of 30 feet. There are no posted truck or weight restrictions, and the average vehicle travel speed is approximately 45 miles per hour.

The most recent average daily traffic (ADT) counts were obtained from the PBC MPO website (http://www.co.palm-beach.fl.us/MPO) for the portion of 45th Street between Jog Road and Haverhill Road. The ADT volumes were 3,640 vehicles per day on 45th Street east of the Florida Turnpike.

5.8.1.2 Impacts

The Florida Department of Transportation (FDOT) guidance requires evaluating the traffic conditions with and without the project for the year project will begin operation and for a five year horizon year. It is anticipated that the LRF and BPF would begin in 2004. Therefore, the horizon year evaluated in this traffic impact analysis is 2009. A comparison of the baseline and project-related traffic volumes was conducted to assess potential traffic impacts.

A background growth of 4.6 percent per year was used to estimate the future baseline traffic volumes without the project. This background traffic growth rate is based on historical ADT count data for 1996-2000 obtained from the PBC MPO website. This 4.6 percent growth rate was applied to existing 2000 traffic volumes of 3,640 on 45th Street to estimate 2004 and 2009 future baseline ADT volumes. In addition, a Costco Distribution Warehouse is expected to be built on 45th Street and in operation by 2003. The average daily traffic volume is estimated to be 1,169 vehicle trips per day. These vehicle trips were added to background traffic volume. It is estimated that the 2004 and 2009 future baseline ADT volumes will be 5,591 and 6,967, respectively.

Trip Generation

Lime sludge would be delivered by dump truck to the LRF. The dump trucks would use close-fitting tarps to secure lime sludge from spilling, as required under Florida Statute Title XXIII, Chapter 316. It is estimated that approximately 47 trucks per day would deliver lime sludge to the LRF.

In addition, approximately 400 wet tons of sludge at 12 to 15 percent solids would be delivered to the BPF in approximately 24 dump trucks or trailer trucks per day.

There will also be approximately 12 plant operator (employee) vehicles traveling to both facilities (four at the LRF and 8 at the BPF) on a daily basis. Therefore, the total number of additional vehicles generated by the LRF/BPF would be approximately 83 per day.

Trip Distribution

It was assumed that this portion of 45th Street between the facility site and Haverhill Road would receive 100 percent of the haul truck trips and employee vehicle trips to and from the site. It is assumed the 50 percent of the truck and employee vehicle trips would use Jog Road and 50 percent would use Haverhill Road to access and egress the site.

Operations

The project-related LRF and BPF traffic volumes were added to the future baseline traffic volumes and divided by the future baseline traffic volumes without the project to estimate the percent increase in traffic volumes due to the project.

The 2004 project-related average weekday traffic increase would be by 3.0 percent on 45th Street. By 2009, the project-related weekday traffic increases would decrease slightly from those projected in 2004 to 2.4 percent. This is because the future background traffic growth rate over the two-year construction period would increase faster than the overall increase in traffic due to the project. These traffic increases are considered minor. In addition, the PBC MPO's 2025 Long Range Transportation Plan calls for the construction of full highway interchange on the Florida Turnpike to connect with 45th Street during the 2011-2015 phase of the plan. If constructed, this interchange would help to reduce the amount of haul and dump trucks using local roads. **Table 5-7** presents the results of the traffic impact analysis.

5.8.2 Downstream Impacts

No stormwater runoff would be directly discharged from the site. Therefore, no downstream impacts as a result of uncontrolled discharges would occur.

Table 5-7 Traffic Impact Analysis

Year	Average Daily Traffic (ADT) Volume	Background Growth in ADT Volume	Project-Related ADT Volume	Project-Related Traffic Increase (%)
2000	3,640	--	--	--
2004 without Project	5,591	1951	--	--
2004 with Project	5,725	2,805	166	3.0
2009 without Project	6,967	3,327	--	--
2009 with Project	7,101	3,461	166	2.4

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Appendix A
Existing PPSA Conditions of Certification Case No. PA 84-20

Palm Beach County Resource Recovery Facility
Case No. PA 84-20
CONDITIONS OF CERTIFICATION

TABLE OF CONTENTS

Last Updated: 08/28/01

State of Florida
Palm Beach County
Resource Recovery Facility
Case No. PA 84-20
CONDITIONS OF CERTIFICATION

I. CHANGE IN DISCHARGE

All discharges or emissions authorized herein shall be consistent with the terms and conditions of this certification. The discharge of any regulated pollutant not identified in the application, or more frequent than, or at a level in excess of that authorized herein, shall constitute a violation of the certification. Any anticipated facility expansions beyond the certified initial nameplate capacity of 2,000 TPD, production increases, or process modifications which may result in new, different, or increased discharge of pollutants, change in type of fuel as described in XIV.B., or expansion in steam generating capacity must be reported by submission of a supplemental application pursuant to Chapter 403, Florida Statutes.

II. NONCOMPLIANCE NOTIFICATION

If, for any reason, the Permittee (defined as the Applicant, Palm Beach County Solid Waste Authority or assigns) does not comply with or will be unable to comply with any limitation specified in this certification, the Permittee shall notify the Southeast Florida District Office of the Department of Environmental Regulation (Southeast District Office) and the Palm Beach County Health Department (PBCHD) by telephone within a working day that said noncompliance occurs and shall confirm this in writing within seventy-two (72) hours of becoming aware of such conditions, and shall supply the following information:

A. A description of the discharge and cause of noncompliance; and

B. The period of noncompliance including exact dates and times, or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying event.

III. FACILITIES OPERATION

The Permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the Permittee to achieve compliance with the terms and conditions of this certification. Stoppages of landfill operations induced by weather conditions shall be allowed until the weather permits operations to resume. In the event of a malfunction of a resource recovery boiler's pollution control system that unit's furnace emissions must be shifted to the extent feasible to the remaining unit having a properly functioning pollution control system. In the event of a prolonged [thirty (30) days or more] equipment malfunction or shutdown of air pollution control equipment, operation could be permitted to continue to take place under a consent order, only if the Permittee demonstrates that such operation will be in compliance with all applicable ambient air quality standards and PSD increments, solid waste rules, domestic waste rules and industrial waste rules. Additionally, during such malfunction or shutdown, the source shall comply with all other requirements of this certification and all applicable state and federal emission standards not affected by the malfunction or shutdown which is the subject of the consent order. Administrative action will not be initiated in the event of such a malfunction for 25 days following a malfunction unless there is an imminent health threat. However, if at thirty (30) days following a malfunction compliance has not been achieved by the source, an order for Corrective Action may be immediately imposed upon the Applicant, subject to the provisions of Chapter 120 of the Florida Statutes. Operational stoppage exceeding two hours for air pollution control systems or four hours for other systems or operational malfunctions as noted below exceeding two hours for air pollution control systems or four hours for other systems and as defined in the operational contingency plans as specified in Condition XVII are to be reported as specified in Condition II. Identified operational malfunctions which do not stop operation but do compromise the integrity the operation shall be reported to the Southeast District Office as specified in Condition II.

IV. ADVERSE IMPACT

The Permittee shall take all reasonable steps to minimize any adverse impact resulting from noncompliance with any limitation specified in this certification, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

V. RIGHT OF ENTRY

The Permittee shall allow during operational hours the Secretary of the Florida Department of Environmental Protection and/or authorized representatives, upon the presentation of credentials:

A. To enter upon the Permittee's premises where an effluent source is located or in which records are required to be kept under the terms and conditions of this certification, and

B. To have access during normal business hours (Mon.-Fri., 9:00 A.M. to 5:00 P.M.) to any records required to be kept under the conditions of this certification for examination and copying, and

C. To inspect and test any monitoring equipment or monitoring method required in this certification and to sample any discharge or pollutants, and

D. To assess any damage to the environment or violation of ambient standards.

VI. REVOCATION OR SUSPENSION

This certification may be suspended or revoked for violations of any of its conditions pursuant to Section 403.512, Florida Statutes.

VII. CIVIL AND CRIMINAL LIABILITY

This certification does, not relieve the Permittee from civil or criminal penalties for noncompliance with any conditions of this certification, applicable rules or regulations of the Department or Chapter 403, Florida Statutes, or regulations thereunder.

Subject to Section 403.511, Florida Statutes, this certification shall not preclude the institution of any legal action or relieve the Permittee from any responsibilities or penalties established pursuant to any other applicable State Statutes, or regulations.

VIII. PROPERTY RIGHTS

The issuance of this certification does not convey any property rights in either real or personal property, nor any exclusive privileges, nor does it authorize any injury to public or private property or any invasion of personal rights nor any infringement of Federal, State or local laws or regulations.

IX. SEVERABILITY

The provisions of this certification are severable, and if any provision of this certification or the application of any provision of this certification to any circumstances, is held invalid, the application of such provisions to other circumstances and the remainder of the certification shall not be affected thereby.

X. DEFINITIONS

The meaning of terms used herein shall be governed by the definitions contained in Chapter 403, Florida Statutes, and any regulations adopted pursuant thereto. In the event of any dispute over the meaning of a term in these conditions which is not defined in such statutes or regulations, such dispute shall be resolved by reference to the most relevant definitions contained in any other state or federal statute or regulation. Words or phrases used herein dealing with conditions of the South Florida Water Management District (SFWMD) shall be defined by reference to Chapter 373, Florida Statutes or applicable rules of the SFWMD. Contaminated water shall include leachate and runoff that have been in contact with ash or solid waste.

XI. REVIEW OF SITE CERTIFICATION

The certification shall be final unless revised, revoked or suspended pursuant to law. At least every five years from the date of issuance of certification the Department shall review all monitoring data that has been submitted to it during the preceding five-year period for the purpose of determining the extent of the Permittee's compliance with the conditions of this certification and the environmental impact of this facility. The Department shall submit the results of its review and recommendations to the Permittee. Such review will be repeated at least every five years thereafter.

XII. MODIFICATION OF CONDITIONS

A. Pursuant to Subsection 403.516(1), Florida Statutes, the Board hereby delegates the authority to the Secretary to modify any condition of this certification dealing with sampling, monitoring, reporting, specification of control equipment, boiler capacity, related time schedules, emission limitations (subject to notice and opportunity for hearing), conservation easements, or any special studies conducted, as necessary to attain the objectives of Chapter 403, Florida Statutes. Requests for modifications of monitoring requirements shall not be unreasonably withheld by the Department.

B. This certification shall be automatically modified to conform to any subsequent amendments, modifications, or renewals made by the Department under a federally delegated or approved program to any separately issued Prevention of Significant Deterioration (PSD) permit, Title V air permit, or National Pollutant Discharge Elimination System (NPDES) permit for the certified facility. The Permittee shall send each party to the original certification proceedings (at the party's last known address as shown in the record of such proceeding) notice of requests for modifications or renewals of the above listed permits if the request involves a relief mechanism (e.g., mixing zone, variance, etc.) From standards, a relaxation of conditions included in the permit due to state permitting requirements, or the inclusion of less restrictive air emission limitations in the air permits. The Department shall notify all parties to the certification proceeding of any intent to modify conditions under this section prior to taking final agency action.

C. All other modifications to these conditions shall be made in accordance with Section 403.516, Florida Statutes.

XIII. CONSTRUCTION

The facility shall be constructed, at a minimum, pursuant to the design standards presented in the application and the standards or plans and drawings submitted and signed by an engineer registered in the state of Florida. The Applicant shall present upon request, specific facility plans, as developed, for review by the Southeast District Office, South Florida Water Management District and PBCHD prior to construction pursuant to the portions of the plans then being submitted. Specific Southeast District Office approval of plans will be required based upon a determination of consistency with approved design concepts, regulations and these Conditions prior to initiating construction of the: leachate collection system, air pollution control equipment, wastewater treatment and disposal systems, composting operations, domestic waste and septage handling and treatment systems, stormwater runoff system, landfill closure plans and hazardous, toxic or pathological handling facilities or areas. Review and action by the Southeast District Office or SFWMD on said plans shall be accomplished in no longer than ninety (90) days from the date of a complete submittal of such plans and any action may be subject to review pursuant to Chapter 120, Florida Statutes. Approvals shall not be unreasonably withheld.

A. Control Measures

1. Stormwater Runoff

To control runoff during construction which may reach and thereby pollute Waters of the State, necessary measures shall be utilized to settle, filter, treat or absorb silt-containing or pollutant-laden stormwater to ensure against spillage or discharge of excavated material that may cause turbidity in excess of 29 Nephelometric Turbidity Units above background in Waters of the State. Control measures may consist of sediment traps, barriers, berms, and vegetation plantings. Exposed or disturbed soil shall be protected and stabilized as soon as possible to minimize silt and sediment-laden runoff. The pH of the runoff shall be kept within the range of 6.0 to 8.5. The Permittee shall comply with Florida Administrative Code Chapter 62-302 and 40F-4. The Permittee shall complete the forms required by 40E-4 and submit those forms and the required information to the SFWMD and Southeast District Office for approval no later than 90 days prior to start of construction, including design drawings indicating flow drainage plans during facility construction and operation. To prevent the discharge-of turbid water (greater than 29 NTU's above background) from the site during construction, a temporary berm with 3H:1V side s lopes and an elevation sufficient to contain the 25 year, 3 day storm event shall be constructed around the resource recovery site (except for the landfill areas and Jog Road) prior to commencement of work on the facility.

2. Burning

Open burning in connection with land clearing shall be in accordance with Chapter 62-256, F.A.C., and Uniform Fire Code Section 33.101 Addendum. No additional permits shall be required, but prior to each act of burning, the Division of Forestry shall be contacted to determine if satisfactory conditions exist for burning. Open burning shall not occur if the Division of Forestry or Palm Beach County Fire and Rescue Department has issued a ban on burning due to fire hazard conditions.

3. Sanitary Wastes

Disposal of sanitary wastes from construction toilet facilities shall be in accordance with applicable regulations of the appropriate local health agency.

4. Solid Wastes

Solid wastes resulting from construction shall be disposed of in accordance with the applicable regulations of Chapter 62-701, F.A.C.

5. Noise

Construction noise shall not exceed either local noise ordinance specifications, or those noise standards imposed by zoning.

6. Dust

The Permittee shall employ proper dust-control techniques to minimize unconfined emissions.

7. Transmission Lines

The directly associated transmission lines from the Resource Recovery Facility electric generators to the existing Florida Power and Light Company transmission system shall be cleared, maintained and prepared without the use of herbicides. Construction of a substation on the certified site east of the Turnpike shall not be allowed without a supplemental application and demonstration of compliance with sections 403.508(1) and (2), F.S.

8. Conservation Easement

Before the commencement of any construction herein authorized, the Permittee shall file and have recorded, in the same manner as any other instrument affecting the title to real property, a conservation easement pursuant to Section 704.06, Florida Statutes, in the office of the Clerk of the Circuit Court, Palm Beach County, for the designated conservation area identified in the mitigation plan, west of Jog Road and the Resource Recovery Facility west to the Water Catchment Area excluding operational areas.

The Permittee shall pay all recording fees. The conservation easement shall be in favor of the Department of Environmental Protection and shall restrict any activity including dredging and filling of land, cutting, eradicating or pruning of endemic vegetation beyond the scope of the approved mitigation plan indicated in Section 4.2 of the application and Condition XX. A draft conservation easement and a certified survey with a legal description shall be submitted to the Southeast District Office for review and approval before it is filed (by the County) with the Clerk of the Circuit Court. Palm Beach County.

9. Written Notice

Written notice from the Department indicating that Condition No. XIII.A.8. has been satisfied shall be obtained by the Permittee prior to the beginning of any construction. All mitigation in the shell pit area shall be in accordance with the time schedule outlined in the mitigation plan approved per Condition XX.

10. Time Limitations

If the proposed construction of the resource recovery facility, within the jurisdiction area, has not been completed within 5 years of the date of certification, a permit application shall be resubmitted to the Department for evaluation and shall be accompanied by the appropriate tee.

11. Monitoring .

The following surface water monitoring program shall be implemented during construction for:

Parameter: Dissolved oxygen, temperature (C°), pH, total and fecal coliform bacteria, salmonella, iron, lead, copper, mercury, cadmium, zinc, silver and turbidity.

Frequency: Quarterly throughout the year except that the samples shall be collected monthly for April, June, August and September. Sampling shall begin at least 30 days prior to initial construction for background levels. All samples shall be taken for a 24 hour period, at 4 hour intervals beginning one hour before sunrise.

Sampling Locations: At the discharge to the EPB-10 canal.

Analyses: Water quality analyses should be performed at detection levels commensurate with water quality criteria for Class III waters (F.A.C. rule 62-302.530). Samples shall be collected in accordance with Standard Methods for Examination of Water and Wastewater and analyzed by a DHRS certified laboratory.

If a violation occurs for any sampled parameter, the Permittee shall, after notifying Department, institute corrective action to abate the violation if it is the result of activities of the Permittee. Corrective action may include further monitoring to determine the extent and degree of violation. Any modifications shall be coordinated with the Southeast District Office. Department approval shall be obtained prior to any action constituting a modification of this permit.

All monitoring reports shall be submitted to the DEP Southeast District Office, PBCHD and the SFWMD under a cover letter containing the following information: (1) certification number; (2) handling, storage and methods of analysis of the samples; (3) a map indicating the sampling locations; and (4) a statement by the individual responsible for implementation of the sampling program concerning the authenticity, precision, limits of detection and accuracy of the data. Monitoring reports shall also include the following information for each sample that is taken:

(1) time of day samples taken;

(2) depth of water body;

(3) depth of sample;

(4) antecedent weather conditions;

(5) tidal stage and direction of flow; and

(6) wind direction and velocity.

(7) status of flow from site stormwater discharge structure. (flowing or not flowing)

Monitoring reports shall be submitted to the Southeast District, PBCHD and SFWMD within 2 weeks of completion of analysis for each sampling period.

12. Protection of Vegetation

The Permittee shall develop the construction site and shall develop the mitigation areas so as to retain endangered and threatened plants, or replant these plants in another suitable environment. Any endangered or threatened plants should be staked in the field or relocated, as appropriate, prior to commencement of any construction or site preparation activities.

13. Dewatering Operations

There shall be no dewatering operations during construction without approval of SFWMD pursuant to XVI.E. Such approval may be obtained by submitting an application to SFWMD at least 90 days prior to start of dewatering operations. Any discharge of water from dewatering operations shall not violate water quality standards.

14. Borrow Material

Prior to excavation of any borrow material from the northeastern portion of the site for use on this project, a hydrogeological assessment of the effects of the existing excavation as well as continued excavation in this area shall be provided to the Department and the SFWMD. No further excavation shall take place until the Department and the SFWMD concur in writing that the location, depth, method of mining, etc., of the excavation will not pose a further threat to groundwater quality in the area.

15. Radio Tower Relocation

The radio tower shall be relocated as shown on the application materials submitted on August 9 and October 2, 1995, in accordance with the following:

a. The fill placed in the borrow pit shall be clean fill.

b. Turbidity curtains shall be placed as shown in the drawings submitted with the application and shall remain in place until the site is stabilized.

c. The side slopes of the tower pad and borrow pit shall be seeded and mulched within 48 hours of final grading.

B. Environmental Control Program

An environmental control program shall be established under the supervision of a qualified individual to assure that all construction activities conform to applicable environmental regulations and the applicable conditions of certification.

If harmful effects or irreversible environmental damage not anticipated by the application or the evidence presented at the certification hearing are detected during construction, the Permittee shall notify the Southeast District Office as required by Condition II.

C. Reporting

1. Notice of commence of construction shall be submitted to the Southeast District Office, PBCHD and SFWMD within 15 days of initiation. Starting three (3) months after construction commences, a quarterly construction status report shall be submitted to the Southeast District Office. The report shall be a short narrative describing the progress of construction,

2. Upon or immediately prior to completion of construction of the resource recovery facility or a phase thereof and upon or immediately prior to completion of all necessary preparation for the operation of each landfill cell, the Southeast District Office, PBCHD and SFWMD will be notified of a date on which a site or facility inspection should be performed in accordance with Condition V, and the inspection shall be performed within fourteen (14) days of the date of notification by Permittee.

XIV. OPERATION

A. Air

The operation of the Resource Recovery Facility shall be in accordance with all applicable provisions of Chapter 62-204, 62-210, 62-256, 62-296, 62-701, and 62-704, Florida Administrative Code. In addition to the foregoing, the Permittee shall comply with the following specific conditions of certification:

1. Emission Limitations upon operation of Units 1 and 2

a. Stack emissions from each unit shall not exceed the following:

(1) Particulate matter: 0.015 grains per standard cubic foot dry gas corrected to 12% CO_2.

(2) SO_2: 70% removal or 30 ppmvd at 7% O_2, whichever is less stringent (24-hour geometric mean).

(3) Nitrogen Oxides: 0.48 lbs/MBtu heat input.

(4) Carbon Monoxide: 400 ppmvd corrected to 7% O_2 (1-hour average); 200 ppm ppmvd corrected to 7% O_2 (24-hour

average).

(5) Lead: 0.0004 lbs/MBtu heat input.

(6) Mercury: 3200 grams/day for the entire facility or when firing sludge or 0.00024 lbs/MBtu whichever is more stringent.

(7) Odor: there shall be no objectionable odor at the site boundary.

(8) Visible emissions: the opacity from each unit shall not exceed 10%, six minute average. CEM readings shall be excluded from averaging calculations when the process is not operating.

(9) Fluoride: 0. 0032 lb/MBtu heat input

(10) Beryllium: 7.3xE^{-7} lb/MBtu heat input

(11) VOC: 0.016 lb/MBtu heat input

(12) Hydrogen Chloride: 90% removal or 25 ppmvd at 7% O_2, whichever is less stringent (24 hour average).

(13) Dioxins/Furans: Emissions of Total dioxins/furans (Tetra through Octa-chlorinated dibenzo-p dioxins and dibenzofurans) shall not exceed 60 ng/dscm at 7% O_2.

b. The height of the boiler exhaust stack shall not be less than 250 feet above grade.

c. The maximum boiler heat input shall not exceed 412.5 Mbtu per hour. This corresponds to a name plate rating of 324,000 pounds per hour steam capacity.

d. The incinerator boilers shall have a metal name plate affixed in a conspicuous place on the shell showing manufacturer, model number, type waste, rated capacity and certification number.

e. Compliance with the limitations for particulates, sulfur oxides, nitrogen oxides, carbon monoxide, fluoride, HCl, VOC, mercury, dioxins and furans, and lead shall be determined in accordance with Florida Administrative Code Rule 62-296, DEP Methods 1,2, 3, and 40 CFR 60, Appendix A, Methods 5, 6 or 6C, 7, 8, (modified with prefilter), 10, 12, 13A or 13B (or modified method 5 for fluorides), and 18, 19, 23, 26, and 101A or other methods as approved by the DEP. The stack test for each unit shall be performed at $\pm$10% of the maximum heat input rate of 360.0 x 10^6 Btu per hour or the maximum charging rate of 58,333 pounds of MSW per hour. Compliance with the beryllium emission limitation shall be determined in accordance with 40 CFR 61, Method 103 or 104, Appendix B. Particulate testing shall include one run during representative soot blowing which shall be averaged proportionally to normal daily operations. Visible emission testing shall be conducted simultaneously with soot blowing and non-soot blowing runs.

2. Emission Control Equipment

a. The boiler particulate emission control devices shall be designed and constructed to achieve a maximum emission rate of 0.015 grains per dscf corrected to 12% CO_2. All other particulate control devices shall be designed to meet the provisions of section 17-2.610.

b. The fluoride, HCl and sulfuric acid mist gas controls system shall be designed to remove at least 90% of the maximum projected inlet concentrations.

c. The Permittee must submit to the Department, within thirty (30) days after it becomes available, copies of technical data pertaining to the selected emissions control systems. These data should include, but not be limited to, guaranteed efficiency and emission rates, and major design parameters. The data shall be processed and approved or denied in accordance with F.S. 120.60.

3. Air Monitoring Program

a. The Permittee shall install and operate continuously monitoring devices for flue gas oxygen, SO_2, NOx, CO, and opacity. The monitoring devices shall meet the applicable requirements of Chapter Chapter 62-296.405(1)(f), F.A.C., and 40 CFR 60.45, and 40 CFR 60.13, including certification of each device in accordance with 40 CFR 60, Appendix B, Performance Specifications, and 40 CFR 60.7 (a)(5). Recertification shall be conducted annually from initial certification. Data on monitoring equipment specifications, manufacturer, type, calibration and maintenance needs, and its proposed location after the economizer or in the air pollution control equipment shall be provide to the Department for approval prior to installation.

b. The Permittee shall provide sampling ports in the air pollution control equipment outlet duct or stack and shall provide access to the sampling ports in accordance with Section 62-297.310(6), F.A.C.. Drawings of testing facilities including sampling port locations as required by Section 62-297.310(6) shall be submitted to the Department for approval at least 120 days prior to construction of the sampling ports and stack.

c. The Permittee shall have a sampling test of the emissions from each unit, including mercury, beryllium, and fluoride, performed by a commercial testing firm within 180 days of the issuance of this permit. A sampling test of the emissions from each unit, including mercury, shall then be performed by a commercial testing firm annually thereafter, except for beryllium and fluoride which shall be sampled every fifth year thereafter. Thirty days prior notice of the initial sampling test shall be provided to the Southeast District and PBCHD. Fifteen days prior notice shall be provided for subsequent sampling tests.

4. Reporting

a. Two copies of the results of the emissions tests for the pollutants listed in XIV A.1.a. shall be submitted within forty-five days of the last sampling run to the Southeast District Office and PBCHD.

b. Emissions monitoring shall be reported to the Southeast District Office and PBCHD on a quarterly basis in accordance with Section 62-297.310(8), F.A.C., and 40 CFR, Part 60, Subsection 60.7.

c. Notice of anticipated and actual start-up dates of each incinerator boiler shall be submitted to the DEP Southeast District Office and PBCHD.

5. Unconfined Emissions

Proper dust control techniques such as water sprays or chemical wetting agents or other containment method shall be used to control visible unconfined (Fugitive) emissions to the outside air no more than 10% opacity as determined by DEP Method 9 for unconfined resource recovery processes. Proper techniques shall also be used to control such emissions to prevent them from crossing the property line to no more than three (3) minutes (cumulative) in any fifteen (15) minute period as determined by 40 CFR 60, Appendix A, Method 22, with observations being made along the property line. Visible emissions shall not include uncombined water vapor or engine exhausts.

6. Landfill Gas Collection and Flare System

a. These emissions units may operate continuously, i.e., 8,760 hours/year. [Rule 62-210.200, F.A.C., Definitions-potential to emit (PTE)]

b. The owner or operator shall comply with the applicable requirements of 40 CFR 60 Subpart WWW, Standards of Performance for Municipal Solid Waste Landfills. [Rule 62-204.800 (7)(b), F.A.C., and 40 CFR 60 Subpart WWW]

2 Flares
Class I 1800 scfm
Class II 1800 scfm

c. The owner or operator shall not allow more than ~~1800~~ scfm of landfill gas to be directed to each flare. The actual flow rate shall be determined for each flare on a monthly average basis by dividing the measured flow by the hours that each flare was operated each month. Compliance with this limitation shall be by measuring shall be by measuring landfill gas flows to each flare and recording flows with a totalizing meter. Records of the totalizing meter values shall be recorded in an operators log monthly or whenever the meter is reset for any purpose, whichever is more frequent. The owner or operator shall maintain a strip chart recorder to record the flow rate to each flare as a backup device in the event that the totalizer meter is not functioning. The strip chart recorder shall also be used in conjunction with an operator's log to document the hours each month that each flare was operated. [Rule 62-4.070(3), F.A.C., and request of the applicant]

d. Pursuant to 40 CFR 60.18, General Control Device Requirements, the owner or operator shall comply with the following requirements for flares.

(1)(a) Flares shall be designed for and operated with no visible emissions as determined by the methods specified in condition XIV.A.6.d.(4), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

(b) Flares shall be operated with a flame present at all times, as determined by the methods specified in condition XIV.A.6.d.(4).

(c) Flares shall be used only with the net heating value of the gas being combusted being 7.45 MJ/scm (200 Btu/scf) or greater if the flare is non-assisted. The net heating value of the gas being combusted shall be determined by the methods specified in XIV.A.6.d.(4).

(d) Non-assisted flares designed for and operated with an exit velocity, as determined by the methods specified in XIV.A.6.d.(4)(d), and less than 122 m/sec (400 ft/sec) are allowed.

(2) Owners or operators of flares used to comply with the provisions of this subpart shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs. Applicable subparts will provide provisions stating how owners or operators of flares shall monitor these control devices.

(3) Flares used to comply with provisions of this subpart shall be operated at all times when emissions may be vented to them.

(4)(a) Reference Method 22 shall be used to determine the compliance of flares with the visible emission provisions of this subpart. The observation period is 2 hours and shall be used according to Method 22.

(b) The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.

(c) The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = KS_i(C_i H_i); \quad i = 1, 2, \ldots, n$$

where:

H_T = Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C;

K = Constant, 1.740×10^{-7} (1/ppm) (g mole/scm) (MJ/kcal) where the standard temperature for (g mole/scm) is 20° C;

C_i = Concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946–77 (Incorporated by reference as specified in 40 CFR 60.17); and

H_i = Net heat of combustion of sample component i, kcal/g mole at 25°C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382-76 (incorporated by reference as specified in 40 CFR 60.17) if published values are not available or cannot be calculated.

(d) The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D as appropriate; by the unobstructed (free) cross sectional area of the flare tip.

(e) The maximum permitted velocity, V_{max}, for flares complying with condition XIV.A.6.d.(4) shall be determined by the following equation.

$$\mathrm{Log}_{10}(V_{max}) = \frac{(H_T+28.8)}{31.7}$$

where:

V_{max} = Maximum permitted velocity, M/sec

28.8 = Constant

31.7 = Constant

H_T = The net heating value as determined in paragraph (f)(3).

[Rule 62-204.800(7)(b), F.A.C., and 40 CFR 60.18]

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e. The owner or operator shall annually determine and report the actual exit velocity of each flare using the methods specified in 40 CFR 60.18. The owner or operator shall annually analyze and report the sulfur content of the landfill gas directed to each flare using ASTM Method D1072-90, or later method. The actual exit velocity and sulfur content shall be reported to the Department as an attachment to the facility's annual operating report. [Rule 62-4.070(3), F.A.C., and requirement of previous PSD FL-108(B)]

B. Fuel

The Resource Recovery Facility shall utilize refuse such as garbage and trash (as defined in Chapter 62-701.200(9), F.A.C.) and natural gas recovered from landfills as its fuel. Use of alternate fuels except for distillate fuel oil or natural gas in start-up burners would necessitate modification to these Conditions of Certification. Refuse as fuel shall not include "hazardous waste" as defined in

Chapter 62-730.030, F.A.C. The alternate fuel shall not contain more than 0.3% sulfur and not be used more than required during boiler startup or shutdown.

C. Wastewater Disposal

1. Plans drawings and specifications for leachate collection systems, pumps, lift stations, sewage collection systems, sewage treatment systems, wastewater treatment systems, deep injection wells, and wastewater collection systems shall be furnished to the Southeast District Office, PBCHD and the SFWMD for approval at least 90 days prior to start of construction for the particular of such component. All items submitted pertaining to the injection wells shall be directly distributed to the Technical Advisory Committee (TAC) for approval.

2. The deep injection well shall be designed and operated in conformance with Chapter 62-528, F.A.C., and all other applicable rules.

3. The injection well system specifications and plans shall be submitted to the Technical Advisory Committee (TAC) at the Southeast Florida District Office for review and approval prior to beginning the bidding process.

4. The surge protection system design calculations and operational features shall be submitted to all members of the department's Technical Advisory Committee (TAC) for approval prior to construction of the deep well injection system.

5. The successful bidder to construct the injection well system shall submit engineering details and drawings of the packer assembly to the TAC for approval prior to construction of the injection well system.

6. If the successful bidder chooses to use corrosion inhibitor(s) with the fresh water-in the monitoring annulus surrounding the 8" injection tubing, this choice of inhibitors shall be submitted to the TAC for approval.

7. The 40" casing for each disposal well shall be set and cemented to the base of the surficial aquifer or to the confining beds below all producing zones used for drinking water, private or public, supplied within the area of review. If the applicant proposes to set and cement the 40" casing above the Hawthorn Formation, he shall provide site specific hydrogeological information, acceptable to the TAC, confirming that confining strata do in fact exist above the Hawthorn. These data shall be obtained by drilling a pilot hole to the top of the Hawthorn Formation prior to enlarging the hole for the 40" casing.

8. A drawing showing drilling pad dimensions and features (slopes, concrete thickness, storage tank capacities, curb height, etc.) shall be submitted to the TAC for approval prior to the drilling pad construction.

9. The applicant shall specify the disposal location-for excess mud, drill cuttings, drilling fluids, etc., for approval at the

preconstruction TAC meeting. Property owner's approval will be required in addition to regulatory approval.

10. The question of the timing of the temperature logging for pilot and cased holes shall be discussed at the preconstruction TAC meeting.

11. The daily drilling log shall include at least the following:

a. Information as to the volume (amount) of weighting materials used to control artesian flow.

b. Description of the lithology encountered during drilling.

c. Results of any water quality analyses.

d. Description of any problems or unusual conditions encountered during drilling and steps that have been taken to correct them.

e. Deviation survey results.

f. Any other information required by the consultant.

The report shall run from Friday to Thursday and be mailed to all TAC members on the following Friday.

12. Upon the beginning of the operation and the injection well system, the applicant will begin a sampling and testing regimen of all individual wastewater streams for the accumulation of data anticipating adverse impacts on the injection zone, formation materials, formation fluids and well construction materials. Sampling and analysis shall also include the investigation of the chemical nature of fluids being injected with respect to hazardous waste characteristics. The parameters to, be sampled for and the frequency of sampling shall be approved by the TAC before operation begins. Periodic review by the TAC will determine the need for continued sampling and/or need for additional or revised treatment before injection and/or need for revised estimates of the usable life of the injection system, increased frequency of mechanical integrity testing, etc.

13. Additional detail on proposed monitoring plans should address the following points:

a. Per 62-528,425(1)(e), F.A.C., within the area of review, the type, number, and location of wells to be used to monitor any potential migration of fluids into or in the direction of underground sources of drinking water (USDW's), and pressure in the USDU's; the parameters to be measured and the frequency of monitoring shall be submitted to DER prior to well construction. The applicant should discuss how these requirements are addressed.

b. Per 62-528,425(1)(f), F.A.C., the background water quality of the injection zone and the monitoring zones shall be determined prior to injection.

14. The applicant must, per 62-528.435(9), F.A.C., submit a certificate that they have ensured through a performance bond or other appropriate means, the resources necessary to close, plug or abandon the well.

15. The cementing program shall be designed with the use of ASTM Type II Cement. Other details of the program shall be made available upon request by the TAC or any of its members.

16. It may be assumed that since the project will be generating electric power there will never be the need for any on-site source of emergency power. The contractor's design shall address the need or lack thereof for an emergency power source to maintain the continuous operation of the injection well system.

17. The application states that the injection well system will have 100% redundancy. The contractor's design shall include standby pumping capability manifolded to both wells to insure continual injection capability.

18. The Contractor shall supply to the Engineer a complete list of spare parts and special tools to be included in the O & M Manual prepared for the Operating Permit Application.

19. The Contractor shall provide or have provided the means for checking grout sample density during casing cementing.

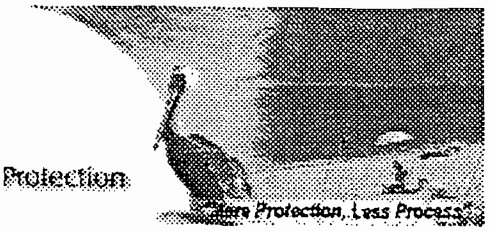
20. Cemented casings shall not be disturbed for 24 hours after the completion of cementing

21. The TAC chairman shall be notified at least 24 hours prior to performing any mechanical integrity testing.

Go to Part II of PA84-20

Return to Conditions Index

Florida
Department of Environmental Protection



continuation of Part I, PA 84-20

Palm Beach County Resource Recovery Facility
Conditions of Certification

D. Water Discharges

1. Surface Water

Any discharges from the site stormwater system via the emergency overflow structure which result from an event LESS than a ten-year, 24-hour storm (as defined by the U.S. Weather Bureau Technical Paper No. 40, or the DOT drainage manual, or similar documents) shall meet applicable State Water Quality Standards, Chapter 62-302, F.A.C., and Chapter 40 E.2 and 40 E.4, F.A.C .

2. Monitoring Surface Water

a. Sampling of water quality in the surface water management system shall be sampled at stations labeled 1, 2, 3, 4, 5, 6, and 7 as shown on sheets 18, 19, and 20 of 25 of Appendix 10.4 of the application dated December 3, 1985, as stated below:

Location of Stations:

1. discharge culvert at the southwest acreage of the Class I Landfill on sheet 20 of 25

2. overflow control structure at EPB-10 west of the Class I Landfill on sheet 20 of 25

3. box culvert at EPB-10 east of the Class I Landfill on sheet 20 of 25

4. discharge culvert west of the Class III Landfill on sheet 19 of 25

5. discharge culvert north west of the Class III Landfill on sheet 19 of 25

6. return dredge line from Dyer Landfill discharging into the existing borrow lake due north of the Class III Landfill on sheet 18 of 25

7. the center of the existing dredge lake one foot above

Last Updated: 08/28/01

the bottom.

Monitoring Type and Schedule	Parameters
1. General (Quarterly)	Total Organic Carbon, Dissolved Oxygen, pH, Turbidity, Specific Conductance, Chemical Oxygen Demand, Alkalinity, Total Suspended Solids, Ammonium N, Nitrate-N, Total Kjeldahl Nitrogen; Oil and Grease, Detergents, Total Coliform, Fecal Coliform, Fecal Streptococcus, Salmonella, Biochemical Oxygen Demand, Total Phosphorus and Chlorides
2. Metals (Semiannual)	Aluminum, Antimony, Beryllium, Cadmium, Copper, Cyanide, Iron, Lead, Mercury, Nickel, Selenium, Silver, Zinc, Arsenic and Chromium

b. Water quality reports shall be submitted within 30 days of receipt of analysis results to the Southeast District Office, PBCHD and SFWMD for distribution to the appropriate review personnel.

c. The monitoring program may be reviewed annually by the Department, and a determination made as to the necessity and extent of continuation of the program. Aspects of the program related to sampling, monitoring , reporting, and related time schedules may be modified in accordance with the provisions of condition number XII.

3. Groundwaters

All discharges to groundwaters, such as landfill leachate, shall be collected and treated as necessary, or otherwise be of high enough quality, to be able to meet the applicable Water Quality Standard of Section 62-520.400, F.A.C., within 100 feet of the landfill perimeter.

4. Groundwater Monitoring Program

a. Sampling of the shallow aquifer groundwater quality shall be conducted in at least eight well clusters and six interceptor wells in the site vicinity. At least one of these well clusters shall be up the hydrological slope from the landfill area to provide current background data. Other wells shall be located down the hydrologic slope from the landfill areas. All wells shall be surveyed by a state certified land surveyor and the locations of each well depicted on a topographical aerial map with the appropriate elevations noted for each well.

b. Operational background monitoring shall commence at least one year prior to operation of the resource recovery facility. Construction of monitoring wells and the collection of samples shall be in accordance with EPA recommended methods as contained in Procedures Manual for Ground Water Monitoring at Solid Waste Disposal Facilities (EPA/530/SW-611). The wells shall be deep enough to ensure that groundwater samples can be obtained with the groundwater table elevation at its estimated lowest point and shall be protected from damage and destruction. Samples shall be analyzed in accordance with the methods described in Chapter 62-522, F.A.C. Analyses shall be performed by laboratories which are approved by the Department of Health and Rehabilitative Services to conduct analyses pursuant to Section 403.863, F.S., the State Public Water Supply Laboratory Certification Program.

c. Sampling of groundwater quality of monitoring well clusters labeled M-1, M-2, M-3, M-4, M-5, M-6, M-7, M-8, IW-1, IW-2, IW-3, IW-4, IW-5, IW-6 as shown on Figure 4.2-1 dated December 2, 1985, shall be performed quarterly for all parameters for three years and thereafter as stated below:

Monitoring Type and Schedule	Parameters
1. General (Quarterly)	pH, Specific Conductance, Temperature, Chloride, Total Organic Carbon (TOC), Sulfate, Bicarbonate, Magnesium, Organic Nitrogen, Ammonia, Nitrate, Chemical Oxygen Demand, Color, Turbidity, Total Iron, Total Dissolved Solids (TDS), Zinc, Calcium, Manganese, Total Nitrogen, Ammonium
2. Yearly (After first three years)	M.A.B.S., Organics listed in S. 17-22.104, F.A.C., Trichloroethylene, Tetrachloroethylene, Carbon Tetrachloride, Vinyl Chloride, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Benzene, Ethylene Dibromide, Chlorinated Phenolic Compounds, Chlorides, Sodium, Lead, Copper, Nickel, Chromium, Cadmium, Iron, Mercury, Arsenic, Selenium, Barium, Silver, COD, Chemical Oxygen Demand, Total Coliform,

	Fecal Coliform, Fecal Streptococcus

d. Water quality monitoring reports shall be submitted within 30 days of receipt of analysis results to the Southeast District Office, the PBCHD and SFWMD. for distribution to the appropriate review personnel.

e. The monitoring program may be reviewed annually by the Department, and a determination made as to the necessity and extent of continuation of the program. Aspects of the program relation to sampling, monitoring, reporting, and related time schedules may be modified in accordance with the provisions of condition number XII.

E. Solid/Hazardous Waste

1. Operation of the associated landfill shall be done in accordance with all applicable portions of Chapter 62-701, F.A.C., including prohibitions, procedures for closing of the landfill, and final cover requirements, or, as provided in this condition (XIV.E.) in its entirety. The plans of the final landfill design shall be provided to the Department for review and approval at least 90 days prior to start of construction. The final plans for this Facility shall include provisions for the isolated temporary handling of suspected hazardous, toxic or pathological wastes. No solid wastes shall be placed in new lateral expansion cells after November 1, 1994, until water quality and leachate monitoring plans are approved pursuant to ss 62-701.510, F.A.C., and such plans are implemented. The maximum height of the Class I and III landfills shall be 160 feet NGVD with side slopes not steeper than 3H:1V (three feet horizontal to one foot vertical rise) in accordance with the application amendment dated April 29, 1994.

2. No suspected or known hazardous, toxic, or infectious wastes as defined by federal, state or local statutes, rules, regulations or ordinances shall be burned or landfilled at the site. The Permittee shall prepare and submit for approval to the South Florida District Office and PBCHD a written training program on the detection and handling of hazardous, toxic or infectious wastes.

3. Rodent and insect control shall be provided as necessary to protect the health and safety of site employees and the public. Pesticides used to control rodents, flies, and other vectors shall be as specified by the Florida Department of Agriculture and Consumer Services.

4. Storage of putrescible waste for processing shall not exceed storage capacity of the refuse bunker or tipping floor as designed on the approved plan, or be stored on the tipping floor for more than 48 hours.

5. Ash prior to transport to the landfill shall be stored in an enclosed building on an impervious surface or other method approved by the Southeast District Office. Final disposal of the ash shall be into the lined landfill or other method approved by the Southeast District Office. Any leachate generated within the building shall be collected and disposed of by a method approved

by the Southeast District Office. The Southeast District Office shall notify the SFWMD of the plans and specifications regarding the above referenced method.

6. A monthly report shall be prepared detailing the amount and type (putrescible, special wastes, boiler residue, etc.) of materials landfilled at the site, and the treatment provided (see condition XIV.E.2. above). These reports shall be furnished to the Southeast District Office and PBCHD quarterly, commencing 120 days after the Resource Recovery Facility becomes operational and is producing residues.

7. The temporary hazardous waste storage and transfer facility shall be designed, constructed and operated in conformance with section 62-730.171, F.A.C. The design of the facility operational procedures, personnel training program, contingency plans and closure plans shall be submitted to the department, PBCHD and SFWMD for review and approval.

8. All cells or disposal areas will be constructed to promote leachate drainage to provide for effective leachate-collection; all leachate collection in active or inactive cells shall be pumped or transported to the leachate collection system for transmission to the treatment system. Leachate collected above the primary liner shall be monitored quarterly for conductivity, pH, copper, arsenic, zinc, phenols, oil and grease and total organic halogens. Results of such monitoring shall be reported to the Southeast District Office and PBCHD. Leachate collected between the primary and secondary liners shall be monitored quarterly for conductivity, chlorides, ammonia, iron, sulfur, nitrates, and zinc. Results will be reported to the Southeast District Office and PBCHD quarterly. The monitoring parameters set forth herein may be modified dependent upon the type of liners utilized and the manufacturer's recommendations to protect the integrity of the liners due to the classes of chemical constituents in the leachate which will be in contact with the liner(s). The Permittee shall provide the Southeast District Office with a certified letter from the liner manufacturer stating what classes of chemical constituents could damage the liners' integrity and include those parameters as part of the quarterly monitoring program noted above.

9. An EPA toxicity analysis of the ash residue being land filled for the chemicals listed and using the prescribed method as set forth in 40 CFR s261, Appendix II, shall be conducted within 30 days after commencement of commercial operation. In addition, said ash residue shall be tested for dioxin (2, 3, 7, 8 - TCDD) content.

10. Results from said residue analysis shall be sent to the Southeast District Office and the PBCHD within 30 days of receipt. Results will be used to determine whether or not these materials constitute a "Hazardous Waste" as defined by applicable Federal or state regulations. Results of these analyses may also be used for correlation with groundwater monitoring information and in any subsequent modification of conditions.

11. If residue materials are determined to be a "Hazardous Waste", then measures shall be take to treat or dispose of the residues pursuant to rule promulgated by Federal, State or Local

authorities, as may be applicable.

12. If the nature of materials received at the facility becomes altered, either due to modification of conditions, i.e., the facility is allowed to incinerate already known hazardous wastes such as pesticides, or if groundwater monitoring reveals abnormal groundwater conditions which may be attributable to the landfilling of this residue, then a subsequent analysis may be required at that time.

13. There shall be no discharge to waters of the State of polychlorinated biphenyl compounds.

14. The Permittee shall provide the Southeast District office and the PBCHD with a set of full-sized (24"x 36") engineering drawings and supporting information, signed and sealed by an engineer registered in the St ate of Florida for the operational and closure phases of the landfill for review and approval at least 90 days prior to implementation of those phases. Within 90 days after completion on the closure phase of the project, the Permittee shall submit certified as-built plans signed and sealed by a Florida Registered Professional Engineer.

15. To ensure that the bottom liners are continuous throughout the cell, the liners will be installed either under the supervision of the manufacturer or by a competent experienced lining contractor according to the manufacturer's specifications. In addition, as part of quality control measures, field seams between in-place liner and newly installed liner will be tested according to ASTM specification ensure integrity between materials and certified in writing by the liner manufacturer, contractor, and engineer of record to the Southeast District Office and PBCHD. Top liners, if required, shall be installed in accordance with closure require meets of the Southeast District Office, PBCHD and SFWMD.

16. The extension of the EPB-10 canal shall be placed in properly designed and constructed reinforced concrete culverts. The landfill height above the culvert shall not exceed 40 feet.

F. Operational Safeguards

The overall design and layout of the facilities shall be such as to mitigate potential adverse effects to humans and the environment. Security control measures shall be utilized to prevent exposure of the public t o hazardous conditions. The Federal Occupational Safety and Health Standards will be complied with during construction and operation. The safety standards specified under Section 440.56, Florida Statutes, by the Florida Department of Employment Security, Division of Safety will be complied with during operation.

G. Transmission Lines .

The directly associated transmission lines from the Resource Recovery Facility electric generators to the Florida Power and Light Company transmission system shall be kept cleared without the use of herbicides.

H. Noise

Operational noises shall not exceed local noise ordinance limitations nor those noise standards imposed by zoning.

I. Potable Water System

The potable water system (wells, pipes, pumps and treatment facilities) shall be designed, constructed and operated in conformance with the applicable provisions of Chapters 62-550 and 62-555, F.A.C. Plans and specifications for these facilities shall be provided to the Southeast District Office and the Palm Beach County Health Department for review and approval 90 days prior to construction.

XV. WATER MANAGEMENT DISTRICT CONDITIONS - GENERAL

A. The Solid Waste Authority shall prosecute the work authorized under the Certification in a manner so as to minimize any adverse impact of the works on fish, wildlife, natural environmental values, and water quality. The Solid Waste Authority/Vendor shall institute necessary measures during the construction period, including full compaction of any fill material placed around newly installed structures, to reduce erosion, turbidity, nutrient loading and sedimentation in the receiving waters.

B. The operational phases of the water management system authorized under this Certification shall not become effective until a Florida registered professional engineer certifies upon completion of each phase that these facilities have been constructed in accordance with the design approved by the District. Within 30 days after completion of construction of each phase, the Authority shall submit the engineer's certification, and notify the District that the facilities are ready for inspection and approval.

C. All road centerlines shall be set or above the flood elevation generated by a three-year, twenty-four hour storm event, in accordance with Palm Beach County criteria, as may be amended, and in accordance with the South Florida Water Management District's Rule 40.E-4., as may be amended.

D. All building floors shall be set at or above flood elevations generated *by* a three-day, one hundred year storm event, in accordance with Palm Beach County criteria, as may be amended, and in accordance with the South Florida Water Management District's Rule 40.E-4., as may be amended.

E. Off-site discharges during construction and development shall be made only through the discharge structures authorized by this Certification.

F. No construction authorized herein shall commence until the Permittee has agreed, in writing, by letter or resolution, that it will be responsible for the construction, operation, and perpetual maintenance of the entire surface water management system, both during operation of the facility and following the closure of the whole or any part of the facility. Responsibility for the operation and maintenance of the surface water management system shall not be assigned or delegated without prior written approval of the District.

G. This Certification is based on the applicant's submitted information to the District which reasonably demonstrates that adverse off-site water resource related impacts will not be caused by the authorized activities. The plans, drawings, and design specifications submitted by the applicant shall be considered the minimum standards for compliance. It is also the responsibility of the Permittee to ensure that adverse offsite water resource related impacts do not occur during construction.

H. The Permittee shall secure a well construction permit prior to construction, repair, or abandonment of any wells as described in Chapter 40E-3, F.A.C.

I. In the event of a declared water shortage, water use reductions may be ordered by the SFWMD in accordance with the Water Shortage Plan, Chapter 40E-2I, F.A.C.

J. This project must be constructed in compliance with and meet all requirements set forth in Chapter 373, Florida Statutes, and Chapter 40E-2, 40E-3, and 40E-4, F.A.C.

K. The Permittee shall hold and save the SFWMD harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, operation, maintenance or use of any facility authorized by this Certification, to the extent permitted under Florida law

L. Authorized representatives of the District shall be allowed to enter the premises to inspect and observe the operation of the surface water management system and associated landfill facilities, mitigation areas, and monitoring wells in order to determine compliance with the conditions of this Certification, as provided in Condition V.

XVI. WATER MANAGEMENT DISTRICT - SITE SPECIFIC STANDARDS

A. Prior to construction of any phase of either the Solid Waste Energy Resource Recovery Facility or the ash residue/unprocessable materials landfill a complete set paving, grading, and drainage plans with supporting calculations for the 40-acre Resource Recovery Facility and Jog Road must submitted to the South Florida Water Management District for review and written approval that the plans are in compliance with Chapters 40F-2 and 40E-4, F.A.C. Said plans shall include the following:

1. Paving, grading and drainage plans with special attention to perimeter site grading; and

2. Drainage calculations including:

a. Design storms used including depth, duration and distribution;

b. Stage-storage computations for the project and stage-discharge computations for the outfall structure(s);

c. Acreages and percentage of property proposed as:

(1) impervious surfaces (excluding water bodies)

(2) pervious surfaces (green areas)

(3) lakes, canals retention areas, etc.

(4) total acreage of the project

d. Runoff routing calculations showing discharges, elevations, and volumes detained during applicable storm events; and

e. Calculations required for determination of minimum building floor and road elevations.

B. Any subsequent modifications to the drawings and supporting calculations submitted to the South Florida Water Management District which alters the quantity or quality of discharge of water offsite shall be pursuant to Section 403.516, F.S., and Rule 62-17, F.A.C. Such modifications shall be submitted to the District for a determination that the modifications are in compliance with Chapters 40E-2 and 40E-4, F.A.C. This includes modification of the discharge route.

C. Minimum standard 24" x 36" surface water management construction plans for the project as proposed as well as any modifications shall be submitted to this District for review and written approval 30 days prior to the commencement of construction.

D. Prior to use and/or connection with any District works, the District shall be notified and the Permittee shall obtain written approval pursuant to Chapter 40E-6.041, F.A.C.

E. Prior to lowering of water levels in excavation sites, the following conditions shall be met:

1. Withdrawal rates, and depending on the methods proposed, well construction details, well and pump capacities and locations, and the data from the groundwater monitoring network shall be provided to the District for review and written approval;

2. The impacts of the proposed withdrawals shall be assessed and provided to the District;

3. No dewatering discharge shall be allowed to drain from the property; and

4. The District concurs in writing that there will be no adverse impacts as a result of the proposed withdrawals under sections 373.223(A)-(C) of the Florida Statutes.

F. Final water use rates for process and irrigation and well locations shall be submitted to the District for review and written approval prior to well construction when a Vendor and final plant design are determined.

G. Prior to closure, detailed closure plans pursuant to Chapter 62-701, F.A.C., shall be submitted to the District for review and written approval.

H. On-site areas which are dedicated for the fire station and Turnpike Interchange are considered by this District as separate from the Certification, and therefore subject to permitting requirements, pursuant to Chapter 373, F. S.

I. Any on-site hazardous materials temporary storage and transfer facility constructed at this site pursuant to the Water Quality Assurance Act should be considered separate from the Certification process and subject to regulatory permits. The design of the building and related infrastructure should be submitted to this District for review and verification that the proposed facility has been designed to prevent any stored or transferred hazardous materials from coming in contact with the surface water management system.

J. If modification and/or realignment of Northern Palm Beach County Water Control District's Canal EPB 10 is necessary, a modification must be obtained for Surface Water Management Permit No. 50-01347-S.

K. Prior to construction of either the Solid Waste Resource Recovery Facility or the ash/residue/unprocessable materials landfills, a phasing plan for the landfills shall be submitted to the District for review and written approval, including detailed drawings and supporting calculations showing how leachate will be separated from runoff in the working area (temporary berms, diversion dikes, cover material, etc.).

L. Surface Water Management plans shall be revised to include spreader swales (or District approved equivalent) to approximate sheetflow discharge into the wetland areas. In addition, a sedimentation "trap" shall be designed, subject to District approval of calculations and discharge locations into the wetlands.

M. Discharge structures shall include a baffle, skimmer, or other mechanism suitable for preventing oil, grease, or other floatable materials from discharging to and/or from retention/detention areas.

N. Prior to landfill construction, a screw gate shall be installed on the water control structure at EPB 10, capable of restricting discharge of poor quality surface water, up to and including the 25 year, 3 day level.

O. Critical areas, including the conveyance and perimeter swales, and areas adjacent to the let down pipes or conduits shall be stabilized to prevent erosion.

P. Energy dissipators shall be used whenever let down pipes discharge into perimeter swales, or the let down pipes or conduits meet the terraces.

Q. Water quality samples shall be taken at the discharge surface water discharge structure location of the water management system into EPB 10 during periods of discharge according to the schedule below. Flow shall be measured continuously at the discharge location into EPB 10 by means of a recording flow meter. A laboratory certified by the State of Florida shall be responsible for all water quality analyses. Chain of custody documentation shall be maintained for all sampling. Reports of water quality results and discharge rates shall be submitted to this District for review and written approval on a semi-annual basis. Results of any additional stormwater quality sampling required by the Florida Department of Environmental Protection shall be provided to the District. Monitoring requirements will be evaluated by this District following two years of data collection.

Monitoring Type and Schedule	Parameters
A. General (Quarterly)	Total Organic Carbon, Dissolved Oxygen, pH, Turbidity, Specific Conductance, Chemical Oxygen Demand, Alkalinity, Total Suspended Solids, Ammonium N, Nitrate N. Total Kjeldahl Nitrogen
B. Organics (Semiannual)	Trichloroethylene, Tetrachloroethylene, Carbon Tetrachloride, Vinyl Chloride, 1,1,1,-Trichloroethane, 1,2-Dichloroethane, Benzene, Ethylene Dibromide
C. Metals (Semiannual)	Aluminum, Antimony, Beryllium, Cadmium, Copper, Cyanide, Iron, Lead, Mercury, Nickel, Selenium, Silver, and Zinc

R. Any Northern Palm Beach County Water Control District facilities which have been permitted (Surface Water Management Permit No. 5001347-S) by this District and are not yet constructed but would be affected by this project must be fully operational prior to commencement of stormwater discharge from this project. The additional 60" CMP at Florida Power and Light's transmission crossing of EPB-10, and one 12" CMP at the confluence of EPB-10 and C-17 shall be so constructed.

S. There shall be a quarterly groundwater monitoring frequency for the groundwater monitoring network. The District shall be copied on the data results of the network and any other groundwater monitoring data required by Florida Department of Environmental Protection.

T. At least 60 days prior to the commencement of construction, the District staff must have received and reviewed any pertinent additional information required to be submitted under the District's site specific standards and the conditions of certification. Written approval for the desired construction must be obtained prior to commencement of construction.

U. Sixty days prior to the commencement of construction of the transmission line, the permittee shall provide the District with the location of areas in which fill and associated facilities will be placed. Written confirmation that the fill and associated facilities will not cause adverse off-site impacts shall be received from the District prior to commencement of construction.

XVII. OPERATIONAL CONTINGENCY PLANS

A. Operating Procedures

The permittee shall develop and furnish the Southeast District a copy of written operating instructions for all aspects of the operation which are critical to keeping the facility working properly. The instructions shall also include procedures for the handling of suspected hazardous, toxic and infectious wastes.

B. Contingency Plans

The Permittee shall develop and furnish the Southeast District Office written contingency plans for the continued operation of the system in event of breakdown. Stoppages which compromise the integrity of the operations must have appropriate contingency plans. Such contingency plans should identify critical spare parts to be maintained on site.

C. Current Engineering Plans

The Permittee shall maintain a complete current set of modified engineering plans, equipment data books, catalogs and documents in order to facilitate the smooth acquisition or fabrication of spare parts or mechanical modifications.

D. Application Modifications

The permittee shall furnish appropriate modifications to drawings and plot plans submitted as part of the application, including operational procedures for isolation and containment of hazardous wastes.

XVIII. TRANSFER OR ASSIGNMENTS OF RIGHTS, DUTIES, OR OBLIGATIONS

If contractual rights are transferred under this certification, notice of such transfer or assignment shall immediately be submitted to the Department of Environmental Protection and South Florida Water Management District by the previous certification holder (Permittee) and Assignee. Included within the notice shall be the identification of the entity responsible for compliance with the certification. Any assignment or transfer shall carry with it full responsibility for the limitations and conditions of this certification.

XIX. PROPRIETARY DOCUMENTS OR INFORMATION - CONFIDENTIALITY

Proprietary or confidential data, documents or information submitted or disclosed to any agency shall be identified as such by the Permittee and shall be maintained as such pursuant to applicable Florida law.

XX. MITIGATION

A. On-Site Restoration and Mitigation.

1. Within ninety (90) days of certification issuance, the Palm Beach Solid Waste Authority shall submit an on-site restoration and mitigation plan (hereinafter "The Plan"). The purpose of the Plan and its implementation is the mitigation of the impact of the project on the site's wetlands and values associated therewith. The Plan shall indicate in a detailed manner the on-site measures and improvements necessary to accomplish all restoration and mitigation, (i) set forth in the application as amended, (ii) as required below and (iii) as may be required by the department of Environmental Protection.

2. The Plan shall include but not be limited to a specification of the commencement and completion dates of all anticipated restoration and mitigation work including a specification of all revegetation of the shell pit mining areas, creation of littoral zones around all lakes, interconnection of wetland areas, areas of wetlands to be created (including the type and extent thereof which shall be not less than 190 acres), dredge and fill volumes, elevations, methods of construction, nature and extent of required improvements to accomplish the above referenced work, and planting schedules together with methods to insure vegetative survival for each area. As part of the plan it shall also be required that (i) littoral zones will be constructed around all existing and proposed borrow lakes, (ii) where it can be done with a reasonable probability of success, cypress trees proposed for elimination shall be transplanted to areas of wetland creation or roost enhancement, and (iii) willow, cypress and other hardwood species shall be planted on the spoil windrows of the abandoned pit south of the roost area to provide future roost availability, and the existing roost shall be monitored over a seven year period.

3. The Plan shall be submitted to the Department of Environmental Protection, the Florida Fish and Wildlife Conservation Commission, the U.S. Fish and Wildlife Service, Treasure Coast Regional Planning Council, and other appropriate governmental authorities or agencies.

4. The Department of Environmental Regulation shall review the Plan and it shall be subject to the approval of the Department of Environmental Protection in consultation with the Florida Fish and Wildlife Conservation Commission, U.S. Fish and Wildlife Service and Treasure Coast Regional Planning Council. The Palm Beach County Solid Waste Authority in the event of disapproval of the Plan by the Department of Environmental Protection shall include such revisions therein as may be required by the Department of Environmental Protection.

5. The Palm Beach County Solid Waste Authority shall complete all restoration and mitigation work set forth in the Plan approved by the Department of Environmental Protection in accordance with the time schedules set forth in the approved Plan.

B. Off-Site Restoration and Mitigation.

1. The off-site restoration and mitigation area is an area of approximately 3400 acres in the L-8 Marsh area of the J. W. Corbett wildlife management area designated by the Florida Fish and Wildlife Conservation Commission and shown on Exhibit A attached hereto and made part hereof (hereinafter referred to as the "preservation area").

2. The Solid Waste Authority shall perform a detailed hydrological study the scope and content. of which shall be subject to approval by the Department of Environmental Protection in consultation with the Florida Fish and Wildlife Conservation Commission, U.S. Fish and Wildlife Service and Treasure Coast Regional Planning Council. The purpose of the hydrological study shall be to identify and detail those modifications and improvements that would be necessary to the preservation area in order to restore a hydroperiod to this area which approximates the natural wetland hydroperiod. The Solid Waste Authority shall pay all costs, engineering and otherwise, for such study and the study shall be completed within two years from the date that certification has been issued. The Solid Waste Authority will at its sole cost and expense make such modifications and improvements to the preservation area including but not limited to payment of all engineering and permitting fees, all costs of labor, material, equipment and physical improvements (all of the foregoing being collectively hereinafter referred to as the "improvements") as identified in the approved hydrological study to restore a hydroperiod to the preservation area which approximates the natural wetland hydroperiod for such area.

3. The hydrological study shall be submitted to the Department of Environmental Protection, the Florida Fish and Wildlife Conservation Commission, U.S. Fish and Wildlife Service and Treasure Coast Regional Planning Council and other appropriate governmental authorities or agencies.

4. The Department of Environmental Protection shall review the hydrological study and the Proposed implementation thereof. The study and the implementation shall be subject to the approval of the Department of Environmental Protection in consultation with the Florida Fish and Wildlife Conservation Commission, U.S. Fish and Wildlife Service and Treasure Coast Regional Planning Council.

5. The Palm Beach County Solid Waste Authority in the event of disapproval of the recommendations contained in the hydrological study by the Department of Environmental Protection stall include such revisions therein as may be required by the Department of Environmental Protection.

6. In the event that the improvements required by the approved hydrological study are projected to significantly exceed $420,000.00 plus the inflation factor as set forth below then the

Palm Beach County Solid Waste Authority may apply to the Department of Environmental Protection for consideration to (i) reduce the size and scope of the mitigation and restoration project or (ii) utilize alternative methods to accomplish the required mitigation and restoration as set forth above. The fact that the cost of the improvements in the approved hydrological study are projected to significantly exceed the amount set forth above, shall not, entitle the Palm Beach County Solid Waste Authority, as a matter of right, to reduce or modify the mitigation required herein. Whether, and the extent to which, the mitigation or restoration requirements shall be reduced or modified shall rest solely in the discretion of the Department of Environmental Protection in consultation with the Florida Fish and Wildlife Conservation Commission, U.S. Fish and Wildlife Service and Treasure Coast Regional Planning Council.

7. The Palm Beach County Solid Waste Authority shall complete all restoration and mitigation work set forth in the approved hydrological study including the implementation measures contained therein, within five years from the date of certification issuance.

8. Inflation Factor:

In paragraph B.6. the sum of $420,000.00 is referred to. The actual number to be utilized in place of $420,000.00 in condition B.6. shall be a sum using $420,000.00 as a base and adding any increase in the index thereto; i.e., in the event there has been a 10% increase in the index from December 3, 1985, through the end of the time period under consideration then there shall be an increase of 10% in the sum of $420,000.00. The Solid Waste Authority shall make no application for modification of the mitigation and restoration until after the completion of the approved hydrological study. For purposes of projecting and determining the actual amount to be utilized in condition B.6. with reference to the $420,000.00, as to improvements to be constructed in the future, there shall be added to the $420,000.00 the following: (i) a sum which represents the percentage increase in the index from December 3, 1985, through the date of approval of the hydrological study and (ii) a sum representing the estimated percentage increase in the index through the date a specific improvement is projected to be constructed in the approved hydrological study. The estimated percentage increase shall be the average annual increase in the index from December 3, 1985, through the date of approval of the hydrological study; i.e., if the average annual increase has been 10% and a specific improvement is to be constructed nine months after the approval of the hydrological study there shall be added [in addition to the amount referred to in (i)] to the $420,000.00 the sum of $31,500.00 representing three quarters of the 10% increase.

Index: The term index as utilized herein shall mean: The Engineering News-Record, Construction Cost Index, published by McGraw-Hill, Inc.

In the event that the Construction Cost Index is discontinued then the Department of Environmental Protection shall choose another index similar in nature to utilize in connection with this off-site mitigation and restoration condition.

History

Issued 03/14/86; signed by Governor Graham
Modification 01/13/92; signed by Secretary Browner
Modification 11/09/94; signed by Secretary Wetherell
Modification 12/19/95; signed by Secretary Wetherell
Modification 03/27/96; signed by Secretary Wetherell
Modification 08/29/97; signed by Secretary Wetherell
Modification 12/07/00; signed by Deputy Secretary Green

Return to Part I

Return to Conditions Index

Appendix B
Permit Applications

B.1 Notice of Intent for Storm Water Discharges Associated with INDUSTRIAL ACTIVITY under the Multi-sector NPDES General Permit

NOTICE OF INTENT
TO USE
MULTI-SECTOR GENERIC PERMIT FOR STORMWATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY
(RULE 62-621.300(5), F.A.C.)

This form is to be completed and submitted to the Department before use of the Multi-Sector Generic Permit for Stormwater Discharge Associated with Industrial Activity (MSGP) provided in Rule 62-621.300(5), F.A.C. The type of facility or activity that qualifies for use of this generic permit, the conditions of the permit, and additional requirements to request coverage are specified in Rule 62-621.300(5)(a), F.A.C. Note that additional requirements for requesting coverage include submittal of the applicable generic permit fee pursuant to Rule 62-4.050, F.A.C. You should familiarize yourself with the generic permit and the attached instructions before completing this form. **Please print or type information in the appropriate areas below.**

I. IDENTIFICATION NUMBER: Facility ID N/A

II. APPLICANT INFORMATION:

A. Operator Name: Solid Waste Authority of Palm Beach County			
B. Address: 7501 North Jog Road			
C. City: West Palm Beach		D. State: FL	E. Zip Code: 33412
F. Operator Status:	G. Responsible Authority: Mr. John D. Booth, P.E., DEE, Executive Director		
	H. Phone No.: 561-640-4000		

III. FACILITY LOCATION INFORMATION:

A. Facility Name: Lime Recalcination & Biosolids Pelletization Facility			
B. Street Address: 5850 Jog Road			
C. City: West Palm Beach		D. State: FL	E. Zip Code: 33412
F. County: Palm Beach	G. Latitude: 26 ° 46′ 00 ″ Longitude: 080 ° 08 ′ 45 ″		
H. Is the facility located on Indian lands? ☐ Yes ☒ No		I. Water Management District: SFWMD	
J. Facility Contact: Mr. Jack Mesojedec, P.E., D.E.E			K. Phone No.: 561-640-4000

IV. FACILITY ACTIVITY INFORMATION:

A. SIC or Designated Activity Code(s)	Primary: 4952	Secondary: 4953	
B. Monitoring code (1, 2, 3, or 4): 1	C. Will construction be conducted for stormwater controls? ☒ Yes ☐ No		
D. Other Existing Permits	ERP No.: N/A	Wastewater Permit No.: N/A	Other (specify): ---

V. DISCHARGE INFORMATION

A. MS4 Operator Name: Total Retention (Zero Discharge)

B. Discharge Location(s):

Outfall No.	Latitude			Longitude			Receiving Water Name
	Deg.	Min.	Sec.	Deg.	Min.	Sec.	
---	---	---	---	---	---	---	N/A

VI. CERTIFICATION[1]:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and Official Title (Type or Print):

To Be Certified Later

Signature: Date Signed:

[1] Signatory requirements are contained in Rule 62-620.305, F.A.C.

INSTRUCTIONS – DEP FORM 62-621.300(5)(b)
NOTICE OF INTENT (NOI) TO USE MULTI-SECTOR GENERIC PERMIT FOR STORMWATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY (MSGP)

Who Must File an NOI:

Federal law at 40 CFR Part 122 prohibits point source discharges of stormwater associated with industrial activity to waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit. Under the State of Florida's delegated authority to administer the NPDES program, operators that have stormwater discharge associated with industrial activity to surface waters of the State must file for and obtain either coverage under an appropriate generic permit contained in Chapter 62-621, Florida Administrative Code (F.A.C.), or an individual permit issued pursuant to Chapter 62-620, F.A.C.

Where to File NOI:

NOIs for coverage under this generic permit must be sent to the following address:

NPDES Stormwater Notices Center, MS #2510
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Part I – Identification Number

Enter the facility's DEP identification number (generic permit coverage number) if known. If an ID number has not yet been assigned to this facility, leave this item blank.

Part II – Applicant Information

Item A.: Provide the legal name of the person, firm, public organization, or any other entity that operates the facility described in this application. The operator of the facility is the legal entity which controls the facility's operation rather than the plant or site manager. The name of the operator may or may not be the same as the name of the facility.

Items B. – E.: Provide the complete mailing address of the facility operator, including city, state, and zip code.

Item F.: Enter the appropriate one letter code from the list below to indicate the legal status of the operator of the facility:

F = Federal; S = State; P = Private; M = Public (other than federal or state); O = Other

Items G. – H.: Provide the name and telephone number (including area code) of the person authorized to submit this application on behalf of the facility operator. This should be the same person as indicated in the certification in Part VI.

Part III – Facility Location Information

Items A. – E.: Enter the facility's official or legal name and complete street address, including city, state, and zip code. Do not provide a P.O. Box number as the street address.

Item F.: Enter the county in which the facility is located.

Item G.: Enter the latitude and longitude of the approximate center of the facility.

Item H.: Indicate whether the facility is located on Indian lands.

Item I.: Enter the appropriate five or six letter code from the list below to indicate the Water Management District the facility is located within:

NWFWMD = Northwest Florida Water Management District
SRWMD = Suwannee River Water Management District
SFWMD = South Florida Water Management District
SWFWMD = Southwest Florida Water Management District
SJRWMD = St. John's River Water Management District

Items J. – K.: Give the name, title, and telephone number (including area code) of the person who is thoroughly familiar with the operation of the facility, with the facts reported in this application, and who can be contacted by the Department if necessary.

Part IV – Facility Activity Information:

Item A.: List, in descending order of significance, up to two 4-digit standard industrial classification (SIC) codes that best describe the principal products or services provided at the facility identified in Part III. For industrial activities defined in 40 CFR 122.26(b)(14)(i)-(xi) that do not have SIC codes that accurately describe the principal products produced or services provided, use the appropriate two letter code from the list below:

HZ = Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under subtitle C of RCRA. [40 CFR 122.26(b)(14)(iv)]

LF = Landfills, land application sites, and open dumps that receive or have received any industrial wastes, including those that are subject to regulation under subtitle D of RCRA. [40 CFR 122.26(b)(14)(v)]

SE = Steam electric power generating facilities, including coal handling sites. [40 CFR 122.26(b)(14)(vii)]

TW = Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage. [40 CFR 122.26(b)(14)(ix)]

Item B.: Enter the appropriate 1-digit monitoring code for the facility from the list below. The monitoring requirements for the facility are contained in the MSGP.

1 = Not subject to monitoring requirements under the conditions of the permit.
2 = Subject to monitoring requirements and required to submit data.
3 = Subject to monitoring requirements but not required to submit data.
4 = Subject to monitoring requirements but submitting certification for monitoring exclusion.

Item C.: Indicate whether any construction will be conducted to install or develop stormwater controls..

Item D.: Provide the permit number for any existing state, federal, or local environmental permit(s) issued to the facility, including any environmental resource permit (ERP) issued by DEP or the Water Management District; any DEP wastewater facility permit; and, any EPA-issued NPDES permit.

Part V – Discharge Information

Item A.: If the facility discharges stormwater associated with industrial activity to a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4 (e.g., municipality name, county name), and in Item B of this Part enter "MS4" as the outfall number and indicate the receiving water of the discharge from the MS4. (See Chapter 62-624, F.A.C., for the definition of an MS4.)

Item B.: If the facility discharges stormwater associated with industrial activity directly to receiving water(s), list each outfall; the receiving water of each outfall; and, the latitude and longitude of each outfall if available.

Part VI – Certification

Type or print the name and official title of the person signing the certification. Sign and date the certification.

Section 403.161, F.S., provides severe penalties for submitting false information on this application (NOI) or any reports or records required by a permit. There are both civil and criminal penalties, in addition to the revocation of permit coverage for submitting false information.

Rule 62-620.305, F.A.C., requires that the application (NOI) and any reports required by the permit to be signed as follows:

A. For a corporation, by a responsible corporate officer as described in Rule 62-620.305, F.A.C.;
B. For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or,
C. For a municipality, state, federal or other public facility, by a principal executive officer or elected official.

Appendix C
Surface Water Management System Design Report

Appendix C
Surface Water Management System Design Report

C.1 Introduction

The purpose of this document is to present the hydrologic and hydraulic analysis for the parcel of land that will be occupied by the Lime Recalcination Facility (LRF) and the Biosolids Pelletization Facility (BPF). This evaluation also demonstrates that the proposed surface water management system meets the applicable regulatory requirements of the Florida Department of Environmental Protection (FDEP) and the Florida Administrative Code (FAC). The organization of this document follows the general sequence presented below.

Section C.2: Description of the surface water management systems;

Section C.3: Surface water management system design considerations;

Section C.4: Hydrologic analysis for the perimeter surface water management system;

Section C.5: Hydraulic routing for the proposed surface water management system;

Section C.6: Calculation of treatment volume and recovery times for dry detention basins;

Section C.7: Design of the temporary surface water management system;

Section C.8: Erosion and sediment control; and

Section C.9: Design of hydraulic structures.

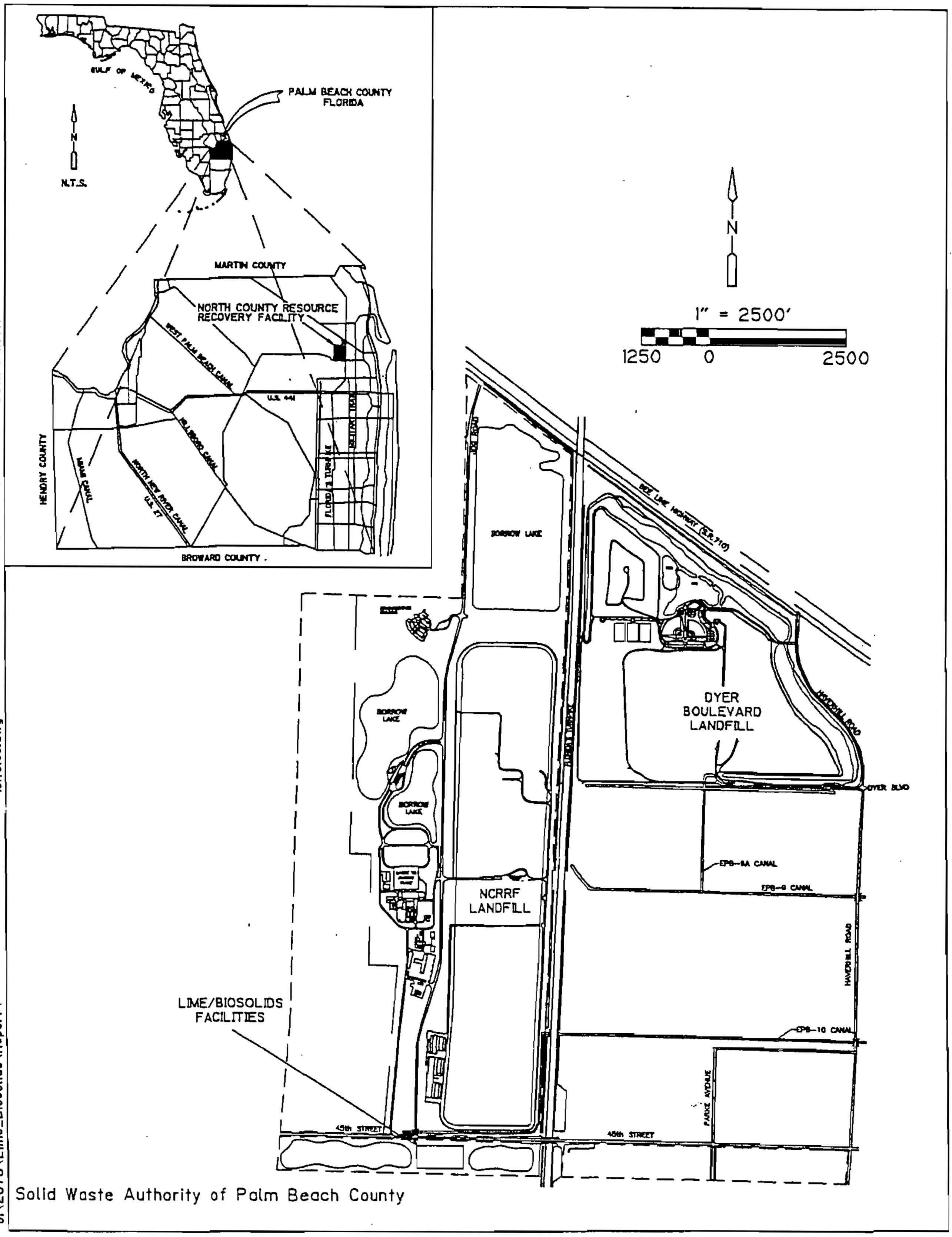
Figures, tables, and attachments referenced in the text are provided at the end of this appendix.

C.2 Description of the Surface Water Management Systems

The proposed LRF and BPF will be constructed within a 31-acre (12.9 hectare) site that is located at the southeast corner of the 45th Street and Jog Road intersection in West Palm Beach, Florida, as shown on **Figure C-1**.

C.2.1 Existing Surface Water Management System

Surface water management for the existing site is achieved by controlling overland flow from within the site and conveying the overland flow to the East Lake. There are no known points of discharge conveying runoff from this parcel.



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CDM

Figure No. C-1
Site Location Map

C.2.2 Proposed Surface Water Management System

The proposed surface water management system for the 31-acre site includes a perimeter surface water management system, and a surface water management system for the parcel occupied by the LRF and BPF. The perimeter surface water management system consists of a series of dry detention basins located at the perimeter of the site that are interconnected by a system of channels and culverts that convey the surface water runoff to the East Lake. The perimeter surface water management system was designed to retain the entire runoff from a 25-year 72-hour design storm event, as required by the South Florida Water Management District (SFWMD)/FDEP.

C.3 Surface Water Management System Design Considerations

C.3.1 Design Storms and Rainfall Distribution

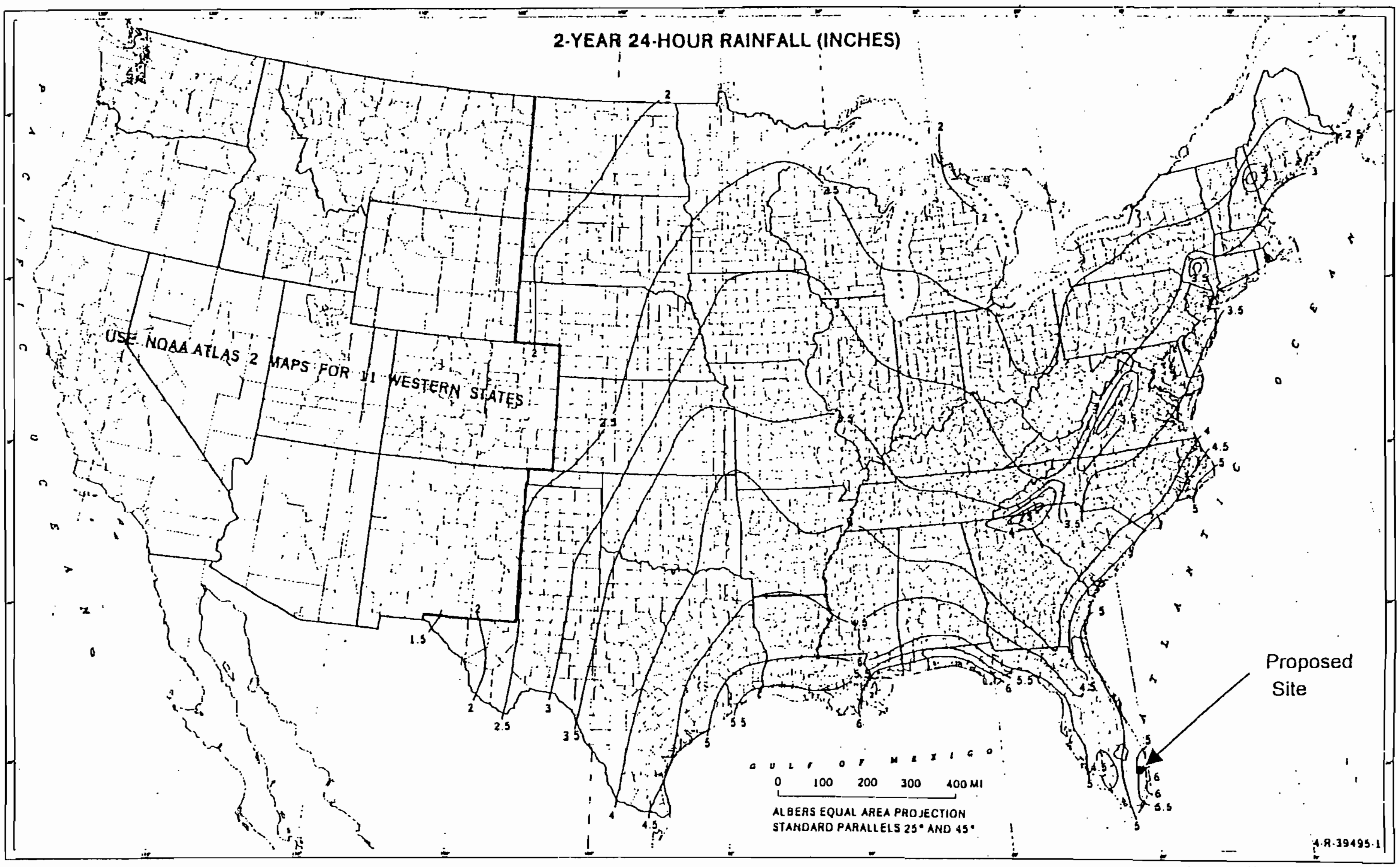
The surface water management system was designed to manage the 25-year 72-hour storm (design storm) on site. This design was based on the requirements presented in Section 6.3 of the "Basis of Review for Environmental Resource Permit Applications Within the South Florida Water Management District" (SFWMD, 1996). The 25-year 24-hour storm was used to design the hydraulic structures pertaining to the surface water management system. The 2-year, 24-hour rainfall depth was used for calculating the time of concentration (T_c) for each hydrologic unit.

Figure C-2 is a copy of a US Department of Agriculture (USDA)-Soil Conservation Service figure for the 2-year, 24-hour design storm depth for the area in which the project is located. This depth is 5.5 inches (USDA-SCS, 1986). **Figure C-3** is a copy of a South Florida Water Management District figure for the 25-year 24-hour design storm depth for the area in which the project is located. This depth is 10.3 inches (SFWMD, 1996). The rainfall depth for the 25-year 72-hour storm event is calculated by multiplying the 25-year 24-hour rainfall depth by a factor of 1.359, as outlined in the "Basis of Review for Environmental Resource Permit Applications Within the South Florida Water Management District" (SFWMD, 1996). Therefore, the 25-year 72-hour design storm depth is 14.0 inches (10.3 inches x 1.359). The 100-year 24-hour rainfall is 12.5 inches, and the 100-year 72-hour rainfall is calculated to be 16.99 inches, as shown in **Figure C-4**. The SFWMD 72-hour rainfall distribution (shown on **Figure C-5**) was used for the hydrologic simulations.

C.3.2 Groundwater Elevation

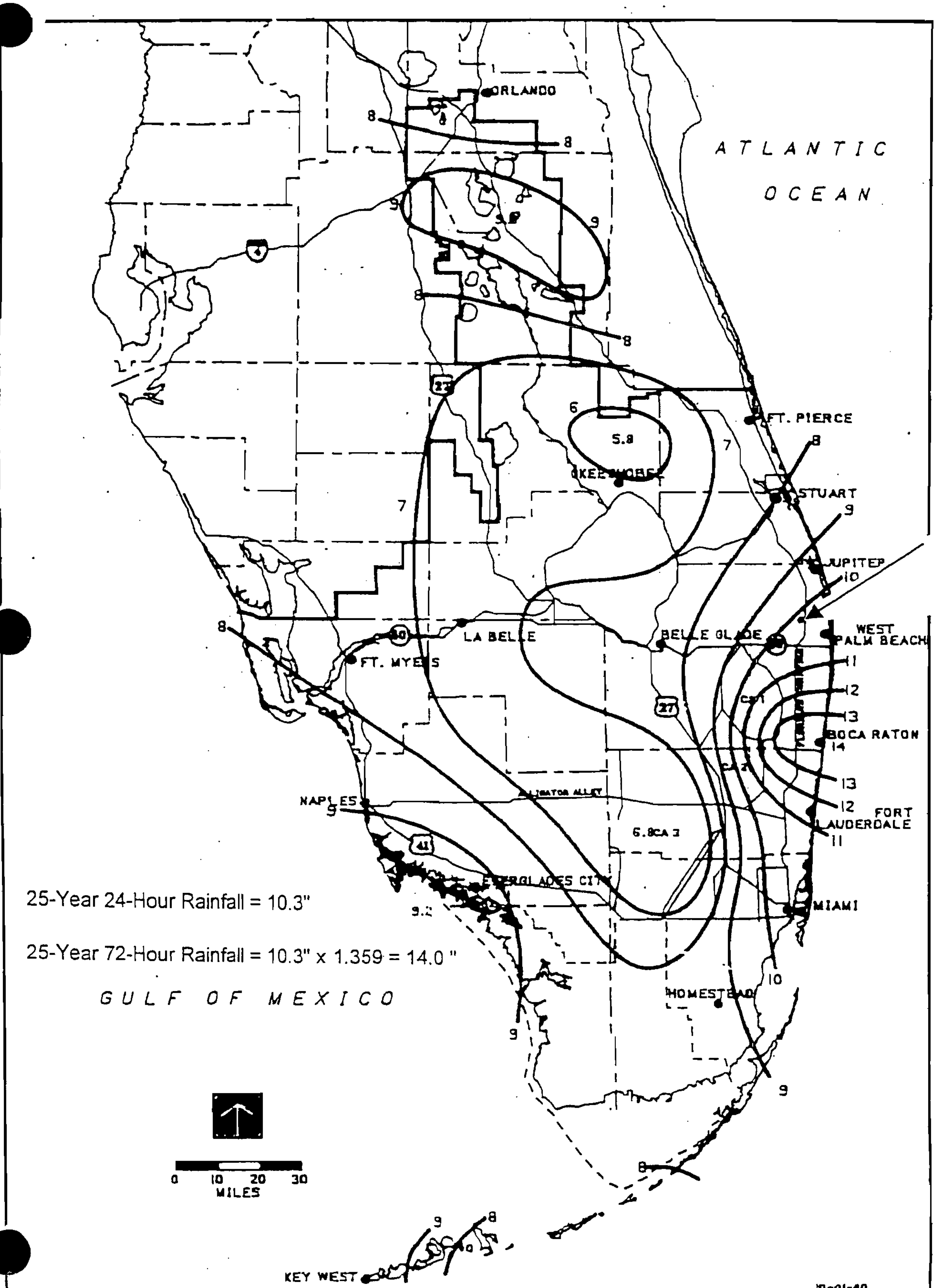
Normal and seasonal high (wet season) groundwater elevations were estimated from available historical data of measurements to the groundwater table (GWT) in monitoring wells at the Solid Waste Authority of Palm Beach County (SWA) North County Resource Recovery Facility (NCRRF). Based on the results of the data analysis, the seasonal high GWT elevation around the site is approximately 18.0 feet National Geodetic Vertical Datum (NGVD) (CDM, 2000).

(210-VI-TR-55, Second Ed., June 1986)



2-Year 24-Hour Rainfall = 5.5 inches

Figure C-2
2-Year 24-Hour Rainfall



I - DAY RAINFALL: 25 YEAR RETURN PERIOD

Figure C-3
25-Year 24-Hour Rainfall

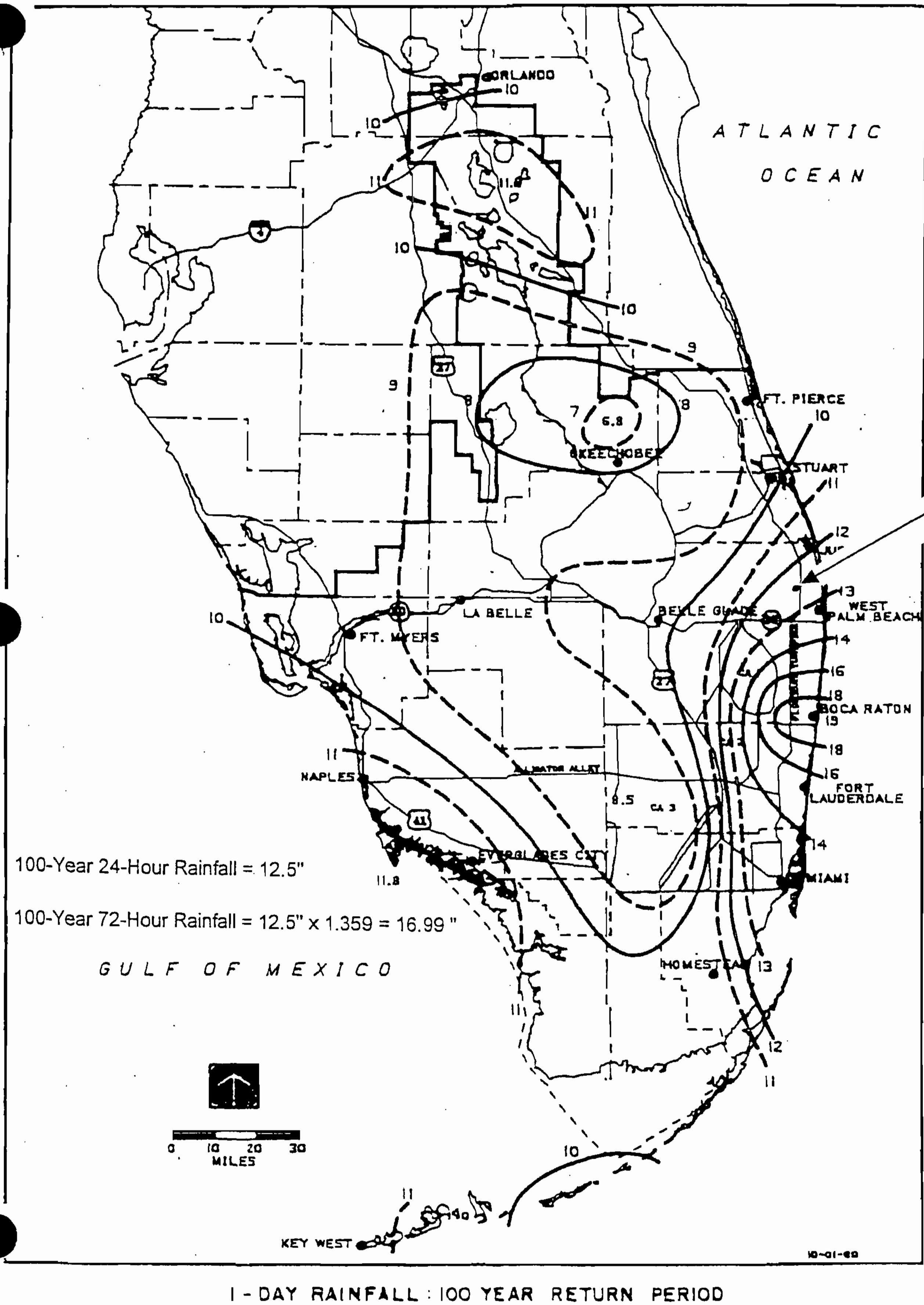


Figure C-4
100-Year 24-Hour Rainfall

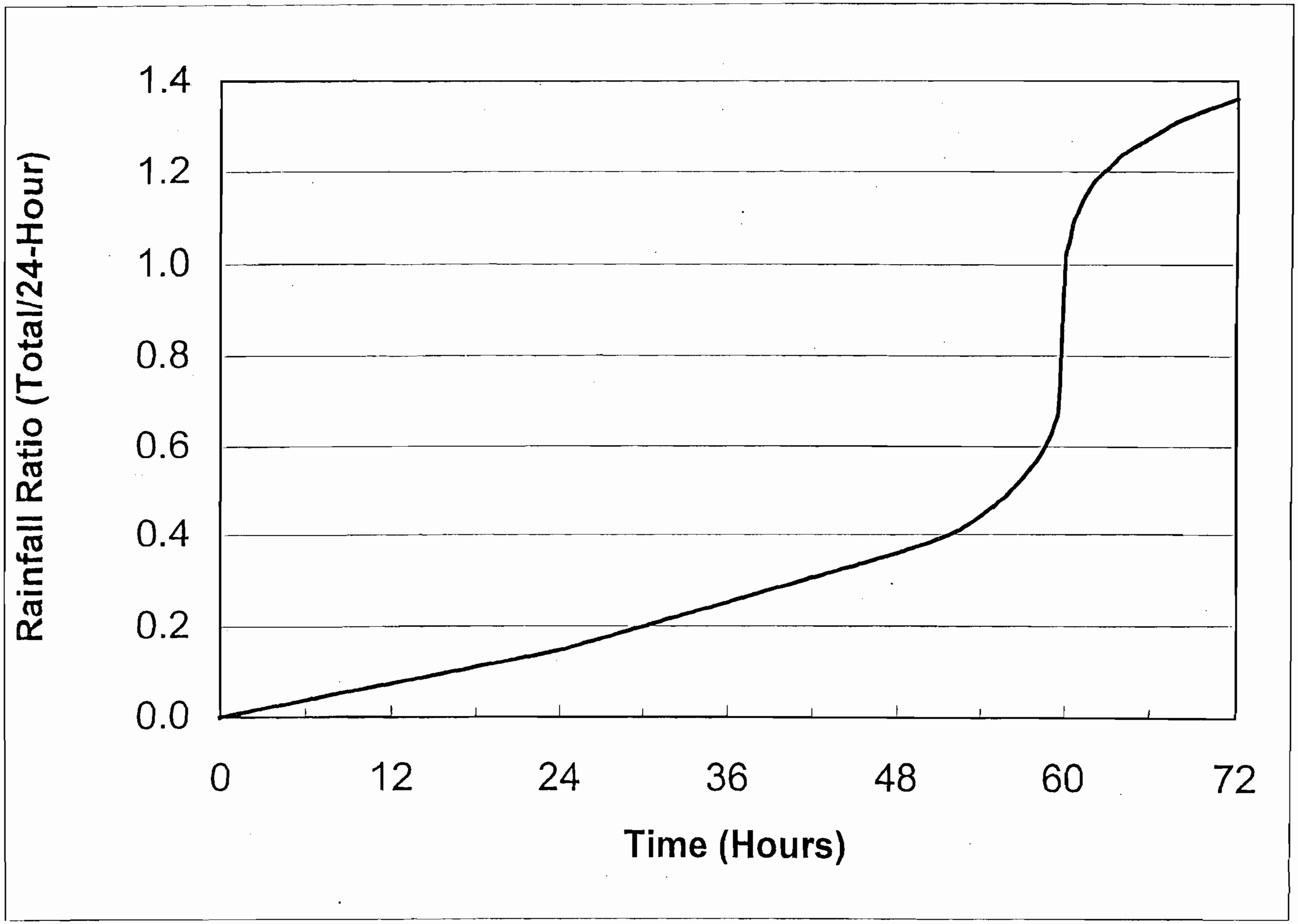


Figure C-5
SFWMD 72-Hour Rainfall Distribution

C.4 Hydrologic Analysis for the Perimeter Surface Water Management System

The purpose of the hydrologic analysis was to estimate the runoff rates and volumes generated from the LRF and BPF for the 25-year 72-hour design storm event. The procedure used for the hydrologic analysis is as follows:

- The site was divided into watershed subbasins based on drainage patterns. The nodal network schematic is shown on **Figure C-6**. The watershed subbasin delineation is shown on **Figures C-7** and **C-8**. **Table C-1** lists the area for each basin.
- Hydrologic parameters such as the runoff curve number (*CN*), T_c, and the basin area (*A*), were calculated as described in the Natural Resource Conservation Service (NRCS) (formerly known as Soil Conservation Service or SCS) Technical Release 55 (TR-55) method (USDA-SCS, 1986).
- Runoff hydrographs were generated using the NRCS unit hydrograph method.

C.4.1 Drainage Basins

The basins tributary to each dry/wet retention area or drainage structure were delineated as shown on Figures C-7 and C-8 (Surface Water Management Plan). Areas for all drainage basins were measured using AutoCAD Release 14 or a TAMAYA 7 digital planimeter. Table C-1 lists the area for each basin.

C.4.2 Time of Concentration

Time of concentration (T_c) is the elapsed time for runoff in a particular basin to travel from the hydraulically farthest point to the basin outlet. Runoff is typically characterized as one, or any combination thereof, of three types of flow: sheet flow, shallow concentrated flow, and channel flow. The time of concentration is the sum of the travel times (T_t) for sheet flow, shallow concentrated flow, and channel flow. The time of concentration for all subbasins was assumed to be 6.0 minutes (0.1 hour), which is the minimum recommended T_c in TR-55. This T_c of 6.0 minutes is considered to be conservative.

C.4.3 Runoff Curve Number (CN)

The runoff curve numbers for the hydrologic analysis were calculated based on the water storage capacity of the soil, as presented in the "Basis of Review for Environmental Resource Permit Applications Within the South Florida Water Management District" (SFWMD, 1996). Based on the estimated 25-year 72-hour rainfall depth for the site, the minimum elevation of the basin, and the compaction of the basin's soil, a curve number can be determined using Table 2.1 of the Technical Release 55 (TR-55) "Urban Hydrology for Small Watersheds". The 25-year 72-hour rainfall depth for the proposed site of 14.0 inches was used in determining the runoff curve number for each area.

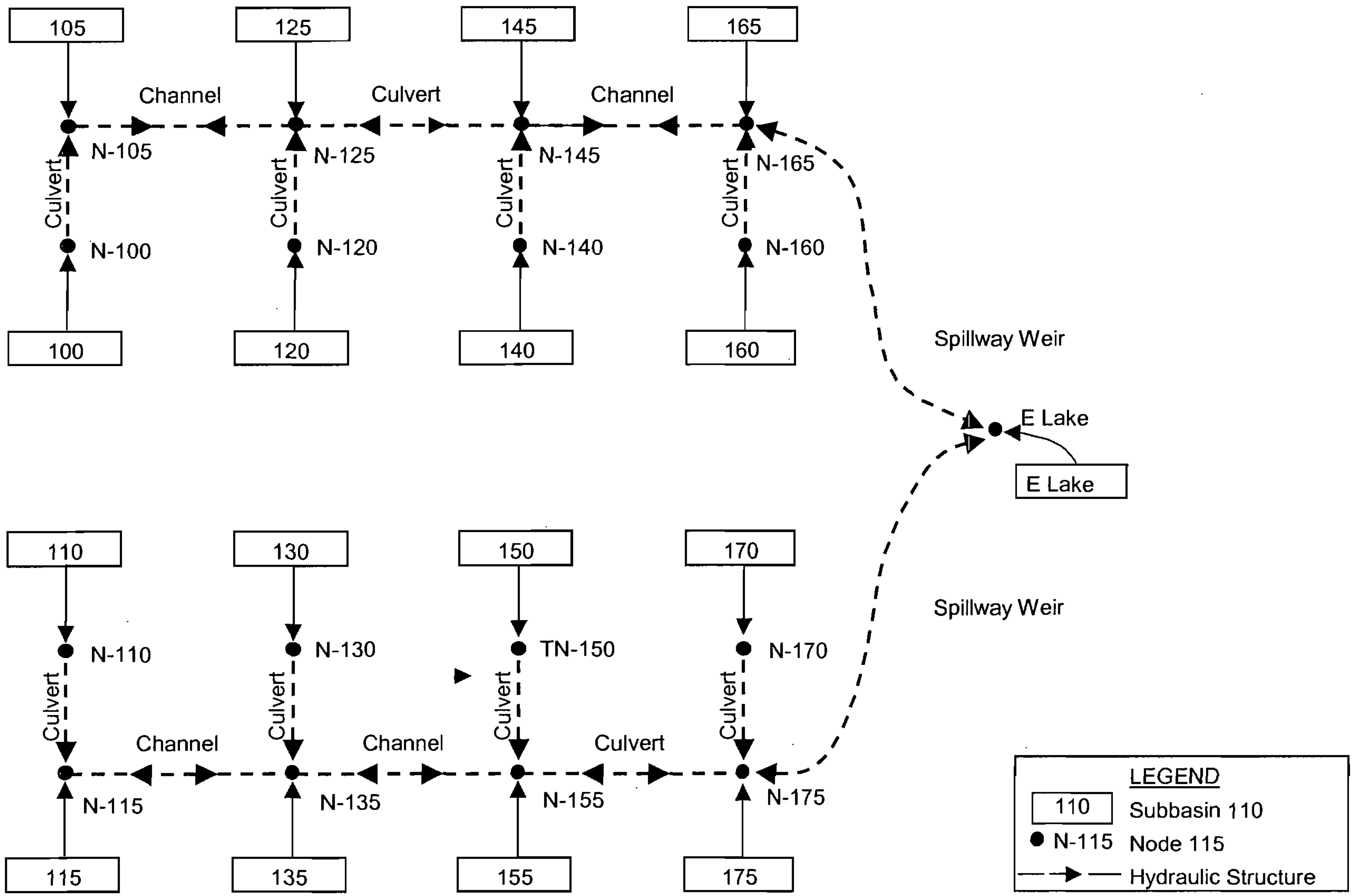


FIGURE C-6
ROUTING AND WATERSHED NODAL NETWORK SCHEMATIC

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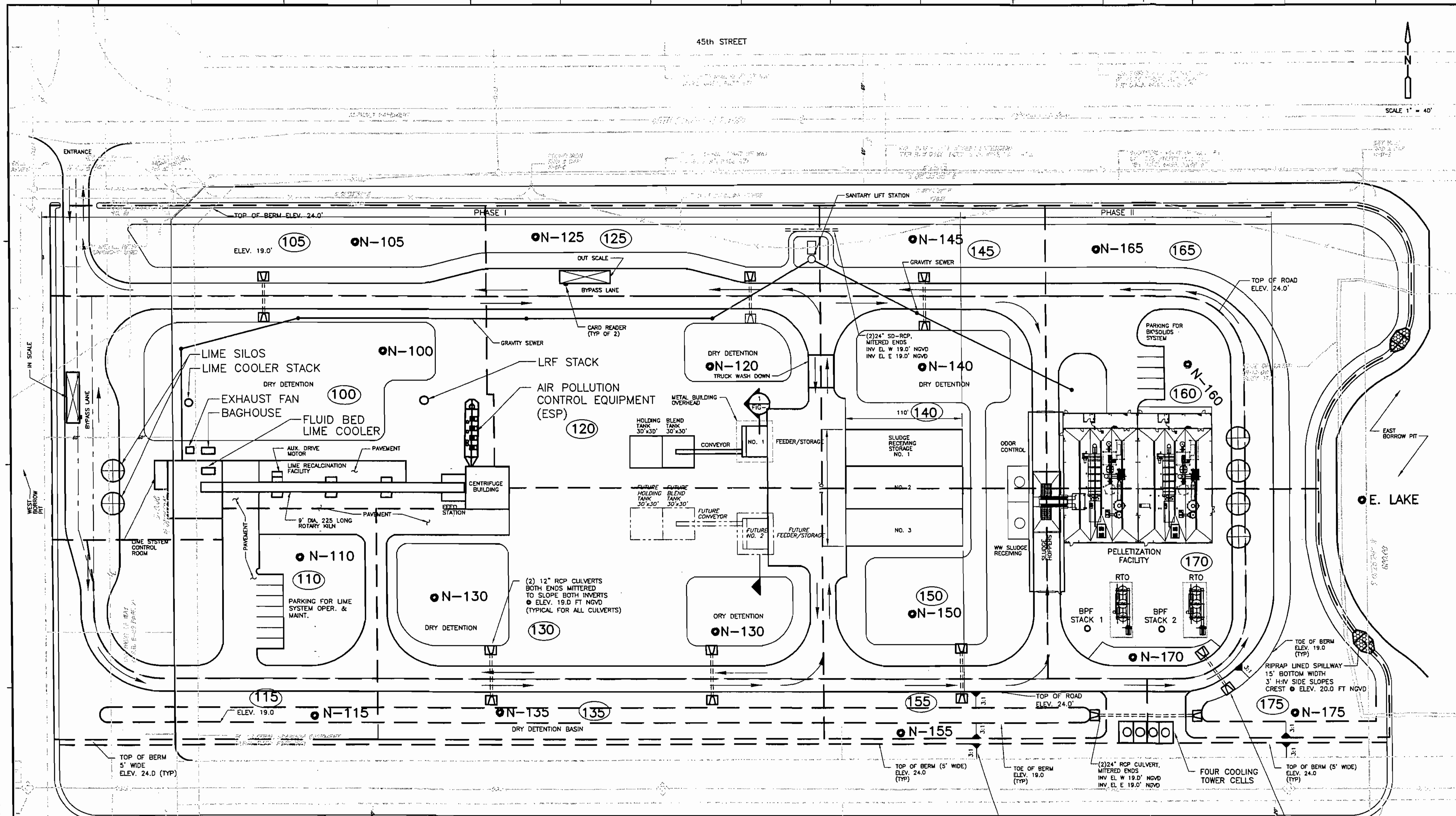


LEGEND

- SUBBASIN BOUNDARY
- (115) SUBBASIN 115
- N-115 NODE 115
- PROPOSED SOIL BORING LOCATIONS
- 20' DRAINAGE EASEMENT TO BE ABANDONED AS PART OF RIGHT OF WAY RELOCATION AGREEMENT

NOT TO BE USED FOR CONSTRUCTION

DAVID PRAH, P.E.
NO. 43393

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. HILL
DRAWN BY: J.L. GERTH
SHEET CHK'D BY: D. PRAH
CROSS CHK'D BY: M. LEWIS
APPROVED BY: D. PRAH
DATE: JULY 2003

CDM Camp Dresser & McKee Inc.
2310 Maitland Center Parkway, Suite 300
Maitland, Florida 32751
Tel: 407-660-2552
Cert. of Authorization No. 20

SOLID WASTE AUTHORITY OF PALM BEACH COUNTY
7501 NORTH JOG ROAD

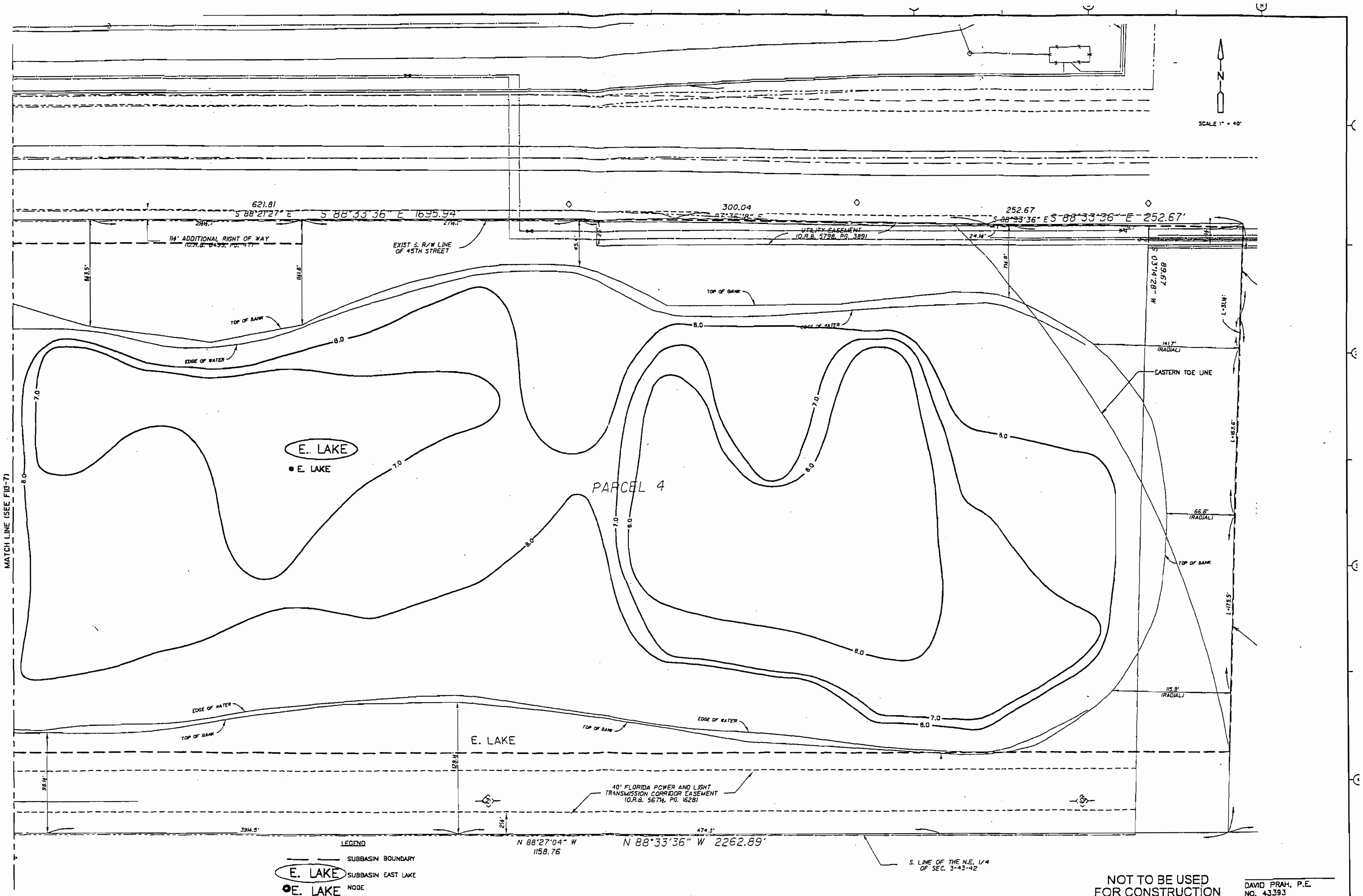
LIME RECALCINATION AND
BIOSOLIDS PELLETIZATION FACILITY

PROPOSED SURFACE WATER
MANAGEMENT PLAN

PROJECT NO. 2678-39373
FILE NAME: FIGUREC-7.DWG

SHEET NO.

FIGURE C-7



NOT TO BE USED FOR CONSTRUCTION

DAVID PRAH, P.E.
NO. 43393

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. HILL
DRAWN BY: D. AUST
SHEET CHK'D BY: D. PRAH
CROSS CHK'D BY: J. HILL
APPROVED BY: D. PRAH
DATE: MAY 2002

CDM Camp Dresser & McKee Inc.
2310 Maitland Center Parkway, Suite 300
Maitland, Florida 32751
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SOLID WASTE AUTHORITY
OF PALM BEACH COUNTY
7501 NORTH JOG ROAD
LIME RECALCINATION AND
BIOSOLIDS PELLETIZATION FACILITY

PROPOSED
SURFACE WATER MANAGEMENT PLAN

PROJECT NO. 2678-33750
FILE NAME: FIG-8

SHEET NO.
FIG C-8

Table C-1

LIME AND BIOSOLIDS FACILITIES

Proposed Condition : Summary of Areas

Subbasin Name	Area (acres)
100	1.987
105	0.781
110	0.821
115	0.518
120	1.276
125	0.654
130	1.673
135	0.550
140	0.876
145	0.416
150	0.876
155	0.385
160	0.777
165	0.985
170	0.765
175	0.660
E.Lake	14.010
Total Tributary Area (acres)	**28.010**

Descriptions of how the runoff curve numbers were calculated for the different areas that are found on site are provided below.

- Pervious Areas

  For uncompacted areas with 3 feet of soil thickness, the water storage in the soil is 6.60 inches. For compacted areas, the water storage in the soil is reduced by 25 percent (SFWMD, 1996). Therefore, the cumulative water storage for compacted pervious areas is 4.95 inches (75 percent of 6.60 inches). The runoff from pervious areas is 9.05 inches (14.00-4.95). From Table 2.1 of TR-55, for a rainfall of 14.00 inches and runoff of 9.05 inches, the curve number can be determined by linear interpolation as 64.56. **Table C-2** presents the calculations for curve numbers and runoff depths for the design storm of 14.00 inches, by means of linear interpolation. A summary of curve number calculations for all basins based on water storage in the soil is presented in **Table C-3**.

- Dry detention basins and perimeter channels

  For most dry detention basins and perimeter channels the depth to ground water table is approximately 1 foot. The cumulative water storage for compacted sandy soil is 0.45 inches (75 percent of 0.60 inches). The runoff depth for the dry detention areas is 13.55 inches (14.00-0.45). From Table 2.1 of TR-55, for a rainfall depth of 14.00 inches and runoff depth of 13.55 inches, the curve number can be determined by linear interpolation as 97.84.

- Wet retention areas

  A curve number of 100 was used, which is appropriate for areas with no infiltration losses, and assuming that evaporation losses are negligible, which is considered conservative.

- Access roads, parking areas, and buildings

  A curve number of 98 was used, as recommended in the TR-55.

Based on the curve numbers determined above, the composite curve numbers for each basin can be obtained. The composite runoff curve number (CN_c) is given by:

$$CN_c = \frac{\sum A_i \times CN_i}{\sum A_i}$$

where: A_i = Area; and CN_i = curve number.

An example calculation for basin "100" is presented below:

Pervious Area = 0.727 ac (CN = 64.56)

Table C-2

LIME AND BIOSOLIDS FACILITIES : SOIL STORAGE & CURVE NUMBER CALCULATIONS

25-year 24-hour rainfall (in) = **10.30** [SFWMD, November 1996]

25-year 72-hour rainfall (in) = **14.00** [SFWMD, November 1996]

Rainfall Depth (in)	Runoff Depths (in) for Curve Numbers												
	40	45	50	55	60	65	70	75	80	85	90	95	100
13.0	4.00	4.89	5.76	6.61	7.42	8.21	8.98	9.71	10.42	11.10	11.76	12.39	12.76
14.0	**4.65**	**5.62**	**6.55**	**7.44**	**8.30**	**9.12**	**9.91**	**10.67**	**11.39**	**12.08**	**12.75**	**13.39**	**13.76**
15.0	5.33	6.36	7.35	8.29	9.19	10.04	10.85	11.63	12.37	13.07	13.74	14.39	14.76

Notes:

The above table was created based on the runoff depth for selected CN's and rainfall amounts, as in Table 2.1 of TR-55.

Depth to Water Table (ft)	Water Storage in Soil (in)		Runoff Depth (in)	CN
	Uncompacted	Compacted		
1	0.60	**0.45**	**13.55**	**97.84**
2	2.50	**1.88**	**12.12**	**85.34**
3	6.60	**4.95**	**9.05**	**64.56**
4	10.90	**8.18**	**5.82**	**46.02**

References:

Natural Resource Conservation Service (NRCS) and United States Department of Agriculture (USDA), "Urban Hydrology for Small Watersheds", Technical Release 55,

Basis of Review for Environmental Resource Permit Applications Within the South Florida Water Management District, West Palm Beach, FL, Nov. 1996.

Table C-3

LIME AND BIOSOLIDS FACILITIES : CURVE NUMBER CALCULATIONS FOR HYDROLOGIC ANALYSIS

PROPOSED SURFACE-WATER MANAGEMENT SYSTEM

PERVIOUS AREA, CN =	**64.56**	
BUILDINGS/ROADS/IMPERVIOUS AREAS, CN =	**98.00**	(See Note 1)
DRY DETENTON BASIN, CN =	**97.84**	
WET RETENTON BASIN, CN =	**100.00**	(See Note 2)

SUBBASIN NAME	PERVIOUS AREA (Acres)	BLDG/ROAD/IMP. AREA (Acres)	DRY DETENTION AREA (Acres)	WET RETENTION AREA (Acres)	CNc	TOTAL BASIN AREA (Acres)
100	0.727	0.650	0.610	0.000	**85.71**	**1.987**
105	0.000	0.165	0.616	0.000	**97.87**	**0.781**
110	0.113	0.525	0.183	0.000	**93.36**	**0.821**
115	0.021	0.099	0.398	0.000	**96.54**	**0.518**
120	0.857	0.298	0.121	0.000	**75.52**	**1.276**
125	0.000	0.147	0.507	0.000	**97.87**	**0.654**
130	0.950	0.333	0.390	0.000	**78.97**	**1.673**
135	0.024	0.116	0.410	0.000	**96.41**	**0.550**
140	0.000	0.632	0.244	0.000	**97.95**	**0.876**
145	0.012	0.058	0.346	0.000	**96.90**	**0.416**
150	0.194	0.235	0.447	0.000	**90.51**	**0.876**
155	0.017	0.093	0.274	0.000	**96.40**	**0.385**
160	0.028	0.694	0.055	0.000	**96.80**	**0.777**
165	0.050	0.126	0.809	0.000	**96.17**	**0.985**
170	0.050	0.646	0.069	0.000	**95.80**	**0.765**
175	0.050	0.104	0.506	0.000	**95.34**	**0.660**
E.Lake	2.000	0.000	1.000	11.010	**94.79**	**14.010**

Notes:

1. A curve number of 98 was used for all roads & impervious areas, as recommended in TR-55 (Table 2.2a).
2. A curve number of 100 was used for the wet retention basin.
3. The total impervious area is 4.923 acres.

Building/Road/Impervious Area = 0.65 ac (CN = 98)

Dry Detention Area = 0.61 ac (CN = 97.84)

Wet Retention Area = 0 ac (CN = 100)

Composite Curve Number (CN_c):

$$\mathrm{CN_c} = \frac{\sum (A_i \times \mathrm{CN}_i)}{\sum A_i} = \left(\frac{0.727 \times 64.56 + 0.65 \times 98 + 0.61 \times 97.84 + 0 \times 100}{(0.727 + 0.65 + 0.61 + 0)} \right)$$

$$\mathrm{CN_c} = 85.71$$

A summary of CN_c for all the basins is presented in Table C-3.

C.4.4 Runoff Hydrographs

The surface water management system for the LRF site was designed for a storm recurrence interval of 25 years and duration of 72 hours. The SFWMD 72-hour rainfall distribution was used for hydrograph generation, as presented in Figure C-5. A hydrograph peaking factor of 484 was used for all basins, which is considered to be conservative.

The computer program, Advanced Interconnected Channel and Pond Routing (ICPR) version 2.11 developed by Streamline Technologies of Winter Park, Florida was used to perform hydrologic and hydraulic simulations of the proposed development. The ICPR program was used to generate runoff hydrographs using the NRCS unit hydrograph method (TR-55). A summary of the basin hydrographs for the final (proposed) surface water management system for the 25-year 72-hour storm is presented in **Exhibit A**.

C.5 Hydraulic Routing for the Proposed Surface Water Management System

C.5.1 Overview

Following the generation of hydrographs (i.e., hydrologic analysis), the ICPR program was used to route the hydrographs through the conveyance system. A schematic of the hydraulic routing is presented in Figure C-6. The sub-basin delineation for the proposed site is shown on Exhibit A. The following sections briefly present the procedures used by ICPR to perform the hydrodynamic routing (hydraulic analysis) of the hydrographs generated. The hydraulic input data for analyzing the proposed surface water management system used for routing is presented in **Exhibit B**.

C.5.2 Boundary Conditions

The hydraulic routing for the proposed surface water management system was performed using the ICPR model, as mentioned previously. The ultimate discharge location for site runoff is the East Lake, located along the eastern boundary of the site.

To perform the hydraulic routing and to calculate the proposed discharges, the boundary condition needs to be established. For the BOUNDARY node, the initial elevation was set at 18.0 feet NGVD (at time = 0 hours), which represents the average high wet season GWT for the site. At 62 hours, the stage was set at 20.0 feet, NGVD, which is 2 feet above the maximum GWT, to represent the peak flows from the entire tributary area of the proposed site. At 80 hours, the boundary stage was set at 19.0 feet NGVD. This represents the increase in stages during the storm and the recession after the peak of the storm has occurred.

The water surface elevations for the East Lake during the 25-year 72-hour storm event were estimated using the ICPR model.

C.5.3 Results of the Hydraulic Routing

C.5.3.1 Peak Stages

The hydrographs generated for the 25-year 72-hour storm were routed through the retention basins, channels, culverts, and other hydraulic structures for the proposed site conditions. Stage-Area relationships were established for each node, as shown in **Table C-4**. The results of the routing indicate that the maximum stage in the surface water management basins is 20.95 feet NGVD for node N-120. The top of berm elevations for the proposed site will be approximately 24.0 feet NGVD. Therefore, the minimum freeboard available in the dry detention basins is 3.05 feet. This freeboard is considered acceptable for below ground impoundments, as recommended in the "Basis of Review for Environmental Resource Permit Applications Within the South Florida Water Management District" (SFWMD, 1996). The results of the 25-year 72-hour storm routing for the proposed surface water management system, using ICPR, are presented in **Exhibit C**. **Table C-5** presents the summary of the peak stages and the available freeboard in the dry retention and wet retention basins for a 25-year 72-hour storm.

A separate hydrologic and hydraulic analysis was performed to determine the peak stages within the site during a 100-year 72-hour storm. The peak stage was determined using the ICPR, and was estimated to be 21.27 feet, NGVD for node N-120, which is considerably lower than the floor pad elevation of 23.00 feet NGVD, and is considered adequate. The results for the 100-year 72-hour storm routing are presented in Exhibit C. A summary of peak stages during the 100-year 72-hour storm is presented in **Table C-6**.

C.6 Calculation of Treatment Volume and Recovery Times for Dry Detention Basins

C.6.1 Treatment Volume

The treatment volume that will be used for the design of dry detention basins is the greater of 1.0 inch of runoff from the entire tributary area to the dry detention basins, or 2.5 inches times the percentage of impervious area tributary to the dry detention basins.

Table C-4

LIME AND BIOSOLIDS FACILITIES
Storage Calculations Using Average End-Area Method

Proposed Surface-water Management Basins

N-100

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.50	0.00	0.00
20.0	0.61	0.56	0.56

N-105

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.40	0.00	0.00
20.0	0.44	0.42	0.42
21.0	0.49	0.47	0.89
22.0	0.53	0.51	1.40
23.0	0.58	0.55	1.95
24.0	0.62	0.60	2.55

N-110

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.13	0.00	0.00
20.0	0.18	0.15	0.15

N-115

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.20	0.00	0.00
20.0	0.24	0.22	0.22
21.0	0.28	0.26	0.48
22.0	0.32	0.30	0.78
23.0	0.36	0.34	1.12
24.0	0.40	0.38	1.50

N-120

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.08	0.00	0.00
20.0	0.12	0.10	0.10

Table C-4 continued

N-125

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.30	0.00	0.00
20.0	0.34	0.32	0.32
21.0	0.38	0.36	0.68
22.0	0.42	0.40	1.09
23.0	0.47	0.44	1.53
24.0	0.51	0.49	2.02

N-130

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.28	0.00	0.00
20.0	0.39	0.34	0.34

N-135

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.25	0.00	0.00
20.0	0.28	0.27	0.27
21.0	0.31	0.30	0.56
22.0	0.35	0.33	0.89
23.0	0.38	0.36	1.26
24.0	0.41	0.39	1.65

N-140

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.20	0.00	0.00
20.0	0.24	0.22	0.22

N-145

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.23	0.00	0.00
20.0	0.25	0.24	0.24
21.0	0.28	0.26	0.51
22.0	0.30	0.29	0.79
23.0	0.32	0.31	1.11
24.0	0.35	0.33	1.44

Table C-4 continued

N-150

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.37	0.00	0.00
20.0	0.45	0.41	0.41

N-155

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.16	0.00	0.00
20.0	0.18	0.17	0.17
21.0	0.21	0.19	0.37
22.0	0.23	0.22	0.58
23.0	0.25	0.24	0.82
24.0	0.27	0.26	1.09

N-160

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.04	0.00	0.00
20.0	0.06	0.05	0.05

N-165

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.55	0.00	0.00
20.0	0.60	0.58	0.58
21.0	0.65	0.63	1.20
22.0	0.71	0.68	1.88
23.0	0.76	0.73	2.61
24.0	0.81	0.78	3.40

N-170

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.03	0.00	0.00
20.0	0.05	0.04	0.04

Table C-4 continued

N-175

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
19.0	0.32	0.00	0.00
20.0	0.36	0.34	0.34
21.0	0.39	0.38	0.71
22.0	0.43	0.41	1.13
23.0	0.47	0.45	1.58
24.0	0.51	0.49	2.07

E.LAKE

Stage (ft)	Area (ac)	Incremental Storage (ac-ft)	Cumulative Storage (ac-ft)
6.00	1.55	0.00	0.00
7.00	3.20	2.38	2.38
8.00	5.93	4.57	6.94
16.00	8.83	59.04	65.98
24.00	10.61	77.76	143.74

Note: The cumulative storage (provided) in all dry retention basins between elevations 19.0 and 20.0 is 4.5 acre-ft. This is greater than the minimum required treatment volume of 1.67 acre-ft for 1 inch of runoff.

Table C-5
LIME AND BIOSOLIDS FACILITIES

Proposed Condition : Summary of Peak Stages
25-Year 72-Hour Storm

Node Name	25-Year 72-Hour Storm Peak Stage (ft, NGVD)	Available Freeboard (ft)
N-100	20.67	3.33
N-105	20.58	3.42
N-110	20.65	3.35
N-115	20.56	3.44
N-120	20.95	3.05
N-125	20.58	3.42
N-130	20.63	3.37
N-135	20.56	3.44
N-140	20.60	3.40
N-145	20.51	3.49
N-150	20.57	3.43
N-155	20.56	3.44
N-160	20.75	3.25
N-165	20.51	3.49
N-170	20.78	3.22
N-175	20.47	3.53
E.Lake	19.89	4.11

Table C-6
LIME AND BIOSOLIDS FACILITIES

Proposed Condition : Summary of Peak Stages
100-Year 72-Hour Storm

Node Name	100-Year 72-Hour Storm Peak Stage (ft, NGVD)	Available Freeboard (ft)
N-100	20.87	3.13
N-105	20.71	3.29
N-110	20.83	3.17
N-115	20.69	3.31
N-120	21.27	2.73
N-125	20.71	3.29
N-130	20.80	3.20
N-135	20.70	3.30
N-140	20.76	3.24
N-145	20.60	3.40
N-150	20.71	3.29
N-155	20.69	3.31
N-160	20.98	3.02
N-165	20.60	3.40
N-170	21.01	2.99
N-175	20.54	3.46
E.Lake	20.18	3.82

The volume of 1-inch of runoff for the entire area is obtained as:

$V_{1\ inch}$ = 1 inch x Area Tributary to all dry detention basins

For all dry detention basins combined, the total tributary area is 14.00 acres (excluding the areas tributary to the East Lake from the total area), therefore:

$$V_{1\ inch} = 1 \text{ inch} \times \frac{1'}{12''} \times 14.00 \text{ ac}$$

$$V_{1\ inch} = 1.17 \text{ acre-feet}$$

The area of impervious surfaces for the proposed surface water management system is 4.923 acres (Table C-3). The percentage of impervious area (4.923 acres) to total area tributary to dry retention areas (14.00 acres) is 35.2 percent. Therefore, the volume of 1-inch of runoff from the entire site (tributary to dry retention areas) is much greater than the volume of 2.5-inches from impervious areas.

The minimum storage capacity required in the dry detention basins for water quality treatment is 1.17 acre-feet. The initial elevation of the dry retention areas was assumed at 19.0 feet NGVD (i.e., 1 foot above wet season average high GWT). The control elevation for the spillways discharging to the East Lake will be graded at 20.0 feet NGVD, which would achieve a treatment volume of 4.5 acre-feet. Table C-4 presents the stage-storage calculations for all proposed surface water management basins.

C.6.2 Estimation of Recovery Times

The purpose of this calculation is to estimate the recovery time for the proposed dry retention basin at the proposed site. The time required to infiltrate the runoff volume from a 25-year 72-hour storm is calculated. The runoff volume must be infiltrated within 72 hours from the time the storm ceases [Rule 40C-42.026 (1) (c)]. The calculation of recovery times for the dry detention basins involves the following:

- Estimating the stage-discharge (rating curves) for the dry detention basins and wet retention basin, based on the hydraulic conductivity data available from literature; and

- Routing the hydrographs through the surface water management system (i.e., performing a hydraulic simulation up to a time of 150 hours from the beginning of the storm).

C.6.2.1 Calculations for Stage-Discharge (Rating Curve)

The stage-discharge calculations for the proposed dry detention and wet retention basins were performed using Darcy's Equation as follows:

$$Q = kiA$$

where,

Q = discharge (ft^3/sec)

K = hydraulic conductivity (cm/sec)

A = surface area (ft^2)

h = head (ft)

L = drainage distance (ft)

i = hydraulic gradient (dimensionless), $i = \frac{h}{L}$

The data for hydraulic conductivity was obtained from the geotechnical investigations conducted by Tierra, Inc. during April/May 2002 (**Exhibit D**). The minimum value of 2.22×10^{-2} cm/sec was used as the infiltration rate for all dry detention basins

An example calculation for obtaining the rating curve is presented below:

Data:

Hydraulic conductivity = 2.22×10^{-2} cm/sec

Max. groundwater elevation = 18.0 feet. NGVD

From geotechnical investigations (borings) performed on site, the uppermost layer extends to about 50 feet below existing ground surface. Therefore, a value of 50 feet was used for the thickness of the sand layer to estimate the hydraulic gradient.

Average thickness of sand layer *(L)* = 50 feet.

For the flood stage at elevation 22.0 feet. NGVD, the available head *(h)* is:

h= 22.0 - 18.0 = 4.0 feet.

The surface area *(A)* of the dry detention basin N-100 at a flood stage of 22.0 feet. NGVD is 0.53 acres, as obtained from AutoCAD measurements.

Therefore, the hydraulic gradient *(i)* can be calculated as:

$$i = \frac{h}{L}$$

$$= \frac{4.0 ft}{50 ft}$$

$$i = 0.08$$

The discharge is then calculated using the Darcy's Equation:

$$Q = KiA$$

$$= (2.22 \times 10^{-2} \frac{cm}{\sec} \times \frac{1in}{2.54cm} \times \frac{1ft}{12in}) \times (0.08) \times (0.53acres \times 43{,}560 \frac{ft^2}{acre})$$

$$Q = 1.35 \, {ft^3}/{\sec}$$

From the above calculations, the discharge from N-100 through infiltration losses is 1.35 ft^3/sec when the flood stage is at 22.0 feet NGVD. A spreadsheet was created to perform calculations for various stages. The discharges resulting for various flood stages were plotted to obtain the stage-discharge curve (rating curve). The rating curves and stage-discharge calculations for all dry detention basins are presented in **Exhibit E**. The values obtained from these calculations were used in the hydraulic routing model (using ICPR computer program).

C.6.2.2 Recovery Time

Recovery times for the dry detention basins on the 15-acre parcel were estimated using the ICPR computer program. Hydraulic simulations were performed up to 150 hours (i.e., 78 hours after the storm end). The time at which the water level in a basin returns to its initial elevation is noted on the stage-time graph generated by ICPR. The recovery time is calculated as the difference between the time noted on the graph and the time the storm ceases, i.e., 72 hours.

C.6.3 Results

The results of the hydraulic simulation (presented in Exhibit C) indicate that at time period of approximately 81 hours (9 hours after the storm ceases), all surface water management basins recover their entire storage (i.e., the stages reach initial elevations).

C.7 Design of the Temporary Surface Water Management System

The temporary surface water management system for the LRF/BPF site was designed for the 25-year 72-hour storm event. Dry detention basins, perimeter channels, and culverts will be utilized for managing site surface water during the construction phases. The temporary construction phase considered for the hydrologic and hydraulic analysis was the completion of grading for surface water basins. This condition is prior to the excavation for construction of the LRF and BPF.

The design of the temporary surface water system was based on the same principles that were adopted for the final surface water management system described previously in this document. The routing schematic is presented on **Figure C-9**. The basin delineation for the temporary surface water management system is shown on **Figure C-10** and **C-11**. The results of the hydrograph generation are presented in **Exhibit F**. Hydraulic input data for the 25-year 72-hour storm are presented in **Exhibit G.** The results of the hydraulic routing are presented in **Exhibit H.** The rating curves and stage-discharge calculations for all dry detention basins for the temporary surface water management system are presented in **Exhibit I.**

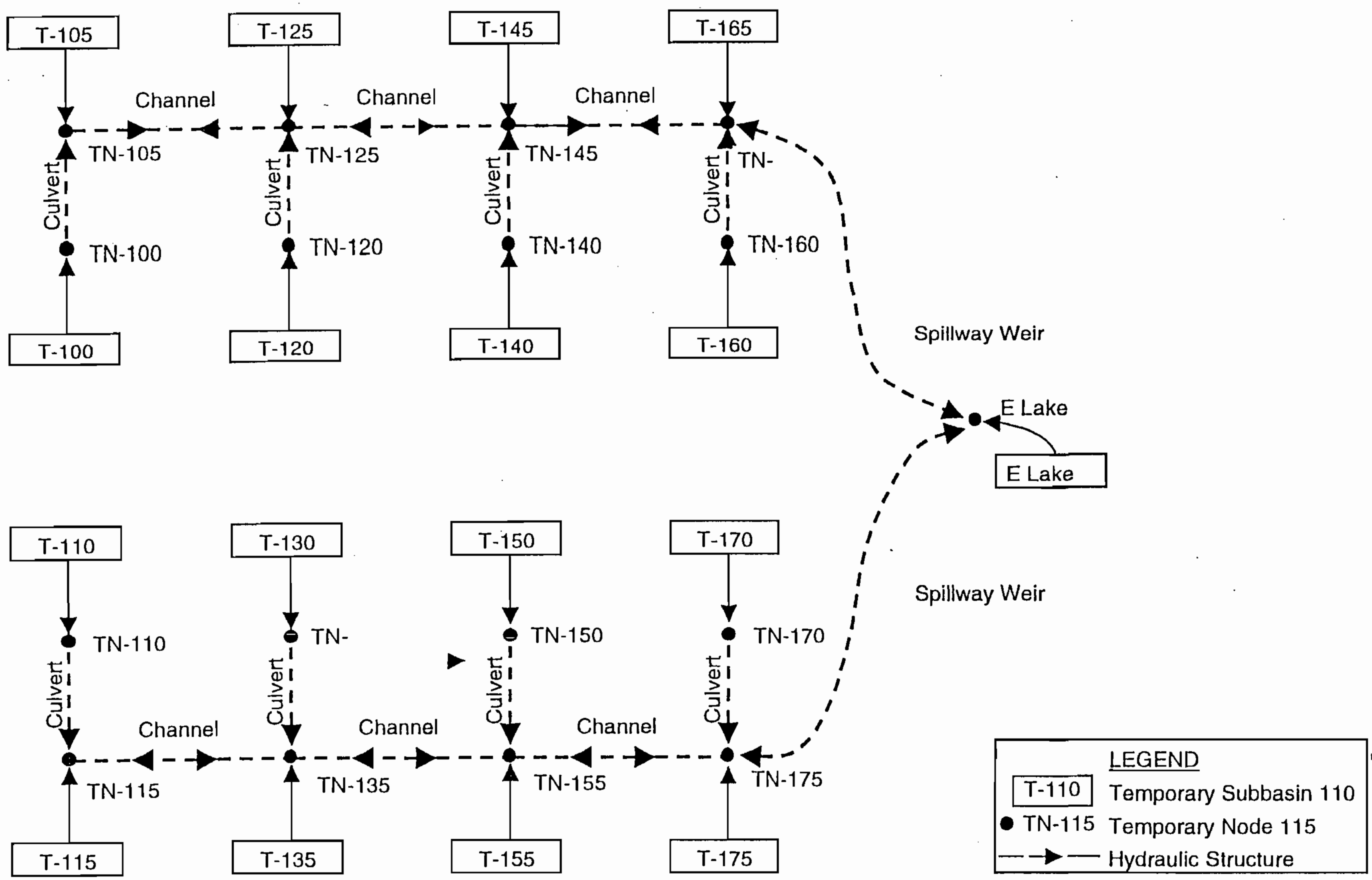

FIGURE C-9
ROUTING AND WATERSHED NODAL NETWORK SCHEMATIC

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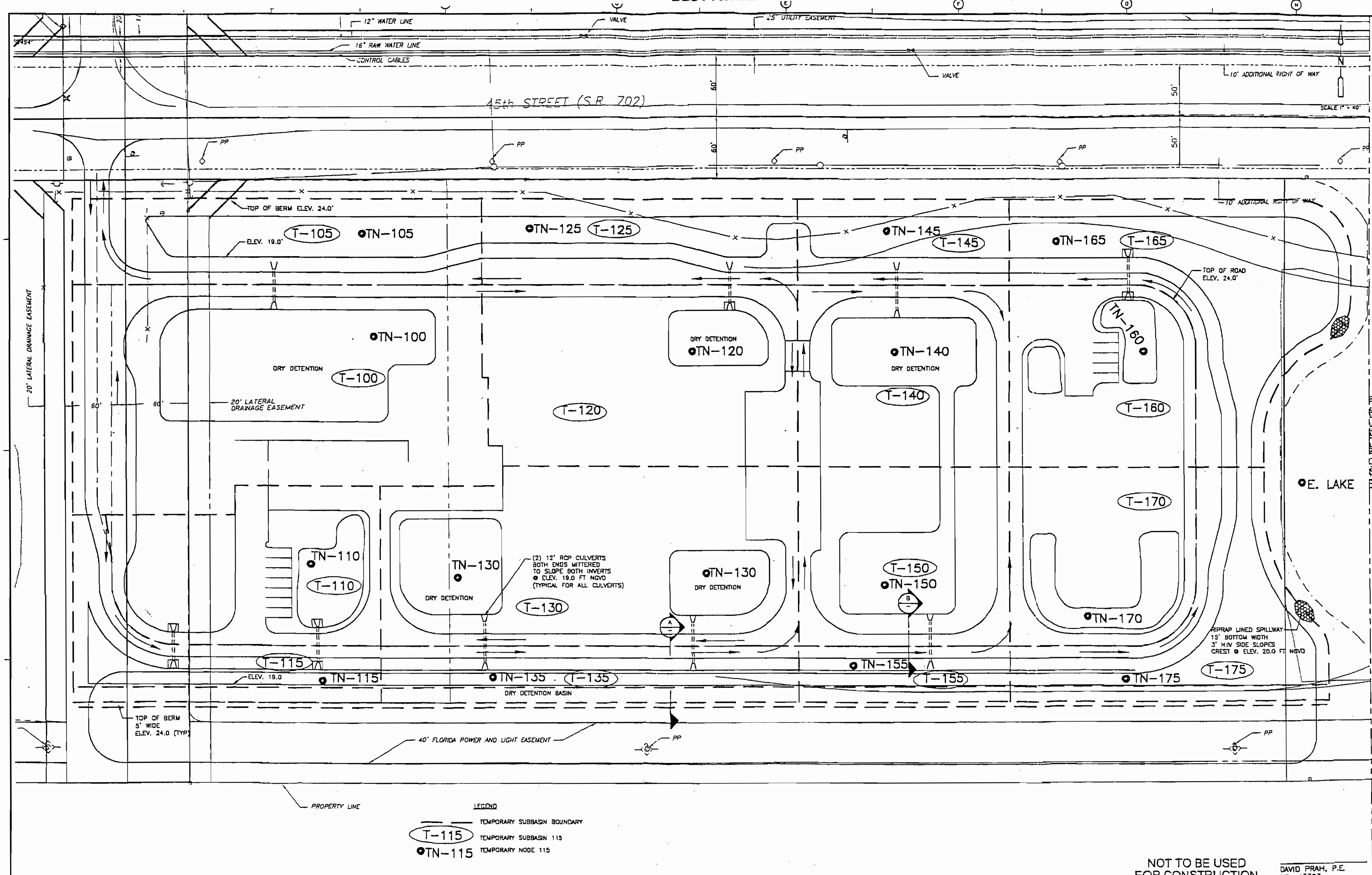


NOT TO BE USED FOR CONSTRUCTION

DAVID PRAH, P.E.
NO. 43393

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. HILL
DRAWN BY: D. AUST
SHEET CHK'D BY: D. PRAH
CROSS CHK'D BY: J. HILL
APPROVED BY: D. PRAH
DATE: MAY 2002

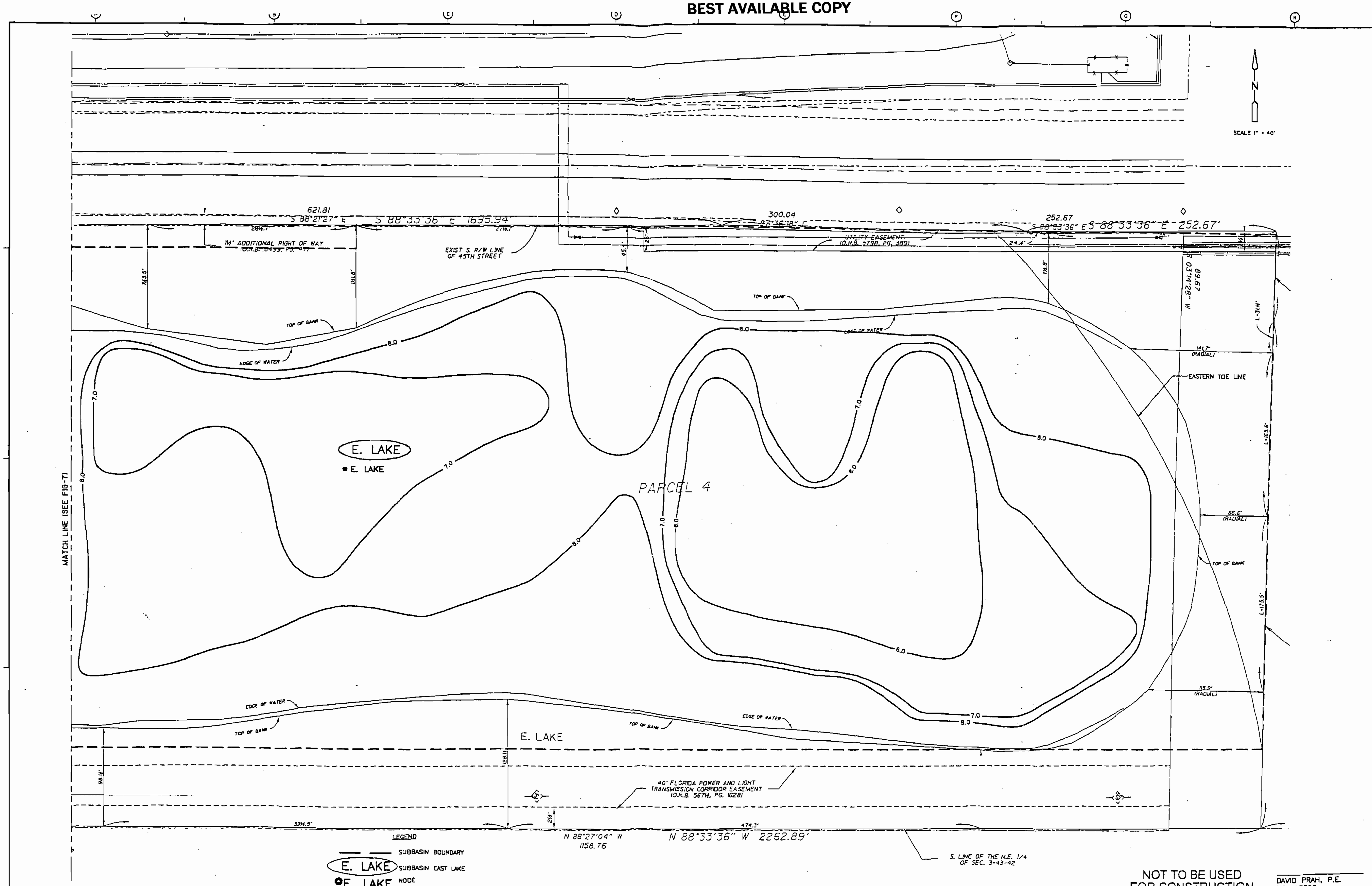
CDM Camp Dresser & McKee Inc.
2310 Maitland Center Parkway, Suite 300
Maitland, Florida 32751
Tel: 407-660-2552
Cert. of Authorization No. 20

SOLID WASTE AUTHORITY
OF PALM BEACH COUNTY
7501 NORTH JOG ROAD
LIME RECALCINATION AND
BIOSOLIDS PELLETIZATION FACILITY

TEMPORARY
SURFACE WATER MANAGEMENT PLAN

PROJECT NO. 2678-33750
FILE NAME: FIG-7

SHEET NO.
FIG C-10



NOT TO BE USED FOR CONSTRUCTION

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TEMPORARY
SURFACE WATER MANAGEMENT PLAN

PROJECT NO. 2678-33750
FILE NAME: FIG-11
SHEET NO.
FIG C-11

The results of the hydraulic routing indicate that the peak stage would be at elevation 20.85 feet NGVD for node TN-120. Therefore, the minimum freeboard available in the surface water management basins is 3.15 feet, which is considered adequate. **Table C-7** presents the peak stages and available freeboard during temporary conditions (for a 25-year 72-hour storm event). The top of the existing berm is approximately at 24.0 feet NGVD, which would provide adequate freeboard during temporary phases of construction.

C.8 Erosion and Sediment Control

The following erosion control measures shall be implemented as needed to reduce soil erosion and siltation during construction, meet the applicable Conditions of Certification, and comply with Chapter 62-302, FAC and 40F-4:

- Using standard measures such as hay bales and siltation fences to prevent the movement of soil beyond a work area;

- Leaving erosion control barriers in place until the work area is permanently stabilized;

- Maintaining a stockpile of silt fence and hay bales on site under a protective cover for routine maintenance and emergency repairs;

- Filtering water from dewatering operations to remove sediment prior to discharge;

- Stabilizing all disturbed areas upon completion of work, including re-seeding vegetated areas to the extent possible;

- Maintaining and refueling vehicles and equipment in designated areas only, located as far from wetlands and water bodies as possible;

- Storing fuel, oil, solvents, etc. in original containers, or in containers manufactured for storing such material that are clearly labeled as to the contents of the container. Fuel, oil and other potentially hazardous materials must be located, stored and maintained in compliance with applicable laws;

- Immediately cleaning up all spills of fuel, oil, or other potentially hazardous materials. Spills will be reported to the proper authorities;

- Backfilling or removing excavated material from the site efficiently to minimize the quantity of soil exposed and the duration of exposure;

- Redirecting surface water runoff to reduce the velocity and quantity of runoff with temporary controls, such as water bars, check dams, and filter strips;

- Lining all channels with grass;

- Establishing vegetation and other permanent erosion control measures throughout the work area as soon as possible after the completion of construction;

- Preventing direct discharges of surface water to vegetated wetlands and water bodies throughout the work area; and

- As required by the National Pollutant Discharge Elimination System (NPDES) Construction Permit, the construction contractor shall inspect the surface water management and construction areas regularly. Thorough inspections will occur after storm events and faulty controls will be repaired and/or replaced as necessary.

As described in Section 1.4.4 of the main text of this request for amendment, a Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activities Under a NPDES General Permit will be submitted to FDEP and the U.S. Environmental Protection Agency (EPA). As a condition of that general permit, a Stormwater Pollution Prevention Plan (SWPPP) will also be prepared to address surface water controls during construction. The construction contractor will be responsible for preparing and complying with the SWPPP. The construction specifications will require that the SWPPP be prepared in accordance with the surface water protection measures discussed in this section and the subsequent modified conditions of certification for Case No. 84-20, if any.

A plan for dewatering will also be included in the SWPPP with specific controls developed during design. The dewatering system design will incorporate the following mitigation measures to ensure that the discharge of water does not violate water quality standards:

- Maintaining a dry, undisturbed subgrade at all times; and

- Accommodating large volumes of water and maintaining stability of excavations;

- Monitoring the construction groundwater drawdown from dewatering in nearby wetlands and water supply wells, as necessary; and

- Discharging groundwater to upland areas or through haybales/silt fence that are set back from surface waters or vegetated wetlands.

During the construction phases, adequate erosion and sediment control measures will be implemented by the construction earthwork contractor, as required by SFWMD/FDEP.

REFERENCES

Camp Dresser & McKee Inc. (CDM), *"Technical Specifications for Construction Dewatering - NCRRF Compost Facility Biofilters Replacement"*, West Palm Beach, Florida, February 2000.

Association of Bay Area Governments (ABAG), *"Manual of Standards for Erosion and Sediment Control Measures"*, Oakland, CA, May 1995.

Florida Department of Transportation (FDOT), *"Drainage Handbook"*, Tallahassee, FL, 1994.

McCuen, R.H., *"Hydrologic Analysis and Design"*, Prentice Hall, 1989.

South Florida Water Management District, *"Basis of Review for Environmental Resources Permit Applications within the South Florida Water Management District"*, West Palm Beach, Florida, November 1996.

Streamline Technologies, Inc., *"Advanced Interconnected Channel and Pond Routing"*, Users Manual for Version 2.11, Streamline Technologies, Inc., Winter Park, Florida, 1995.

United States Department of Agriculture and Soil Conservation Service (USDA-SCS), "Urban Hydrology for Small Watersheds", *Technical Release 55*, June 1986.

Exhibit A

Basin Hydrographs for Proposed Site

25-Year 72-Hour Storm

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]

Solid Waste Authority
Lime Recalcination & Biosolids Facilties (Aug2003)
Proposed Conditions: 25-Year 72-Hour Storm

********** Basin Summary - LRF0253 **

***

Basin Name:	100	105	110	115	120
Group Name:	BASE	BASE	BASE	BASE	BASE
Node Name:	N-100	N-105	N-110	N-115	N-120
Hydrograph Type:	UH	UH	UH	UH	UH
Unit Hydrograph:	UH484	UH484	UH484	UH484	UH484
Peaking Factor:	484.00	484.00	484.00	484.00	484.00
Spec Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Comp Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72	SFWMD72	SFWMD72	SFWMD72
Rainfall Amount (in):	14.00	14.00	14.00	14.00	14.00
Storm Duration (hr):	72.00	72.00	72.00	72.00	72.00
Status:	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00	6.00	6.00	6.00
Lag Time (hr):	0.00	0.00	0.00	0.00	0.00
Area (acres):	1.99	0.78	0.82	0.52	1.28
Vol of Unit Hyd (in):	1.00	1.00	1.00	1.00	1.00
Curve Number:	85.71	97.87	93.36	96.54	75.52
DCIA (%):	0.00	0.00	0.00	0.00	0.00
Time Max (hrs):	60.00	60.00	60.00	60.00	60.00
Flow Max (cfs):	13.67	5.49	5.75	3.64	8.37
Runoff Volume (in):	12.16	13.72	13.16	13.56	10.73
Runoff Volume (cf):	87738	38907	39230	25499	49695

***

Basin Name:	125	130	135	140	145
Group Name:	BASE	BASE	BASE	BASE	BASE
Node Name:	N-125	N-130	N-135	N-140	N-145
Hydrograph Type:	UH	UH	UH	UH	UH
Unit Hydrograph:	UH484	UH484	UH484	UH484	UH484
Peaking Factor:	484.00	484.00	484.00	484.00	484.00
Spec Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Comp Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72	SFWMD72	SFWMD72	SFWMD72
Rainfall Amount (in):	14.00	14.00	14.00	14.00	14.00
Storm Duration (hr):	72.00	72.00	72.00	72.00	72.00
Status:	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00	6.00	6.00	6.00
Lag Time (hr):	0.00	0.00	0.00	0.00	0.00
Area (acres):	0.65	1.67	0.55	0.88	0.42
Vol of Unit Hyd (in):	1.00	1.00	1.00	1.00	1.00
Curve Number:	97.87	78.97	96.41	97.95	96.90
DCIA (%):	0.00	0.00	0.00	0.00	0.00
Time Max (hrs):	60.00	60.00	60.00	60.00	60.00
Flow Max (cfs):	4.60	11.19	3.87	6.16	2.92

Solid Waste Authority
Lime Recalcination & Biosolids Facilties (Aug2003)
Proposed Conditions: 25-Year 72-Hour Storm

********** Basin Summary - LRF0253 ***

Runoff Volume (in):	13.72	11.23	13.54	13.73	13.60
Runoff Volume (cf):	32580	68193	27042	43671	20544

***

Basin Name:	150	155	160	165	170
Group Name:	BASE	BASE	BASE	BASE	BASE
Node Name:	N-150	N-155	N-160	N-165	N-170
Hydrograph Type:	UH	UH	UH	UH	UH
Unit Hydrograph:	UH484	UH484	UH484	UH484	UH484
Peaking Factor:	484.00	484.00	484.00	484.00	484.00
Spec Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Comp Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72	SFWMD72	SFWMD72	SFWMD72
Rainfall Amount (in):	14.00	14.00	14.00	14.00	14.00
Storm Duration (hr):	72.00	72.00	72.00	72.00	72.00
Status:	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00	6.00	6.00	6.00
Lag Time (hr):	0.00	0.00	0.00	0.00	0.00
Area (acres):	0.88	0.38	0.78	0.99	0.76
Vol of Unit Hyd (in):	1.00	1.00	1.00	1.00	1.00
Curve Number:	90.51	96.40	96.80	96.17	95.80
DCIA (%):	0.00	0.00	0.00	0.00	0.00
Time Max (hrs):	60.00	60.00	60.00	60.00	60.00
Flow Max (cfs):	6.11	2.71	5.46	6.92	5.37
Runoff Volume (in):	12.80	13.54	13.59	13.51	13.47
Runoff Volume (cf):	40698	18928	38338	48323	37403

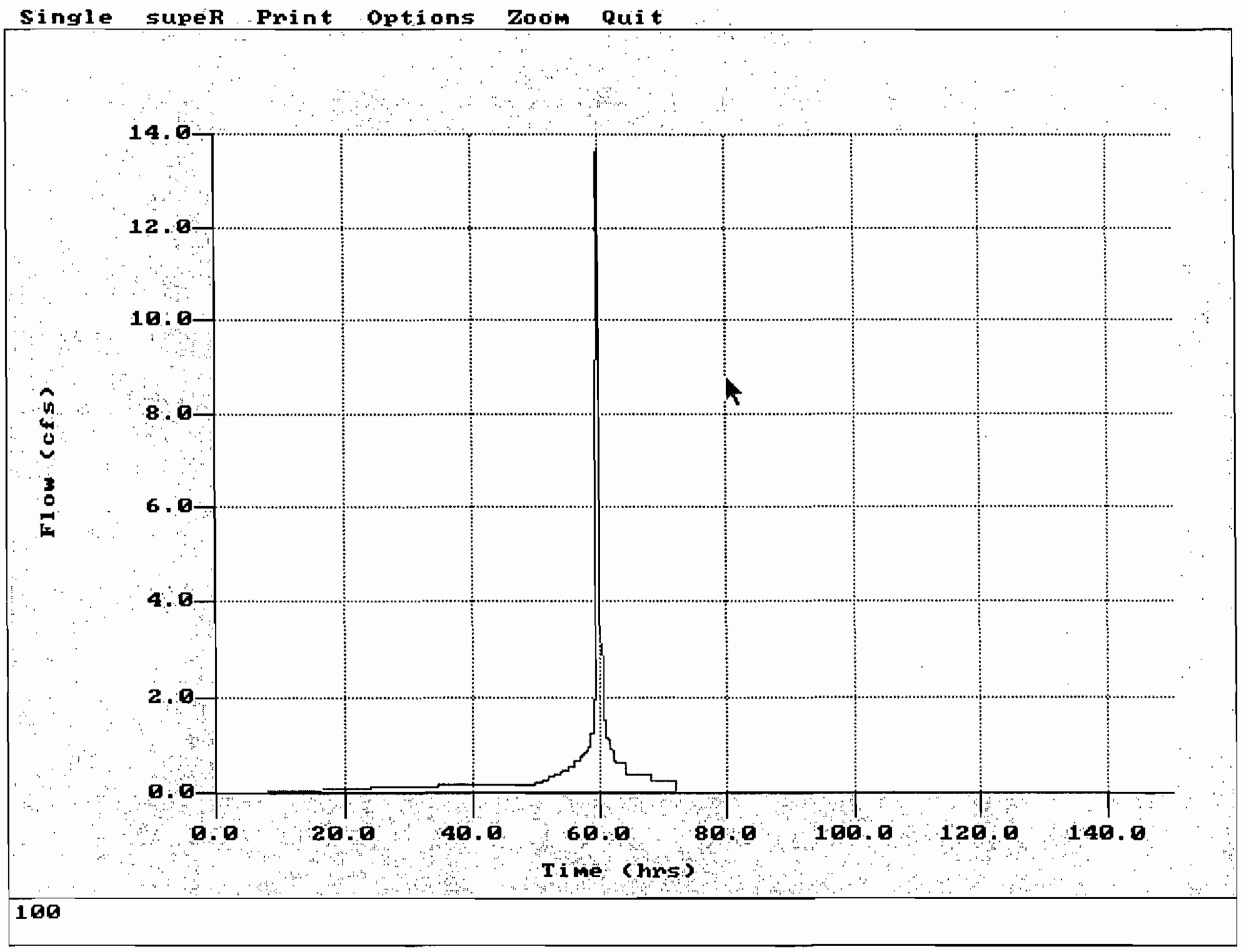
***

Basin Name:	175	E.LAKE
Group Name:	BASE	BASE
Node Name:	N-175	E.LAKE
Hydrograph Type:	UH	UH
Unit Hydrograph:	UH484	UH484
Peaking Factor:	484.00	484.00
Spec Time Inc (min):	0.80	0.80
Comp Time Inc (min):	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72
Rainfall Amount (in):	14.00	14.00
Storm Duration (hr):	72.00	72.00
Status:	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00
Lag Time (hr):	0.00	0.00
Area (acres):	0.66	14.01
Vol of Unit Hyd (in):	1.00	1.00
Curve Number:	95.34	94.79

Solid Waste Authority
Lime Recalcination & Biosolids Facilties (Aug2003)
Proposed Conditions: 25-Year 72-Hour Storm

********** Basin Summary - LRF0253 ***

DCIA (%):	0.00	0.00
Time Max (hrs):	60.00	60.00
Flow Max (cfs):	4.63	98.31
Runoff Volume (in):	13.41	13.34
Runoff Volume (cf):	32132	678593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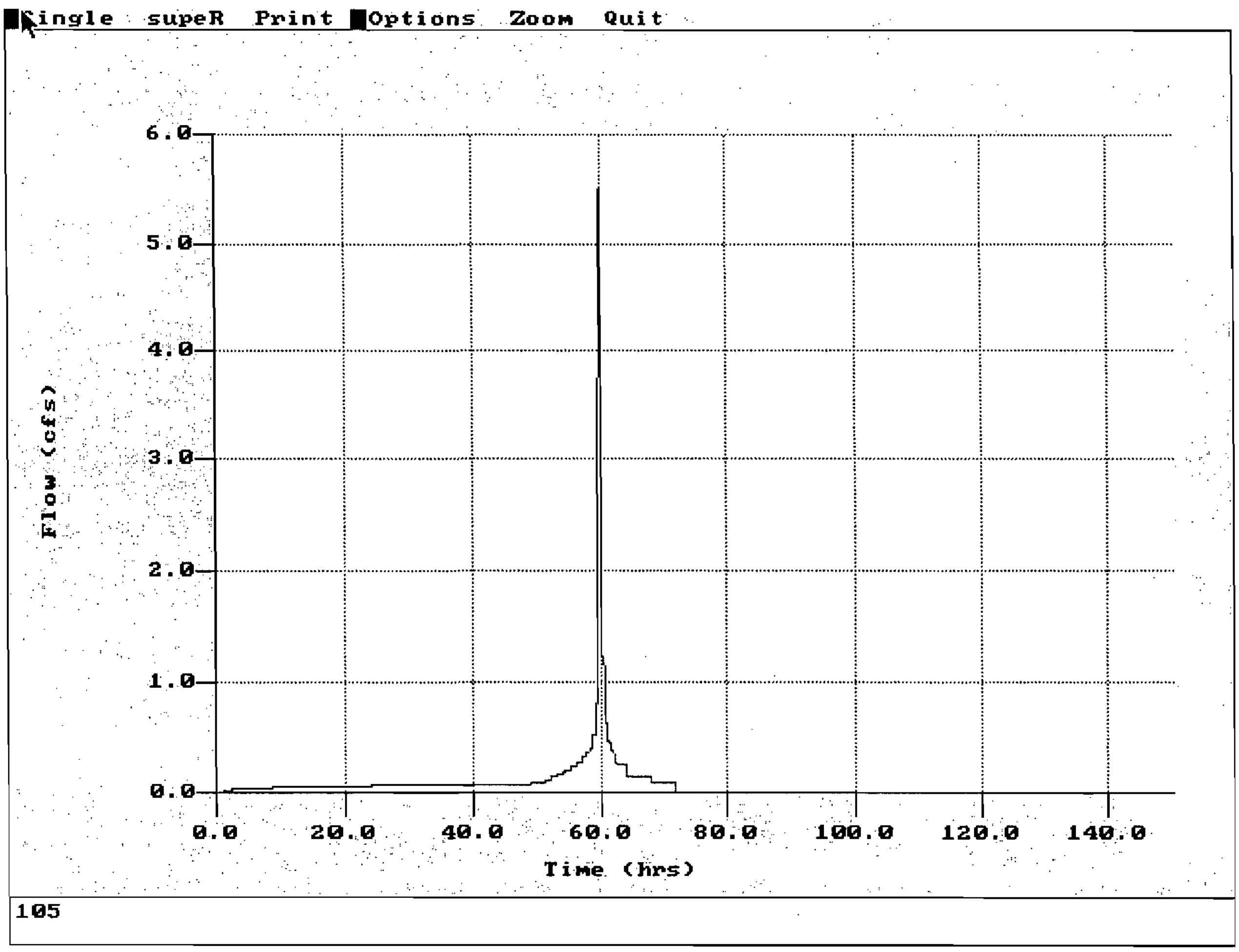
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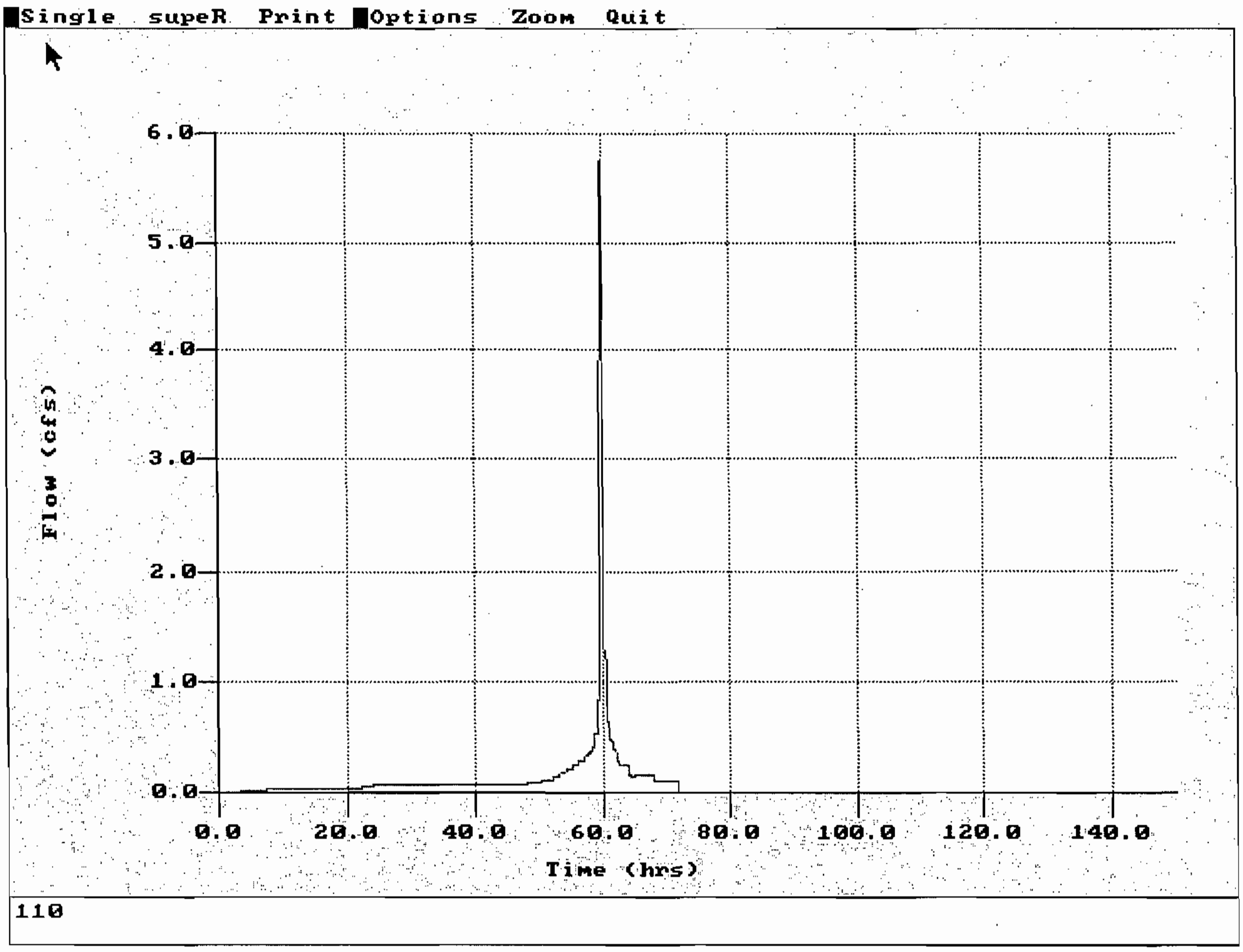
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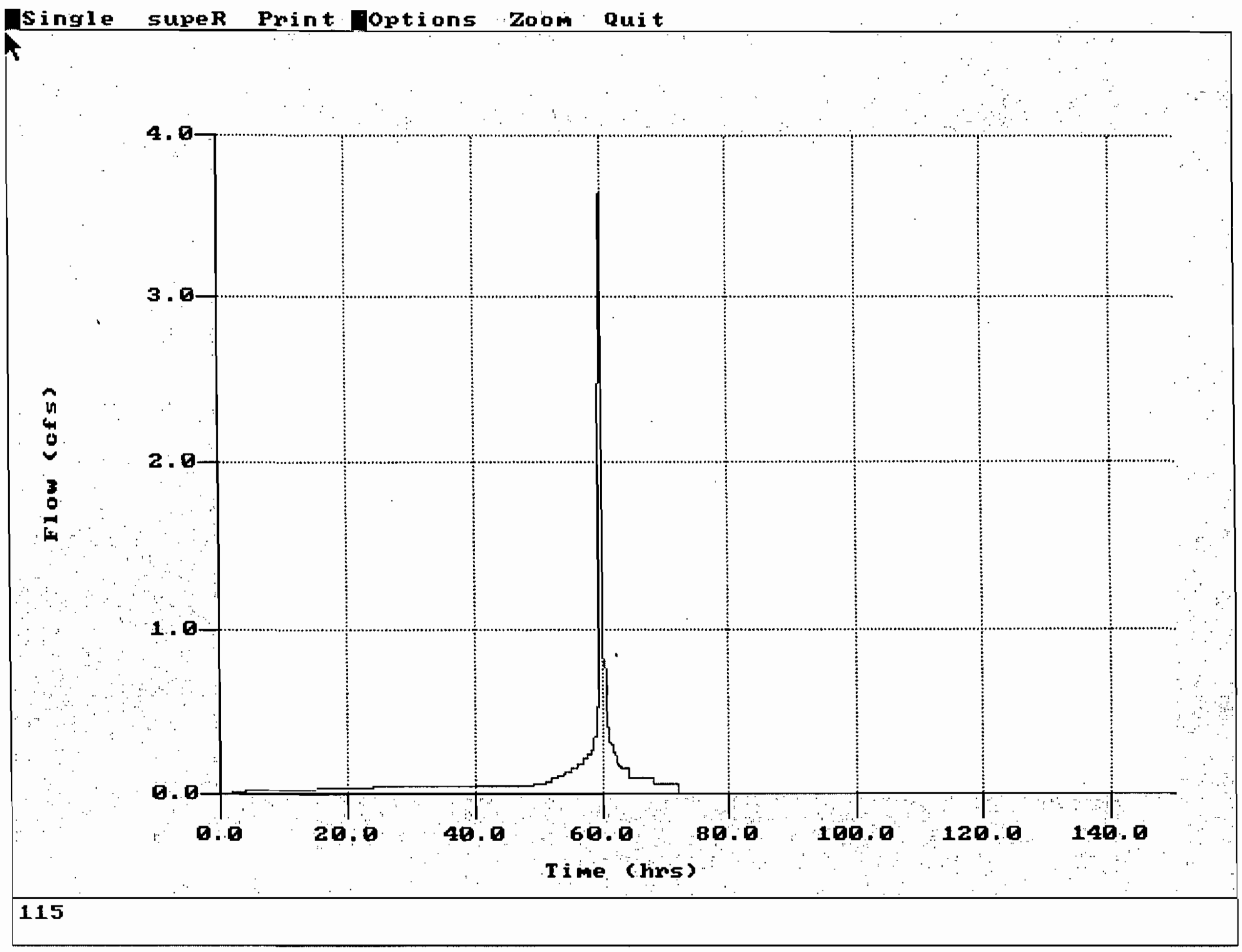
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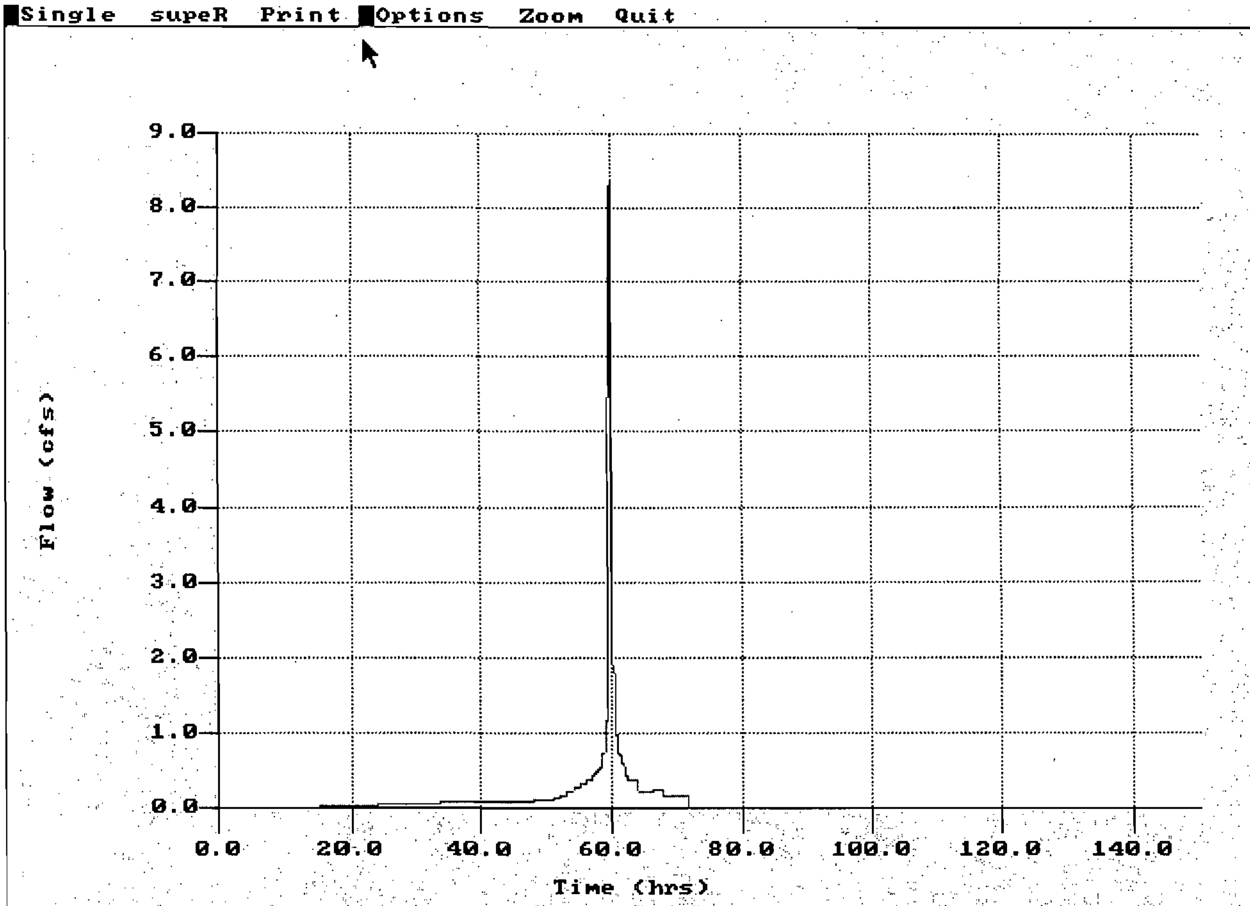

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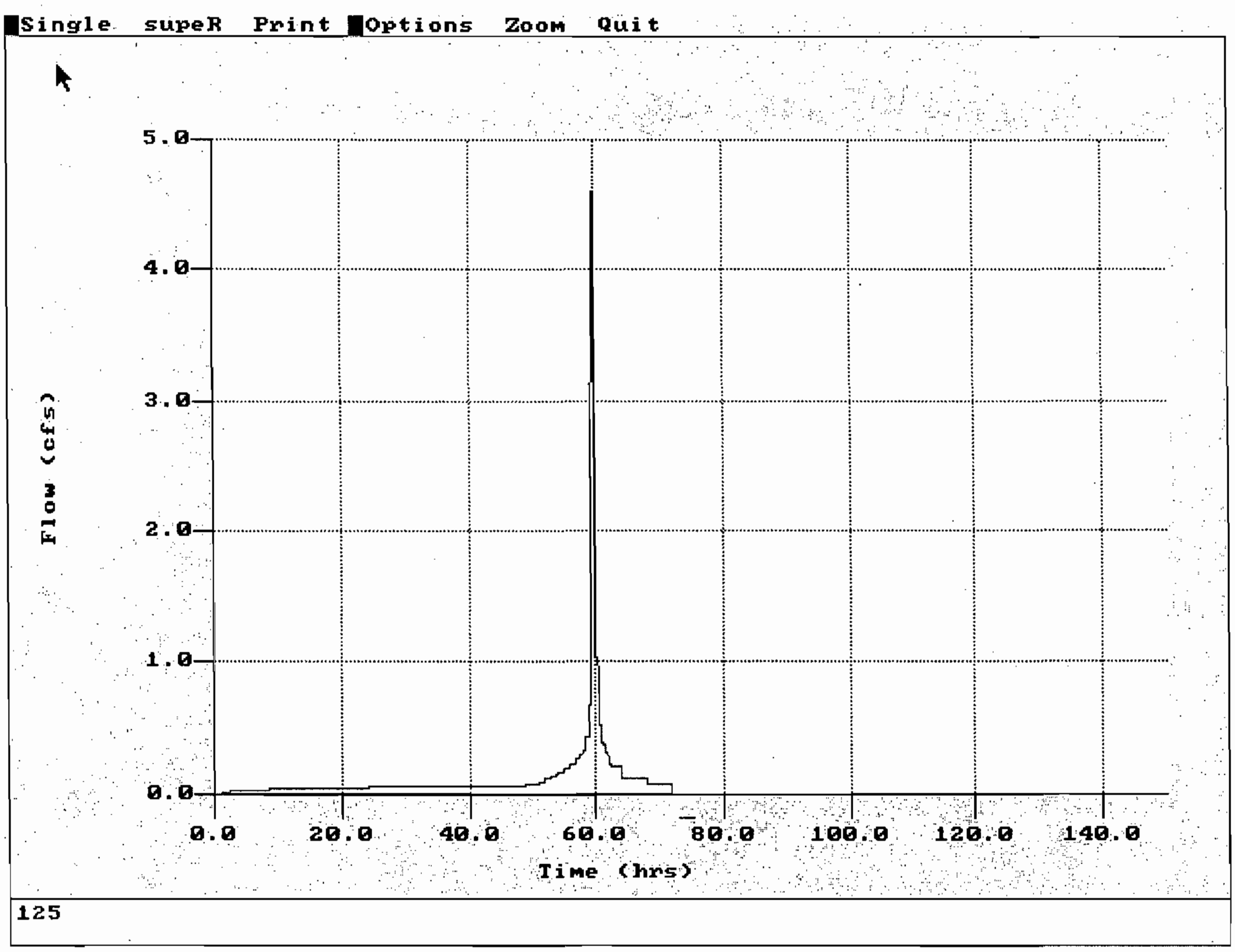
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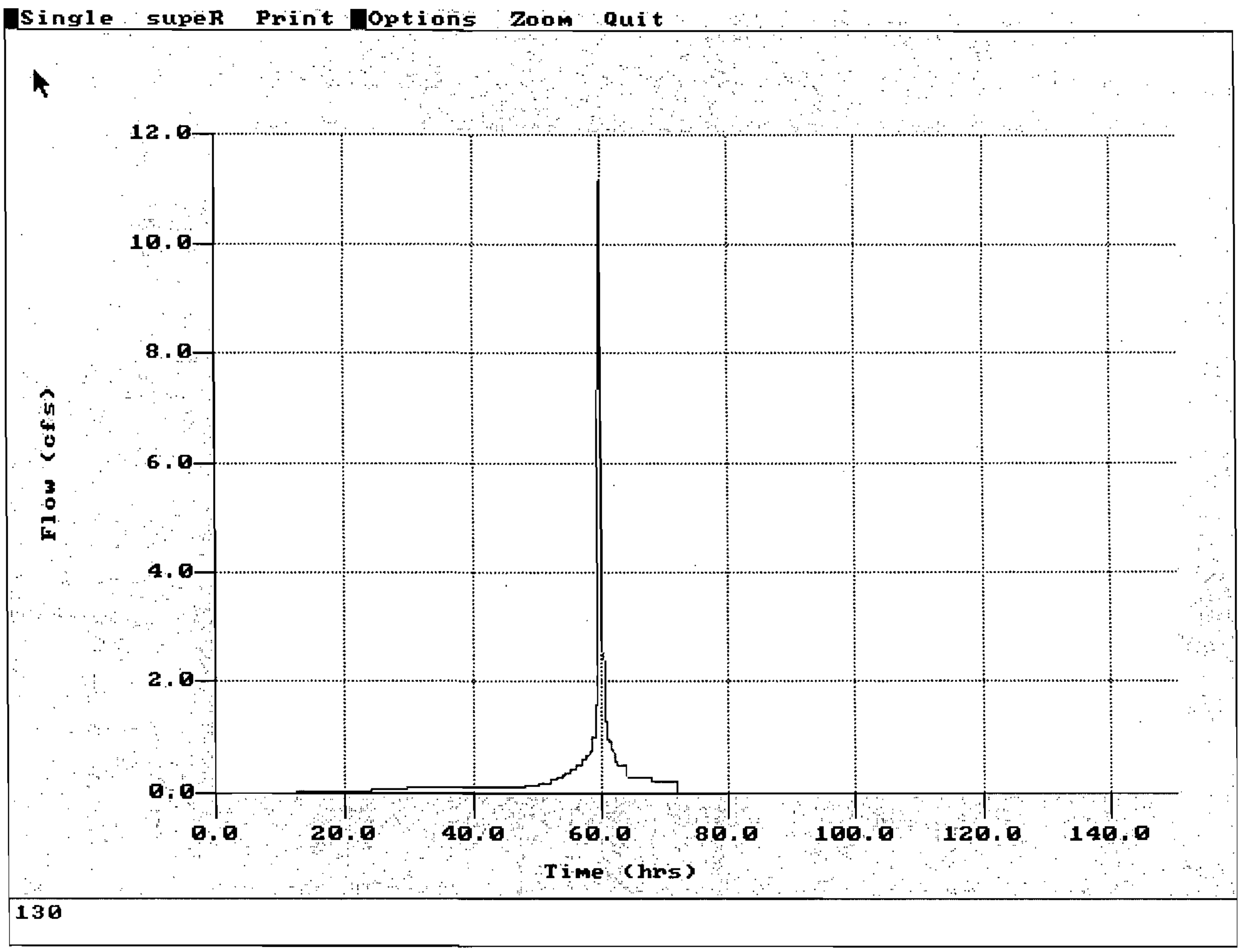
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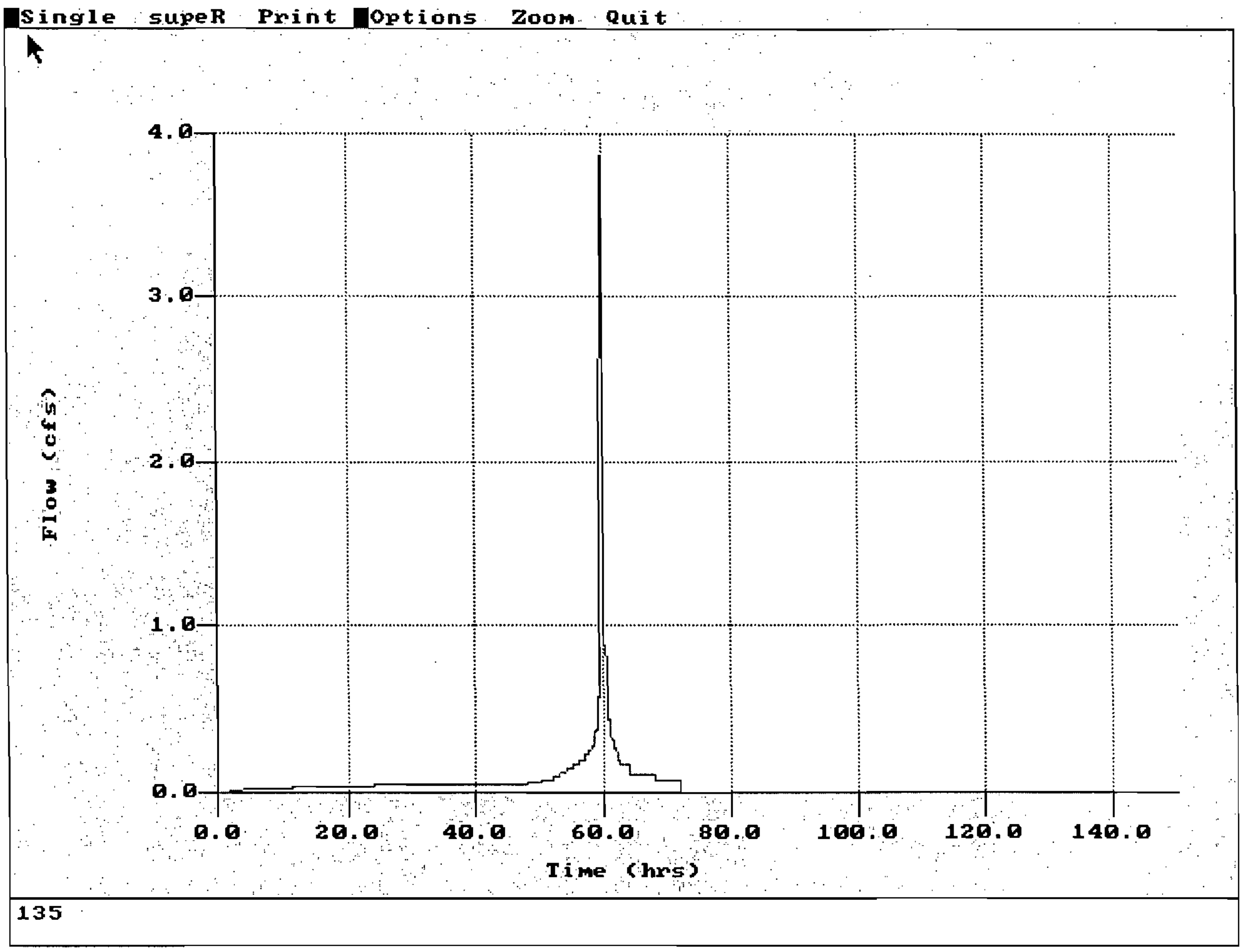
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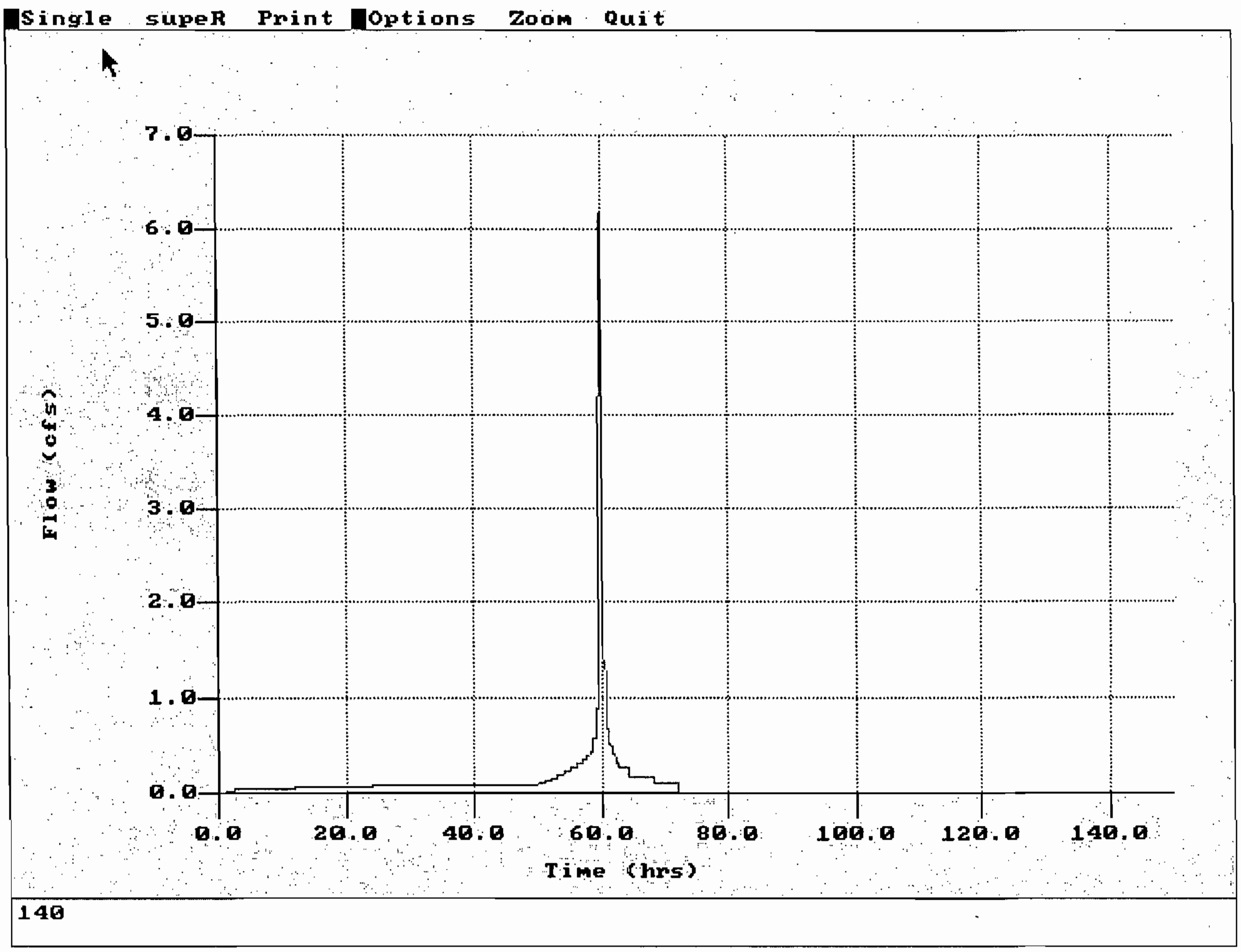
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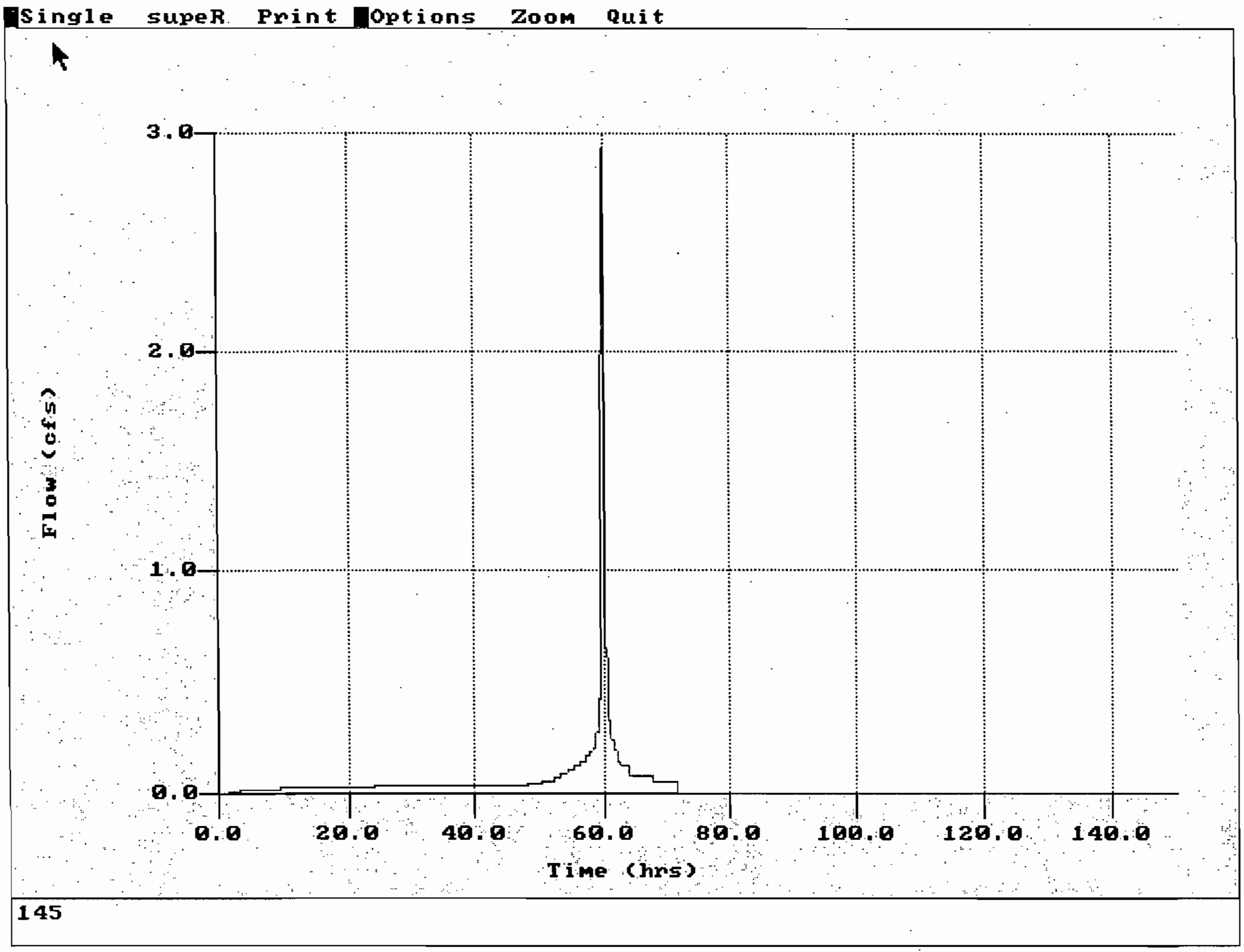
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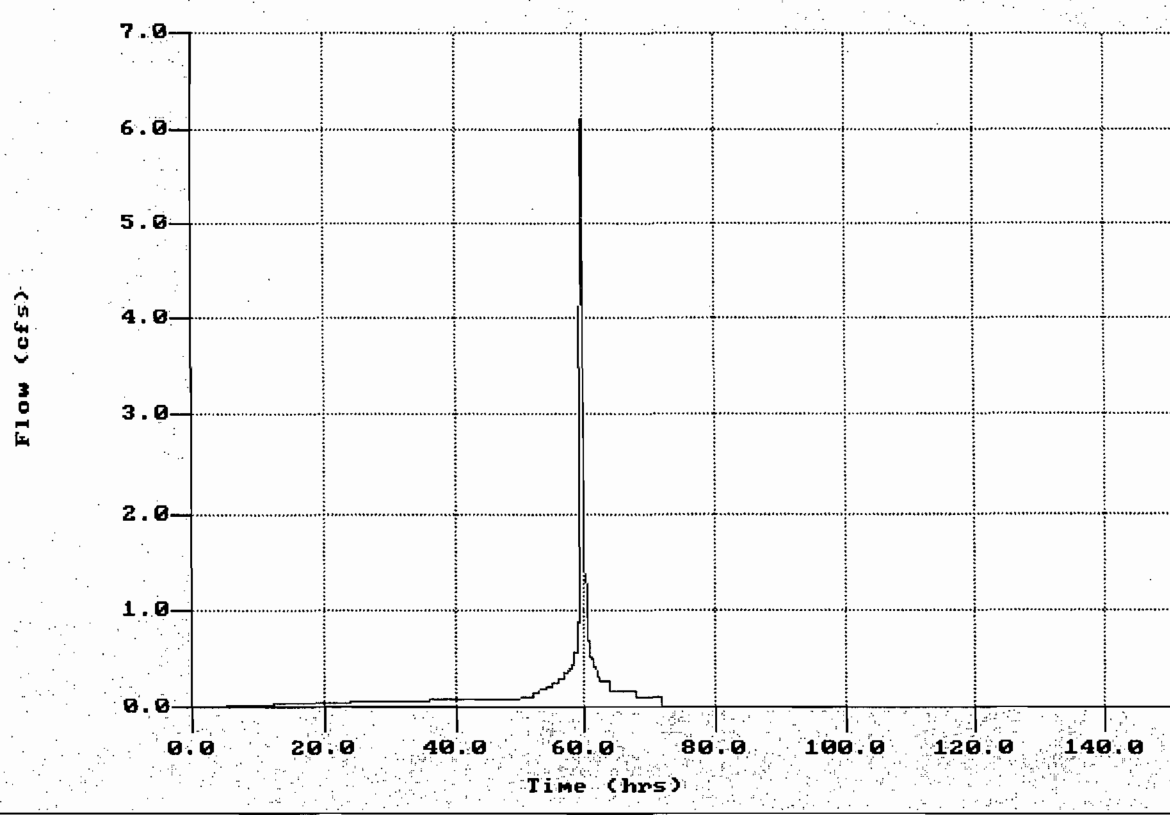

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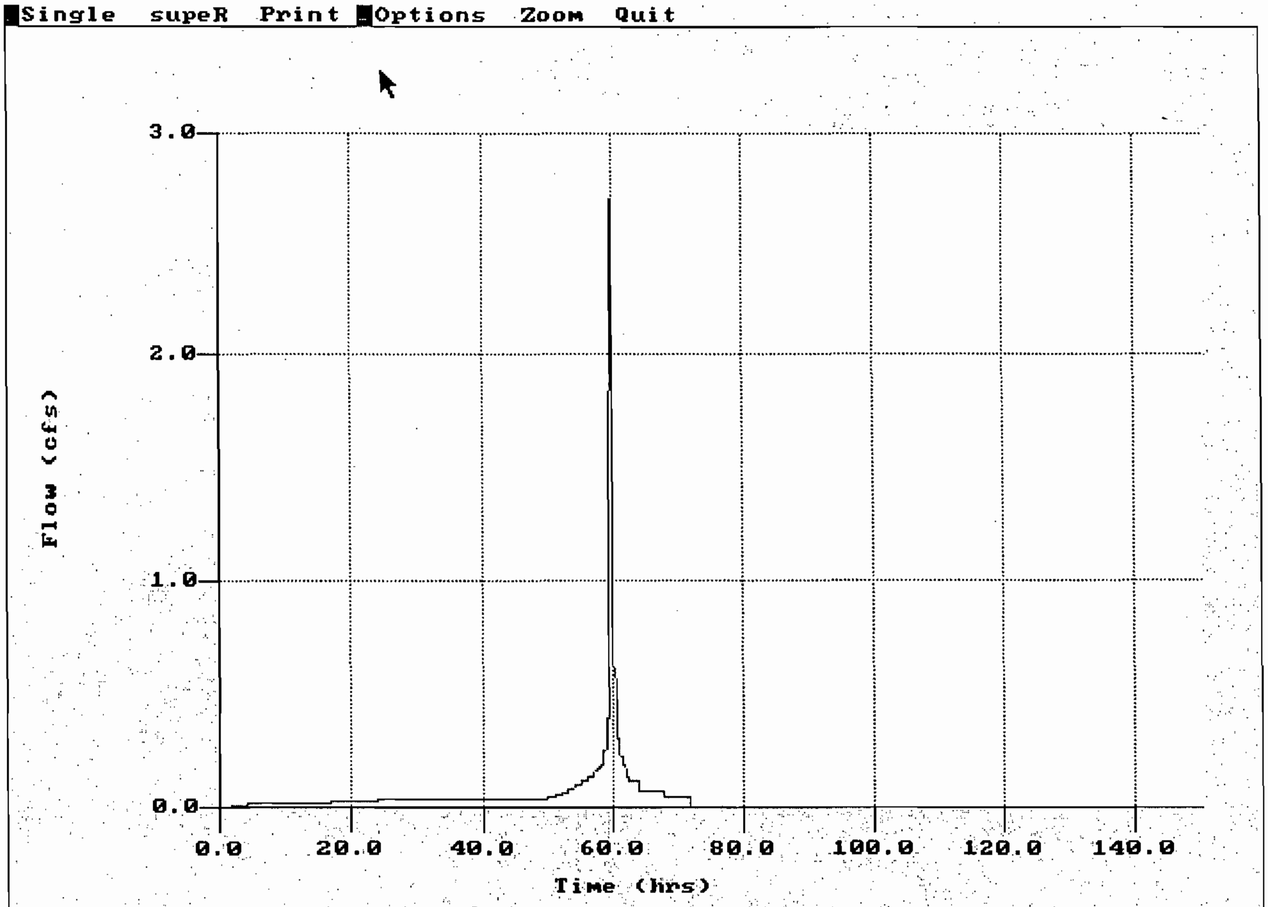

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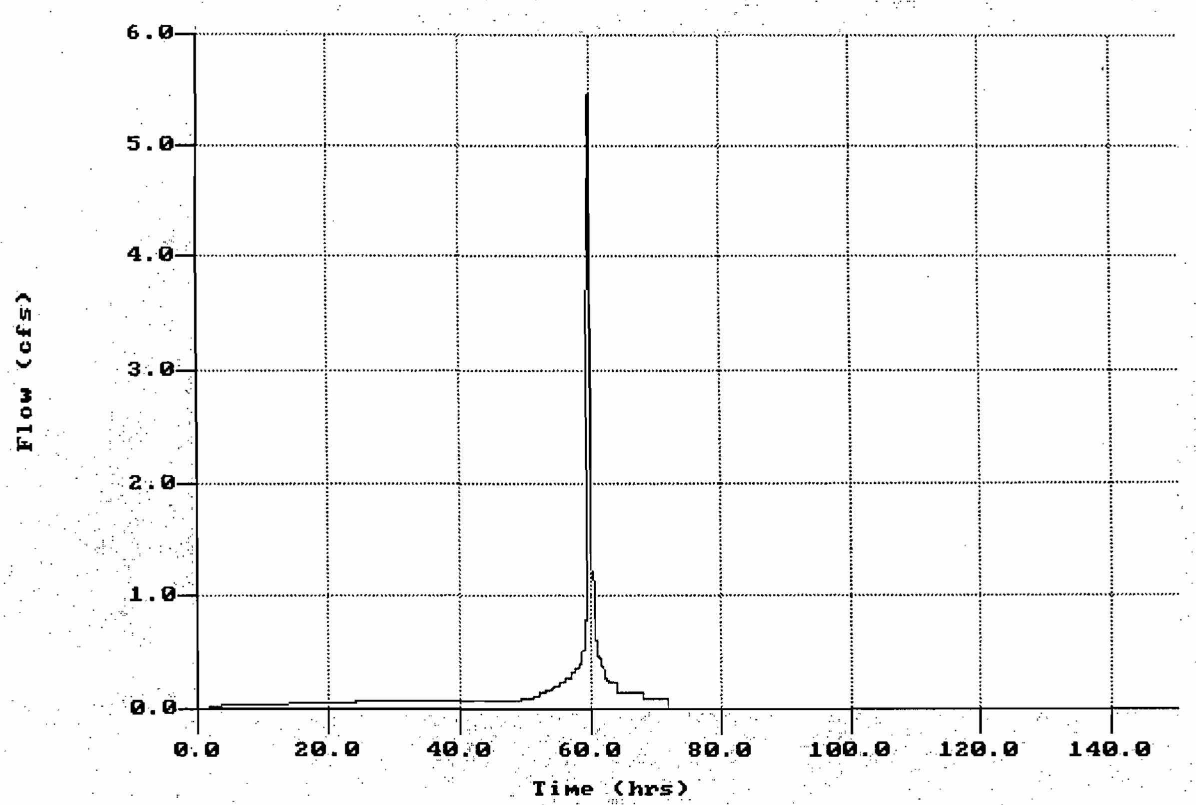

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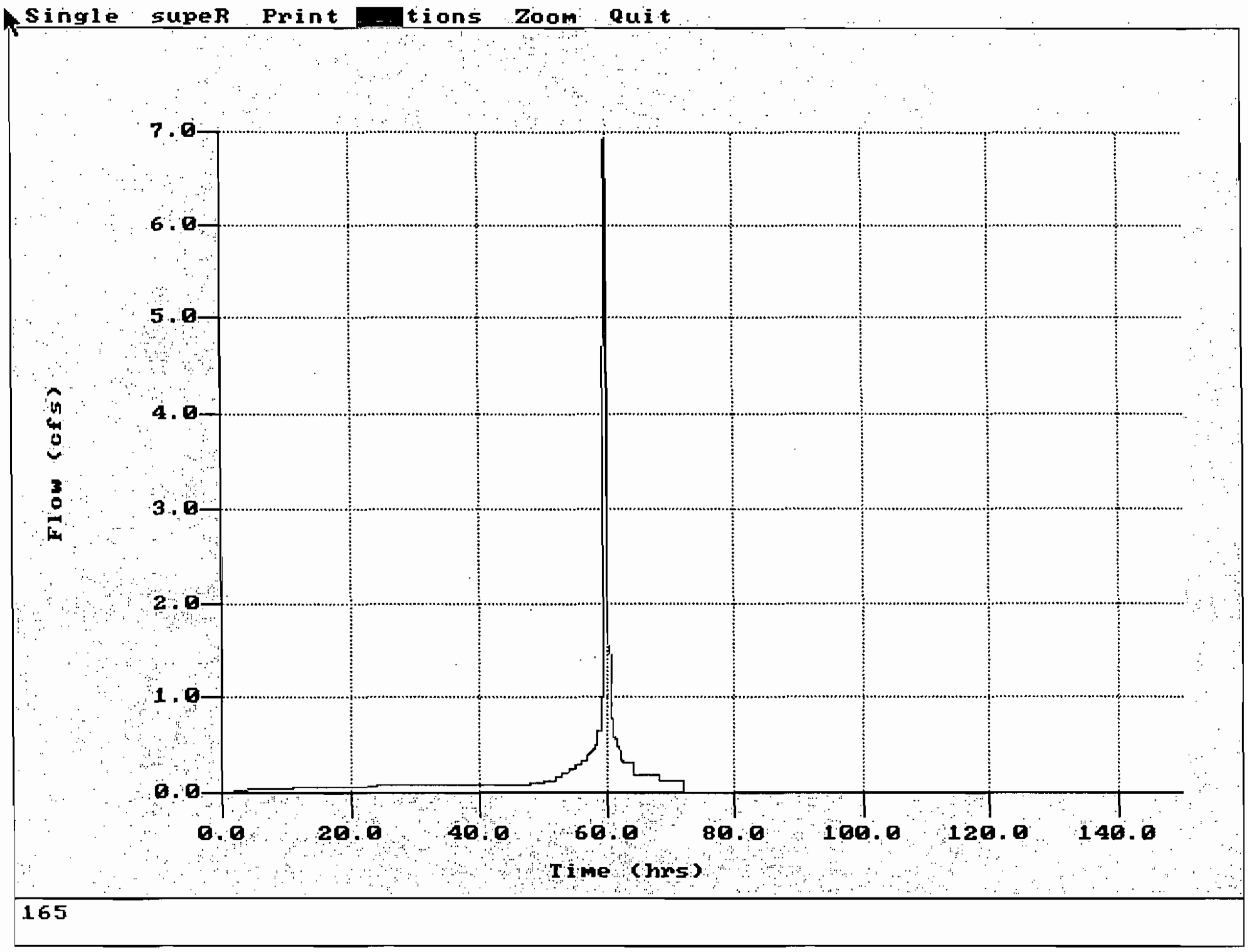
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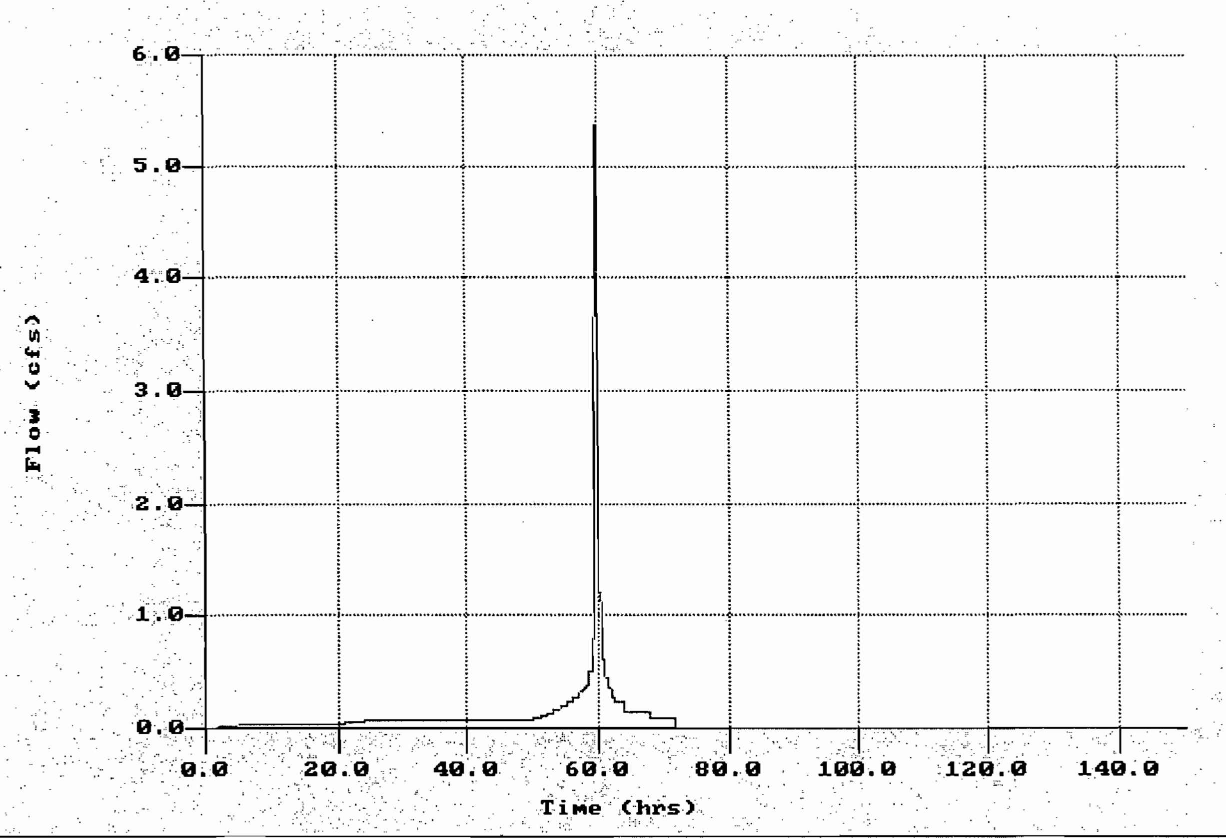

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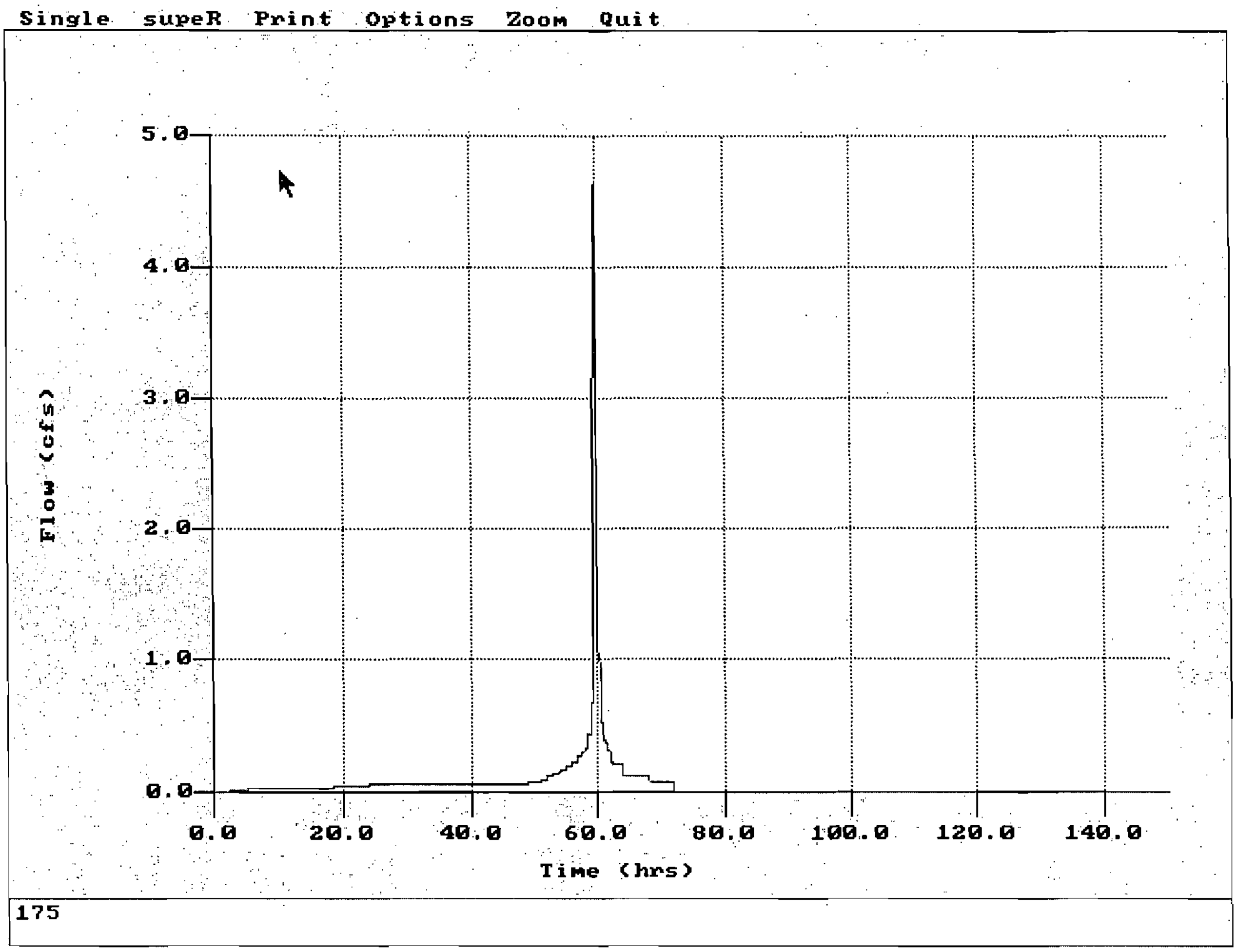
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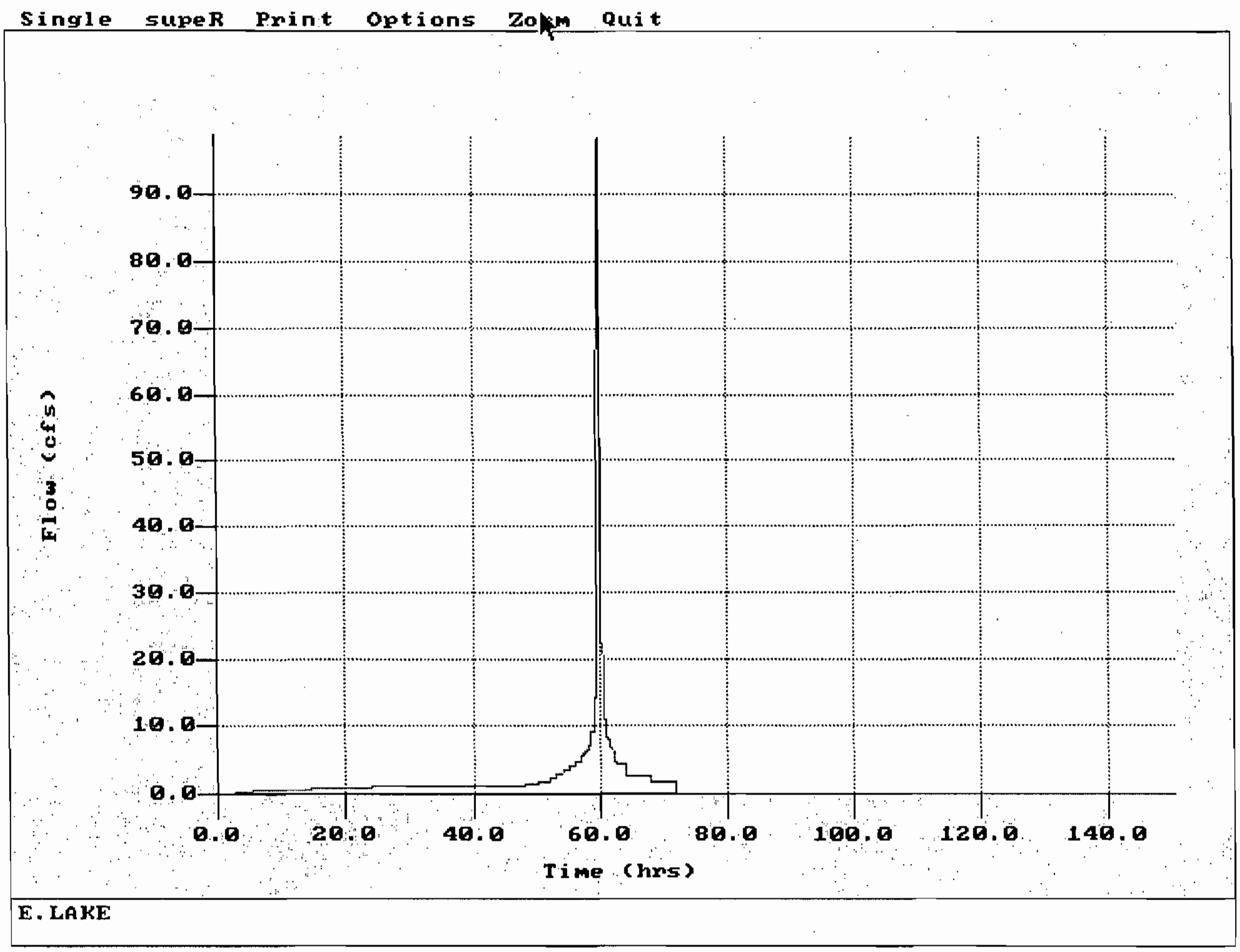

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E.LAKE

100-Year 72-Hour Storm

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]

Solid Waste Authority
Lime Recalcination & Biosolids Facilties (Aug2003)
Proposed Conditions: 100-Year 72-Hour Storm

********** Basin Summary - LRF1003 ***

***

Basin Name:	100	105	110	115	120
Group Name:	BASE	BASE	BASE	BASE	BASE
Node Name:	N-100	N-105	N-110	N-115	N-120
Hydrograph Type:	UH	UH	UH	UH	UH
Unit Hydrograph:	UH484	UH484	UH484	UH484	UH484
Peaking Factor:	484.00	484.00	484.00	484.00	484.00
Spec Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Comp Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72	SFWMD72	SFWMD72	SFWMD72
Rainfall Amount (in):	16.99	16.99	16.99	16.99	16.99
Storm Duration (hr):	72.00	72.00	72.00	72.00	72.00
Status:	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00	6.00	6.00	6.00
Lag Time (hr):	0.00	0.00	0.00	0.00	0.00
Area (acres):	1.99	0.78	0.82	0.52	1.28
Vol of Unit Hyd (in):	1.00	1.00	1.00	1.00	1.00
Curve Number:	85.71	97.87	93.36	96.54	75.52
DCIA (%):	0.00	0.00	0.00	0.00	0.00
Time Max (hrs):	60.00	60.00	60.00	60.00	60.00
Flow Max (cfs):	16.70	6.67	6.99	4.42	10.36
Runoff Volume (in):	15.12	16.71	16.14	16.54	13.62
Runoff Volume (cf):	109062	47370	48112	31110	63078

***

Basin Name:	125	130	135	140	145
Group Name:	BASE	BASE	BASE	BASE	BASE
Node Name:	N-125	N-130	N-135	N-140	N-145
Hydrograph Type:	UH	UH	UH	UH	UH
Unit Hydrograph:	UH484	UH484	UH484	UH484	UH484
Peaking Factor:	484.00	484.00	484.00	484.00	484.00
Spec Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Comp Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72	SFWMD72	SFWMD72	SFWMD72
Rainfall Amount (in):	16.99	16.99	16.99	16.99	16.99
Storm Duration (hr):	72.00	72.00	72.00	72.00	72.00
Status:	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00	6.00	6.00	6.00
Lag Time (hr):	0.00	0.00	0.00	0.00	0.00
Area (acres):	0.65	1.67	0.55	0.88	0.42
Vol of Unit Hyd (in):	1.00	1.00	1.00	1.00	1.00
Curve Number:	97.87	78.97	96.41	97.95	96.90
DCIA (%):	0.00	0.00	0.00	0.00	0.00
Time Max (hrs):	60.00	60.00	60.00	60.00	60.00
Flow Max (cfs):	5.58	13.78	4.69	7.48	3.55

Solid Waste Authority
Lime Recalcination & Biosolids Facilties (Aug2003)
Proposed Conditions: 100-Year 72-Hour Storm

********** Basin Summary - LRF1003 ***

Runoff Volume (in):	16.71	14.15	16.53	16.72	16.59
Runoff Volume (cf):	39668	85909	33000	53164	25052

***

Basin Name:	150	155	160	165	170
Group Name:	BASE	BASE	BASE	BASE	BASE
Node Name:	N-150	N-155	N-160	N-165	N-170
Hydrograph Type:	UH	UH	UH	UH	UH
Unit Hydrograph:	UH484	UH484	UH484	UH484	UH484
Peaking Factor:	484.00	484.00	484.00	484.00	484.00
Spec Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Comp Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72	SFWMD72	SFWMD72	SFWMD72
Rainfall Amount (in):	16.99	16.99	16.99	16.99	16.99
Storm Duration (hr):	72.00	72.00	72.00	72.00	72.00
Status:	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00	6.00	6.00	6.00
Lag Time (hr):	0.00	0.00	0.00	0.00	0.00
Area (acres):	0.88	0.38	0.78	0.99	0.76
Vol of Unit Hyd (in):	1.00	1.00	1.00	1.00	1.00
Curve Number:	90.51	96.40	96.80	96.17	95.80
DCIA (%):	0.00	0.00	0.00	0.00	0.00
Time Max (hrs):	60.00	60.00	60.00	60.00	60.00
Flow Max (cfs):	7.43	3.28	6.63	8.40	6.53
Runoff Volume (in):	15.77	16.53	16.58	16.50	16.45
Runoff Volume (cf):	50153	23098	46756	58993	45688

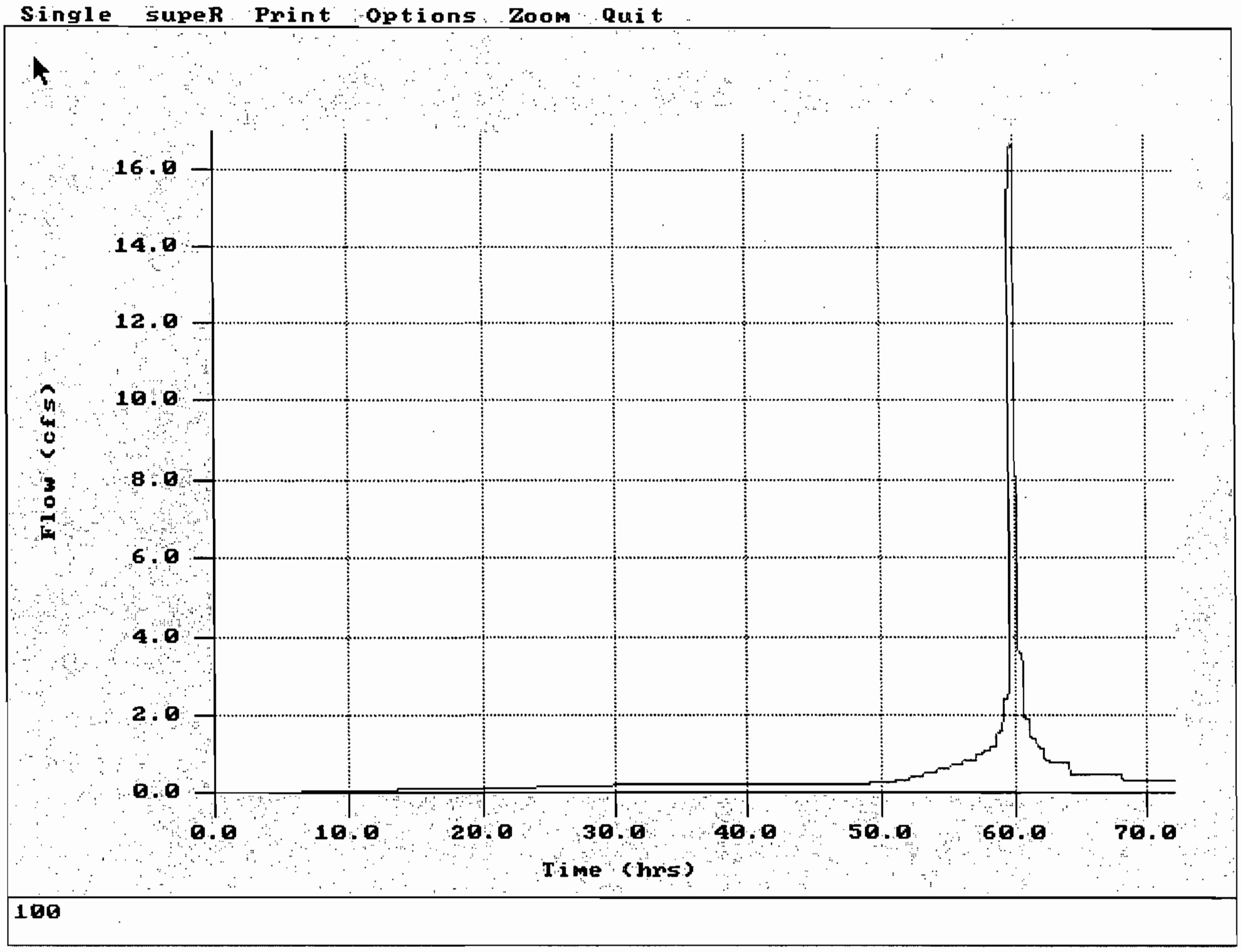
***

Basin Name:	175	E.LAKE
Group Name:	BASE	BASE
Node Name:	N-175	E.LAKE
Hydrograph Type:	UH	UH
Unit Hydrograph:	UH484	UH484
Peaking Factor:	484.00	484.00
Spec Time Inc (min):	0.80	0.80
Comp Time Inc (min):	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72
Rainfall Amount (in):	16.99	16.99
Storm Duration (hr):	72.00	72.00
Status:	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00
Lag Time (hr):	0.00	0.00
Area (acres):	0.66	14.01
Vol of Unit Hyd (in):	1.00	1.00
Curve Number:	95.34	94.79

Solid Waste Authority
Lime Recalcination & Biosolids Facilties (Aug2003)
Proposed Conditions: 100-Year 72-Hour Storm

********** Basin Summary - LRF1003 **

DCIA (%):	0.00	0.00
Time Max (hrs):	60.00	60.00
Flow Max (cfs):	5.63	119.41
Runoff Volume (in):	16.40	16.33
Runoff Volume (cf):	39279	830272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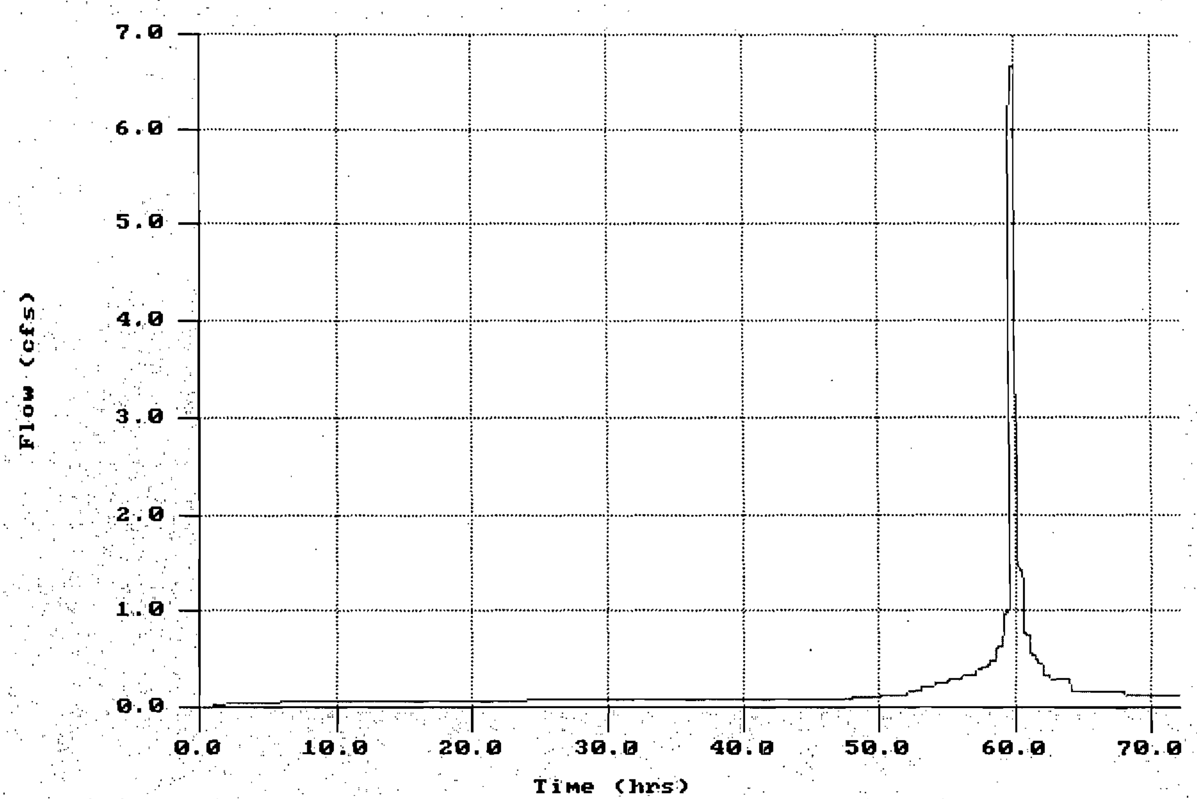
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Flow (cfs)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
100

Single superR Print Options Zoom Quit



105

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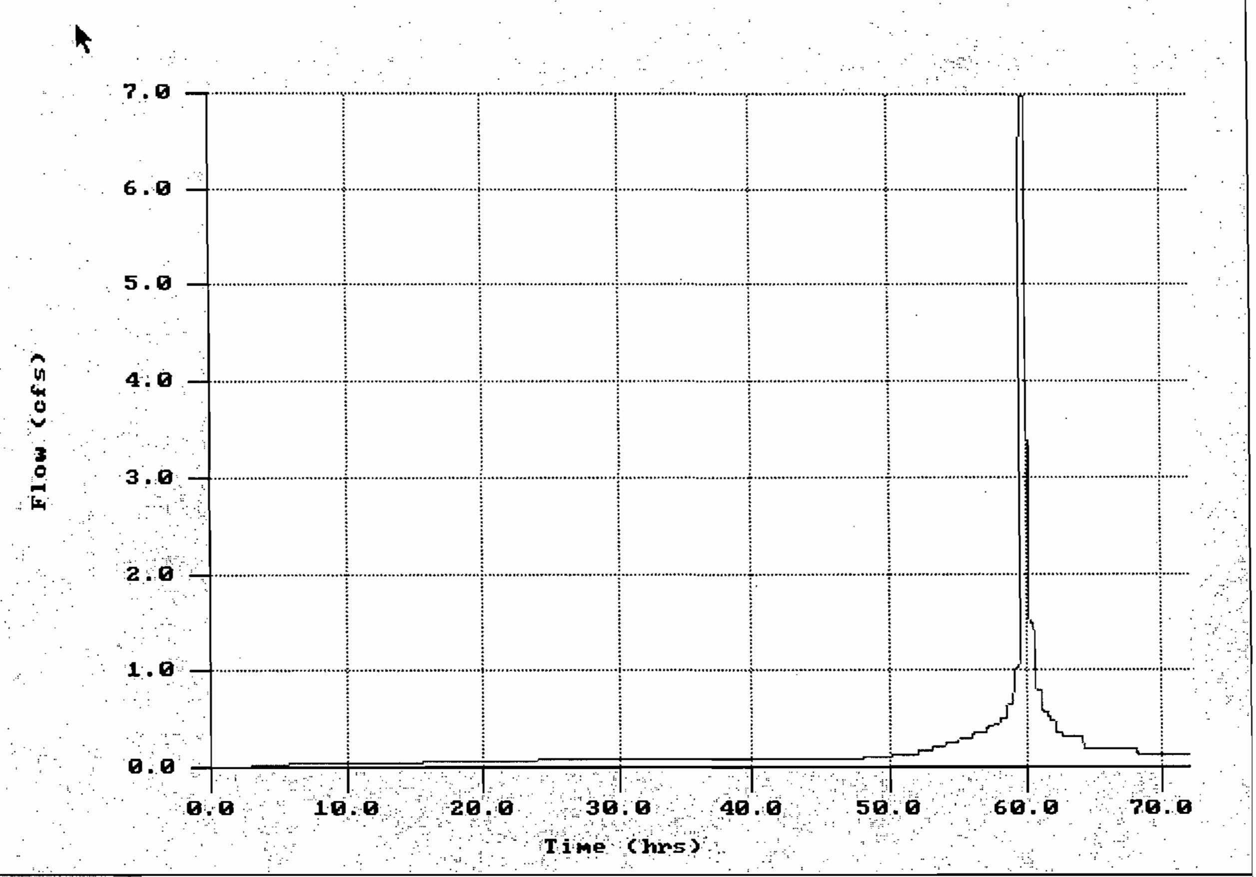

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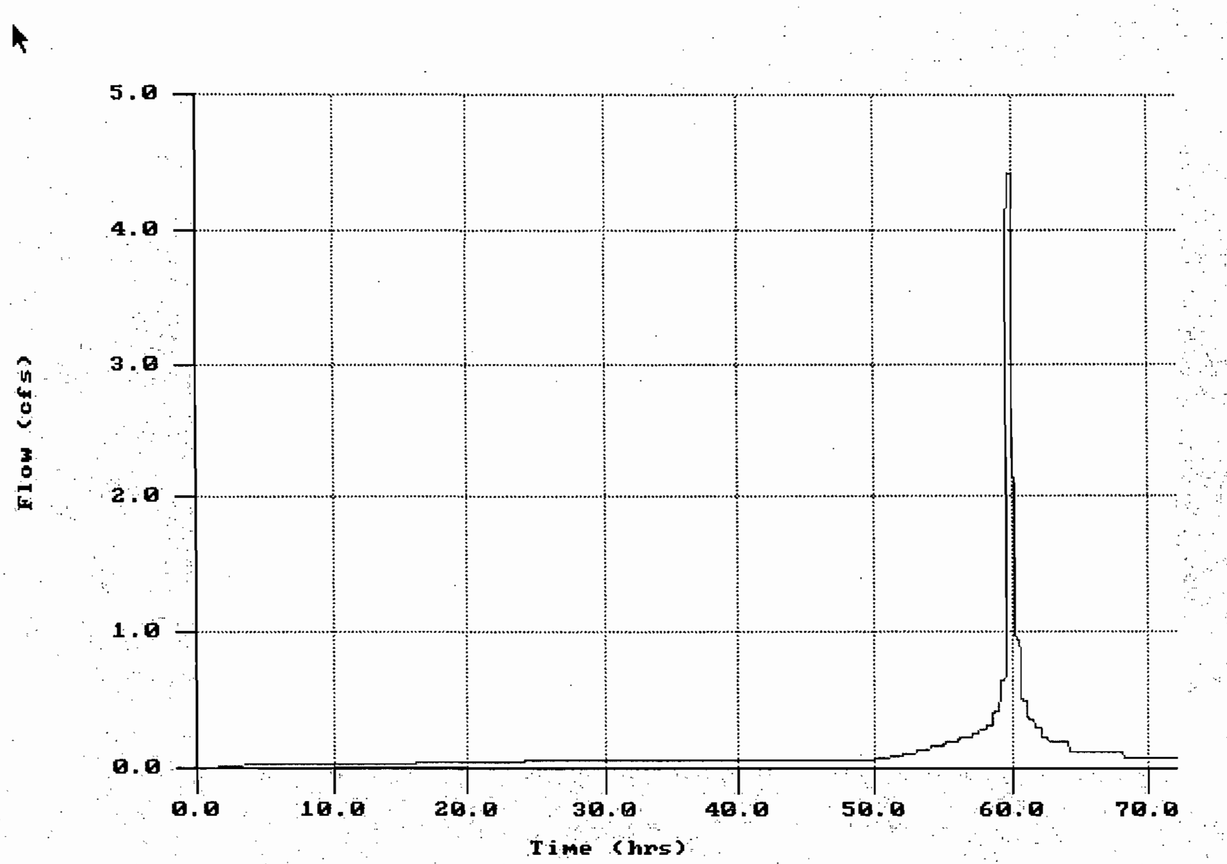

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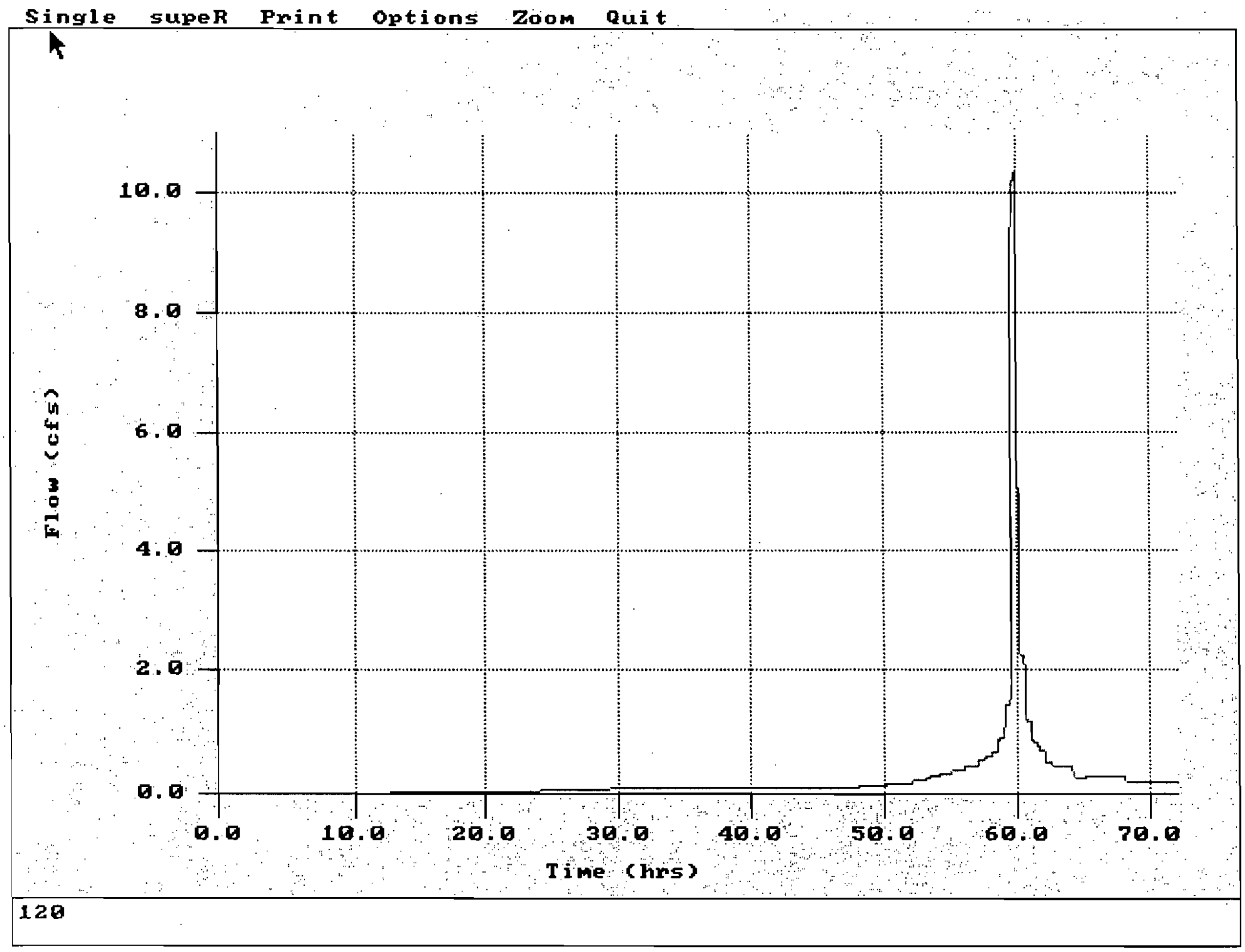

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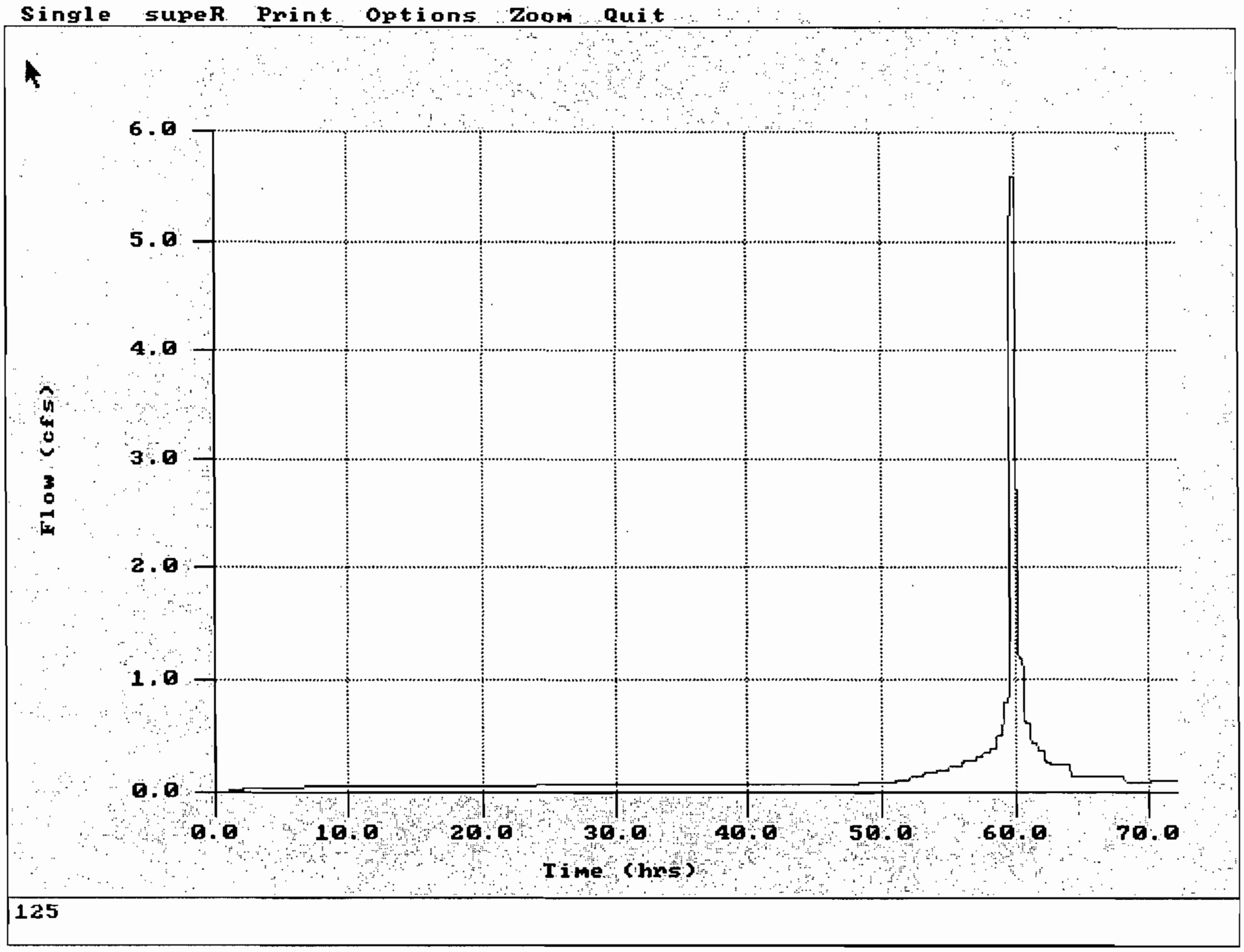
Flow (cfs)
10.0
8.0
6.0
4.0
2.0
0.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
120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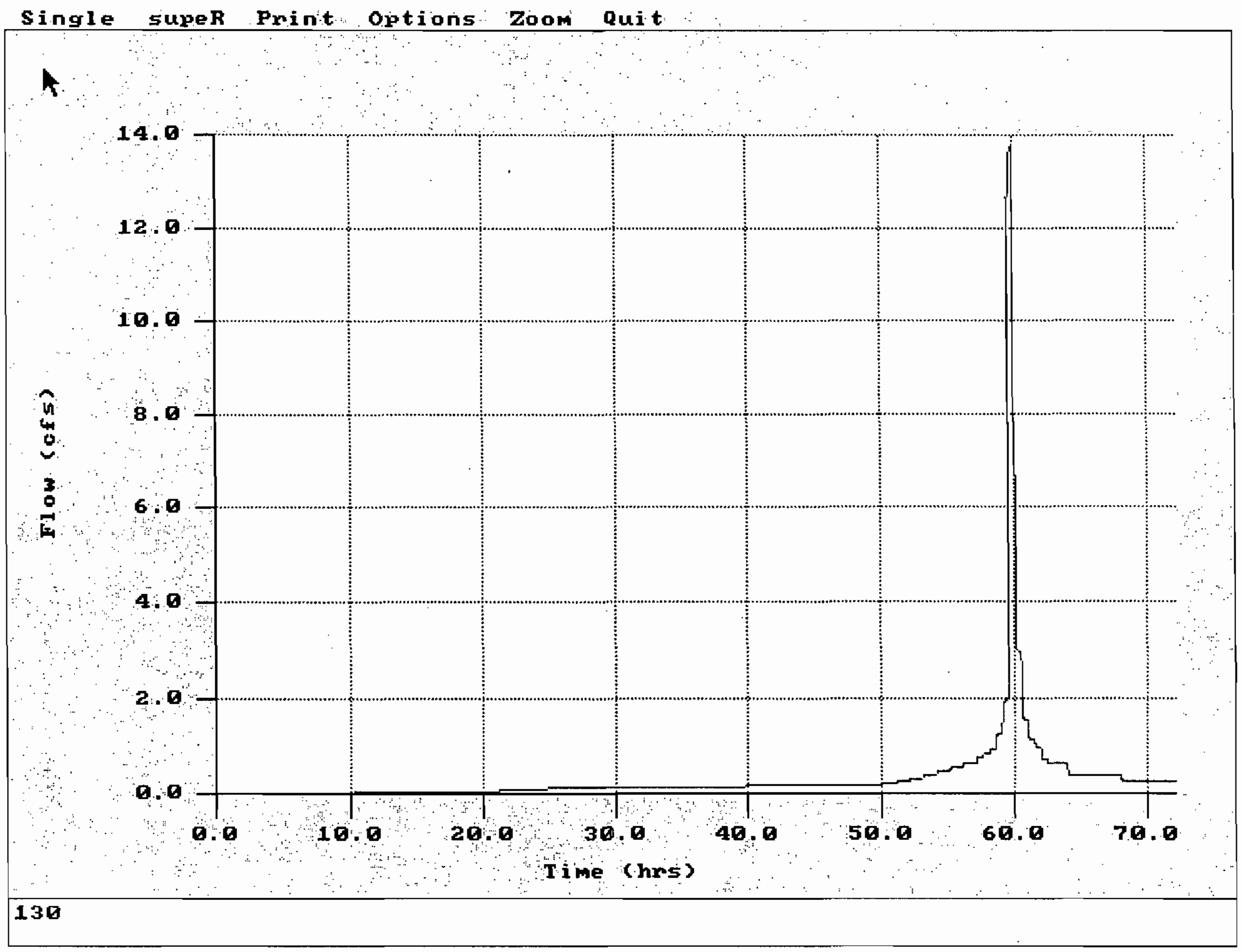
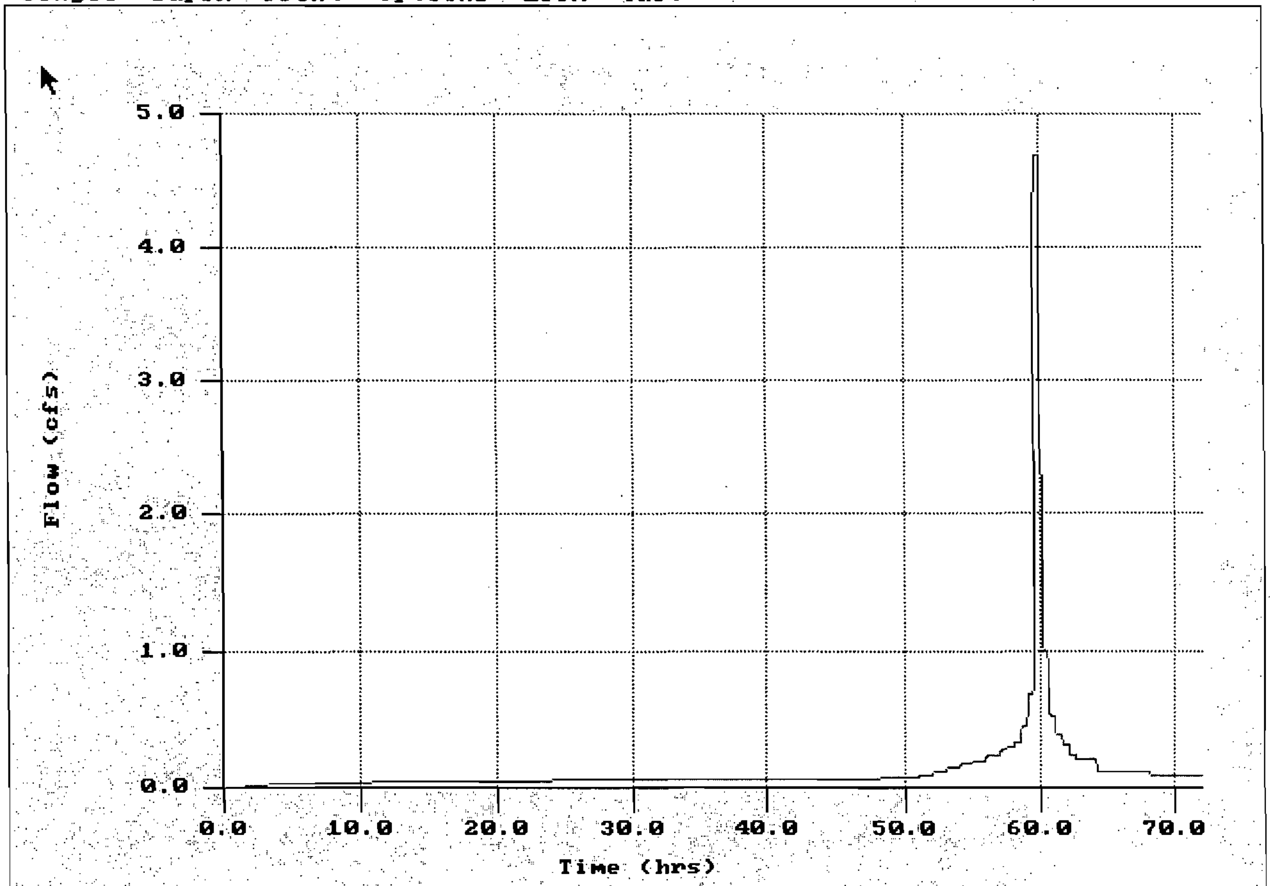
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
125


Single superR Print Options Zoom Quit
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Flow (cfs)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
130

Single superR Print Options Zoom Quit



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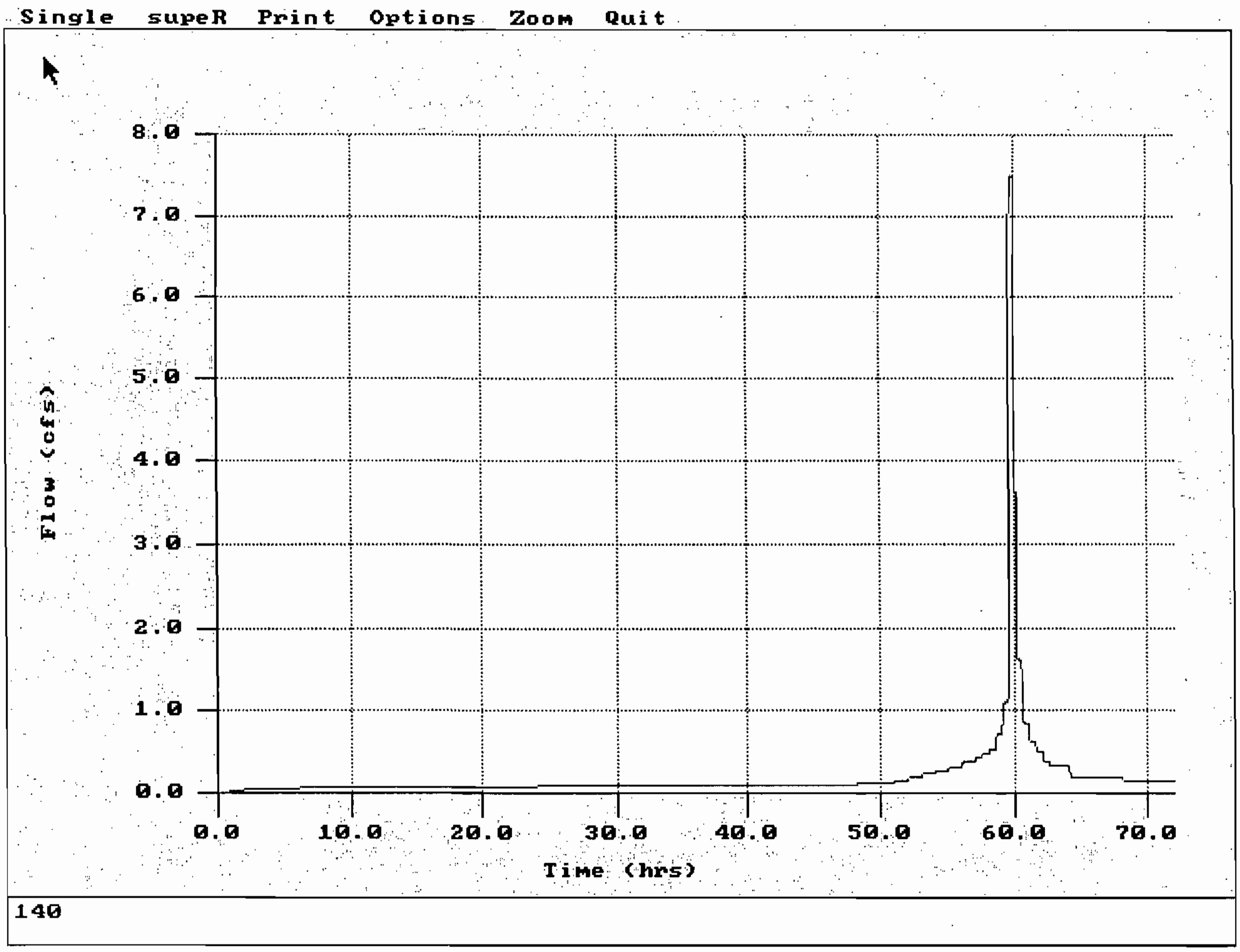
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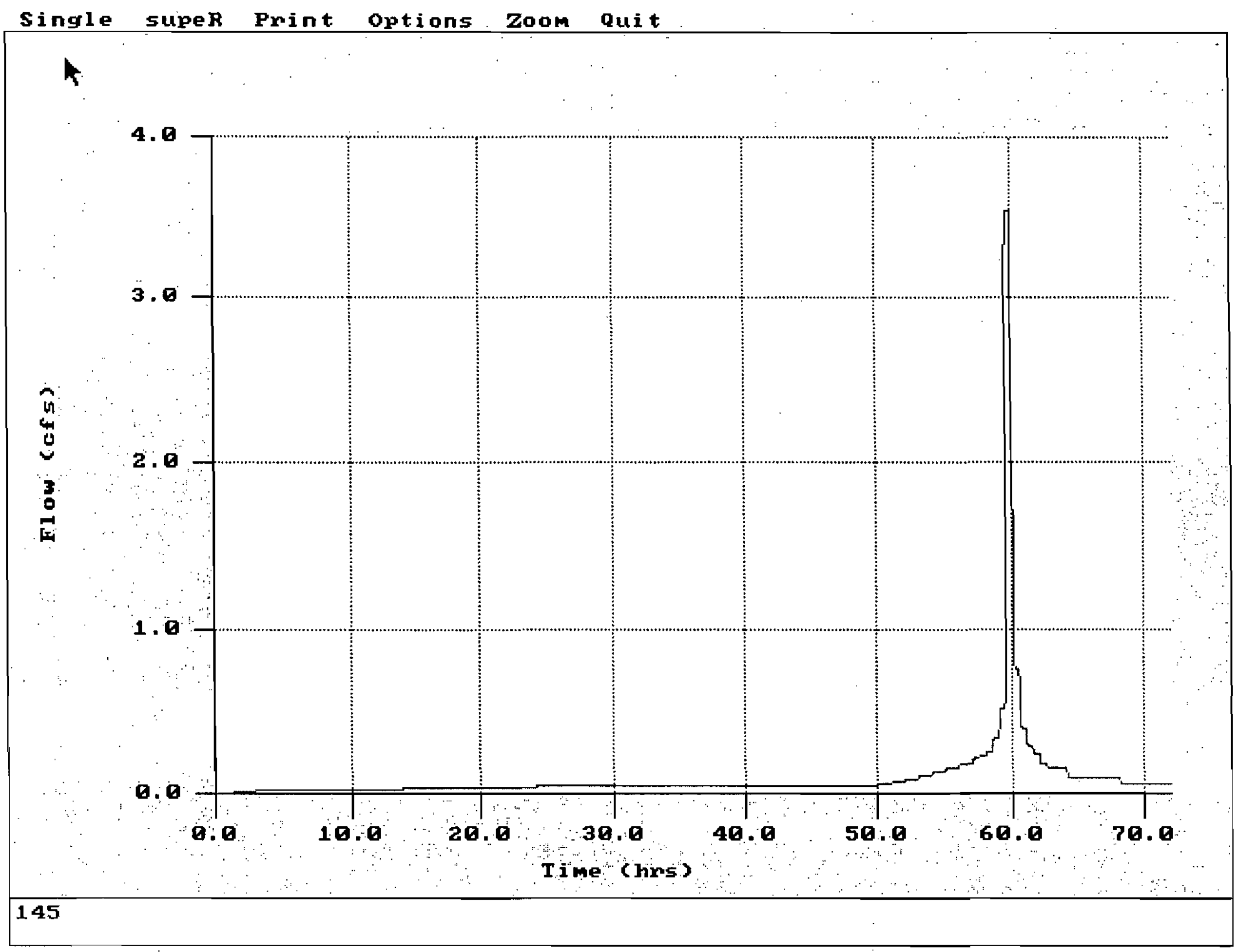
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
140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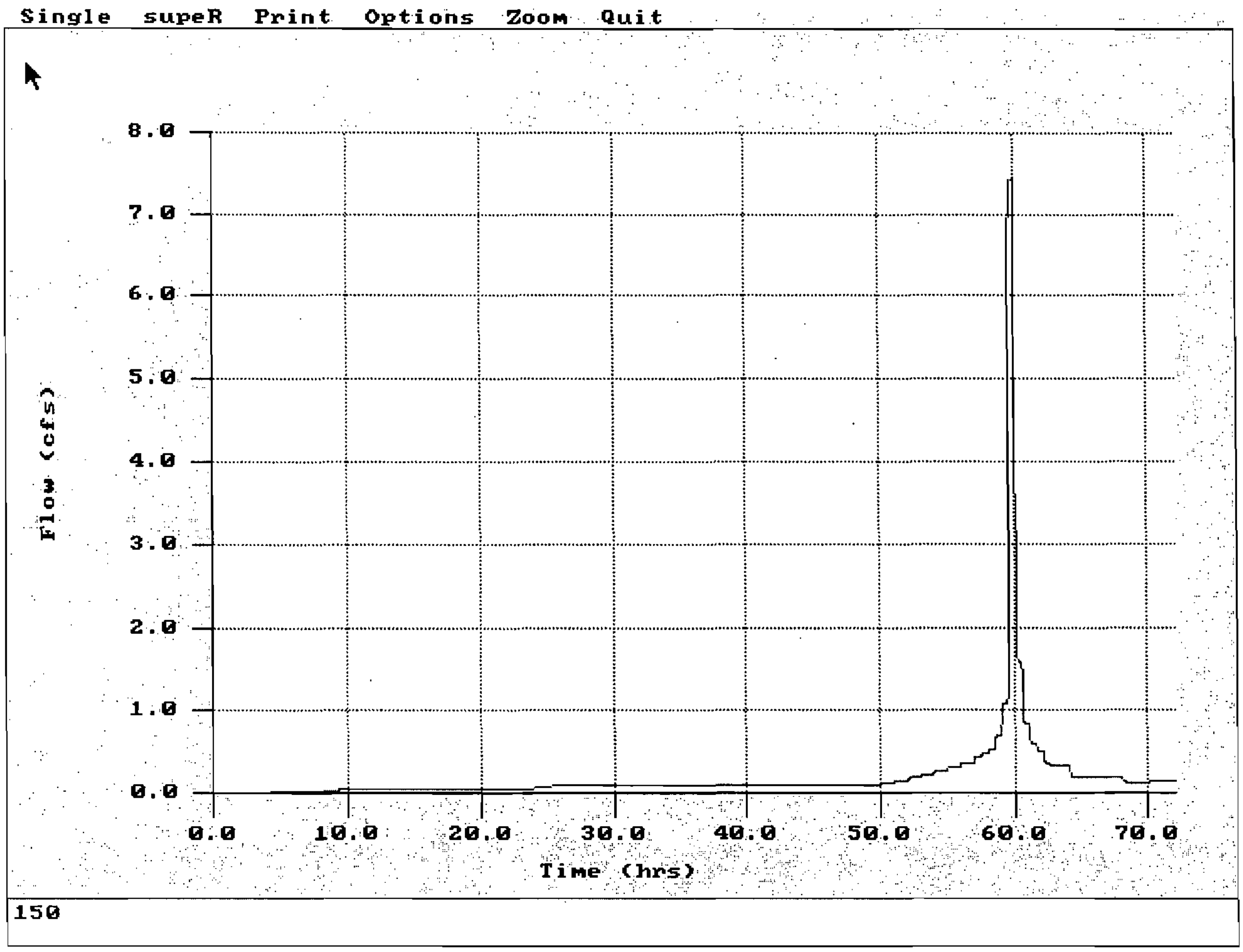
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
145



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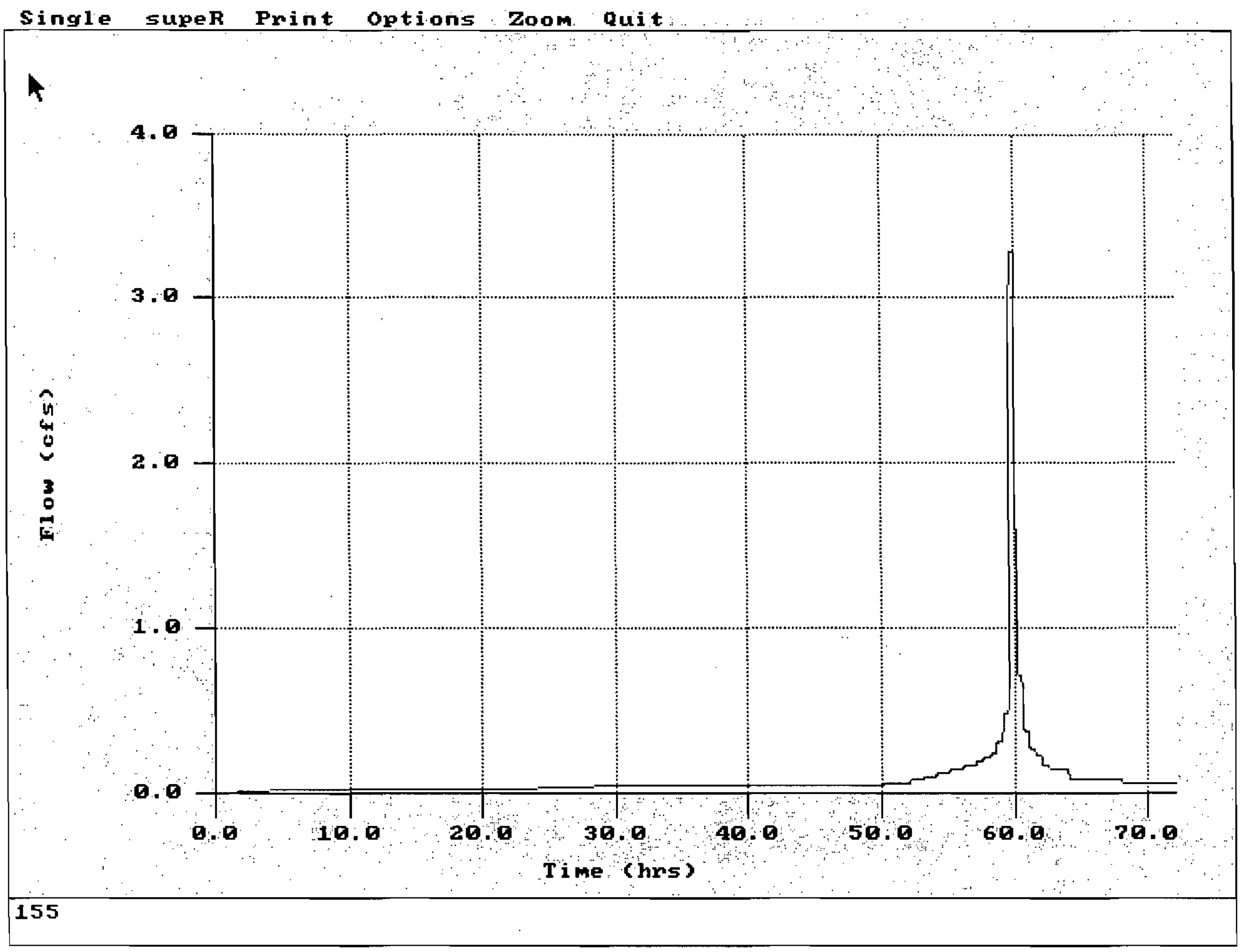
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
150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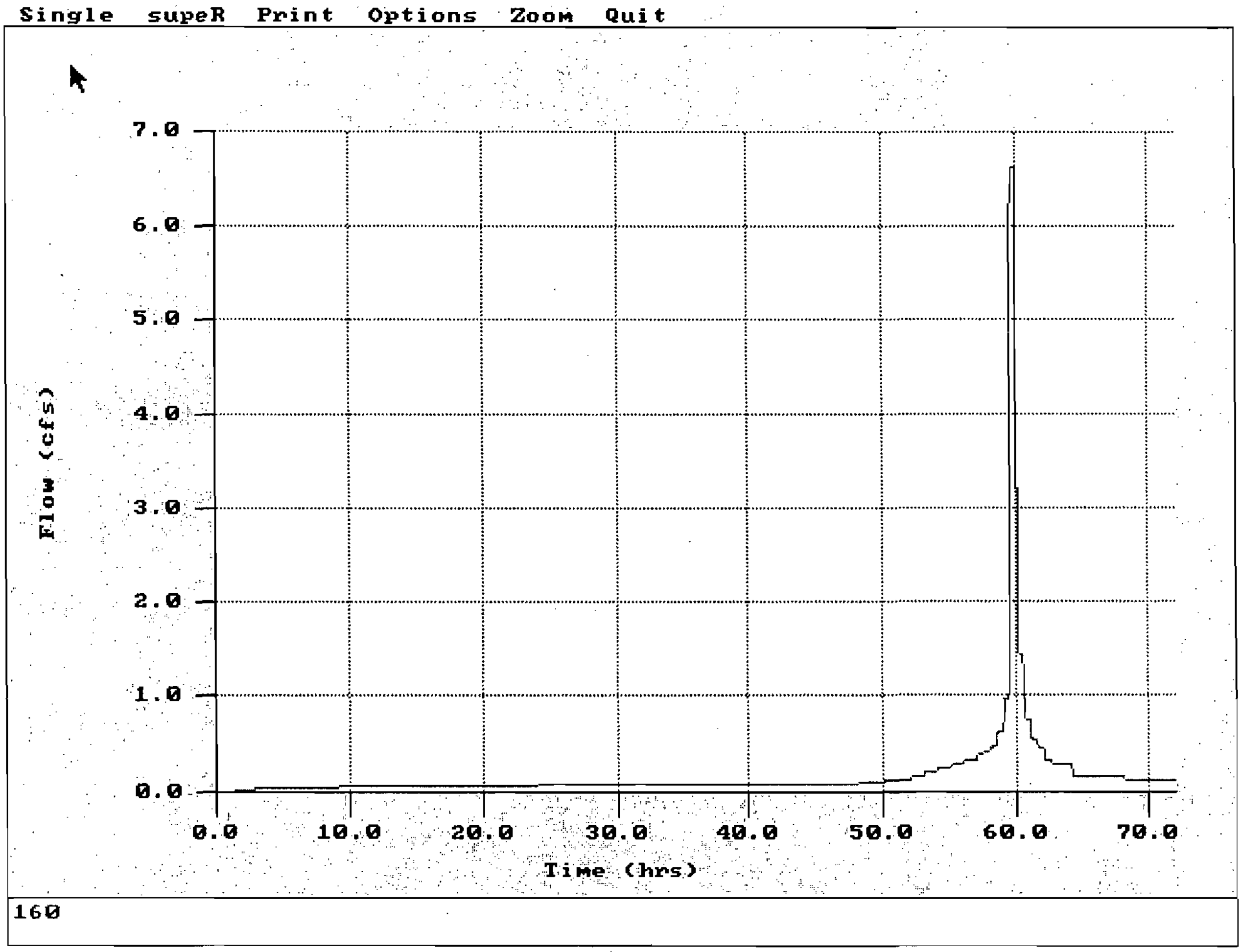
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
155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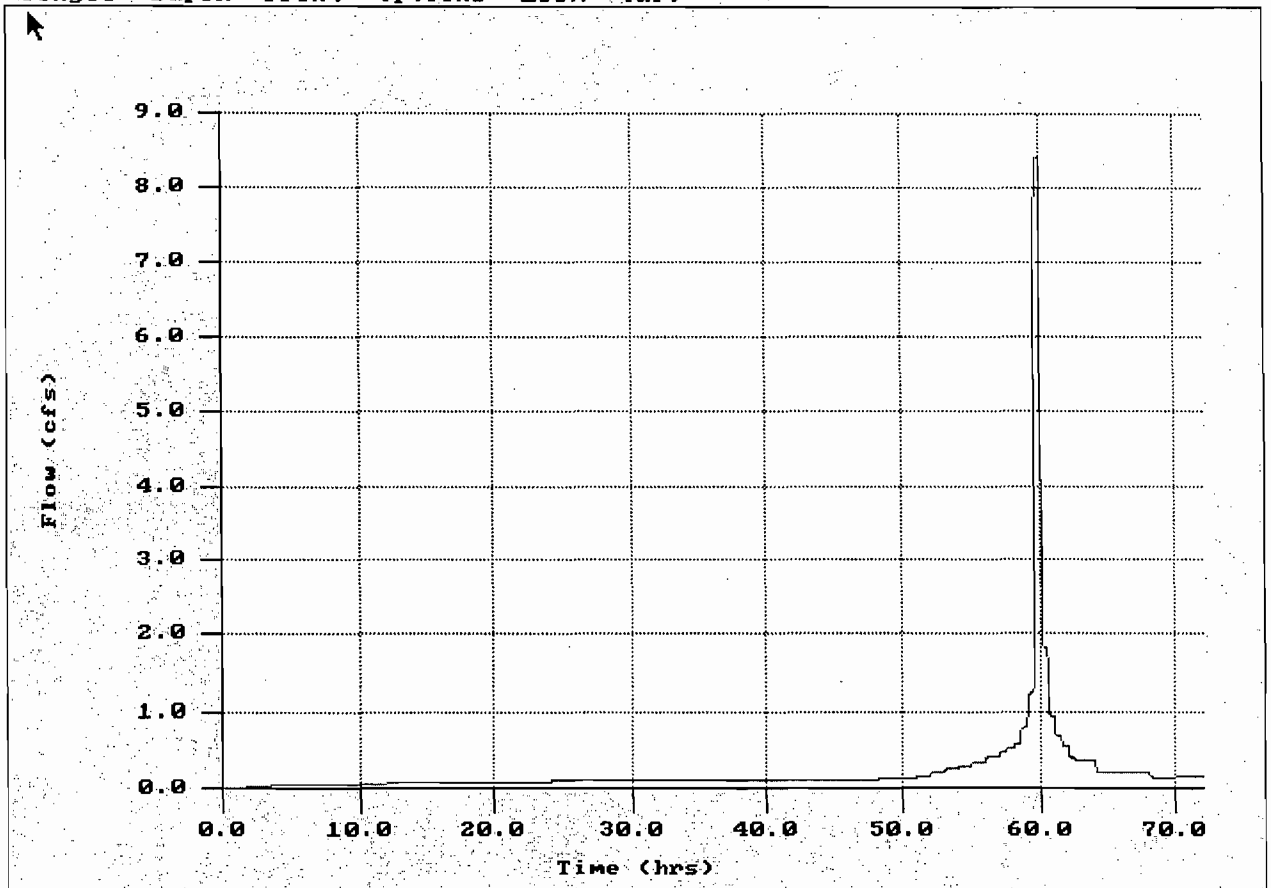
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
160

Single superR Print Options Zoom Quit



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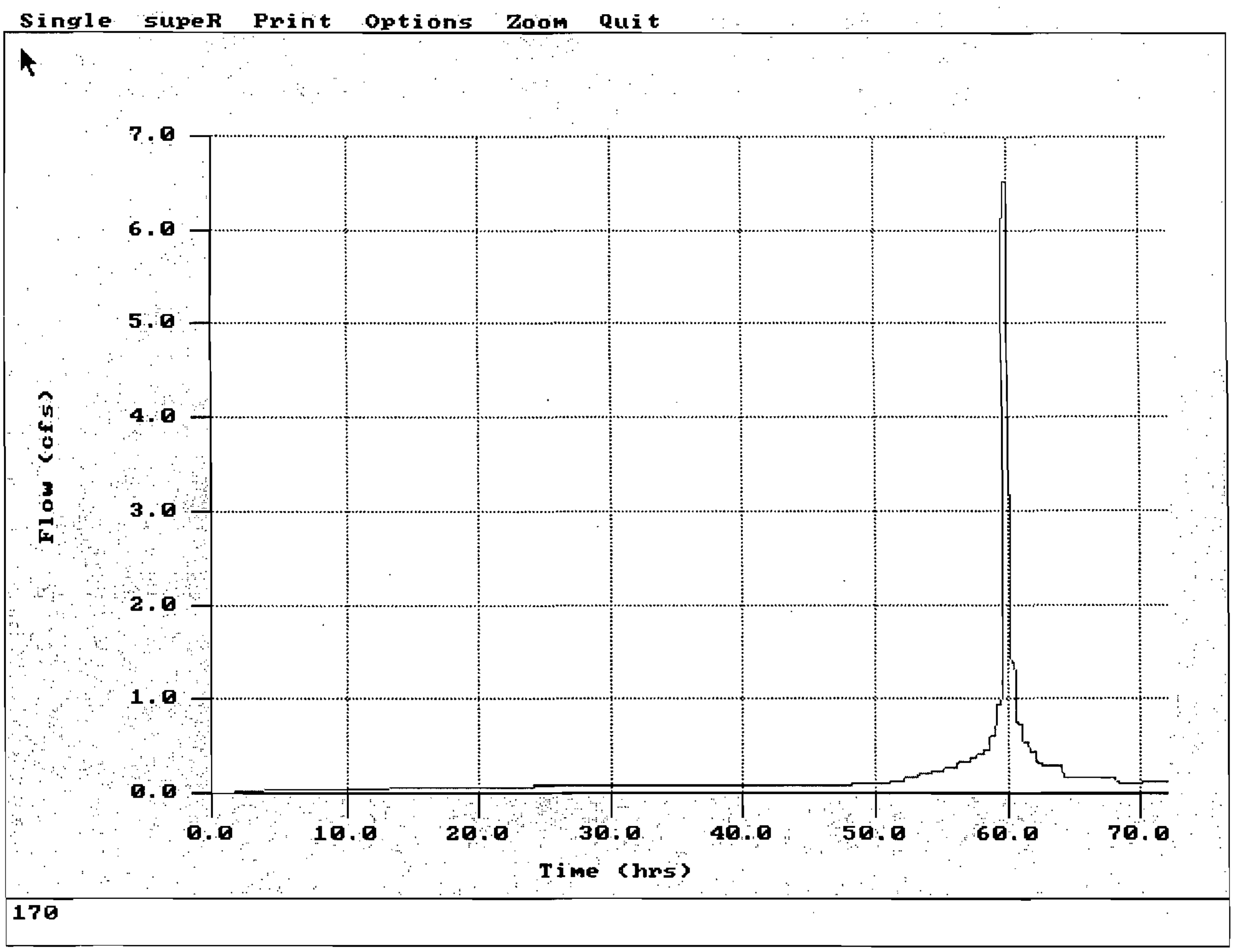
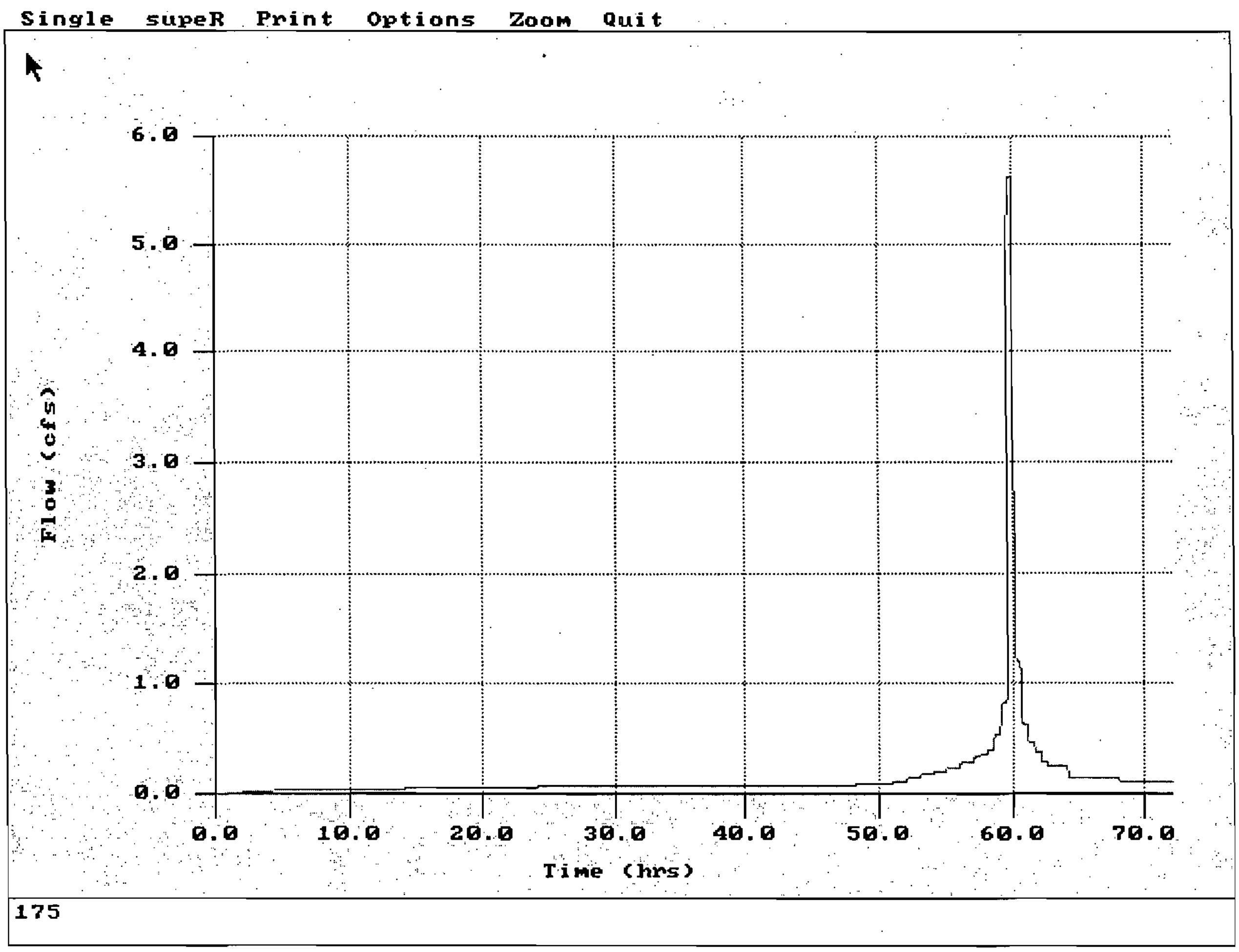
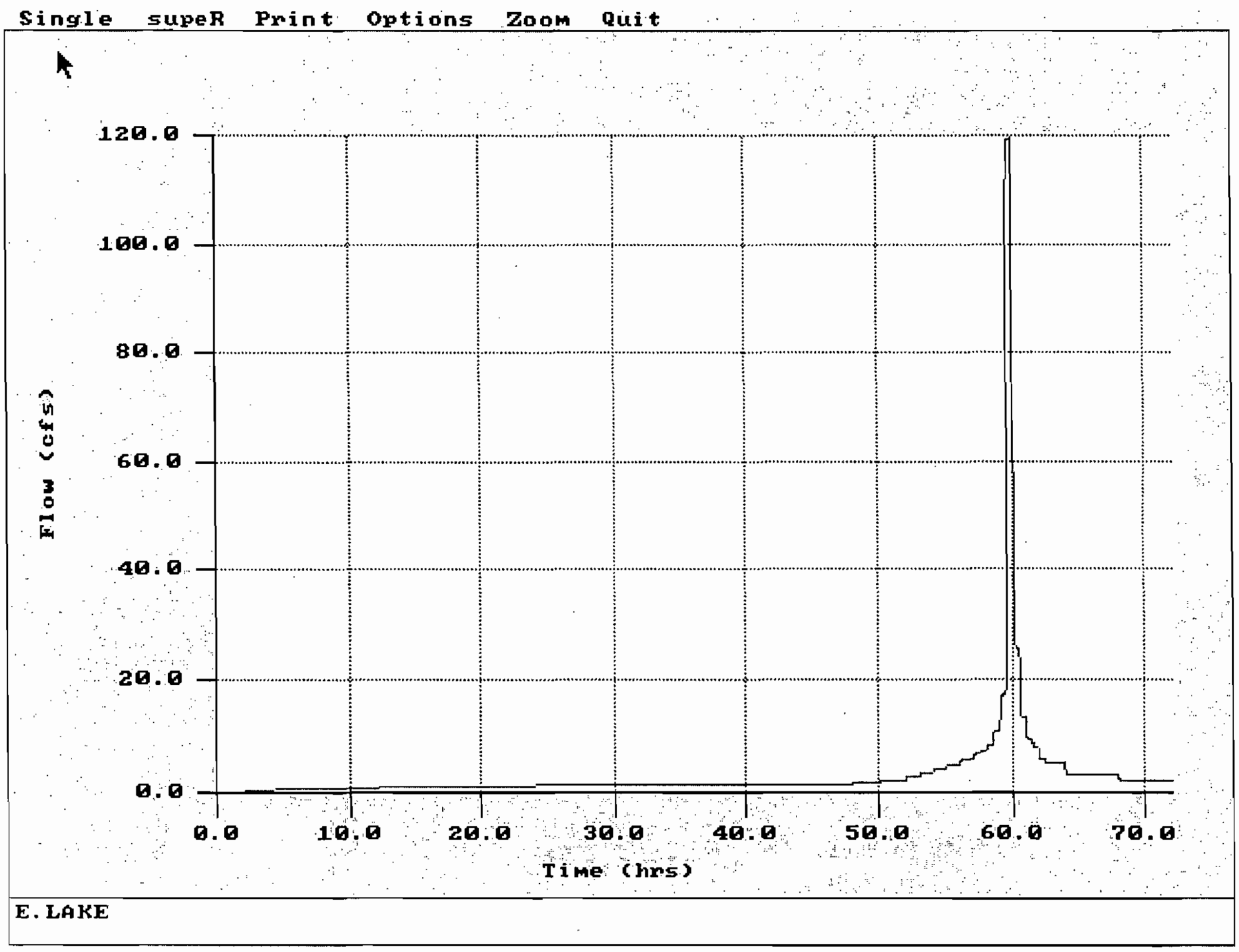


Single superR Print Options Zoom Quit
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
170


Single superR Print Options Zoom Quit
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
175



Single superR Print Options Zoom Quit
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Flow (cfs)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Time (hrs)
E.LAKE

Exhibit B

Hydraulic Input Data for the Proposed Site

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]
Copyright 1995, Streamline Technologies, Inc.

Solid Waste Authority of Palm Beach County, FL
Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ******************************************************
--------Class: Node-----------------------------------------------------------
   Name: BOUNDARY   Base Flow(cfs): 0          Init Stage(ft): 18
  Group: BASE                                  Warn Stage(ft): 22
Comment:

Time(hrs)     Stage(ft)
0             18
62            20
80            19
--------Class: Node-----------------------------------------------------------
   Name: E.LAKE     Base Flow(cfs): 0          Init Stage(ft): 18
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
6             1.55
7             3.2
8             5.93
16            8.83
24            10.61
--------Class: Node-----------------------------------------------------------
   Name: N-100      Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
19            0.5
20            0.61
--------Class: Node-----------------------------------------------------------
   Name: N-105      Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
19            0.4
20            0.44
21            0.49
22            0.53
23            0.58
24            0.62
--------Class: Node-----------------------------------------------------------
   Name: N-110      Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
19            0.13
20            0.18
```

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [2]

Solid Waste Authority of Palm Beach County, FL
Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

```
********** Input Report ********************************************************
--------Class: Node--------------------------------------------------------------
   Name: N-115      Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
19            0.2
20            0.24
21            0.28
22            0.32
23            0.36
24            0.4
--------Class: Node--------------------------------------------------------------
   Name: N-120      Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
19            0.08
20            0.12
--------Class: Node--------------------------------------------------------------
   Name: N-125      Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
19            0.3
20            0.34
21            0.38
22            0.42
23            0.47
24            0.51
--------Class: Node--------------------------------------------------------------
   Name: N-130      Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
19            0.28
20            0.39
```

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [3]
Copyright 1995, Streamline Technologies, Inc.

Solid Waste Authority of Palm Beach County, FL
Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Node-------------------------------------------------------------
   Name: N-135      Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.25
20           0.28
21           0.31
22           0.35
23           0.38
24           0.41
--------Class: Node-------------------------------------------------------------
   Name: N-140      Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.2
20           0.24
--------Class: Node-------------------------------------------------------------
   Name: N-145      Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.23
20           0.25
21           0.28
22           0.3
23           0.32
24           0.35
--------Class: Node-------------------------------------------------------------
   Name: N-150      Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.37
20           0.45
```

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [4]

Solid Waste Authority of Palm Beach County, FL
Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report **
--------Class: Node--

Name: N-155 Base Flow(cfs): 0 Init Stage(ft): 19
Group: BASE Warn Stage(ft): 24
Comment:

Stage(ft)	Area(ac)
19	0.16
20	0.18
21	0.21
22	0.23
23	0.25
24	0.27

--------Class: Node--

Name: N-160 Base Flow(cfs): 0 Init Stage(ft): 19
Group: BASE Warn Stage(ft): 24
Comment:

Stage(ft)	Area(ac)
19	0.04
20	0.06

--------Class: Node--

Name: N-165 Base Flow(cfs): 0 Init Stage(ft): 19
Group: BASE Warn Stage(ft): 24
Comment:

Stage(ft)	Area(ac)
19	0.55
20	0.6
21	0.65
22	0.71
23	0.76
24	0.81

--------Class: Node--

Name: N-170 Base Flow(cfs): 0 Init Stage(ft): 19
Group: BASE Warn Stage(ft): 24
Comment:

Stage(ft)	Area(ac)
19	0.03
20	0.05

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [5]
Copyright 1995, Streamline Technologies, Inc.

Solid Waste Authority of Palm Beach County, FL
Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report **
--------Class: Node--
Name: N-175 Base Flow(cfs): 0 Init Stage(ft): 19
Group: BASE Warn Stage(ft): 24
Comment:

Stage(ft)	Area(ac)
19	0.32
20	0.36
21	0.39
22	0.43
23	0.47
24	0.51

--------Class: Operating Table--
Name: E.LAKE Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	3.012
20	6.165
21	9.459
22	12.894
23	16.47
24	20.188

--------Class: Operating Table--
Name: N-100 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.317
20	0.774

--------Class: Operating Table--
Name: N-105 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.254
20	0.563
21	0.929
22	1.35
23	1.827
24	2.344

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [6]

Solid Waste Authority of Palm Beach County, FL
Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report **

--------Class: Operating Table--

Name: N-110 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.079
20	0.232

--------Class: Operating Table--

Name: N-115 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.127
20	0.304
21	0.533
22	0.812
23	1.142
24	1.515

--------Class: Operating Table--

Name: N-120 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.051
20	0.153

--------Class: Operating Table--

Name: N-125 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.19
20	0.433
21	0.728
22	1.076
23	1.476
24	1.929

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [7]

Solid Waste Authority of Palm Beach County, FL
Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report **

--------Class: Operating Table--

Name: N-130 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.178
20	0.495

--------Class: Operating Table--

Name: N-135 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.159
20	0.358
21	0.597
22	0.878
23	1.199
24	1.56

--------Class: Operating Table--

Name: N-140 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.127
20	0.31

--------Class: Operating Table--

Name: N-145 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.146
20	0.321
21	0.526
22	0.76
23	1.024
24	1.317

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [8]

Solid Waste Authority of Palm Beach County, FL
Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report **

--------Class: Operating Table--

Name: N-150 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.235
20	0.567

--------Class: Operating Table--

Name: N-155 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.101
20	0.232
21	0.391
22	0.579
23	0.797
24	1.043

--------Class: Operating Table--

Name: N-160 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.022
20	0.07

--------Class: Operating Table--

Name: N-165 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.349
20	0.763
21	1.244
22	1.79
23	2.401
24	3.079

```
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Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Operating Table-------------------------------------------------
   Name: N-170         Type: Rating Curve
Comment:

   U/S Stage(ft)      Discharge(cfs)
   18                 0
   19                 0.019
   20                 0.063

--------Class: Operating Table-------------------------------------------------
   Name: N-175         Type: Rating Curve
Comment:

   U/S Stage(ft)      Discharge(cfs)
   18                 0
   19                 0.203
   20                 0.453
   21                 0.75
   22                 1.095
   23                 1.487
   24                 1.926

--------Class: Pipe-------------------------------------------------------------

          Name: 100-105      From Node: N-100      Length(ft): 40
         Group: BASE           To Node: N-105           Count: 2

               UPSTREAM      DOWNSTREAM           Equation: Average K
      Geometry: Circular     Circular                 Flow: Both
      Span(in): 12           12          Entrance Loss Coef: 0
      Rise(in): 12           12              Exit Loss Coef: 1
    Invert(ft): 19           19              Bend Loss Coef: 0
   Manning's N: 0.012        0.012       Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0            0            Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0            0           Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                 1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                 1     3
```

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [10]

Solid Waste Authority of Palm Beach County, FL
Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

```
********** Input Report ********************************************************
--------Class: Pipe--------------------------------------------------------------

          Name: 110-115      From Node: N-110     Length(ft): 40
         Group: BASE           To Node: N-115          Count: 2

                UPSTREAM     DOWNSTREAM             Equation: Average K
      Geometry: Circular     Circular                   Flow: Both
      Span(in): 12           12          Entrance Loss Coef: 0
      Rise(in): 12           12              Exit Loss Coef: 1
    Invert(ft): 19           19              Bend Loss Coef: 0
   Manning's N: 0.012        0.012        Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0            0             Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0           0            Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                    1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                    1     3

--------Class: Pipe--------------------------------------------------------------

          Name: 120-125      From Node: N-120     Length(ft): 40
         Group: BASE           To Node: N-125          Count: 2

                UPSTREAM     DOWNSTREAM             Equation: Average K
      Geometry: Circular     Circular                   Flow: Both
      Span(in): 12           12          Entrance Loss Coef: 0
      Rise(in): 12           12              Exit Loss Coef: 1
    Invert(ft): 19           19              Bend Loss Coef: 0
   Manning's N: 0.012        0.012        Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0            0             Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0           0            Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                    1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                    1     3
```

```
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Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Pipe-------------------------------------------------------------

          Name: 125-145      From Node: N-125     Length(ft): 55
         Group: BASE           To Node: N-145          Count: 2

                UPSTREAM     DOWNSTREAM              Equation: Average K
      Geometry: Circular     Circular                    Flow: Both
      Span(in): 24           24           Entrance Loss Coef: 0
      Rise(in): 24           24               Exit Loss Coef: 1
    Invert(ft): 19           19               Bend Loss Coef: 0
   Manning's N: 0.012        0.012         Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0            0              Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0           0             Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

--------Class: Pipe-------------------------------------------------------------

          Name: 130-135      From Node: N-130     Length(ft): 40
         Group: BASE           To Node: N-135          Count: 4

                UPSTREAM     DOWNSTREAM              Equation: Average K
      Geometry: Circular     Circular                    Flow: Both
      Span(in): 12           12           Entrance Loss Coef: 0
      Rise(in): 12           12               Exit Loss Coef: 1
    Invert(ft): 19           19               Bend Loss Coef: 0
   Manning's N: 0.012        0.012         Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0            0              Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0           0             Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3
```

```
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Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ******************************************************
--------Class: Pipe-----------------------------------------------------------

          Name: 140-145      From Node: N-140     Length(ft): 40
         Group: BASE           To Node: N-145          Count: 2

               UPSTREAM     DOWNSTREAM            Equation: Average K
      Geometry: Circular    Circular                  Flow: Both
      Span(in): 12          12          Entrance Loss Coef: 0
      Rise(in): 12          12              Exit Loss Coef: 1
    Invert(ft): 19          19              Bend Loss Coef: 0
   Manning's N: 0.012       0.012        Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0           0             Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0          0            Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

--------Class: Pipe-----------------------------------------------------------

          Name: 150-155      From Node: N-150     Length(ft): 40
         Group: BASE           To Node: N-155          Count: 2

               UPSTREAM     DOWNSTREAM            Equation: Average K
      Geometry: Circular    Circular                  Flow: Both
      Span(in): 12          12          Entrance Loss Coef: 0
      Rise(in): 12          12              Exit Loss Coef: 1
    Invert(ft): 19          19              Bend Loss Coef: 0
   Manning's N: 0.012       0.012        Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0           0             Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0          0            Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3
```

```
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Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Pipe--------------------------------------------------------------

          Name: 155-175      From Node: N-155     Length(ft): 95
         Group: BASE           To Node: N-175          Count: 2

                UPSTREAM      DOWNSTREAM            Equation: Average K
      Geometry: Circular      Circular                  Flow: Both
      Span(in): 24            24            Entrance Loss Coef: 0
      Rise(in): 24            24                Exit Loss Coef: 1
    Invert(ft): 19            19                Bend Loss Coef: 0
   Manning's N: 0.012         0.012          Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0             0               Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0            0              Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

--------Class: Pipe--------------------------------------------------------------

          Name: 160-165      From Node: N-160     Length(ft): 40
         Group: BASE           To Node: N-165          Count: 2

                UPSTREAM      DOWNSTREAM            Equation: Average K
      Geometry: Circular      Circular                  Flow: Both
      Span(in): 12            12            Entrance Loss Coef: 0
      Rise(in): 12            12                Exit Loss Coef: 1
    Invert(ft): 19            19                Bend Loss Coef: 0
   Manning's N: 0.012         0.012          Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0             0               Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0            0              Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3
```

```
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Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Pipe--------------------------------------------------------------

          Name: 170-175       From Node: N-170      Length(ft): 50
         Group: BASE            To Node: N-175           Count: 2

                UPSTREAM      DOWNSTREAM              Equation: Average K
      Geometry: Circular      Circular                    Flow: Both
      Span(in): 12            12          Entrance Loss Coef: 0
      Rise(in): 12            12              Exit Loss Coef: 1
    Invert(ft): 19            19              Bend Loss Coef: 0
    Manning's N: 0.012        0.012        Outlet Cntrl Spec: Use dc or tw
   Top Clip(in): 0            0             Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0            0            Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

--------Class: Pipe--------------------------------------------------------------

          Name: 175-E.LK      From Node: N-175      Length(ft): 60
         Group: BASE            To Node: E.LAKE          Count: 1

                UPSTREAM      DOWNSTREAM              Equation: Average K
      Geometry: Circular      Circular                    Flow: Both
      Span(in): 4             4           Entrance Loss Coef: 0
      Rise(in): 4             4               Exit Loss Coef: 0
    Invert(ft): 19            19              Bend Loss Coef: 0
    Manning's N: 0.01         0.01         Outlet Cntrl Spec: Use dc or tw
   Top Clip(in): 0            0             Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0            0            Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3

                 Bleeder Pipe 4 " Diameter HDPE
```

```
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Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Channel-------------------------------------------------------------
 Name: C105-125          From Node: N-105        Length(ft): 10
Group: BASE                To Node: N-125             Count: 1

              UPSTREAM     DOWNSTREAM
   Geometry: Trapezoidal  Trapezoidal           Equation: Aver Conveyance
  Invert(ft): 19           19                        Flow: Both
TclpInitZ(ft): 9999         9999           Eddy Contrac Coef: 0
 Manning's N: 0.03         0.03            Eddy Expans Coef: 0
    TClip(ft): 0            0            Entrance Loss Coef: 0
    BClip(ft): 0            0                Exit Loss Coef: 0
    Main Xsec:                           Outlet Cntrl Spec: Use dc or tw
    AxEl1(ft):                            Inlet Cntrl Spec: Use dn
    Aux Xsec1:                           Stabilizer Option: None
    AxEl2(ft):
    Aux Xsec2:
   TWidth(ft):
    Depth(ft):
   BWidth(ft): 23           23
  LSdSlp(h/v): 2            2
  RSdSlp(h/v): 2            2


--------Class: Channel-------------------------------------------------------------
 Name: C115-135          From Node: N-115        Length(ft): 10
Group: BASE                To Node: N-135             Count: 1

              UPSTREAM     DOWNSTREAM
   Geometry: Trapezoidal  Trapezoidal           Equation: Aver Conveyance
  Invert(ft): 19           19                        Flow: Both
TclpInitZ(ft): 9999         9999           Eddy Contrac Coef: 0
 Manning's N: 0.03         0.03            Eddy Expans Coef: 0
    TClip(ft): 0            0            Entrance Loss Coef: 0
    BClip(ft): 0            0                Exit Loss Coef: 0
    Main Xsec:                           Outlet Cntrl Spec: Use dc or tw
    AxEl1(ft):                            Inlet Cntrl Spec: Use dn
    Aux Xsec1:                           Stabilizer Option: None
    AxEl2(ft):
    Aux Xsec2:
   TWidth(ft):
    Depth(ft):
   BWidth(ft): 18           18
  LSdSlp(h/v): 2            2
  RSdSlp(h/v): 2            2
```

```
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Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Channel-----------------------------------------------------------
 Name: C135-155          From Node: N-135          Length(ft): 10
Group: BASE                To Node: N-155               Count: 1

                 UPSTREAM     DOWNSTREAM
    Geometry: Trapezoidal  Trapezoidal           Equation: Aver Conveyance
   Invert(ft): 19           19                        Flow: Both
TclpInitZ(ft): 9999         9999          Eddy Contrac Coef: 0
  Manning's N: 0.03         0.03           Eddy Expans Coef: 0
    TClip(ft): 0            0            Entrance Loss Coef: 0
    BClip(ft): 0            0                Exit Loss Coef: 0
    Main Xsec:                           Outlet Cntrl Spec: Use dc or tw
    AxEl1(ft):                            Inlet Cntrl Spec: Use dn
    Aux Xsec1:                           Stabilizer Option: None
    AxEl2(ft):
    Aux Xsec2:
   TWidth(ft):
    Depth(ft):
   BWidth(ft): 18           18
  LSdSlp(h/v): 2            2
  RSdSlp(h/v): 2            2


--------Class: Channel-----------------------------------------------------------
 Name: C145-165          From Node: N-145          Length(ft): 10
Group: BASE                To Node: N-165               Count: 1

                 UPSTREAM     DOWNSTREAM
    Geometry: Trapezoidal  Trapezoidal           Equation: Aver Conveyance
   Invert(ft): 19           19                        Flow: Both
TclpInitZ(ft): 9999         9999          Eddy Contrac Coef: 0
  Manning's N: 0.03         0.03           Eddy Expans Coef: 0
    TClip(ft): 0            0            Entrance Loss Coef: 0
    BClip(ft): 0            0                Exit Loss Coef: 0
    Main Xsec:                           Outlet Cntrl Spec: Use dc or tw
    AxEl1(ft):                            Inlet Cntrl Spec: Use dn
    Aux Xsec1:                           Stabilizer Option: None
    AxEl2(ft):
    Aux Xsec2:
   TWidth(ft):
    Depth(ft):
   BWidth(ft): 40           40
  LSdSlp(h/v): 2            2
  RSdSlp(h/v): 2            2
```

```
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Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Channel----------------------------------------------------------
 Name: SPLWY165          From Node: N-165        Length(ft): 10
Group: BASE                To Node: E.LAKE            Count: 1

              UPSTREAM    DOWNSTREAM
    Geometry: Trapezoidal Trapezoidal          Equation: Aver Conveyance
  Invert(ft): 20          20                       Flow: Both
TclpInitZ(ft): 9999       9999        Eddy Contrac Coef: 0
  Manning's N: 0.03       0.03         Eddy Expans Coef: 0
    TClip(ft): 0          0           Entrance Loss Coef: 0
    BClip(ft): 0          0               Exit Loss Coef: 0
   Main Xsec:                          Outlet Cntrl Spec: Use dc or tw
   AxEl1(ft):                           Inlet Cntrl Spec: Use dn
   Aux Xsec1:                          Stabilizer Option: None
   AxEl2(ft):
   Aux Xsec2:
  TWidth(ft):
   Depth(ft):
  BWidth(ft): 15          15
 LSdSlp(h/v): 3           3
 RSdSlp(h/v): 3           3


--------Class: Channel----------------------------------------------------------
 Name: SPLWY175          From Node: N-175        Length(ft): 10
Group: BASE                To Node: E.LAKE            Count: 1

              UPSTREAM    DOWNSTREAM
    Geometry: Trapezoidal Trapezoidal          Equation: Aver Conveyance
  Invert(ft): 20          20                       Flow: Both
TclpInitZ(ft): 9999       9999        Eddy Contrac Coef: 0
  Manning's N: 0.03       0.03         Eddy Expans Coef: 0
    TClip(ft): 0          0           Entrance Loss Coef: 0
    BClip(ft): 0          0               Exit Loss Coef: 0
   Main Xsec:                          Outlet Cntrl Spec: Use dc or tw
   AxEl1(ft):                           Inlet Cntrl Spec: Use dn
   Aux Xsec1:                          Stabilizer Option: None
   AxEl2(ft):
   Aux Xsec2:
  TWidth(ft):
   Depth(ft):
  BWidth(ft): 15          15
 LSdSlp(h/v): 3           3
 RSdSlp(h/v): 3           3
```

```
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Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Rating Curve-----------------------------------------------------
    Name: E.LAKE       Count: 1         From Node: E.LAKE
   Group: BASE          Flow: Positive    To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: E.LAKE     18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0


--------Class: Rating Curve-----------------------------------------------------
    Name: N-100        Count: 1         From Node: N-100
   Group: BASE          Flow: Positive    To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: N-100      18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0


--------Class: Rating Curve-----------------------------------------------------
    Name: N-105        Count: 1         From Node: N-105
   Group: BASE          Flow: Positive    To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: N-105      18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0


--------Class: Rating Curve-----------------------------------------------------
    Name: N-110        Count: 1         From Node: N-110
   Group: BASE          Flow: Positive    To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: N-110      18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0
```

```
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Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ****************************************************
--------Class: Rating Curve--------------------------------------------------
    Name: N-115       Count: 1         From Node: N-115
   Group: BASE         Flow: Positive    To Node: BOUNDARY

          TABLE       ELEV ON(ft) ELEV OFF(ft)
      #1: N-115       18          18.01
      #2:             0           0
      #3:             0           0
      #4:             0           0


--------Class: Rating Curve--------------------------------------------------
    Name: N-120       Count: 1         From Node: N-120
   Group: BASE         Flow: Positive    To Node: BOUNDARY

          TABLE       ELEV ON(ft) ELEV OFF(ft)
      #1: N-120       18          18.01
      #2:             0           0
      #3:             0           0
      #4:             0           0


--------Class: Rating Curve--------------------------------------------------
    Name: N-125       Count: 1         From Node: N-125
   Group: BASE         Flow: Positive    To Node: BOUNDARY

          TABLE       ELEV ON(ft) ELEV OFF(ft)
      #1: N-125       18          18.01
      #2:             0           0
      #3:             0           0
      #4:             0           0


--------Class: Rating Curve--------------------------------------------------
    Name: N-130       Count: 1         From Node: N-130
   Group: BASE         Flow: Positive    To Node: BOUNDARY

          TABLE       ELEV ON(ft) ELEV OFF(ft)
      #1: N-130       18          18.01
      #2:             0           0
      #3:             0           0
      #4:             0           0
```

```
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Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Rating Curve------------------------------------------------------
    Name: N-135       Count: 1         From Node: N-135
   Group: BASE          Flow: Positive    To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: N-135      18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0


--------Class: Rating Curve------------------------------------------------------
    Name: N-140       Count: 1         From Node: N-140
   Group: BASE          Flow: Positive    To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: N-140      18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0


--------Class: Rating Curve------------------------------------------------------
    Name: N-145       Count: 1         From Node: N-145
   Group: BASE          Flow: Positive    To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: N-145      18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0


--------Class: Rating Curve------------------------------------------------------
    Name: N-150       Count: 1         From Node: N-150
   Group: BASE          Flow: Positive    To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: N-150      18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0
```

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [21]

Solid Waste Authority of Palm Beach County, FL
Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report **

--------Class: Rating Curve--

Name: N-155 Count: 1 From Node: N-155
Group: BASE Flow: Positive To Node: BOUNDARY

	TABLE	ELEV ON(ft)	ELEV OFF(ft)
#1:	N-155	18	18.01
#2:		0	0
#3:		0	0
#4:		0	0

--------Class: Rating Curve--

Name: N-160 Count: 1 From Node: N-160
Group: BASE Flow: Positive To Node: BOUNDARY

	TABLE	ELEV ON(ft)	ELEV OFF(ft)
#1:	N-160	18	18.01
#2:		0	0
#3:		0	0
#4:		0	0

--------Class: Rating Curve--

Name: N-165 Count: 1 From Node: N-165
Group: BASE Flow: Positive To Node: BOUNDARY

	TABLE	ELEV ON(ft)	ELEV OFF(ft)
#1:	N-165	18	18.01
#2:		0	0
#3:		0	0
#4:		0	0

--------Class: Rating Curve--

Name: N-170 Count: 1 From Node: N-170
Group: BASE Flow: Positive To Node: BOUNDARY

	TABLE	ELEV ON(ft)	ELEV OFF(ft)
#1:	N-170	18	18.01
#2:		0	0
#3:		0	0
#4:		0	0

```
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Lime Recalcination & Biosolids Pelletization Facilities
Proposed Final Conditions: HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Rating Curve-------------------------------------------------------
    Name: N-175       Count: 1         From Node: N-175
   Group: BASE         Flow: Positive    To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: N-175      18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0


   --------Class: Simulation---------------------------------------------------------
O:\ICPR2\SWA\LIME-A~1\PROPOSED\25-72\LRF0
Execution: Both
   Header: Solid Waste Authority
           Lime Recalcination & Biosolids Facilties (Aug2003)
           Proposed Conditions: 25-Year 72-Hour Storm
---------HYDRAULICS----------------------------HYDROLOGY--------------------
        Max Delta Z (ft): 1
          Delta Z Factor: 0.005          Override Defaults: Yes
     Time Step Optimizer: 0                 Storm Dur(hrs): 72
Drop Structure Optimizer: 0                Rain Amount(in): 14
     Sim Start Time(hrs): 0                 Rainfall File: SFWMD72
       Sim End Time(hrs): 150
      Min Calc Time(sec): 0.1
      Max Calc Time(sec): 20
        To Hour:   PInc(min):                  To Hour:   PInc(min):
        25         15                          45         5
        58         10                          58         2
        62         1                           62         1
        65         5                           72         2
        70         10                          150        10
        80         15
        150        60
---------GROUP SELECTIONS-----------------------------------------------

+ BASE     [07/31/03]


   --------Class: Simulation---------------------------------------------------------
O:\ICPR2\SWA\LIME-A~1\PROPOSED\25-72\LRF1
Execution: Both
   Header: Solid Waste Authority
           Lime Recalcination & Biosolids Facilties (Aug2003)
           Proposed Conditions: 100-Year 72-Hour Storm
---------HYDRAULICS----------------------------HYDROLOGY--------------------
        Max Delta Z (ft): 1
          Delta Z Factor: 0.005          Override Defaults: Yes
     Time Step Optimizer: 0                 Storm Dur(hrs): 72
Drop Structure Optimizer: 0                Rain Amount(in): 16.99
     Sim Start Time(hrs): 0                 Rainfall File: SFWMD72
       Sim End Time(hrs): 80
      Min Calc Time(sec): 0.1
      Max Calc Time(sec): 20
        To Hour:   PInc(min):                  To Hour:   PInc(min):
        25         15                          45         5
        58         10                          58         2
        62         1                           62         1
        65         5                           72         2
```

```
        70          10
        80          15
---------GROUP SELECTIONS----------------------------------------------------
+ BASE     [07/31/03]
```

Exhibit C

Hydraulic Routing Results for the Proposed Site

25-Year 72-Hour Storm

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]
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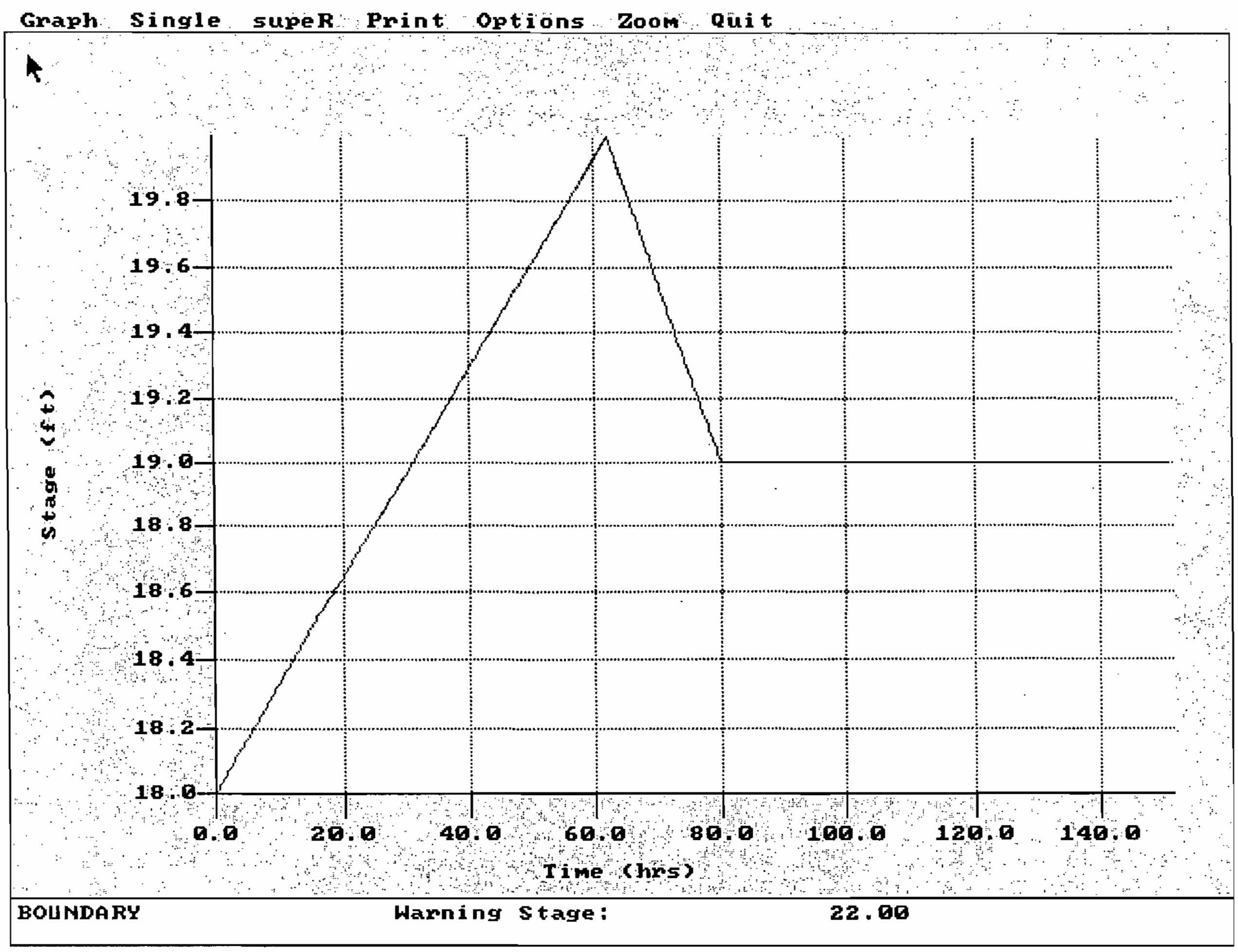
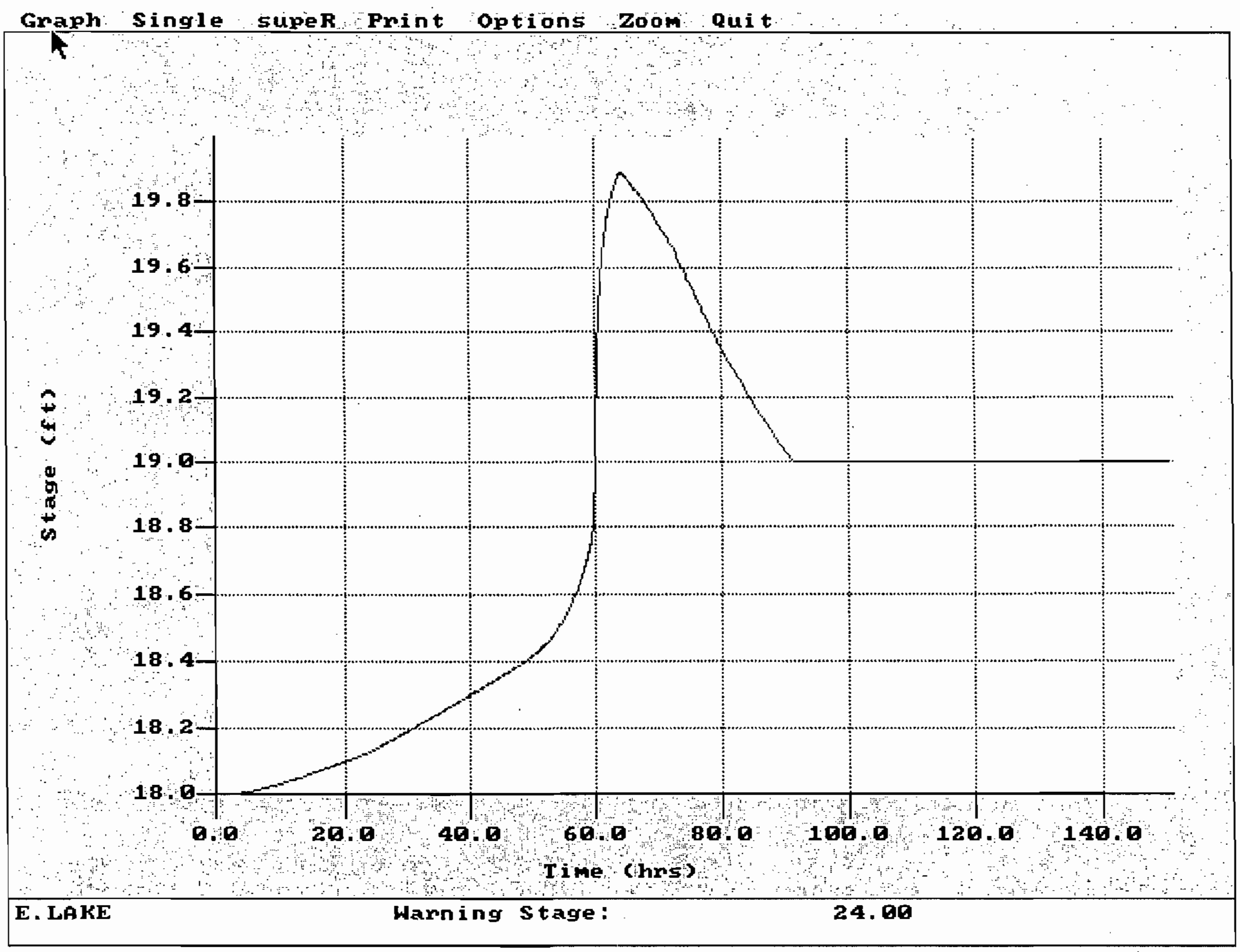
Solid Waste Authority
Lime Recalcination & Biosolids Facilities (Aug2003)
Proposed Conditions: 25-Year 72-Hour Storm

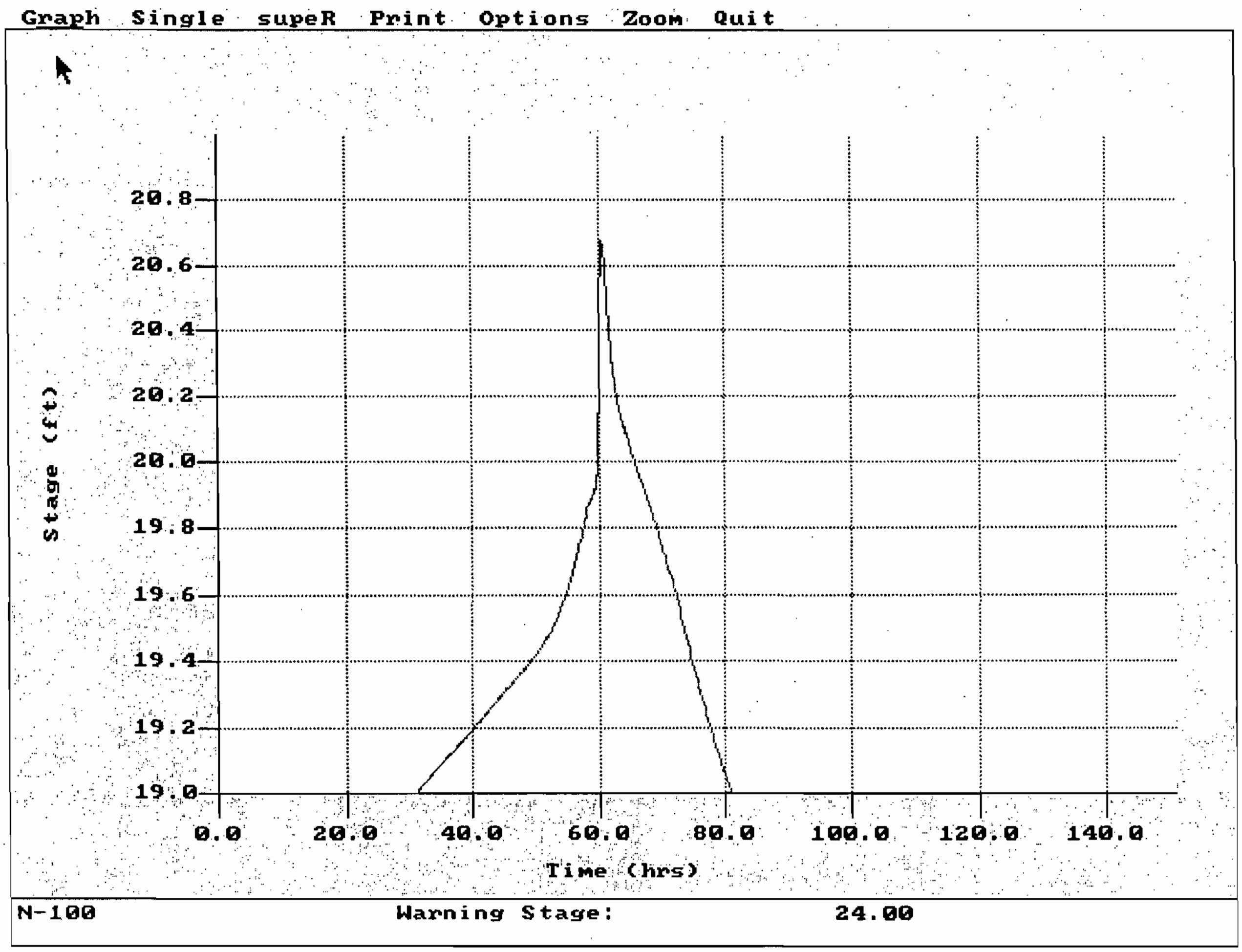
********** Node Maximum Conditions - LRF0253 **

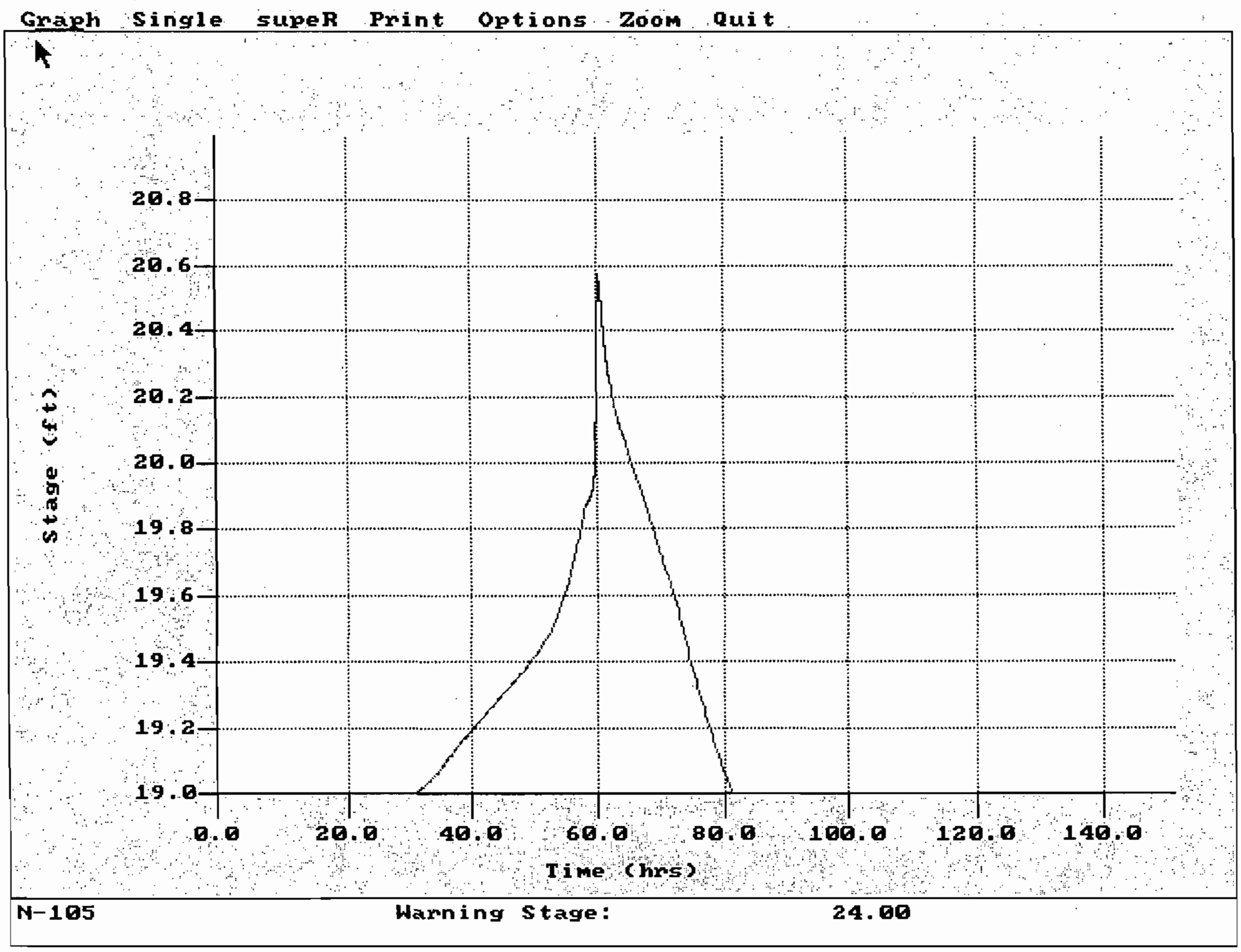
(Time units - hours)

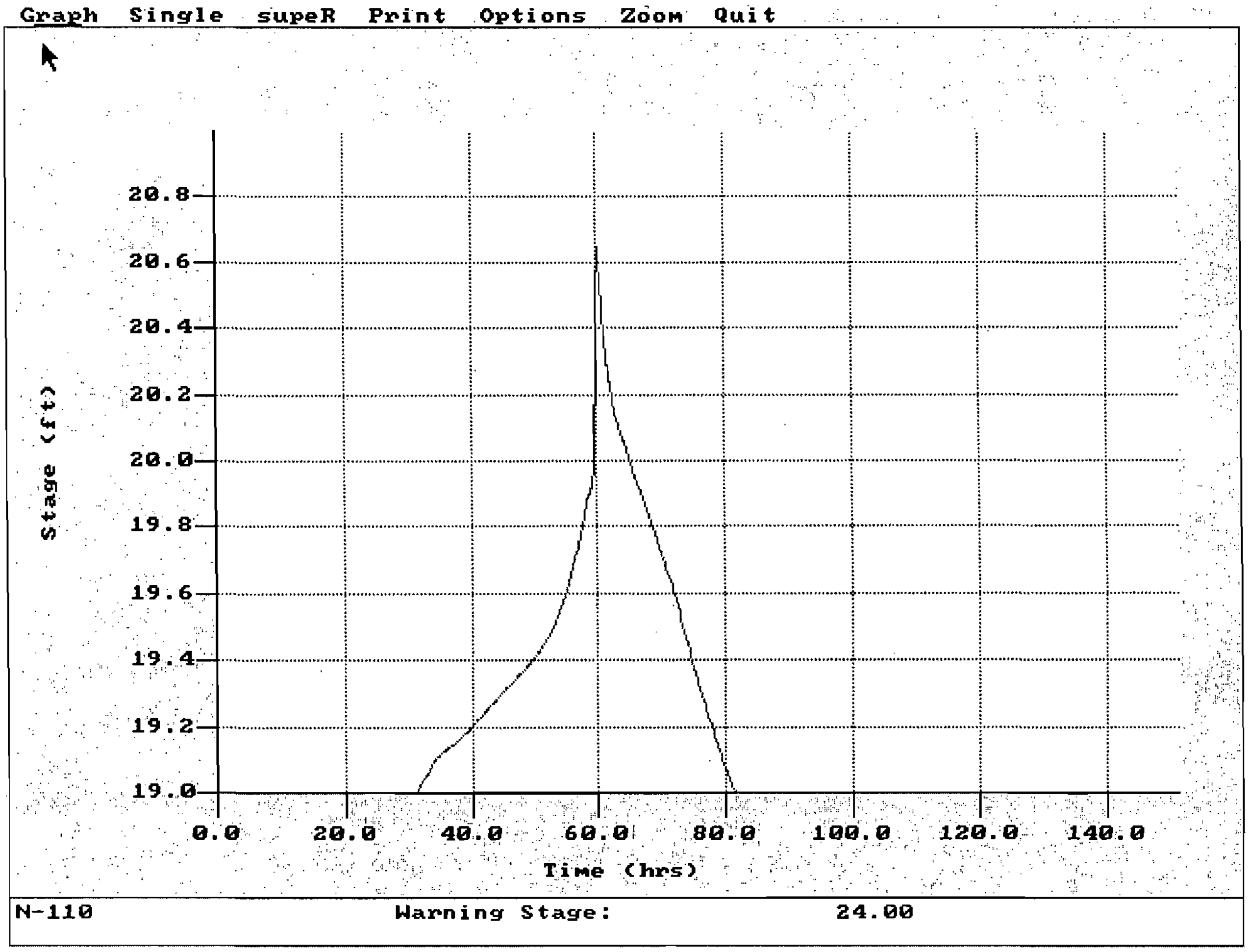
Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
BOUNDARY	BASE	62.00	20.00	22.00	-0.0003	0.00	63.91	12.11	0.00	0.00
E.LAKE	BASE	63.91	19.89	24.00	0.0006	422530.90	60.00	124.95	63.91	5.83
N-100	BASE	60.16	20.67	24.00	0.0011	29805.63	59.98	13.67	60.60	3.98
N-105	BASE	60.15	20.58	24.00	0.0010	20569.15	60.00	7.98	79.51	0.28
N-110	BASE	60.08	20.65	24.00	0.0012	9252.88	59.98	5.75	60.04	3.00
N-115	BASE	60.13	20.56	24.00	0.0015	11557.01	60.00	6.33	60.13	41.37
N-120	BASE	60.06	20.95	24.00	0.0019	6891.92	60.00	8.36	60.04	5.73
N-125	BASE	60.15	20.58	24.00	0.0013	16055.05	36.10	0.09	60.24	9.85
N-130	BASE	60.09	20.63	24.00	0.0011	19989.78	59.98	11.18	60.05	5.41
N-135	BASE	60.13	20.56	24.00	0.0016	13172.97	60.07	47.25	81.30	0.16
N-140	BASE	60.09	20.60	24.00	0.0011	11499.43	59.98	6.16	60.06	3.06
N-145	BASE	60.11	20.51	24.00	0.0018	11876.30	60.03	12.97	80.40	0.16
N-150	BASE	60.18	20.57	24.00	0.0009	21576.49	59.98	6.10	60.71	2.22
N-155	BASE	60.13	20.56	24.00	0.0016	8856.71	33.17	0.04	60.24	9.90
N-160	BASE	60.04	20.75	24.00	0.0018	3271.22	59.98	5.46	60.02	4.61
N-165	BASE	60.11	20.51	24.00	0.0014	27562.20	34.07	0.13	60.11	17.74
N-170	BASE	60.04	20.78	24.00	0.0021	2856.25	59.98	5.37	60.02	4.75
N-175	BASE	60.08	20.47	24.00	0.0010	16547.30	60.03	16.60	60.08	15.13


Graph Single supeR Print Options Zoom Quit
Stage (ft)
19.8
19.6
19.4
19.2
19.0
18.8
18.6
18.4
18.2
18.0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
BOUNDARY
Warning Stage:
22.00


Graph Single supeR Print Options Zoom Quit
19.8
19.6
19.4
19.2
19.0
18.8
18.6
18.4
18.2
18.0
Stage (ft)
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
E.LAKE
Warning Stage:
24.00

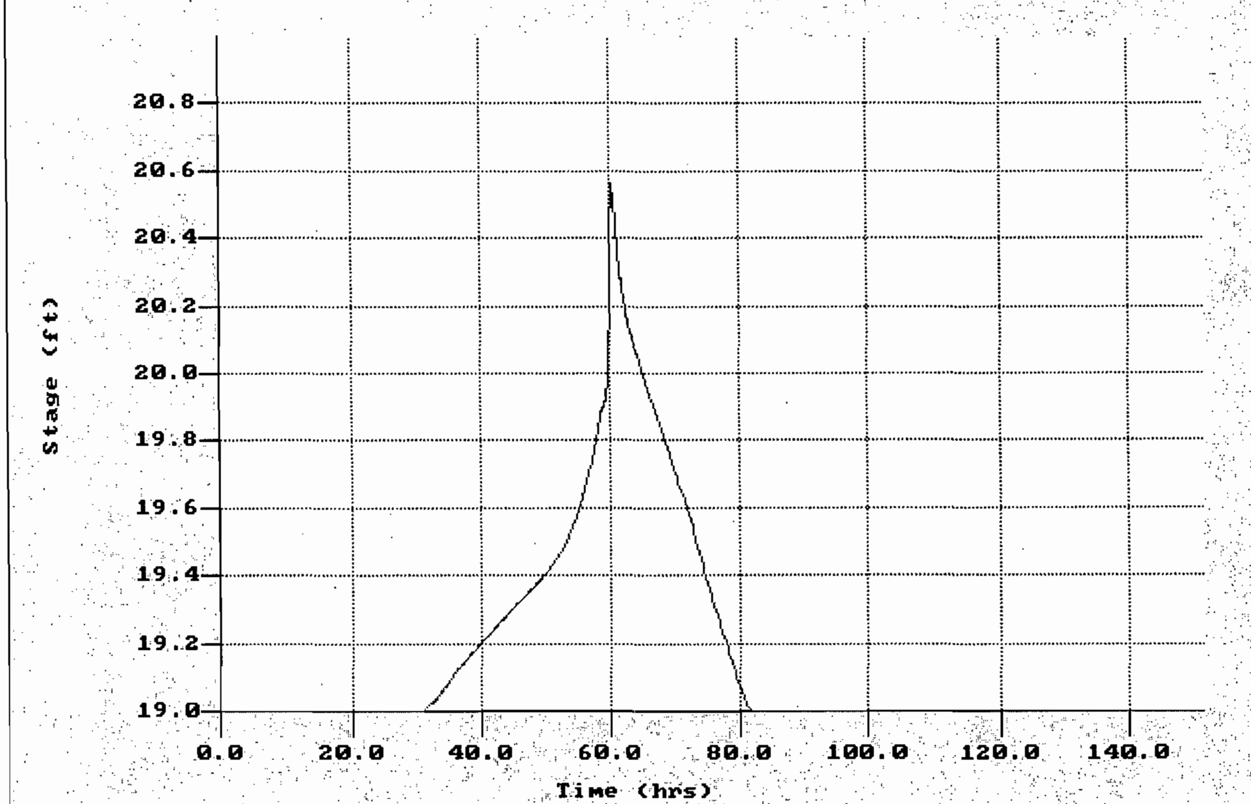

Graph Single supeR Print Options Zoom Quit
20.8
20.6
20.4
20.2
20.0
19.8
19.6
19.4
19.2
19.0
Stage (ft)
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
N-100
Warning Stage:
24.00


Graph Single supeR Print Options Zoom Quit
Stage (ft)
20.8
20.6
20.4
20.2
20.0
19.8
19.6
19.4
19.2
19.0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
N-105
Warning Stage: 24.00

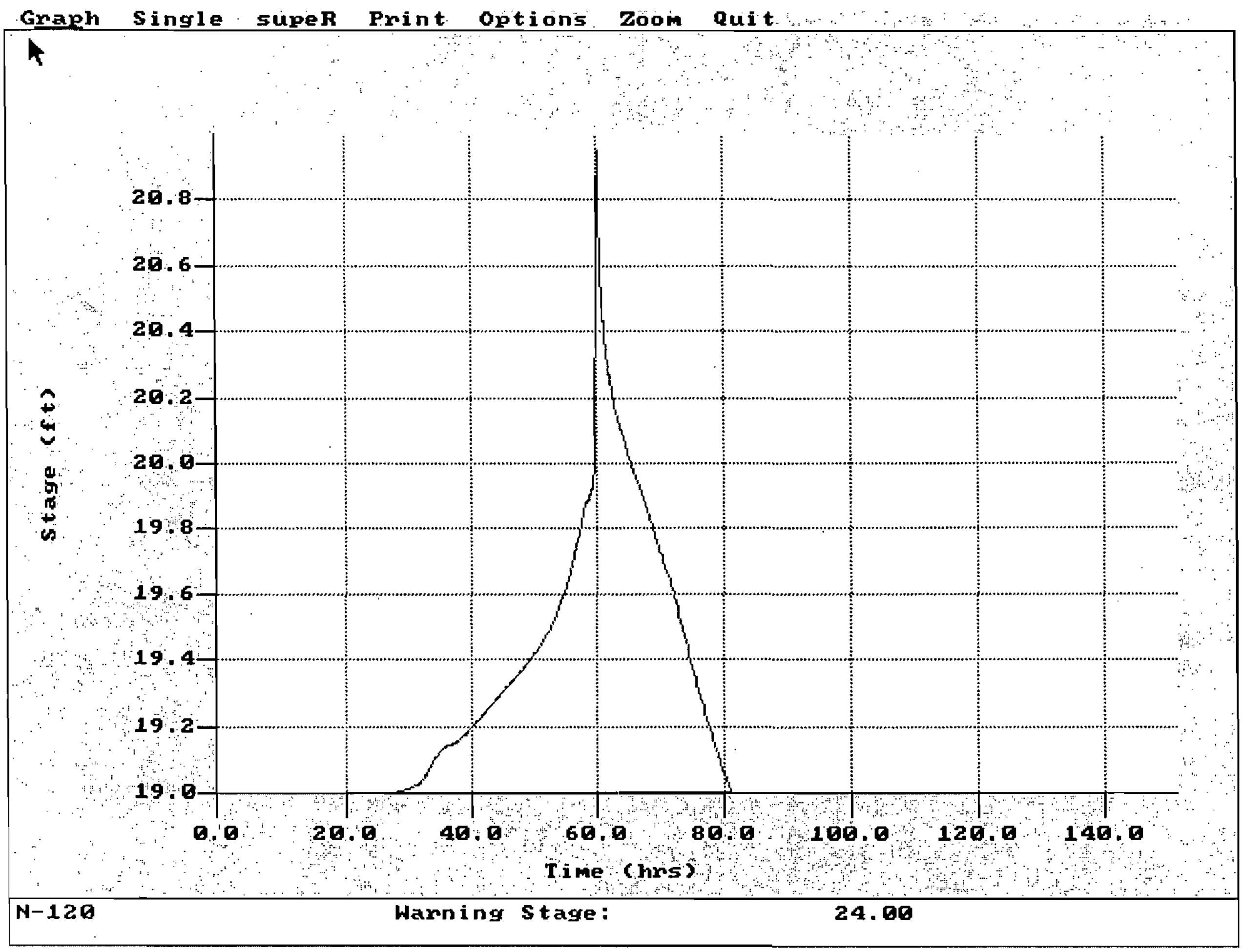


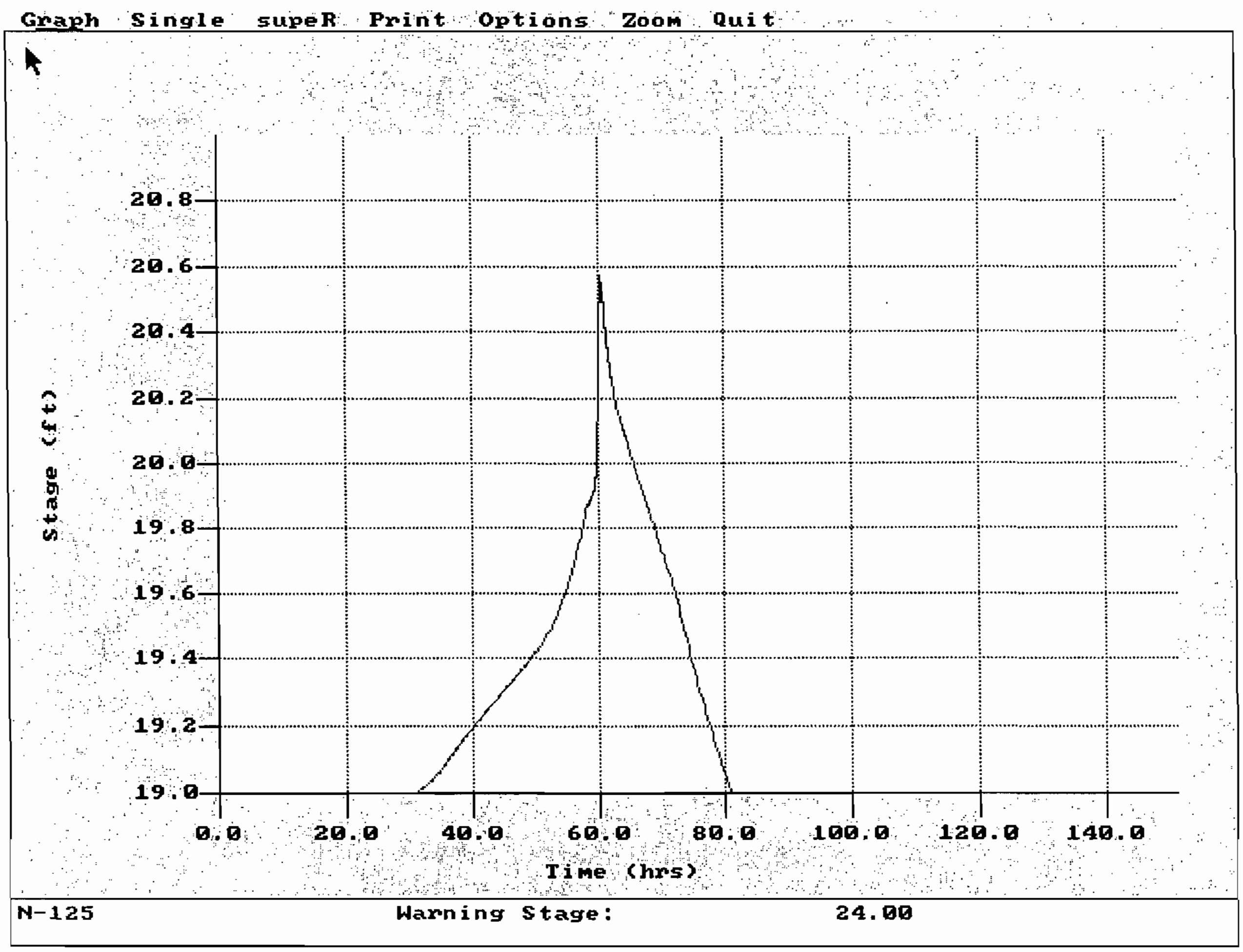
Graph Single supeR Print Options Zoom Quit
20.8
20.6
20.4
20.2
20.0
19.8
19.6
19.4
19.2
19.0
Stage (ft)
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
N-110
Warning Stage:
24.00

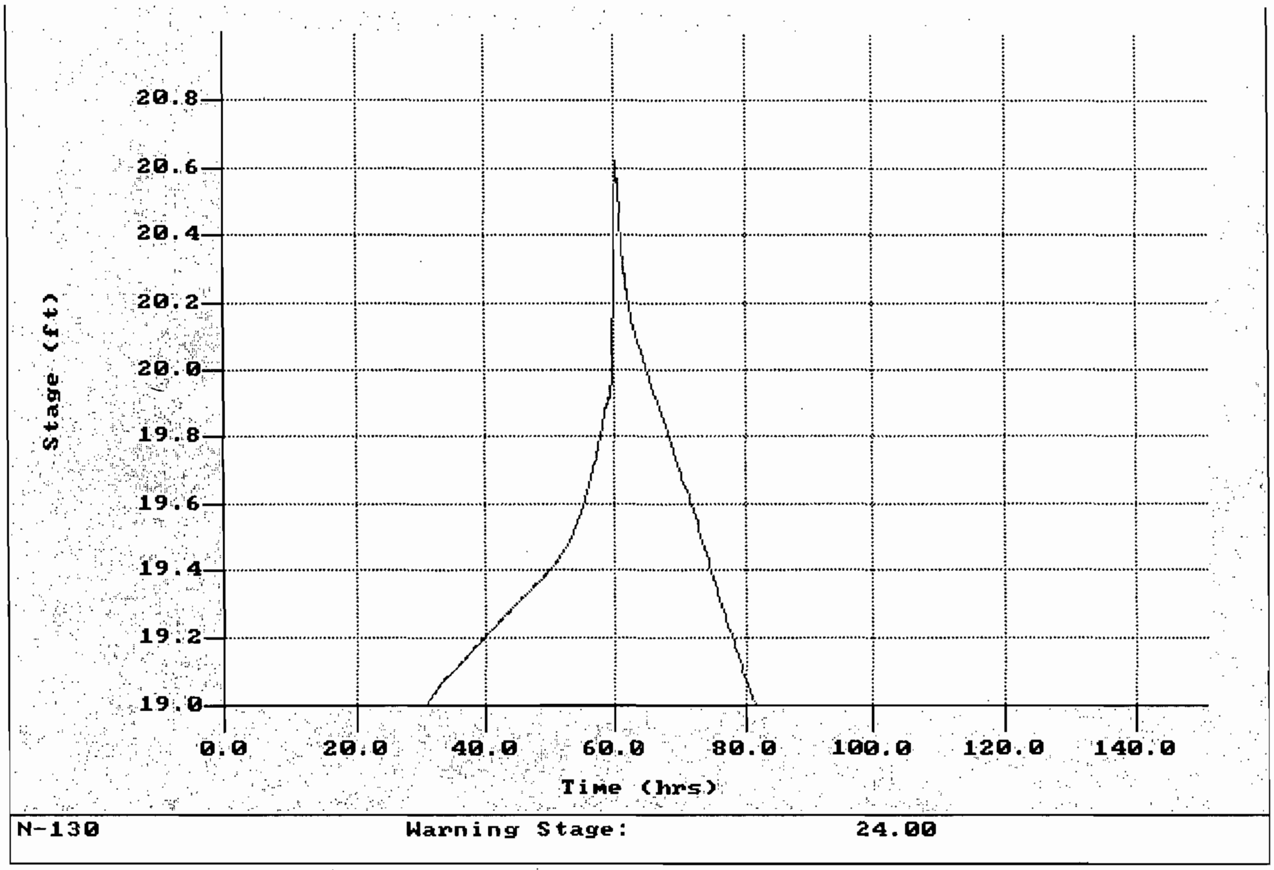
Graph Single supeR Print Options Zoom Quit



N-115 Warning Stage: 24.00

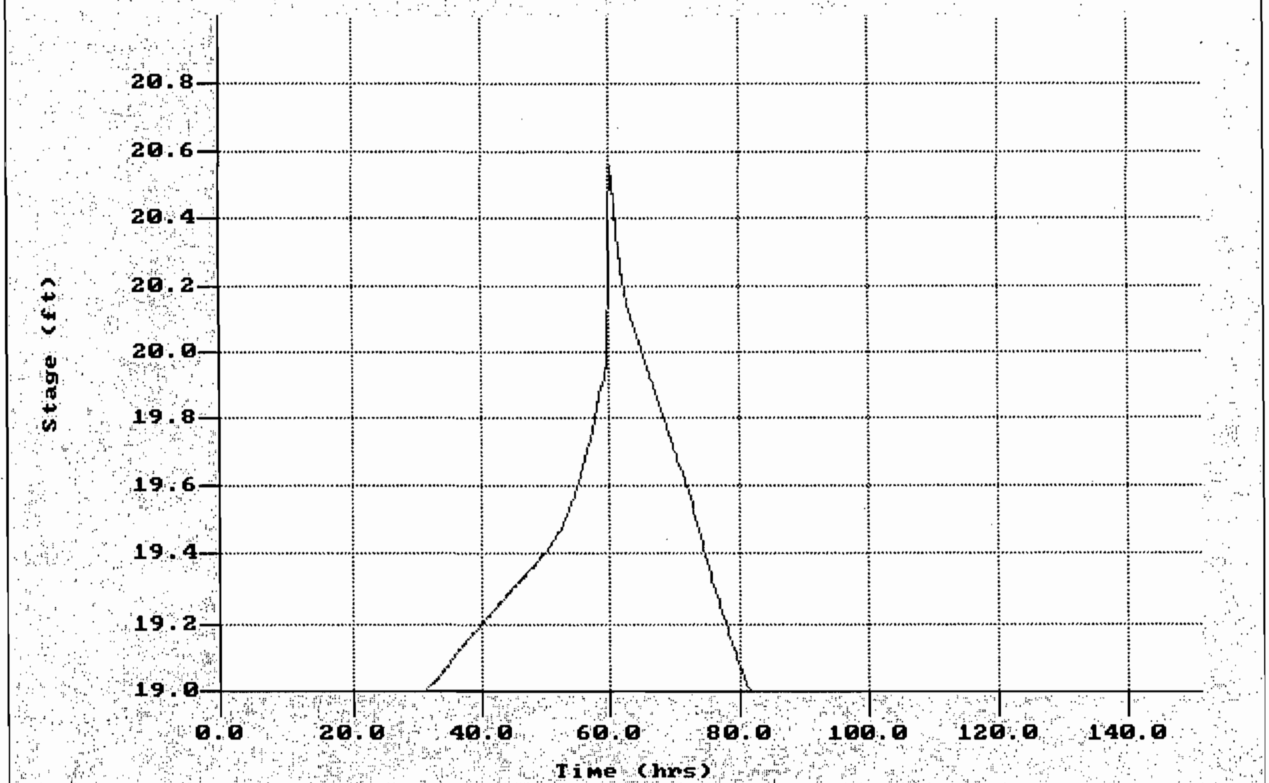

Graph Single supeR Print Options Zoom Quit
Stage (ft)
20.8
20.6
20.4
20.2
20.0
19.8
19.6
19.4
19.2
19.0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
N-120
Warning Stage: 24.00


Graph Single supeR Print Options Zoom Quit
Stage (ft)
20.8
20.6
20.4
20.2
20.0
19.8
19.6
19.4
19.2
19.0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
N-125
Warning Stage:
24.00



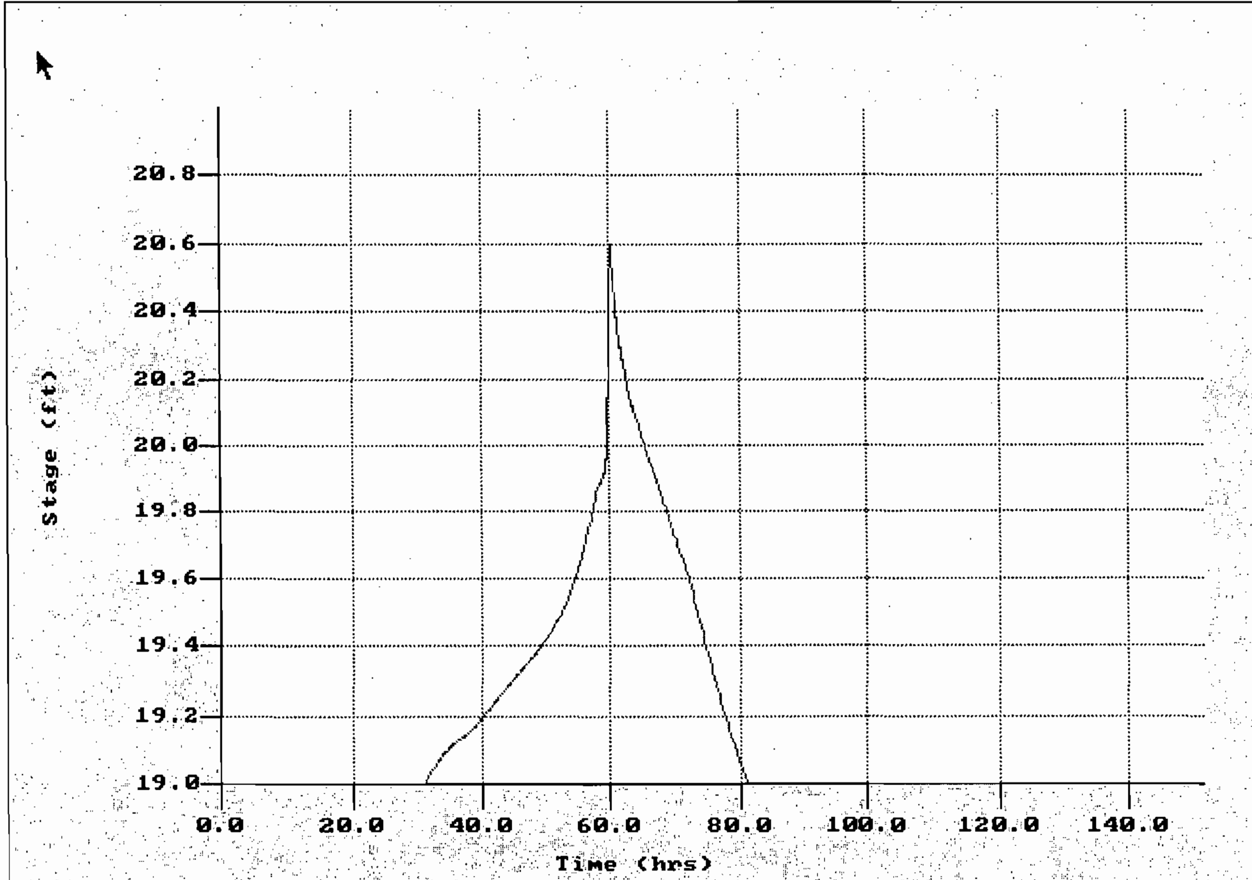
Stage (ft)
20.8
20.6
20.4
20.2
20.0
19.8
19.6
19.4
19.2
19.0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
N-130
Warning Stage:
24.00

Graph Single superR Print Options Zoom Quit

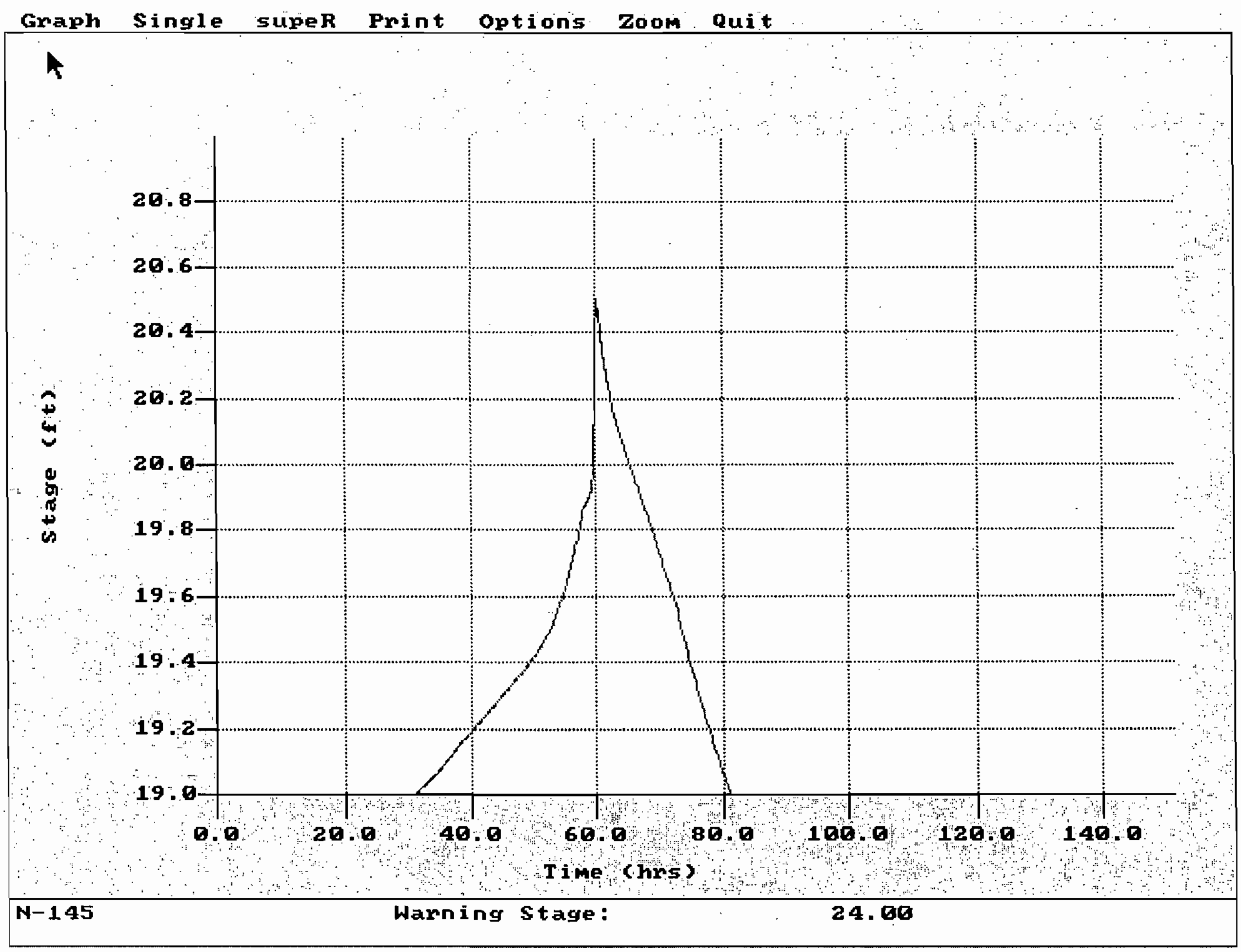


N-135 Warning Stage: 24.00

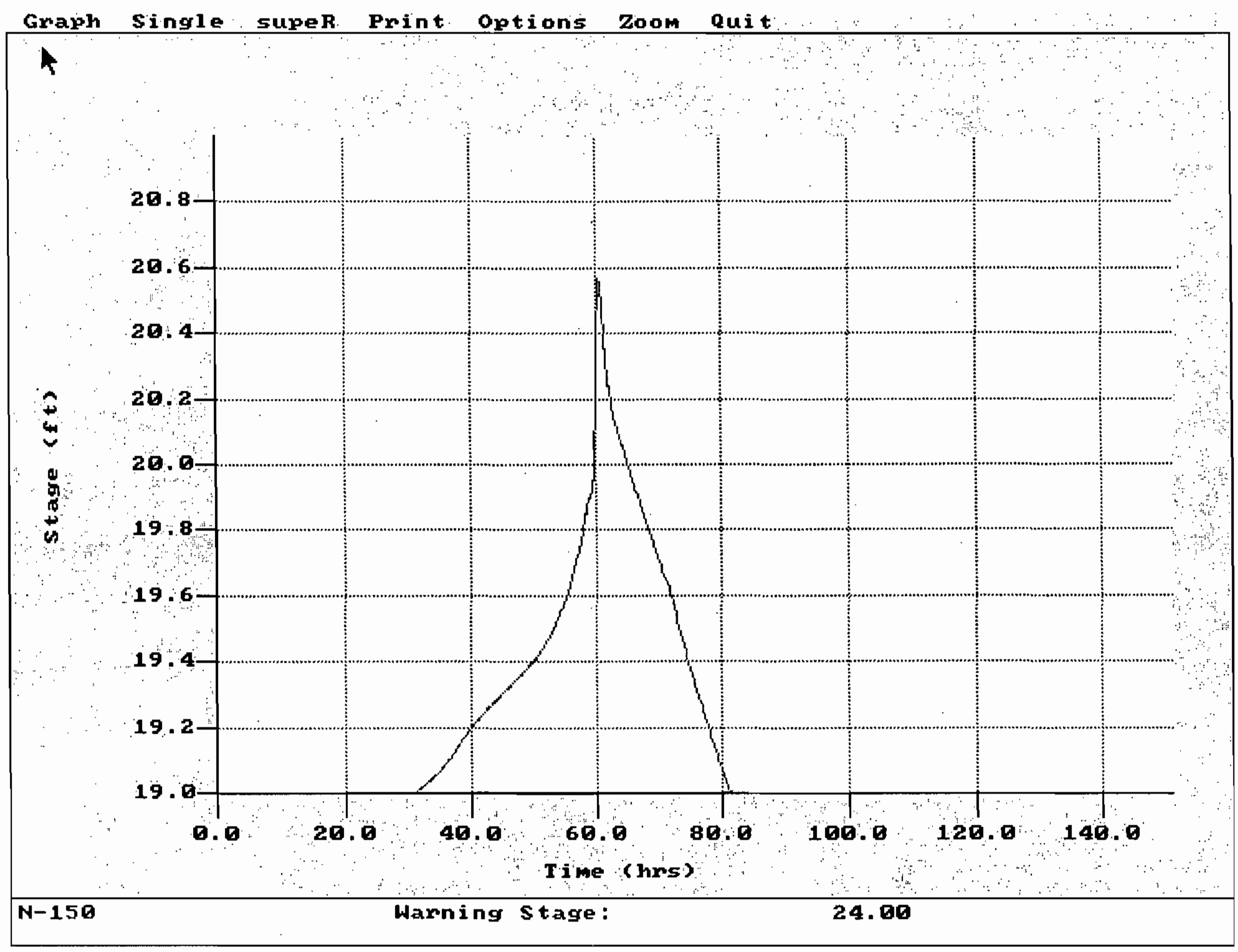
Graph Single supeR Print Options Zoom Quit



N-140 Warning Stage: 24.00

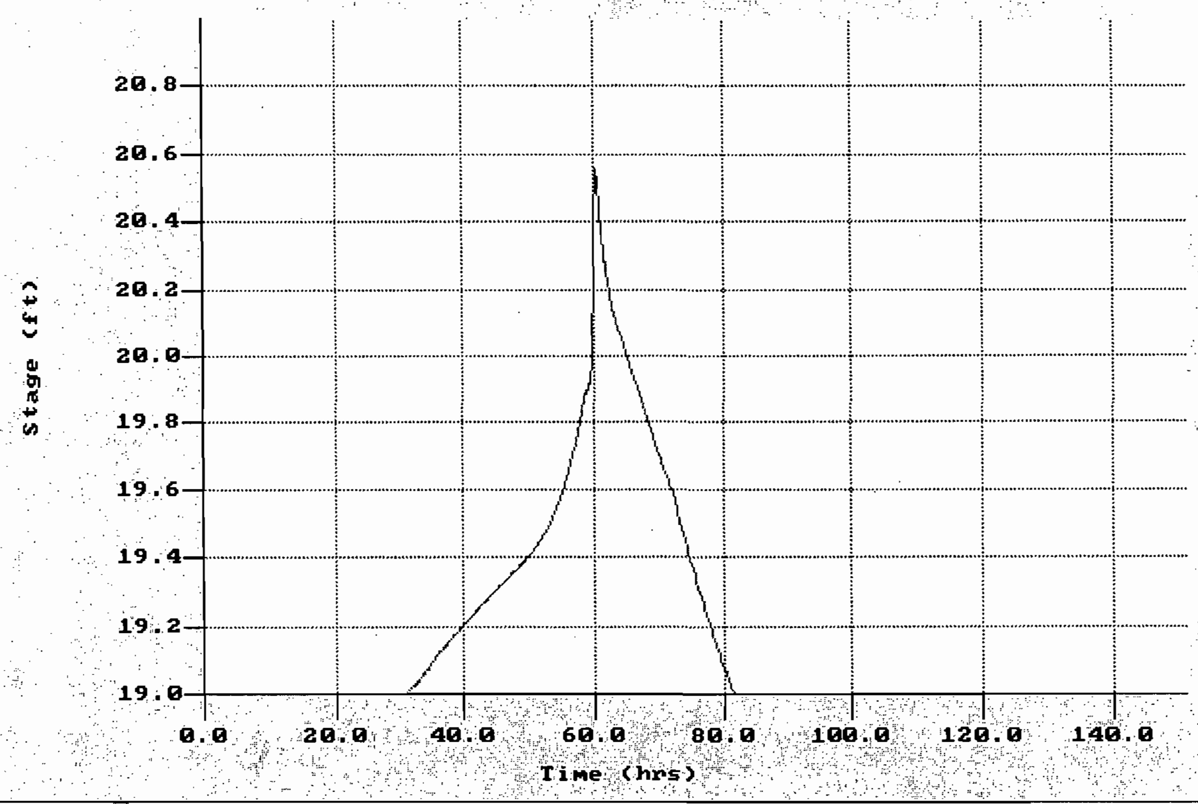


Graph Single supeR Print Options Zoom Quit
Stage (ft)
20.8
20.6
20.4
20.2
20.0
19.8
19.6
19.4
19.2
19.0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
N-145
Warning Stage: 24.00



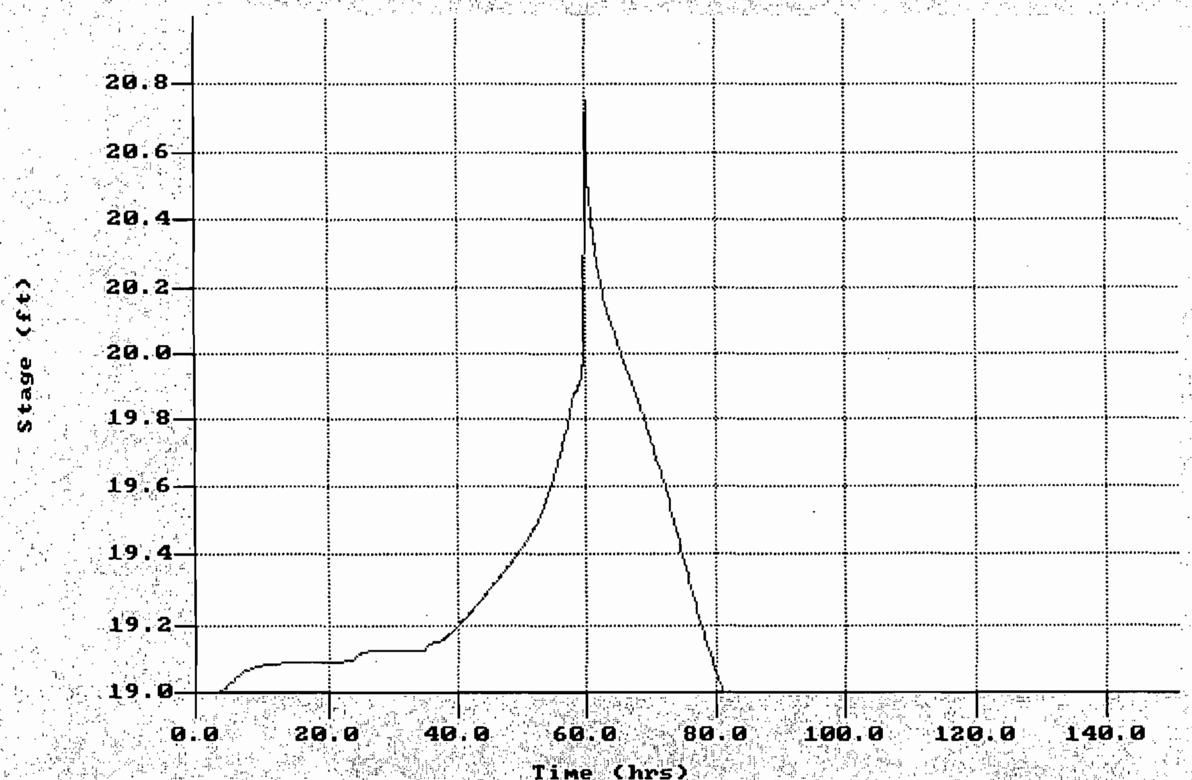
Graph Single supeR Print Options Zoom Quit
20.8
20.6
20.4
20.2
20.0
19.8
19.6
19.4
19.2
19.0
Stage (ft)
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
N-150
Warning Stage:
24.00

Graph Single supeR Print Options Zoom Quit

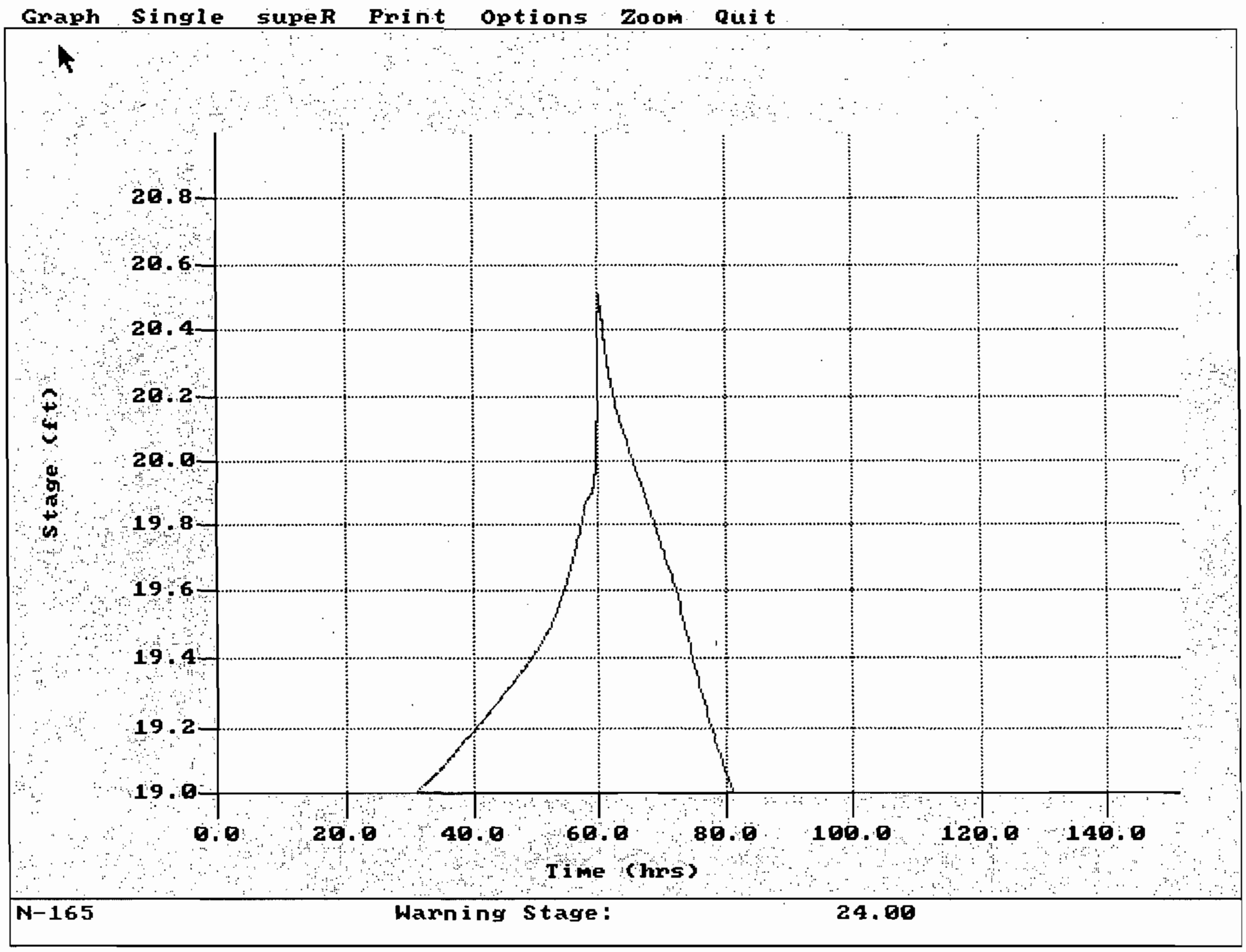


N-155 Warning Stage: 24.00

Graph Single supeR Print Options Zoom Quit

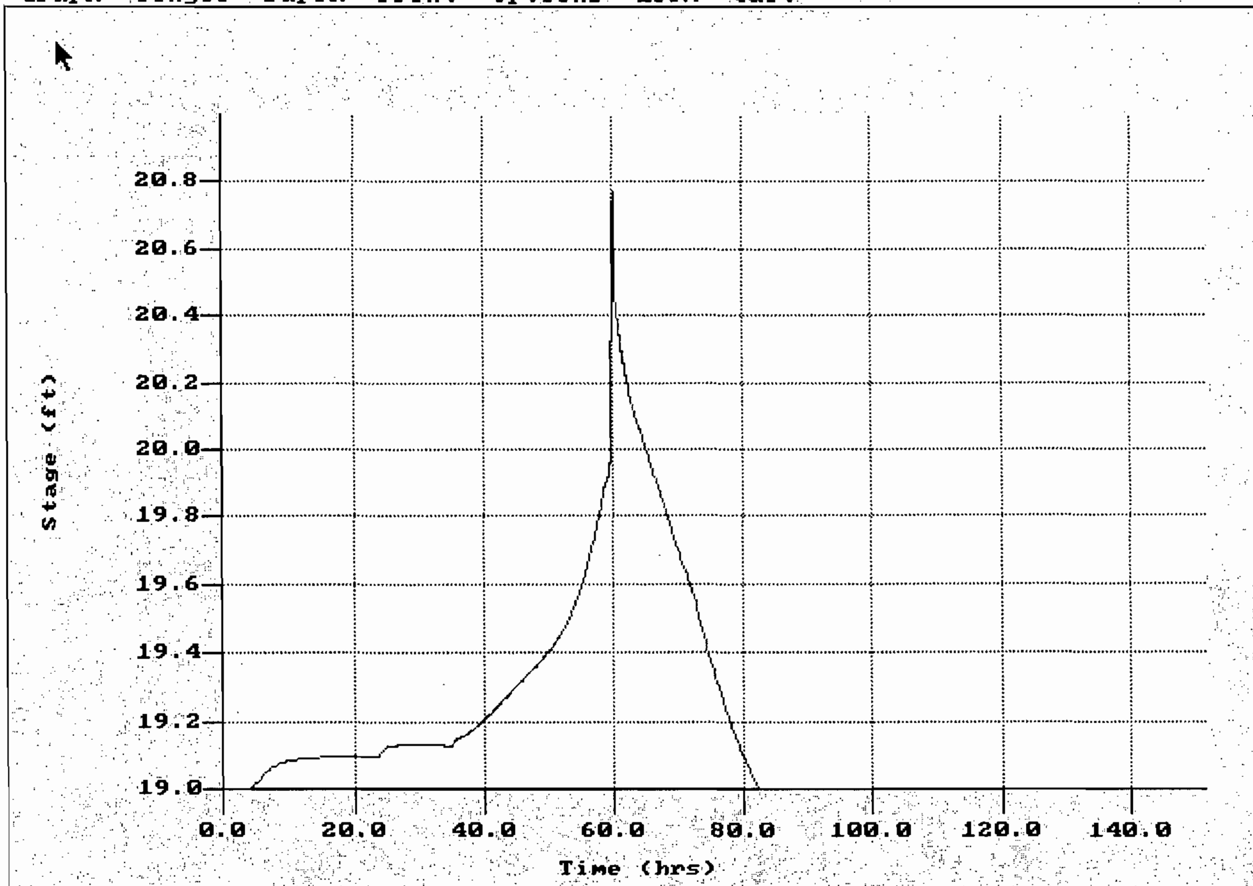


N-160 Warning Stage: 24.00

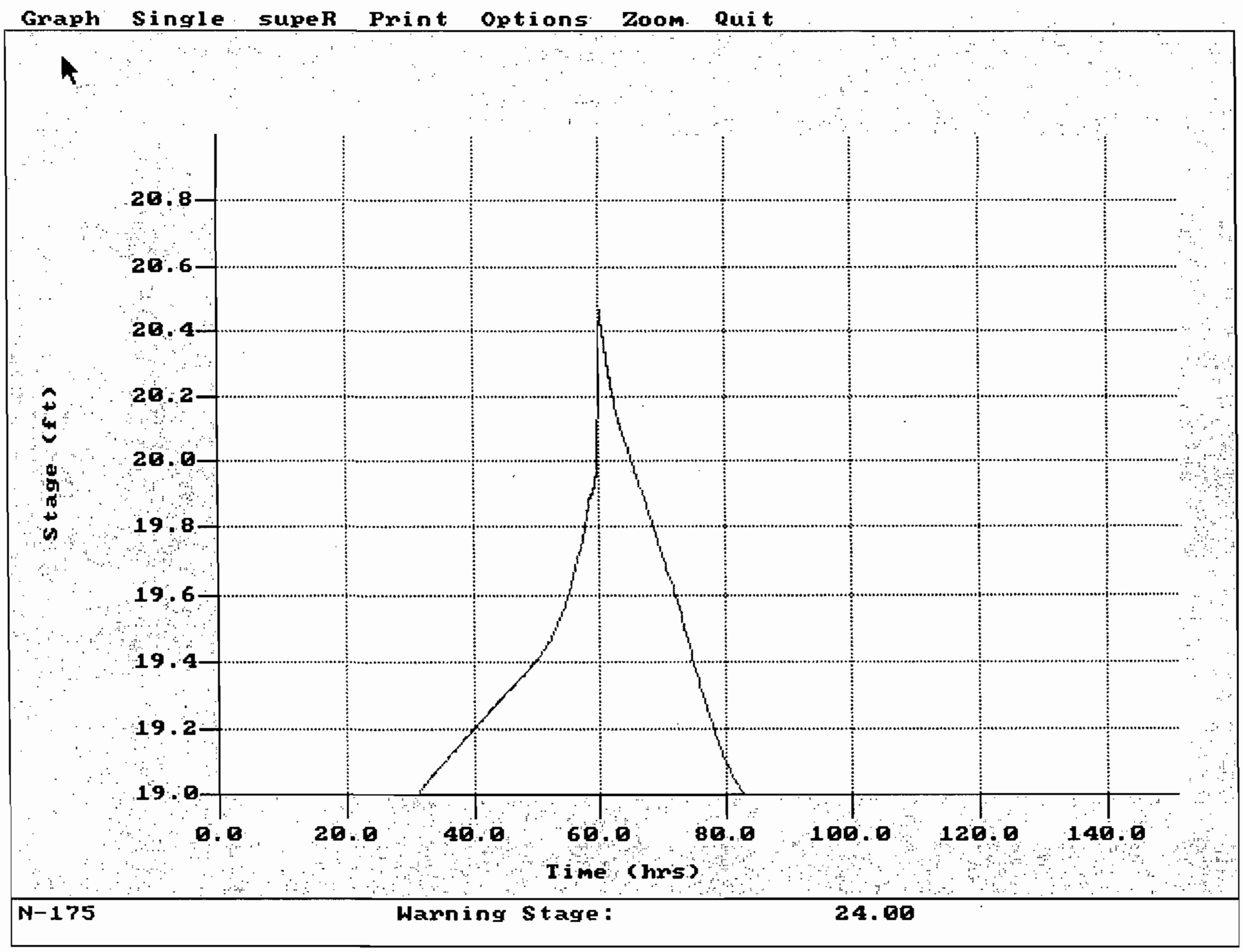


Graph Single supeR Print Options Zoom Quit
Stage (ft)
20.8
20.6
20.4
20.2
20.0
19.8
19.6
19.4
19.2
19.0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
N-165
Warning Stage:
24.00

Graph Single supeR Print Options Zoom Quit



N-170 Warning Stage: 24.00


Graph Single supeR Print Options Zoom Quit
Stage (ft)
20.8
20.6
20.4
20.2
20.0
19.8
19.6
19.4
19.2
19.0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
N-175
Warning Stage:
24.00

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]

Solid Waste Authority
Lime Recalcination & Biosolids Facilities (Aug2003)
Proposed Conditions: 25-Year 72-Hour Storm

********** Link Maximum Conditions - LRF0253 **********

(Time units - hours)

Link Name	Group Name	Max Time Flow	Max Flow (cfs)	Max Delta Q (cfs)	Max Time U/S Stage	Max US Stage (ft)	Max Time D/S Stage	Max DS Stage (ft)
100-105	BASE	60.60	3.21	0.04	60.16	20.67	60.15	20.58
110-115	BASE	60.04	2.76	0.27	60.08	20.65	60.13	20.56
120-125	BASE	60.04	5.57	0.22	60.06	20.95	60.15	20.58
125-145	BASE	60.24	9.25	-0.23	60.15	20.58	60.11	20.51
130-135	BASE	60.05	4.91	0.15	60.09	20.63	60.13	20.56
140-145	BASE	60.06	2.75	0.09	60.09	20.60	60.11	20.51
150-155	BASE	60.71	1.66	0.34	60.18	20.57	60.13	20.56
155-175	BASE	60.24	9.58	-0.61	60.13	20.56	60.08	20.47
160-165	BASE	60.02	4.54	0.29	60.04	20.75	60.11	20.51
170-175	BASE	60.02	4.69	0.02	60.04	20.78	60.08	20.47
175-E.LK	BASE	60.08	0.35	-0.00	60.08	20.47	63.91	19.89
C105-125	BASE	0.00	0.00	6.26	60.15	20.58	60.15	20.58
C115-135	BASE	60.13	40.94	6.95	60.13	20.56	60.13	20.56
C135-155	BASE	35.57	0.03	10.49	60.13	20.56	60.13	20.56
C145-165	BASE	80.40	0.01	16.61	60.11	20.51	60.11	20.51
E.LAKE	BASE	63.91	5.83	5.83	63.91	19.89	62.00	20.00
N-100	BASE	59.57	0.77	0.71	60.16	20.67	62.00	20.00
N-105	BASE	60.15	0.77	0.52	60.15	20.58	62.00	20.00
N-110	BASE	59.57	0.23	0.21	60.08	20.65	62.00	20.00
N-115	BASE	60.13	0.43	0.28	60.13	20.56	62.00	20.00
N-120	BASE	59.54	0.15	0.14	60.06	20.95	62.00	20.00
N-125	BASE	60.15	0.60	0.40	60.15	20.58	62.00	20.00
N-130	BASE	59.57	0.50	0.46	60.09	20.63	62.00	20.00
N-135	BASE	60.13	0.49	0.34	60.13	20.56	62.00	20.00
N-140	BASE	59.57	0.31	0.28	60.09	20.60	62.00	20.00
N-145	BASE	60.11	0.42	0.30	60.11	20.51	62.00	20.00
N-150	BASE	59.59	0.57	0.53	60.18	20.57	62.00	20.00
N-155	BASE	60.13	0.32	0.22	60.13	20.56	62.00	20.00
N-160	BASE	59.55	0.07	0.06	60.04	20.75	62.00	20.00
N-165	BASE	60.11	1.01	0.71	60.11	20.51	62.00	20.00
N-170	BASE	59.55	0.06	0.06	60.04	20.78	62.00	20.00
N-175	BASE	60.08	0.59	0.43	60.08	20.47	62.00	20.00
SPLWY165	BASE	60.11	16.73	-0.08	60.11	20.51	60.11	20.33
SPLWY175	BASE	60.08	14.18	-0.07	60.08	20.47	60.08	20.30

100-Year 72-Hour Storm

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]

Solid Waste Authority
Lime Recalcination & Biosolids Facilities (Aug2003)
Proposed Conditions: 100-Year 72-Hour Storm

********** Node Maximum Conditions - LRF1003 **********

(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
BOUNDARY	BASE	62.00	20.00	22.00	-0.0003	0.00	62.06	13.38	0.00	0.00
E.LAKE	BASE	62.90	20.18	24.00	0.0007	425355.10	60.00	157.04	62.90	6.77
N-100	BASE	60.16	20.87	24.00	0.0012	30734.42	59.98	16.70	60.70	4.83
N-105	BASE	60.14	20.71	24.00	0.0010	20858.73	60.00	9.82	80.00	0.14
N-110	BASE	60.08	20.83	24.00	0.0014	9649.27	59.98	6.99	60.05	3.61
N-115	BASE	60.13	20.69	24.00	0.0013	11789.69	60.00	7.71	33.72	0.01
N-120	BASE	60.07	21.27	24.00	0.0025	7436.68	59.98	10.35	60.05	6.84
N-125	BASE	60.14	20.71	24.00	0.0013	16276.24	34.80	0.12	60.25	12.68
N-130	BASE	60.09	20.80	24.00	0.0013	20839.21	59.98	13.77	60.05	6.49
N-135	BASE	60.13	20.70	24.00	-0.0032	13359.09	33.72	0.11	60.32	58.08
N-140	BASE	60.08	20.76	24.00	0.0012	11779.33	59.98	7.48	60.07	3.84
N-145	BASE	60.10	20.60	24.00	0.0018	11992.24	60.03	16.88	31.00	0.00
N-150	BASE	60.18	20.71	24.00	0.0009	22063.86	59.98	7.43	60.75	2.77
N-155	BASE	60.13	20.69	24.00	0.0032	9013.04	60.32	60.06	60.23	12.64
N-160	BASE	60.04	20.98	24.00	0.0023	3471.91	59.98	6.63	60.02	5.62
N-165	BASE	60.10	20.60	24.00	0.0014	27769.95	33.77	0.16	60.10	24.14
N-170	BASE	60.04	21.01	24.00	0.0026	3062.30	59.98	6.52	60.02	5.77
N-175	BASE	60.08	20.54	24.00	0.0011	16639.44	60.03	21.26	60.08	20.00

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]

Solid Waste Authority
Lime Recalcination & Biosolids Facilities (Aug2003)
Proposed Conditions: 100-Year 72-Hour Storm

********** Link Maximum Conditions - LRF1003 **********

(Time units - hours)

Link Name	Group Name	Max Time Flow	Max Flow (cfs)	Max Delta Q (cfs)	Max Time U/S Stage	Max US Stage (ft)	Max Time D/S Stage	Max DS Stage (ft)
100-105	BASE	60.70	4.05	-0.15	60.16	20.87	60.14	20.71
110-115	BASE	60.05	3.38	-0.06	60.08	20.83	60.13	20.69
120-125	BASE	60.05	6.69	0.23	60.07	21.27	60.14	20.71
125-145	BASE	60.25	12.04	-0.35	60.14	20.71	60.10	20.60
130-135	BASE	60.05	5.99	0.74	60.09	20.80	60.13	20.70
140-145	BASE	60.07	3.53	0.10	60.08	20.76	60.10	20.60
150-155	BASE	60.75	2.20	-0.32	60.18	20.71	60.13	20.69
155-175	BASE	60.23	12.30	0.32	60.13	20.69	60.08	20.54
160-165	BASE	60.02	5.55	0.29	60.04	20.98	60.10	20.60
170-175	BASE	60.02	5.70	-0.09	60.04	21.01	60.08	20.54
175-E.LK	BASE	59.86	0.35	-0.00	60.08	20.54	62.90	20.18
C105-125	BASE	31.00	0.00	13.93	60.14	20.71	60.14	20.71
C115-135	BASE	33.72	0.01	35.23	60.13	20.69	60.13	20.70
C135-155	BASE	60.32	57.56	-35.61	60.13	20.70	60.13	20.69
C145-165	BASE	31.00	0.00	33.71	60.10	20.60	60.10	20.60
E.LAKE	BASE	62.90	6.77	6.05	62.90	20.18	62.00	20.00
N-100	BASE	59.38	0.77	0.69	60.16	20.87	62.00	20.00
N-105	BASE	60.14	0.82	0.52	60.14	20.71	62.00	20.00
N-110	BASE	59.43	0.23	0.20	60.08	20.83	62.00	20.00
N-115	BASE	60.13	0.46	0.28	60.13	20.69	62.00	20.00
N-120	BASE	59.31	0.15	0.13	60.07	21.27	62.00	20.00
N-125	BASE	60.14	0.64	0.38	60.14	20.71	62.00	20.00
N-130	BASE	59.43	0.50	0.43	60.09	20.80	62.00	20.00
N-135	BASE	60.13	0.52	0.32	60.13	20.70	62.00	20.00
N-140	BASE	59.38	0.31	0.27	60.08	20.76	62.00	20.00
N-145	BASE	60.10	0.44	0.30	60.10	20.60	62.00	20.00
N-150	BASE	59.46	0.57	0.51	60.18	20.71	62.00	20.00
N-155	BASE	60.13	0.34	0.22	60.13	20.69	62.00	20.00
N-160	BASE	59.35	0.07	0.06	60.04	20.98	62.00	20.00
N-165	BASE	60.10	1.05	0.67	60.10	20.60	62.00	20.00
N-170	BASE	59.39	0.06	0.05	60.04	21.01	62.00	20.00
N-175	BASE	60.08	0.61	0.41	60.08	20.54	62.00	20.00
SPLWY165	BASE	60.10	23.09	-0.08	60.10	20.60	60.10	20.41
SPLWY175	BASE	60.08	19.10	-0.08	60.08	20.54	60.08	20.36

Exhibit D

Geotechnical Test Results

TIERRA, INC.

Fax

To:	RAMANA KARI ~~Mr. Marty Lewis~~	From:	Raj Krishnasamy
Company	CDM	Date:	May 1, 2002
Fax:		Total Pages:	
Phone:		Reference	SWA
RE:	BHP		

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply

Comments:

Marty,

As requested, here are the results of Borehole Permeability tests:

HC-1,	8.07 x 10-4 ft/sec per ft of head induced.
HC-2,	7.28 x 10-4
HC-3,	7.41 x 10-4

The water level at the tests locations were at 4.0 feet below existing grade.

Please call if you have any question.

Thanks

1100 Barnett Drive, Suite 35, Lake Worth, FL 33461

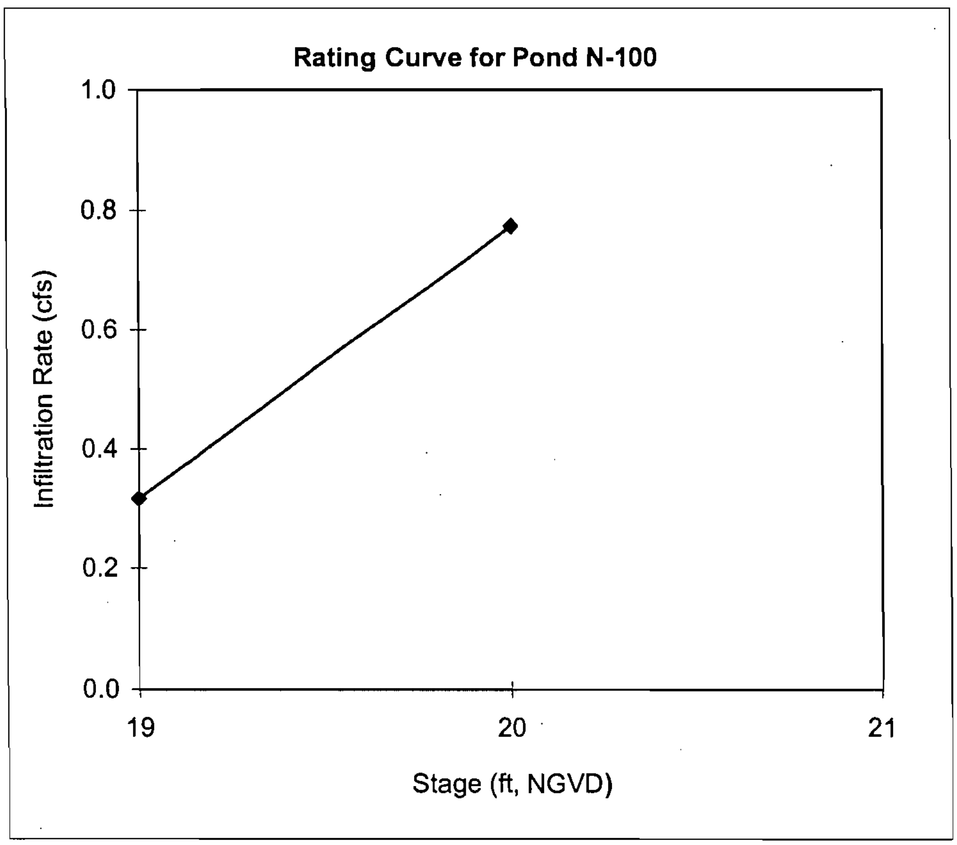
Exhibit E

Rating Curves for Proposed Surface Water Basins

Rating Curve for Pond N-100

Hydraulic Conductivity	**(k)**	ft/sec	**7.28E-04**
Hydraulic Conductivity	**(k)**	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	**Head (ft)**	**Gradient**	**Unit Infiltration $ft^3/s/ft^2$**	**Area acres**	**Infiltration cfs**
19.0	1.0	0.02	1.5E-05	0.50	0.317
20.0	2.0	0.04	2.9E-05	0.61	0.774

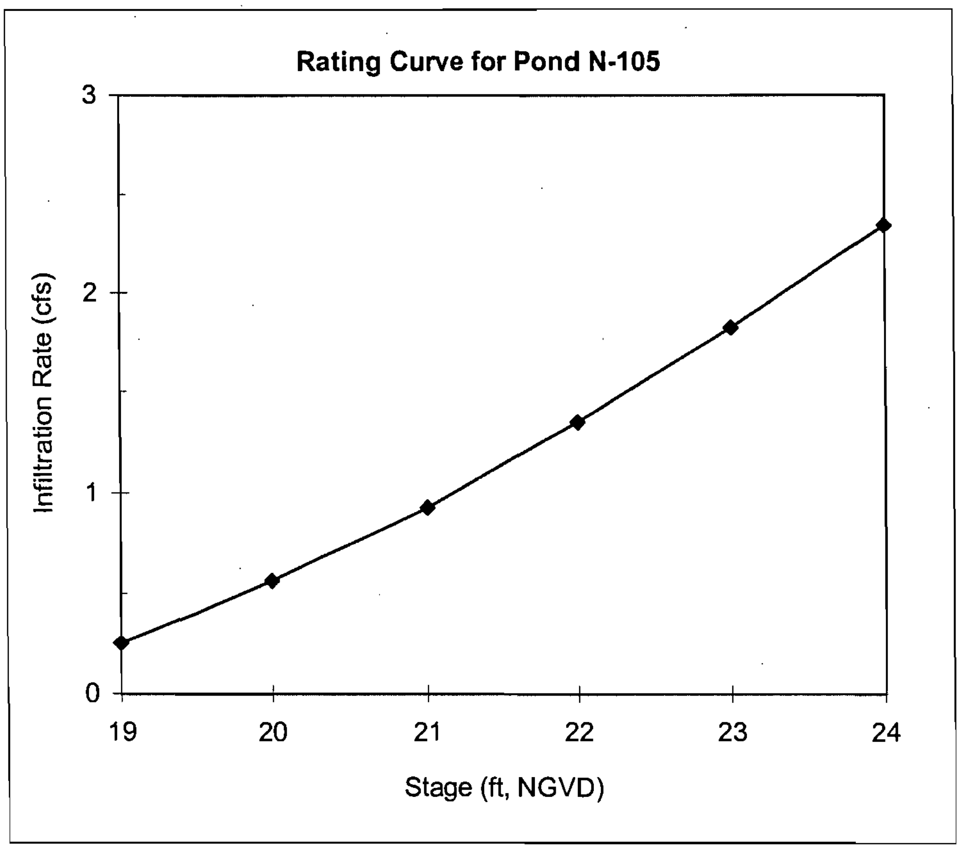


RPK
7/31/03

Rating Curve for Pond N-105

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.40	0.254
20.0	2.0	0.04	2.9E-05	0.44	0.563
21.0	3.0	0.06	4.4E-05	0.49	0.929
22.0	4.0	0.08	5.8E-05	0.53	1.350
23.0	5.0	0.10	7.3E-05	0.58	1.827
24.0	6.0	0.12	8.7E-05	0.62	2.344

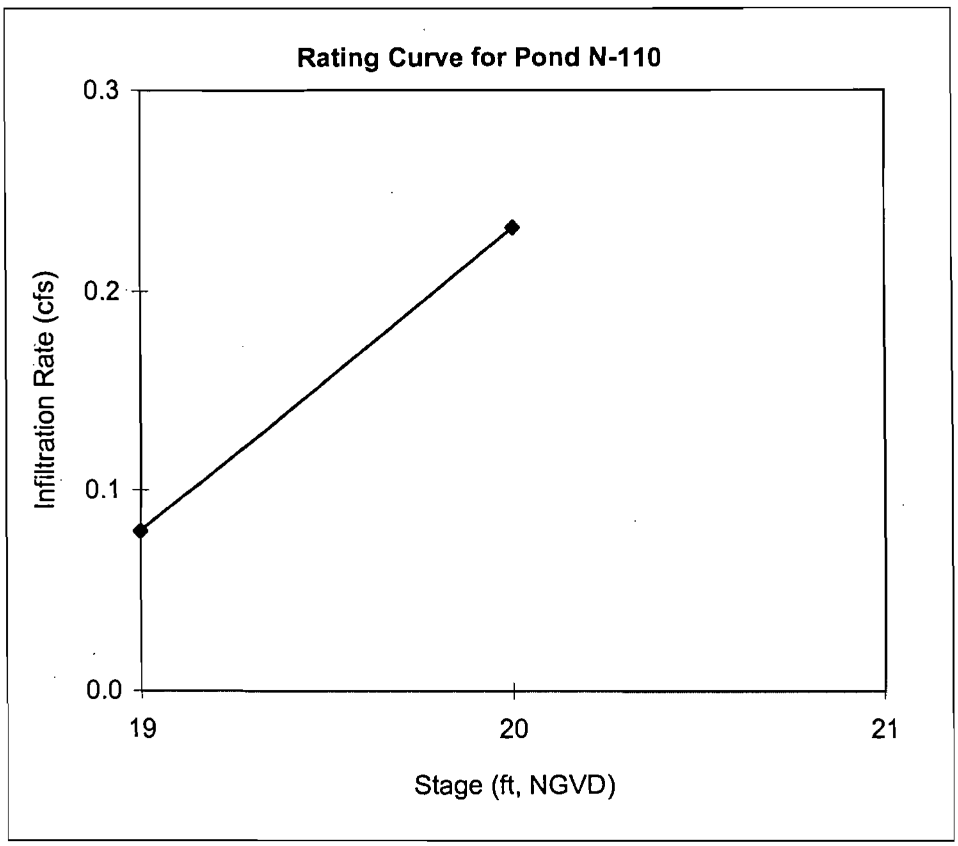


RPK
7/31/03

Rating Curve for Pond N-110

Hydraulic Conductivity	**(k)**	ft/sec	**7.28E-04**
Hydraulic Conductivity	**(k)**	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.13	0.079
20.0	2.0	0.04	2.9E-05	0.18	0.232

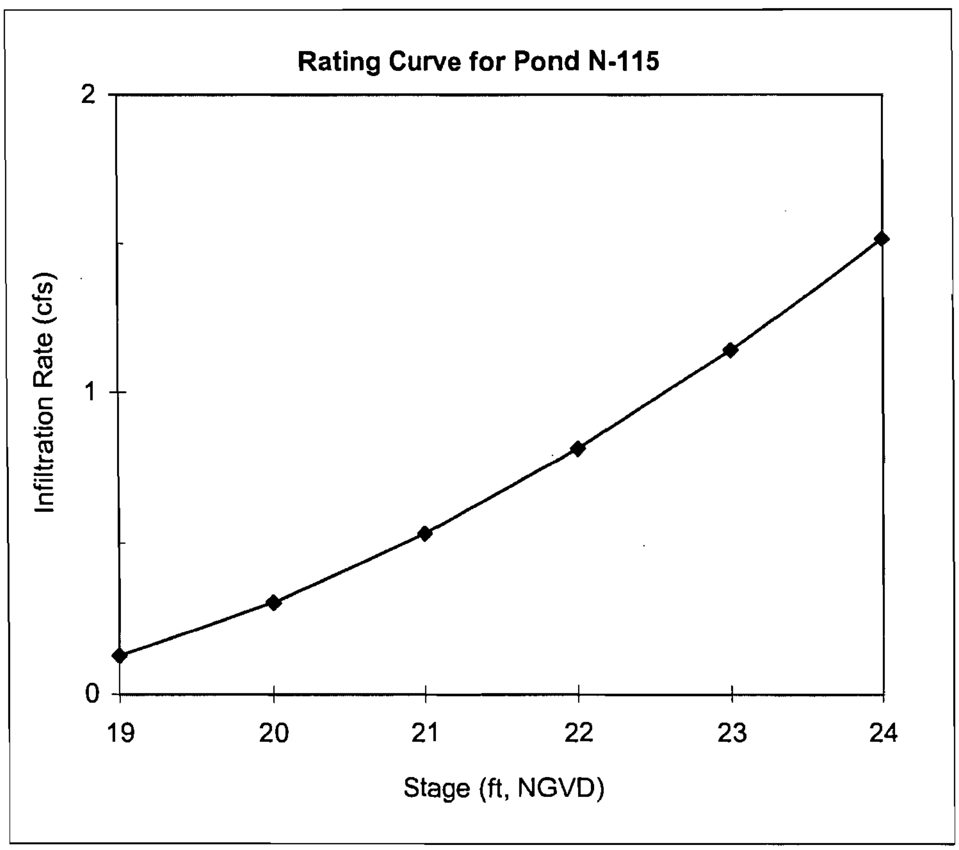


RPK
7/31/03

Rating Curve for Pond N-115

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.20	0.127
20.0	2.0	0.04	2.9E-05	0.24	0.304
21.0	3.0	0.06	4.4E-05	0.28	0.533
22.0	4.0	0.08	5.8E-05	0.32	0.812
23.0	5.0	0.10	7.3E-05	0.36	1.142
24.0	6.0	0.12	8.7E-05	0.40	1.515

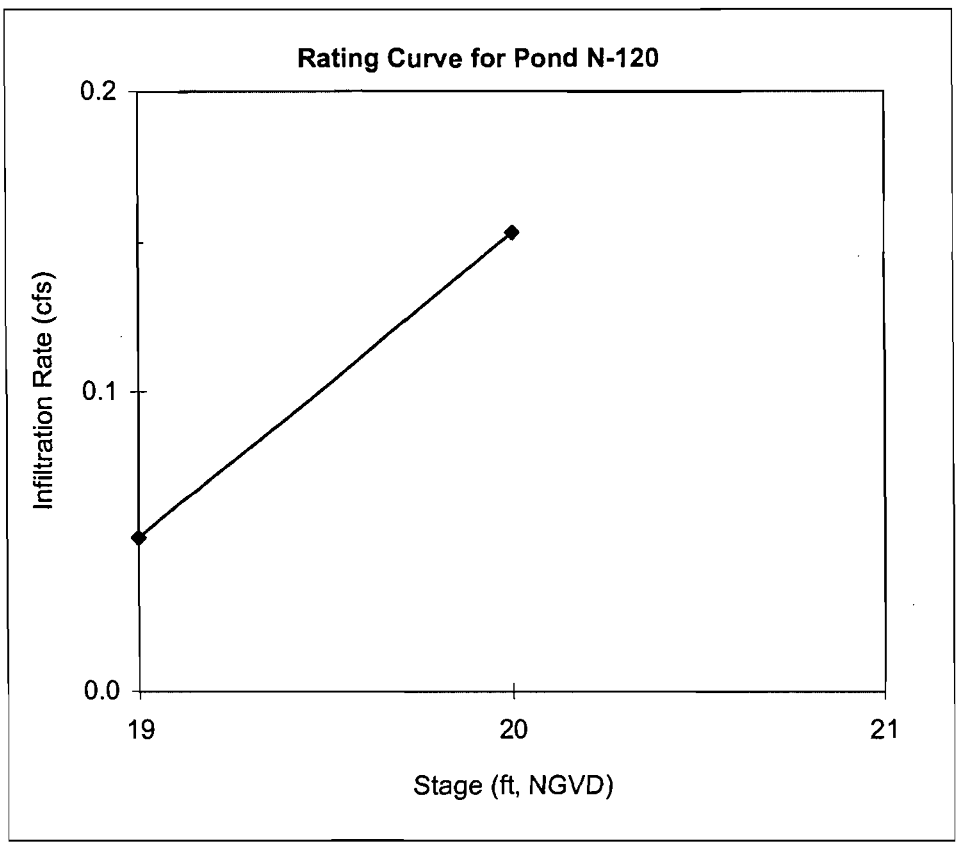


RPK
7/31/03

Rating Curve for Pond N-120

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.08	0.051
20.0	2.0	0.04	2.9E-05	0.12	0.153

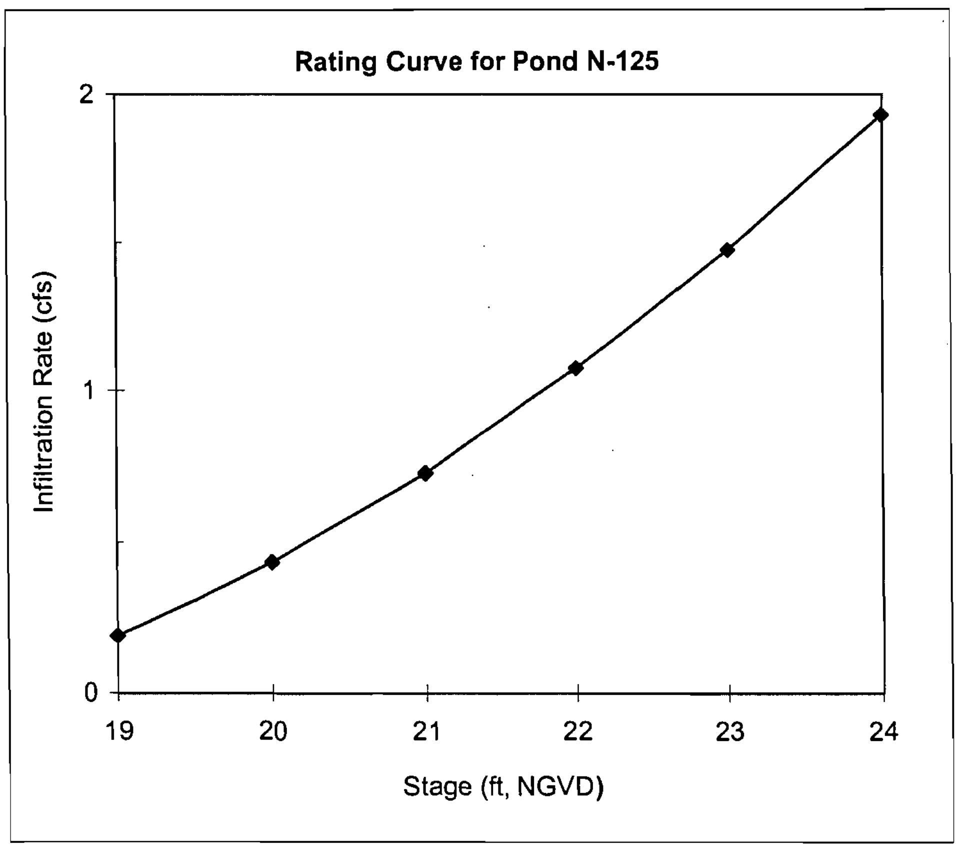


RPK
7/31/03

Rating Curve for Pond N-125

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.30	0.190
20.0	2.0	0.04	2.9E-05	0.34	0.433
21.0	3.0	0.06	4.4E-05	0.38	0.728
22.0	4.0	0.08	5.8E-05	0.42	1.076
23.0	5.0	0.10	7.3E-05	0.47	1.476
24.0	6.0	0.12	8.7E-05	0.51	1.929

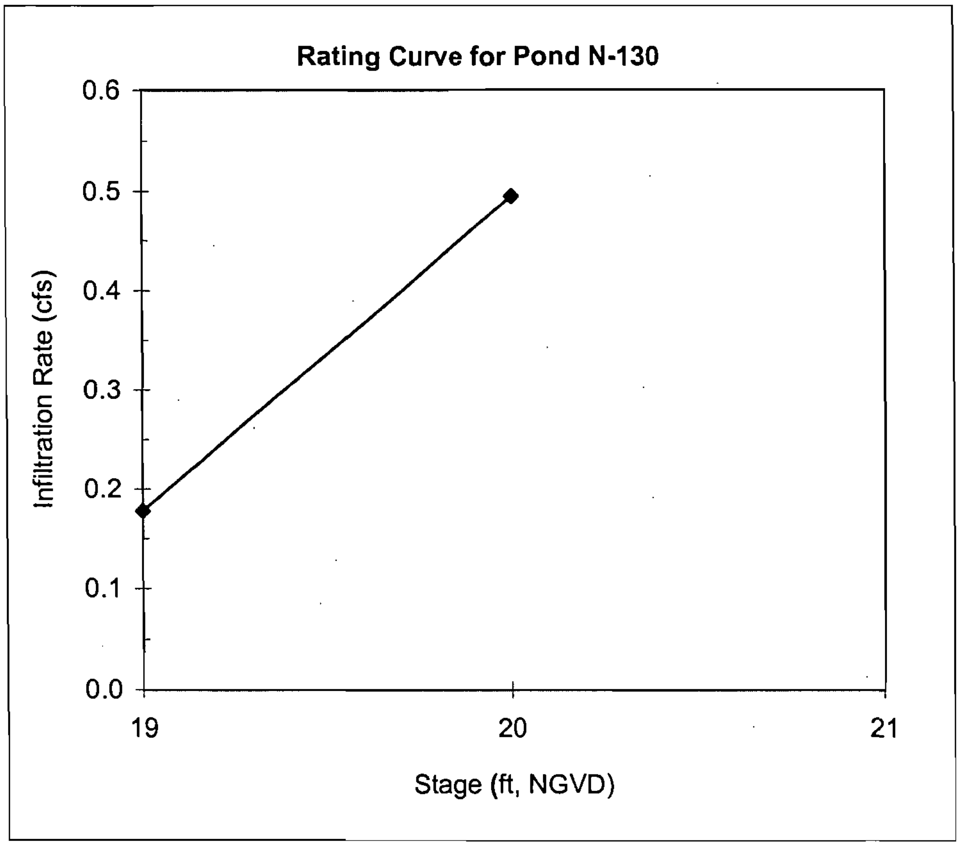


RPK
7/31/03

Rating Curve for Pond N-130

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	**Head (ft)**	**Gradient**	**Unit Infiltration $ft^3/s/ft^2$**	**Area acres**	**Infiltration cfs**
19.0	1.0	0.02	1.5E-05	0.28	0.178
20.0	2.0	0.04	2.9E-05	0.39	0.495



RPK
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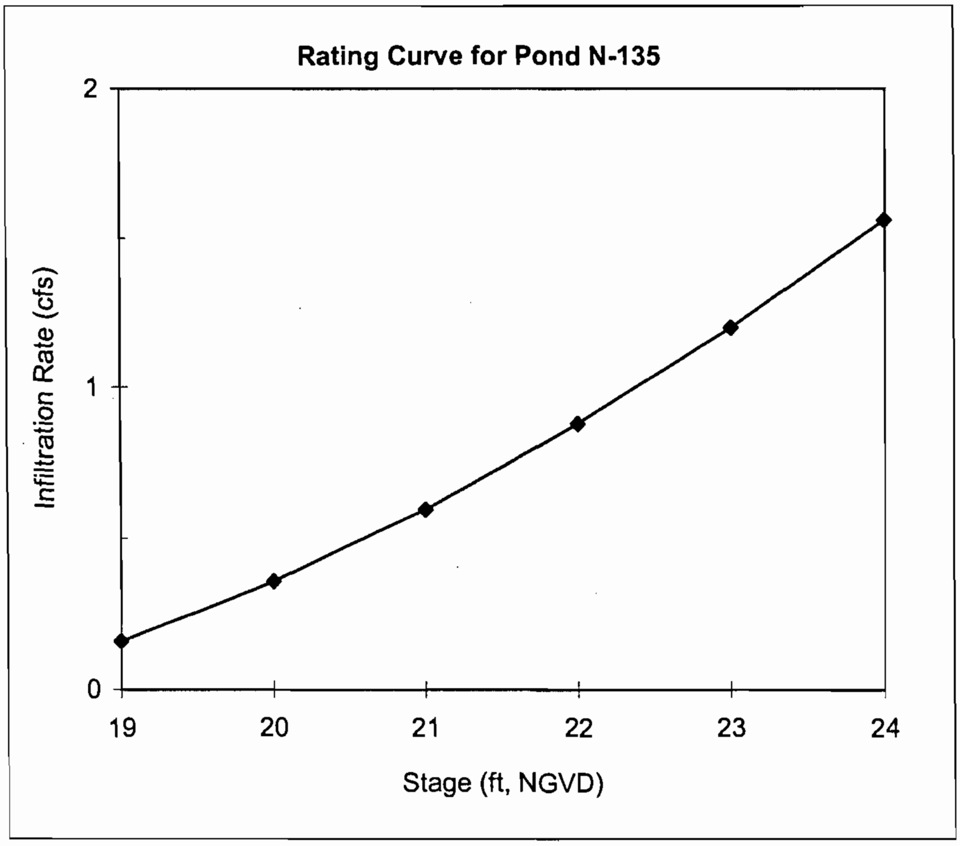
Rating Curve for Pond N-135

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.25	0.159
20.0	2.0	0.04	2.9E-05	0.28	0.358
21.0	3.0	0.06	4.4E-05	0.31	0.597
22.0	4.0	0.08	5.8E-05	0.35	0.878
23.0	5.0	0.10	7.3E-05	0.38	1.199
24.0	6.0	0.12	8.7E-05	0.41	1.560

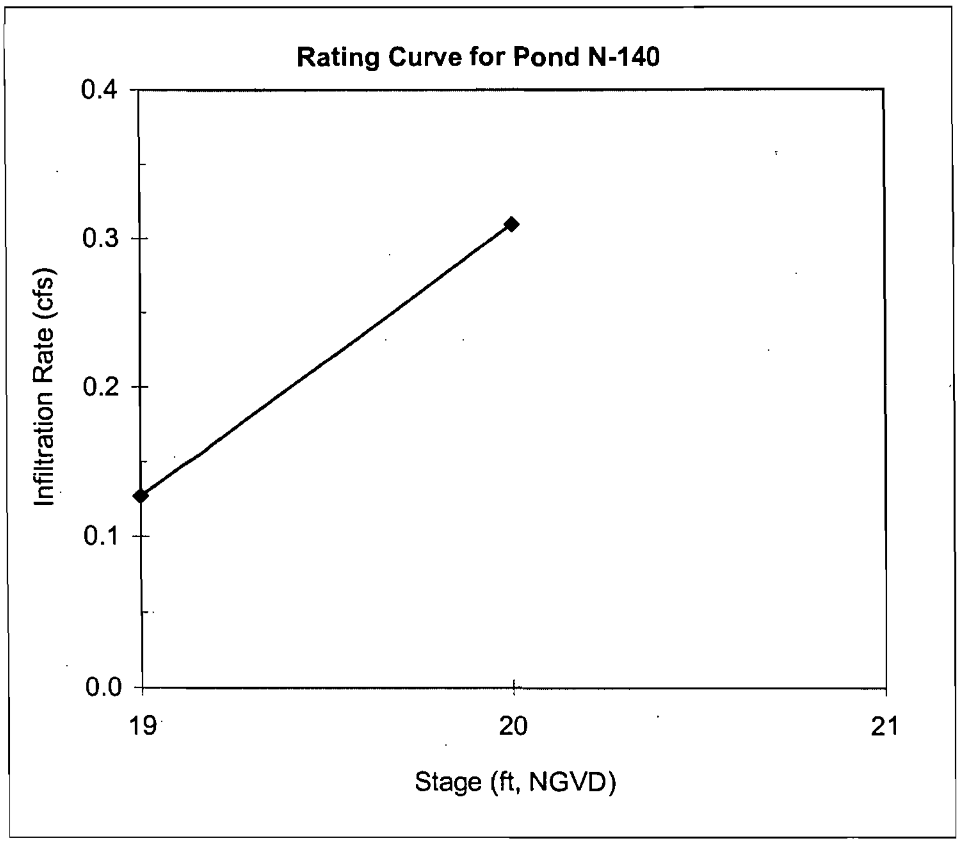


RPK
7/31/03

Rating Curve for Pond N-140

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.20	0.127
20.0	2.0	0.04	2.9E-05	0.24	0.310

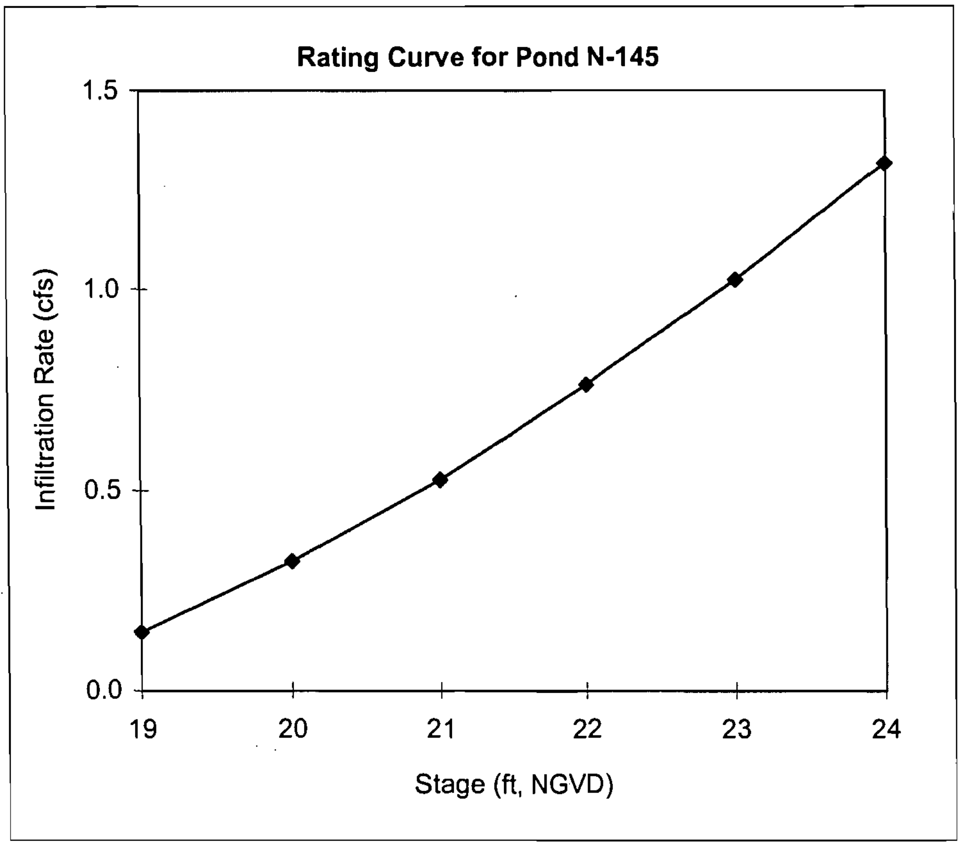


RPK
7/31/03

Rating Curve for Pond N-145

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.23	0.146
20.0	2.0	0.04	2.9E-05	0.25	0.321
21.0	3.0	0.06	4.4E-05	0.28	0.526
22.0	4.0	0.08	5.8E-05	0.30	0.760
23.0	5.0	0.10	7.3E-05	0.32	1.024
24.0	6.0	0.12	8.7E-05	0.35	1.317

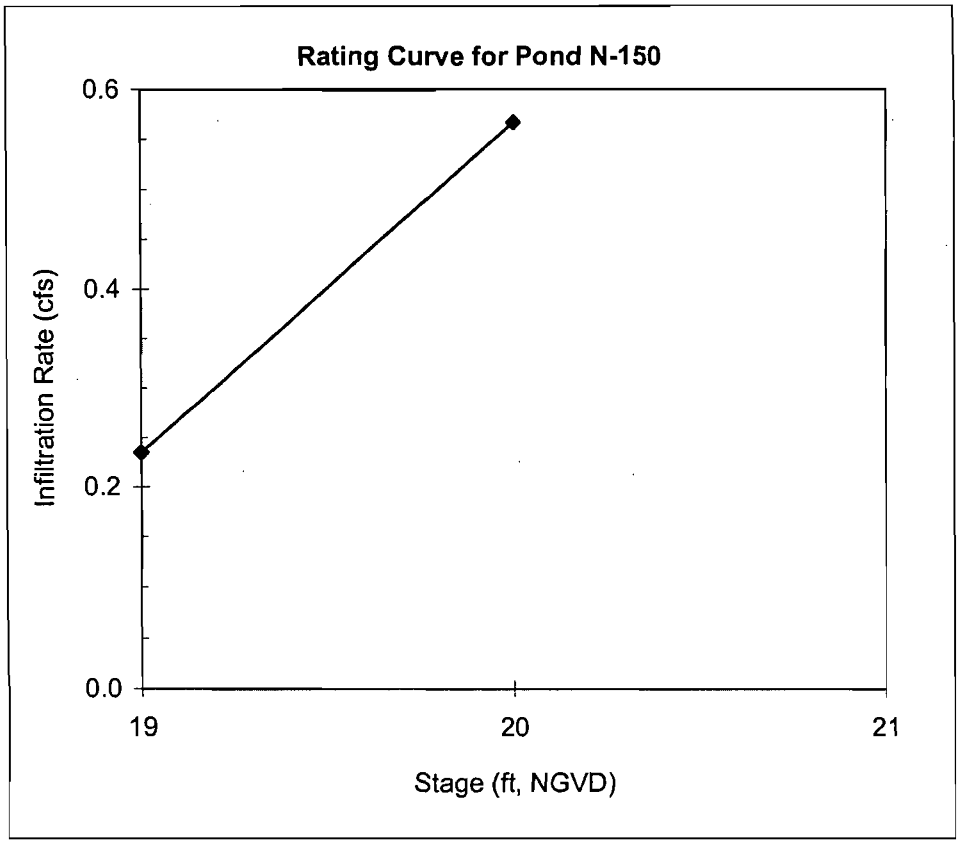


RPK
7/31/03

Rating Curve for Pond N-150

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.37	0.235
20.0	2.0	0.04	2.9E-05	0.45	0.567

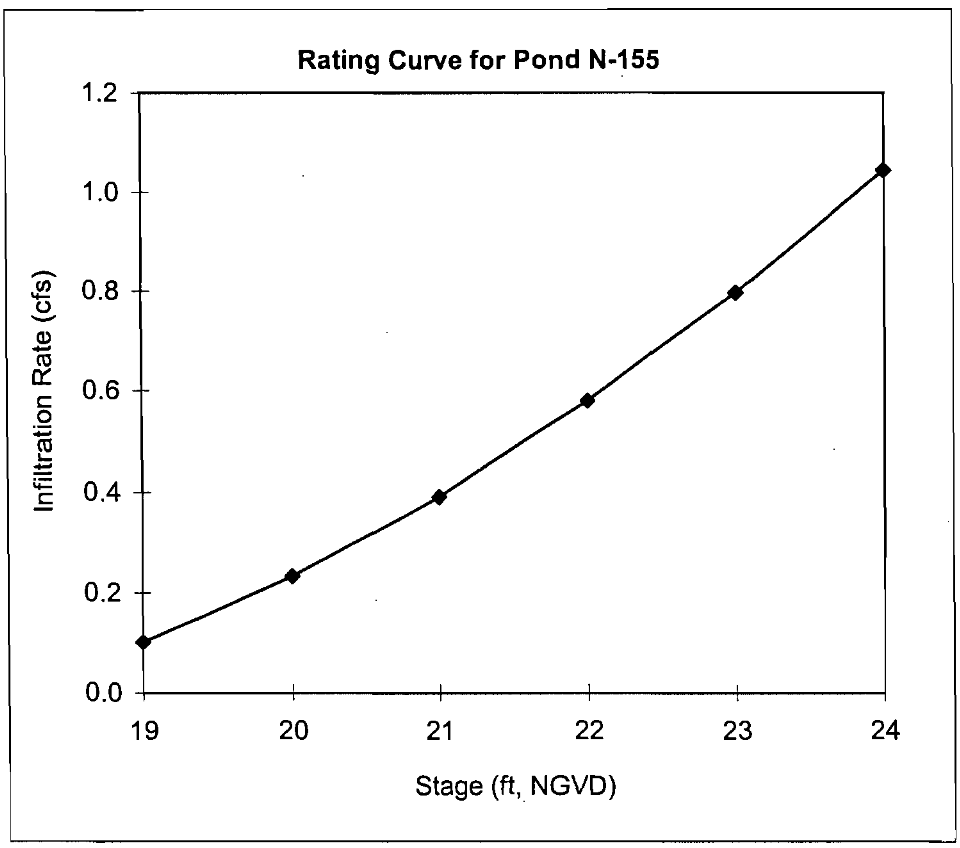


RPK
7/31/03

Rating Curve for Pond N-155

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.16	0.101
20.0	2.0	0.04	2.9E-05	0.18	0.232
21.0	3.0	0.06	4.4E-05	0.21	0.391
22.0	4.0	0.08	5.8E-05	0.23	0.579
23.0	5.0	0.10	7.3E-05	0.25	0.797
24.0	6.0	0.12	8.7E-05	0.27	1.043

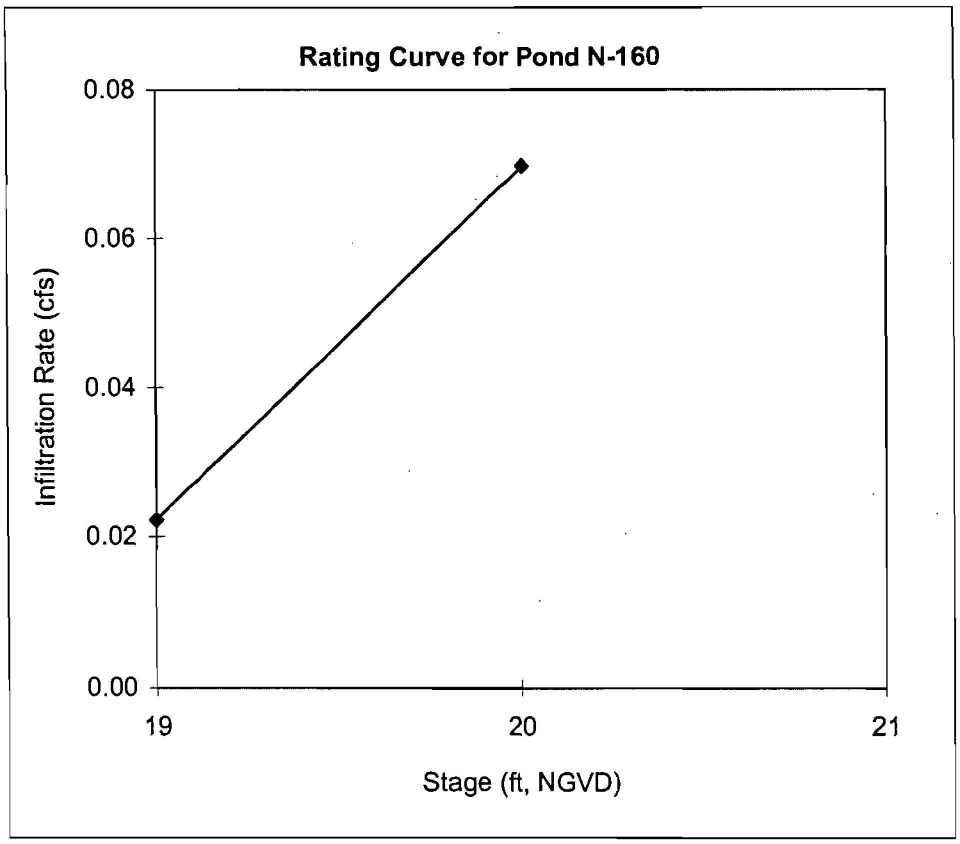


RPK
7/31/03

Rating Curve for Pond N-160

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.04	0.022
20.0	2.0	0.04	2.9E-05	0.06	0.070

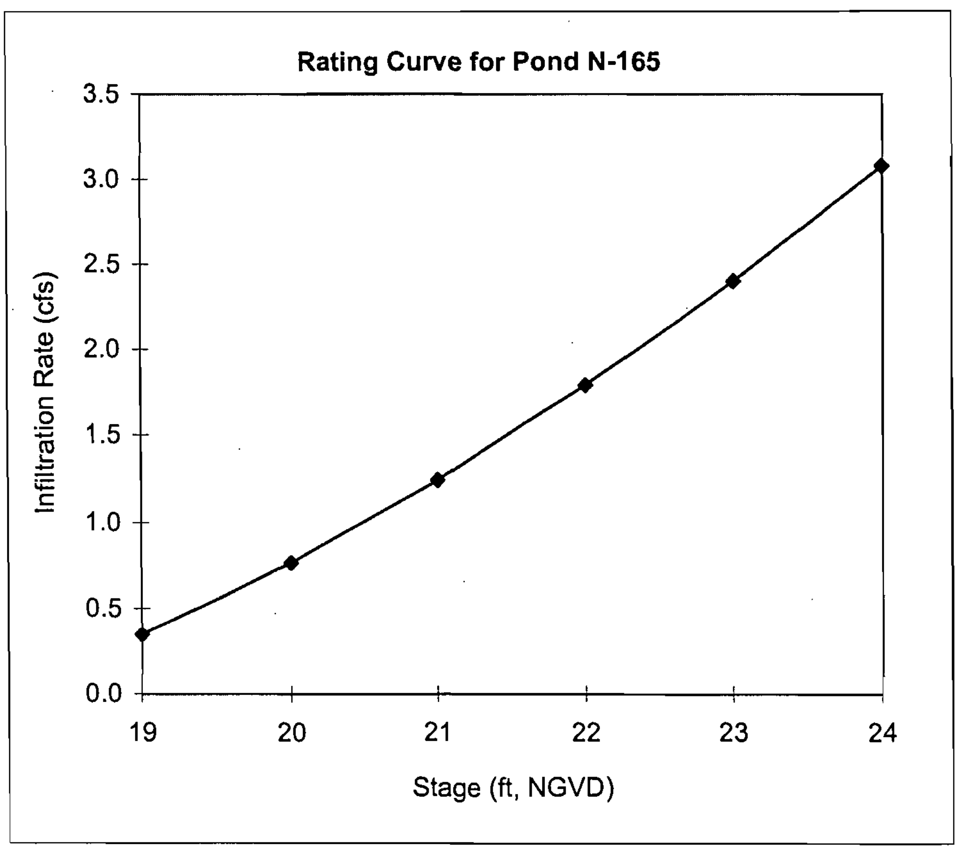


RPK
7/31/03

Rating Curve for Pond N-165

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	**Head (ft)**	**Gradient**	**Unit Infiltration $ft^3/s/ft^2$**	**Area acres**	**Infiltration cfs**
19.0	1.0	0.02	1.5E-05	0.55	0.349
20.0	2.0	0.04	2.9E-05	0.60	0.763
21.0	3.0	0.06	4.4E-05	0.65	1.244
22.0	4.0	0.08	5.8E-05	0.71	1.790
23.0	5.0	0.10	7.3E-05	0.76	2.401
24.0	6.0	0.12	8.7E-05	0.81	3.079

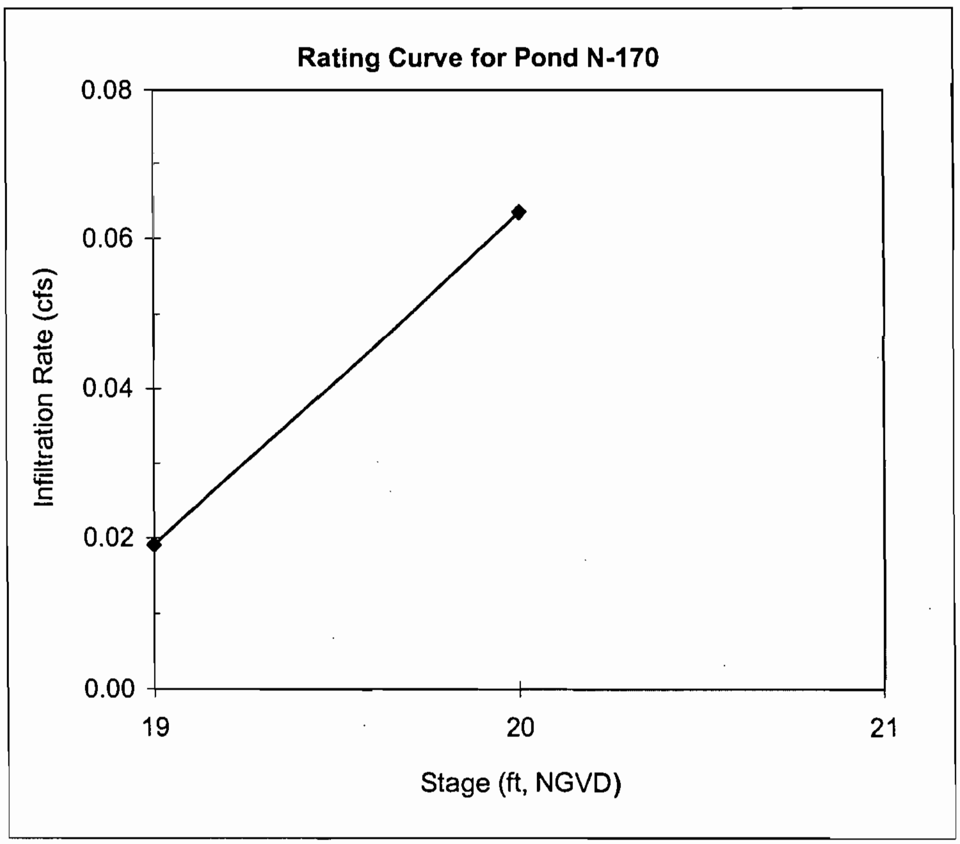


RPK
7/31/03

Rating Curve for Pond N-170

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	**Head (ft)**	**Gradient**	**Unit Infiltration $ft^3/s/ft^2$**	**Area acres**	**Infiltration cfs**
19.0	1.0	0.02	1.5E-05	0.03	0.019
20.0	2.0	0.04	2.9E-05	0.05	0.063

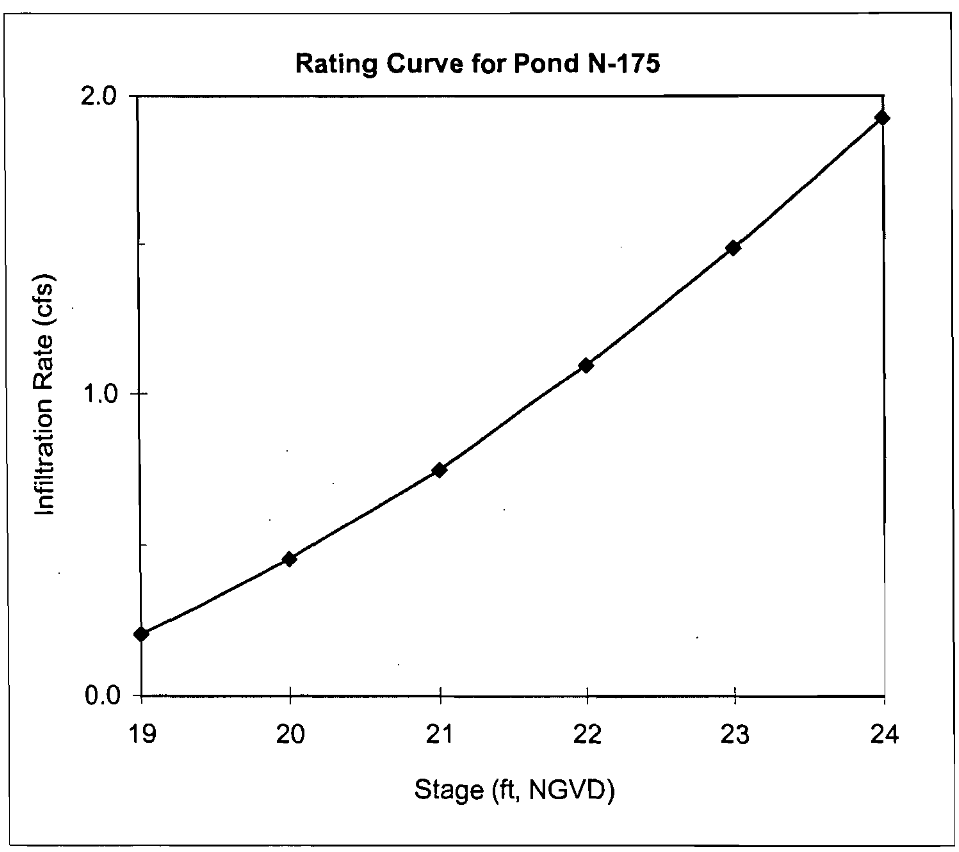


RPK
7/31/03

Rating Curve for Pond N-175

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.32	0.203
20.0	2.0	0.04	2.9E-05	0.36	0.453
21.0	3.0	0.06	4.4E-05	0.39	0.750
22.0	4.0	0.08	5.8E-05	0.43	1.095
23.0	5.0	0.10	7.3E-05	0.47	1.487
24.0	6.0	0.12	8.7E-05	0.51	1.926

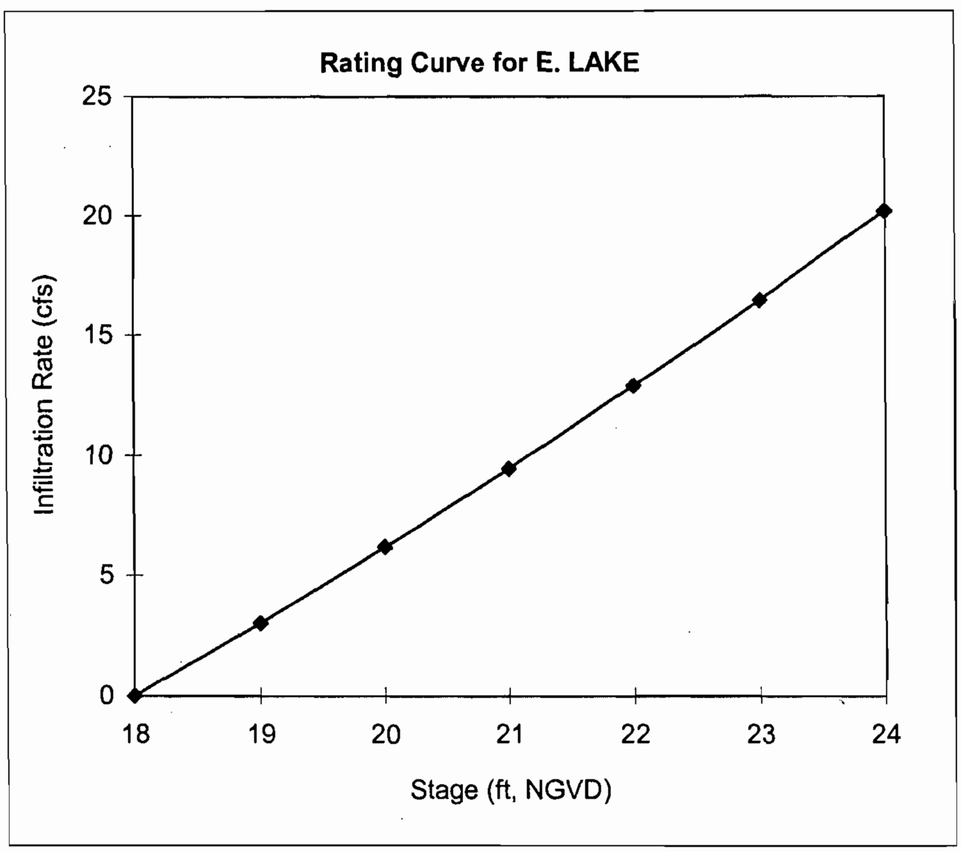


RPK
7/31/03

Rating Curve for East Lake

Hydraulic Conductivity	**(k)**	ft/sec	**7.28E-04**
Hydraulic Conductivity	**(k)**	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**100**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
18.0	0.0	0.00	0.0E+00	9.28	0.000
19.0	1.0	0.01	7.3E-06	9.50	3.012
20.0	2.0	0.02	1.5E-05	9.72	6.165
21.0	3.0	0.03	2.2E-05	9.94	9.459
22.0	4.0	0.04	2.9E-05	10.17	12.894
23.0	5.0	0.05	3.6E-05	10.39	16.470
24.0	6.0	0.06	4.4E-05	10.61	20.188



RPK
7/31/03

Exhibit F

Hydrographs for Temporary Conditions

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]
Copyright 1995, Streamline Technologies, Inc.

Solid Waste Authority
Lime Recalcination & Biosolids Facilties
Temporary Conditions: 25-Year 72-Hour Storm

********** Basin Summary - LRFTMP25 **

***

Basin Name:	T-100	T-105	T-110	T-115	T-120
Group Name:	BASE	BASE	BASE	BASE	BASE
Node Name:	TN-100	TN-105	TN-110	TN-115	TN-120
Hydrograph Type:	UH	UH	UH	UH	UH
Unit Hydrograph:	UH323	UH323	UH323	UH323	UH323
Peaking Factor:	323.00	323.00	323.00	323.00	323.00
Spec Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Comp Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72	SFWMD72	SFWMD72	SFWMD72
Rainfall Amount (in):	14.00	14.00	14.00	14.00	14.00
Storm Duration (hr):	72.00	72.00	72.00	72.00	72.00
Status:	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00	6.00	6.00	6.00
Lag Time (hr):	0.00	0.00	0.00	0.00	0.00
Area (acres):	1.99	0.78	0.82	0.52	1.28
Vol of Unit Hyd (in):	1.00	1.00	1.00	1.00	1.00
Curve Number:	80.67	97.87	84.40	96.54	71.59
DCIA (%):	0.00	0.00	0.00	0.00	0.00
Time Max (hrs):	60.00	60.00	60.00	60.00	60.00
Flow Max (cfs):	13.39	5.50	5.62	3.65	8.12
Runoff Volume (in):	11.49	13.75	12.01	13.58	10.16
Runoff Volume (cf):	82875	38975	35786	25543	47055

***

Basin Name:	T-125	T-130	T-135	T-140	T-145
Group Name:	BASE	BASE	BASE	BASE	BASE
Node Name:	TN-125	TN-130	TN-135	TN-140	TN-145
Hydrograph Type:	UH	UH	UH	UH	UH
Unit Hydrograph:	UH323	UH323	UH323	UH323	UH323
Peaking Factor:	323.00	323.00	323.00	323.00	323.00
Spec Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Comp Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72	SFWMD72	SFWMD72	SFWMD72
Rainfall Amount (in):	14.00	14.00	14.00	14.00	14.00
Storm Duration (hr):	72.00	72.00	72.00	72.00	72.00
Status:	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00	6.00	6.00	6.00
Lag Time (hr):	0.00	0.00	0.00	0.00	0.00
Area (acres):	0.65	1.67	0.55	0.88	0.42
Vol of Unit Hyd (in):	1.00	1.00	1.00	1.00	1.00
Curve Number:	97.87	75.97	96.41	81.46	96.90
DCIA (%):	0.00	0.00	0.00	0.00	0.00
Time Max (hrs):	60.00	60.00	60.00	60.00	60.00
Flow Max (cfs):	4.61	10.98	3.87	5.93	2.93

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [2]

Solid Waste Authority
Lime Recalcination & Biosolids Facilties
Temporary Conditions: 25-Year 72-Hour Storm

********** Basin Summary - LRFTMP25 **

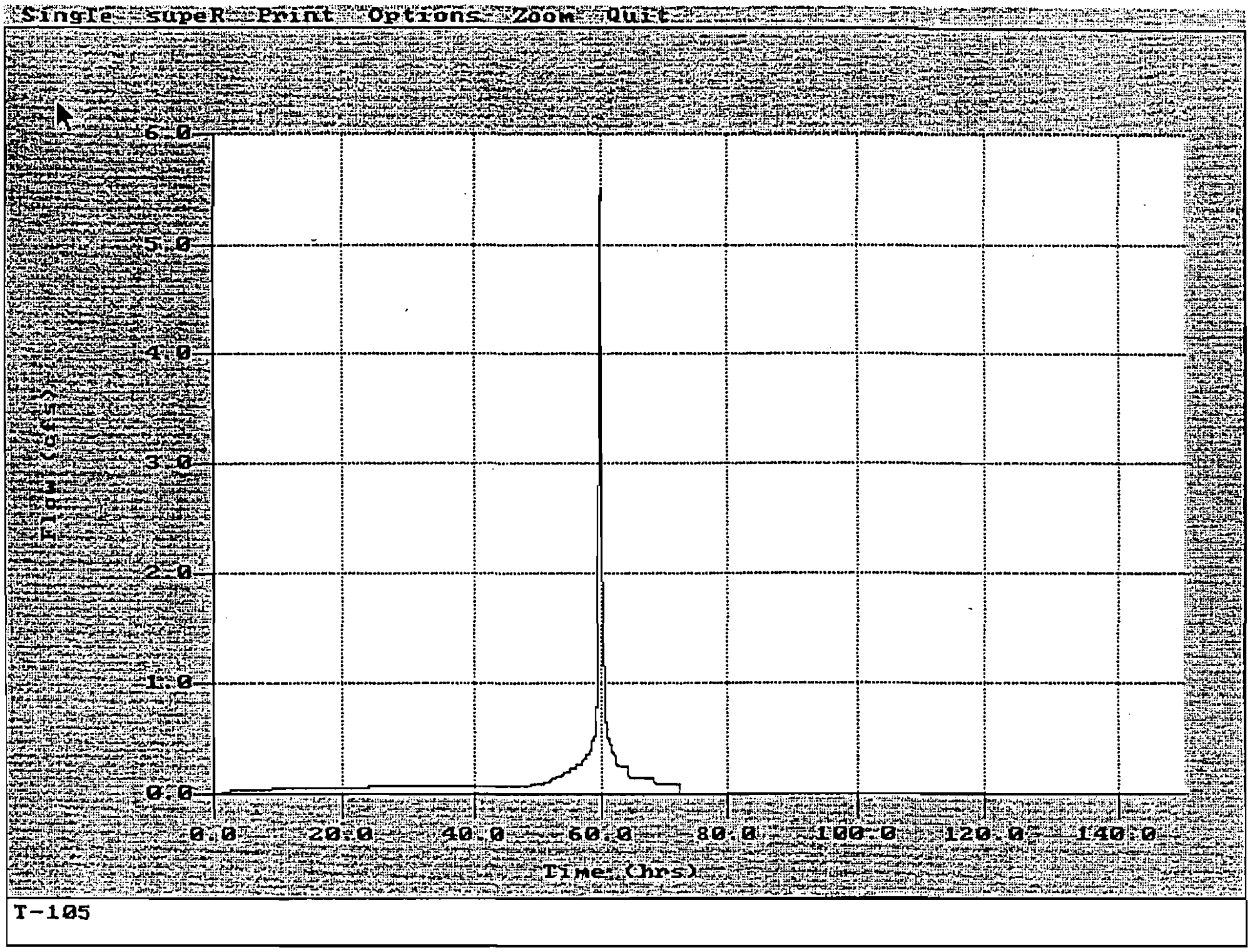
Runoff Volume (in):	13.75	10.81	13.57	11.60	13.63
Runoff Volume (cf):	32638	65673	27089	36890	20581

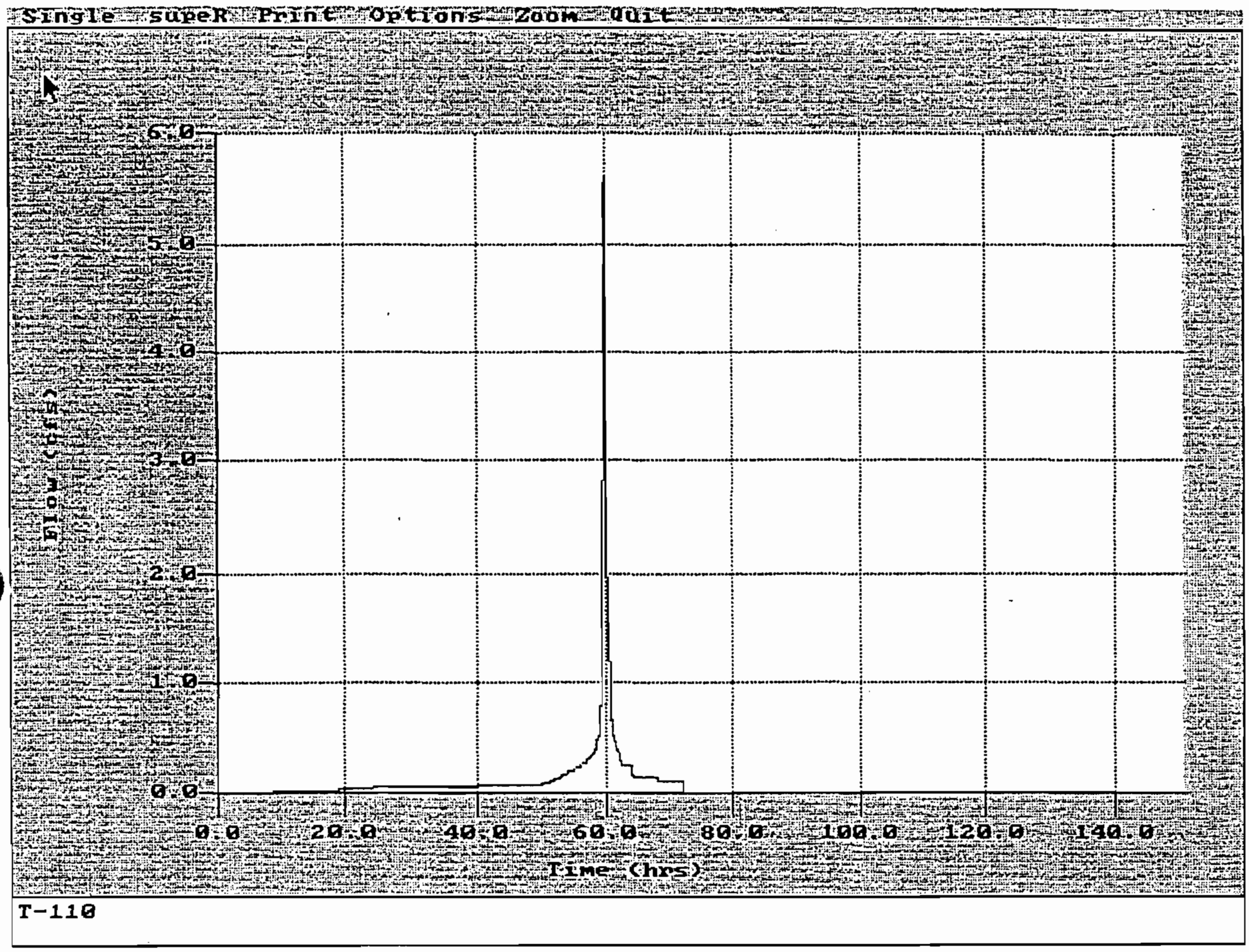
***

Basin Name:	T-150	T-155	T-160	T-165	T-170
Group Name:	BASE	BASE	BASE	BASE	BASE
Node Name:	TN-150	TN-155	TN-160	TN-165	TN-170
Hydrograph Type:	UH	UH	UH	UH	UH
Unit Hydrograph:	UH323	UH323	UH323	UH323	UH323
Peaking Factor:	323.00	323.00	323.00	323.00	323.00
Spec Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Comp Time Inc (min):	0.80	0.80	0.80	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72	SFWMD72	SFWMD72	SFWMD72
Rainfall Amount (in):	14.00	14.00	14.00	14.00	14.00
Storm Duration (hr):	72.00	72.00	72.00	72.00	72.00
Status:	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00	6.00	6.00	6.00
Lag Time (hr):	0.00	0.00	0.00	0.00	0.00
Area (acres):	0.88	0.27	0.78	0.99	0.76
Vol of Unit Hyd (in):	1.00	1.00	1.00	1.00	1.00
Curve Number:	86.47	96.41	76.73	96.17	82.45
DCIA (%):	0.00	0.00	0.00	0.00	0.00
Time Max (hrs):	60.00	60.00	60.00	60.00	60.00
Flow Max (cfs):	6.05	1.91	5.13	6.93	5.20
Runoff Volume (in):	12.29	13.57	10.93	13.54	11.74
Runoff Volume (cf):	39074	13348	30814	48408	32599

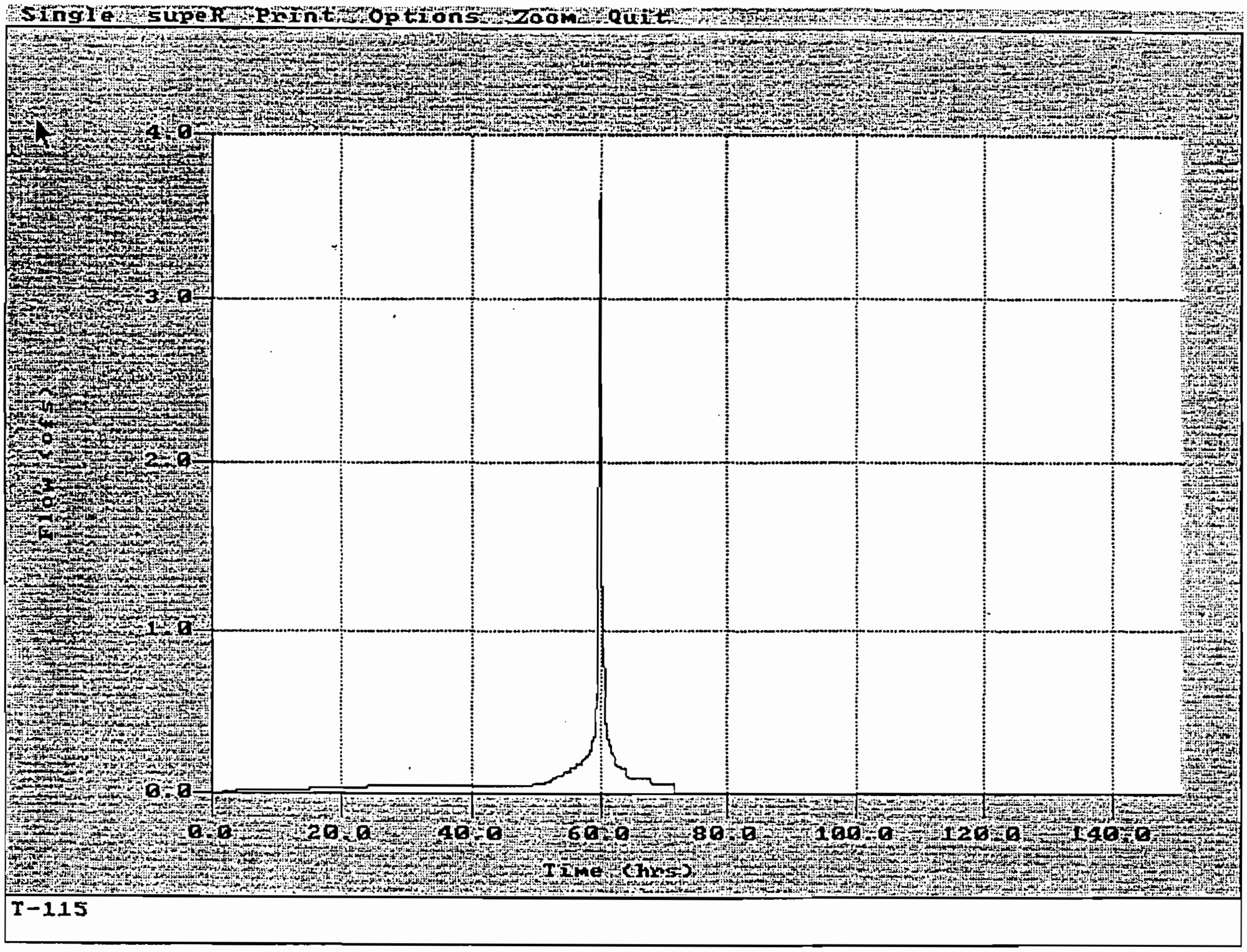
***

Basin Name:	T-175	E.LAKE
Group Name:	BASE	BASE
Node Name:	TN-175	E.LAKE
Hydrograph Type:	UH	UH
Unit Hydrograph:	UH323	UH484
Peaking Factor:	323.00	484.00
Spec Time Inc (min):	0.80	0.80
Comp Time Inc (min):	0.80	0.80
Rainfall File:	SFWMD72	SFWMD72
Rainfall Amount (in):	14.00	14.00
Storm Duration (hr):	72.00	72.00
Status:	ONSITE	ONSITE
Time of Conc. (min):	6.00	6.00
Lag Time (hr):	0.00	0.00
Area (acres):	0.77	14.01
Vol of Unit Hyd (in):	1.00	1.00
Curve Number:	95.71	94.79


Single superR Print Options Zoom Quit
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
T-105


Single superR Print Options Zoom Quit
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
T-110

BEST AVAILABLE COPY



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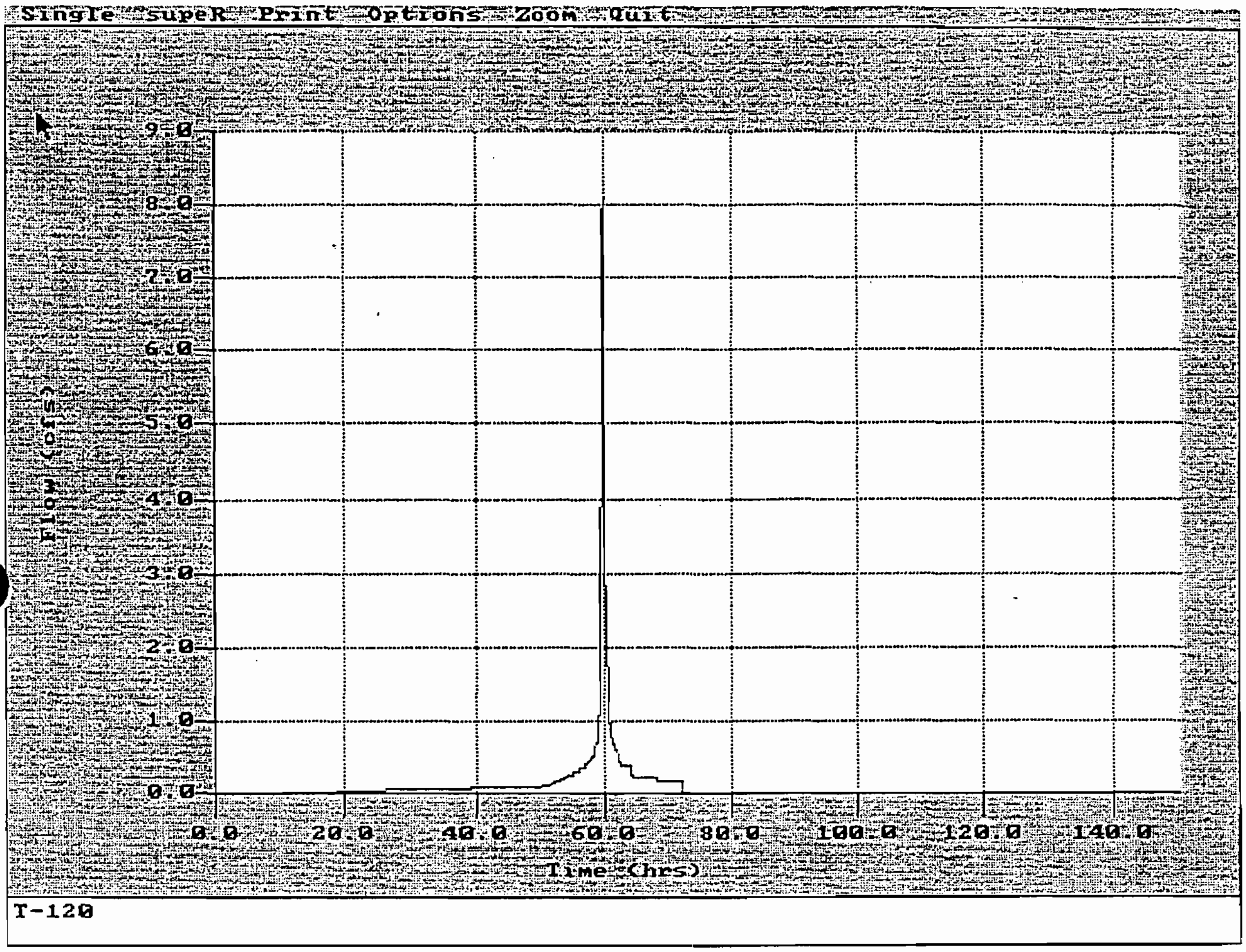
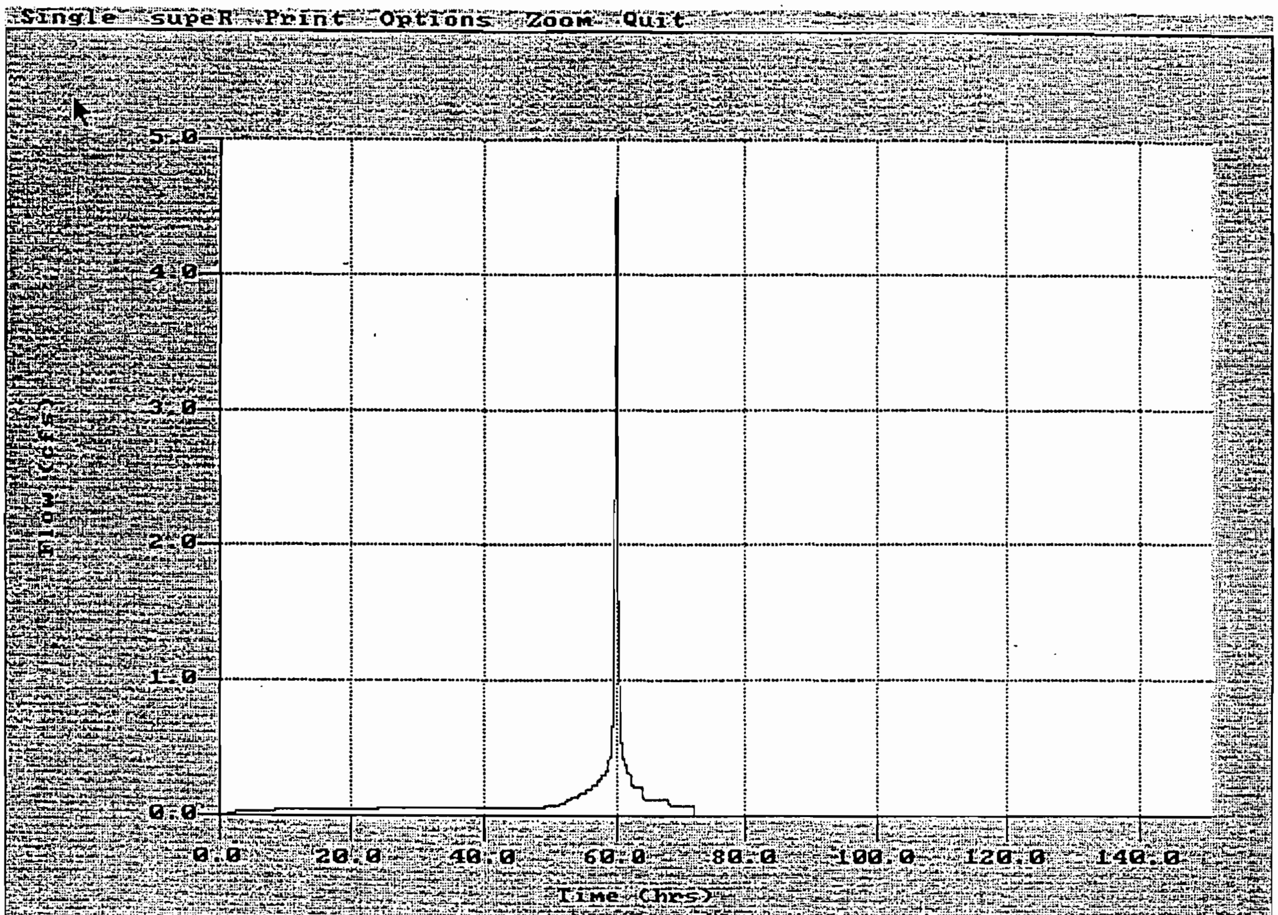
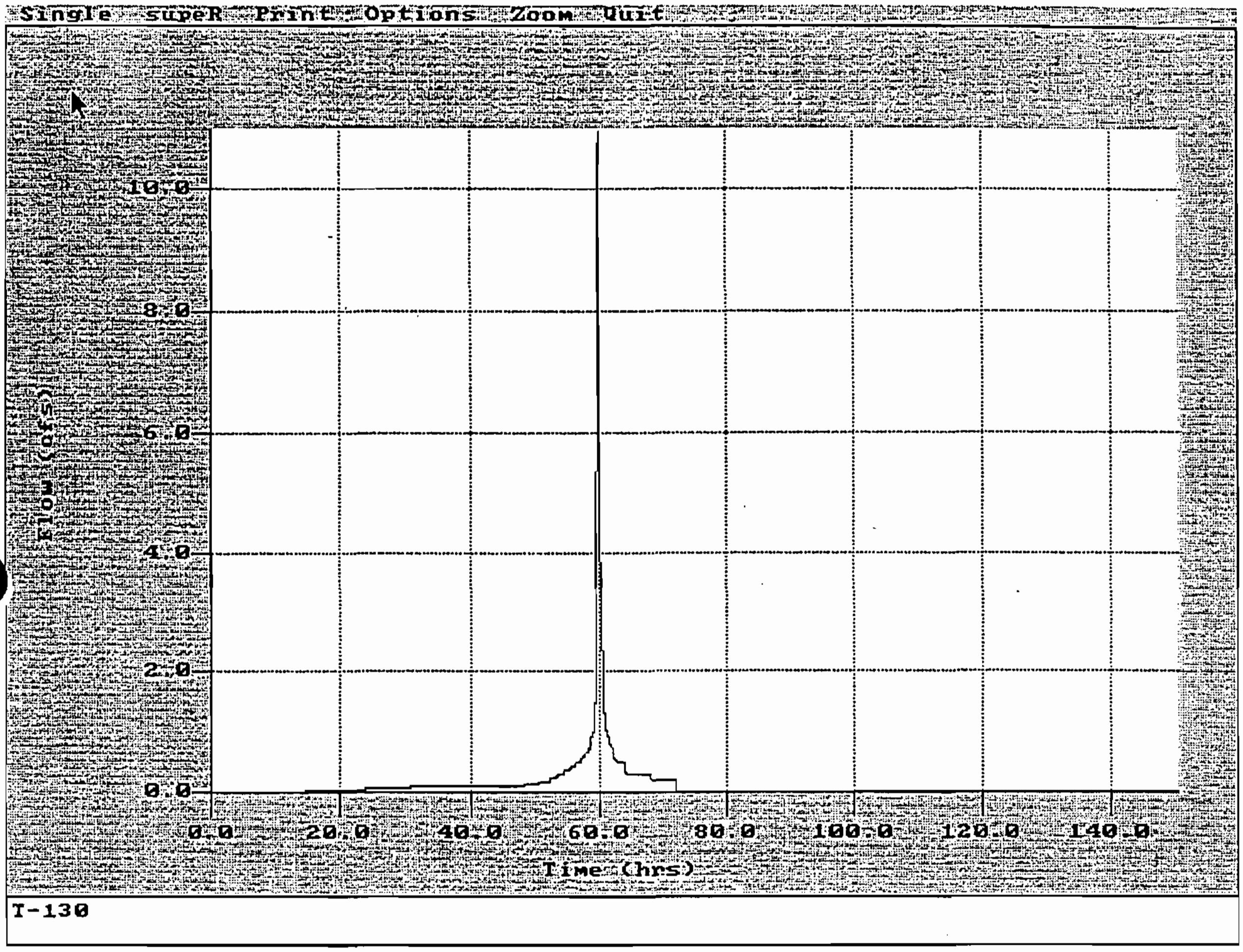




Single supeR Print Options Zoom Quit
5.0
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)

T-125

BEST AVAILABLE COPY



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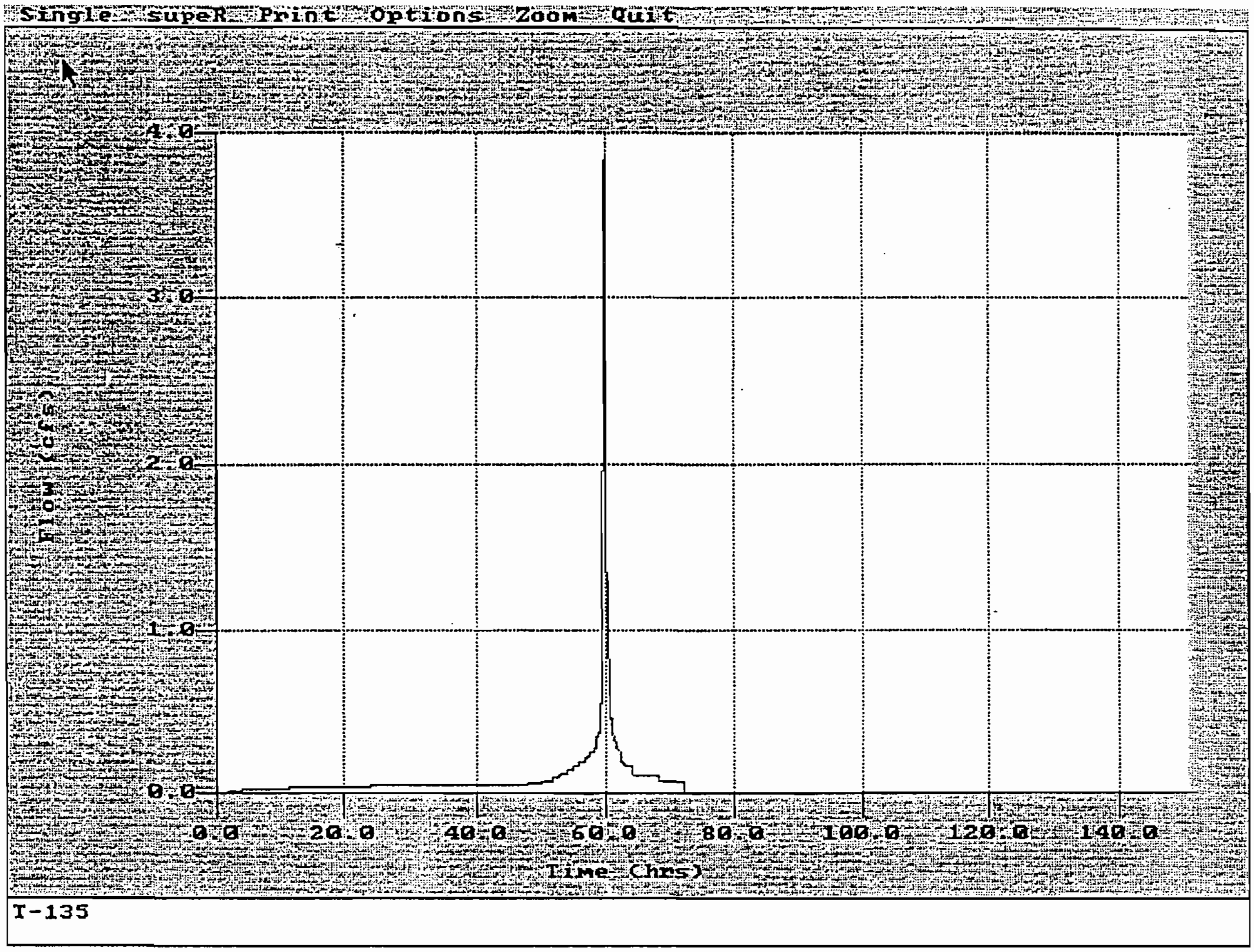

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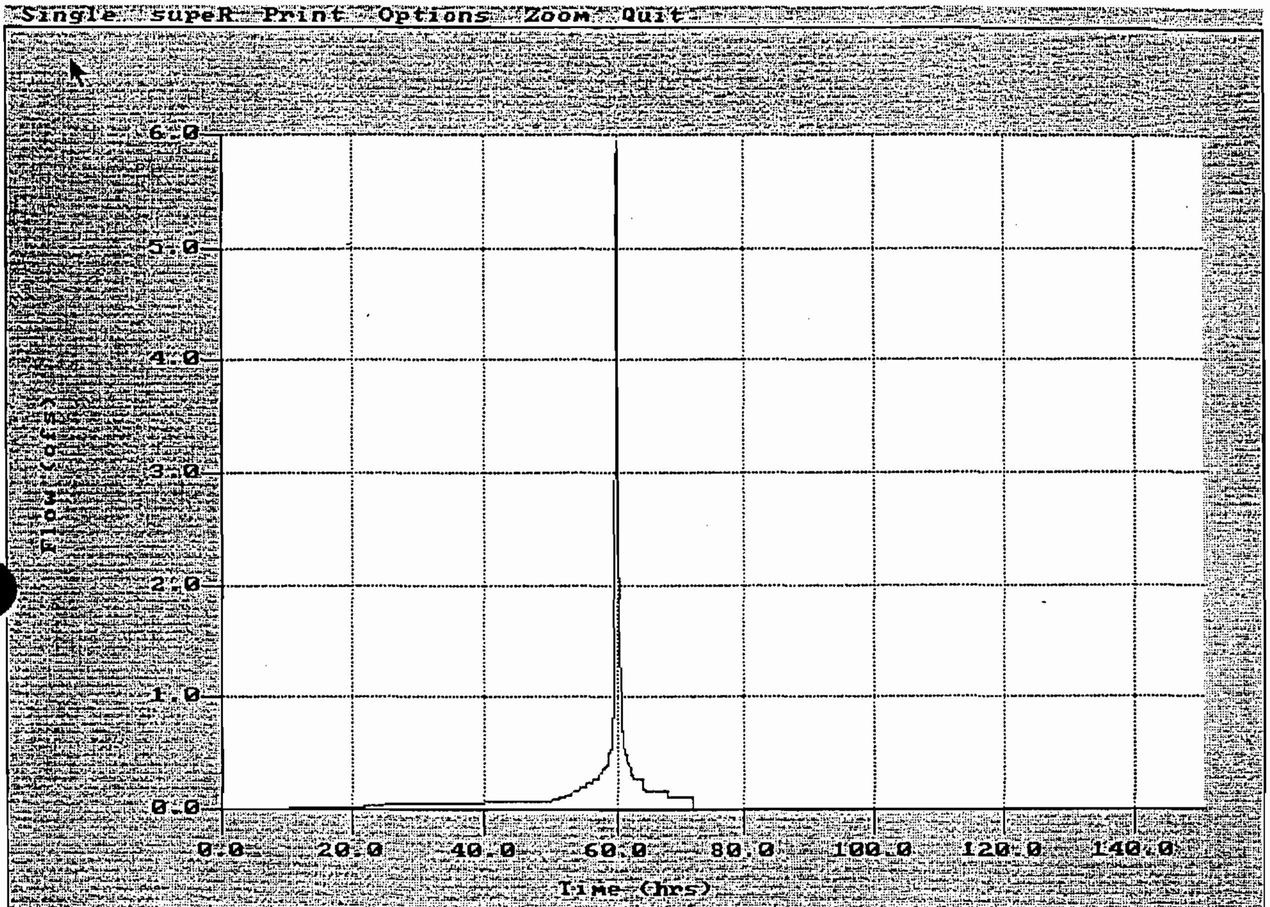
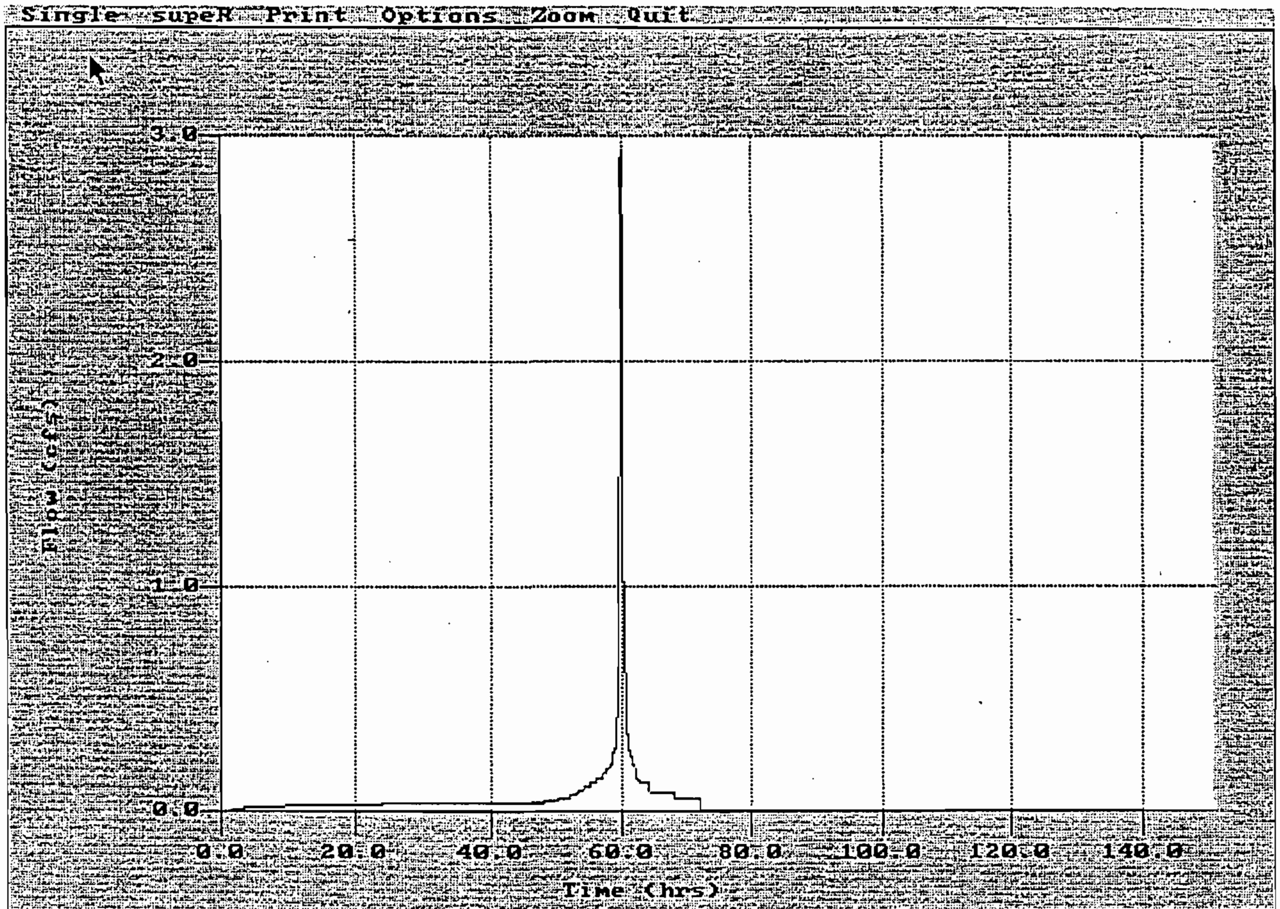


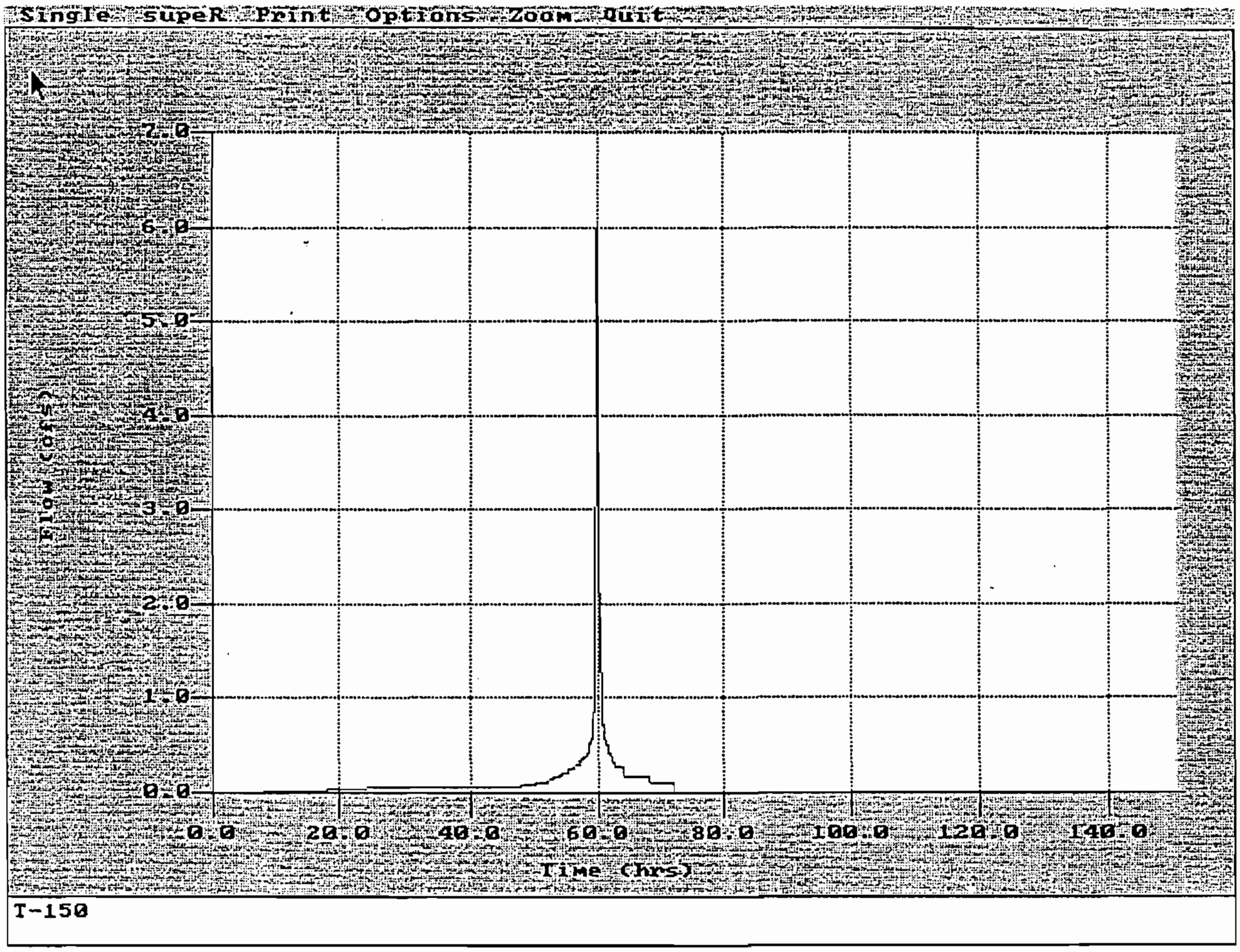
T-140

BEST AVAILABLE COPY



T-145

BEST AVAILABLE COPY



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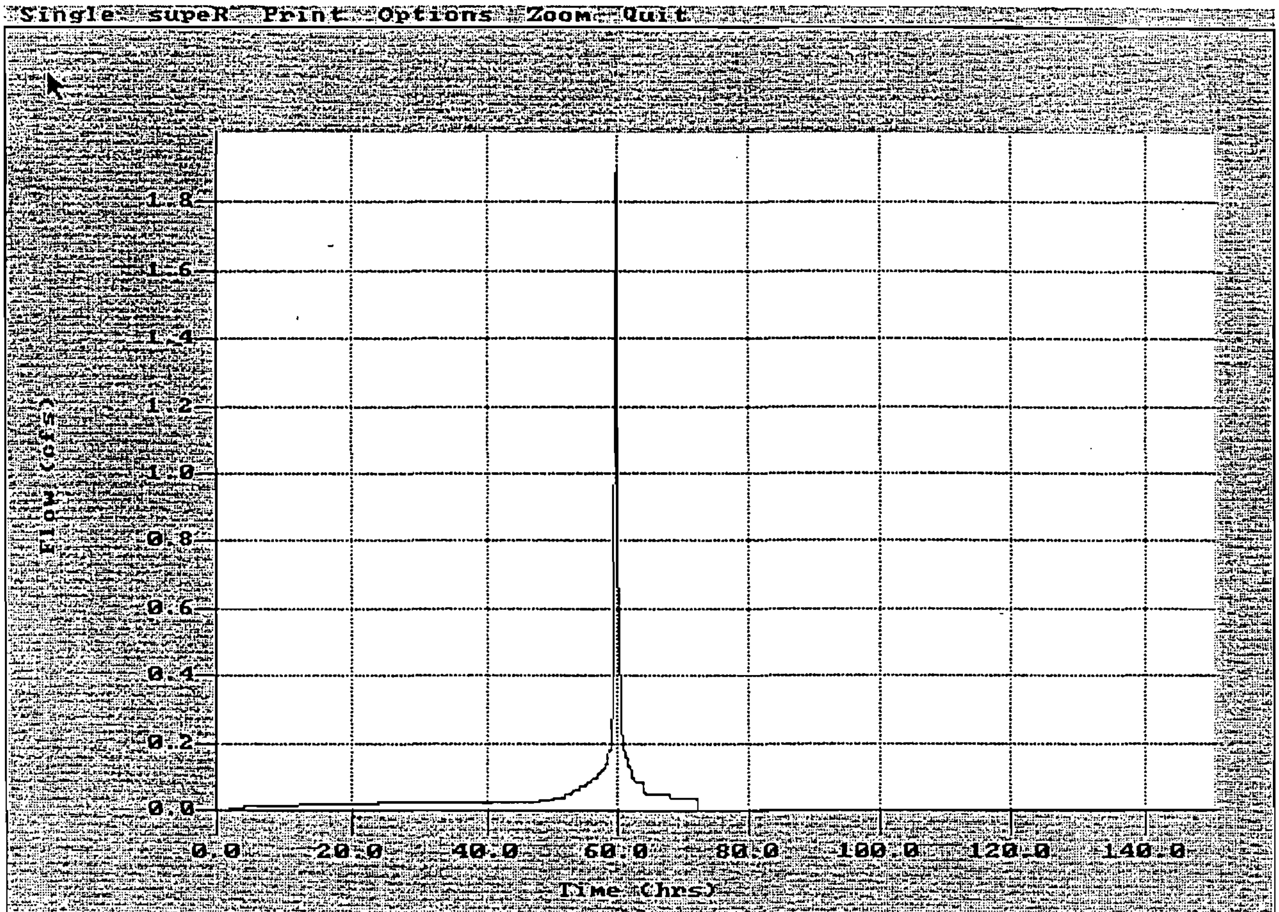
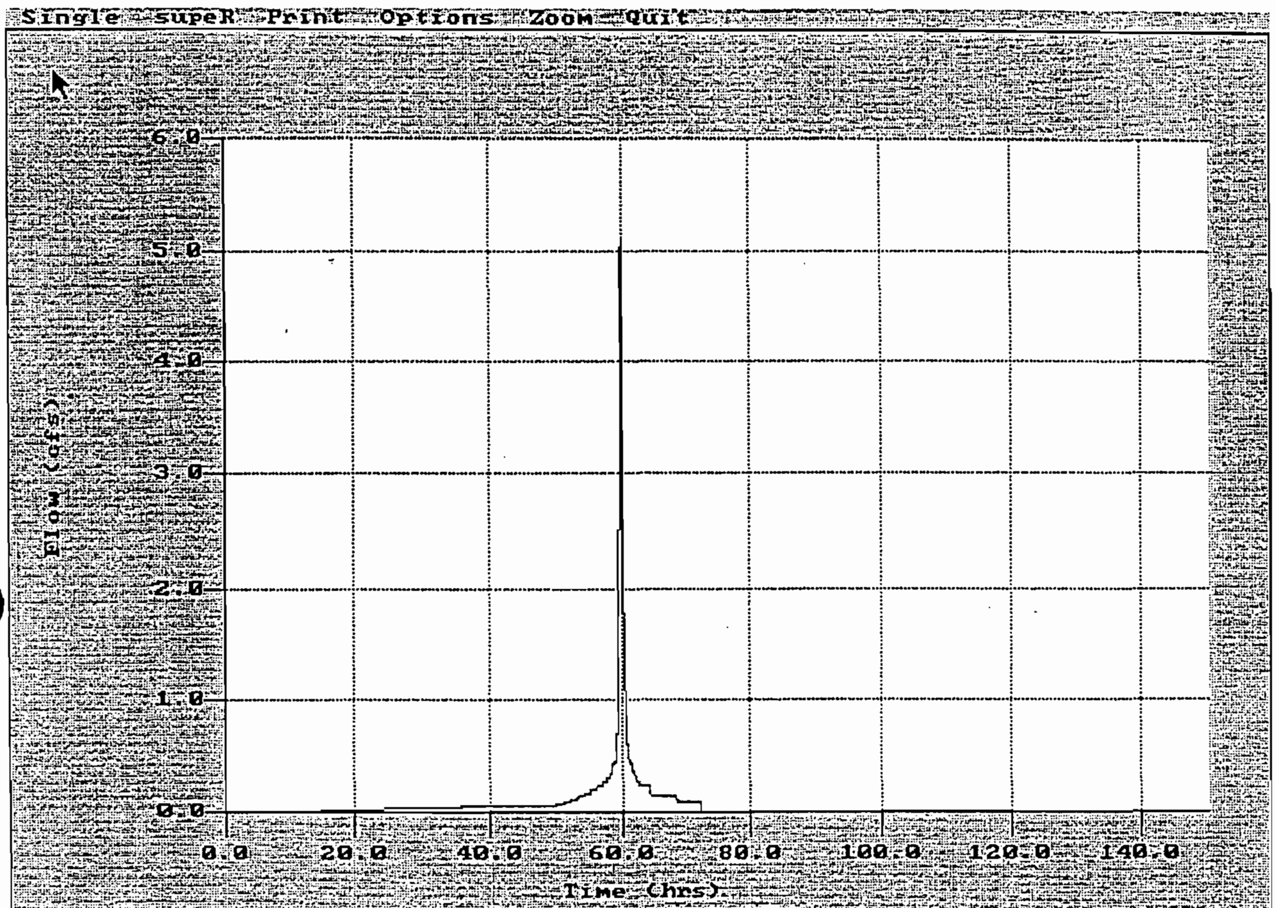
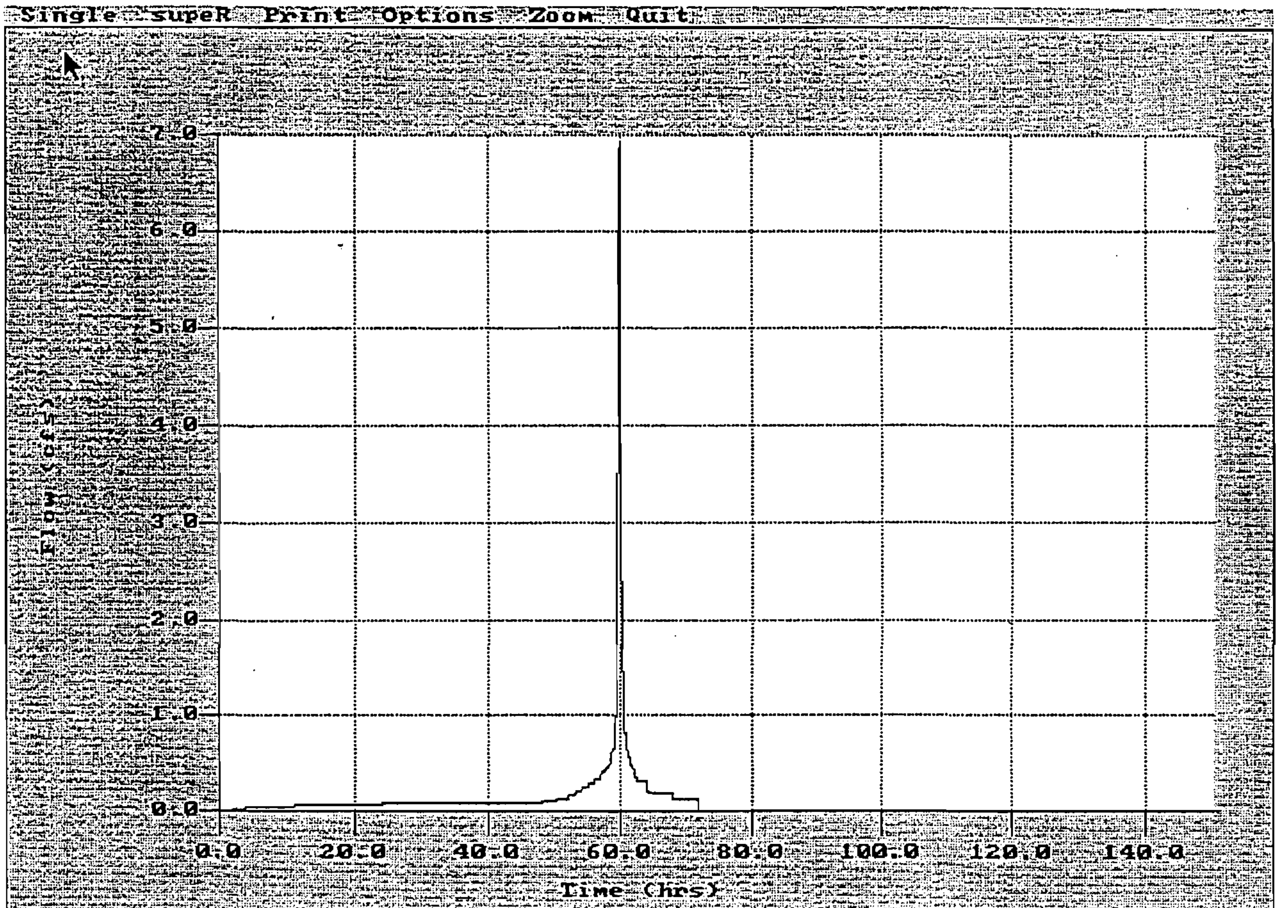


T-155


Single superR Print Options Zoom Quit
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Flow (cfs)
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)

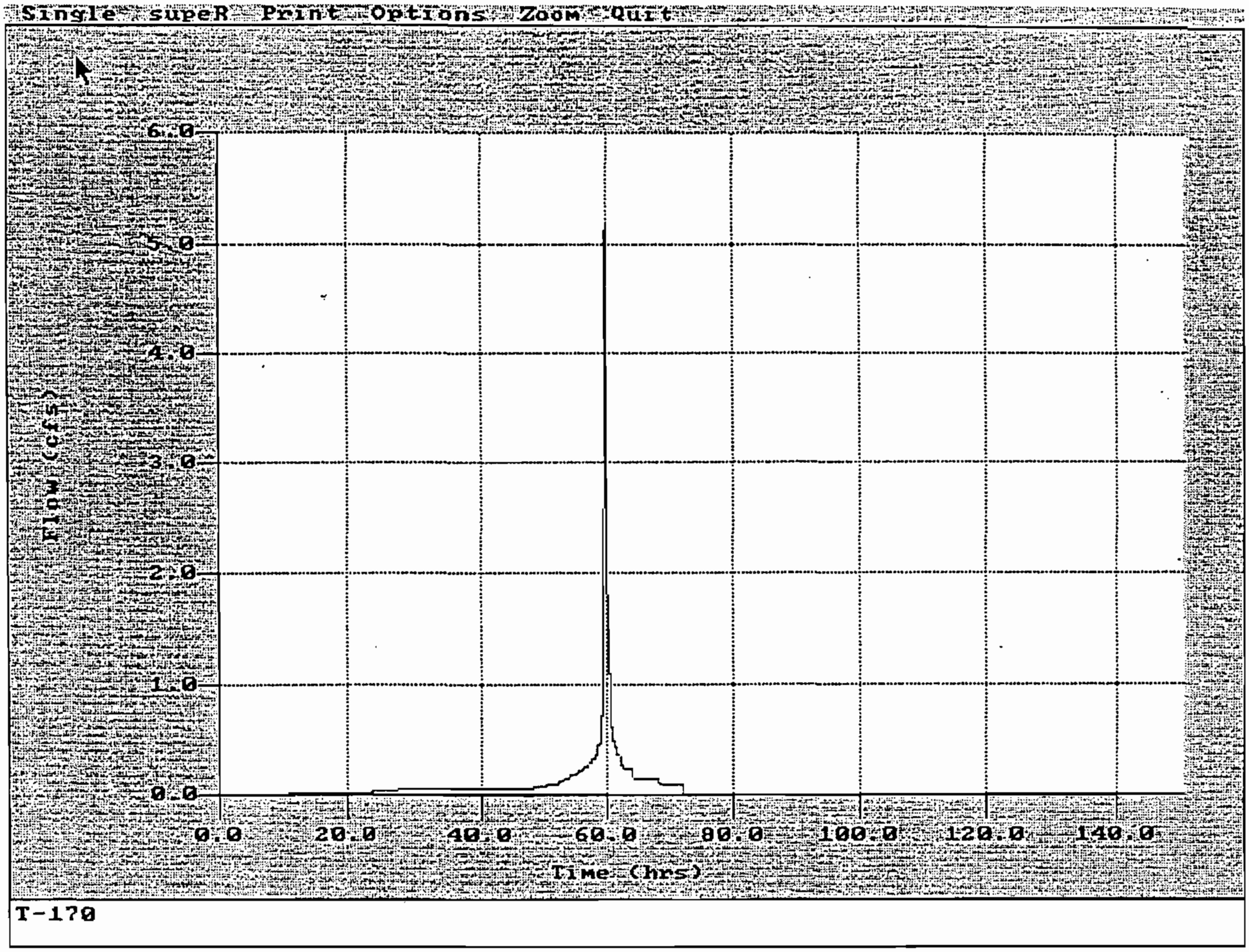
T-160

BEST AVAILABLE COPY

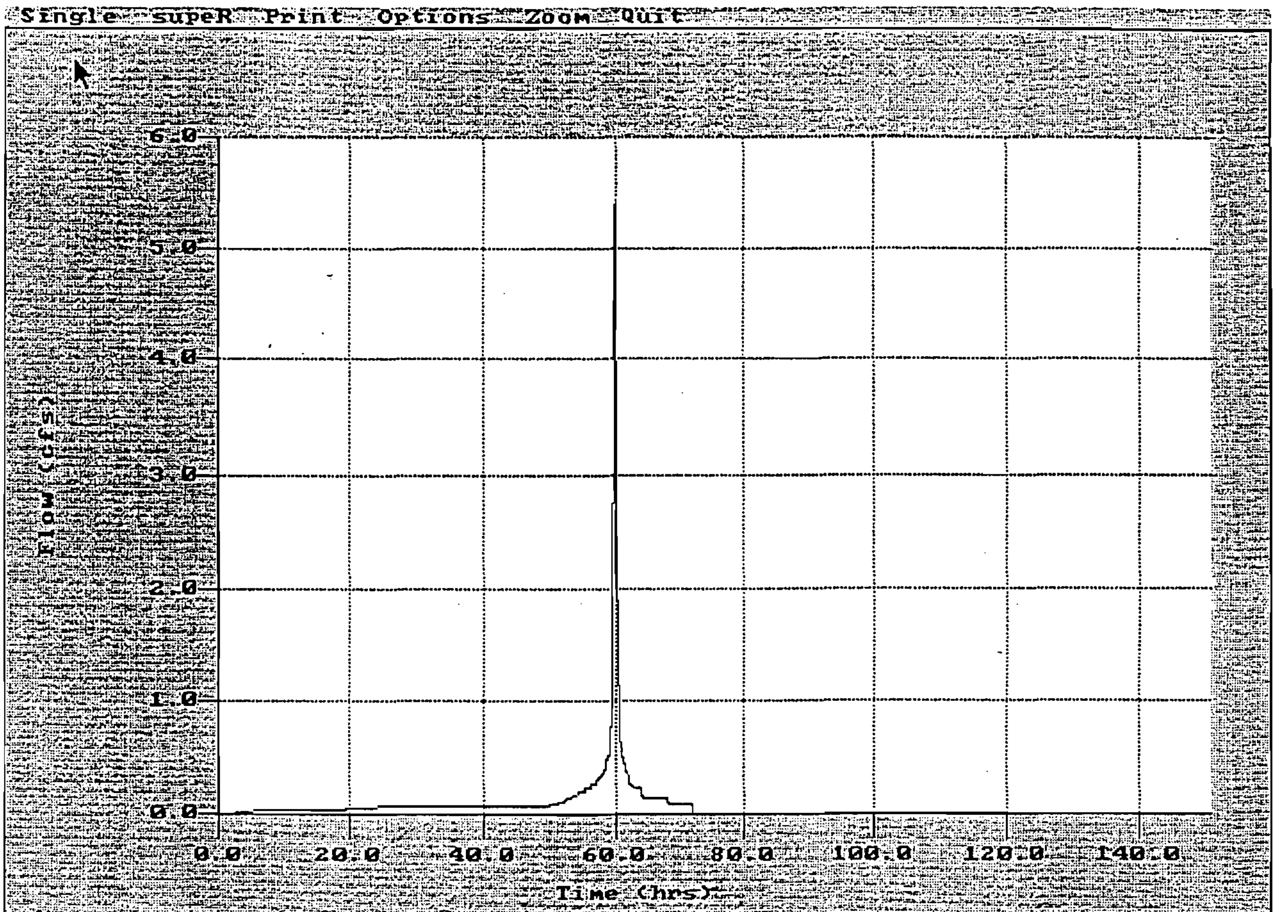


T-165

BEST AVAILABLE COPY



BEST AVAILABLE COPY



T-175

BEST AVAILABLE COPY

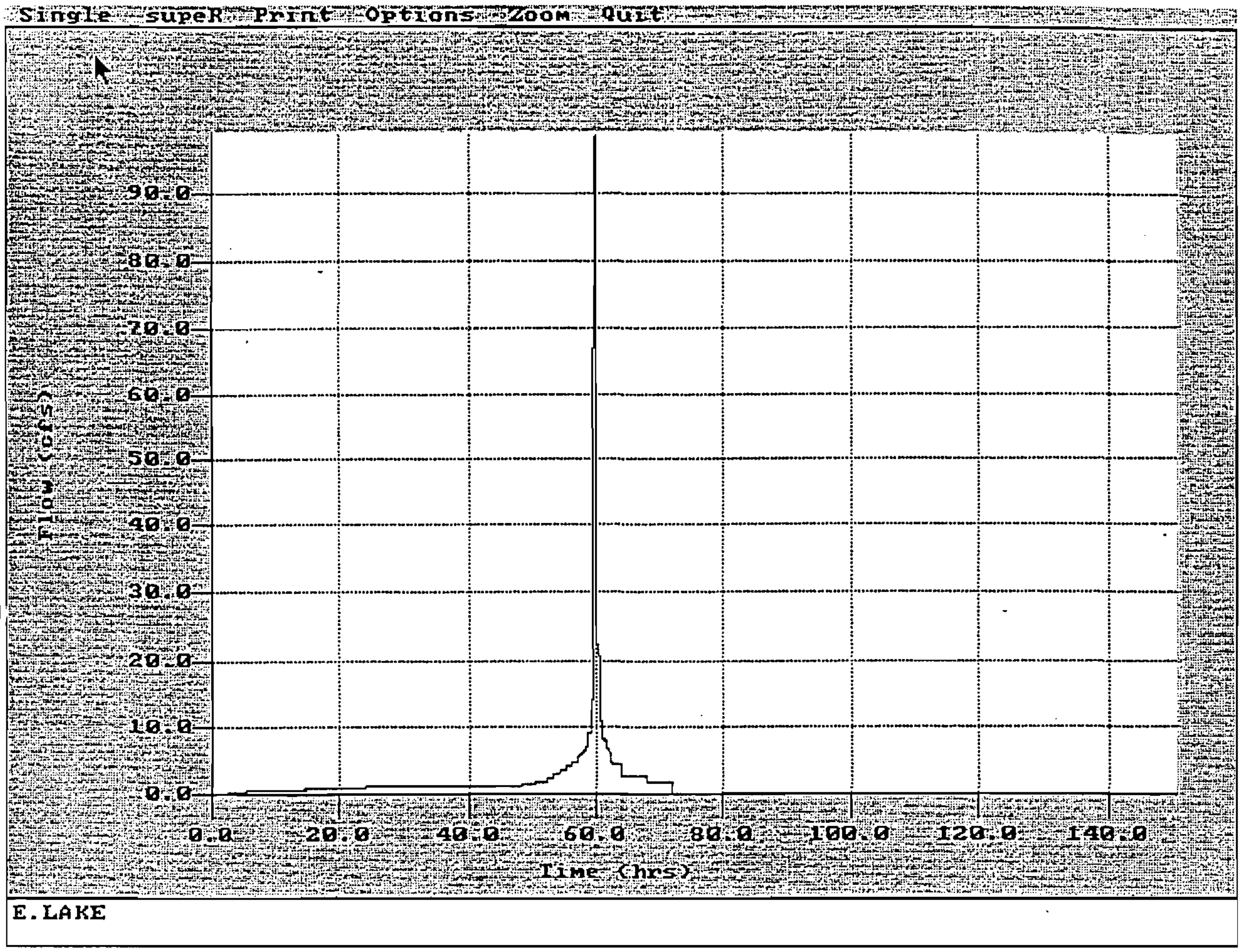


Exhibit G

Hydraulic Input Data for Temporary Conditions

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]
Copyright 1995, Streamline Technologies, Inc.

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Node-------------------------------------------------------------
   Name: BOUNDARY   Base Flow(cfs): 0          Init Stage(ft): 18
  Group: BASE                                  Warn Stage(ft): 22
Comment:

Time(hrs)    Stage(ft)
0            18
62           20
80           19
--------Class: Node-------------------------------------------------------------
   Name: E.LAKE     Base Flow(cfs): 0          Init Stage(ft): 18
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
6            1.55
7            3.2
8            5.93
16           8.83
24           10.61
--------Class: Node-------------------------------------------------------------
   Name: TN-100     Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.5
20           0.61
--------Class: Node-------------------------------------------------------------
   Name: TN-105     Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.4
20           0.44
21           0.49
22           0.53
23           0.58
24           0.62
--------Class: Node-------------------------------------------------------------
   Name: TN-110     Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.13
20           0.18
```

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [2]

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

```
********** Input Report ***********************************************************
--------Class: Node-----------------------------------------------------------------
   Name: TN-115     Base Flow(cfs): 0           Init Stage(ft): 19
  Group: BASE                                   Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
19            0.2
20            0.24
21            0.28
22            0.32
23            0.36
24            0.4
--------Class: Node-----------------------------------------------------------------
   Name: TN-120     Base Flow(cfs): 0           Init Stage(ft): 19
  Group: BASE                                   Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
19            0.08
20            0.12
--------Class: Node-----------------------------------------------------------------
   Name: TN-125     Base Flow(cfs): 0           Init Stage(ft): 19
  Group: BASE                                   Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
19            0.3
20            0.34
21            0.38
22            0.42
23            0.47
24            0.51
--------Class: Node-----------------------------------------------------------------
   Name: TN-130     Base Flow(cfs): 0           Init Stage(ft): 19
  Group: BASE                                   Warn Stage(ft): 24
Comment:

Stage(ft)     Area(ac)
19            0.28
20            0.39
```

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [3]
Copyright 1995, Streamline Technologies, Inc.

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ***********************************************************
--------Class: Node----------------------------------------------------------------
   Name: TN-135     Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.25
20           0.28
21           0.31
22           0.35
23           0.38
24           0.41
--------Class: Node----------------------------------------------------------------
   Name: TN-140     Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.2
20           0.24
--------Class: Node----------------------------------------------------------------
   Name: TN-145     Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.23
20           0.25
21           0.28
22           0.3
23           0.32
24           0.35
--------Class: Node----------------------------------------------------------------
   Name: TN-150     Base Flow(cfs): 0          Init Stage(ft): 19
  Group: BASE                                  Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.37
20           0.45
```

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [4]
Copyright 1995, Streamline Technologies, Inc.

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Node--------------------------------------------------------------
   Name: TN-155     Base Flow(cfs): 0           Init Stage(ft): 19
  Group: BASE                                   Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.12
20           0.14
21           0.15
22           0.17
23           0.19
24           0.2
--------Class: Node--------------------------------------------------------------
   Name: TN-160     Base Flow(cfs): 0           Init Stage(ft): 19
  Group: BASE                                   Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.04
20           0.06
--------Class: Node--------------------------------------------------------------
   Name: TN-165     Base Flow(cfs): 0           Init Stage(ft): 19
  Group: BASE                                   Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.55
20           0.6
21           0.65
22           0.71
23           0.76
24           0.81
--------Class: Node--------------------------------------------------------------
   Name: TN-170     Base Flow(cfs): 0           Init Stage(ft): 19
  Group: BASE                                   Warn Stage(ft): 24
Comment:

Stage(ft)    Area(ac)
19           0.1
20           0.16
```

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [5]
Copyright 1995, Streamline Technologies, Inc.

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report **
--------Class: Node--
Name: TN-175 Base Flow(cfs): 0 Init Stage(ft): 19
Group: BASE Warn Stage(ft): 24
Comment:

Stage(ft)	Area(ac)
19	0.4
20	0.44
21	0.48
22	0.53
23	0.57
24	0.61

--------Class: Operating Table---
Name: E.LAKE Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	3.012
20	6.165
21	9.459
22	12.894
23	16.47
24	20.188

--------Class: Operating Table---
Name: TN-100 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.317
20	0.774

--------Class: Operating Table---
Name: TN-105 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.254
20	0.563
21	0.929
22	1.35
23	1.827
24	2.344

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [6]

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

*********** Input Report **

--------Class: Operating Table--

Name: TN-110 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.079
20	0.232

--------Class: Operating Table--

Name: TN-115 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.127
20	0.304
21	0.533
22	0.812
23	1.142
24	1.515

--------Class: Operating Table--

Name: TN-120 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.051
20	0.153

--------Class: Operating Table--

Name: TN-125 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.19
20	0.433
21	0.728
22	1.076
23	1.476
24	1.929

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [7]
Copyright 1995, Streamline Technologies, Inc.

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ***
--------Class: Operating Table---
Name: TN-130 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.178
20	0.495

--------Class: Operating Table---
Name: TN-135 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.159
20	0.358
21	0.597
22	0.878
23	1.199
24	1.56

--------Class: Operating Table---
Name: TN-140 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.127
20	0.31

--------Class: Operating Table---
Name: TN-145 Type: Rating Curve
Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.146
20	0.321
21	0.526
22	0.76
23	1.024
24	1.317

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [8]

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report **

--------Class: Operating Table--

Name: TN-150 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.235
20	0.567

--------Class: Operating Table--

Name: TN-155 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.076
20	0.173
21	0.291
22	0.429
23	0.589
24	0.769

--------Class: Operating Table--

Name: TN-160 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.022
20	0.07

--------Class: Operating Table--

Name: TN-165 Type: Rating Curve

Comment:

U/S Stage(ft)	Discharge(cfs)
18	0
19	0.349
20	0.763
21	1.244
22	1.79
23	2.401
24	3.079

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [9]

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

```
********** Input Report ********************************************************
--------Class: Operating Table----------------------------------------------------
   Name: TN-170        Type: Rating Curve
Comment:

   U/S Stage(ft)     Discharge(cfs)
   18                0
   19                0.063
   20                0.203

--------Class: Operating Table----------------------------------------------------
   Name: TN-175        Type: Rating Curve
Comment:

   U/S Stage(ft)     Discharge(cfs)
   18                0
   19                0.254
   20                0.561
   21                0.922
   22                1.337
   23                1.806
   24                2.329

--------Class: Pipe---------------------------------------------------------------

         Name: 100-105      From Node: TN-100    Length(ft): 40
        Group: BASE           To Node: TN-105         Count: 2

               UPSTREAM     DOWNSTREAM            Equation: Average K
     Geometry: Circular     Circular                  Flow: Both
     Span(in): 12           12           Entrance Loss Coef: 0
     Rise(in): 12           12               Exit Loss Coef: 1
   Invert(ft): 19           19               Bend Loss Coef: 0
  Manning's N: 0.012        0.012         Outlet Cntrl Spec: Use dc or tw
 Top Clip(in): 0            0              Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0          0             Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end w/ headwall                 1     2

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                  1     3
```

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [10]
Copyright 1995, Streamline Technologies, Inc.

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Pipe--------------------------------------------------------------

          Name: 110-115      From Node: TN-110    Length(ft): 40
         Group: BASE           To Node: TN-115         Count: 2

                UPSTREAM     DOWNSTREAM             Equation: Average K
      Geometry: Circular     Circular                   Flow: Both
      Span(in): 12           12           Entrance Loss Coef: 0
      Rise(in): 12           12               Exit Loss Coef: 1
    Invert(ft): 19           19               Bend Loss Coef: 0
    Manning's N: 0.012       0.012         Outlet Cntrl Spec: Use dc or tw
   Top Clip(in): 0           0              Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0           0             Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end w/ headwall                  1     2

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                   1     3

--------Class: Pipe--------------------------------------------------------------

          Name: 120-125      From Node: TN-120    Length(ft): 40
         Group: BASE           To Node: TN-125         Count: 2

                UPSTREAM     DOWNSTREAM             Equation: Average K
      Geometry: Circular     Circular                   Flow: Both
      Span(in): 12           12           Entrance Loss Coef: 0
      Rise(in): 12           12               Exit Loss Coef: 1
    Invert(ft): 19           19               Bend Loss Coef: 0
    Manning's N: 0.012       0.012         Outlet Cntrl Spec: Use dc or tw
   Top Clip(in): 0           0              Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0           0             Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end w/ headwall                  1     2

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                   1     3
```

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [11]
Copyright 1995, Streamline Technologies, Inc.

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ****************************************************
--------Class: Pipe---------------------------------------------------------

          Name: 130-135      From Node: TN-130    Length(ft): 40
         Group: BASE           To Node: TN-135         Count: 4

                UPSTREAM      DOWNSTREAM            Equation: Average K
      Geometry: Circular      Circular                  Flow: Both
      Span(in): 12            12          Entrance Loss Coef: 0
      Rise(in): 12            12              Exit Loss Coef: 1
    Invert(ft): 19            19              Bend Loss Coef: 0
   Manning's N: 0.012         0.012         Outlet Cntrl Spec: Use dc or tw
   Top Clip(in): 0            0              Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0            0             Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end w/ headwall                   1     2

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                    1     3

--------Class: Pipe---------------------------------------------------------

          Name: 140-145      From Node: TN-140    Length(ft): 40
         Group: BASE           To Node: TN-145         Count: 2

                UPSTREAM      DOWNSTREAM            Equation: Average K
      Geometry: Circular      Circular                  Flow: Both
      Span(in): 12            12          Entrance Loss Coef: 0
      Rise(in): 12            12              Exit Loss Coef: 1
    Invert(ft): 19            19              Bend Loss Coef: 0
   Manning's N: 0.012         0.012         Outlet Cntrl Spec: Use dc or tw
   Top Clip(in): 0            0              Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0            0             Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end w/ headwall                   1     2

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                    1     3
```

```
vanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [12]
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Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report *******************************************************
--------Class: Pipe------------------------------------------------------------

          Name: 150-155      From Node: TN-150    Length(ft): 40
         Group: BASE           To Node: TN-155         Count: 2

               UPSTREAM     DOWNSTREAM              Equation: Average K
      Geometry: Circular     Circular                   Flow: Both
      Span(in): 12           12           Entrance Loss Coef: 0
      Rise(in): 12           12               Exit Loss Coef: 1
    Invert(ft): 19           19               Bend Loss Coef: 0
   Manning's N: 0.012        0.012         Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0            0              Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0           0              Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end w/ headwall                  1     2

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                   1     3

--------Class: Pipe------------------------------------------------------------

          Name: 160-165      From Node: TN-160    Length(ft): 40
         Group: BASE           To Node: TN-165         Count: 2

               UPSTREAM     DOWNSTREAM              Equation: Average K
      Geometry: Circular     Circular                   Flow: Both
      Span(in): 12           12           Entrance Loss Coef: 0
      Rise(in): 12           12               Exit Loss Coef: 1
    Invert(ft): 19           19               Bend Loss Coef: 0
   Manning's N: 0.012        0.012         Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0            0              Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0           0              Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end w/ headwall                  1     2

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                   1     3
```

```
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Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Pipe-------------------------------------------------------------

          Name: 170-175      From Node: TN-170    Length(ft): 40
         Group: BASE           To Node: TN-175         Count: 2

              UPSTREAM     DOWNSTREAM           Equation: Average K
      Geometry: Circular   Circular                 Flow: Both
      Span(in): 12         12          Entrance Loss Coef: 0
      Rise(in): 12         12              Exit Loss Coef: 1
    Invert(ft): 19         19              Bend Loss Coef: 0
   Manning's N: 0.012      0.012       Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0          0            Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0         0            Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end w/ headwall                1     2

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                 1     3

--------Class: Pipe-------------------------------------------------------------

          Name: 175-E.LK     From Node: TN-175    Length(ft): 60
         Group: BASE           To Node: E.LAKE         Count: 1

              UPSTREAM     DOWNSTREAM           Equation: Average K
      Geometry: Circular   Circular                 Flow: Both
      Span(in): 4          4           Entrance Loss Coef: 0
      Rise(in): 4          4               Exit Loss Coef: 0
    Invert(ft): 19         19              Bend Loss Coef: 0
   Manning's N: 0.012      0.012       Outlet Cntrl Spec: Use dc or tw
  Top Clip(in): 0          0            Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0         0            Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                 1     3

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Groove end projecting                 1     3
```

```
 vanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [14]
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Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Channel-----------------------------------------------------------
 Name: C105-125         From Node: TN-105        Length(ft): 10
Group: BASE               To Node: TN-125             Count: 1

              UPSTREAM    DOWNSTREAM
   Geometry: Trapezoidal  Trapezoidal           Equation: Aver Conveyance
  Invert(ft): 19          19                        Flow: Both
TclpInitZ(ft): 9999       9999            Eddy Contrac Coef: 0
 Manning's N: 0.03        0.03             Eddy Expans Coef: 0
   TClip(ft): 0           0               Entrance Loss Coef: 0
   BClip(ft): 0           0                   Exit Loss Coef: 0
   Main Xsec:                             Outlet Cntrl Spec: Use dc or tw
   AxEl1(ft):                              Inlet Cntrl Spec: Use dn
   Aux Xsec1:                             Stabilizer Option: None
   AxEl2(ft):
   Aux Xsec2:
  TWidth(ft):
   Depth(ft):
  BWidth(ft): 23          23
 LSdSlp(h/v): 2           2
 RSdSlp(h/v): 2           2


 -------Class: Channel-----------------------------------------------------------
  ame: C115-135         From Node: TN-115        Length(ft): 10
  oup: BASE               To Node: TN-135             Count: 1

              UPSTREAM    DOWNSTREAM
   Geometry: Trapezoidal  Trapezoidal           Equation: Aver Conveyance
  Invert(ft): 19          19                        Flow: Both
TclpInitZ(ft): 9999       9999            Eddy Contrac Coef: 0
 Manning's N: 0.03        0.03             Eddy Expans Coef: 0
   TClip(ft): 0           0               Entrance Loss Coef: 0
   BClip(ft): 0           0                   Exit Loss Coef: 0
   Main Xsec:                             Outlet Cntrl Spec: Use dc or tw
   AxEl1(ft):                              Inlet Cntrl Spec: Use dn
   Aux Xsec1:                             Stabilizer Option: None
   AxEl2(ft):
   Aux Xsec2:
  TWidth(ft):
   Depth(ft):
  BWidth(ft): 18          18
 LSdSlp(h/v): 2           2
 RSdSlp(h/v): 2           2
```

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [15]
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Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report **********************************************************
--------Class: Channel------------------------------------------------------------
 Name: C125-145        From Node: TN-125       Length(ft): 10
Group: BASE              To Node: TN-145            Count: 1

              UPSTREAM    DOWNSTREAM
   Geometry: Trapezoidal  Trapezoidal          Equation: Aver Conveyance
 Invert(ft): 19           19                       Flow: Both
TclpInitZ(ft): 9999       9999          Eddy Contrac Coef: 0
 Manning's N: 0.03        0.03           Eddy Expans Coef: 0
   TClip(ft): 0           0             Entrance Loss Coef: 0
   BClip(ft): 0           0                 Exit Loss Coef: 0
   Main Xsec:                         Outlet Cntrl Spec: Use dc or tw
   AxEl1(ft):                          Inlet Cntrl Spec: Use dn
   Aux Xsec1:                         Stabilizer Option: None
   AxEl2(ft):
   Aux Xsec2:
  TWidth(ft):
   Depth(ft):
  BWidth(ft): 10          10
 LSdSlp(h/v): 2           2
 RSdSlp(h/v): 2           2


--------Class: Channel------------------------------------------------------------
 Name: C135-155        From Node: TN-135       Length(ft): 10
Group: BASE              To Node: TN-155            Count: 1

              UPSTREAM    DOWNSTREAM
   Geometry: Trapezoidal  Trapezoidal          Equation: Aver Conveyance
 Invert(ft): 19           19                       Flow: Both
TclpInitZ(ft): 9999       9999          Eddy Contrac Coef: 0
 Manning's N: 0.03        0.03           Eddy Expans Coef: 0
   TClip(ft): 0           0             Entrance Loss Coef: 0
   BClip(ft): 0           0                 Exit Loss Coef: 0
   Main Xsec:                         Outlet Cntrl Spec: Use dc or tw
   AxEl1(ft):                          Inlet Cntrl Spec: Use dn
   Aux Xsec1:                         Stabilizer Option: None
   AxEl2(ft):
   Aux Xsec2:
  TWidth(ft):
   Depth(ft):
  BWidth(ft): 18          18
 LSdSlp(h/v): 2           2
 RSdSlp(h/v): 2           2
```

```
vanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [16]
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Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ***********************************************************
--------Class: Channel--------------------------------------------------------------
 Name: C145-165          From Node: TN-145       Length(ft): 10
Group: BASE                To Node: TN-165            Count: 1

              UPSTREAM     DOWNSTREAM
    Geometry: Trapezoidal  Trapezoidal          Equation: Aver Conveyance
   Invert(ft): 19          19                       Flow: Both
TclpInitZ(ft): 9999        9999         Eddy Contrac Coef: 0
  Manning's N: 0.03        0.03          Eddy Expans Coef: 0
    TClip(ft): 0           0            Entrance Loss Coef: 0
    BClip(ft): 0           0                Exit Loss Coef: 0
    Main Xsec:                           Outlet Cntrl Spec: Use dc or tw
    AxEl1(ft):                            Inlet Cntrl Spec: Use dn
    Aux Xsec1:                           Stabilizer Option: None
    AxEl2(ft):
    Aux Xsec2:
   TWidth(ft):
    Depth(ft):
   BWidth(ft): 40          40
  LSdSlp(h/v): 2           2
  RSdSlp(h/v): 2           2


--------Class: Channel--------------------------------------------------------------
 ame: C155-175           From Node: TN-155       Length(ft): 10
 oup: BASE                 To Node: TN-175            Count: 1

              UPSTREAM     DOWNSTREAM
    Geometry: Trapezoidal  Trapezoidal          Equation: Aver Conveyance
   Invert(ft): 19          19                       Flow: Both
TclpInitZ(ft): 9999        9999         Eddy Contrac Coef: 0
  Manning's N: 0.03        0.03          Eddy Expans Coef: 0
    TClip(ft): 0           0            Entrance Loss Coef: 0
    BClip(ft): 0           0                Exit Loss Coef: 0
    Main Xsec:                           Outlet Cntrl Spec: Use dc or tw
    AxEl1(ft):                            Inlet Cntrl Spec: Use dn
    Aux Xsec1:                           Stabilizer Option: None
    AxEl2(ft):
    Aux Xsec2:
   TWidth(ft):
    Depth(ft):
   BWidth(ft): 18          18
  LSdSlp(h/v): 2           2
  RSdSlp(h/v): 2           2
```

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [17]
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Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Channel-----------------------------------------------------------
 Name: SPLWY165        From Node: TN-165       Length(ft): 10
Group: BASE              To Node: E.LAKE            Count: 1

              UPSTREAM    DOWNSTREAM
    Geometry: Trapezoidal Trapezoidal           Equation: Aver Conveyance
  Invert(ft): 20          20                        Flow: Both
TclpInitZ(ft): 9999       9999         Eddy Contrac Coef: 0
  Manning's N: 0.03       0.03          Eddy Expans Coef: 0
    TClip(ft): 0          0           Entrance Loss Coef: 0
    BClip(ft): 0          0               Exit Loss Coef: 0
    Main Xsec:                         Outlet Cntrl Spec: Use dc or tw
    AxEl1(ft):                          Inlet Cntrl Spec: Use dn
    Aux Xsec1:                         Stabilizer Option: None
    AxEl2(ft):
    Aux Xsec2:
   TWidth(ft):
    Depth(ft):
   BWidth(ft): 15         15
  LSdSlp(h/v): 3          3
  RSdSlp(h/v): 3          3


--------Class: Channel-----------------------------------------------------------
 Name: SPLWY175        From Node: TN-175       Length(ft): 10
Group: BASE              To Node: E.LAKE            Count: 1

              UPSTREAM    DOWNSTREAM
    Geometry: Trapezoidal Trapezoidal           Equation: Aver Conveyance
  Invert(ft): 20          20                        Flow: Both
TclpInitZ(ft): 9999       9999         Eddy Contrac Coef: 0
  Manning's N: 0.03       0.03          Eddy Expans Coef: 0
    TClip(ft): 0          0           Entrance Loss Coef: 0
    BClip(ft): 0          0               Exit Loss Coef: 0
    Main Xsec:                         Outlet Cntrl Spec: Use dc or tw
    AxEl1(ft):                          Inlet Cntrl Spec: Use dn
    Aux Xsec1:                         Stabilizer Option: None
    AxEl2(ft):
    Aux Xsec2:
   TWidth(ft):
    Depth(ft):
   BWidth(ft): 15         15
  LSdSlp(h/v): 3          3
  RSdSlp(h/v): 3          3
```

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [18]

Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report **

--------Class: Rating Curve--

Name: E.LAKE Count: 1 From Node: E.LAKE
Group: BASE Flow: Positive To Node: BOUNDARY

	TABLE	ELEV ON(ft)	ELEV OFF(ft)
#1:	E.LAKE	18	18.01
#2:		0	0
#3:		0	0
#4:		0	0

--------Class: Rating Curve--

Name: TN-100 Count: 1 From Node: TN-100
Group: BASE Flow: Positive To Node: BOUNDARY

	TABLE	ELEV ON(ft)	ELEV OFF(ft)
#1:	TN-100	18	18.01
#2:		0	0
#3:		0	0
#4:		0	0

--------Class: Rating Curve--

Name: TN-105 Count: 1 From Node: TN-105
Group: BASE Flow: Positive To Node: BOUNDARY

	TABLE	ELEV ON(ft)	ELEV OFF(ft)
#1:	TN-105	18	18.01
#2:		0	0
#3:		0	0
#4:		0	0

--------Class: Rating Curve--

Name: TN-110 Count: 1 From Node: TN-110
Group: BASE Flow: Positive To Node: BOUNDARY

	TABLE	ELEV ON(ft)	ELEV OFF(ft)
#1:	TN-110	18	18.01
#2:		0	0
#3:		0	0
#4:		0	0

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [19]
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Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report *********************************************************
--------Class: Rating Curve---------------------------------------------------
    Name: TN-115     Count: 1          From Node: TN-115
   Group: BASE        Flow: Positive     To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: TN-115     18           18.01
      #2:            0            0
      #3:            0            0
      #4:            0            0


--------Class: Rating Curve---------------------------------------------------
    Name: TN-120     Count: 1          From Node: TN-120
   Group: BASE        Flow: Positive     To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: TN-120     18           18.01
      #2:            0            0
      #3:            0            0
      #4:            0            0


--------Class: Rating Curve---------------------------------------------------
    Name: TN-125     Count: 1          From Node: TN-125
   Group: BASE        Flow: Positive     To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: TN-125     18           18.01
      #2:            0            0
      #3:            0            0
      #4:            0            0


--------Class: Rating Curve---------------------------------------------------
    Name: TN-130     Count: 1          From Node: TN-130
   Group: BASE        Flow: Positive     To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: TN-130     18           18.01
      #2:            0            0
      #3:            0            0
      #4:            0            0
```

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [20]
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Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ******************************************************
--------Class: Rating Curve--------------------------------------------------
    Name: TN-135     Count: 1         From Node: TN-135
   Group: BASE        Flow: Positive    To Node: BOUNDARY

         TABLE     ELEV ON(ft) ELEV OFF(ft)
     #1: TN-135    18          18.01
     #2:           0           0
     #3:           0           0
     #4:           0           0


--------Class: Rating Curve--------------------------------------------------
    Name: TN-140     Count: 1         From Node: TN-140
   Group: BASE        Flow: Positive    To Node: BOUNDARY

         TABLE     ELEV ON(ft) ELEV OFF(ft)
     #1: TN-140    18          18.01
     #2:           0           0
     #3:           0           0
     #4:           0           0


--------Class: Rating Curve--------------------------------------------------
    Name: TN-145     Count: 1         From Node: TN-145
   Group: BASE        Flow: Positive    To Node: BOUNDARY

         TABLE     ELEV ON(ft) ELEV OFF(ft)
     #1: TN-145    18          18.01
     #2:           0           0
     #3:           0           0
     #4:           0           0


--------Class: Rating Curve--------------------------------------------------
    Name: TN-150     Count: 1         From Node: TN-150
   Group: BASE        Flow: Positive    To Node: BOUNDARY

         TABLE     ELEV ON(ft) ELEV OFF(ft)
     #1: TN-150    18          18.01
     #2:           0           0
     #3:           0           0
     #4:           0           0
```

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [21]
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Solid Waste Authority
Lime and Biosolids Facilities - Temporary Condition
HYDRAULIC INPUT DATA

********** Input Report ********************************************************
--------Class: Rating Curve----------------------------------------------------
    Name: TN-155      Count: 1          From Node: TN-155
   Group: BASE         Flow: Positive     To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: TN-155     18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0


--------Class: Rating Curve----------------------------------------------------
    Name: TN-160      Count: 1          From Node: TN-160
   Group: BASE         Flow: Positive     To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: TN-160     18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0


--------Class: Rating Curve----------------------------------------------------
    Name: TN-165      Count: 1          From Node: TN-165
   Group: BASE         Flow: Positive     To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: TN-165     18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0


--------Class: Rating Curve----------------------------------------------------
    Name: TN-170      Count: 1          From Node: TN-170
   Group: BASE         Flow: Positive     To Node: BOUNDARY

          TABLE      ELEV ON(ft) ELEV OFF(ft)
      #1: TN-170     18          18.01
      #2:            0           0
      #3:            0           0
      #4:            0           0
```

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [22]
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   Solid Waste Authority
   Lime and Biosolids Facilities - Temporary Condition
   HYDRAULIC INPUT DATA

   ********** Input Report *************************************************************
   --------Class: Rating Curve-------------------------------------------------------
       Name: TN-175     Count: 1         From Node: TN-175
      Group: BASE        Flow: Positive    To Node: BOUNDARY

            TABLE     ELEV ON(ft) ELEV OFF(ft)
         #1: TN-175    18           18.01
         #2:           0            0
         #3:           0            0
         #4:           0            0


   --------Class: Simulation--------------------------------------------------------
O:\ICPR2\SWA\LIME\TEMPORAR\25YR3DAY\LRFTM
Execution: Both
   Header: Solid Waste Authority
           Lime Recalcination & Biosolids Facilties
           Temporary Conditions: 25-Year 72-Hour Storm
---------HYDRAULICS-----------------------------HYDROLOGY--------------------
       Max Delta Z (ft): 1
         Delta Z Factor: 0.005          Override Defaults: Yes
     Time Step Optimizer: 0                Storm Dur(hrs): 72
Drop Structure Optimizer: 0               Rain Amount(in): 14
     Sim Start Time(hrs): 0                  Rainfall File: SFWMD72
       Sim End Time(hrs): 150
       Min Calc Time(sec): 0.1
       Max Calc Time(sec): 20
       To Hour:   PInc(min):                  To Hour:   PInc(min):
       25         15                          45         5
       58         10                          58         2
       62         1                           62         1
       65         5                           72         2
       70         10                          150        10
       80         15
       150        60
---------GROUP SELECTIONS-------------------------------------------------------
+ BASE      [07/03/02]
```

Exhibit H

Hydraulic Routing Results for Temporary Conditions

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]

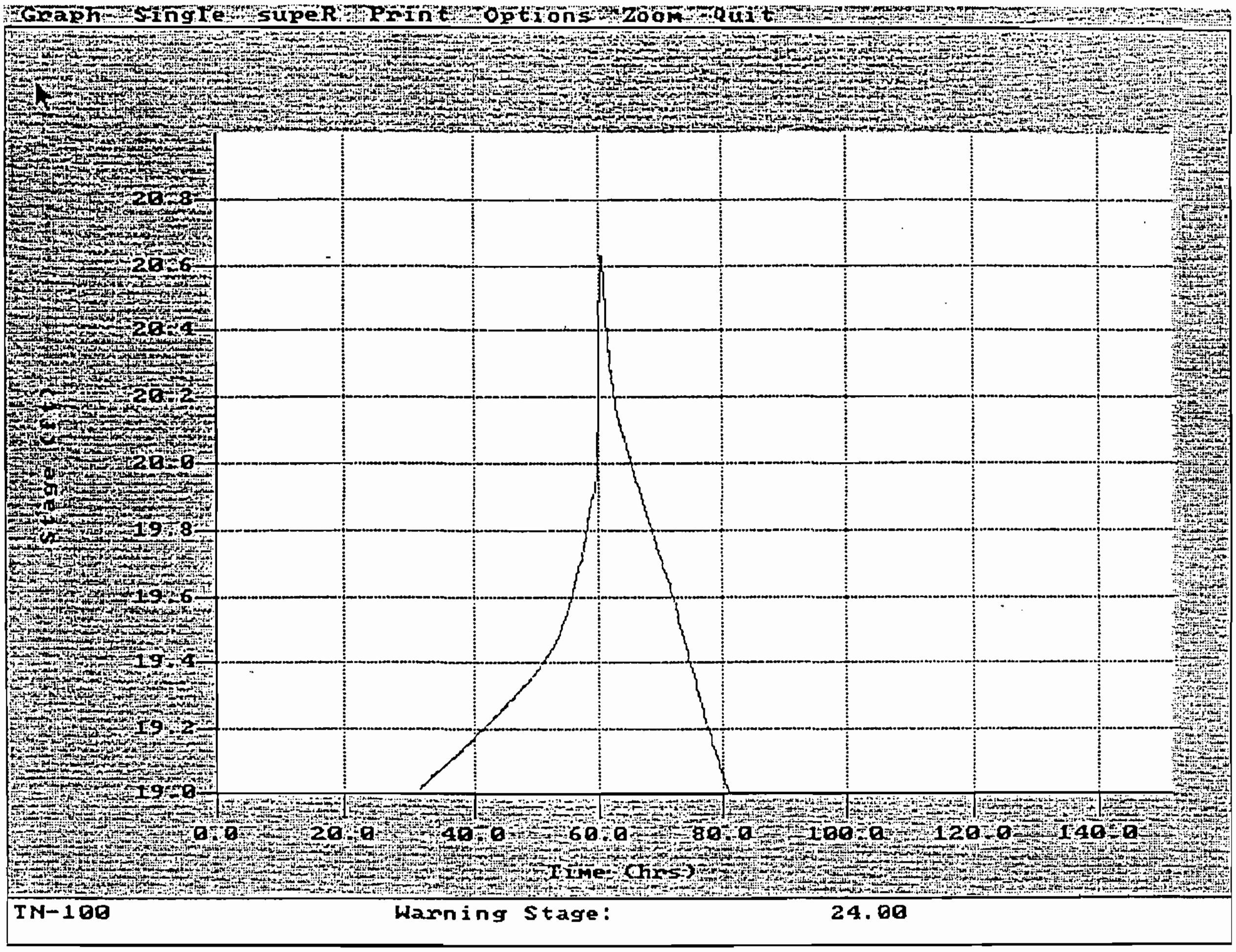
Solid Waste Authority
Lime Recalcination & Biosolids Facilties
Temporary Conditions: 25-Year 72-Hour Storm

********** Node Maximum Conditions - LRFTMP25 **********

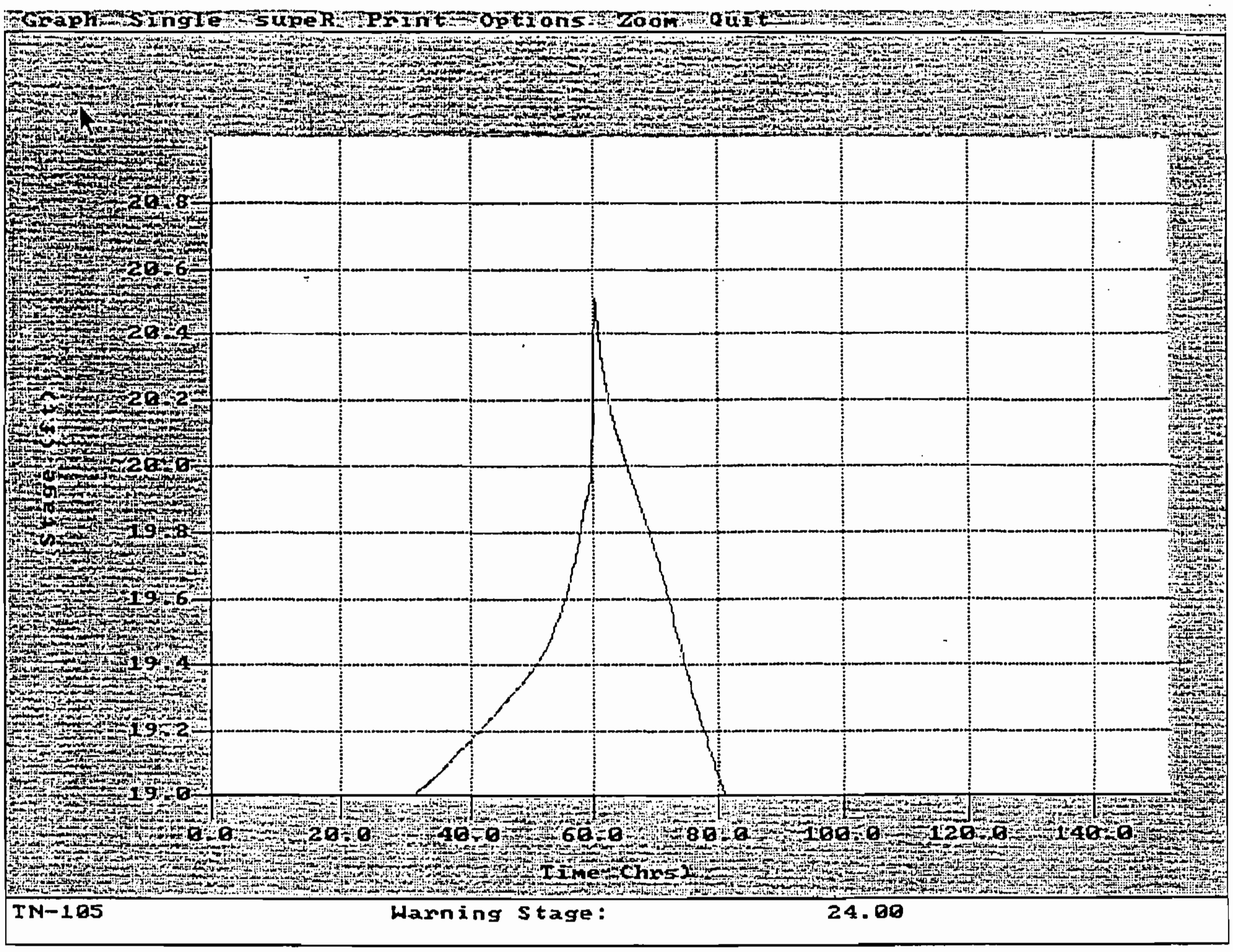
(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
BOUNDARY	BASE	62.00	20.00	22.00	-0.0003	0.00	64.16	12.20	0.00	0.00
E.LAKE	BASE	64.16	19.88	24.00	0.0005	422394.88	60.00	120.45	64.16	5.79
TN-100	BASE	60.26	20.63	24.00	0.0006	29598.77	59.98	13.38	60.56	4.10
TN-105	BASE	60.19	20.51	24.00	0.0007	20421.90	60.00	7.93	60.23	26.20
TN-110	BASE	60.12	20.56	24.00	0.0007	9058.84	59.98	5.62	60.06	3.02
TN-115	BASE	60.18	20.47	24.00	0.0008	11393.27	60.00	6.31	60.17	26.45
TN-120	BASE	60.08	20.85	24.00	0.0011	6718.46	60.00	8.11	60.06	5.52
TN-125	BASE	60.19	20.51	24.00	0.0008	15922.30	59.98	33.15	60.89	9.45
TN-130	BASE	60.13	20.54	24.00	0.0007	19582.15	60.00	10.97	60.07	5.51
TN-135	BASE	60.18	20.47	24.00	0.0012	13049.74	59.98	33.68	59.98	16.82
TN-140	BASE	60.16	20.57	24.00	0.0006	11442.57	59.98	5.92	60.08	2.54
TN-145	BASE	60.19	20.51	24.00	-0.0016	11865.79	59.98	13.39	60.20	69.60
TN-150	BASE	60.24	20.48	24.00	0.0005	21293.15	59.98	6.04	60.55	2.21
TN-155	BASE	60.18	20.47	24.00	-0.0030	6543.25	59.98	17.66	60.18	38.21
TN-160	BASE	60.06	20.68	24.00	0.0010	3208.39	60.00	5.12	60.03	4.16
TN-165	BASE	60.19	20.50	24.00	0.0008	27556.03	59.98	76.79	60.19	17.56
TN-170	BASE	60.12	20.54	24.00	0.0007	8393.30	59.98	5.20	60.06	2.88
TN-175	BASE	60.18	20.46	24.00	0.0009	20184.83	59.98	43.33	60.18	15.11

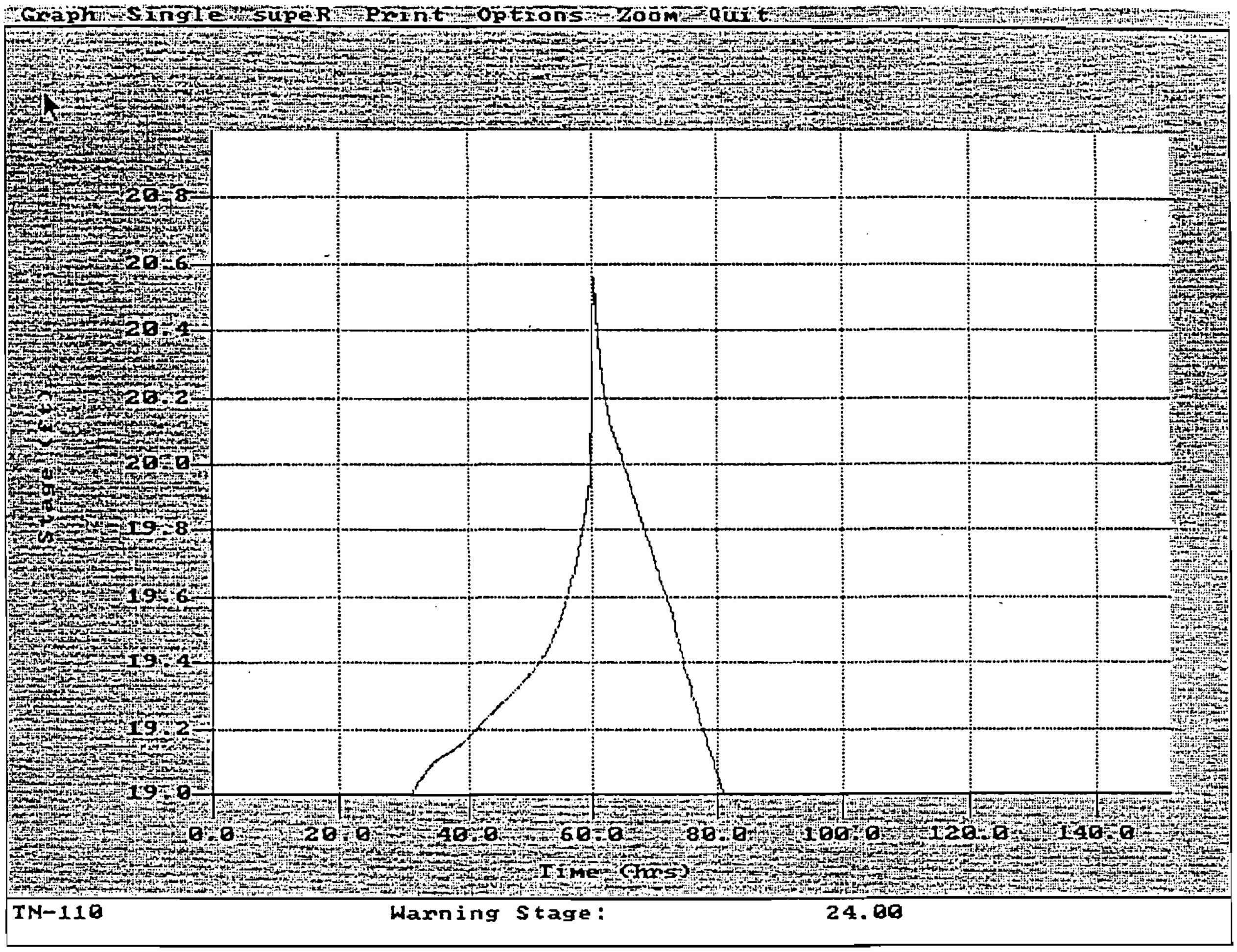
BEST AVAILABLE COPY

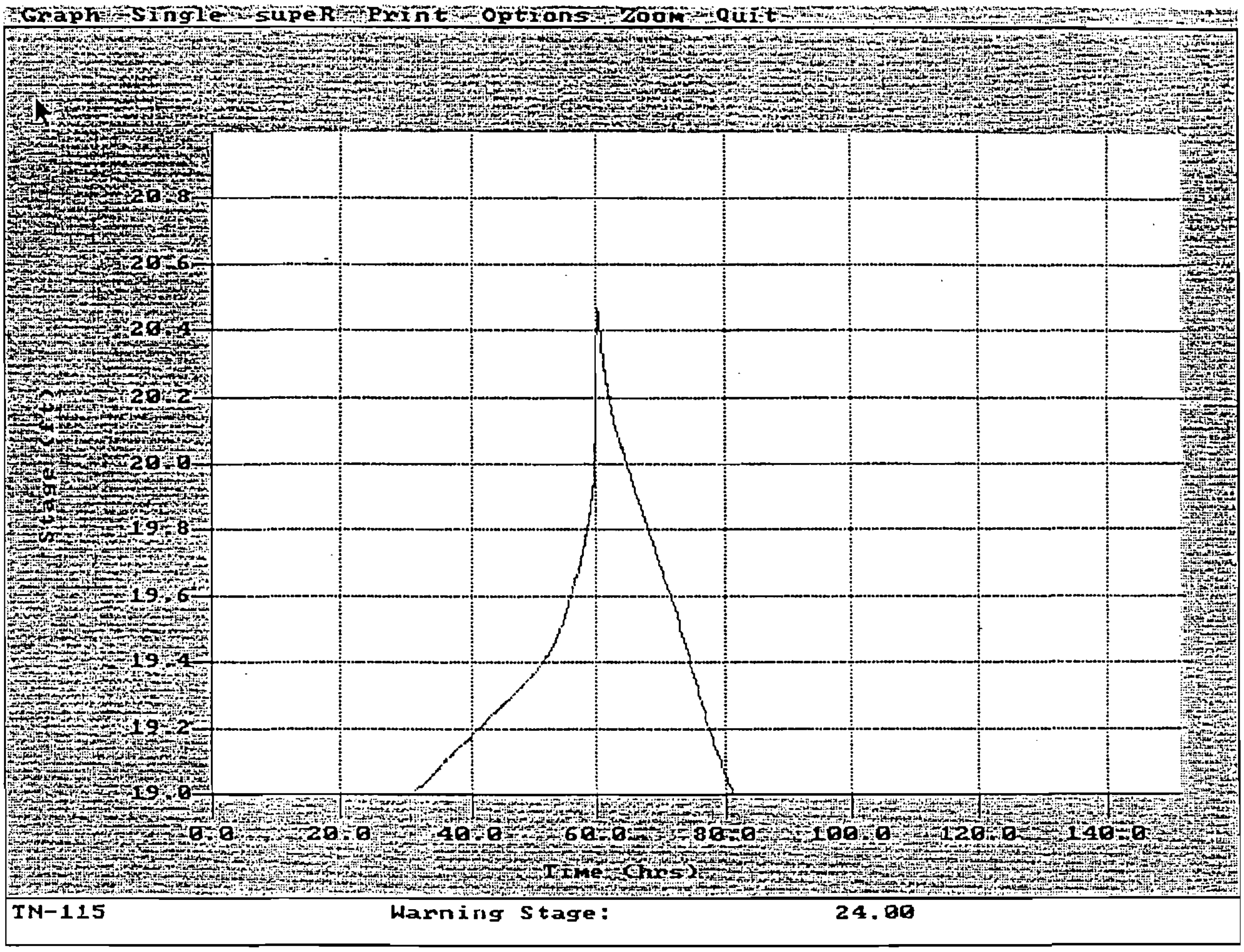


BEST AVAILABLE COPY

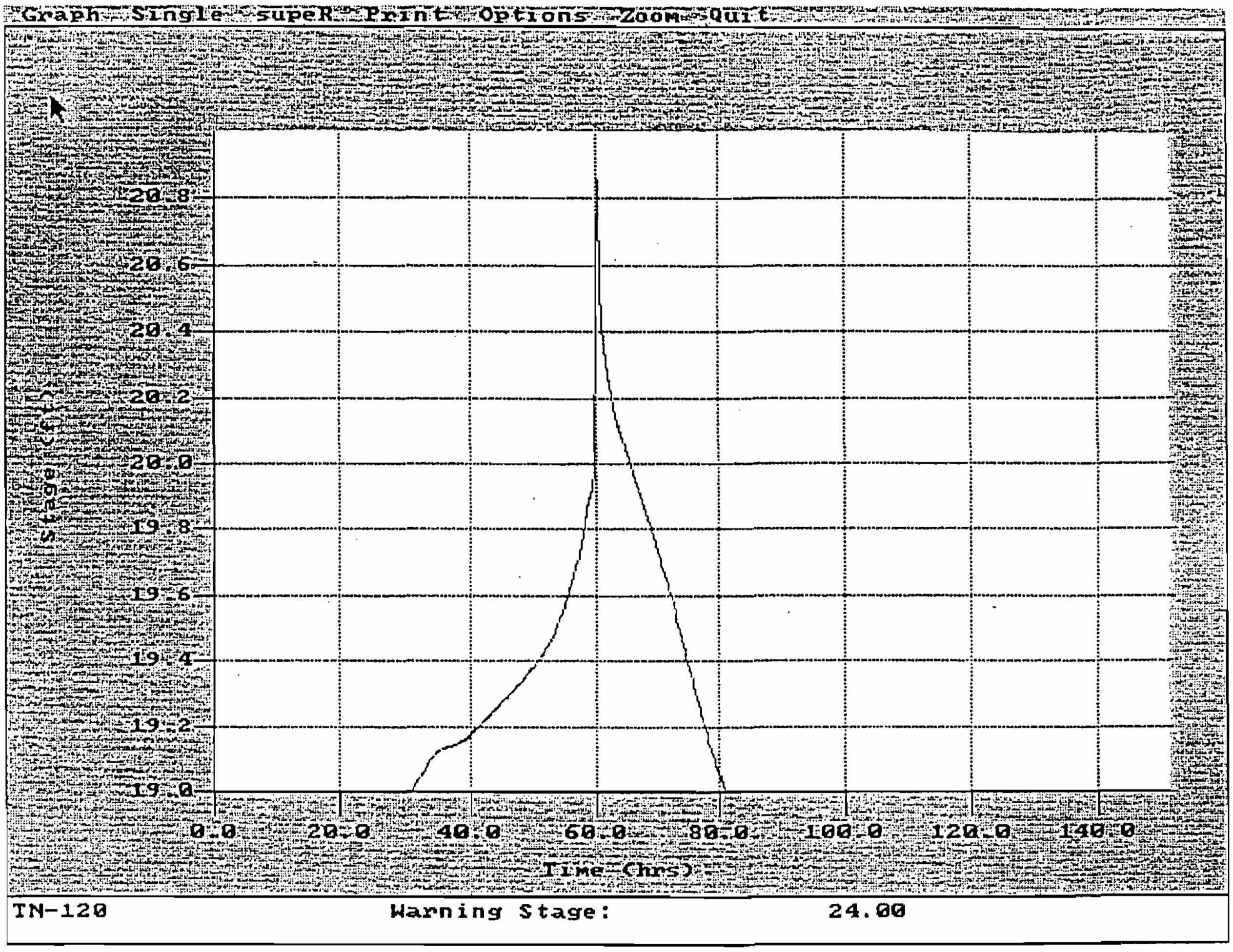


BEST AVAILABLE COPY




Graph Single supeR Print Options Zoom Quit
Stage (ft)
20.8
20.6
20.4
20.2
20.0
19.8
19.6
19.4
19.2
19.0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
TN-115
Warning Stage:
24.00

BEST AVAILABLE COPY



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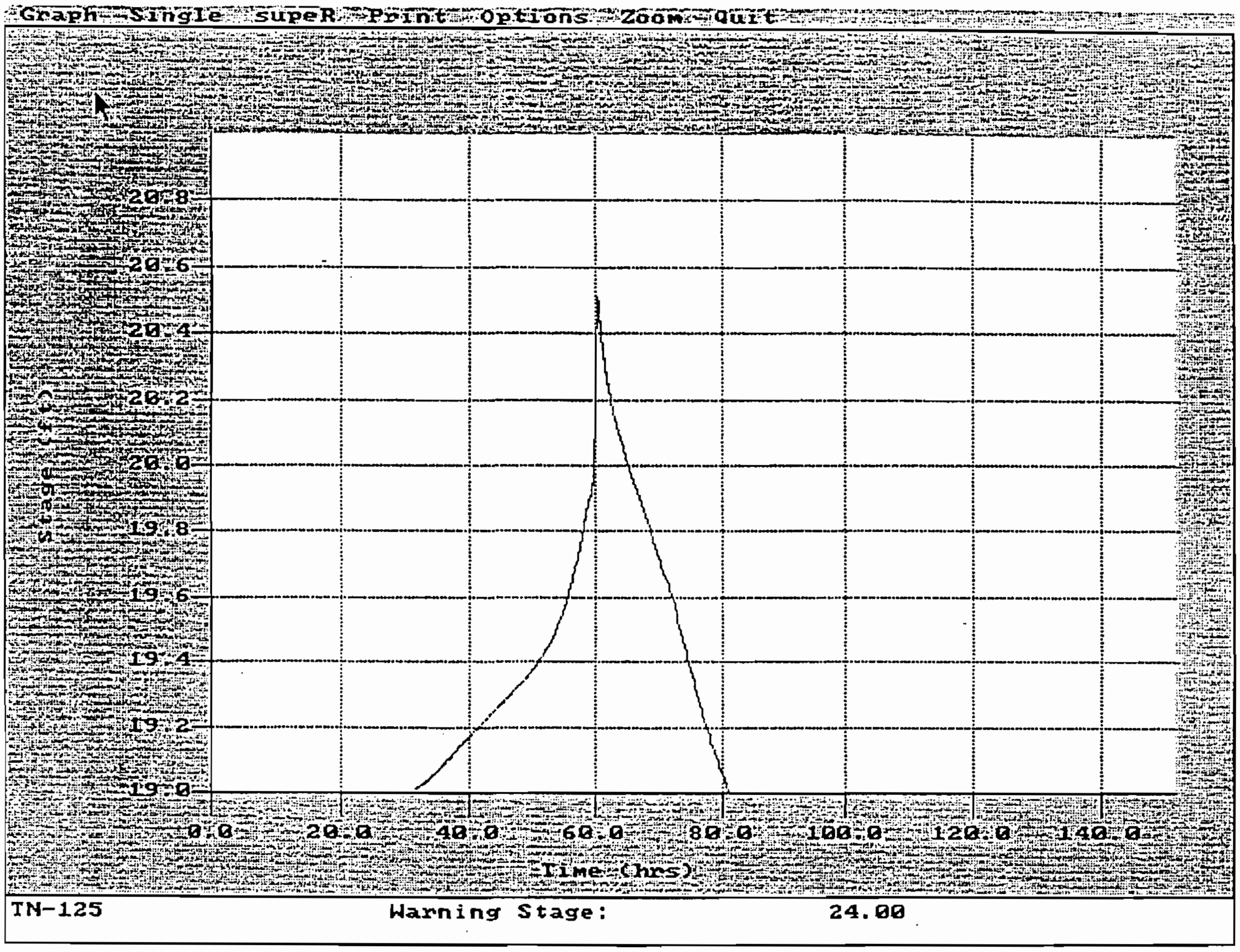

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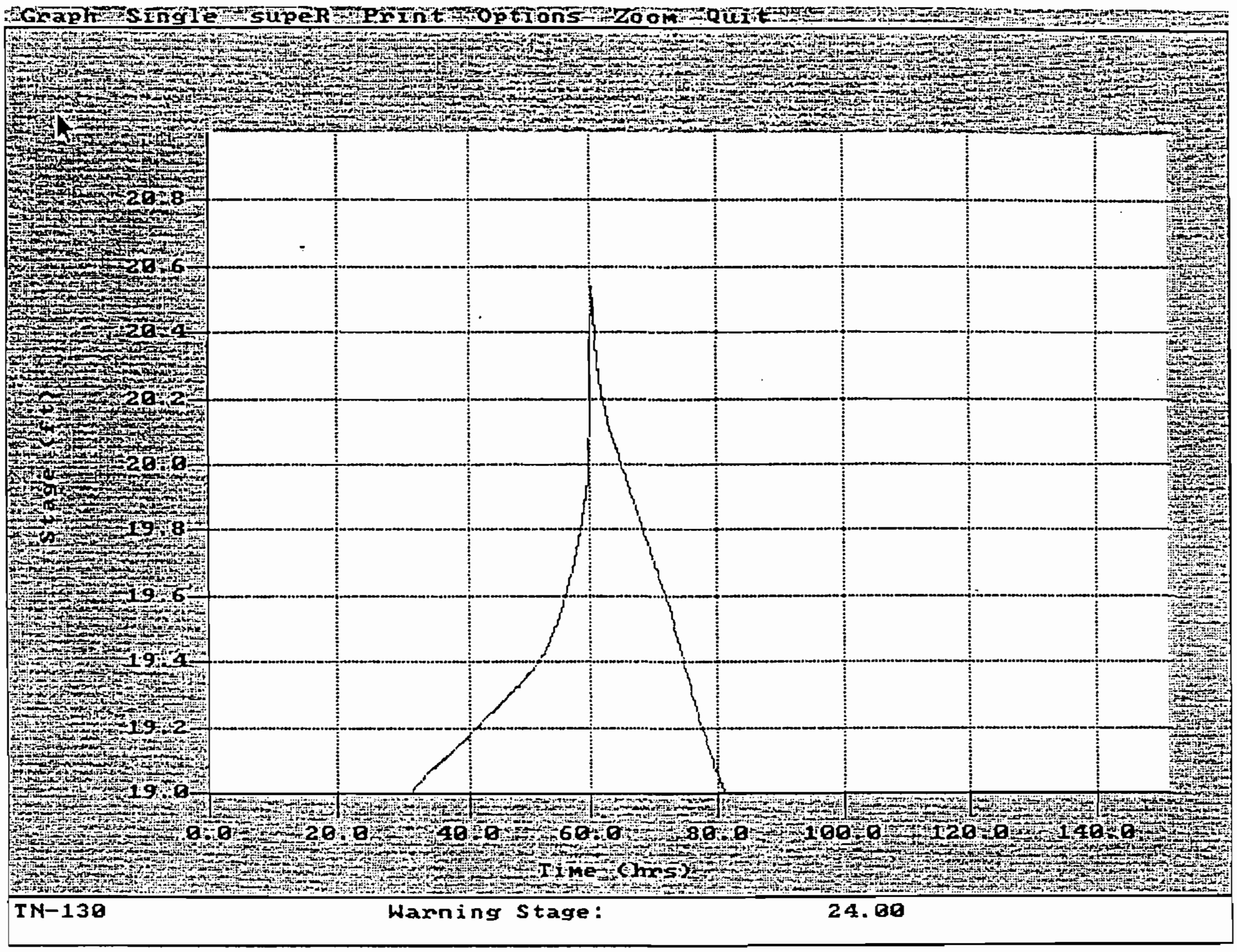

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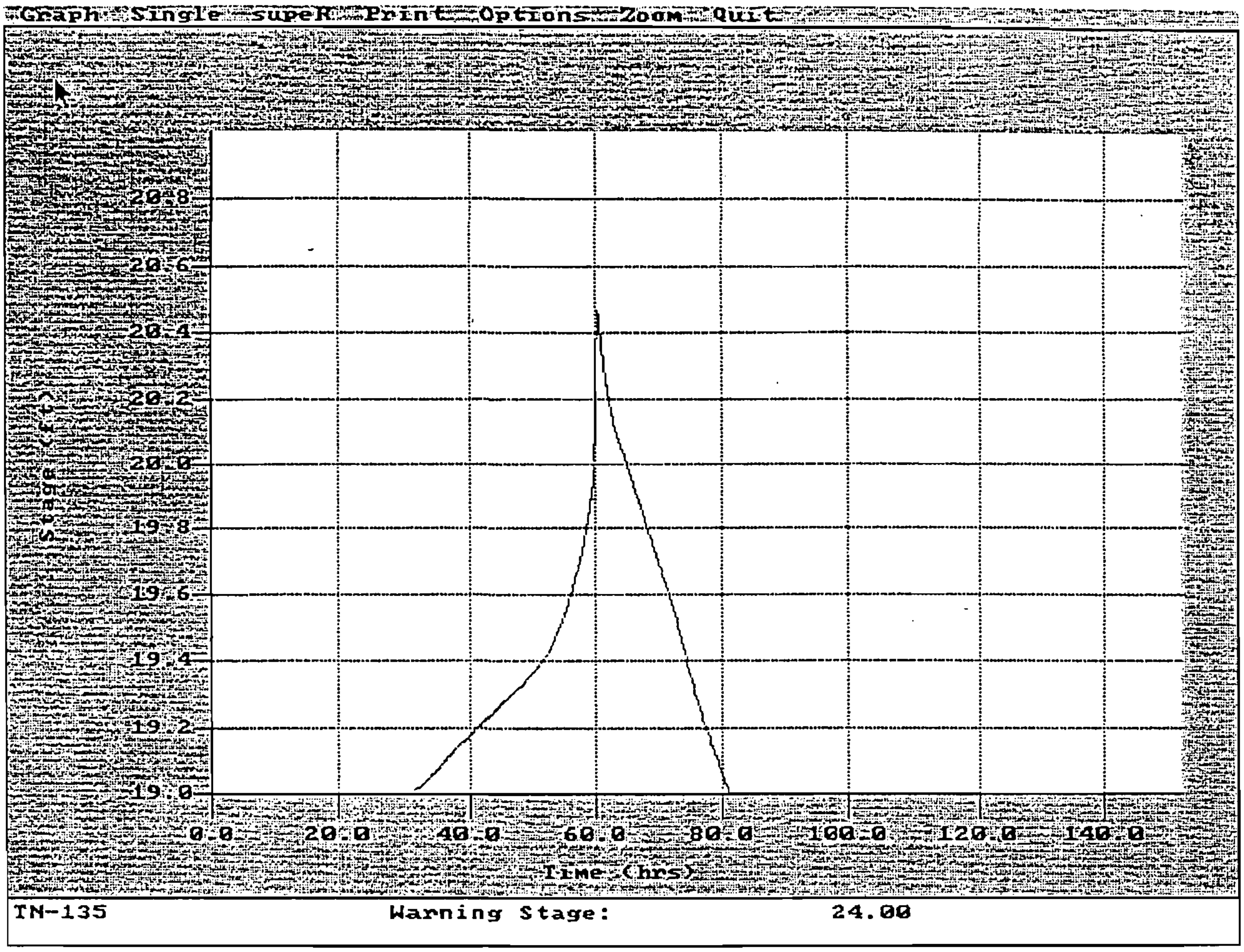

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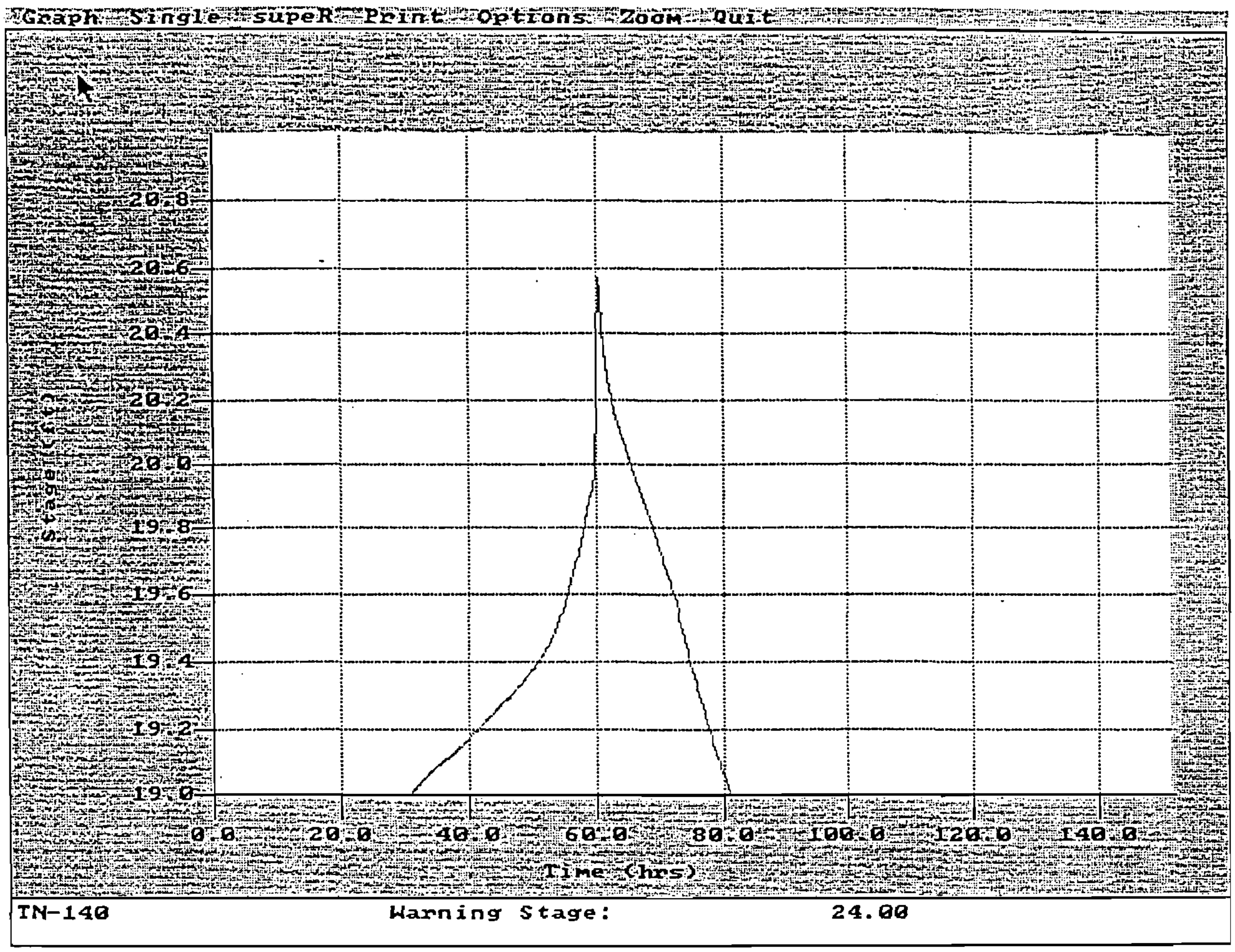

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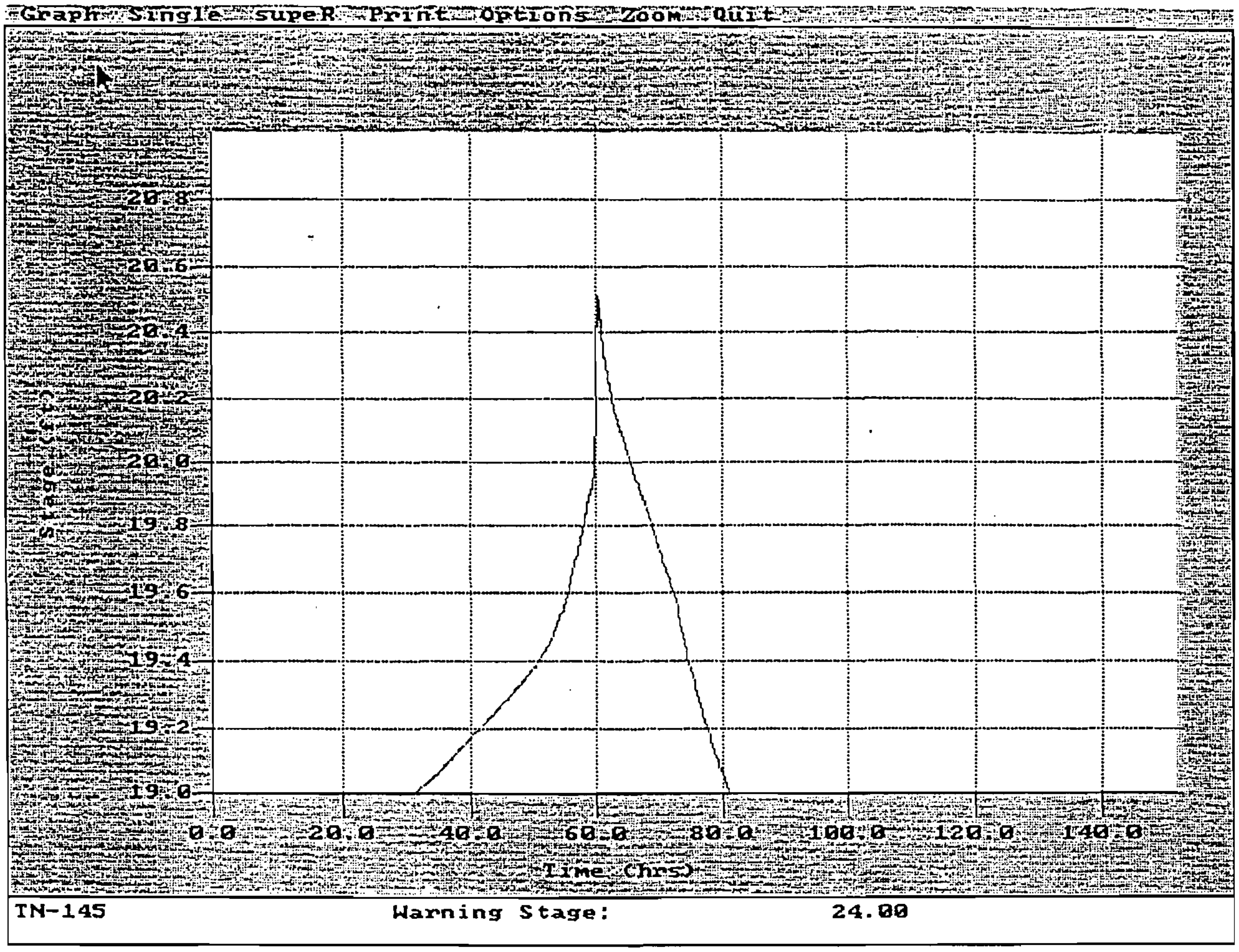

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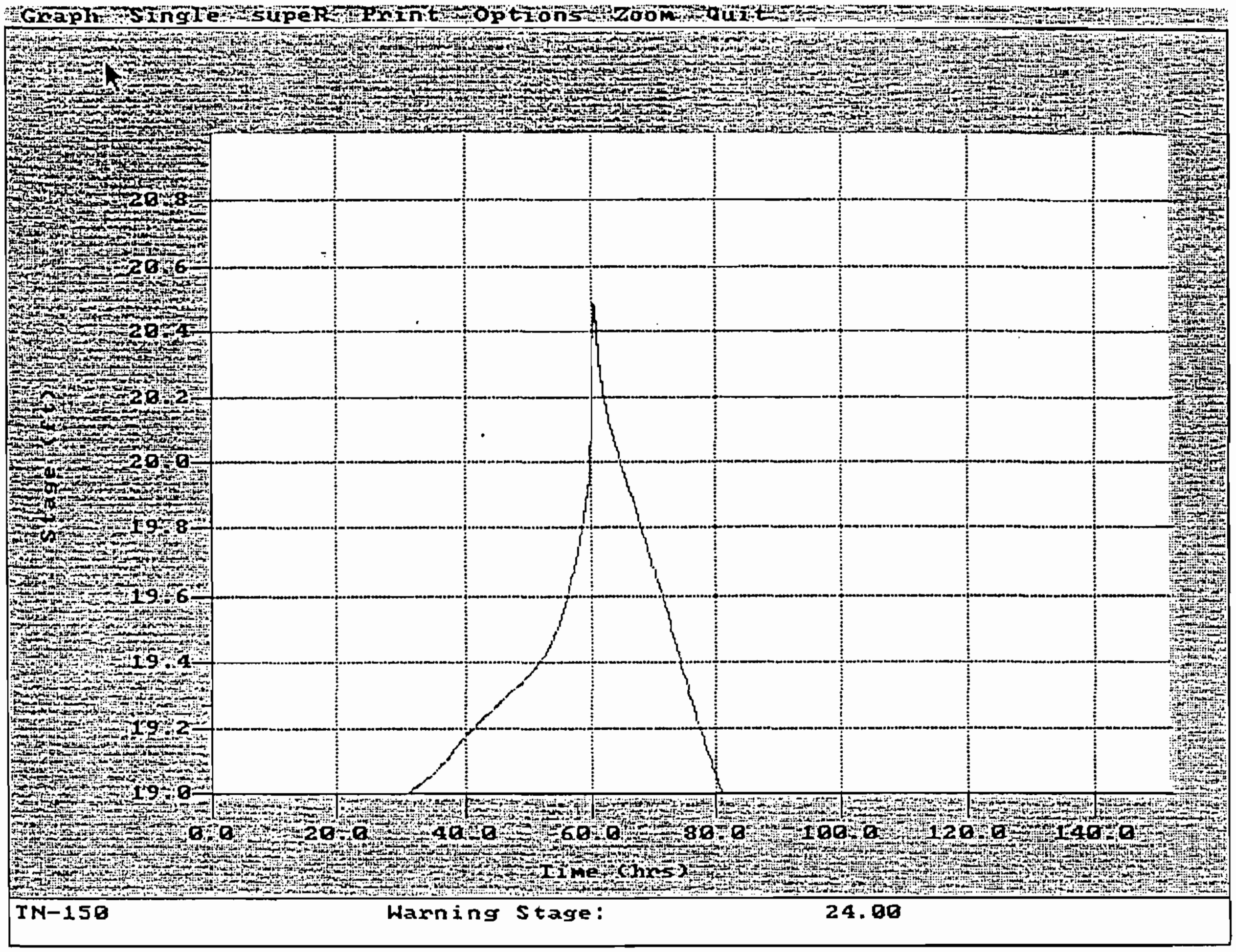

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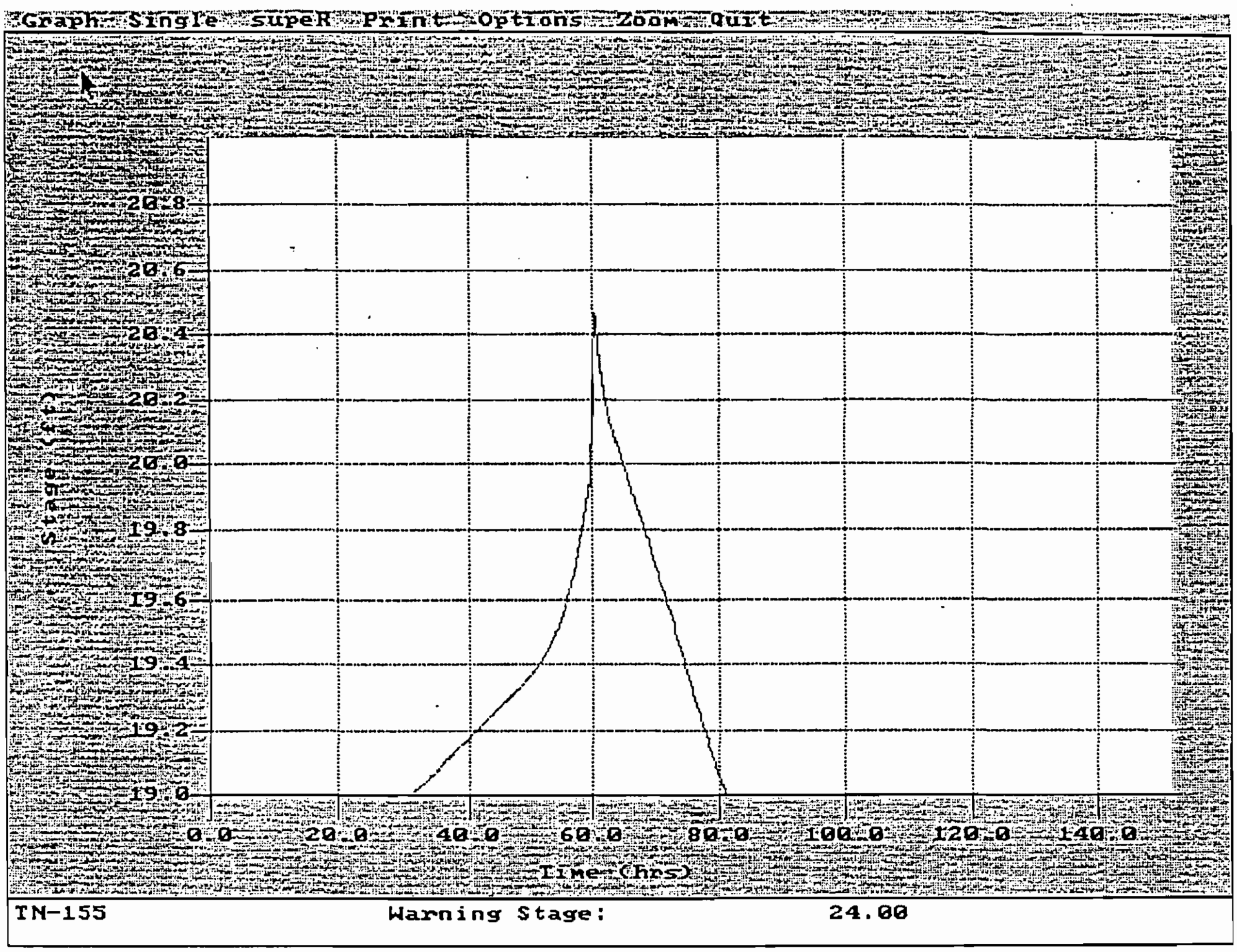
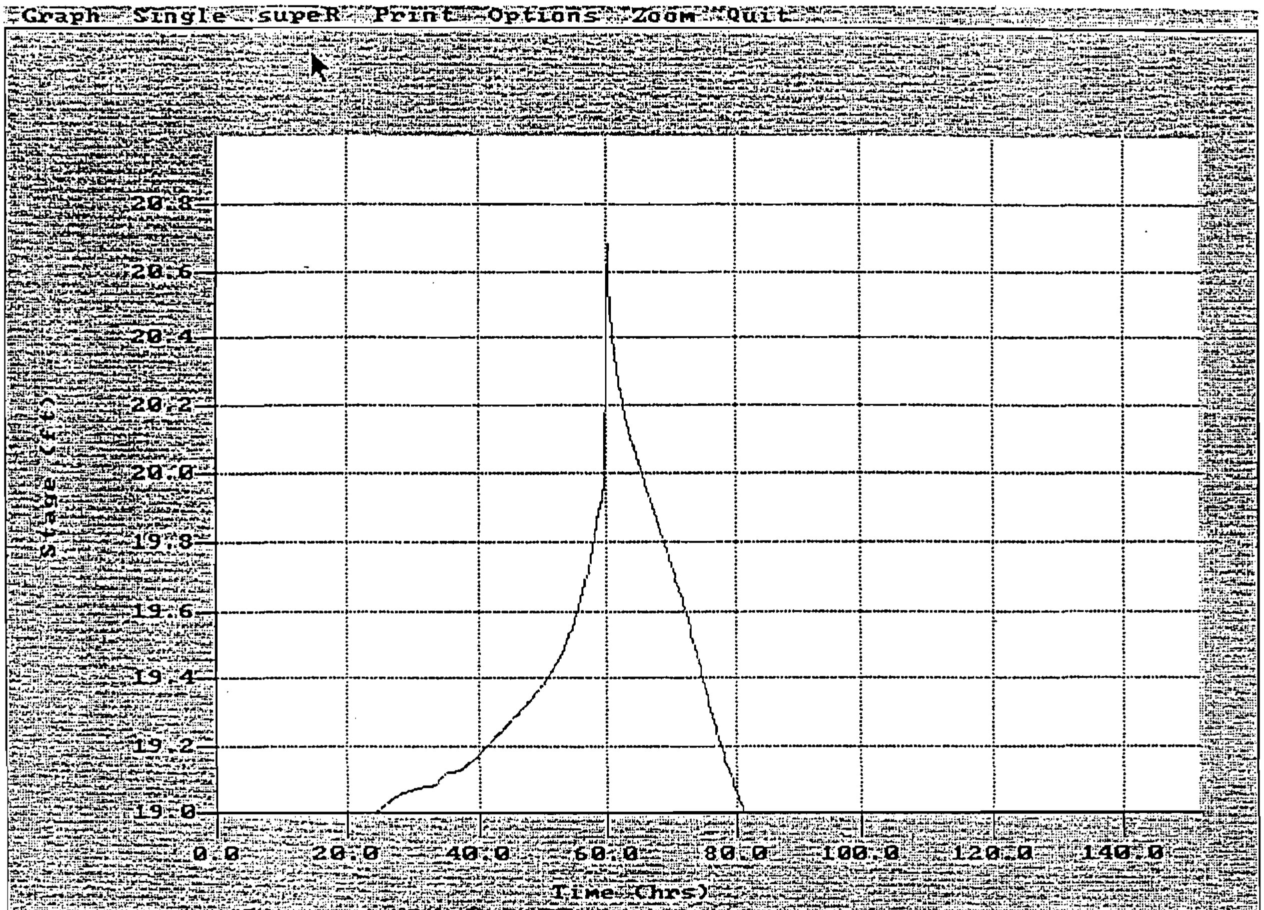
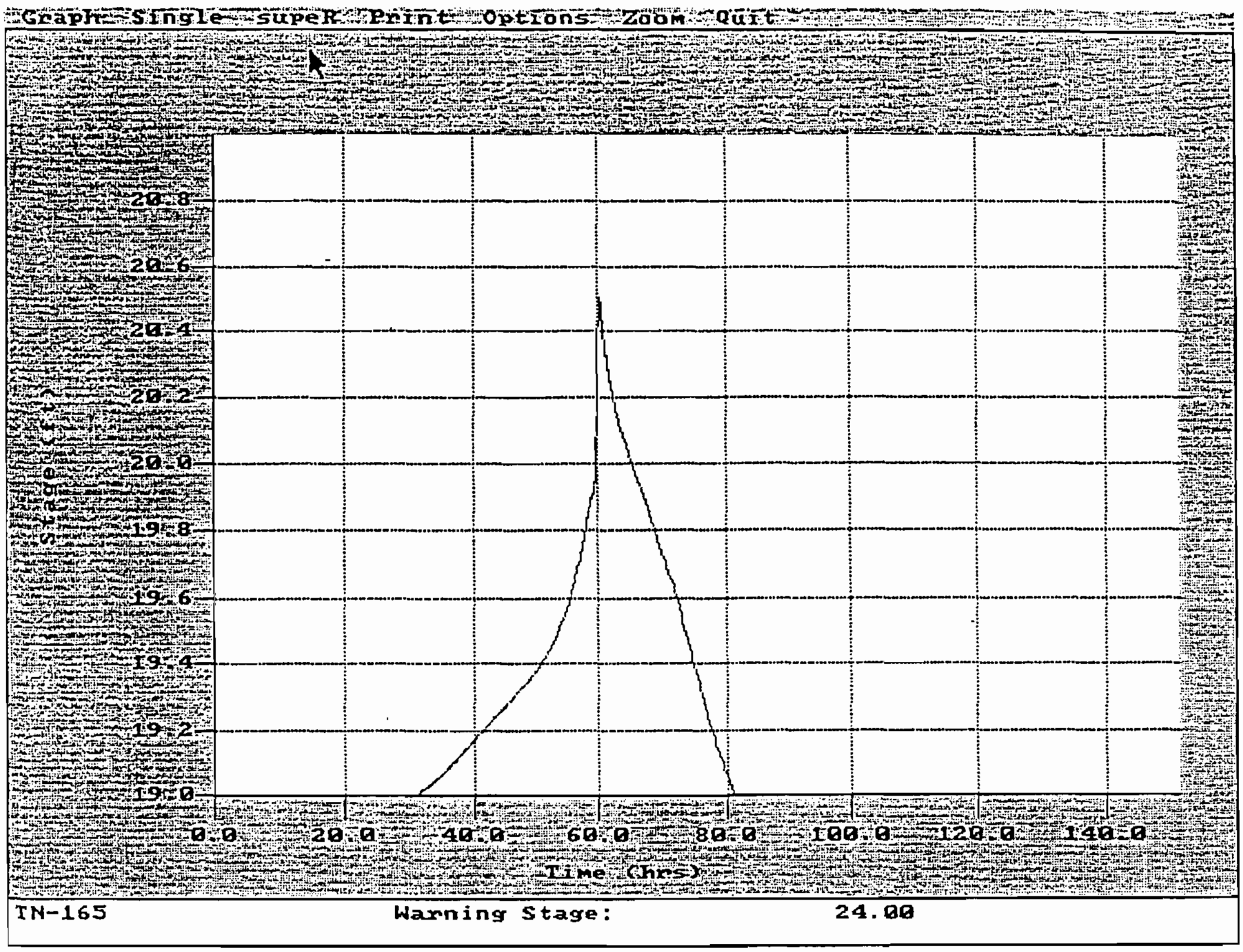


BEST AVAILABLE COPY



IN-160 Warning Stage: 24.00

BEST AVAILABLE COPY



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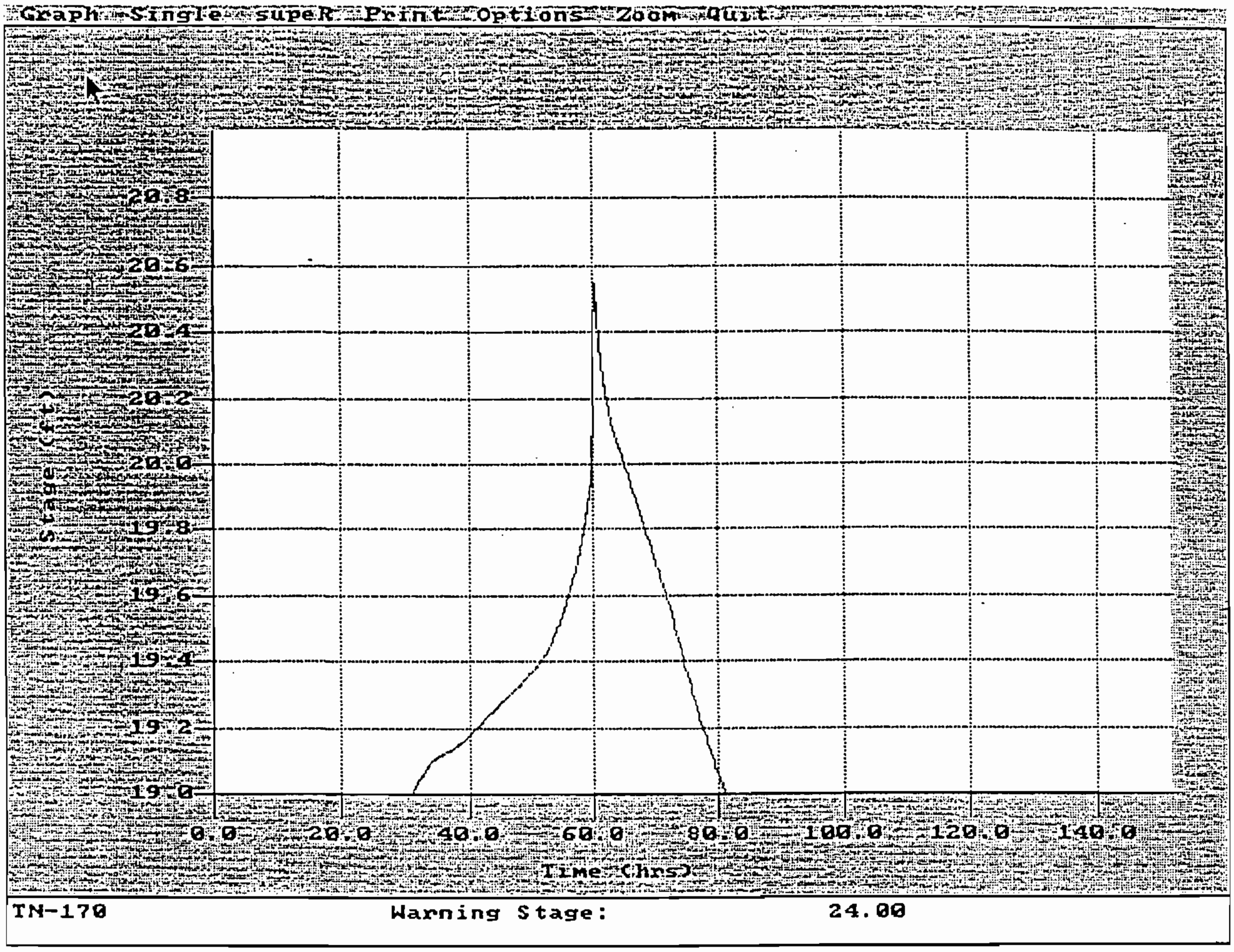

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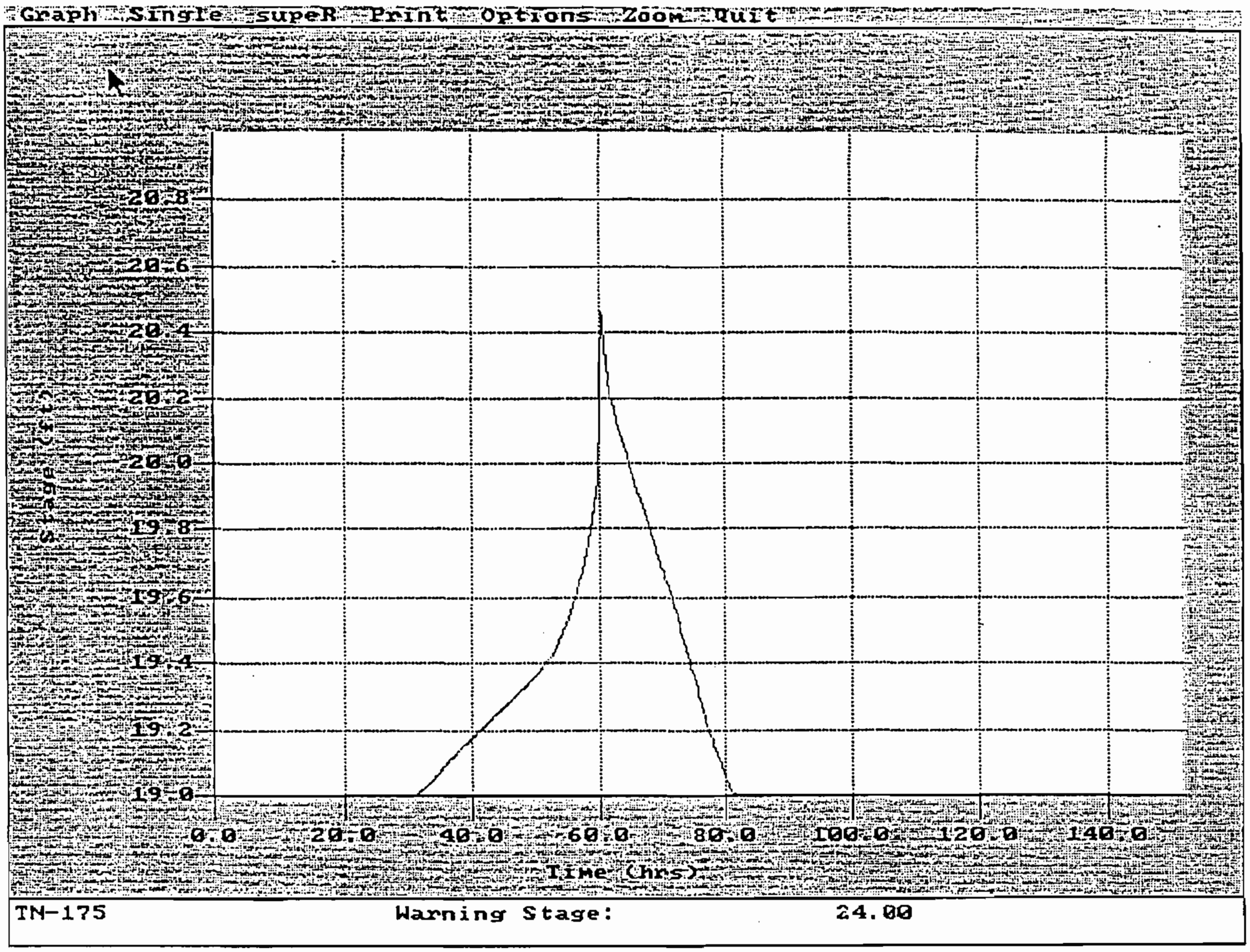
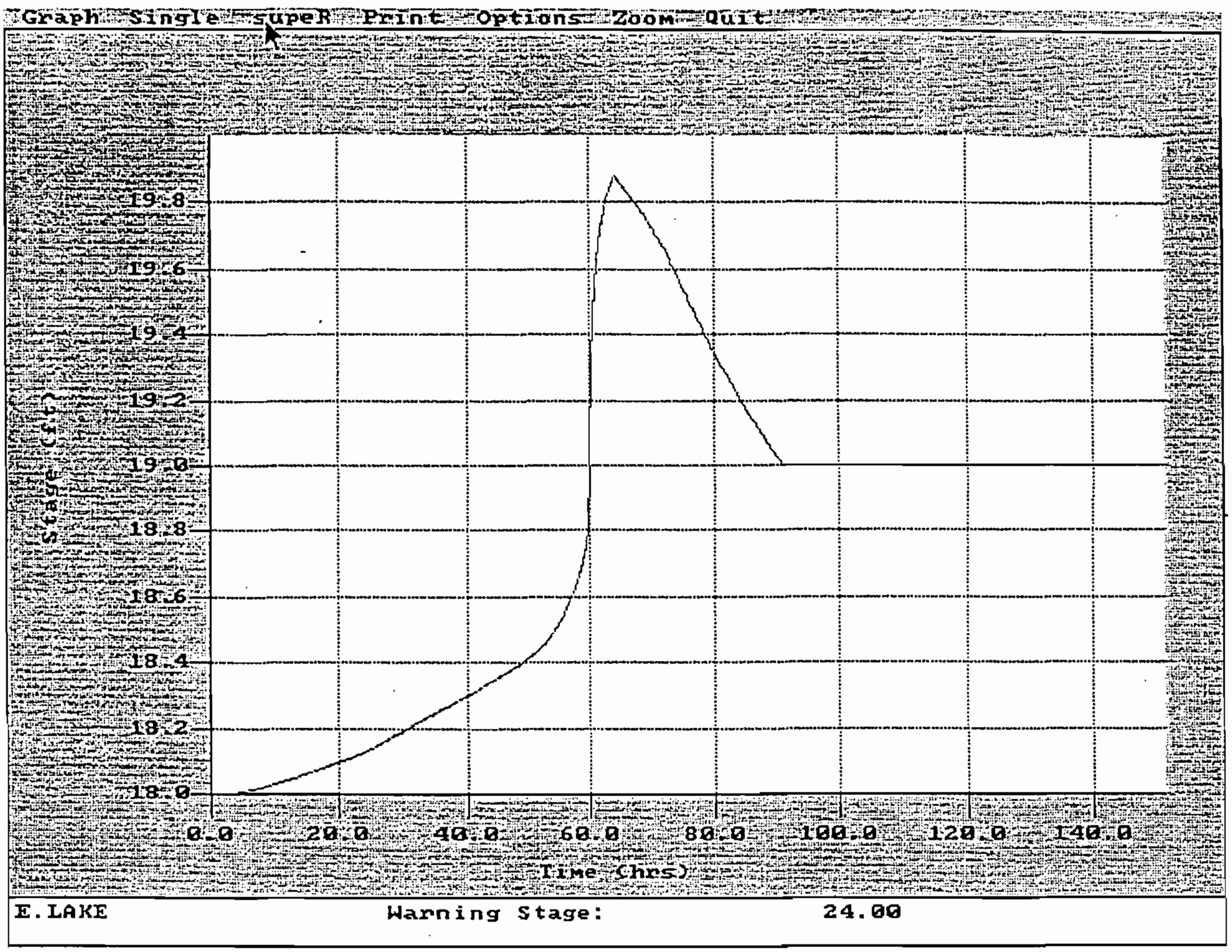
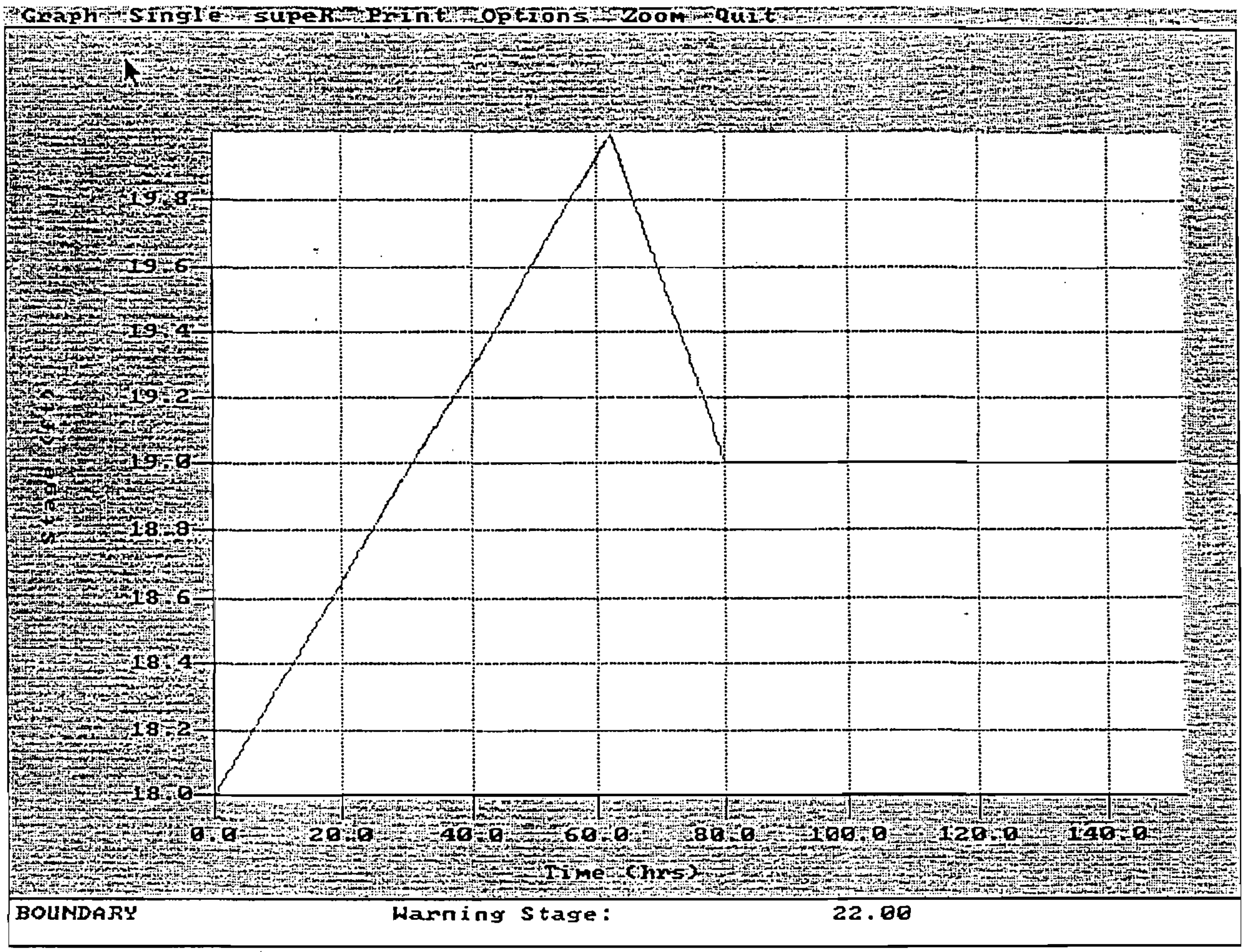



Graph Single supeR Print Options Zoom Quit
19.8
19.6
19.4
19.2
19.0
18.8
18.6
18.4
18.2
18.0
Stage (ft)
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Time (hrs)
E.LAKE
Warning Stage:
24.00

BEST AVAILABLE COPY



Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]

Solid Waste Authority
Lime Recalcination & Biosolids Facilties
Temporary Conditions: 25-Year 72-Hour Storm

********** Link Maximum Conditions - LRFTMP25 **

(Time units - hours)

Link Name	Group Name	Max Time Flow	Max Flow (cfs)	Max Delta Q (cfs)	Max Time U/S Stage	Max US Stage (ft)	Max Time D/S Stage	Max DS Stage (ft)
100-105	BASE	60.56	3.33	0.15	60.26	20.63	60.19	20.51
110-115	BASE	60.06	2.79	0.19	60.12	20.56	60.18	20.47
120-125	BASE	60.06	5.37	0.04	60.08	20.85	60.19	20.51
130-135	BASE	60.07	5.01	0.12	60.13	20.54	60.18	20.47
140-145	BASE	60.08	2.23	0.33	60.16	20.57	60.19	20.51
150-155	BASE	60.55	1.64	0.21	60.24	20.48	60.18	20.47
160-165	BASE	60.03	4.09	-0.04	60.06	20.68	60.19	20.50
170-175	BASE	60.06	2.68	0.03	60.12	20.54	60.18	20.46
175-E.LK	BASE	60.16	0.30	-0.00	60.18	20.46	64.16	19.88
C105-125	BASE	60.23	25.45	-11.18	60.19	20.51	60.19	20.51
C115-135	BASE	60.17	26.03	-9.01	60.18	20.47	60.18	20.47
C125-145	BASE	60.89	8.91	19.60	60.19	20.51	60.19	20.51
C135-155	BASE	59.98	16.37	42.38	60.18	20.47	60.18	20.47
C145-165	BASE	60.20	69.17	-24.59	60.19	20.51	60.19	20.50
C155-175	BASE	60.18	37.98	-16.19	60.18	20.47	60.18	20.46
E.LAKE	BASE	64.16	5.79	5.79	64.16	19.88	62.00	20.00
SPLWY165	BASE	60.19	16.56	-0.08	60.19	20.50	60.19	20.33
SPLWY175	BASE	60.18	14.08	-0.08	60.18	20.46	60.18	20.30
TN-100	BASE	59.59	0.77	0.72	60.26	20.63	62.00	20.00
TN-105	BASE	60.19	0.75	0.53	60.19	20.51	62.00	20.00
TN-110	BASE	59.61	0.23	0.22	60.12	20.56	62.00	20.00
TN-115	BASE	60.18	0.41	0.29	60.18	20.47	62.00	20.00
TN-120	BASE	59.57	0.15	0.14	60.08	20.85	62.00	20.00
TN-125	BASE	60.19	0.58	0.41	60.19	20.51	62.00	20.00
TN-130	BASE	59.61	0.50	0.47	60.13	20.54	62.00	20.00
TN-135	BASE	60.18	0.47	0.34	60.18	20.47	62.00	20.00
TN-140	BASE	59.59	0.31	0.29	60.16	20.57	62.00	20.00
TN-145	BASE	60.19	0.43	0.30	60.19	20.51	62.00	20.00
TN-150	BASE	59.63	0.57	0.54	60.24	20.48	62.00	20.00
TN-155	BASE	60.18	0.23	0.16	60.18	20.47	62.00	20.00
TN-160	BASE	59.57	0.07	0.06	60.06	20.68	62.00	20.00
TN-165	BASE	60.19	1.01	0.72	60.19	20.50	62.00	20.00
TN-170	BASE	59.61	0.20	0.19	60.12	20.54	62.00	20.00
TN-175	BASE	60.18	0.73	0.53	60.18	20.46	62.00	20.00

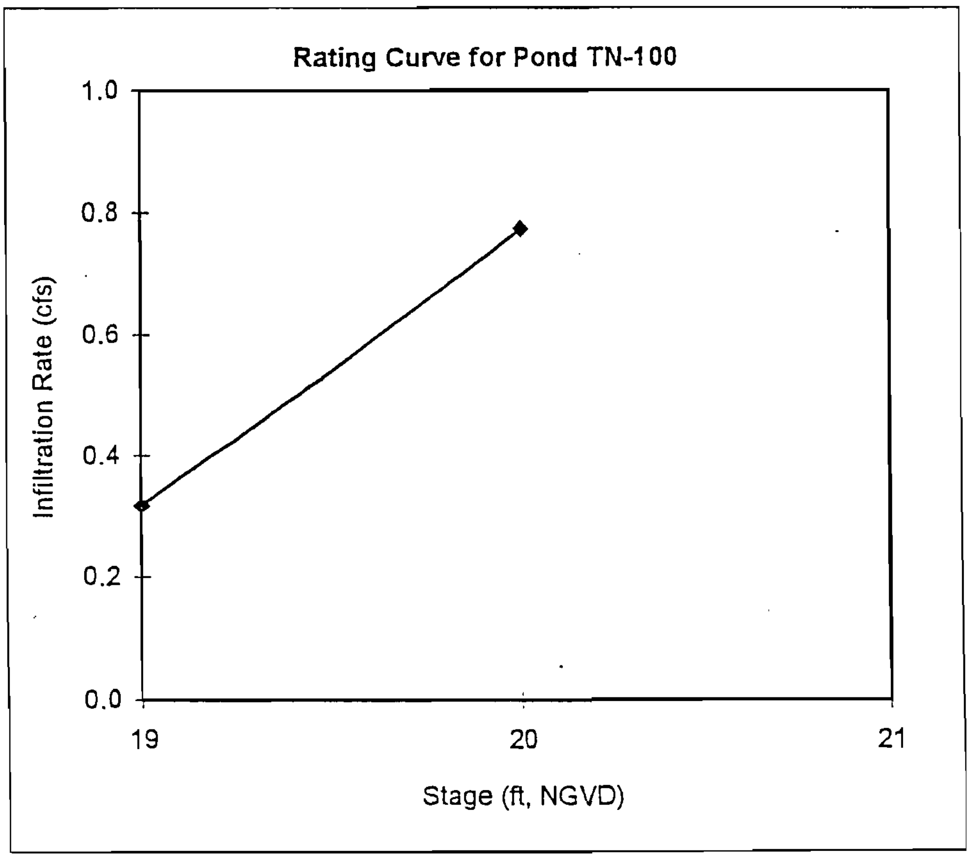
Exhibit I

Rating Curves for Temporary Surface Water Basins

Rating Curve for Pond TN-100

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.50	0.317
20.0	2.0	0.04	2.9E-05	0.61	0.774

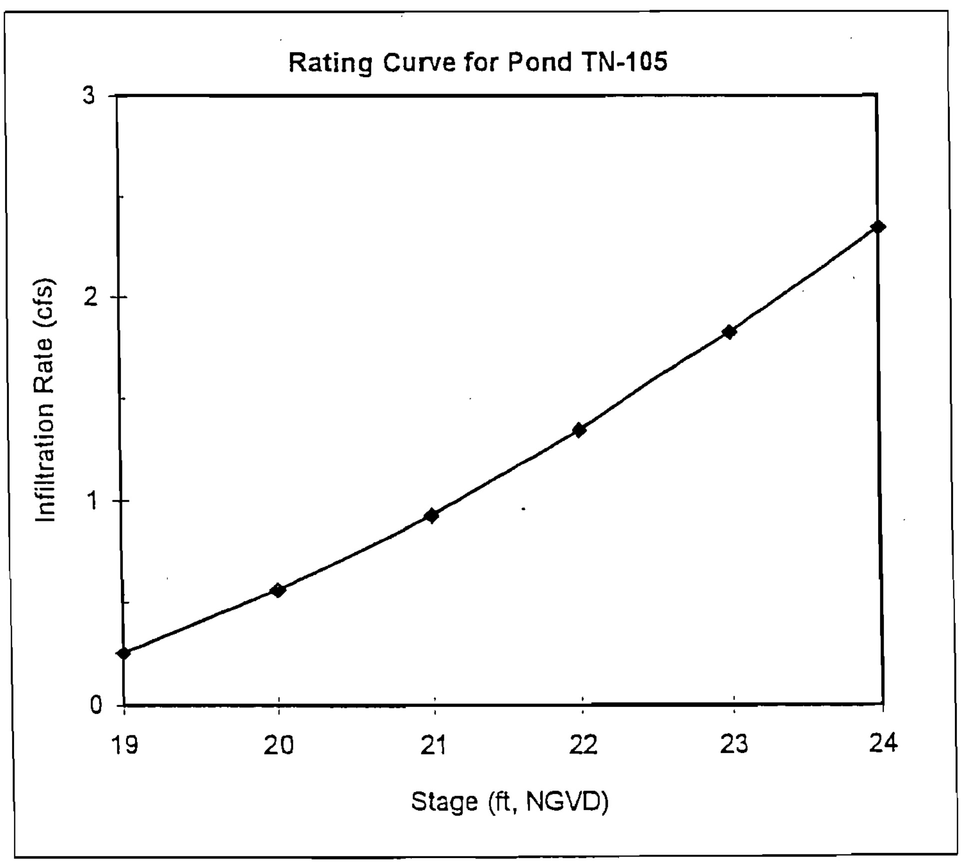


RPK
7/3/02

Rating Curve for Pond TN-105

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.40	0.254
20.0	2.0	0.04	2.9E-05	0.44	0.563
21.0	3.0	0.06	4.4E-05	0.49	0.929
22.0	4.0	0.08	5.8E-05	0.53	1.350
23.0	5.0	0.10	7.3E-05	0.58	1.827
24.0	6.0	0.12	8.7E-05	0.62	2.344

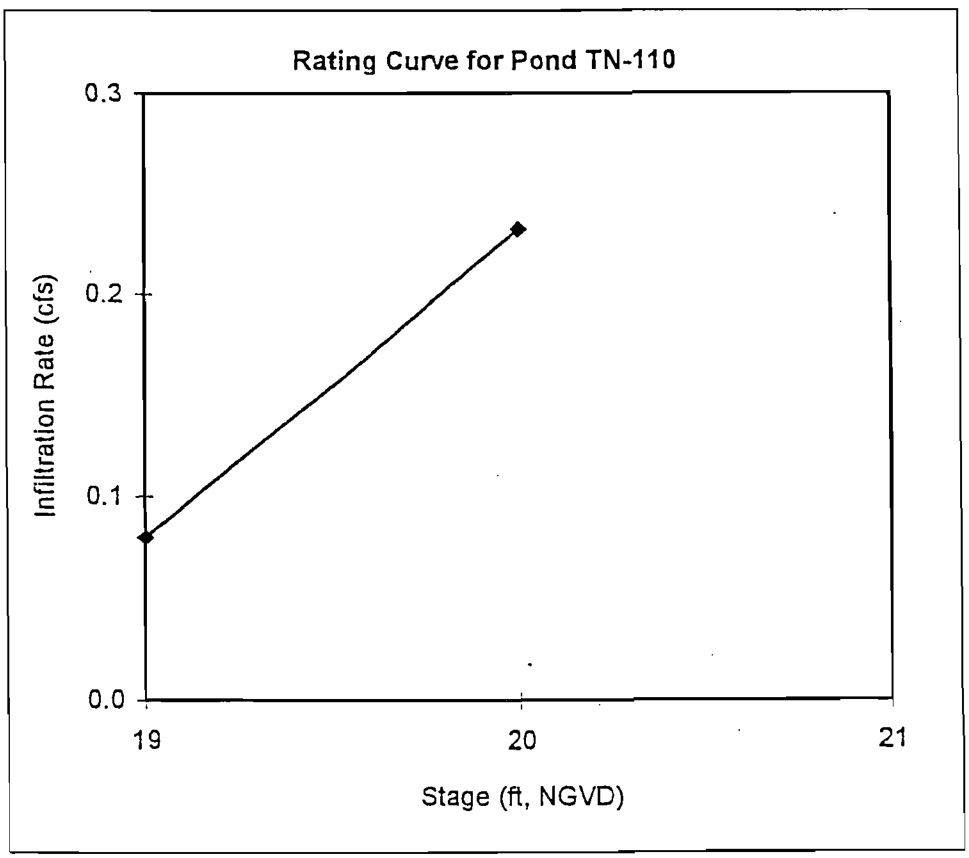


RPK
7/3/02

Rating Curve for Pond TN-110

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.13	0.079
20.0	2.0	0.04	2.9E-05	0.18	0.232

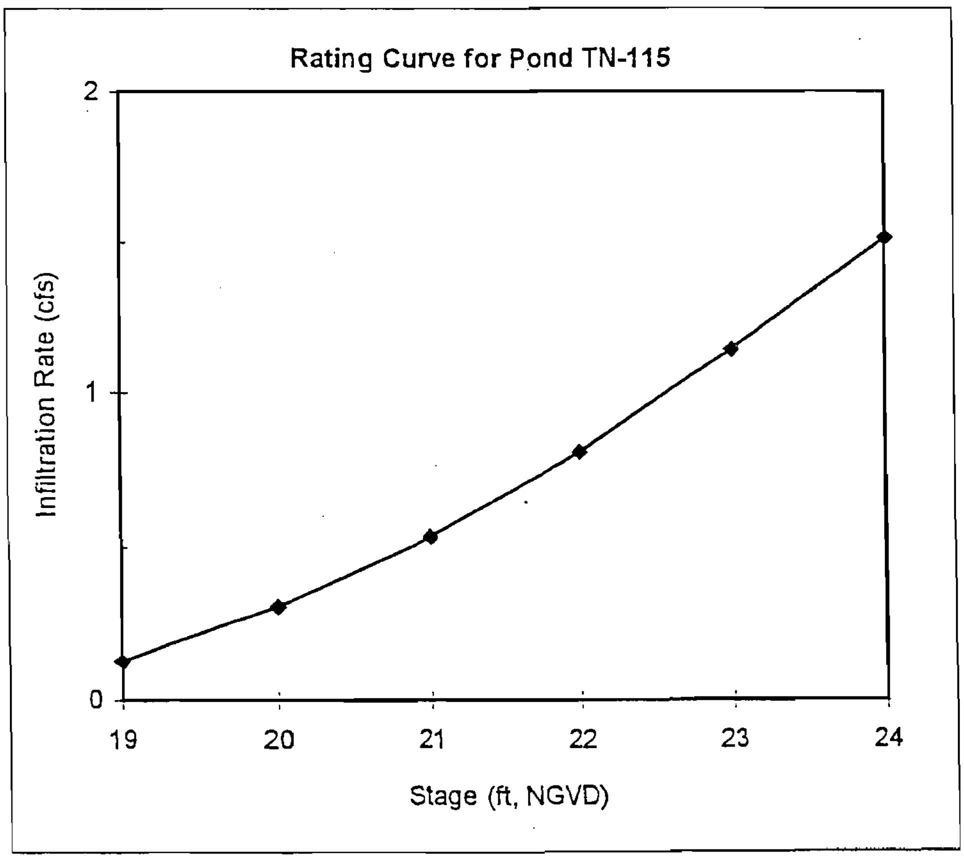


RPK
7/3/02

Rating Curve for Pond TN-115

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.20	0.127
20.0	2.0	0.04	2.9E-05	0.24	0.304
21.0	3.0	0.06	4.4E-05	0.28	0.533
22.0	4.0	0.08	5.8E-05	0.32	0.812
23.0	5.0	0.10	7.3E-05	0.36	1.142
24.0	6.0	0.12	8.7E-05	0.40	1.515

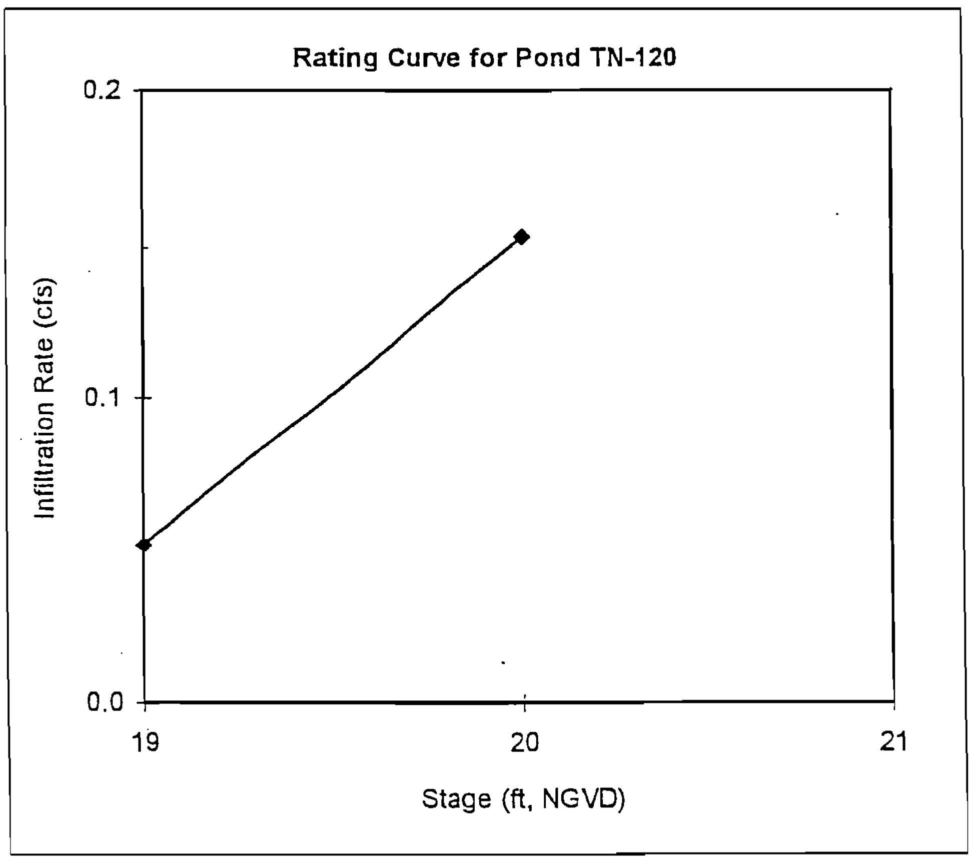


RPK
7/3/02

Rating Curve for Pond TN-120

Hydraulic Conductivity	(k)	ft/sec	7.28E-04
Hydraulic Conductivity	(k)	cm/s	2.22E-02
Max. Ground Water Elevation		ft, NGVD.	18.00
Average thickness of sand layer		ft	50

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.08	0.051
20.0	2.0	0.04	2.9E-05	0.12	0.153

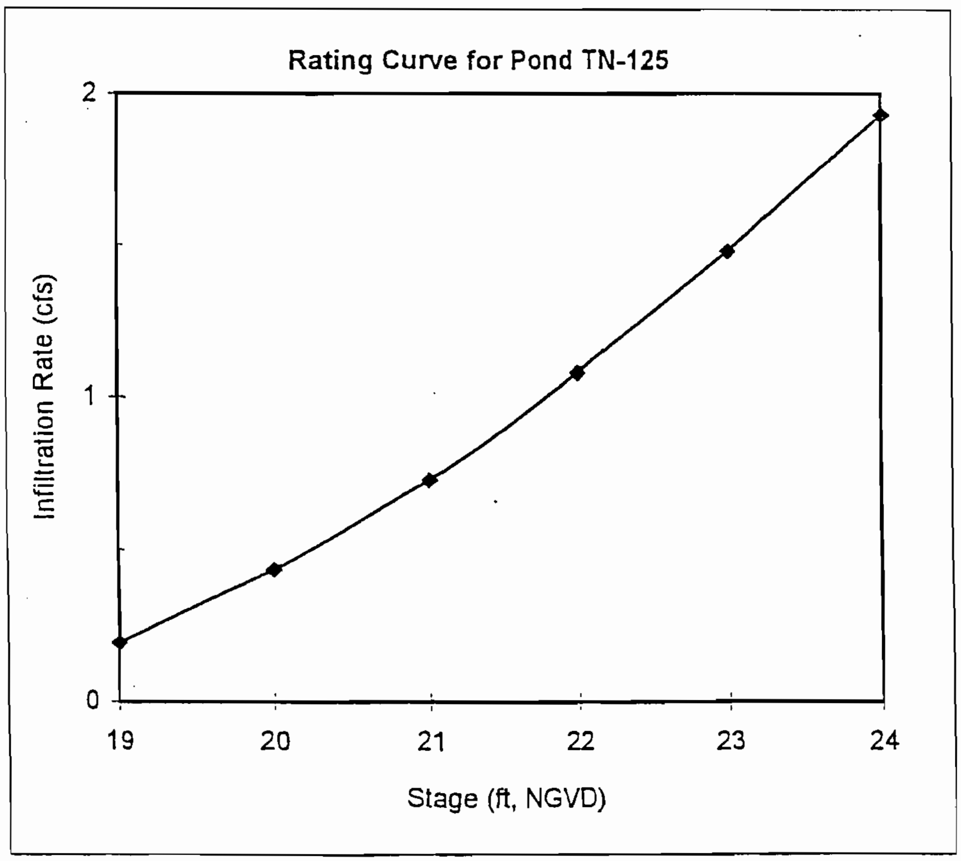


RPK
7/3/02

Rating Curve for Pond TN-125

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	**Head** (ft)	**Gradient**	**Unit Infiltration** $ft^3/s/ft^2$	**Area** acres	**Infiltration** cfs
19.0	1.0	0.02	1.5E-05	0.30	0.190
20.0	2.0	0.04	2.9E-05	0.34	0.433
21.0	3.0	0.06	4.4E-05	0.38	0.728
22.0	4.0	0.08	5.8E-05	0.42	1.076
23.0	5.0	0.10	7.3E-05	0.47	1.476
24.0	6.0	0.12	8.7E-05	0.51	1.929

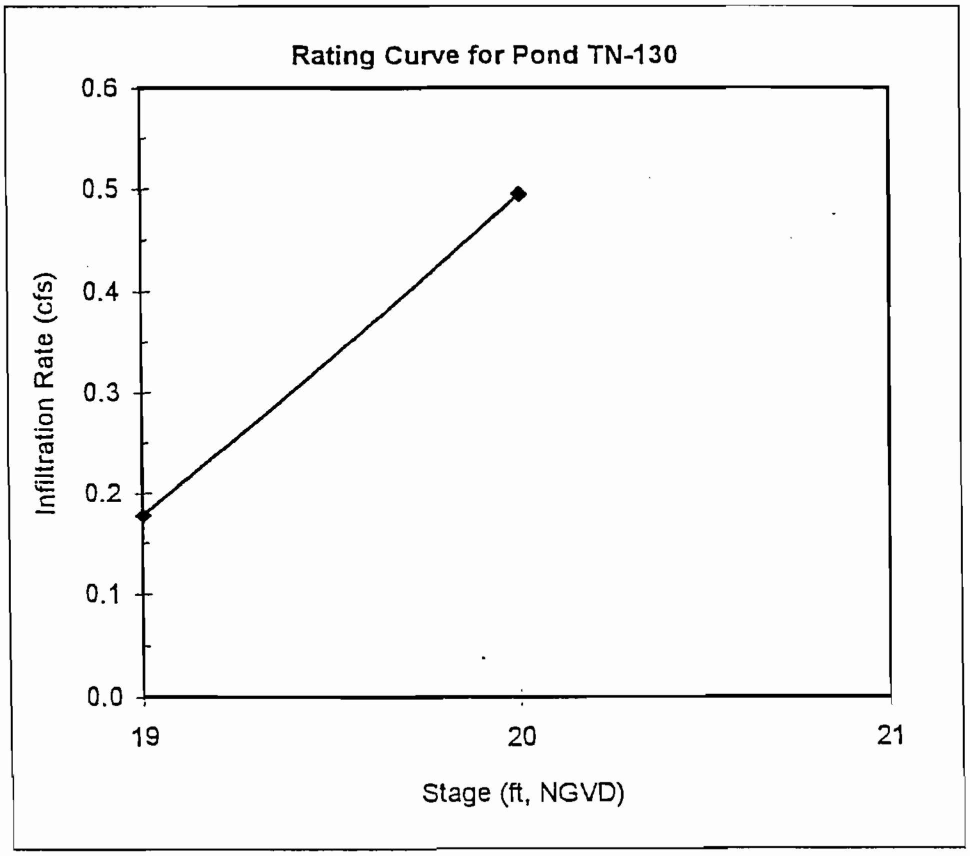


RPK
7/3/02

Rating Curve for Pond TN-130

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	**Head (ft)**	**Gradient**	**Unit Infiltration $ft^3/s/ft^2$**	**Area acres**	**Infiltration cfs**
19.0	1.0	0.02	1.5E-05	0.28	0.178
20.0	2.0	0.04	2.9E-05	0.39	0.495

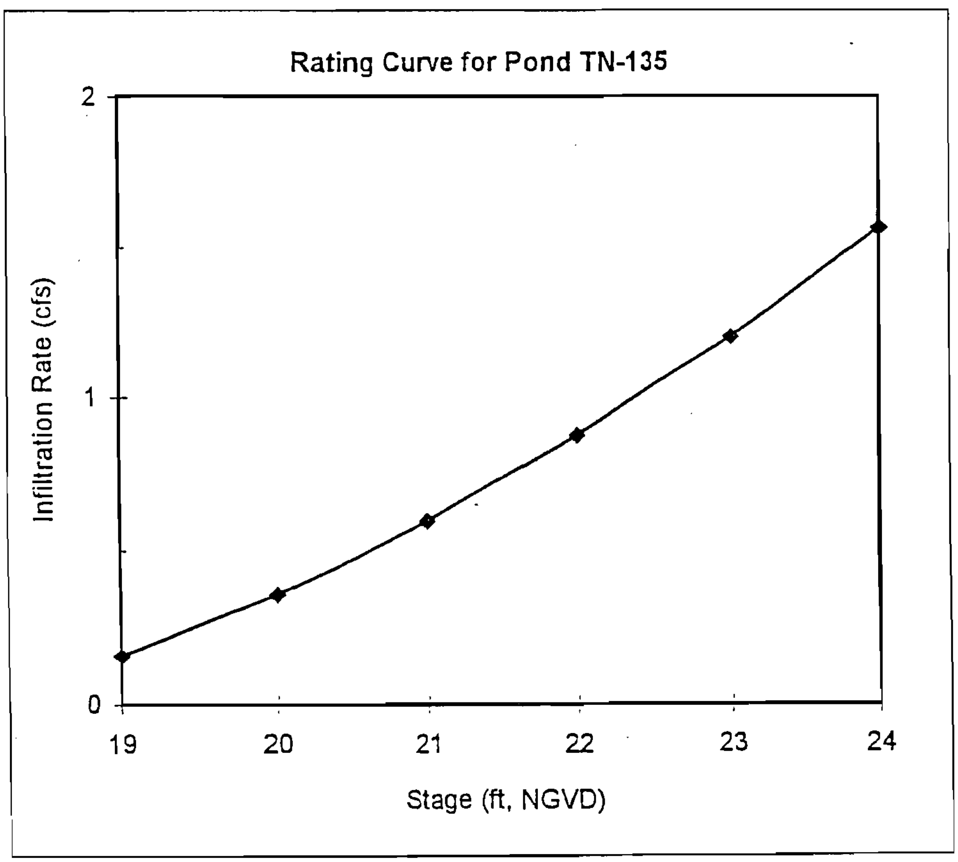


RPK
7/3/02

Rating Curve for Pond TN-135

Hydraulic Conductivity	(k)	ft/sec	7.28E-04
Hydraulic Conductivity	(k)	cm/s	2.22E-02
Max. Ground Water Elevation		ft, NGVD.	18.00
Average thickness of sand layer		ft	50

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.25	0.159
20.0	2.0	0.04	2.9E-05	0.28	0.358
21.0	3.0	0.06	4.4E-05	0.31	0.597
22.0	4.0	0.08	5.8E-05	0.35	0.878
23.0	5.0	0.10	7.3E-05	0.38	1.199
24.0	6.0	0.12	8.7E-05	0.41	1.560

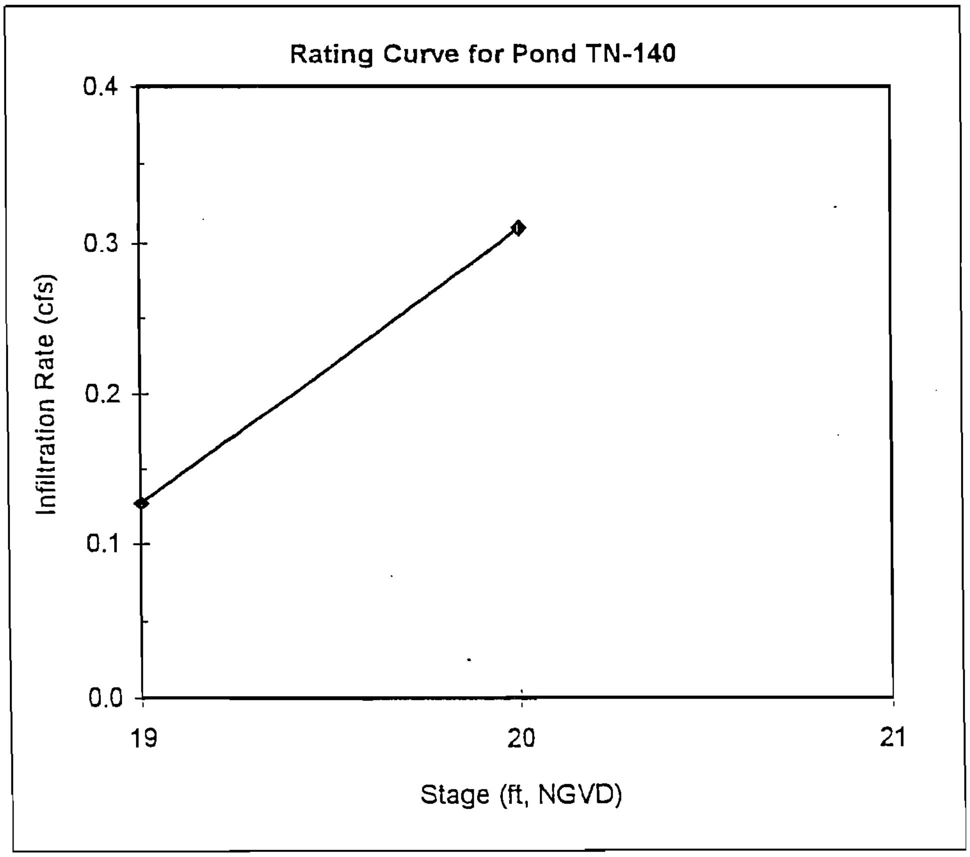


RPK
7/3/02

Rating Curve for Pond TN-140

Hydraulic Conductivity	(k)	ft/sec	7.28E-04
Hydraulic Conductivity	(k)	cm/s	2.22E-02
Max. Ground Water Elevation		ft, NGVD.	18.00
Average thickness of sand layer		ft	50

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.20	0.127
20.0	2.0	0.04	2.9E-05	0.24	0.310

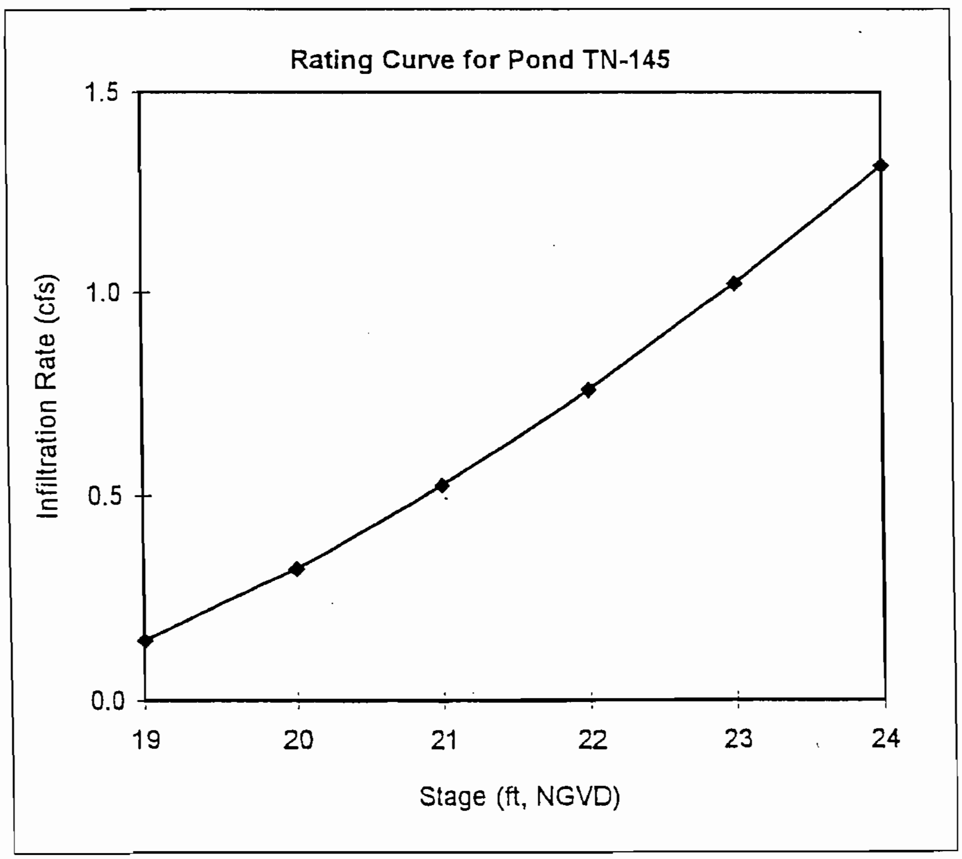


RPK
7/3/02

Rating Curve for Pond TN-145

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.23	0.146
20.0	2.0	0.04	2.9E-05	0.25	0.321
21.0	3.0	0.06	4.4E-05	0.28	0.526
22.0	4.0	0.08	5.8E-05	0.30	0.760
23.0	5.0	0.10	7.3E-05	0.32	1.024
24.0	6.0	0.12	8.7E-05	0.35	1.317

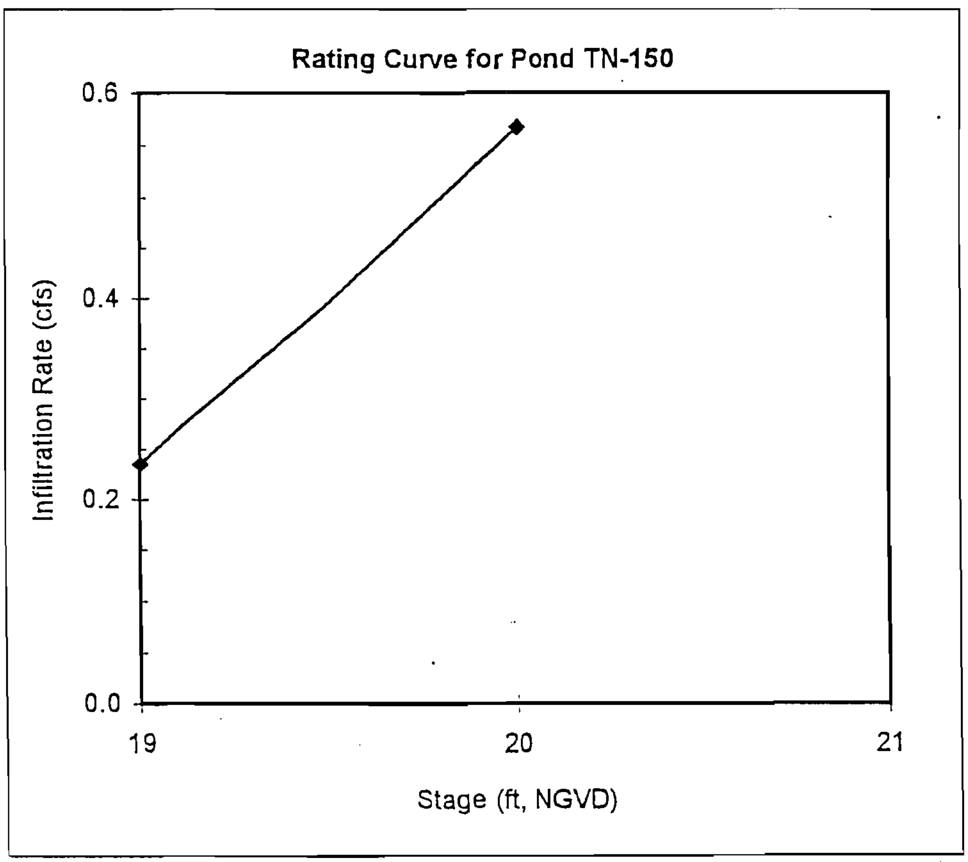


RPK
7/3/02

Rating Curve for Pond TN-150

Hydraulic Conductivity	(k)	ft/sec	7.28E-04
Hydraulic Conductivity	(k)	cm/s	2.22E-02
Max. Ground Water Elevation		ft, NGVD.	18.00
Average thickness of sand layer		ft	50

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.37	0.235
20.0	2.0	0.04	2.9E-05	0.45	0.567

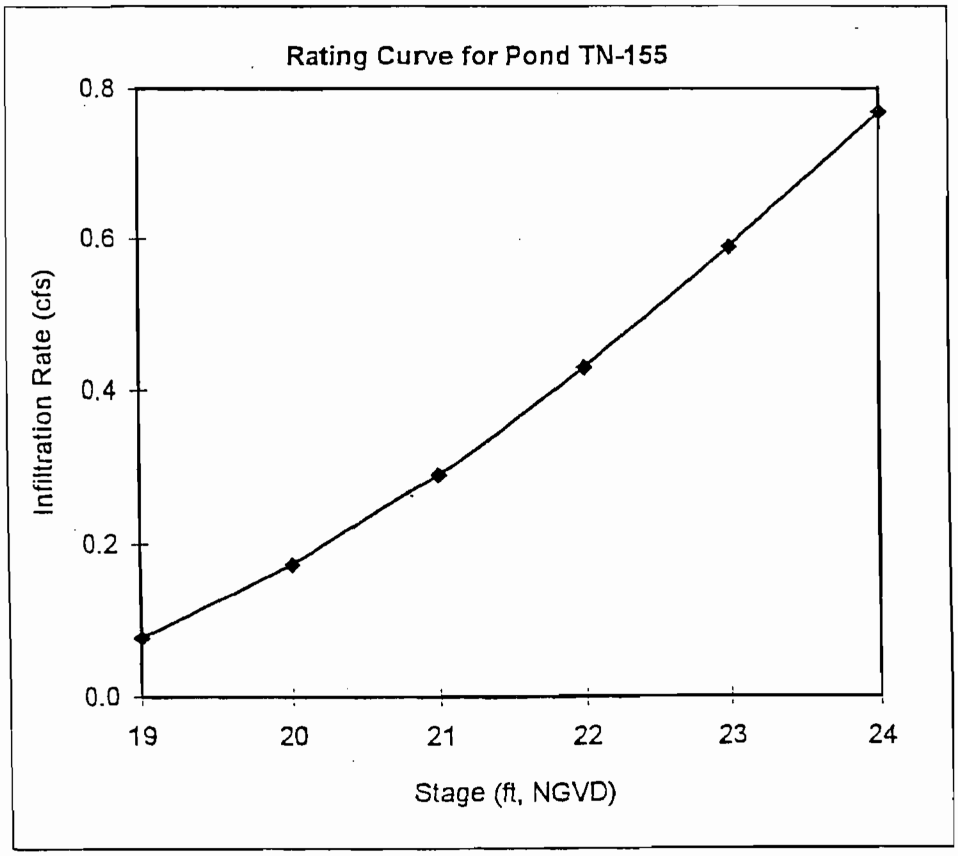


RPK
7/3/02

Rating Curve for Pond TN-155

Hydraulic Conductivity	(k)	ft/sec	7.28E-04
Hydraulic Conductivity	(k)	cm/s	2.22E-02
Max. Ground Water Elevation		ft, NGVD.	18.00
Average thickness of sand layer		ft	50

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.12	0.076
20.0	2.0	0.04	2.9E-05	0.14	0.173
21.0	3.0	0.06	4.4E-05	0.15	0.291
22.0	4.0	0.08	5.8E-05	0.17	0.429
23.0	5.0	0.10	7.3E-05	0.19	0.589
24.0	6.0	0.12	8.7E-05	0.20	0.769

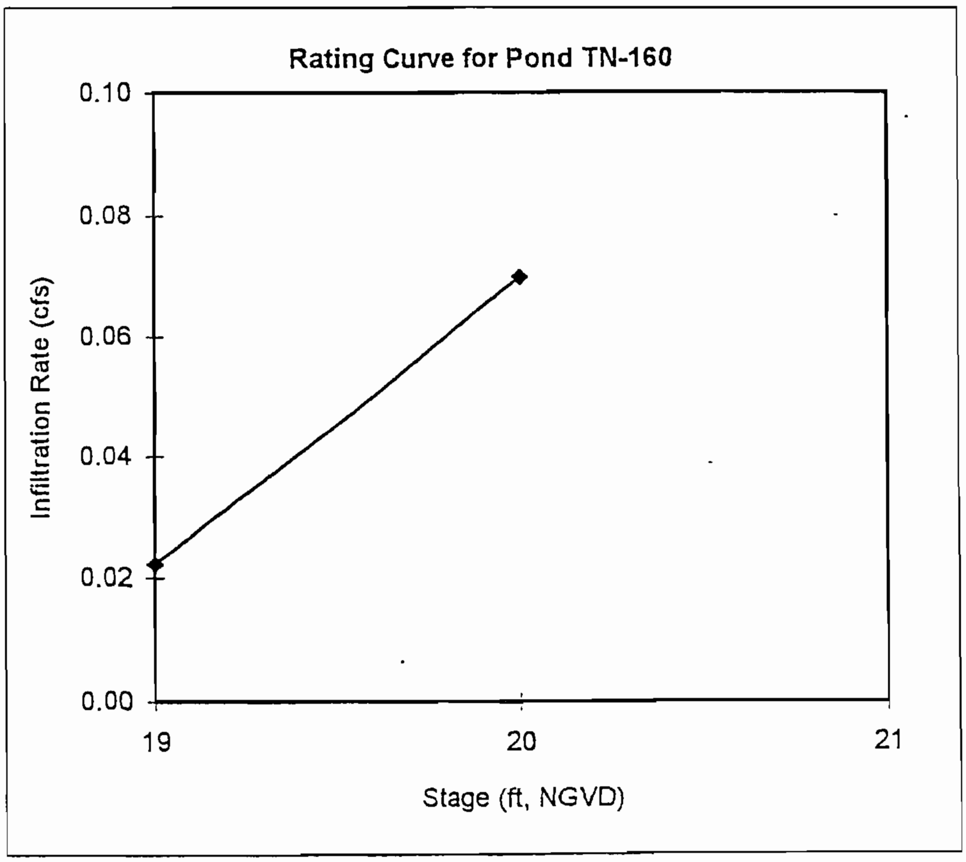


RPK
7/3/02

Rating Curve for Pond TN-160

Hydraulic Conductivity	(k)	ft/sec	7.28E-04
Hydraulic Conductivity	(k)	cm/s	2.22E-02
Max. Ground Water Elevation		ft, NGVD.	18.00
Average thickness of sand layer		ft	50

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.04	0.022
20.0	2.0	0.04	2.9E-05	0.06	0.070

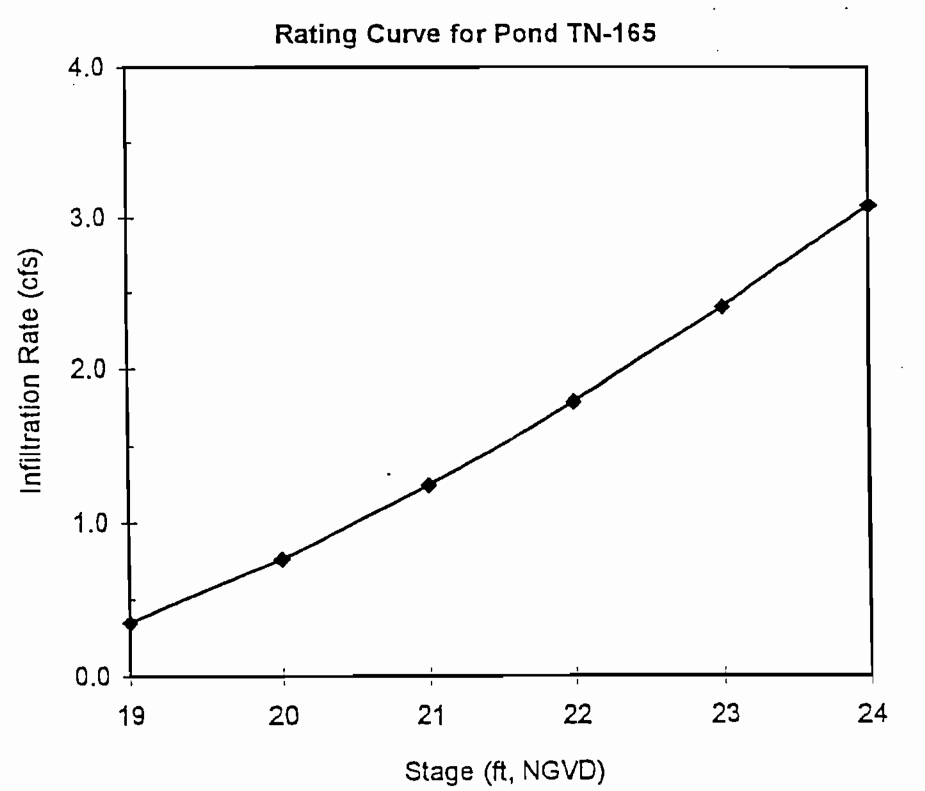


RPK
7/3/02

Rating Curve for Pond TN-165

Hydraulic Conductivity	(k)	ft/sec	7.28E-04
Hydraulic Conductivity	(k)	cm/s	2.22E-02
Max. Ground Water Elevation		ft, NGVD.	18.00
Average thickness of sand layer		ft	50

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.55	0.349
20.0	2.0	0.04	2.9E-05	0.60	0.763
21.0	3.0	0.06	4.4E-05	0.65	1.244
22.0	4.0	0.08	5.8E-05	0.71	1.790
23.0	5.0	0.10	7.3E-05	0.76	2.401
24.0	6.0	0.12	8.7E-05	0.81	3.079

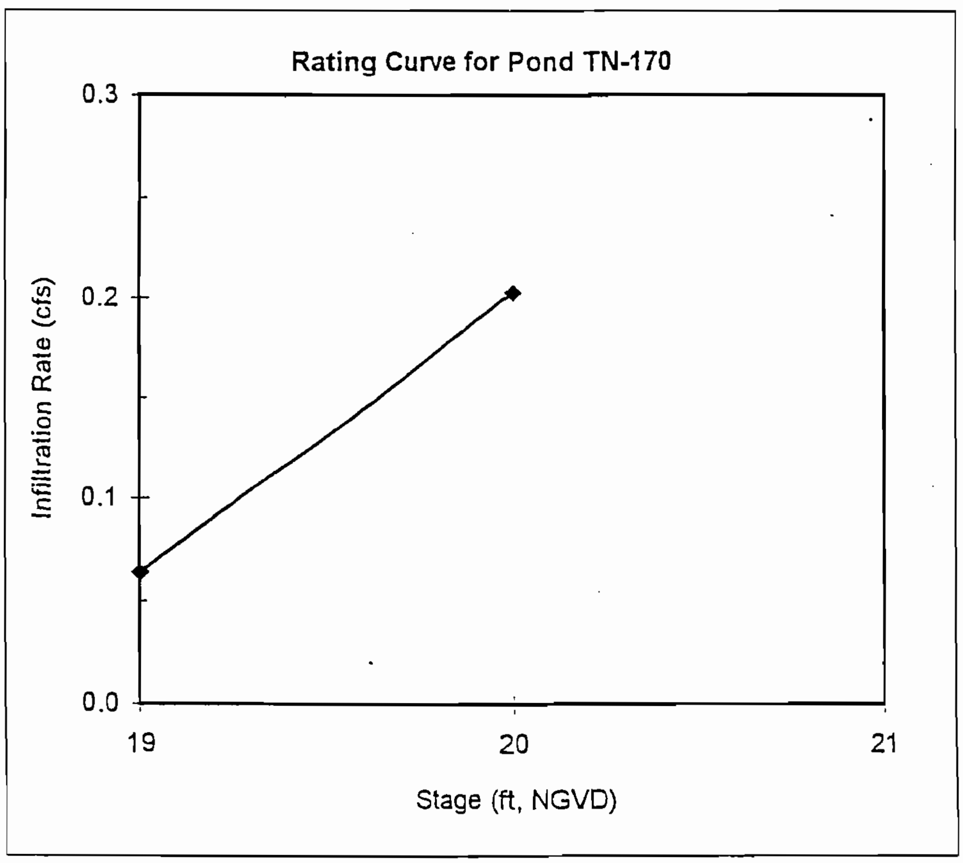


RPK
7/3/02

Rating Curve for Pond TN-170

Hydraulic Conductivity	(k)	ft/sec	7.28E-04
Hydraulic Conductivity	(k)	cm/s	2.22E-02
Max. Ground Water Elevation		ft, NGVD.	18.00
Average thickness of sand layer		ft	50

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.10	0.063
20.0	2.0	0.04	2.9E-05	0.16	0.203



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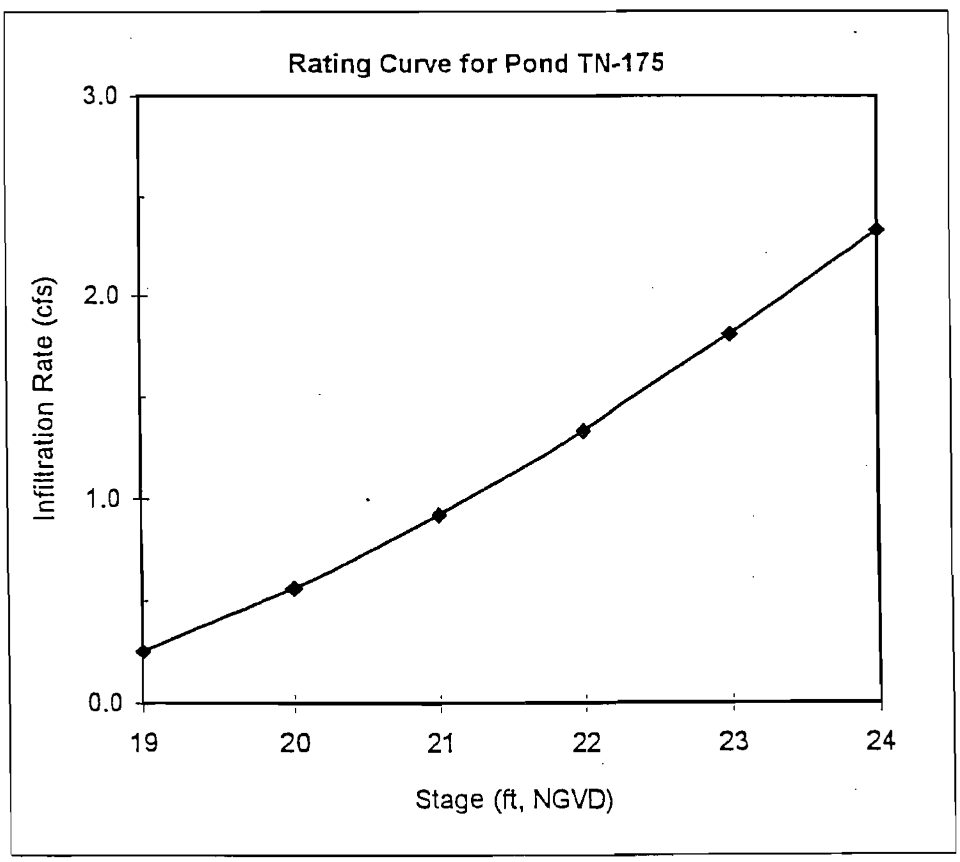
Rating Curve for Pond TN-175

Hydraulic Conductivity	(k)	ft/sec	**7.28E-04**
Hydraulic Conductivity	(k)	cm/s	**2.22E-02**
Max. Ground Water Elevation		ft, NGVD.	**18.00**
Average thickness of sand layer		ft	**50**

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
19.0	1.0	0.02	1.5E-05	0.40	0.254
20.0	2.0	0.04	2.9E-05	0.44	0.561
21.0	3.0	0.06	4.4E-05	0.48	0.922
22.0	4.0	0.08	5.8E-05	0.53	1.337
23.0	5.0	0.10	7.3E-05	0.57	1.806
24.0	6.0	0.12	8.7E-05	0.61	2.329



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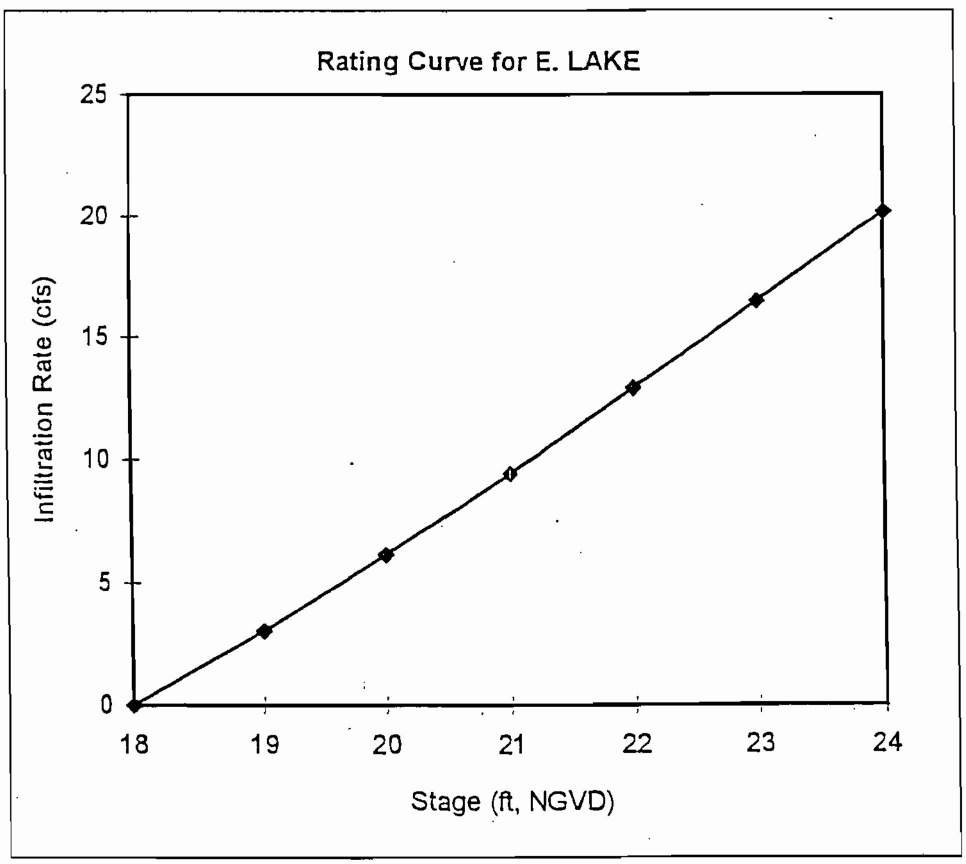
Rating Curve for East Lake

Hydraulic Conductivity	(k)	ft/sec	7.28E-04
Hydraulic Conductivity	(k)	cm/s	2.22E-02
Max. Ground Water Elevation		ft, NGVD.	18.00
Average thickness of sand layer		ft	100

Stage (ft NGVD)	Head (ft)	Gradient	Unit Infiltration $ft^3/s/ft^2$	Area acres	Infiltration cfs
18.0	0.0	0.00	0.0E+00	9.28	0.000
19.0	1.0	0.01	7.3E-06	9.50	3.012
20.0	2.0	0.02	1.5E-05	9.72	6.165
21.0	3.0	0.03	2.2E-05	9.94	9.459
22.0	4.0	0.04	2.9E-05	10.17	12.894
23.0	5.0	0.05	3.6E-05	10.39	16.470
24.0	6.0	0.06	4.4E-05	10.61	20.188



Appendix D
Groundwater Allocation Report

Appendix D
Groundwater Allocation Report

This appendix provides the technical support and back-up modeling information for the request to increase the average daily allocation of industrial supply water from 1.74 million gallons per day (mgd) to 3.49 mgd. The requested maximum daily allocation would increase from 2.39 mgd to 4.28 mgd. This increased allocation will enable the Lime Recalcination Facility (LRF) and Biosolids Pelletization Facility (BPF) to use the onsite Industrial Supply Wells (ISW) for industrial water use. The information provided in this appendix is consistent with the requirements of Chapter 40E-2, Florida Administration Code (FAC) (Water Use Permitting).

D.1 Site Information

The North County Resource Recovery Facility (NCRRF) is an existing 1,320-acre resource recovery facility that accepts Class I (sanitary) and Class III waste (construction debris and yard wastes). Inert ash residue and non-combustibles resulting from the Waste-to-Energy (WTE) Facility's combustion process are disposed of at the Class I landfill. This site was certified in 1985 by FDEP under Florida's Electrical Power Plant Siting Act (Chapter 62-17, FAC). This facility was constructed to meet the county's solid waste disposal needs after closure of the Dyer Boulevard Landfill, a 422-acre facility that accepted Class I and Class III solid waste until 1990. Prior to development as a landfill, the sites were relatively flat cow pasture. Predevelopment topographic elevations ranged from +17.0 to +18.0 feet National Geodetic Vertical Datum (NGVD).

The sites are located in the C-17 surface water management basin of the South Florida Water Management District (SFWMD). The C-17 Canal (Earman River) flows to the north and discharges into the Intracoastal Waterway (Lake Worth) just north of Singer Island. This canal provides flood control for the basin and maintains a hydraulic barrier against saltwater intrusion in the water supply. The C-17 basin is subdivided into several local water control districts. Each local water control district has a drainage canal or ditch that discharges into the C-17 Canal.

D.1.1 Location Sketch

The NCRRF and Dyer Boulevard landfills are located in northeastern Palm Beach County, Florida. A map of northern Palm Beach County showing the location of both sites is presented on **Figure D-1**. More specifically, the NCRRF is bounded on the east by the Florida Turnpike, on the south and west by the City of West Palm Beach Water Catchment Area (WPBWCA), and on the north by State Road 710. Dyer Boulevard Landfill is a triangular-shaped property bounded on the west by Florida's Turnpike, on the south by Dyer Boulevard, on the north by State Road 710, and on the east by Haverhill Road.

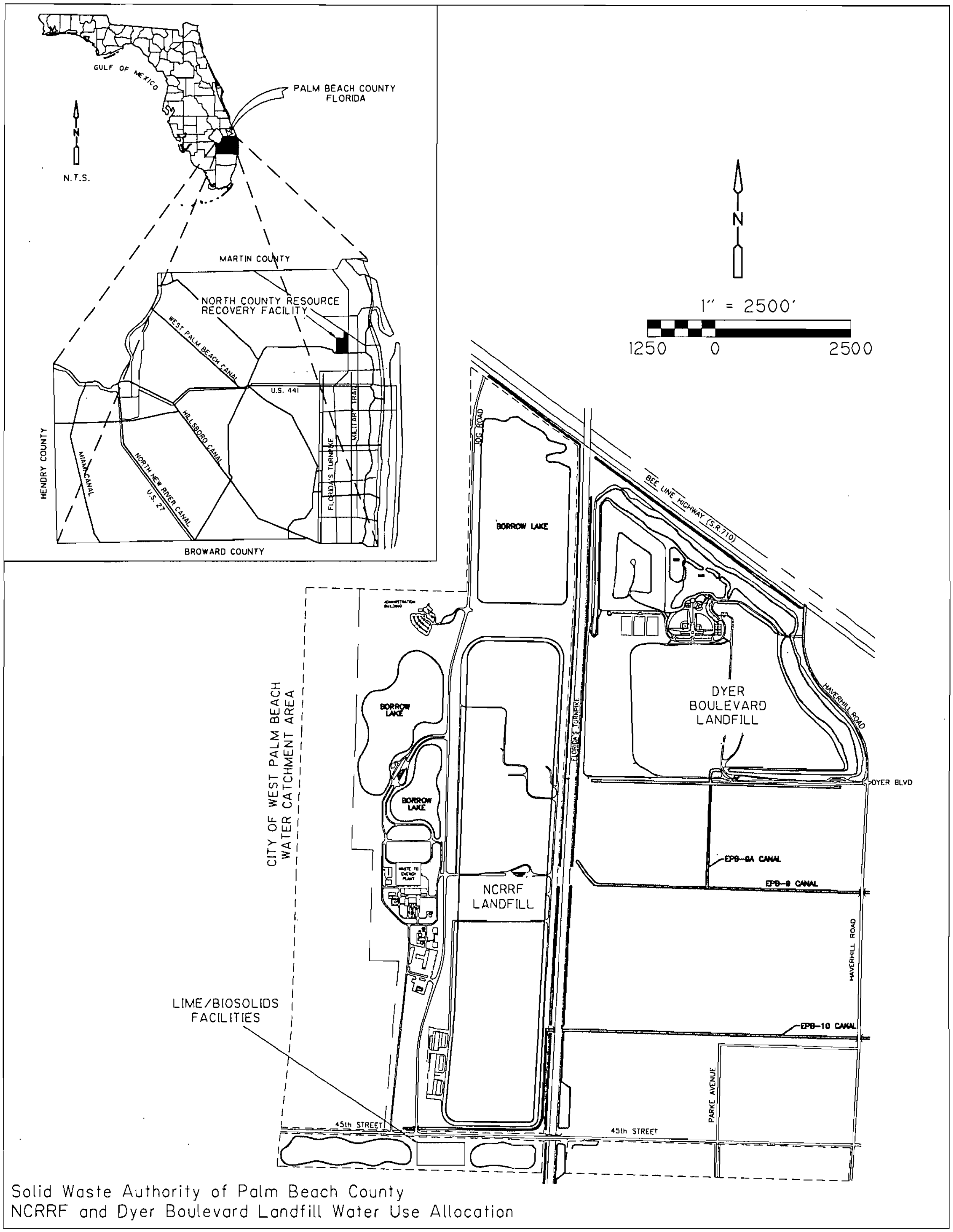


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Figure D-1
Site Location Map

D.1.2 Aerial Photograph

A recent aerial photograph of the project site is provided on **Figure D-2**. The figure shows the boundaries of the project site and location of pertinent facilities associated with the project.

D.1.3 Wetlands

The designations and descriptions of existing vegetative cover as described by the SFWMD 1995 Land Use database are provided on **Figure D-3**. As indicated, the land included within the project is designated primarily as barren land and utilities. Information regarding preservation areas and/or wetlands is provided in Section 2 and Appendix H of Volume I of this Request for Amendment. Drawdown of the groundwater table resulting from the increase in allocation near wetlands is discussed in Section D.3.5.

D.2 Project Information

D.2.1 General Information

The Solid Waste Authority of Palm Beach County (SWA) is currently responsible for processing and disposing of the solid waste collected in all 37 Palm Beach County municipalities and the unincorporated area of Palm Beach County. Recently, SWA has been approached by several of these municipalities regarding the growing need for alternative disposal methods for both lime softening and wastewater sludges from their water and wastewater plants, respectively.

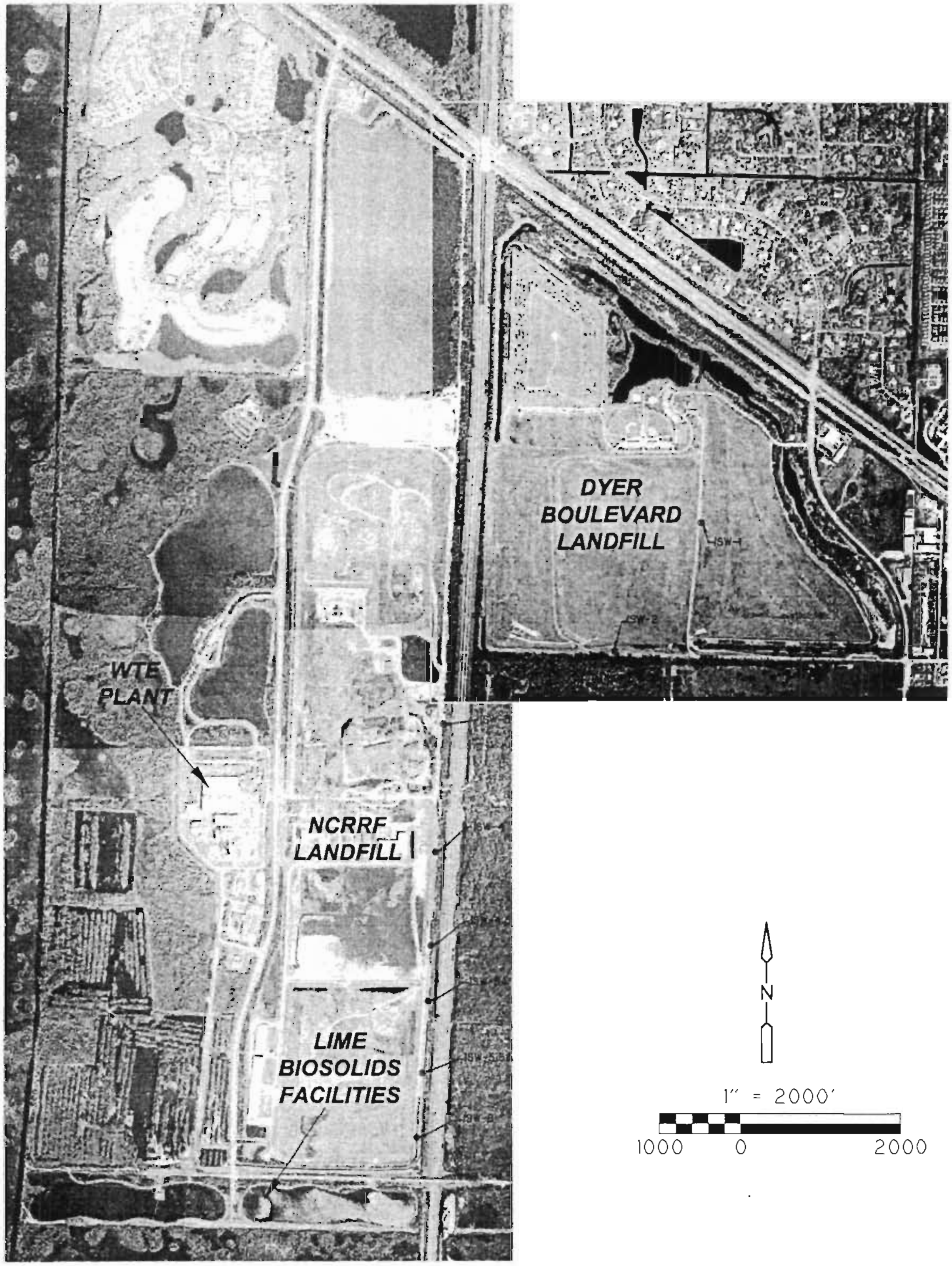
SWA has proposed the construction of two facilities to address the concerns of these municipalities. The LRF will recycle lime sludge into quicklime, for reintroduction into the water softening process. The BPF will process wastewater sludge by drying it and producing a potentially marketable pelletized product. These facilities will be located at the SWA Complex at 7501 N. Jog Road in West Palm Beach (WPB) (See **Figure D-4**). Specifically, they will occupy 15 acres of the 31-acre site located at the corner of Jog Road and 45th Street. This parcel of land is owned by SWA, and is currently permitted for landfill use. The facilities are described in further detail in the following sections and Section 3 of the Request for Amendment.

D.2.2 Surface Water Management

The surface water management for the project area is permitted under the Power Plant Siting Act (PPSA) [PA 84-20]. Changes to the surface water management system of the PPSA are planned and submitted in Appendix C of this request. In addition, the allocation increase requested herein is used primarily for industrial processes and no surface water discharge will be generated.

D.2.3 Right-of-Way Occupancy

There are no withdrawals from the SFWMD Canal System related to the water use allocation increase and therefore, no SFWMD right-of-way occupancy is impacted.



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Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

Flight date: 4/15/98

Figure D-2
Aerial Photograph

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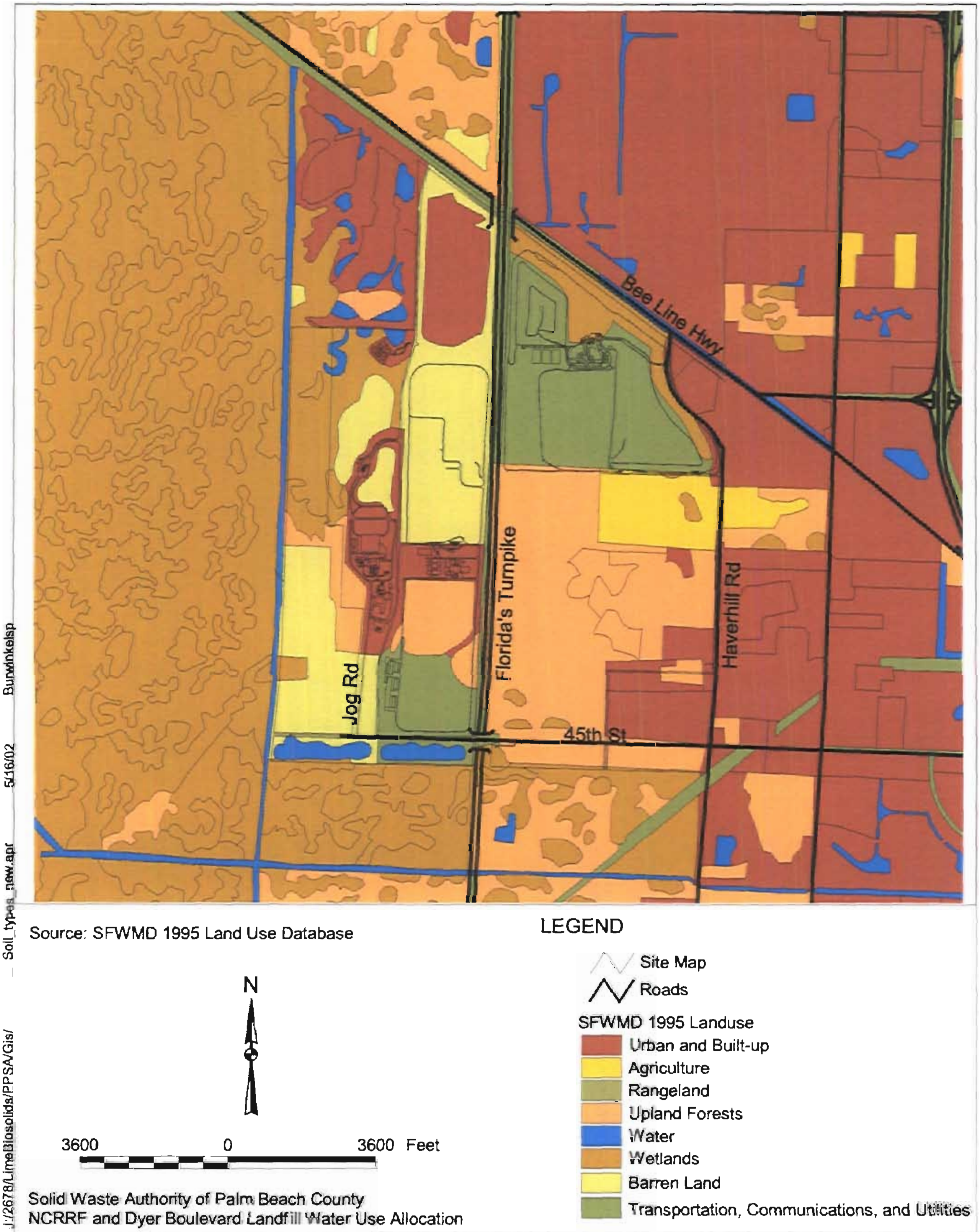

Figure D-3
Land Use in Project Area and Vicinity

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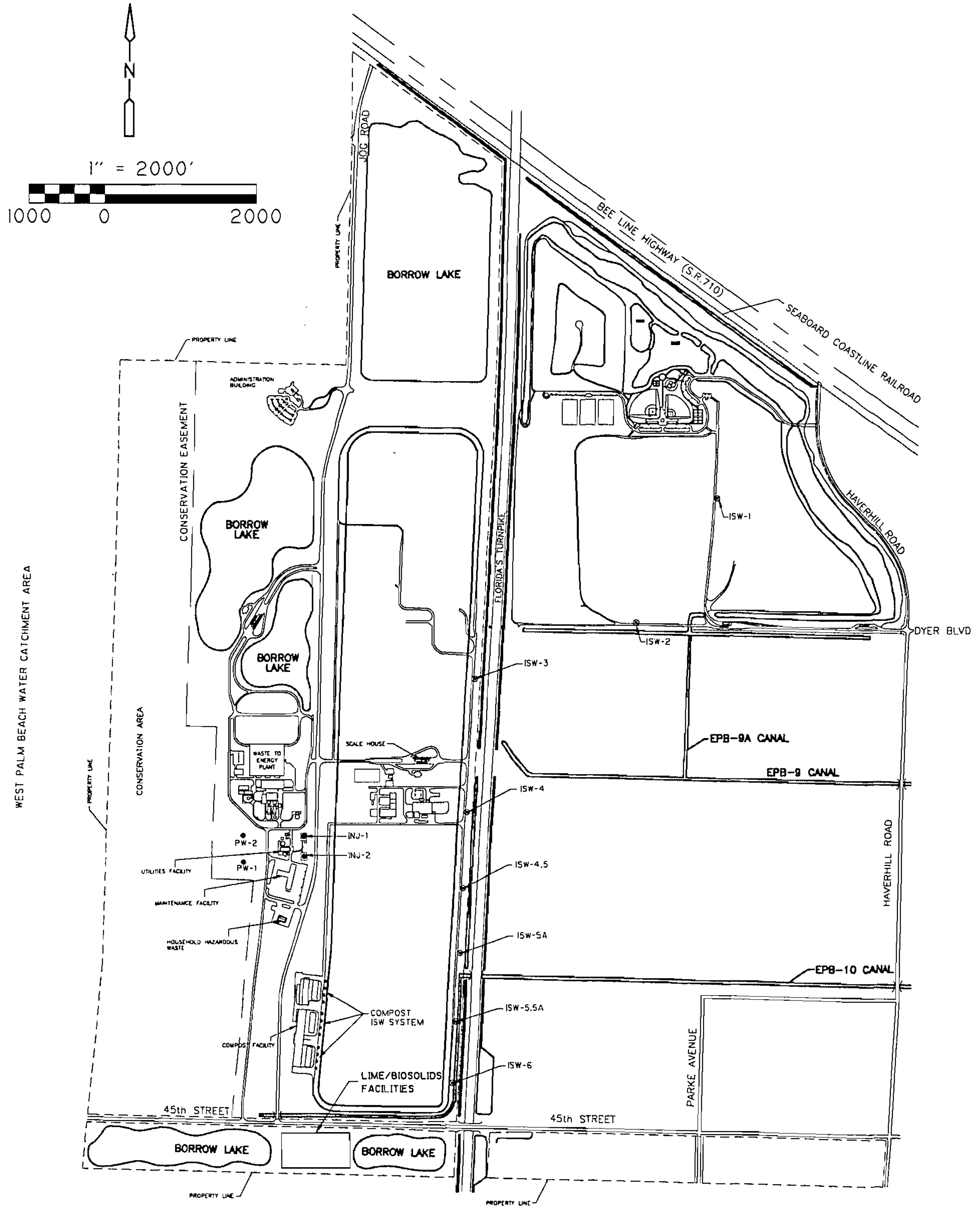

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

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Figure D-4
Site Map

D.2.4 Facilities

The existing withdrawal facilities for this project are permitted in conjunction with the current PPSA certification. The current system consists of a total of 20 industrial supply wells (19 production and 1 standby) located throughout the site. Two wells (ISW-1 and ISW-2) are located at Dyer Park and are used exclusively for irrigation at Dyer. Twelve wells (CISW-1 through CISW-12) are located on the western edge of the Class I landfill cells. These wells are used to supply the NCRRF Compost Facility with a water supply for irrigation and humidification purposes. The final six wells are the NCRRF supply wells [ISW-3, 4, 4.5, 5A, 5.5A, and 6(s)]. The well specifications for these wells vary significantly. A summary of the well specifications is provided in **Table D-1**.

Table D-1 Existing NCRRF and Dyer Boulevard Landfill Well Specifications

Site Name	Well Name	Easting (ft NAD83)	Northing (ft NAD83)	Screen Interval Top (ft NGVD)	Screen Interval Bottom (ft NGVD)	Approximate Pump Capacity (gpm)
NCRRF	ISW-3	938,888	888,952	-36	-106	500
	ISW-4	938,787	887,194	-2	-92	600
	ISW-4.5	938,732	886,197	0	-20	400
	ISW-5A	938,693	885,358	4	-26	400
	ISW-5.5A	938,628	884,474	5	-25	400
	ISW-6(s)	938,588	883,675	-3	-54	300
	CISW-1	936,905	884,995	-2	-22	40
	CISW-2	936,895	884,906	-2	-22	40
	CISW-3	936,885	884,817	-2	-22	40
	CISW-4	936,874	884,725	-2	-22	40
	CISW-5	936,861	884,584	-2	-22	40
	CISW-6	936,850	884,494	-2	-22	40
	CISW-7	936,840	884,405	-2	-22	40
	CISW-8	936,834	884,313	-2	-22	40
	CISW-9	936,812	884,144	-2	-22	40
	CISW-10	936,801	884,055	-2	-22	40
	CISW-11	936,791	883,965	-2	-22	40
	CISW-12	936,780	883,874	-2	-22	40
DYER	ISW-1(s)	942,092	891,286	-27	-52	400
	ISW-2	941,020	889,686	-32	-102	400

Currently, the design of system modifications is underway to provide better hydraulic gradient control on the eastern NCRRF boundary and prevent any potential leachate from migrating to the highly transmissive Turnpike Aquifer. This will be accomplished by adding four additional supply wells (ISW-2.5, 3.5, 5.25, and 5.75) and shallowing the deeper, existing supply wells. ISW-3, due to its design, cannot be shallowed and consequently will be replaced (ISW-3A) at the same location.

However, ISW-3 will be kept as standby. Two additional wells (ISW-7 and 8) are proposed in order to minimize impacts to surrounding environmentally sensitive areas. Finally, modifications will also be made to the system operation so that water is extracted more proportionally from each well. A summary of the proposed well specifications is provided in **Table D-2**. Groundwater flow simulations for the proposed increase were conducted under both scenarios (with and without the modifications).

There are no surface water withdrawals or withdrawal culverts proposed in this modification.

Table D-2 Proposed NCRRF and Dyer Boulevard Landfill Well Specifications

Site Name	Well Name	Easting (ft NAD83)	Northing (ft NAD83)	Screen Interval		Approximate Pump Capacity (gpm)
				Top (ft NGVD)	Bottom (ft NGVD)	
NCRRF	ISW-3	938,888	888,952	-36	-106	500
	ISW-3A	938,888	888,952	5	-25	400
	ISW-4	938,787	887,194	-2	-92	600
	ISW-4.5R	938,732	886,197	5	-25	400
	ISW-5A	938,693	885,358	4	-26	400
	ISW-5.25	938,654	884,912	5	-25	200
	ISW-5.5A	938,628	884,474	5	-25	400
	ISW-5.75	938,607	884,072	5	-25	200
	ISW-6(s)	938,588	883,675	-3	-53	300
	ISW-7	936,738	888,541	-30	-80	600
	ISW-8	936,099	886,756	-30	-60	400
	CISW-1	936,905	884,995	-2	-22	30
	CISW-2	936,895	884,906	-2	-22	30
	CISW-3	936,885	884,817	-2	-22	30
	CISW-4	936,874	884,725	-2	-22	30
	CISW-5	936,861	884,584	-2	-22	30
	CISW-6	936,850	884494	-2	-22	30
	CISW-7	936,840	884,405	-2	-22	30
	CISW-8	936,834	884,313	-2	-22	30
	CISW-9	936,812	884,144	-2	-22	30
	CISW-10	936,801	884,055	-2	-22	30
	CISW-11	936,791	883,965	-2	-22	30
	CISW-12	936,780	883,874	-2	-22	30
DYER	ISW-1(s)	942,092	891,286	-27	-52	400
	ISW-2(s)	941020	889686	-32	-72	400

D.2.5 Potential Groundwater Impact Issues

Wetlands in the vicinity of the supply wells are the West Palm Beach Wetlands southeast of the site as shown on **Figure D-5**. Major water bodies (i.e. lakes and canals) in the vicinity of the supply wells are limited to on-site borrow ponds and minor drainage canals. The borrow ponds are generally located outside the radius of influence of the supply wells. Therefore, no adverse impacts to the environment are expected (see Section D.3.5 for simulation results of the groundwater flow model).

There is no expected saline water intrusion associated with pumping of the supply wells due to the location of the project site relative to the coast. The wells extract water from the surficial aquifer above the thick, low-permeable Hawthorn Formation.

The potential for induced contamination movement is considered minimal based on the location of the supply wells. The NCRRF and Dyer supply wells were located and installed such that the pumping would control any contamination or potential contamination that occurs. In addition, the water extracted is consumed by industrial processes (i.e. WTE plant and the proposed LRF/BPF).

There are no expected adverse impacts to land used outside of the NCRRF property boundary. The area east of NCRRF and south of Dyer is primarily barren land.

The only potential impact to existing offsite uses is the City of Riviera Beach Western Wellfield (CRB-WEST). The CRB-WEST is located east and southeast of the NCRRF supply wells. The overall impact to this existing user is discussed in Section D.3.6.

The additional increase in water withdrawal allocation is not expected to cause any adverse impacts and therefore no mitigation program is necessary.

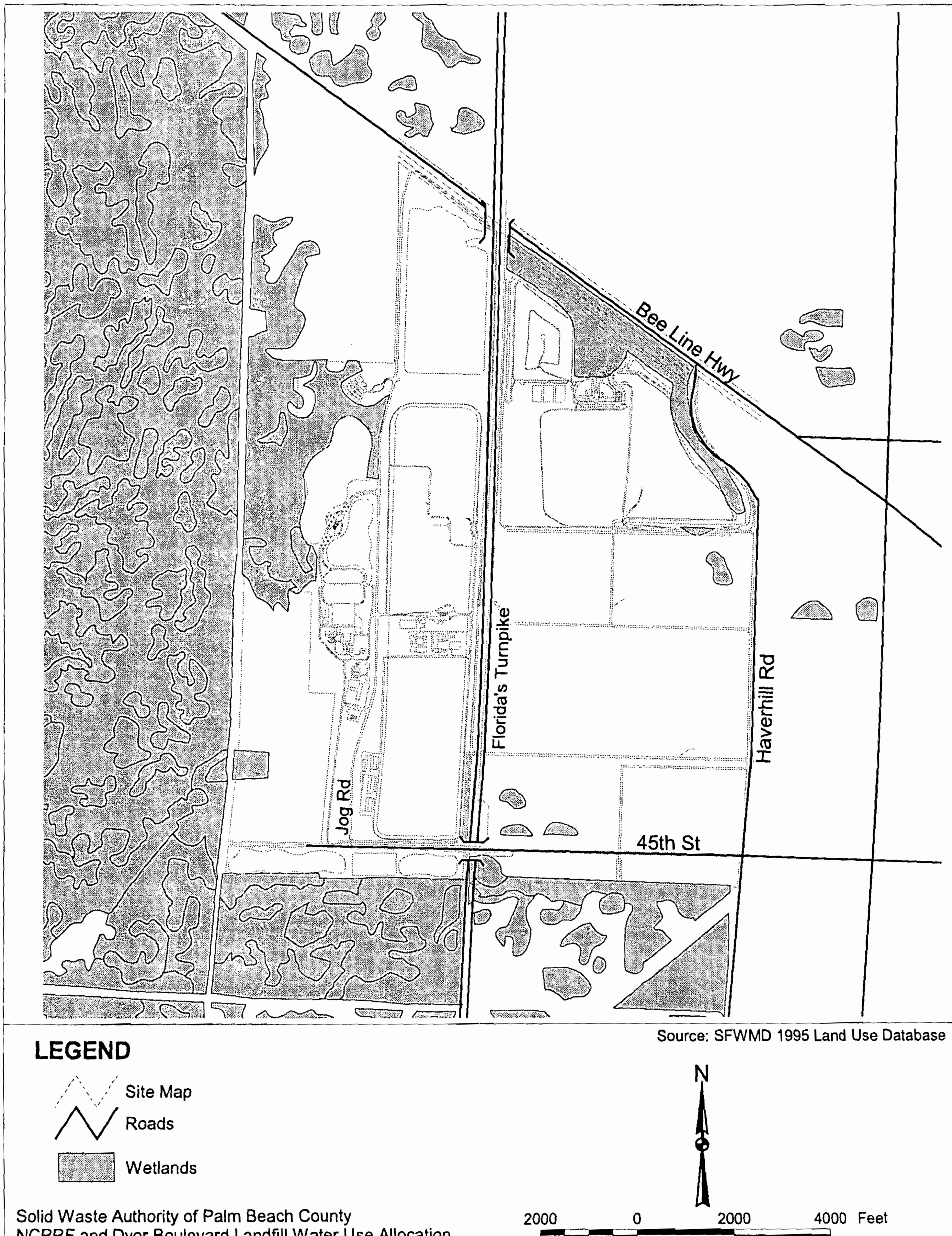
D.2.6 Potential Groundwater Pollution Sources

The possible pollution sources within immediate vicinity of the supply wells include: the existing NCRRF Class I and Class III landfill cells (lined landfill), the closed Dyer Boulevard Landfill, the NCRRF hazardous waste collection facility, the WTE plant, NCRRF Compost Facility, and the proposed LRF/BPF. These facilities, along with other potential pollution sources within a 1-mile radius of the site, are shown in **Figure D-6**.

D.3 Industrial Water Use

D.3.1 Ownership and Land Use

Proof of ownership and compatibility of land use with the proposed changes are not applicable in this case. The purpose of this modification is to increase the allocation of water use under PA 84-20.



Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

Figure D-5
Wetlands in Project Area and Vicinity

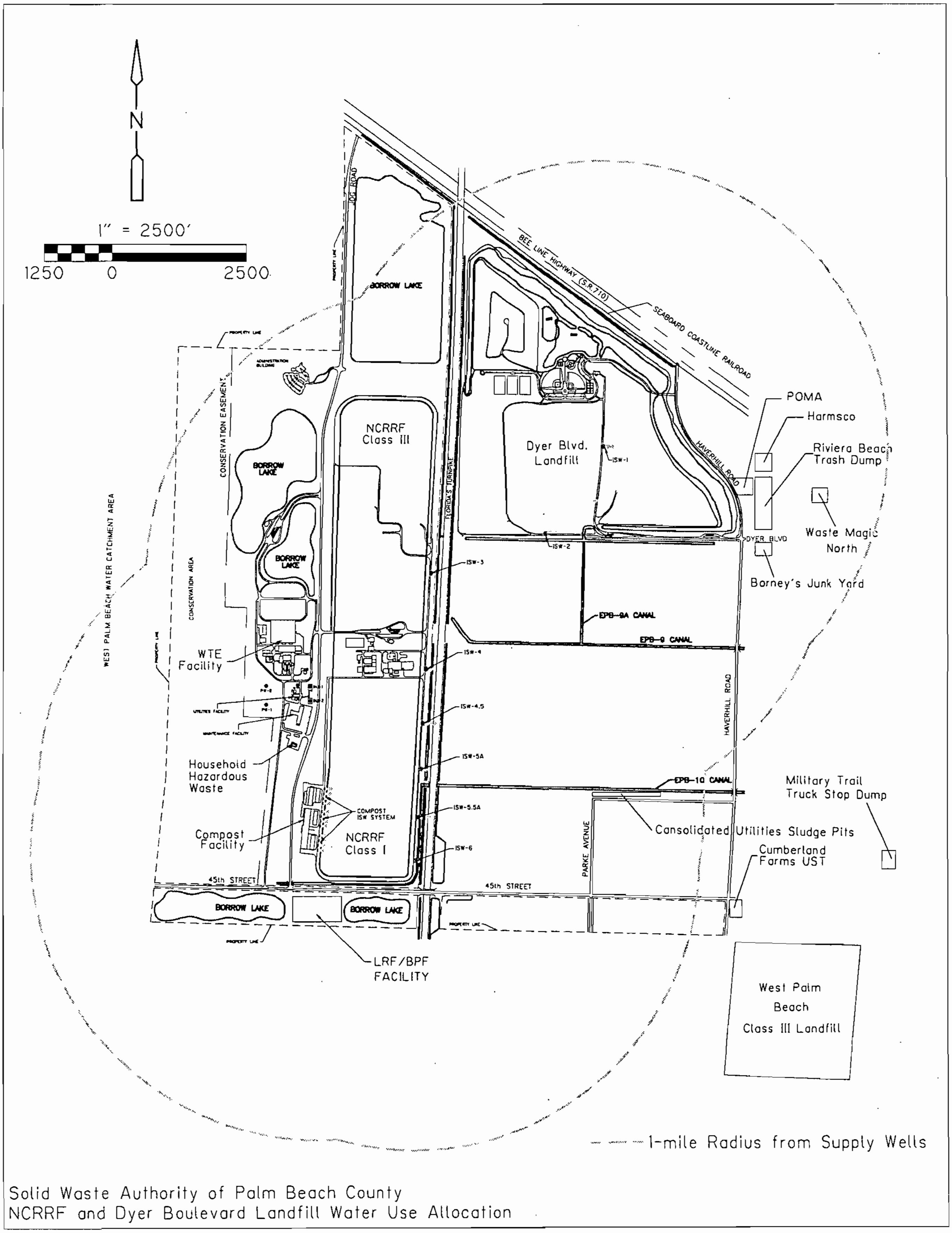


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Figure D-6
Location of Pollution Sources

D.3.2 Water Demand Analysis

The current water allocation for the NCRRF and Dyer Boulevard Landfill site is set forth in PA 84-20. The allocation is divided among three separate water sources: industrial supply wells at the NCRRF eastern boundary, potable wells at the western portion of site, and industrial supply wells at Dyer. The average and maximum daily water allocation for the site (sum of each of water supply facilities) is currently 1.74 and 2.39 mgd, respectively. The majority of the water allocation is from the NCRRF ISW system, currently at 1.64 mgd (average). The potable water wells (total of 2) were constructed, but were never used. The water allocation for the two potable wells is 91,600 (average) gallons per day (gpd). The Dyer industrial supply wells (ISW-1 and ISW-2) are independent of the NCRRF ISW system and are allocated at 10,000 gpd.

A comprehensive water balance of the entire facility in average and maximum daily flows is shown on **Figure D-7** and in **Table D-3**.

Table D-3 Overall Site Water Budget

Water Source	**Water User**	*INFLOW*		*OUTFLOW*	
		Average (gpd)	*Maximum (gpd)*	*Average (gpd)*	*Maximum (gpd)*
Potable Water - Chlorinated					
	LRF/BPF	500	600	500	600
	Current Facilities	20,000	28,000	20,000	28,000
	Subtotal	20,500	28,600	20,500	28,600
Potable Water - De-Chlorinated					
	Resource Recovery	212,000	318,000	"A"	"A"
Total		**232,500**	**346,600**	**20,500**	**28,600**
Leachate		247,000	631,000	247,000	631,000
Industrial Supply					
	NCRRF - Resource Recovery[B]	1,640,000	2,160,000	644,000	919,000
	NCRRF - RO Plant (proposed)	100,000	100,000	40,000	40,000
	NCRRF - LRF/BPF[C]	1,540,000	1,690,000	491,900	491,900
	NCRRF Subtotal	3,280,000	3,950,000	1,175,900	1,450,900
	Compost Facility – Biofilters[D]	50,000	70,000	27,000	100,000
	NCRRF Irrigation	10,000	10,000	0	0
	Dyer - Dyer Park	150,000	250,000	0	0
Total		**3,490,000**	**4,280,000**	**1,202,900**	**1,550,900**

Notes:

[A] Outflow included with NCRRF Resource Recovery Industrial Supply Well

[B] Outflow includes de-chlorinated potable water disposed of by deep injection wells

[C] Variability in inflow between average and maximum due to irrigation demand

[D] Increased outflow due to extreme rain events

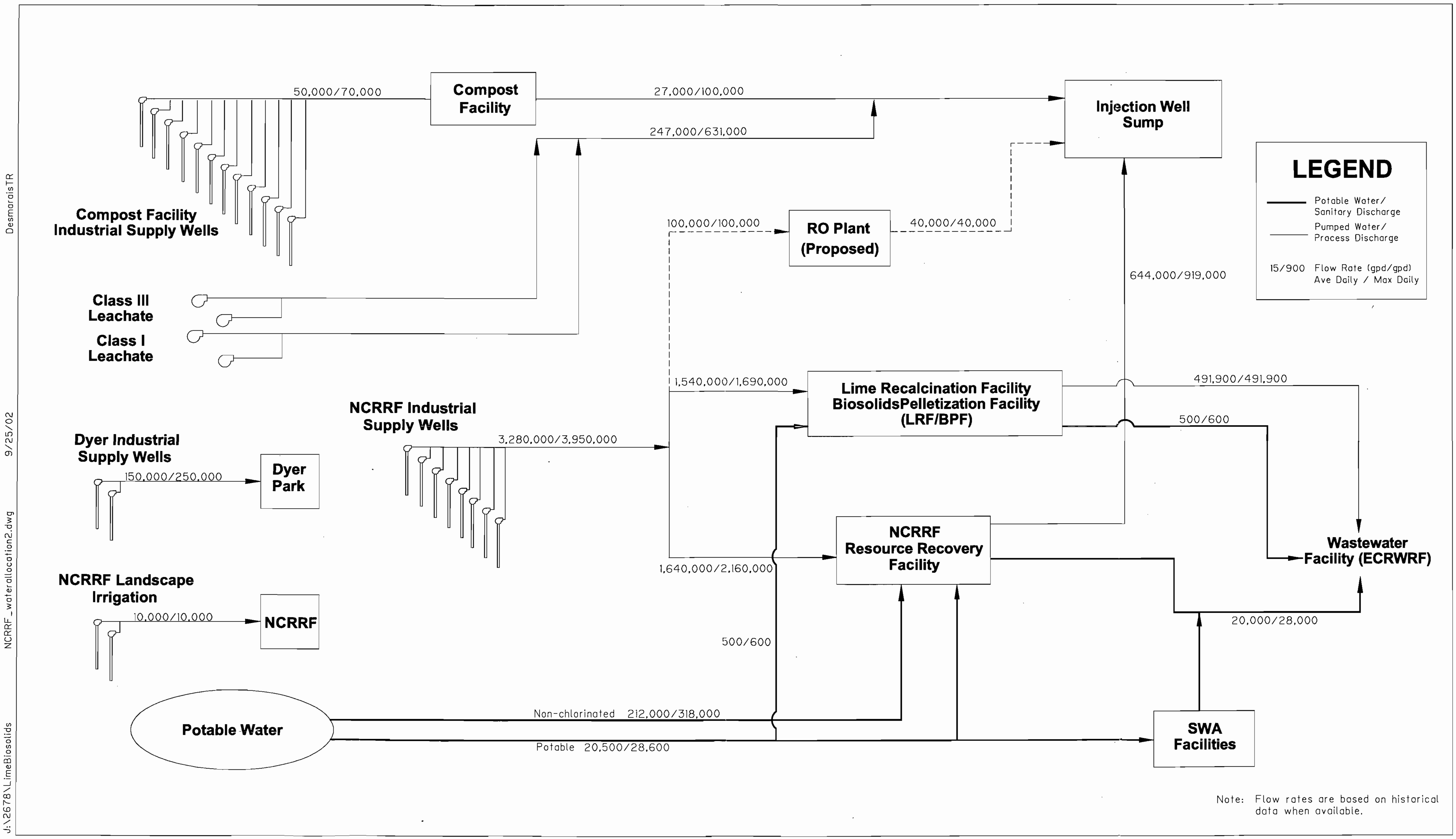

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Figure D-7
Overall Water Balance Design Diagram

A separate water balance for the proposed facilities is provided on **Figure D-8** and in **Table D-4**. The proposed facilities water balance is provided for maximum daily flows for initial and final build-out.

Table D-4 LRF/BPF Water Budget

Process	INFLOW			OUTFLOW		
	Peak (gpm)	Initial Capacity (gpd)	Full Build-out (gpd)	Peak (gpm)	Initial Capacity (gpd)	Full Build-out (gpd)
Potable Water						
BPF[A]	-	100	200	-	100	200
LRF[B]	-	400	400	-	400	400
Total	-	**500**	**600**	-	**500**	**600**
Industrial Supply						
LRF - Truck Washdown	15	1,000	1,000	15	1,000	1,000
LRF - Lime Make Up	200	288,000	288,000	-	-	-
LRF Subtotal	215	289,000	289,000	15	1,000	1,000
BPF - Dryer Pellet Cooler	108	51,800	154,500	99	47,500	142,600
BPF - Venturi Scrubber[C]	171	82,100	245,300	177	85,000	254,900
BPF - Cooling Tower	135	64,800	193,500	33	15,800	47,500
BPF - Odor Control	450	216,000	643,000	30	14,400	43,200
BPF - Truck Washdown	45	900	2,700	45	900	2,700
BPF Subtotal	909	415,600	1,239,000	384	163,600	490,900
Irrigation	225	162,000	162,000	-	-	-
Total	**1,349**	**866,600**	**1,690,000**	**399**	**164,600**	**491,900**

Notes:

[A] Flows for initial capacity based on 8 workers at 25 gpd per worker (Chapter 64E-6, FAC)

[B] Flows based on 15 workers at 25 gpd per worker (Chapter 64E-6, FAC)

[C] Additional water in outflow due to exhaust gas condensate accumulated during process

Currently, the total average water use at the site is 1.74 mgd with a maximum water use of 2.39 mgd. With future water users (Lime/Biosolids Facility and a possible reverse osmosis (RO) plant), the average water demand will be 3.49 mgd. The total maximum daily water demand will be 4.28 mgd, which represents the water use if all users use the maximum on the same day. The requested average annual allocation is 3.49 mgd or 1,275 million gallons per year (mgy). This represents an increase of 1.75 mgd or 639 mgy. The requested maximum daily withdrawal is 4.28 mgd.

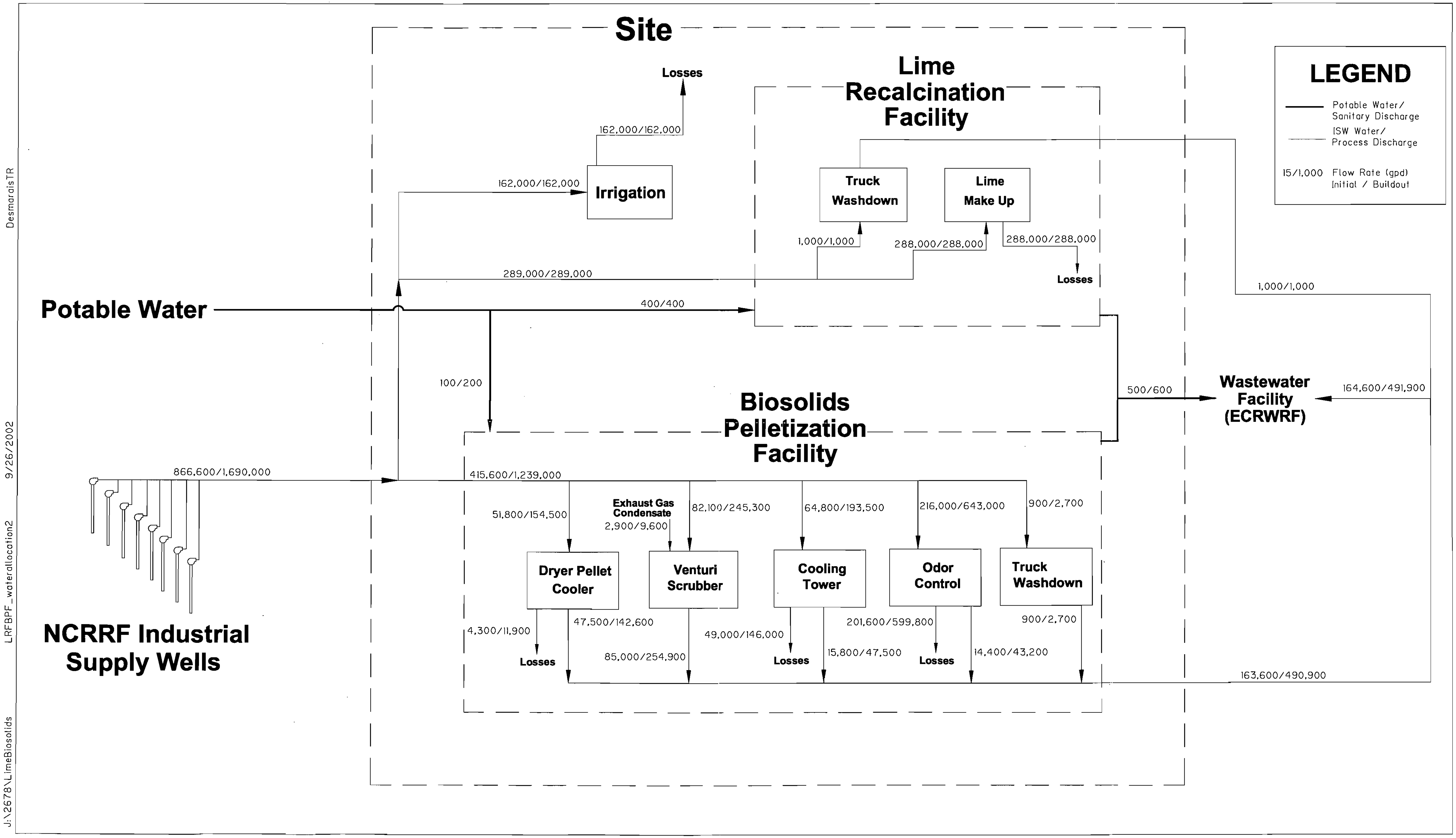

Figure D-8
LRF/BPF Water Balance Design Diagram

D.3.3 Facilities

The locations of main facilities for the project area (WTE plant, LRF/BPF, and industrial supply wells) are shown on Figure D-4. The extracted groundwater does not go through any treatment process prior to use. Potable water for select processes at the WTE plant and LRF/BPF will be supplied by the City of West Palm Beach. (Refer to the main text for more information regarding in-plant losses of the industrial process water and fire-flow capacity.)

The operating plan for the site operates as three separate systems: Compost Facility, Dyer, and NCRRF Industrial Supply Wells. The Compost Facility supply wells consist of 12, 6-inch diameter, shallow wells (<50 feet deep) and provide water for irrigation and humidification at the compost facility. The wells are currently operated manually with selected pumps operating 24 hours per day. Currently, there are no 'lead' or 'lag' pumps. Future operation of the system will operate in sequence with each well operating for a specific length of time. There will still be no 'lead' or 'lag' pumps during operation. The Dyer Industrial Supply Wells consist of two wells (ISW-1 and ISW-2) of which only one (ISW-1) is currently in use. The well is used to supply irrigation water to Dyer Park and is operated by the Palm Beach County Parks and Recreation Department.

The current operation of the NCRRF Industrial Supply Wells is based on the pressure of a hydropneumatic tank located near the WTE plant. The operation of the system is not expected to change significantly with the addition of the LRF/BPF. The lead pump is alternated based on operation prior to previous shutdown. When the tank reaches a pressure of 70 psi all pumps are shut off. When the pressure drops to 55 psi, the lead pump is turned on. The logic for the wellfield operation allows the lead pump to alternate based on the previous wells in operation. The 'lag' pumps follow a north to south progression with a new well turned on following a 5-psi drop at the tank.

For example, if pumps 5A, 5.5A and 6 were called to start based on pressure and then were shut off as the pressure reached 70 psi at the WTE plant, the next lead pump to start would be 3 with lag being 4 and follow being 4.5. If only pump 3 were to operate during the last cycle, then for the next sequence pump 4 would be the lead with 4.5 and 5A being the lag and follow 1. If a pump is in the "Off" or "Manual" mode or in a faulted condition, the pump is skipped and not a part of the automatic sequence.

Since the wellfield operation is based exclusively on the demand at the WTE plant, the duration of the rotational pumping schedule varies significantly. Not only does the water demand at the WTE plant depend on the current electricity demand at the facilities, but also on the water quality of the groundwater withdrawn. Based on the historical pumping rates and the well pump capacities, each well operates anywhere from three to ten hours per day (under average pumping conditions). The duration of the pumping can vary between several minutes or hours depending on the various factors affecting WTE plant operation (i.e. electricity demand, water quality, ambient air temperature, etc.).

With the inclusion of the Lime/Biosolids Facility in the NCRRF ISW operation, the operating plan is not anticipated to change significantly. Of course, due to the increase in water use, the pumps will be required to run for longer periods of time. Based on the anticipated flows and the expected well capacities, the well pumps should operate approximately thirteen hours per day (assuming current WTE Plant demands). As with the current operating plan, the duration of the pumping can vary throughout the day between several minutes or hours depending on the various factors previously discussed.

The only significant proposed modification to the wellfield operation is the use of total flow (rather than the cyclical, north-to-south pattern) to distribute the pumping more equally. The system will determine the "lead" and "lag pumps on a continual basis throughout the day causing the rotational schedule to vary each day and throughout the day. The total flow measured at each well will determine the 'lead' and 'lag' pumps. The well with the lowest total flow for the day will be the 'lead' pump. The first 'lag' pump will be the well with the second lowest total flow for the day. The second 'lag' pump will be the well with the third lowest total flow for the day and so on. As with the current plan, the shut off pressure will be 70 psi and the 'lead' pump turn on pressure will be 55 psi. Each 'lag' pump will turn on as the pressure drops (measured at the hydropneumatic tank).

The following changes to withdrawal facilities are proposed:

- Addition of two shallow supply wells located at the southeast portion of the site. These two new wells, ISW-5.25 and ISW-5.75, will be located approximately 450 feet due south and north of ISW-5.5A, respectively, as shown on **Figure D-9**. These wells were added due to concerns of inadequate hydraulic gradient control once the pumping rates were reduced to 400 gpm in the adjacent wells. These wells will have a lower pumping capacity (approximately 200 gpm) to limit drawdown in the southern portion of the site.

- Addition of two deep supply wells (ISW-7 & 8), located at the western portion of the site, as shown on Figure D-9. These two wells will be completed with the construction of the proposed Lime Recalcination/Biosolids Pelletization Facility. The wells are located at the western portion of the site and within the Turnpike Aquifer to minimize drawdown at the WPB Wetlands (south of 45th Street), drawdown at the City of Riviera Beach Western Wellfield (CRB-WEST), and changes in the upper surficial groundwater flow patterns.

- Well ISW-3 will be a backup well to be used during extended periods when one or more primary wells are shut down for maintenance or any unforeseen problems.

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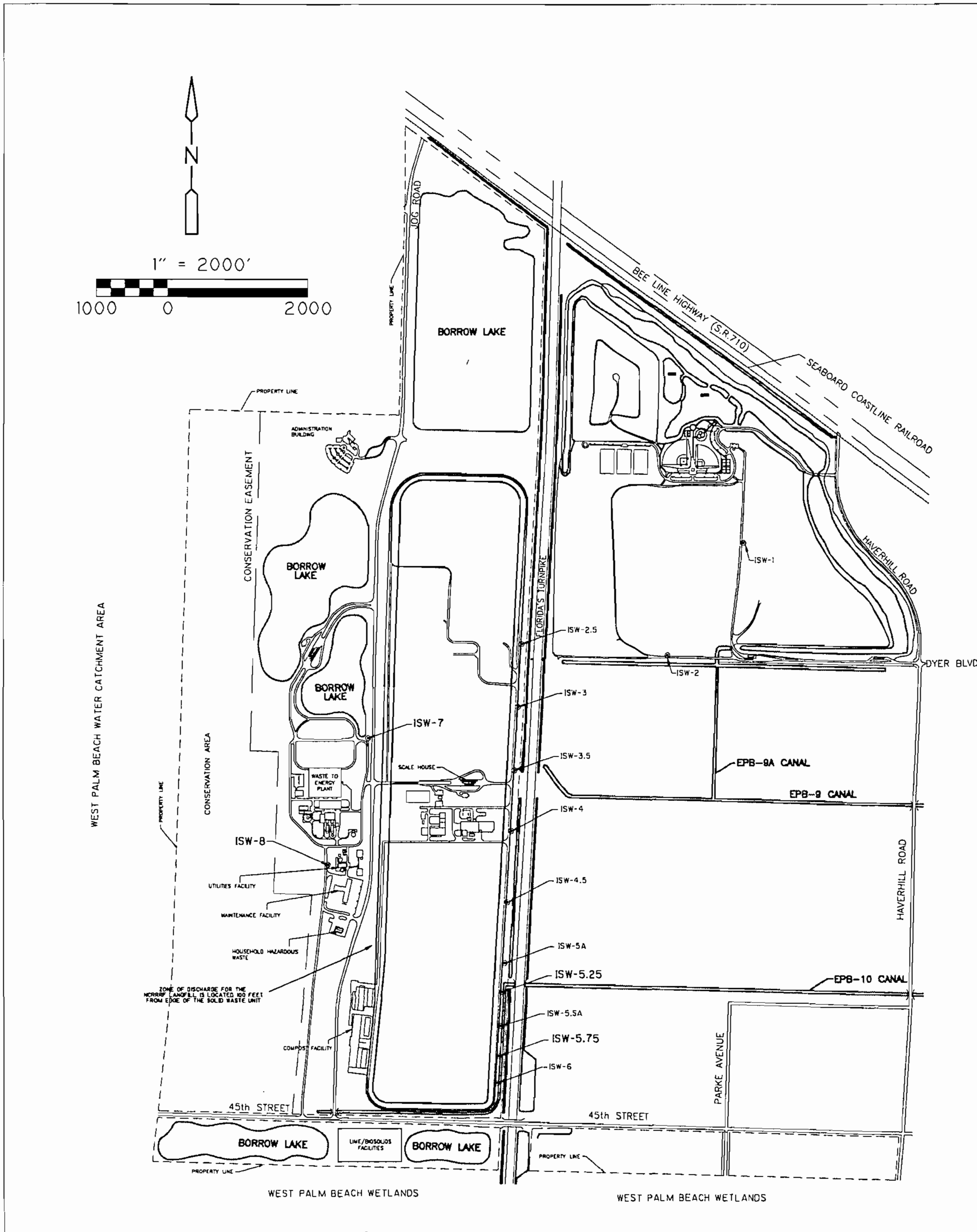


Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

Figure D-9
Location Sketch of Additional Supply Wells

CDM

D.3.4 Processes and Wastewater Disposal

Disposal of any process water at the LRF/BPF will be through a lift station and sanitary sewer leading to the East Central Regional Wastewater Treatment Plant.

D.3.5 Groundwater Flow Model

An integrated surface water/groundwater flow model was developed for East-Central Palm Beach County in May 1998. The integrated surface water/ groundwater flow model was used to evaluate proposed interactions between adjacent, existing municipal water users within the model area. Complete details of the model domain, input, development, calibration, confirmation, and uses are described in the *NCRRF and Dyer Boulevard Landfill Groundwater Modeling Report* (CDM, 1999).

The groundwater flow model study area extends from PGA Boulevard in the north to the SFWMD C-51 Canal in the south and from the western boundary of the WPBWCA in the west to the Intercostal Waterway in the east (**Figure D-10**). The model consisted of 295 rows and 251 columns covering an area of 106 square miles. The model describes the surficial aquifer system as a six-layered system with wetland and surface water interaction occurring in the top layer. The second layer represents the surficial aquifer sands. Layer 3 represents a transitional zone between the surficial sands and the Turnpike Aquifer consisting of sand with lenses of shell. Layer 4 represents the Turnpike Aquifer, and is composed of solutioned limestone and shell with lenses of sand. Layer 5 is a low to moderate permeable layer consisting of shell, sand, and silts. The bottom layer, layer 6, is a low to moderate permeable layer of sand and marl with lenses of low permeable clay and carbonate-based sandstone.

The model input consists of boundary conditions (constant head, general head, and leaky), layering (geology and stratigraphy), aquifer characteristics (hydraulic conductivity, anisotropy, and aquifer storage), canal locations, canal bottom elevations and sediment conductance, land surface elevation, recharge (rainfall), evapotranspiration (ET), and well pumping.

D.3.5.1 Model Selection

MODFLOW

The groundwater flow computer code used in this study is the finite difference code, MODFLOW. This code was developed by the United States Geological Survey (USGS) and is fully described in "A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model" (McDonald and Harbaugh, 1984).

MODFLOW is a computer program that simulates three-dimensional groundwater flow using a finite difference technique for solution of the governing flow equations. MODFLOW solves both confined and unconfined flow equations to simulate the behavior of groundwater flow systems under several types of natural and artificial stresses.

Figure D-10
Groundwater Flow Model Area and Grid

CDM

The model is able to represent variations in hydraulic properties of the porous media, natural and artificial recharge, discharge (e.g., rainfall infiltration, infiltration from or discharge to streams, well withdrawals, or injection), and differing boundary conditions. An aquifer system is discretized into an orthogonal array of cells to which aquifer characteristics and hydrologic stresses are assigned. Located at the center of each cell are nodes at which the groundwater head and flux are calculated.

Boundary conditions at each node can be assigned a specified head (1st type), a specified flow (2nd type), or can be defined as a head-dependent flow boundary (3rd type). Flow into and out of the model area can be simulated through the use of external source and sink terms. Flow between the nodes (both horizontally and vertically) is calculated using Darcy's equation. Specified flow boundaries used for this project are recharge and wells. Head-dependent flow boundaries used for this project are general head, rivers, drains, streams, and ET.

The PCG2 (pre-conditioned gradient) solver, developed by the USGS (Hill, 1990), was used to solve the partial differential equation that describes flow in the MODFLOW model. This solver was selected since it is very stable, particularly under conditions where wetting and drying of cells occurs during successive iterations- as in the modeling performed for this project.

WETLAND Package

The SFWMD WETLAND package (Restrepo and Montoya, 1997) was used to represent overland (sheet) flow, the associated hydroperiods, and the interaction between groundwater and surface water within selected wetlands in the modeled area. This new module is capable of simulating flow routing, the export/import of water to the wetland and evapotranspiration from the wetlands. Surface flow can be either overland/vegetation plain flow (in forested areas) or channelized/preferential flow (in sloughs).

The rewetting package, developed by the USGS (McDonald *et al.*, 1991), was used in combination with the WETLANDS module for the modeling. The rewetting package allows for individual model cells to become wet after they have gone dry (and vice-versa) in a particular layer based on a prescribed set of conditions. This is the only method of representing the limits of saturation both spatially and temporally in the wetlands due to changes in hydrologic stress, such as pumping, recharge, and ET.

D.3.5.2 Model Development

A three-dimensional groundwater flow model with overland flow simulation capabilities was constructed and calibrated to assess the hydrology, hydrogeology, and potential hydraulic conveyance characteristics within the project area. The model is based on an extensive and thorough review of published information, data available from SWA, the City of West Palm Beach, Palm Beach County, and the SFWMD and supplemental site-specific data collected.

Model Stratigraphy

The groundwater flow model has been discretized vertically into six model layers to represent the variability in stratigraphic units, and to simulate the observed vertical head differences. The stratigraphic units modeled are described in **Table D-5**. Soil boring logs and well completion reports were evaluated to determine the thickness and composition of the different stratigraphic sub-units and to identify the areas of higher permeability materials within the sandy matrix of the surficial aquifer. Stratigraphic contact elevations identified from the boring logs were contoured to develop the stratigraphic layers.

Table D-5 Summary of Model Stratigraphic Units

Layer	Hydrologic Units	Soils	General Hydraulic Characteristics	Description
1	Pamlico Sand and Miami Oolite	Quartz sand, silt and shell	Moderate Permeability	Upper Surficial Aquifer (Layer 1 for Wetland cells)
2				
3	Anastasia and Fort Thompson Formation	Limestone, shell sand and sand	Extreme Permeability	Turnpike Aquifer
4				
5	Tamiami Formation	Marl, shell, sand and limestone; clayey sandy silt	Moderate to low permeability	Semi-confining bed
6				

The MODFLOW convention is to begin numbering layers from the top of the model; thus, layer 1 represents the surface water features modeled by the WETLAND package. Layer 2 represents the upper sand layer of the surficial aquifer where the water table occurs. Layers 3 through 6 represent the production zone of the surficial aquifer. Multiple layers were utilized to represent this unit to reproduce the vertical head differences observed at the monitor wells. These layers consist primarily of moderate hydraulic conductivity materials, with pockets of higher conductivity materials. Layer 2 is composed primarily of sand with lenses of shell and is a transitional zone between the surface layers of sand and the underlying Turnpike aquifer. Layer 3 is composed of solutioned limestone and shell with lenses of sand and represents the highly conductive Turnpike aquifer. Layer 4, which is composed of lower permeability shell, sand, and silts, represents the bottom of the production zone. Layer 5 is composed of low to moderately permeable sands and marls, with lenses of low permeability clay and carbonate-based sandstones.

Layer thicknesses are more refined in the area of the proposed sites, based upon interpretation of soil boring logs and well completion reports. Outside the area of the proposed sites, where less information on stratigraphic variability is available, aquifer characteristics were developed from consultant reports and published stratigraphic data such as the SFWMD modeling reports for Palm Beach County (Shine *et al.*, 1989; Yan *et al.*, 1995). A total of 156 soil borings was used to develop the stratigraphy for the groundwater flow model.

Model Domain and Grid

The model includes the surficial aquifer system in all of east central Palm Beach County. The model extends from PGA Boulevard in the north, to the C-51 Canal in the south, to the Intracoastal Waterway in the east and the western edge of the WPBWCA in the west. Figure D-7 depicts the model domain for the project sites.

Each model layer is composed of 295 rows and 251 columns of elements. The areal extent of the model is approximately 106 square miles, of which approximately 103 square miles are active. Grid density is uniform across the model with grid cells dimensions of 200 feet by 200 feet. The model grid has been rotated 1.5 degrees in a counter-clockwise direction from the model origin so that the grid columns are aligned with the surface water features in the model area. This provided for better spatial representation of the interaction between the surficial aquifer and surface water features.

Boundary Conditions

The boundaries of the active model area were chosen to correspond to natural groundwater flow boundaries whenever possible. The northern boundary of the model extends to PGA Boulevard. The eastern boundary is the Intracoastal Waterway. The southern boundary is the SFWMD C-51 Canal. The western boundary extends to the western side of the WPBWCA. The groundwater model makes use of three types of boundary conditions. These include general head boundaries, river boundaries, and drain boundaries. These first two boundary conditions are specified for those cells at the edge of the active model area. Within the active model area, cells in the top layer are modeled using all three of the boundary conditions.

General Head Boundaries

All model layers make use of specified head boundary conditions, allowing flow into and out of the model at these locations. In model layers 2 through 5, a general head boundary condition occurs around the entire perimeter of the active model area. The head levels in layers 1 through 5 are taken from USGS and SFWMD-developed contour maps of the surficial aquifer. A total of 6,420 cells (of 429,612 cells) in model layers 1 through 5 were designated as general head boundary cells.

River Boundary Condition
The WPBWCA, M-Canal, Clear Lake, Lake Mangonia, SFWMD C-17 Canal, SWA Water Conservation Area, SFWMD C-51 Canal, Loxahatchee Slough, and SFWMD C-18 Canal were represented as RIVER cells in the model. This was done since these surface water bodies could act as either a "source" or a "sink" for the surficial aquifer system. RIVER cells occur primarily in model layer 1. A total of 17,154 cells of 143,204 cells in model layers 1 and 2 are designated as RIVER cells.

Drain Boundary Condition
All surface water features with a positive surface water overflow are represented as a DRAIN cell in the top layer of the model with the MODFLOW DRAIN package. These surface water features acted solely as a "sink" for the surficial aquifer system. A drain allows discharge at interior canals and lakes if the piezometric head in the top aquifer layer exceeds the specified drain elevation. The ground surface elevations and streambed elevations are specified as the drain elevation in each cell. A total of 4,725 cells of 71,602 cells in model layer 1 were designated as DRAIN cells.

Well Pumping
Public supply well locations and average pumping rates were initially taken from the most recent version of the SFWMD MODFLOW model for Palm Beach County (Yan *et al.*, 1995). The information in the SFWMD database was updated using consumptive use permits and pumping records provided by the City of West Palm Beach, Palm Beach County Water Utilities, SWA, and the City of Riviera Beach.

The groundwater flow model used to evaluate the impact of the increased allocation was updated based on recent (2003) submittal of the City of Riviera Beach Water Use Permit Renewal (combined permits 50-00460-W and 50-00713-W). The wellfield pumping data provided in that submittal and used in the groundwater flow modeling was updated in the model used for this evaluation.

A further evaluation of SWA's NCRRF and Dyer supply well pumping was also conducted to provide consistent methodologies for calculating monthly pumping rates during the 1-in-10 year dry season. The last 3 years of flow data (2000-2002) were used to determine the monthly water use distribution and applied to the model. A summary of the historical water use data for the NCRRF ISW system is provided in **Table D-6**. Since the water use at the NCRRF is for industrial purposes and not public water supply, the maximum monthly water use does not occur during the last two months of a 1-in-10 year dry season. In fact, historical data has shown that there is no correlation between rainfall and water use at the facilities.

A total of 13 stress periods were used for each model simulation. The first stress period represents steady-state conditions by modeling forty years of average pumping conditions. Stress periods 2-6 represent each month of the wet season under average pumping rates. Stress periods 7-13 represents the 1-in-10 year dry season under the maximum permitted pumping rates for all wells in the model. **Table D-7** contains the pumping rates for each well associated with the increased water allocation request for both average and dry conditions.

Table D-6 SWA NCRRF ISW Flow Data for 2000-2002

Month	# Of Days	2000			2001			2002			3-Year Average		
		ADF	AMF	PAF	ADF	AMF	PAF	ADF	AMF	PAF	ADF	AMF	PAF
		mgd	mgm	%	mgd	mgm	%	mgd	mgm	%	mgd	mgm	%
Jan	31	1.41	43.7	8.05	1.55	47.9	8.64	1.56	48.5	8.84	1.51	46.7	8.51
Feb	28	1.47	41.2	7.59	1.53	42.7	7.71	1.58	44.2	8.07	1.53	42.7	7.79
Mar	31	1.51	46.8	8.62	1.58	48.9	8.83	1.48	45.8	8.37	1.52	47.2	8.61
Apr	30	1.21	36.2	6.68	1.47	44.1	7.96	1.46	43.9	8.01	1.38	41.4	7.55
May	31	1.56	48.3	8.91	1.45	45.1	8.13	1.58	49.0	8.95	1.53	47.5	8.66
Jun	30	1.71	51.2	9.45	1.61	48.2	8.68	1.46	43.9	8.02	1.59	47.8	8.72
Jul	31	1.55	48.1	8.87	1.57	48.5	8.75	1.51	46.8	8.54	1.54	47.8	8.72
Aug	31	1.54	47.8	8.82	1.54	47.7	8.61	1.66	51.6	9.42	1.58	49.1	8.95
Sep	30	1.38	41.4	7.62	1.53	46.0	8.29	1.54	46.1	8.41	1.48	44.5	8.11
Oct	31	1.49	46.1	8.50	1.31	40.6	7.32	1.57	48.8	8.90	1.46	45.2	8.24
Nov	30	1.41	42.2	7.79	1.57	47.2	8.51	1.15	34.4	6.27	1.38	41.3	7.52
Dec	31	1.59	49.3	9.09	1.53	47.6	8.58	1.45	44.9	8.19	1.52	47.2	8.62
Total			542.4			554.5			547.8			548.2	
Average		1.49			1.52			1.50			1.50		

ADF – Average Daily Flow; AMF – Average Monthly Flow; PAF – Percent of Annual Flow

Rainfall and ET

Recharge is applied using the MODFLOW recharge package. The average annual rainfall for the West Palm Beach area is 60.83 inches per year for the years 1942 through 1996. Total recharge to the aquifer was calculated by subtracting stormwater runoff and unsaturated zone ET (ET_{UNSAT}) from rainfall. Stormwater runoff and ET_{UNSAT} were assumed to be a function of land use. SFWMD geographic information system (GIS) land use coverages were used to define the distribution of land use in the model area. The recharge is applied to the uppermost active model layer, which represents the water table. The procedure for calculating recharge is described in detail in Yan and Smith, 1994.

ET is specified using the MODFLOW ET package and is simulated in the uppermost active model layer. Two components of evapotranspiration are incorporated into the model simulations. The first component is the 29 inches per year of ET that is assumed to always occur, and which was subtracted from rainfall over the entire model area. An additional component of ET is considered to be dependent on the depth of the water table. If the water table is at the ground surface, a maximum additional evapotranspiration rate occurs. The maximum potential rate varies across the entire active model area based on land use.

Table D-7 Model Simulation Pumping Rate Summary

Site	Well ID	Sim1 Pumping Rates (gpd)		Sim2 Pumping Rates (gpd)		Sim3 Pumping Rates (gpd)		Sim4 Pumping Rates (gpd)	
		Ave	Max	Ave	Max	Ave	Max	Ave	Max
NCRRF									
	ISW-2.5	0	0	0	0	390,000	401,820	280,000	288,490
	ISW-3	278,000	294,900	640,000	659,400	0	0	0	0
	ISW-3A	0	0	0	0	390,000	401,820	280,000	288,490
	ISW-3.5	0	0	0	0	390,000	401,820	280,000	288,490
	ISW-4	333,700	353,900	660,000	680,000	590,000	607,880	420,000	432,730
	ISW-4.5R	0	0	440,000	453,340	390,000	401,820	280,000	288,490
	ISW-5A	278,000	294,900	440,000	453,340	390,000	401,820	280,000	288,490
	ISW-5.25	0	0	0	0	0	0	140,000	144,240
	ISW-5.5A	278,000	294,900	440,000	453,340	390,000	401,820	280,000	288,490
	ISW-5.75	0	0	0	0	0	0	140,000	144,240
	ISW-6	333,700	353,900	660,000	680,000	0	0	0	0
	ISW-6(s)	0	0	0	0	350,000	360,610	494,345	494,345
	ISW-7	0	0	0	0	0	0	420,000	432,730
	ISW-8	0	0	0	0	0	0	280,000	288,490
Sub-total (MGD)		**1.50**	**1.59**	**3.28**	**3.38**	**3.28**	**3.38**	**3.28**	**3.38**
Dyer									
	ISW-1	70,000	110,000	75,000	120,000	75,000	120,000	75,000	120,000
	ISW-2	0	0	75,000	120,000	75,000	120,000	75,000	120,000
Sub-total (MGD)		**0.07**	**0.11**	**0.15**	**0.24**	**0.15**	**0.24**	**0.15**	**0.24**
Compost Facility									
	CISW-1 through CISW-12	14,167	19,167	4,167	5,834	4,167	5,834	4,167	5,834
Sub-total (MGD)		**0.17**	**0.23**	**0.05**	**0.07**	**0.05**	**0.07**	**0.05**	**0.07**

**(s) means shallowed per proposed system modifications
Sim1 considers the existing wells at the present pumping rates
Sim2 considers the existing wells at the proposed pumping rates
Sim3 considers two proposed wells at the proposed pumping rates
Sim4 considers six proposed wells at the proposed pumping rates

The extinction depth varied from 1 to 6 feet throughout the model. Once the water table drops below the extinction depth, no ET in excess of 29 inches per year is computed. If the water table is between 0 and the extinction depth, the additional component of ET varies linearly (with water table depth) between the maximum potential rate and 0 inches per yr.

Visher and Hughes (1969) have reported an average evaporation rate of 50 inches per year from a free water surface in south Florida. The Institute of Food and Agricultural Sciences (Smajstrla *et al.*, 1984) has reported an average potential ET rate of approximately 55 inches per year for West Palm Beach. The SFWMD has reported an average potential ET rate of approximately 50 inches per year from two years

(August 1994 through August 1996) of lysimeter data at the Everglades Nutrient Removal Project (SFWMD, 1996). The SFWMD has used an average annual PET of 55 inches per year for two groundwater modeling studies of Palm Beach County (Shine *et al.*, 1989; Yan *et al.*, 1995). ET rates from all of these studies were used for this project.

Aquifer Characteristics
Two aquifer parameters are specified in each cell of the model: horizontal hydraulic conductivity and vertical hydraulic conductivity. Effective porosity is specified for the transient model for the particle tracking simulations.

Hydraulic Conductivity
Hydraulic conductivities were initially estimated based upon the examination of soil boring logs, pump test data, and from estimates developed in prior modeling work (Shine *et al.*, 1989; Montgomery Watson, 1994). In general, the initial set of values for hydraulic conductivities in the model was selected to be consistent with the geological materials in this region of Palm Beach County. The upper sand layer, the Turnpike aquifer, and the lower sand layers showed horizontal conductivities of 50, 1600, and 50 to 150 feet per day, respectively, within the model area. This distribution of parameters was applied to the initial model, and these values were then adjusted during the calibration process.

Anisotropy
The vertical anisotropy ratio is used to represent the interbedding of sands and clays within the stratigraphic units. The upper sand layer (model layer 1) is modeled with a uniform vertical anisotropy ratio of 30H:1V. The anisotropy ratios specified within the model layers representing the production zone range from 10:1 to 2300:1. The model layer that represents the lower non- production zone are modeled with a uniform vertical anisotropy ratio of 40:1. In the literature, vertical anisotropy ratios are reported to be uniform throughout the surficial aquifer at 10:1 (Shine *et al.*, 1989).

Aquifer Storage
Specific yield (or effective storage) of the surficial aquifer was estimated from the SFWMD Management and Storage of Surface Waters Permit Information Manual. Specific yield is a function of soil type, grain size, *in-situ* density and depth to the water table. According to this manual, specific yield ranges from 0.05 (depth to water table = 1.0 foot) to 0.23 (depth to water table = 4.0 feet) for natural undisturbed soils in the SFWMD. A value of 0.2 was used in the model. The storage coefficient of model layers 2 through 5 was taken from the SFWMD model of Palm Beach County (Yan *et al.*, 1995). A value of 0.0001 was used in the model.

D.3.5.3 Calibration and Verification

The model was calibrated for steady state and transient conditions using data from six aquifer performance tests; water elevation readings from 222 monitor wells, piezometers, and staff gauges; and regional surface water/groundwater flow balances. Model confirmation was completed using additional data sets from field observations collected over the period from July 1996 through August 1997.

To implement the wetland module in the groundwater flow model, Layer 1 is only active in the area of the City of West Palm Beach Wetland Reuse Site, Additional Sites 1 and 2, the City of West Palm Beach Standby Wellfield, and several surrounding lakes. All other areas in layer 1 are inactive (no flow boundaries). Recharge was added to the highest active layer in the model. Total rainfall was used as recharge in the active surface water areas of layer 1. Correspondingly, total ET (evaporation, ET_{UNSAT} and ET_{SAT}) was used in the active surface water areas of layer 1. Recharge and ET_{SAT} were used in all other areas of the model and were applied to the water table. Using the calibrated groundwater/surface water flow model, steady-state flow balances (water budget) were developed for existing conditions.

D.3.5.4 Simulation Development

For the groundwater flow simulation analysis, four simulations were conducted to show existing and proposed conditions. Simulation 0 (Sim0) is a no-pumping scenario where all wells are removed from the model. The groundwater elevations for the remaining simulations are subtracted from the groundwater elevations for Sim0 to determine the total drawdown. Simulation 1 (Sim1) represents current pumping conditions with an average pumping rate of 1.50 mgd and peak pumping rate of 1.59 mgd for the NCRRF ISW system. Simulation 2 (Sim2) represents proposed pumping rates of 3.28 (average) and 3.38 (maximum) mgd for the existing NCRRF ISW system. Simulation 3 (Sim3) represents the proposed flow rates with the future addition of two new NCRRF ISW (ISW-2.5 and 3.5) and shallowing of ISW-6. Simulation 4 (Sim4) represents proposed pumping rates with the addition of four additional supply wells (ISW-5.25, 5.75, 7, and 8) and the shallowing of ISW-6.

All proposed simulations (Sim2, 3, and 4) used consistent pumping rates for the Dyer ISW system [0.15 mgd (average) and 0.25 mgd (peak)] and NCRRF Compost Facility [0.05 mgd (average) and 0.07 (peak)]. A summary of the model simulations is shown in **Table D-8**.

D.3.5.5 Simulation Results

The groundwater flow model simulations were evaluated based on groundwater contours and drawdown analysis. Groundwater contour maps of the water table were plotted under average conditions and at the end of the 1-in-10 year dry season. The drawdown analysis was conducted by generating additional drawdown plots by comparing the proposed simulations (Sim2, Sim3, and Sim4) to the existing pumping scenario (Sim1). Cumulative (or total) drawdown plots were generated for existing conditions as well as the final proposed scenario. The drawdown analysis was conducted under average conditions and at the end of the 1-in-10 dry season.

Table D-8 Model Simulation Summary

Simulation	Description	NCRRF Landfill			Dyer Boulevard Landfill		
		Active Wells	Pumpage (mgd)		Active Wells	Pumpage (mgd)	
			Ave	End of 1-in-10		Ave	End of 1-in-10
Sim0	Existing Conditions No Pumping	N/A	N/A	N/A	N/A	N/A	N/A
Sim1	Existing Wells Present Pumping	3, 4, 4.5, 5A, 5.5A, & 6	1.50	1.59	1(s)	0.07	0.11
Sim2	Existing Wells Proposed Pumping	3, 4, 4.5, 5A, 5.5A, & 6	3.28	3.38	1(s)	0.15	0.24
Sim3	Two Proposed Wells Proposed Pumping	2.5, 3A, 3.5, 4, 4.5, 5A, 5.5A, & 6(s)	3.28	3.38	1(s), 2(s)	0.15	0.24
Sim4	Six Proposed Wells Proposed Pumping	2.5, 3A, 3.5, 4, 4.5, 5A, 5.25, 5.5A, 5.75, 6(s), 7, & 8	3.28	3.38	1(s), 2(s)	0.15	0.24

(s) - Wells shallowed from original construction details
N/A - Not Applicable

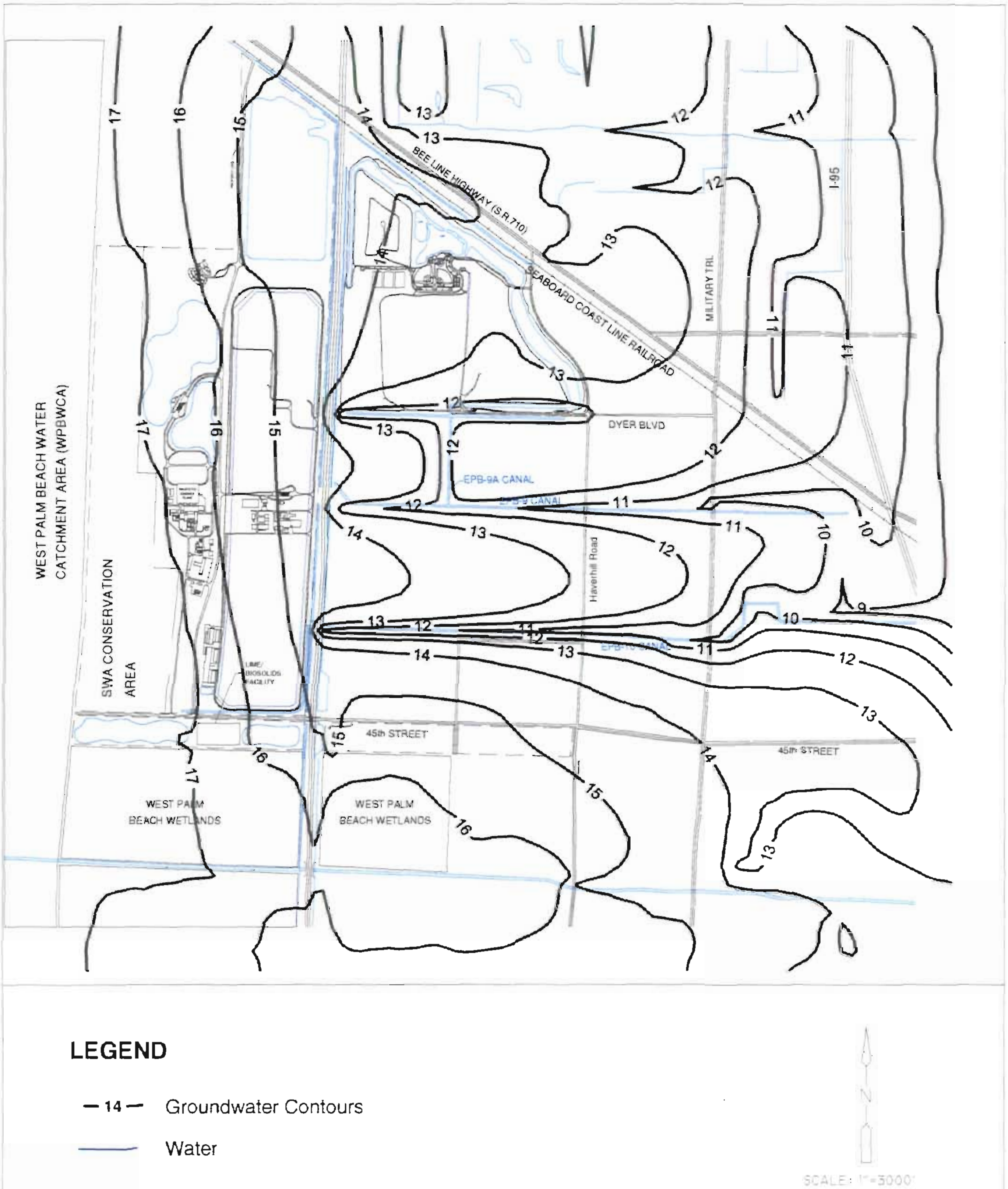
For Sim2, it is unlikely, due to well and pump limitations, that the existing supply well system can adequately supply the proposed water allocation. Additionally, system expansion is already planned for maintaining/improving hydraulic gradient control and providing a sufficient amount of backup capacity. Therefore, Sim2 is unlikely to occur and graphical plots of the results are not presented. Groundwater contours for the simulations are provided on **Figures D-11 through D-18**.

Hydraulic Gradient Control

The primary function of the ISW system is to provide hydraulic gradient control at the eastern boundary of NCRRF. Under Sim1 and Sim2, hydraulic gradient control is maintained at the active Class I landfill cells. However, hydraulic gradient control at the future Class I cells (located just north of the active cells) is not maintained. For this reason, the proposed ISW system modifications (addition of ISW-2.5 and 3.5) are currently being designed. These new wells (modeled in Sim3 and Sim4) show that hydraulic gradient control is maintained for essentially the entire eastern NCRRF boundary (as shown on Figures D-15, D-16, D-17, and D-18).

West Palm Beach Wetlands

The plots generated for the drawdown analysis are provided on **Figures D-19 to D-26**. Additional drawdown plots for Sim3 and Sim4 are shown on Figure D-21 through D-24. A comparison of the additional drawdown at the West Palm Beach Wetlands for the various simulations is provided in **Table D-9**.

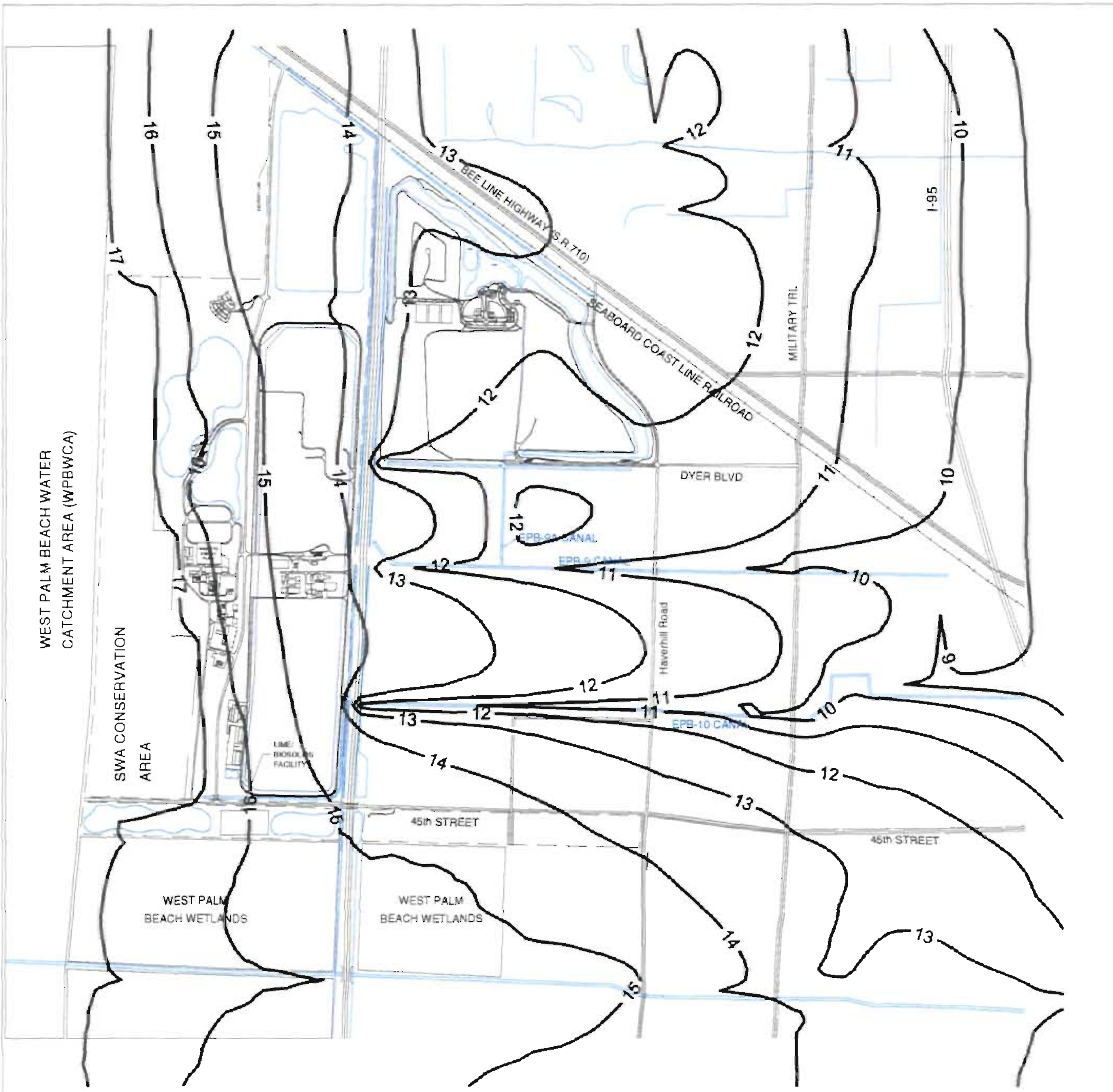


Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

J:/2678/Lime_Biosolids/PPSA/Figures/ h0s1wt.srf 7/28/03 Burwinkelsp

CDM

Figure D-11
Sim0 Groundwater Elevation Contours Under Average Conditions



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LEGEND

— 14 — Groundwater Contours

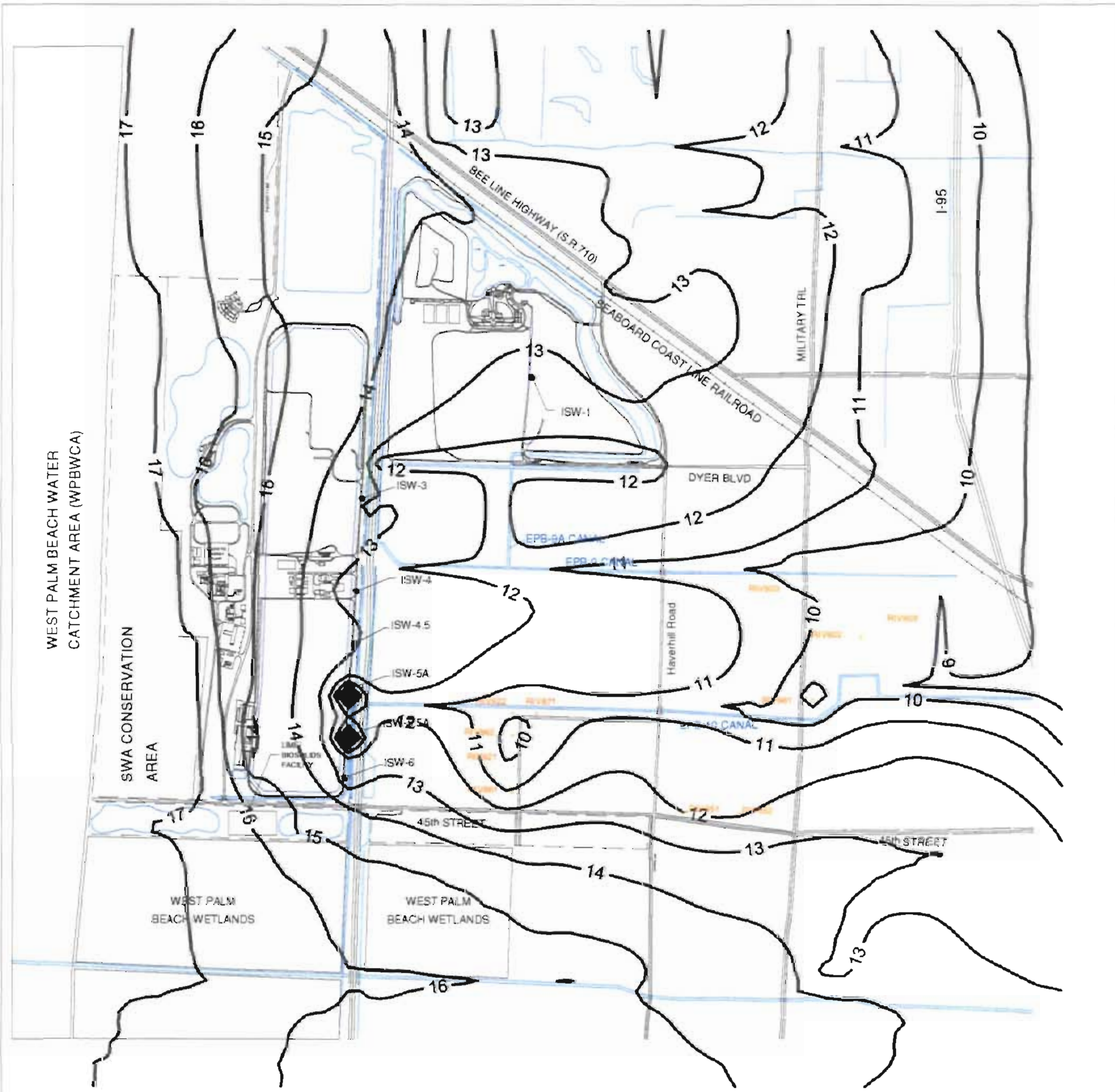
——— Water

SCALE: 1"=3000'

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

CDM

Figure D-12
Sim0 Groundwater Elevation Contours Under 1-in-10 Year Dry Season Conditions



LEGEND

— 14 — Groundwater Contours

Water

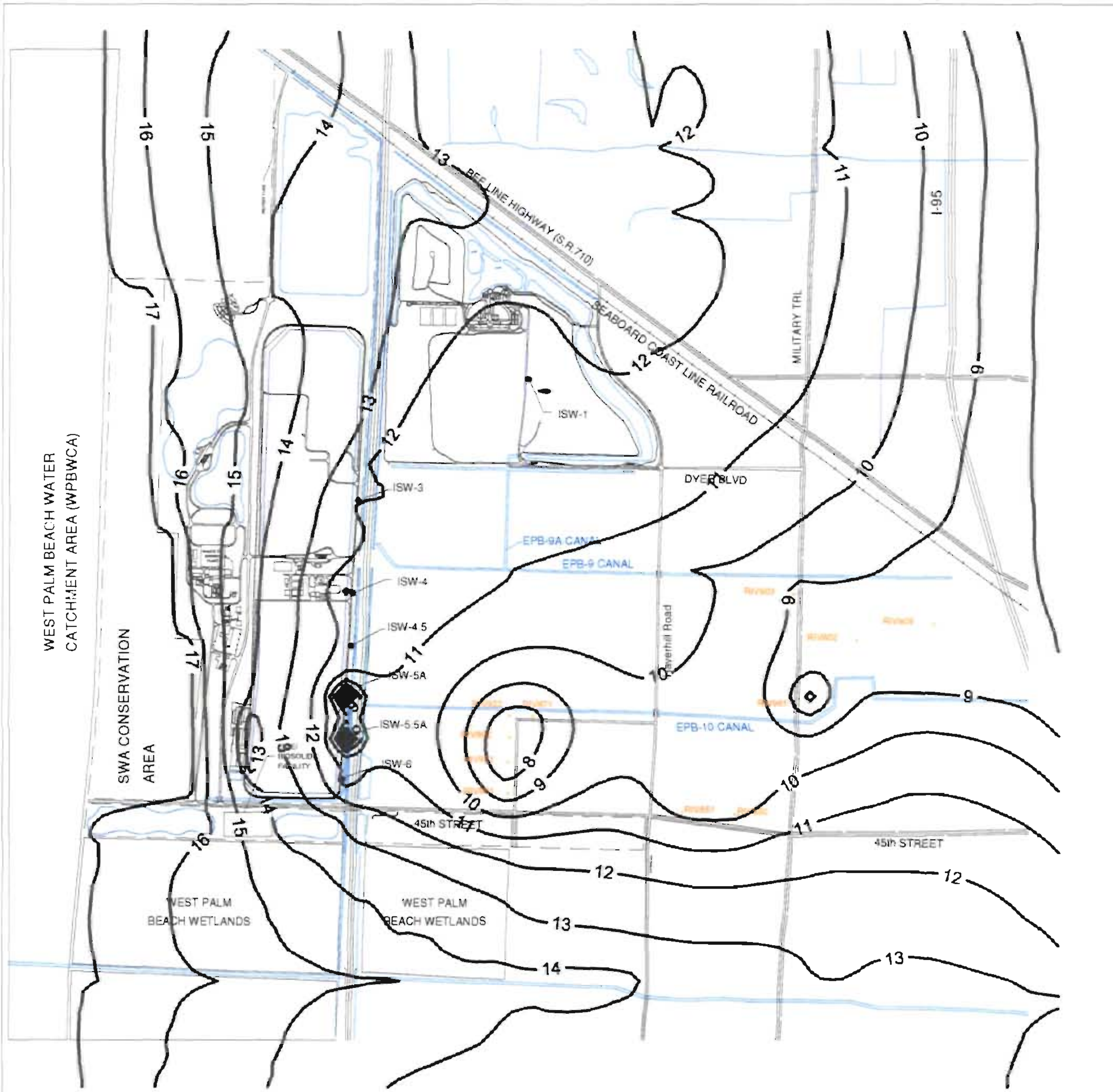
SCALE: 1"=3000'

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

J:/2678/Lime_Biosolids/PPSA/Figures/ h1s1wl.srf 7/28/03 Burwinkelsp

Figure D-13
Sim1 Groundwater Elevation Contours Under Average Conditions

CDM



LEGEND

— 14 — Groundwater Contours

——— Water

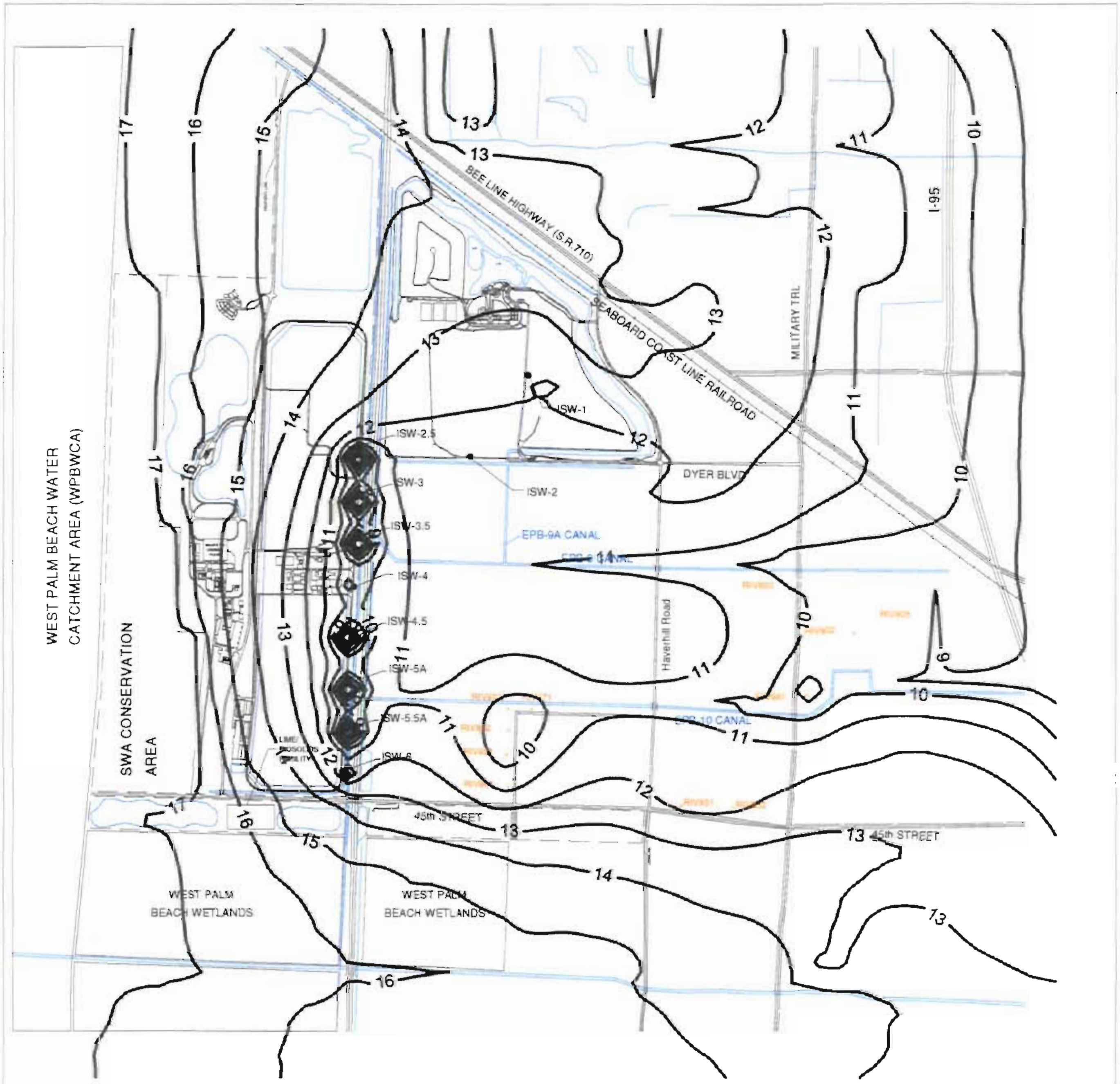
SCALE: 1"=3000'

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

J:/2678/Lime_Biosolids/PPSA/Figures/ h1s13wt.srf 7/29/03 Burwinkelsp

CDM

Figure D-14
Sim1 Groundwater Elevation Contours
Under 1-in-10 Year Dry Season Conditions



LEGEND

— 14 — Groundwater Contours

——— Water

SCALE: 1"=3000'

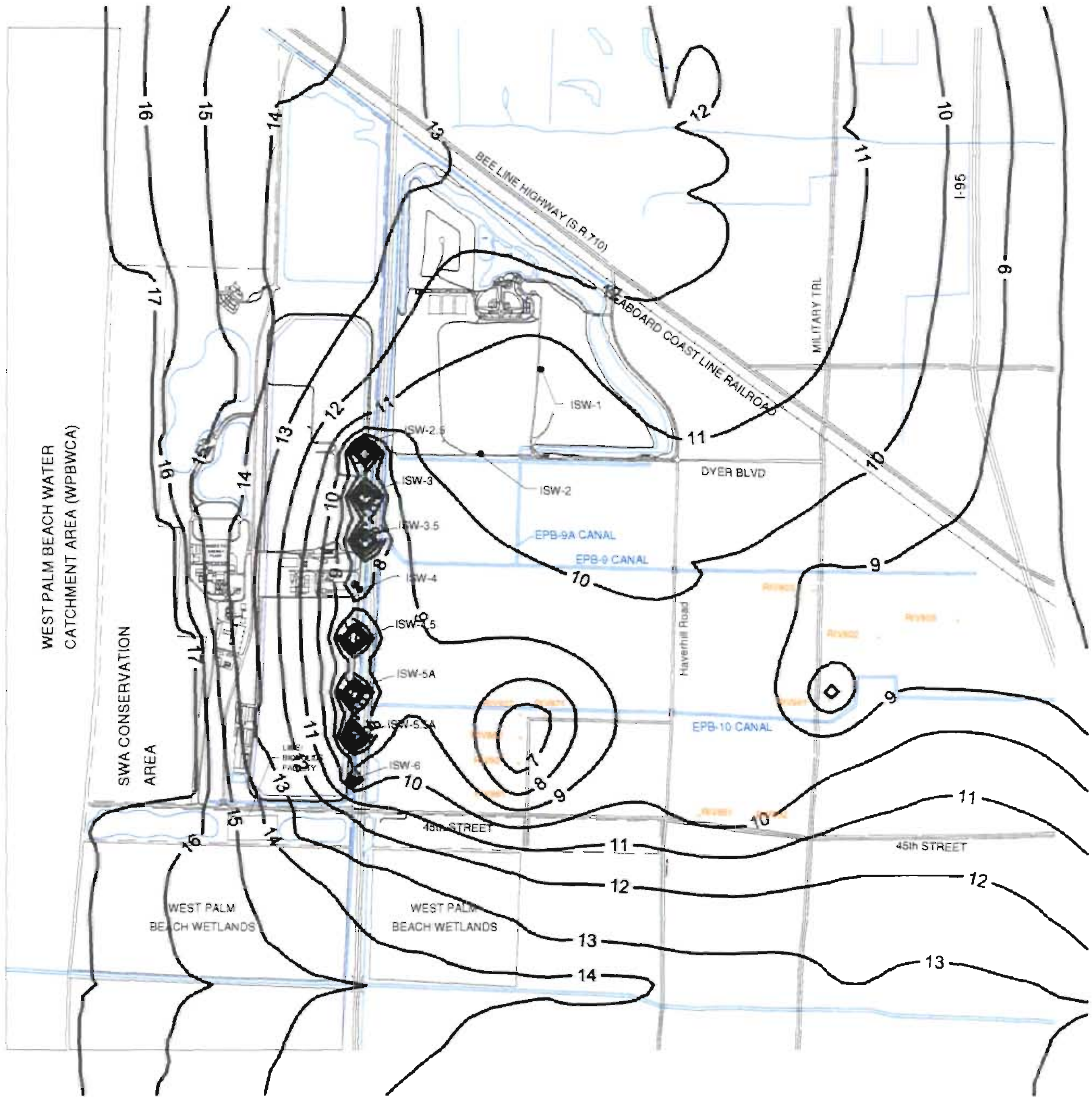
Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

J:/2678/Lime_Biosolids/PPSA/Figures/ h3s1wt.srf 7/28/03 Burwinkelsp

CDM

Figure D-15
Sim3 Groundwater Elevation Contours
Under Average Conditions

Burwinkelsp 7/29/03 h3s13wt.srf J:/2678/Lime_Biosolids/PPSA/Figures/



LEGEND

— 14 — Groundwater Contours

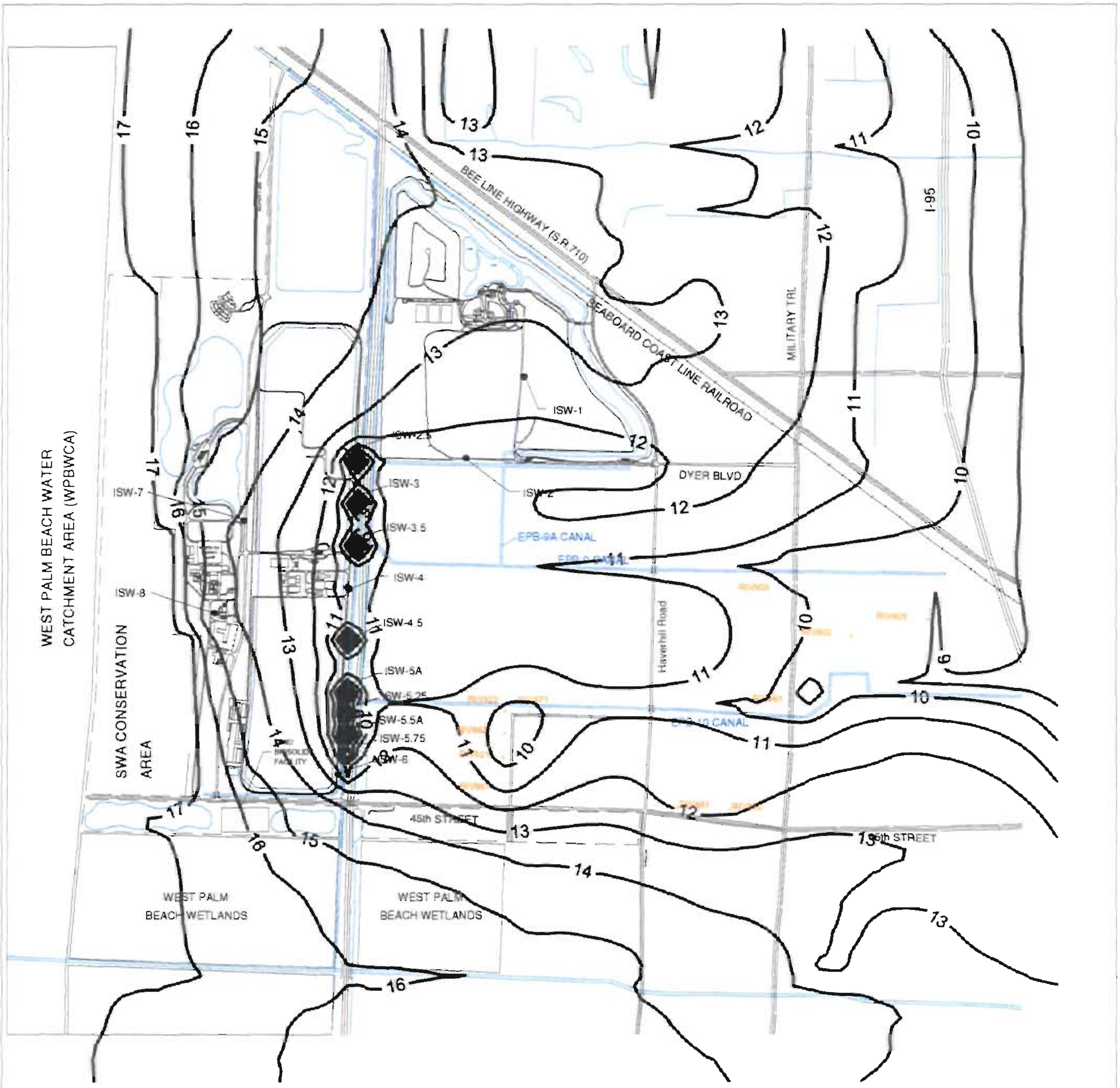
——— Water

SCALE: 1"=3000

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

CDM

Figure D-16
Sim3 Groundwater Elevation Contours
Under 1-in-10 Year Dry Season Conditions



LEGEND

— 14 — Groundwater Contours

——— Water

N

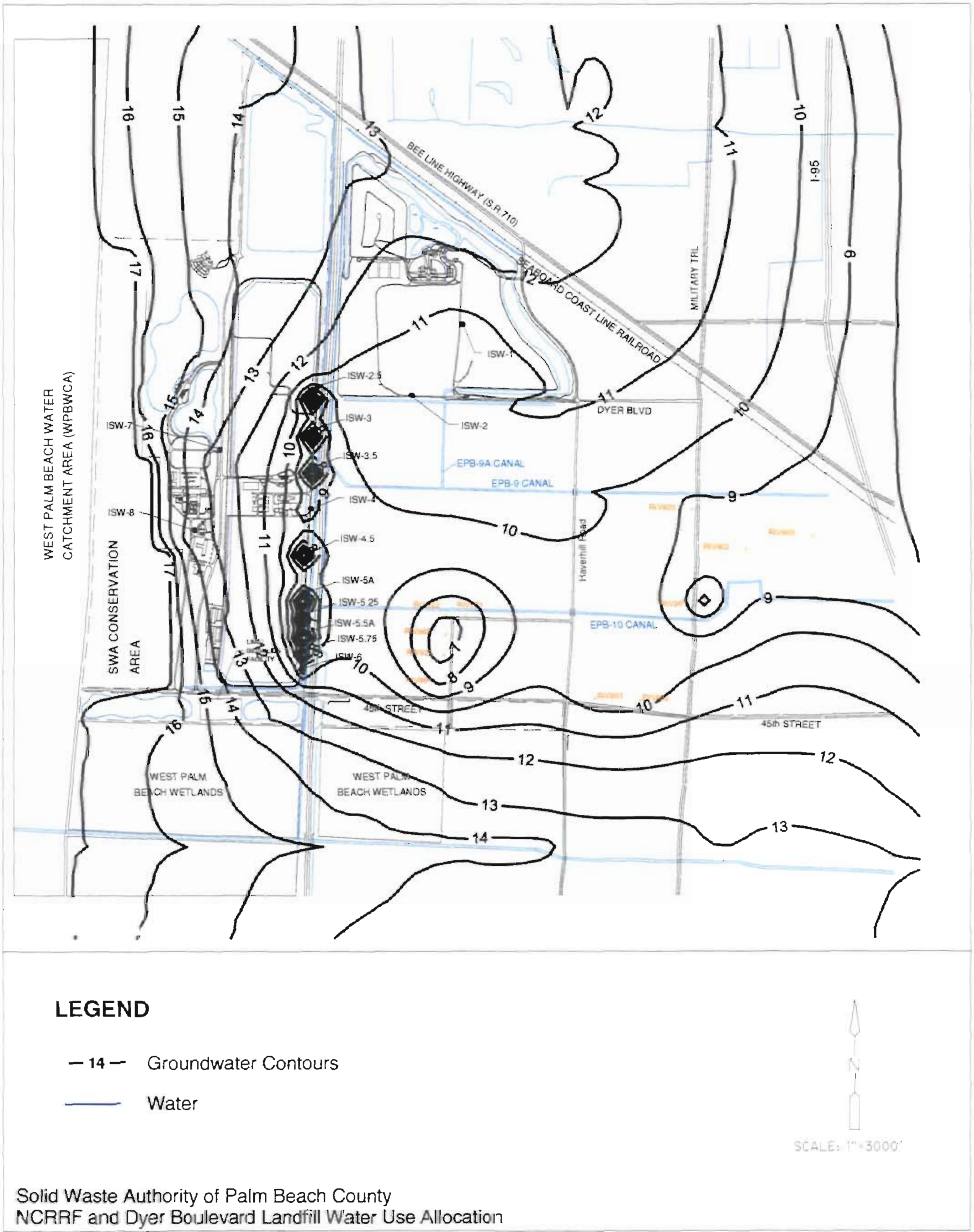
SCALE: 1"=3000'

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

J:/2678/Lime_Biosolids/PPSA/Figures/ h4s1wt.srf 7/28/03 Burwinkelsp

CDM

Figure D-17
Sim4 Groundwater Elevation Contours
Under Average Conditions

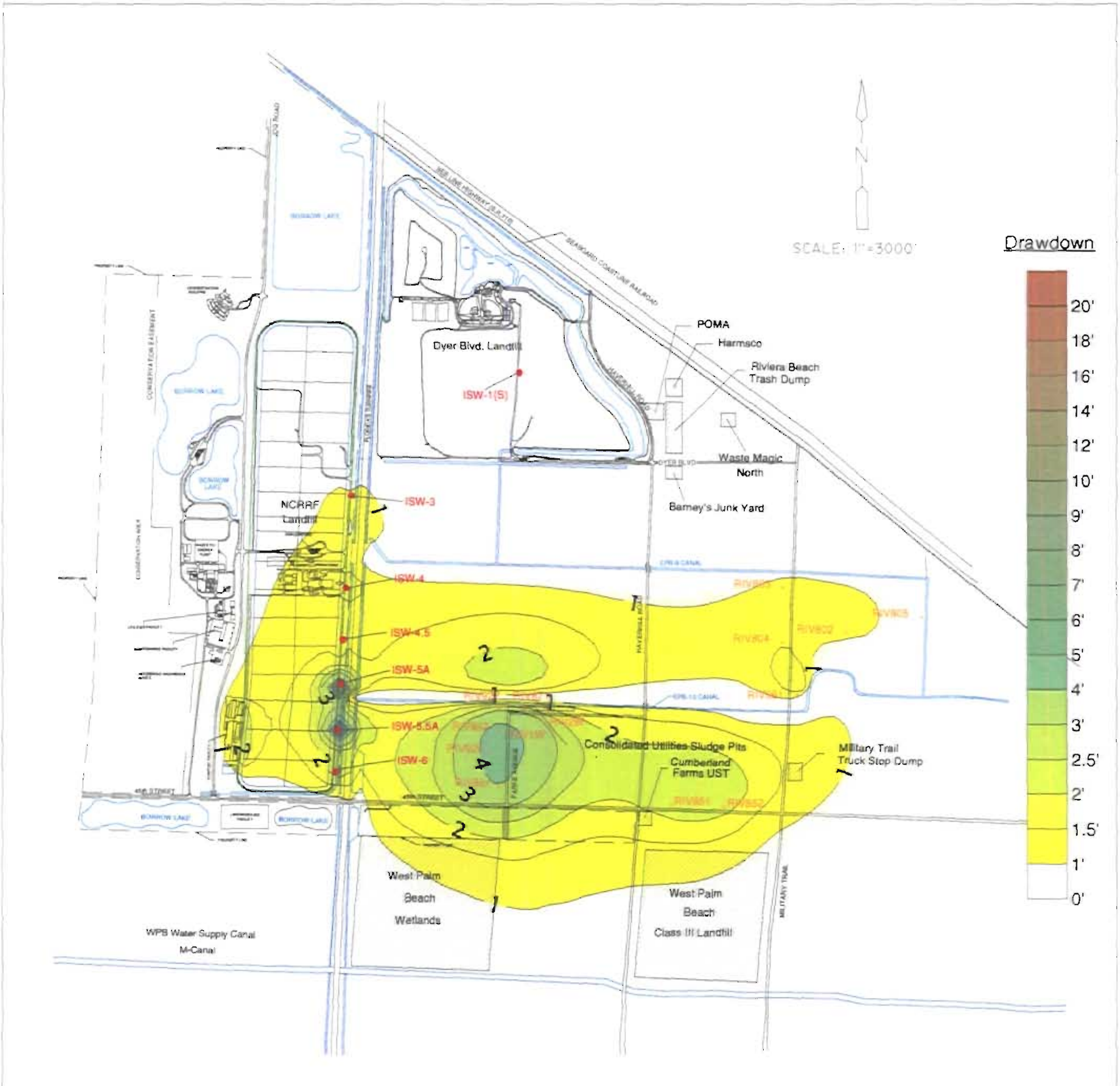


Burwinkelsp 7/29/03 h4s13wt.srf J:/2678/Lime_Biosolids/PPSA/Figures/

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

CDM

Figure D-18
Sim4 Groundwater Elevation Contours
Under 1-in-10 Year Dry Season Conditions



LEGEND

City of Riviera Beach Western Wellfield Wells

NCRRF Industrial Supply Wells

Offsite Areas of Concern
(Source: Inventory of Palm Beach County Solid Waste Sites, 1996)

NOTE:

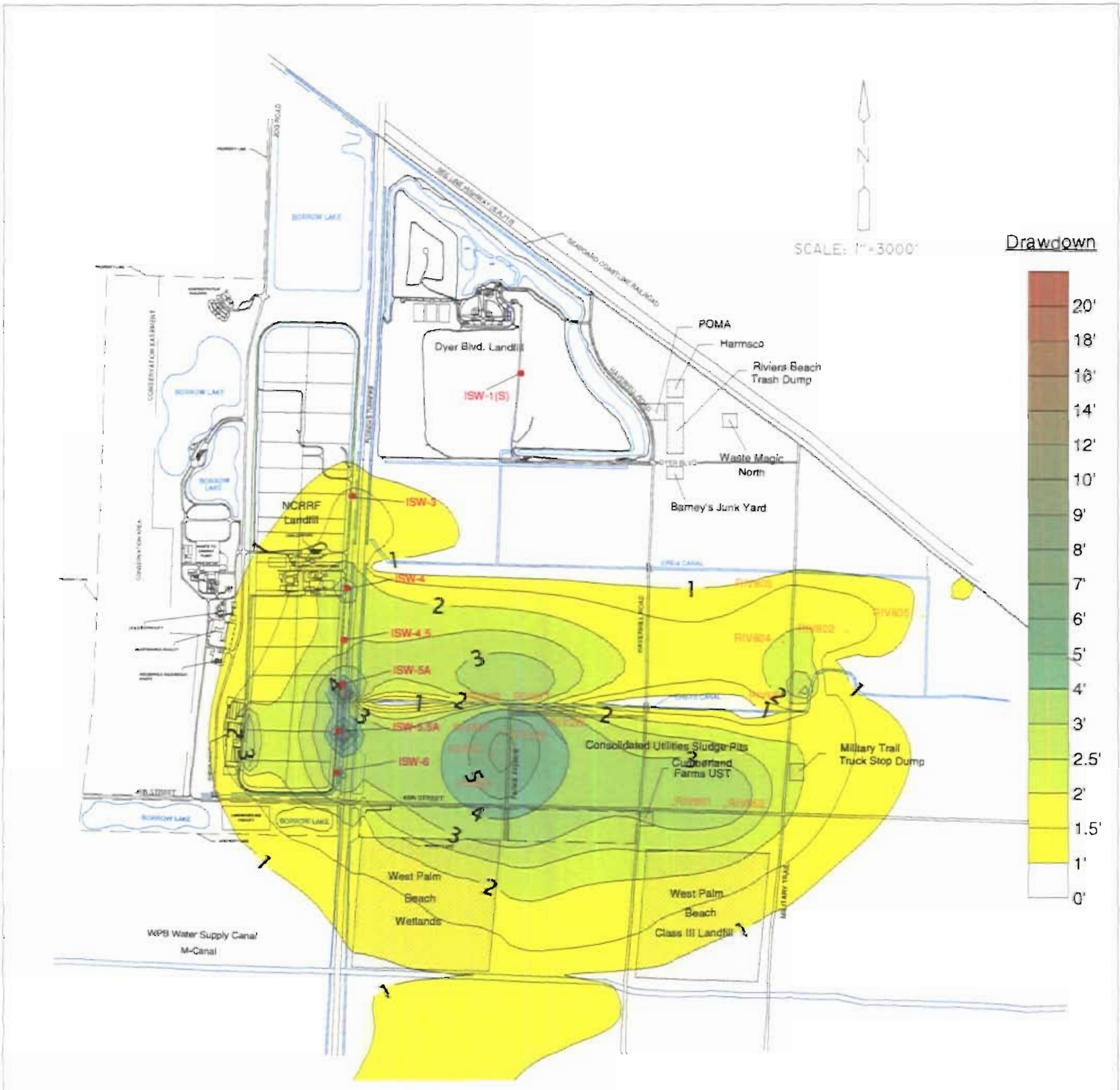
+ POSITIVE VALUE INDICATES DRAWDOWN
- NEGATIVE VALUE INDICATES MOUNDING

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

J:/2678/Lime_Biosolids/PPSA/Model/Figures/ td_sp1_sim1.srf 7/29/03 DesmaraisTR

CDM

Figure D-19
Total Drawdown Under Average Conditions for Sim1



NOTE:

+ POSITIVE VALUE INDICATES DRAWDOWN
- NEGATIVE VALUE INDICATES MOUNDING

LEGEND

City of Riviera Beach Western Wellfield Wells

NCRRF Industrial Supply Wells

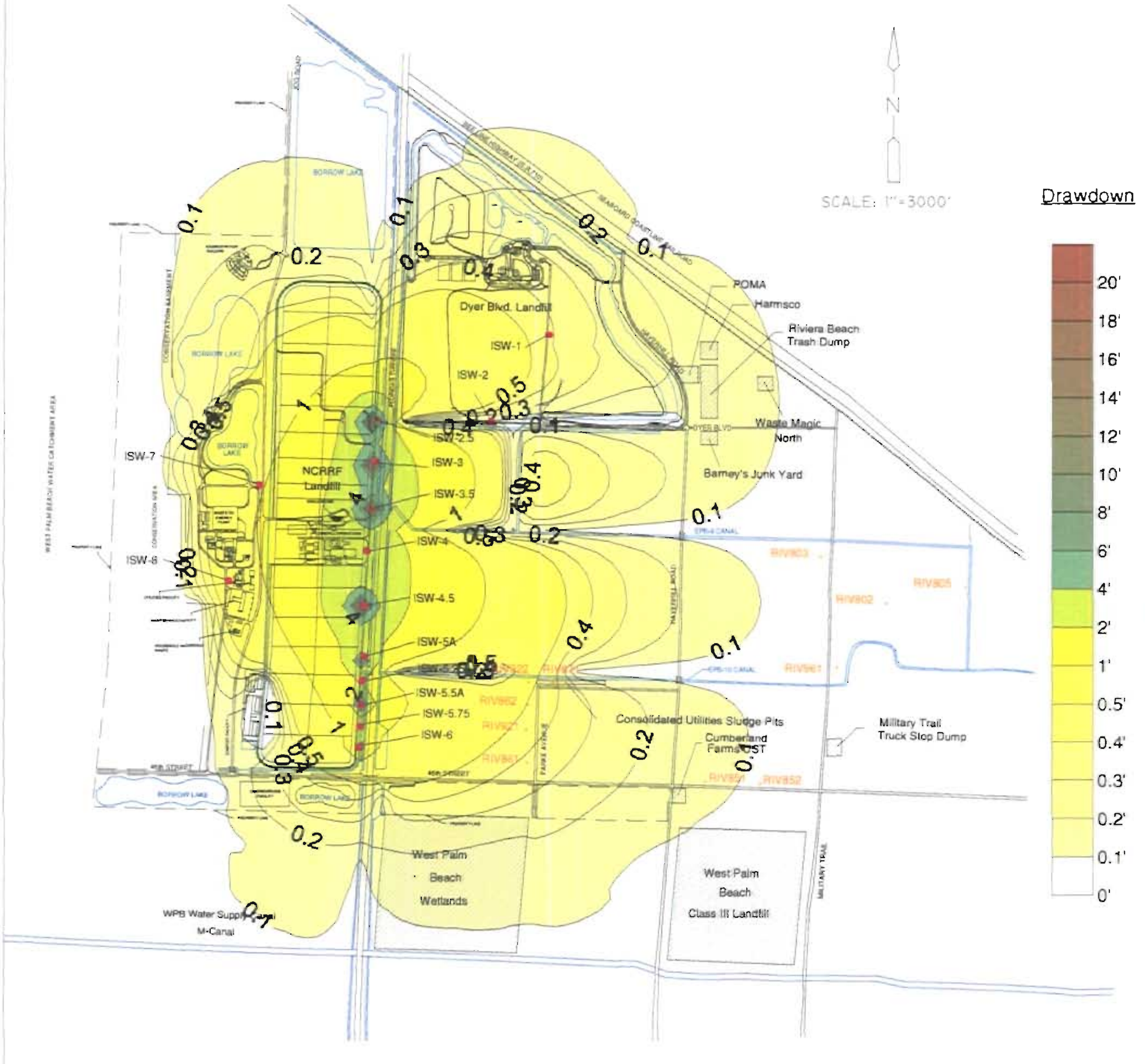
Offsite Areas of Concern
(Source: Inventory of Palm Beach County Solid Waste Sites, 1996)

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

J:/2678/Lime_Biosolids/PPSA/Model/Figures/ td_sp13_sim1.srf 7/29/03 DesmaraisTR

CDM

Figure D-20
Total Drawdown Under 1-in-10 Year Dry Season Conditions for Sim1



LEGEND

- City of Riviera Beach Western Wellfield Wells
- NCRRF Industrial Supply Wells
- Offsite Areas of Concern (Source: Inventory of Palm Beach County Solid Waste Sites, 1996)

NOTE:

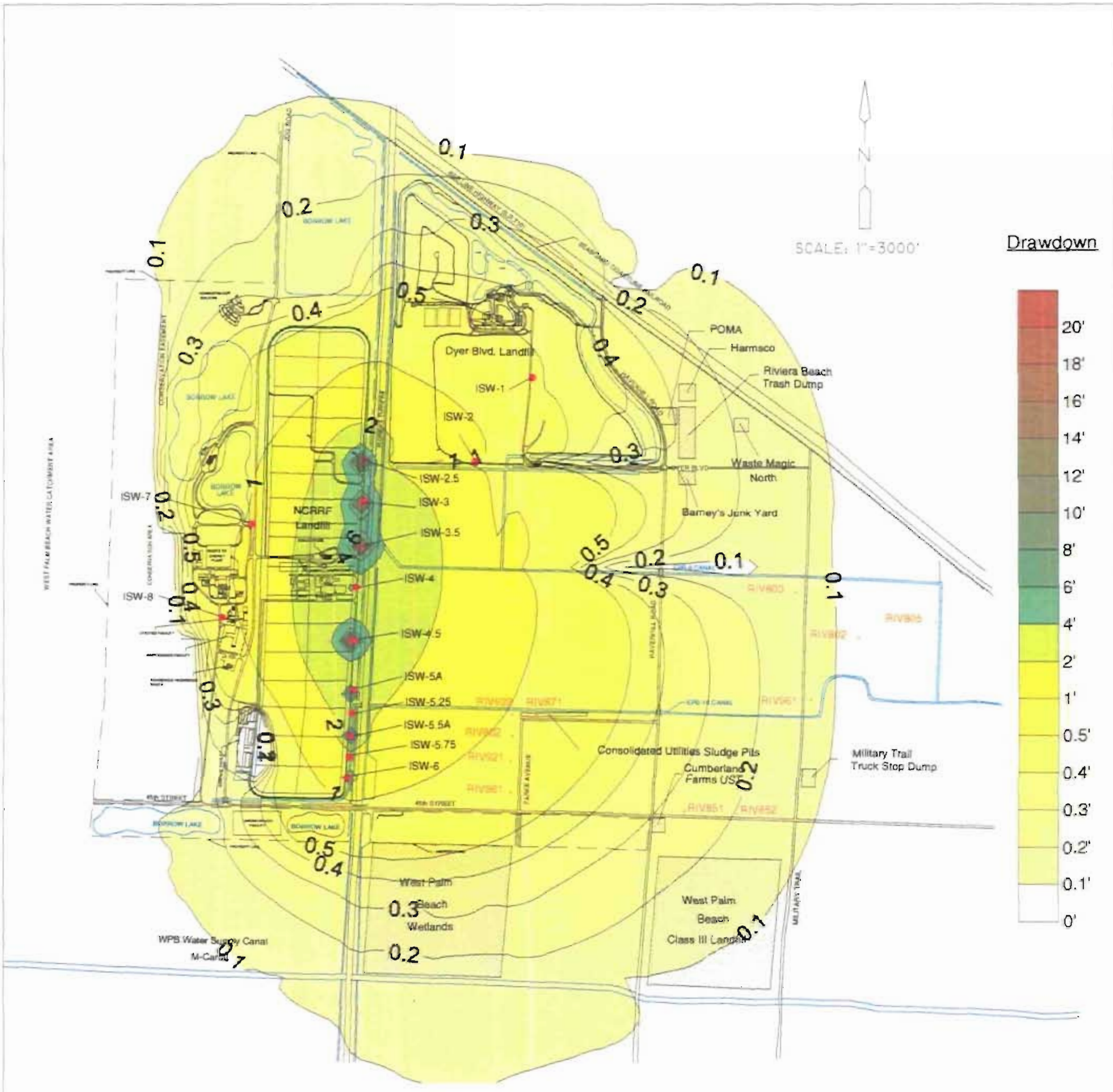
+ POSITIVE VALUE INDICATES DRAWDOWN
- NEGATIVE VALUE INDICATES MOUNDING

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

J:/2678/Lime_Biosolids/PPSA/Figures/ad_sp1_sim3 07/29/03 Burwinkelsp

CDM

Figure D-21
Change in Water Table Elevation Between Sim1 and Sim3 under Average Conditions



LEGEND

City of Riviera Beach Western Wellfield Wells

NCRRF Industrial Supply Wells

Offsite Areas of Concern
(Source: Inventory of Palm Beach County Solid Waste Sites, 1996)

NOTE:

+ POSITIVE VALUE INDICATES DRAWDOWN
- NEGATIVE VALUE INDICATES MOUNDING

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

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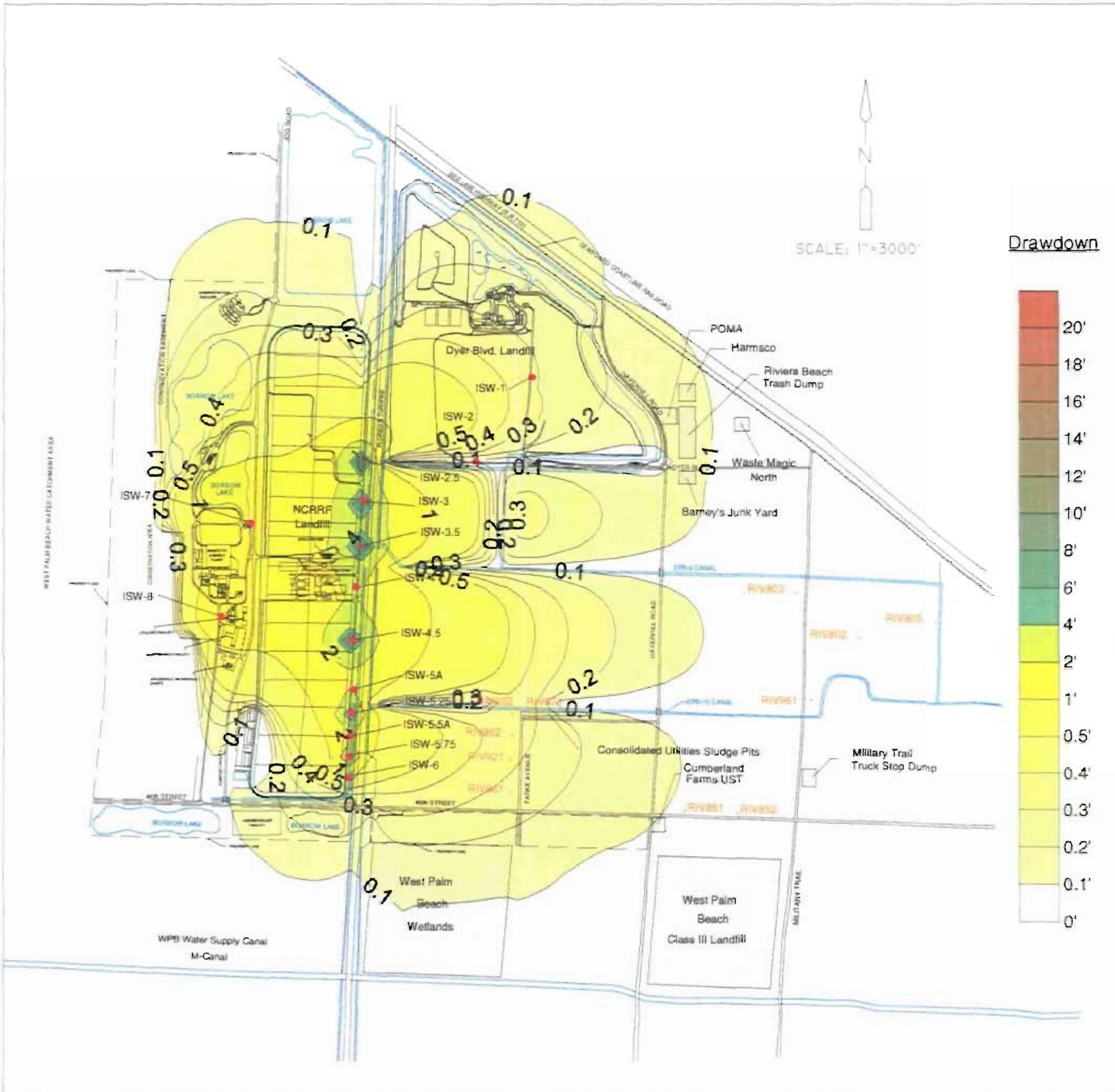
Figure D-22
Change in Water Table Elevation Between Sim1 and Sim3 under 1-in-10 Year Dry Season Conditions

CDM



LEGEND

City of Riviera Beach Western Wellfield Wells

NCRRF Industrial Supply Wells

Offsite Areas of Concern
(Source: Inventory of Palm Beach County Solid Waste Sites, 1996)

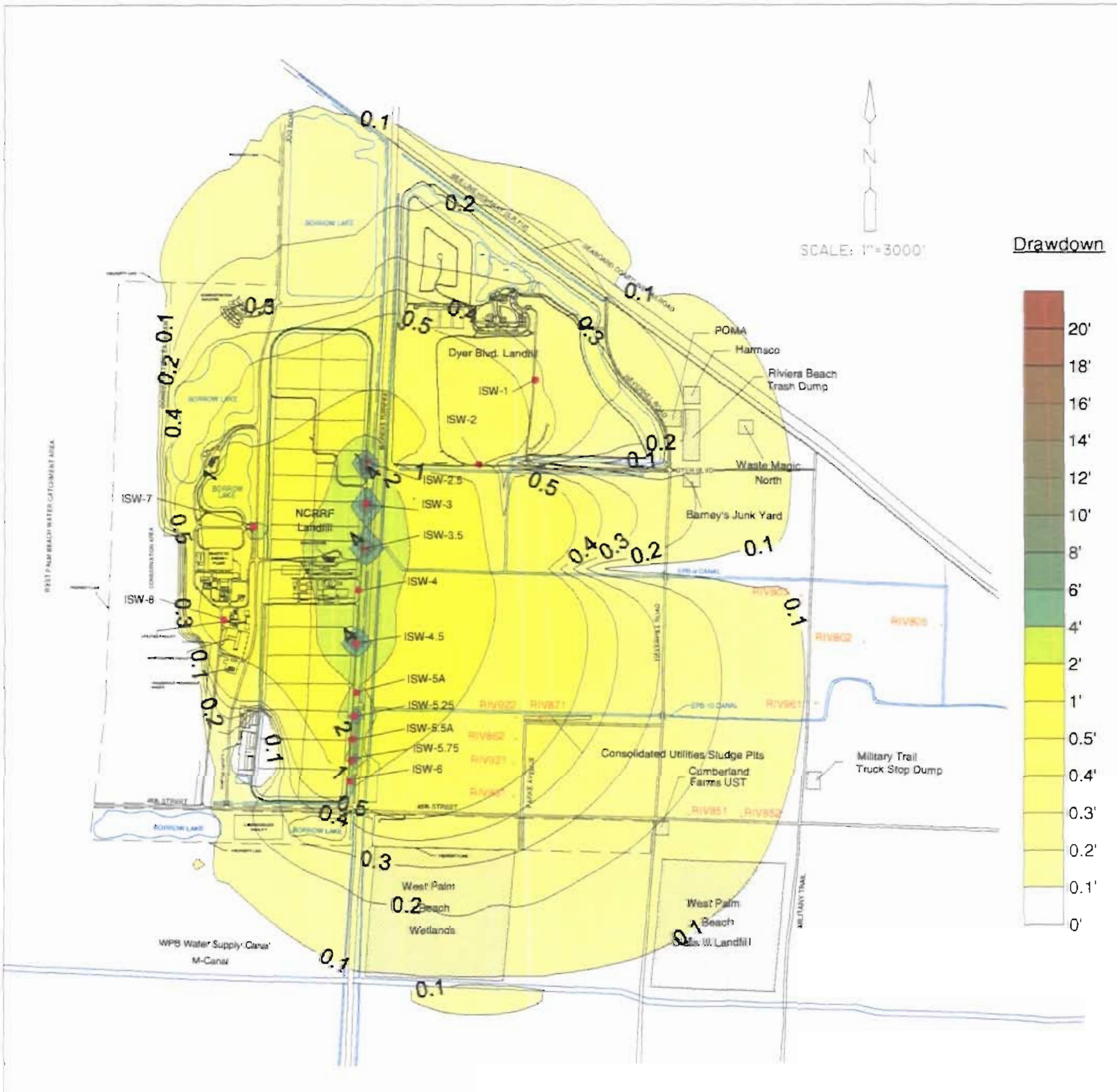
NOTE:

+ POSITIVE VALUE INDICATES DRAWDOWN
- NEGATIVE VALUE INDICATES MOUNDING

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

CDM

Figure D-23
Change in Water Table Elevation Between Sim1 and Sim4 under Average Conditions



LEGEND

City of Riviera Beach Western Wellfield Wells

NCRRF Industrial Supply Wells

Offsite Areas of Concern
(Source: Inventory of Palm Beach County Solid Waste Sites, 1996)

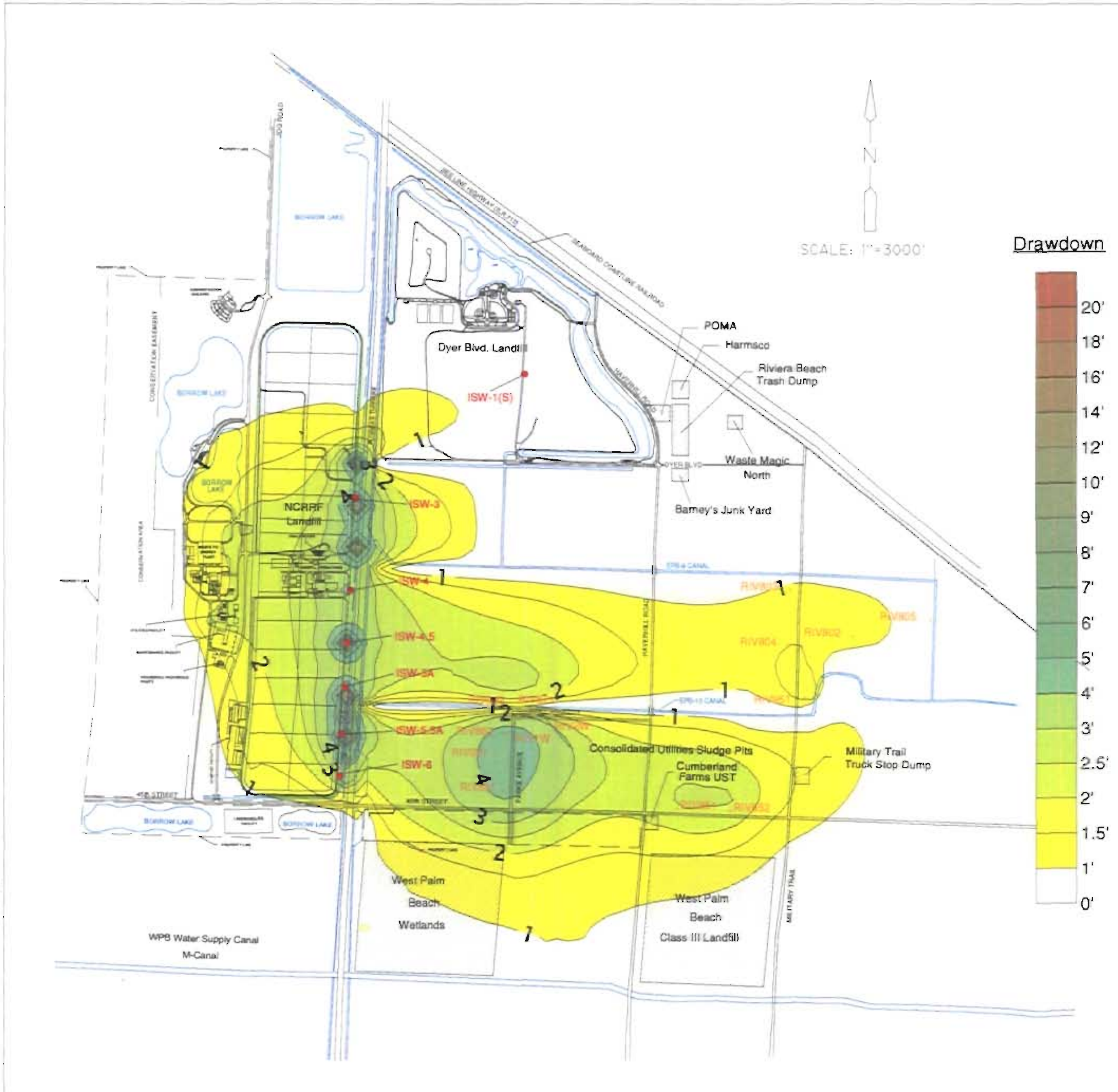
NOTE:

+ POSITIVE VALUE INDICATES DRAWDOWN
- NEGATIVE VALUE INDICATES MOUNDING

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

Figure D-24
Change in Water Table Elevation Between Sim1 and Sim4 under 1-in-10 Year Dry Season Conditions

CDM



LEGEND

City of Riviera Beach Western Wellfield Wells

● NCRRF Industrial Supply Wells

Offsite Areas of Concern
(Source: Inventory of Palm Beach County Solid Waste Sites, 1996)

NOTE:

\+ POSITIVE VALUE INDICATES DRAWDOWN
\- NEGATIVE VALUE INDICATES MOUNDING

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

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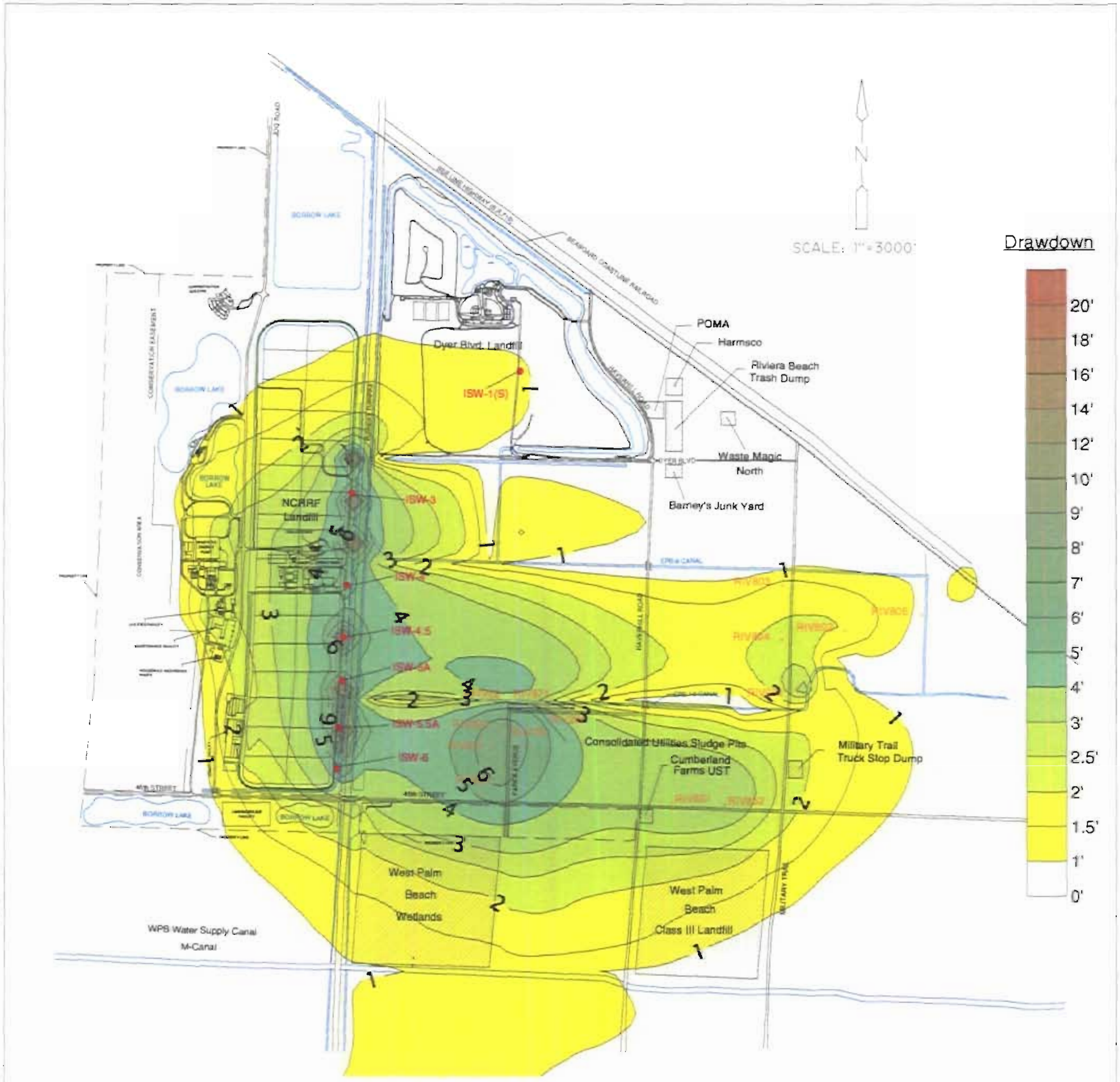
CDM

Figure D-25
Total Drawdown Under Average Conditions for Sim4



NOTE:

+ POSITIVE VALUE INDICATES DRAWDOWN
- NEGATIVE VALUE INDICATES MOUNDING

LEGEND

City of Riviera Beach Western Wellfield Wells

NCRRF Industrial Supply Wells

Offsite Areas of Concern
(Source: Inventory of Palm Beach County Solid Waste Sites, 1996)

Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

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CDM

Figure D-26
Total Drawdown Under 1-in-10 Year Dry Season Conditions for Sim1

Table D-9 Summary of Model-Predicted Drawdown at the WPB Wetlands

Scenario	Description	Average Pumping Rate	Additional Drawdown at WPB Wetlands	
			Average	1-in-10 Yr Dry
		(mgd)	(feet)	(feet)
Sim3	Proposed withdrawal facilities (addition of ISW-2.5 and 3.5 and shallowing of 6)	3.49	0.3	0.6
Sim4	Proposed withdrawal facilities (Sim3) with additional wells 5.25, 5.75, 7, & 8	3.49	0.2	0.35

From the drawdown plots, the inclusion of supply wells ISW-7 and ISW-8 reduces the amount of additional drawdown at the WPB Wetlands from about 0.3 to 0.2 feet under average conditions and from 0.6 to 0.35 feet under 1-in-10 year dry conditions.

Total drawdown plots for Sim1 (existing conditions) is provided on Figures D-19 and D-20 for comparison purposes. Total drawdown plots for Sim4 under average and 1-in-10 year dry season conditions are provided in Figures D-25 and D-26.

West Palm Beach Water Catchment Area
In order to quantify the seepage from the WPBWCA and adjacent SWA conservation easement, a water budget was calculated. The area includes the approximately 13,000-acre WPBWCA and 300-acre SWA conservation easement as shown on **Figure D-27**. These two areas were modeled using the RIVER package in MODFLOW. The outflow analysis indicates a minimal amount of induced seepage as a result from the increased water allocation. The outflow analysis for the WPBWCA (including the adjacent WPBWCA easement) is presented in **Table D-10** for all three simulations.

For Sim3, the overall increase in seepage from Sim1 (existing conditions) is 0.34 [28.21-27.87] and 0.52 [35.54-34.82] inches, for average and 1-in-10 dry season conditions, respectively. For Sim4, the overall increase in seepage is 0.59 [28.46-27.87] and 0.73 [35.55-34.82] inches, for average and 1-in-10 dry season conditions, respectively.

The outflows (in inches per year) presented in Table D-10 are only valid if the WPBWCA is not dry and the entire area can buffer additional seepage on the eastern boundary closest to the site and the supply wells. This assumption is generally valid for average conditions as the bottom elevation of the wetlands (as modeled) is approximately +17.0 feet NGVD. Historical data for a staff gauge located in the WPBWCA shows average water levels at or above +17.0 feet NGVD. However, during a drought condition (i.e. 1-in-10 year) the water level may drop to +15.0 to +16.0 feet NGVD, as occurred in 1989 and 1990. If this occurs, the effective buffer area of the WPBWCA will be reduced. It is difficult to quantify the actual effective area based on readily available data. However, if an effective area at 15 percent of the total area were assumed, the increase in seepage would only be approximately 3.5 inches (Sim3) and 4.9 inches (Sim4).

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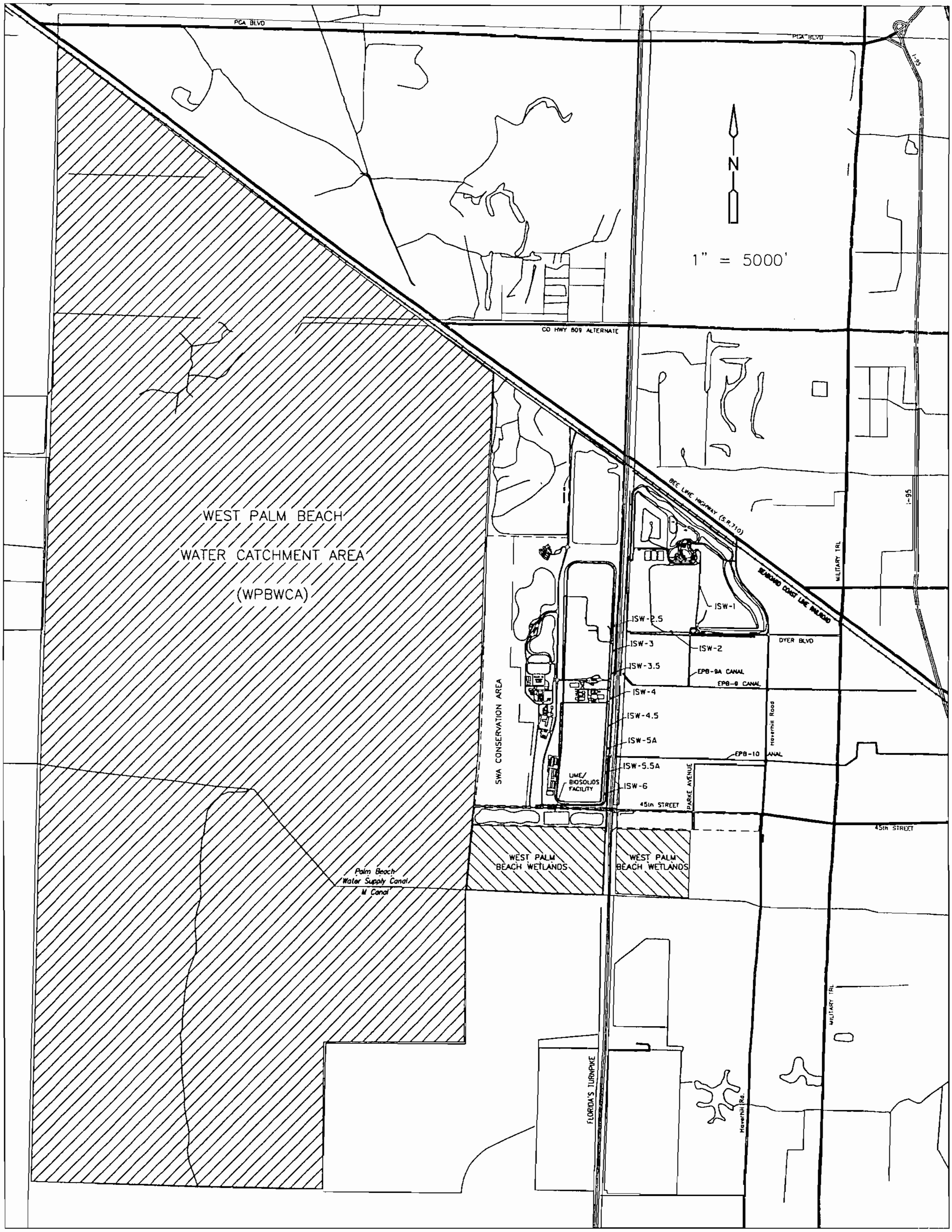

Figure D-27
Location Sketch of Major Nearby Wetlands

CDM

Table D-10 Summary of WPBWCA Outflows

Flow Component	Units	Flow					
		Sim1		Sim3		Sim4	
		Ave	Dry	Ave	Dry	Ave	Dry
Seepage	MGD	27.32	34.14	27.66	34.65	27.90	34.85
	in/yr	27.87	34.82	28.21	35.54	28.46	35.55
Lateral groundwater outflow to Surficial Aquifer	MGD	0.90	1.37	0.98	1.51	1.05	1.57
	in/yr	0.92	1.40	1.00	1.54	1.07	1.60
Leakage to underlying Turnpike aquifer (downward flow to model layer below)	MGD	17.85	19.55	18.10	19.91	18.28	20.06
	in/yr	18.20	19.94	18.46	20.31	18.64	20.46
Difference in flow due to Increase in Water Allocation							
Seepage	MGD	-	-	0.34	0.51	0.58	0.71
	in/yr	-	-	0.34	0.52	0.59	0.73
Lateral groundwater outflow to Surficial Aquifer	MGD	-	-	0.08	0.14	0.15	0.20
	in/yr	-	-	0.08	0.14	0.15	0.20
Leakage to underlying Turnpike aquifer (downward flow to model layer below)	MGD	-	-	0.26	0.37	0.43	0.51
	in/yr	-	-	0.26	0.37	0.44	0.52

City of Riviera Beach West Wellfield

With the current pumping allocation, the groundwater elevation at the City of Riviera Beach Western Wellfield (CRB-WEST) at the end of the 1-in-10 year dry season is approximately 7.0 feet NGVD. For Sim3, the groundwater elevations at the end of the 1-in-10 year dry season is approximately 6.1 feet NGVD resulting in a change of approximately 11 inches (from 7.0 feet to 6.1 feet). For Sim4, the groundwater elevations at the end of the 1-in-10 year dry season is approximately 6.3 feet NGVD. A change of approximately 8 inches (from 7.0 feet to 6.3 feet) should not adversely impact the ability of the City to pump their permitted allocation of 3.26 mgd since the City's wells are relatively deep (greater than 100 feet) and use submersible type pumps to withdraw water from the highly transmissive Turnpike Aquifer. The groundwater flow paths are not altered by the increase in pumping except in the immediate vicinity of the proposed SWA wells

Additionally, the potential for harm to the CRB-WEST, due to 8 inches or less of additional drawdown, is considered minimal to non-existent due to the following considerations.

- The water withdrawal from SWA's supply well system, following the modifications, will be primarily from the upper surficial aquifer. Water withdrawal from the CRB-WEST is from the deeper and more transmissive Turnpike Aquifer. A relatively thin, semi-confining unit that typically separates the two aquifers and the varying hydrogeologic properties of the soils results in groundwater levels in the two aquifers that are slightly different (approximately 0.1 to 0.2 feet).

- Under average pumping conditions, the CRB-WEST Wellfield would only see additional drawdown of 4 inches or less due to the increased allocation.

The addition of the two new supply wells in the western portion of the site was proposed to reduce drawdown at the WPB Wetlands and provide sufficient flexibility/redundancy for operation of the facilities. Additionally, the drawdown at the CRB-WEST wellfield was reduced by 0.25 feet at the end of a 1-in-10-year dry season and reduced by 0.20 feet at the end of an average dry season. **Table D-11** shows the anticipated increase in drawdown at the CRB-WEST wellfield for each of the model simulations. Regardless, the change in groundwater levels is still considered to have minimal impact to the WPB's wellfield operation. The additional pumping does not reverse, alter, or change the direction of groundwater flow at the CRB-WEST wellfield or any of the surrounding environmentally sensitive areas.

Table D-11 Summary of Model-Predicted Drawdown at CRB-WEST

Scenario	Description	Average Pumping Rate	Maximum Additional Drawdown at CRB-WEST	
			Average	1-in-10 Yr Dry
		(mgd)	(feet)	(feet)
Sim3	Proposed Withdrawal Facilities (addition of ISW-2.5 and 3.5 and shallowing of 6)	3.49	0.55	0.95
Sim4	Proposed withdrawal facilities of Sim3 with additional wells 5.25, 5.75, 7, & 8	3.49	0.35	0.7

D.3.5.6 Monitoring Program

The existing groundwater monitoring network for the NCRRF Landfill has numerous monitoring wells located near the ISW system. These wells will be used to monitor changes in water elevation due to the increase in pumping.

D.4 Summary and Conclusions

The purpose of the request for increasing the water withdrawal allocation at the NCRRF and Dyer Boulevard Landfill is to provide additional water for a proposed LRF and BPF at the NCRRF site. The facility will provide an alternate method for municipalities to dispose of lime softening and wastewater sludge subsequently producing usable products. The industrial processes required to convert lime sludge and biosolids to a usable product uses both potable and non-potable water. The non-potable water is available at the site via several supply wells that provide water to the on site WTE plant. This water would be used for the new facilities for non-potable water requirements.

The industrial process water required for operation of the facility, based on the anticipated capacity at full build-out, is 3.49 mgd on an average day basis. The current average water withdrawal allocation for the site is 1.74 mgd. Therefore, an increase of 1.75 mgd is requested for this PPSA amendment to adequately meet the demands of the various on-site water users. The maximum daily allocation requested is 4.28 mgd. The supply well system currently in operation would not be adequate to supply the water needed. The additional modifications presented will increase the capacity of the system providing the water needed with appropriate backup.

In order to access the impacts of the proposed increase, the proposed pumping rates were simulated using an existing groundwater flow model previously developed, calibrated, and verified. Simulations were conducted under both the existing supply well system (Sim2) and proposed system following modifications (Sim3 and Sim4). By using a drawdown analysis (comparison of the surficial water table under proposed conditions with no pumping and existing pumping conditions), the impact of the pumping is evaluated.

The proposed wells were located to meet the needs of the on-site facilities while providing hydraulic gradient control at the eastern NCRRF boundary. Four of the six proposed wells (ISW-2.5, 3.5, 5.25, and 5.75) were located with the purpose of maintaining hydraulic gradient control. The two remaining proposed wells (ISW-7 and 8) were located in order to minimize impacts to the WPB Wetlands, WPBWCA, and CRB-WEST.

From the drawdown plots (Figures D-19 to D-26), the additional drawdown due to the increase in pumping was minimal and does not impact any major surface water bodies. Nearby wetlands, primarily the City of West Palm Beach Wetlands (south of site) and WPBWCA (west of site), is not adversely affected by the increase in pumping. Only minimal additional (<0.35 feet) drawdown occurs at the wetland due to the increase in allocation.

With the proposed modifications to the ISW system, the additional drawdown is minimal at the southern portion of the landfill (near CRB-WEST and WPB Wetlands). The impact is minimized since the operation of the new supply wells distributes the drawdown over a greater area. Drawdown in the area of the new wells is obviously greater, but is further away from other water users and environmentally sensitive areas. The greatest potential groundwater pollution source within the radius of influence of these wells is the NCRRF and Dyer Boulevard landfills. Since the supply wells are also used to provide hydraulic gradient control at the site in the case where pollution becomes a concern, this impact is not applicable. Other minor pollution sources are located along Haverhill Road but these sources are not impacted by the proposed increase and the groundwater flow patterns are not altered at these locations.

D.5 References

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Appendix E
Ecological Report

Contents - Ecological Survey

Appendix E
Ecological Report

E.1 Purpose

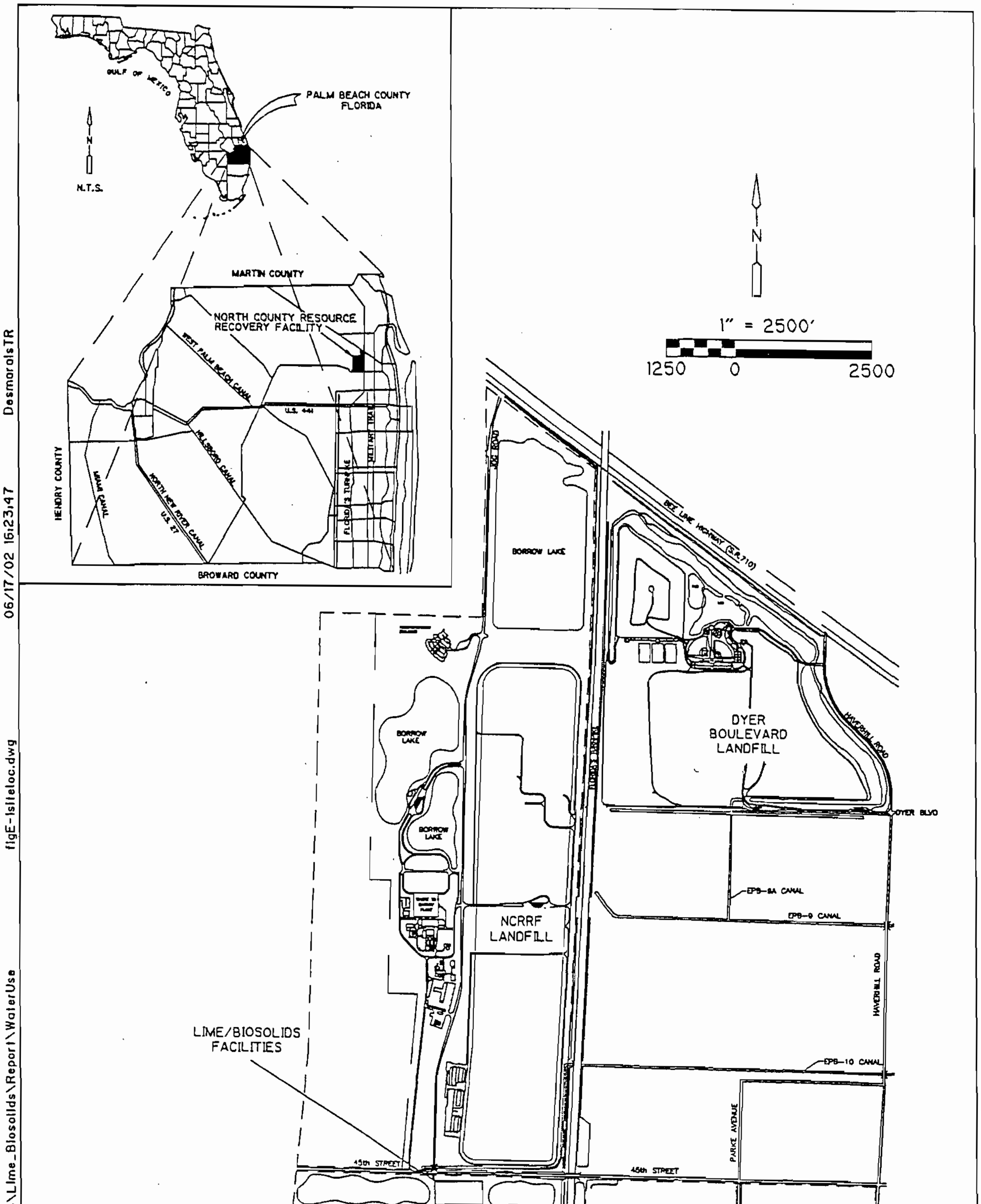
The purpose of this evaluation is to determine which state and federally listed threatened and endangered flora and fauna, or species of special concern occur within the project parcel. The parcel is proposed for the construction of a Lime Recalcination Facility (LRF) and Biosolids Pelletization Facility (BPF). Environmental constraints such as the presence of listed threatened and endangered species are part of the review process in determining suitability for the proposed facilities. The study area includes the 15-acre parcel located on the southeast corner of Jog Road and 45th Street, south of the Solid Waste Authority (SWA) landfill facility, Florida. **Figure E-1** presents the location map of the project parcel.

This evaluation identifies potential listed species that occur in Palm Beach County, Florida, methodologies used to determine the occurrence of threatened and endangered species or species of special concern, and the list of species that have been documented or observed within the parcel. An onsite investigation was made to confirm and determine whether the parcel contains nesting or denning sites, or is being used intermittently to forage or roost, and the type and condition of the vegetative community.

E.2 Methodology

The United States Fish and Wildlife Service (FWS), along with the Florida Fish and Wildlife Conservation Commission (FWC) have been delegated authority to protect the threatened and endangered fauna and flora that occur in Florida. An Official List of Endangered and Potentially Endangered Fauna and Flora in Florida (FWS, 2000 and FFWS 2000) are published in the Endangered Species Act of 1973 (U.S.C. 1531) and Section 581.185-197, Florida Statutes. The Florida Natural Areas Inventory (FNAI) maintains the lists for each agency, along with documented occurrences of each listed species for each county area.

Related documents that were reviewed include Palm Beach County soil maps that indicate soil types present within the parcel, including whether the soils are hydric or not. Upland soils and the range of water table help establish the type of potential vegetative community present within that soil classification. The National Wetlands Inventory (NWI) map was reviewed to determine whether wetlands occur on the parcel. Land use classification of the parcel was reviewed to determine the presence of specific vegetative communities. Habitat characteristics and known ranges of listed species provided in written documents and reports were also reviewed. Through evaluation of the land use and vegetation types and the habitat requirements for threatened and endangered species or species of special concern, specific vegetation communities are identified where these species could occur. The occurrence of these



Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

J:\2678\Lime_Biosolids\Report\WaterUse figE-1siteloc.dwg 06/17/02 16:23:47 DesmaraisTR

CDM

Figure No. E-1
Site Location Map

species is related to the presence and availability of particular habitat types, food sources, and reproduction capability with other related species.

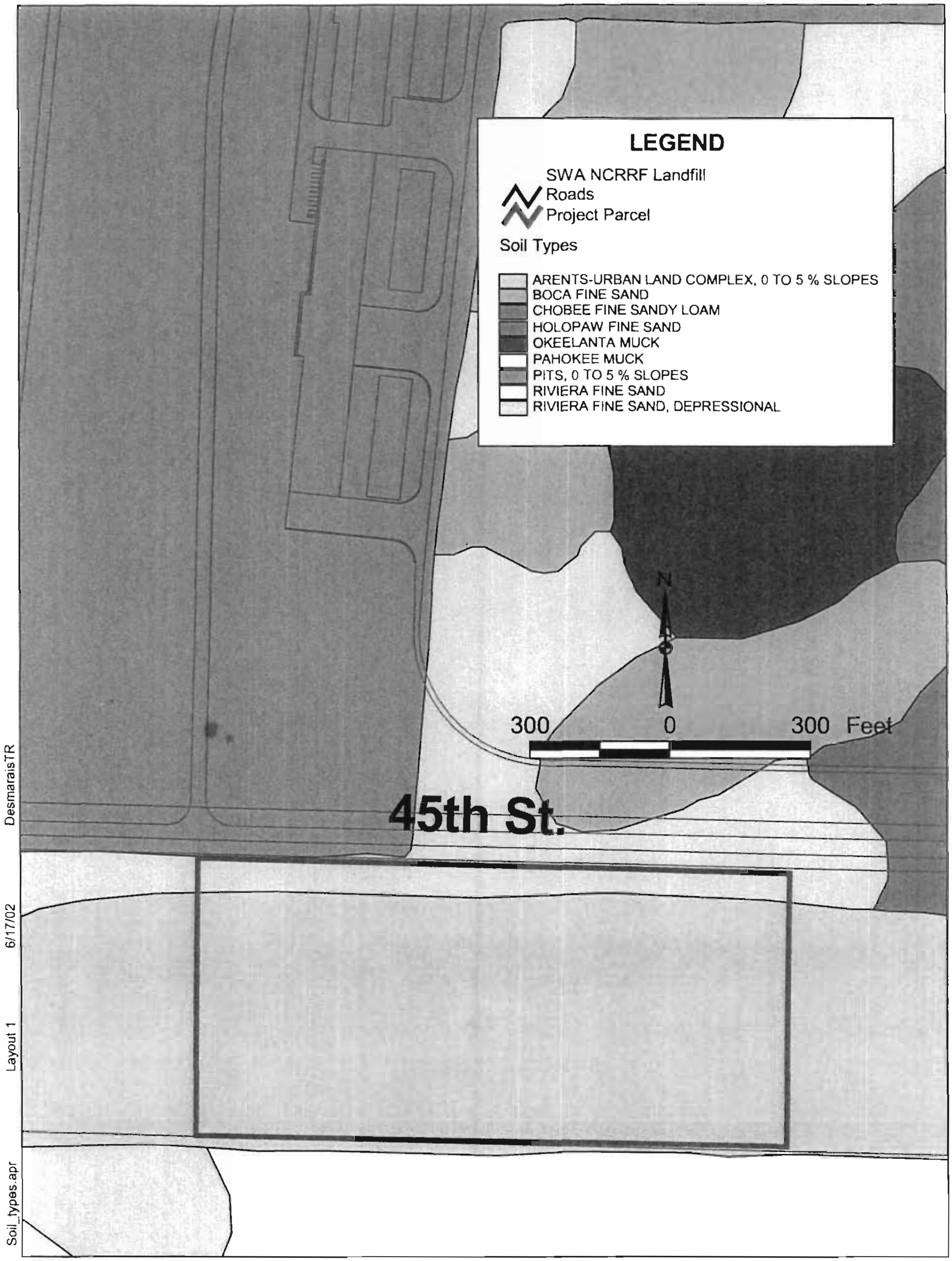
The Florida Fish and Wildlife Conservation Commission (FWC) was contacted to obtain documented or known listed plants and animals within the study area out to a radius of one mile from the project parcel. Also, the FWC website was used to locate known active bald eagle nest within the vicinity of the parcel. **Exhibit A** presents the results that no eagle nests are in Section 3, Township 43 South, Range 42 East, Palm Beach County, Florida. (http://wld.fwc.state.fl.us/eaglenests/nestsearch). There is an active bald eagle nest in the City of West Palm Beach Water Catchment area adjacent to the project parcel. The Florida Natural Areas Inventory (FNAI) data was used to confirm all listed species in the study area. In addition, the FNAI recent publications on listed species and habitat characterization was reviewed (Hipes, *et al.*2001 and Chafin 2000).

A three-day pedestrian survey was conducted from April 16, 2002 to April 18, 2002, throughout the parcel to identify and assess the vegetative community types, potential wildlife habitat, tracks, scat, burrows, and denning sites. The survey was conducted in the early morning hours, afternoon, and late evening hours to observe and hear potential wildlife activity on site. Results of the survey are discussed in Section E.4. The survey also included inspecting the parcel for listed plant species.

E.3 Site Description

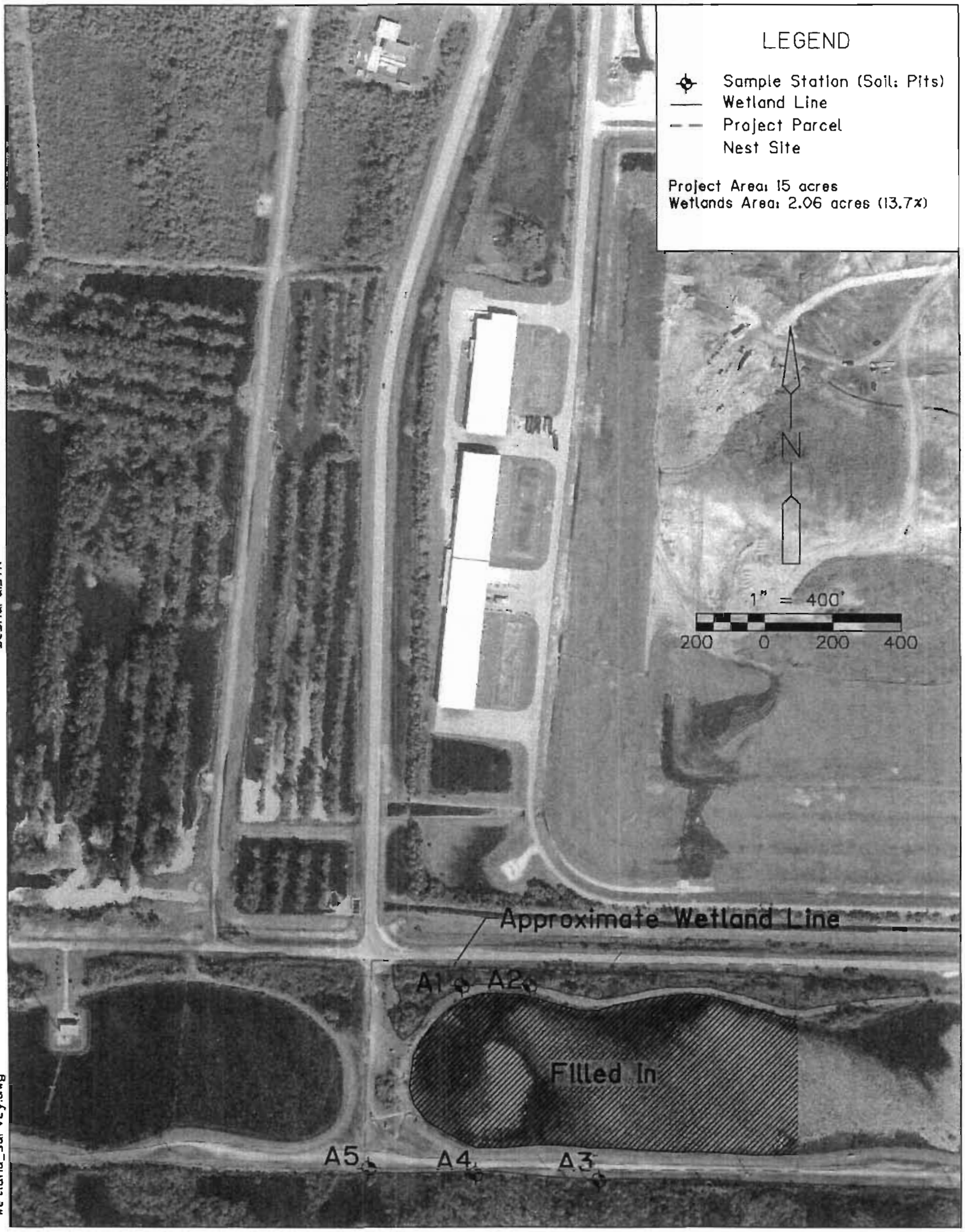
The rectangular shaped parcel (15 acres) is located on the southeast corner of Jog Road and 45th Street and south of the SWA landfill in Palm Beach County, Florida. The parcel was a borrow pond that was filled in with sands in June 2000 (Army Corps of Engineers Permit No. 198-52-1054 [IP-TM]). The barren parcel is flat, partly covered with grasses and open sandy areas, and has an earthen berm around the perimeter of the parcel. The parcel is surrounded by the SWA landfill to the north, Florida Turnpike and borrow pond on the east boundary, cypress-marsh community that is partly ponded on the south boundary, and a borrow pond on the west boundary that contains a wetland mitigation site.

Pedestrian surveys were performed throughout the parcel to visually inspect for signs and listen for listed species. **Figure E-2** presents the soils within the project parcel. Soils in this area are classified as Riviera fine sand, depressional soils (Rd) and Arents urban land complex (AU). Arents complex soils are areas that have been filled in with sand and used for urban development. These soils are considered upland and do not contain hydric soil characteristics. The Riviera fine sand, depressional series is considered hydric soil, however since the soil map was printed, the site has been partly filled in with sand (landward of the perimeter berm). The water table determinations were recorded to be about 24-inches below ground surface. Wetlands surrounding the perimeter of the parcel include a ditch, borrow pond, and natural wetland. The barren land is covered grass and sand through the entire parcel. **Figure E-3** presents an aerial photograph of the parcel.



CDM

Figure E-2
Project Parcel Soil Types



DesmaraisTR
6/20/02
wetland_survey.dwg

CDM

Figure No. E-3
Soil Survey

E.4 Results

The parcel was investigated from April 16, 2002 to April 18, 2002 to verify whether listed species occur on site. Exhibit A presents plant species listed as threatened and endangered that occur within Palm Beach County. **Exhibit B** presents the amphibians, reptiles, birds, and mammals listed as threatened, endangered, or species of special concern that are known to occur in Palm Beach County.

The 15-acre parcel was recently filled in with sand and planted with Bahia grass (*Paspalum notatum*). The parcel is devoid of vegetation except for the Bahia grass and other ruderal grasses. The sand barren habitat significantly reduced the possibility of most listed species to permanently occur on site, or use the parcel to migrate through. Listed species that potentially occur on site include the eastern indigo snake (*Drymarchon corais couperi*) and gopher tortoise (*Gopher polyphemus*).

The open field, poor soils, limited habitat conditions, and sparse vegetated groundcover limit food sources for listed wildlife and plants to inhabit the parcel.

E.4.1 Species Observed

The project parcel is sparsely covered with ruderal grasses, Bahia grass, and sand as groundcover. No listed plants were observed on site. No listed animals were observed on site. Wildlife typical of this flat, barren habitat that were observed during the survey include the Carolina wren, six lined skinks, and cattle egrets. Armadillo tracks and burrows, and deer tracks were also observed.

E.4.2 Summary

The project parcel has limited suitable habitat for listed plants and animals. No listed plant or animal species were observed on site during field surveys. Development surrounds half of the boundary that restricts species migration. This proposed project will not have an effect on listed species.

Exhibit A
Eagle Nest Search

Instructions for use of the "Map" and "Topo" buttons:

Clicking on the MAP button near the end of a nest row links to a website that displays the nest location on an interactive road map. You can zoom and shift the view area of the map and control the level of detail displayed. You can return to the list of found nests by using the "Back" browser button.

Clicking on the TOPO button at the end of a nest row links to a website that displays the nest location on a printable portion of a USGS 1:100,000 scale topographic map. The name of the USGS 1:24,000 scale quad map on which the nest is located is displayed above the map, and additional USGS quad map information can be accessed by clicking on the "Quad Info" link. When the "printer dialog" box displays, you can choose to print the map immediately or cancel the printer dialog in order to view the map first. You can return to the list of found nests by using the "Back" button on your browser.

Please Note: The nest location map accessed by the TOPO or MAP buttons is not an adequate substitute for careful plotting of FWC eagle nest location coordinates on an accurate small-scale topographic paper map or Geographic Information System (GIS) electronic map. This feature is provided only to allow the user to view the general location of a nest and to confirm that an appropriate area of interest was targeted by the user's search. Careful plotting of a nest location on an accurate map is not an adequate substitute for a specific on-the-ground survey of the nest site.

Township = '43S' AND Range = '42E' AND Section = '3'
0 record(s) were found.
Goto Page: ALL

							Active Territory?					Maps	
County	NestID	Longitude	Latitude	Township	Range	Section	97	98	99	00	01	Road	Topo

Goto Page: ALL

Search again

Exhibit B

List of Threatened or Endangered Species

Exhibit B

List of Threatened or Endangered Plants Species that Occur in Palm Beach County, Florida. April 2002.

April 2002

Scientific Name	Common Name	Indicator Status		Habitat
		Federal	State	
Acrostichum aureum	Golden leather fern	N	E	Mangrove swamps-brackish marshes
Actinostachys pennula	Ray fern	N	E	swamps
Argusia gnaphalodes	Sea lavender	N	E	Dunes
Aristida rhizomorphora	Florida three-awned grass	N	N (S2)	wet flatwoods
Asclepias curtissii	Curtiss' milkweed	N	E	scrub
Asimina tetramera	Four-petal pawpaw	E	E	sandpine scrub
Asplenium trichomanes-dentatum	Slender spleenwort	N	E	?
Calopogon multiflorus	Many-flowered grasspink	N	E	flatwoods
Chamaesyce cumulicola	Sand-dune spurge	N	E	sand dune
Cheiroglossa palmata	Hand fern	N	E	on cabbage palms
Coccothrinax argentata	Silver palm	N	E	rocky pinelands
Conradina grandiflora	Large-flowered rosemary	N	E	scrub
Crossopteralum rhacoma	Rhacoma	N	E	pineland-hammocks
Cucurbita okeechobeensis	Okeechobee gourd	E	E	Floodplain forest margins
Dennstaedtia bipinnata	Hay scented fern	N	E	hammock swamps
Elytraria caroliniensis var *angustifolia*	Narrow-leaved Carolina scalystem	N	N (S2)	wet pinelands
Epidendrum nocturnum	Night-scented orchid	N	E	swamp-hammock-mangrove
Euphorbia pinetorum	Rockland painted-leaf	N	E	pinelands
Glandularia martima	Coastal vervain	N	E	coastal pinelands
Halophila johnsonii	Johnson's seagrass	T	N (S2)	Estuarine
Indigofera mucronata var *keyensis*	Decumbent indigo	N	N (S1)	?
Inopsis utricularioides	Delicate ionopsis	N	E	cypress swamps
Jacquemonita reclinata	Beach jacquemontia	E	E	coastal scrub
Lantana depressa var *floridana*	Atlantic Coast Florida lantana	N	N (S2)	ruderal scrub
Lechea cernua	Nodding pinweed	N	T	scrub
Lechea divaricata	Pine pinweed	N	E	scrub flatwoods
Leiphaimos parasitica	Ghost plant	N	N (S2)	hammocks
Linum cateri var smallii	Carter's large-flowered flax	N	E	pinelands
Myrcianthes fragrans var simpsonii	Twinberry	N	T	coastal hammocks
Nemastylis floridana	Fall-flowering ixia	N	E	wet flatwoods
Okenia hypogaea	Burrowing four-o'clock	N	E	dunes
Oncidium bahamense	Dancing-lady orchid	N	E	scrub
Panicum abscissum	Cutthroat grass	N	E	wet flatwoods
Pecluma ptilodon	Swamp plume polypody	N	E	hammocks
Persea humilis	Scrub bay	N	N (S3)	scrub
Phyllanthus pentaphyllus ssp floridanus	Florida five-petaled leaf-flower	N	E	rocky pinelands
Polygala smallii	Tiny polygala	E	E	pine rockland
Polyrrhiza lindenii	Ghost orchid	N	E	cypress swamps & hammocks
Pteris bahamensis	Bahama brake	N	E	rocky pinelands/edge of hammock
Spiranthes lanceolata var paludicola	Fahkahatchee ladies'-tresses	N	N (S1)	cypress swamps
Spiranthes torta	Southern ladies'-tresses	N	E	flatwoods (rocky), marl prairies
Stillingia sylvatica ssp *tenuis*	Queen's delight	N	N (S2)	sandhills-flatwoods
Tephrosia angustissima var *curtissii*	Coastal hoary-pea	N	E	sand-scrub-pine
Thelypteris serrata	Toothed lattice-vein fern	N	E	cypress-sloughs-floodplains
Thrinax morrisii	Brittle thatch palm	N	E	hammocks
Tillandsia flexuosa	Banded wild-pine	N	E	hammocks-cypress swamps
Zanthoxylum coriaceum	Biscayne prickly-ash	N	E	tropical coastal hammocks
Zephyranthes simpsonii	Rain lily	N	T	pine-flatwoods
NON VASCULAR PLANT				
Cladonia perforata	Perforated reindeer lichen	E	E	scrub

T=Threatened, E=Endangered

S1= Critically imperiled, S2=Imperiled in Florida, S3=Very rare, restricted range & vulnerable to extinction.

Exhibit B

List of Threatened or Endangered Animal Species that Occur in Palm Beach County, Florida.

April, 2002

Scientific Name	Common Name	Indicator Status		State Rank	Habitat
		Federal	State		
Fish					
Bairdiella sanctaeluciae	Striped croaker	N	N	S2	Coastal
Gobiomorus dormitor	Bigmouth sleeper	N	N	S2	Coastal
Gobionellus stigmaturus	Spottail goby	N	N	S2	Coastal
Microphis brachyurus	Opossum pipefish	N	N	S2	Coastal
Amphibians					
Rana areolata	gopher frog	N	N	S3	gopher burrows
Rana capito		N	N	S3	
Reptiles					
Alligator mississippiensis	American alligator	T(S/A)	SSC	S4	wetlands
Carretta caretta	Loggerhead	T	T	S3	Coastal
Chelonia mudas	Green turtle	E	E	S2	Coastal
Crocodylus acutus	American crocodile	E	E	S1	Coastal
Crotalus adamanteus	Eastern diamondback rattlesnake	N	N	S3	undeveloped areas
Dermochelys coriacea	Leatherback turtle	E	E	S2	Coastal
Drymarchon corais	Eastern indigo snake	T	T	S3	undeveloped areas
Eretmochelys imbricata	Hawksbill	E	E	S1	Coastal
Gopherus polyphemus	Gopher turtle	N	SSC	S3	undeveloped areas
Lepidochelys kempii	Kemp's ridley turtle	E	E	S1	Coastal
Pituophis melanoleucus	Florida Pine snake	N	SSC	S3	pine flatwoods
Sceloporus woodi	Florida scrub lizard	N	N	S3	scrub

T= Threatened

E=Endangered

SSC= Special of Special Concern

N= Not listed

S1= Critically imperiled, S2=Imperiled in Florida, S3=Very rare, restricted range & vulnerable to extinction.

Exhibit B

List of Threatened or Endangered Animal Species that Occur in Palm Beach County, Florida.

April, 2002

Scientific Name	Common Name	Indicator Status		State Rank	Habitat
		Federal	State		
Birds					
Accipiter cooperii	Cooper's hawk	N	N	S3?	forest
Aimophila aestivalis	Bachman's sparrow	N	N	S3	forest
Aphelocoma coerulescens	Florida scrub jay	T	T	S3	scrub
Aramus guarauna	Limpkin	N	SSC	S3	wetlands
Ardea alba	Great egret	N	N	S4	wetlands
Ardea herodias occidentalis	Great White heron	N	N	S2	wetlands
Buteo brachyurus	Short-tailed hawk	N	N	S3	forest
Caracacara plancus	Crested caracara	T	T	S2	open fields
Charadrius melodus	Piping plover	T	T	S2	Coastal
Dendroica discolor paludicola	Florida prairie warbler	N	N	S3	open fields
Egretta caerulea	Little blue heron	N	SSC	S4	wetlands
Egretta thula	Snowy egret	N	SSC	S4	wetlands
Egretta tricolor	Tricolored heron	N	SSC	S4	wetlands
Elanoides forficatus	Swallowed tailed kite	N	N	S2S3	wetlands
Eudocimus albus	White ibis	N	SSC	S4	wetlands
Falco columbarius	Merlin	N	N	SU	Coastal
Falcao peregrinus	Pergrine falcon	E	E	S2	undeveloped areas
Falco sparverius paulus	Southeastern American kestrel	N	T	S3?	undeveloped areas
Fregaa magnificens	Magnificant frigatebird	N	N	S1	Coastal
Grus canadensis pratensis	Florida sandhill crane	N	SSC	S1	open fields
Haematopus palliatus	American oystercatcher	N	SSC	S3	Coastal
Haliaeetus leucocephalus	Bald eagle	T	T	S3	wetlands/pine
Ixobrachus exilis	Least bittern	N	N	S4	swamp
Laterallus jamaicensis	Black rail	N	N	S4	swamp
Mycteria ameriacana	Wood stork	E	E	S2	wetlands
Nyctanassa violacea	Yellow-crowned night he	N	N	S3?	wetlands
Nycticorax nycticorax	Black-crowned night her	N	N	S3?	wetlands
Pandion haliaetus	Osprey	N	SSC*	S3S4	wetlands
Pelecanus occidentalis	Brown pelican	N	SSC	S3	coastal
Picoides borealis	Red-cockaded woodpec	N	SSC	S3	pine flatwoods
Picoides villosus	Hairy woodpecker	N	N	S3?	forest
Plegadis falcinellus	Glossy ibis	N	N	S2	wetlands
Rallus longirostris scotti	Florida clapper rail	N	N	S3?	wetlands
Rostrhamus sociabilis	Snail kite	E	E	S1	marshes
Rynchops niger	Black skimmer	N	SSC	S3	wetlands
Setophaga ruticilla	American redstart	N	N	S3	forest
Speotyto cunicularia flor	Florida burrowing owl	S	SSC	S3	open field
Sterna antillarum	Least tern	N	T	S3	coastal
Sterna caspia	Caspian tern	N	N	S3	coastal
Sterna maxima	Royal tern	N	N	S3	coastal
Sterna sandvicensis	Sandich tern	N	N	S2	coastal

T= Threatened

E=Endangered

SSC= Special of Special Concern

N= Not listed

S1= Critically imperiled, S2=Imperiled in Florida, S3=Very rare, restricted range & vulnerable to extinction.

Exhibit B

List of Threatened or Endangered Animal Species that Occur in Palm Beach County, Florida.

April, 2002

Scientific Name	Common Name	Indicator Status		State Rank	Habitat
		Federal	State		
Birds					
Ixobrachus exilis	Least bittern	N	N	S4	swamp
Laterallus jamaicensis	Black rail	N	N	S4	swamp
Mycteria ameriacana	Wood stork	E	E	S2	wetlands
Nyctanassa violacea	Yellow-crowned night heron	N	N	S3?	wetlands
Nycticorax nycticorax	Black-crowned night heron	N	N	S3?	wetlands
Pandion haliaetus	Osprey	N	SSC*	S3S4	wetlands
Pelecanus occidentalis	Brown pelican	N	SSC	S3	coastal
Picoides borealis	Red-cockaded woodpecker	N	SSC	S3	pine flatwoods
Picoides villosus	Hairy woodpecker	N	N	S3?	forest
Plegadis falcinellus	Glossy ibis	N	N	S2	wetlands
Rallus longirostris scottii	Florida clapper rail	N	N	S3?	wetlands
Rostrhamus sociabilis	Snail kite	E	E	S1	marshes
Rynchops niger	Black skimmer	N	SSC	S3	wetlands
Setophaga ruticilla	American redstart	N	N	S3	forest
Speotyto cunicularia floridana	Florida burrowing owl	N	SSC	S3	open field
Sterna antillarum	Least tern	N	T	S3	coastal
Sterna caspia	Caspian tern	N	N	S3	coastal
Sterna maxima	Royal tern	N	N	S3	coastal
Sterna sandvicensis	Sandwich tern	N	N	S2	coastal
Animals					
Felis concolor coryi	Florida panther	E	E	S1	all systems
Neofiber alleni	Round-tailed muskrat	N	N	S3	marshes
Podimys floridanus	Florida mouse	N	SSC	S3	scrub
Sciurus niger shermani	Sherman's fox squirrel	N	SSC		mature oak-pine
Trichechus manatus	Manatee	E	E	S2?	coastal
Ursus americanus floridanus	Florida black bear	C	T	S2	forest
Invertebrates					
Latrocectus bishopi	Red widow spider	N	N	S?	forest

T= Threatened

E=Endangered

SSC= Special of Special Concern

N= Not listed

*Listed only in the Keys

C=In consideration

S1= Critically imperiled, S2=Imperiled in Florida, S3=Very rare, restricted range & vulnerable to extinction.

Appendix F
Title V/PSD Permits
(See Volumes II and III)

Appendix G
Noise Monitoring Data

Day

#1

AMBIENT SOUND LEVEL MEASUREMENTS

Project: SWA Biosolids/Lime

Sheet No. ______

Date: 4/30/02

Time: 3:42 pm

Location: #1

Field Personnel: Meghan Capaldo, Suzanne Meyer.

Noise Levels (dBA)

Calibration Level ______

L_{10} 62.6 dB

L_{90} 53.4 dB

L_{eq} 59.4 dB

Weather Conditions

Sky Cover: sunny

Temperature (°F): 85°

Humidity (%): 62%

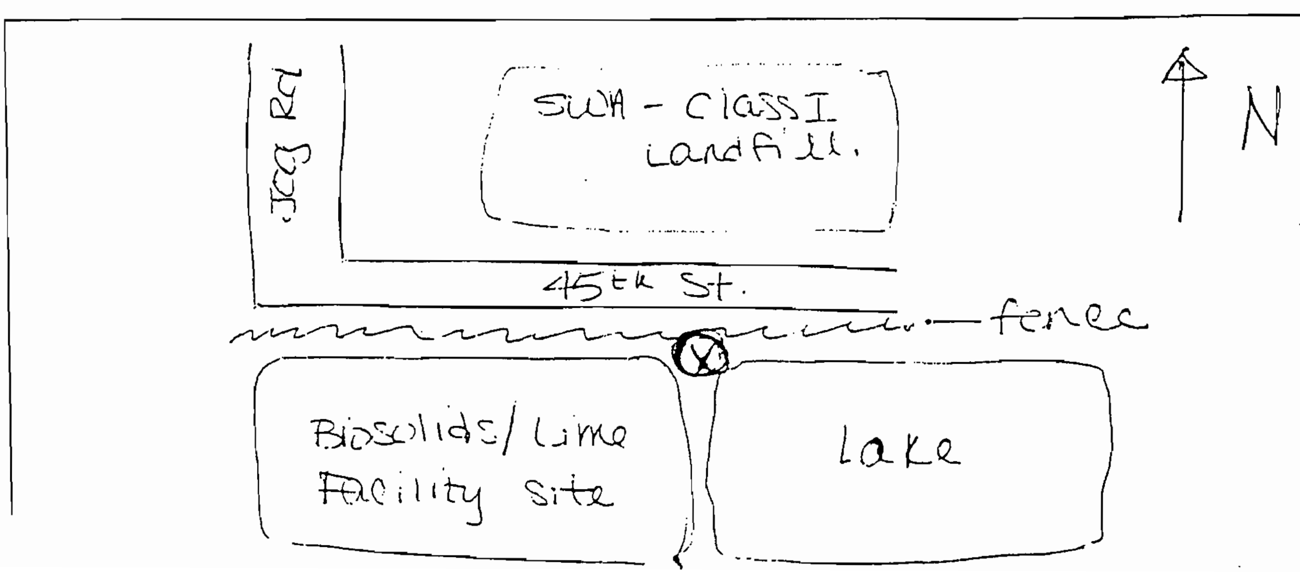
Wind Speed (mph): 8 mph

Wind Direction: NNE

Field Notes

A lot of birds in this area. Heard noises from landfill operations (eg. trucks backing up).

Sketch



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71 1

PALM BEACH COUNTY SWA
TRAFFIC COUNT DATA

VEHICLE TYPE	TRAFFIC COUNTS	TOTAL
Automobile		40
Automobile		
Automobile		
Automobile		
Motorcycle		
Motorcycle		
Motorcycle		
Motorcycle		
Light-Duty Trucks		5
Light-Duty Trucks		
Light-Duty Trucks		
Light-Duty Trucks		
Heavy-Duty Trucks		7
Heavy-Duty Trucks		
Heavy-Duty Trucks		
Heavy-Duty Trucks		

Date 11/20/[illegible]

Time 3:42

Roadway

Noise Monitoring Location

Average Travel Speed [illegible] mph

#

#2

AMBIENT SOUND LEVEL MEASUREMENTS

Project: SCA Biosolids/Lime

Sheet No. ______

Date: 4/30/02

Time: 2:42 pm

Location: #2

Field Personnel: Meghan Capaldo, Suzanne Meyer.

Noise Levels (dBA)

Calibration Level ______

L_{10} 48.8 dB

L_{90} 45.3 dB.

L_{eq} 47.5 dB

Weather Conditions

Sky Cover: Sunny

Temperature (°F): 85°

Humidity (%): 62%

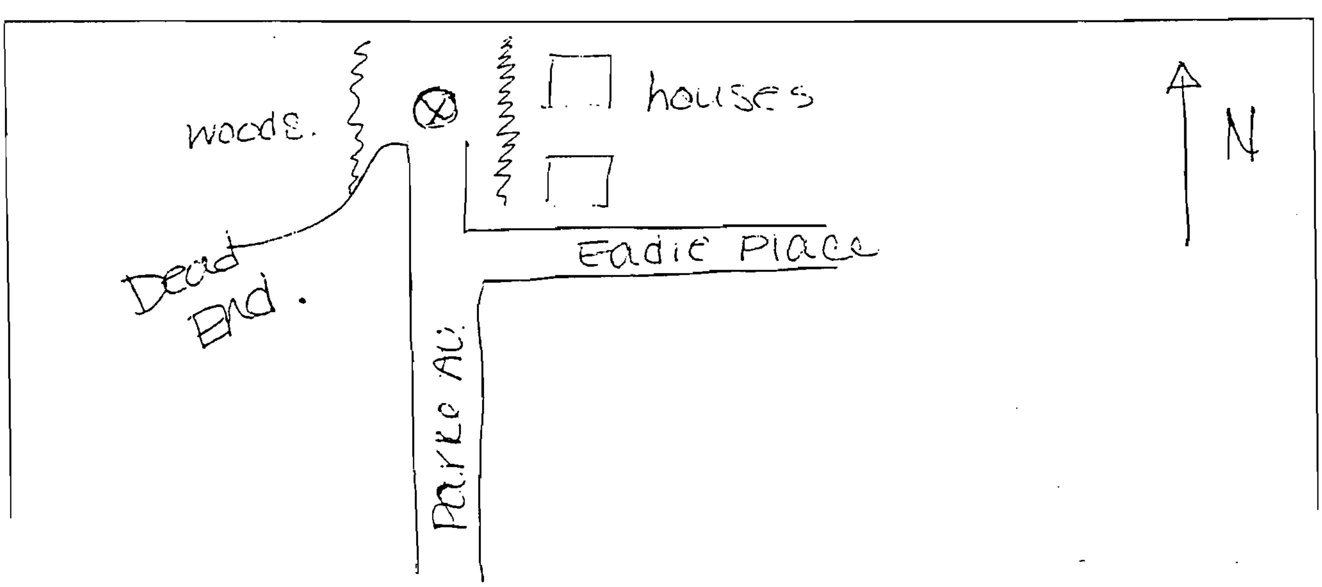
Wind Speed (mph): 6 mph

Wind Direction: NNE

Field Notes

There was a wastewater pump making noises intermittantly the whole time about 80 ft away. A golf cart drove by once. 4 planes passed overhead. An air conditioner was humming about 50 ft away.

Sketch



PALM BEACH COUNTY SWA
TRAFFIC COUNT DATA

VEHICLE TYPE	TRAFFIC COUNTS	TOTAL
Automobile	~~IIII~~	5
Automobile		
Automobile		
Automobile		
Motorcycle		
Motorcycle		
Motorcycle		
Motorcycle		
Light-Duty Trucks		
Light-Duty Trucks		
Light-Duty Trucks		
Light-Duty Trucks		
Heavy-Duty Trucks		
Heavy-Duty Trucks		
Heavy-Duty Trucks		
Heavy-Duty Trucks		

Date 4/30/02

Time 2:42 pm

Roadway Eadie Pl + Parke Av.

Noise Monitoring Location #-2

Average Travel Speed residential ~ 10 mph

#2

#3

AMBIENT SOUND LEVEL MEASUREMENTS

Project: SWA Biosolids/Lime

Sheet No. ______

Date: 4/30/02

Time: 3:12 pm

Location: #3

Field Personnel: meghan capaldo
suzanne mayer

Noise Levels (dBA)

Calibration Level

L_{10} 62.7 dB

L_{90} 41.2 dB

L_{eq} 59.3 dB

Weather Conditions

Sky Cover: sunny

Temperature (°F): 85°

Humidity (%): 62%

Wind Speed (mph): 6 mph

Wind Direction: NNE

Field Notes

A lot of traffic on 45th.
Two planes flying overhead.

Sketch

PALM BEACH COUNTY SWA
TRAFFIC COUNT DATA

VEHICLE TYPE	TRAFFIC COUNTS	TOTAL
Automobile	~~IIII~~ ~~IIII~~ ~~IIII~~ ~~IIII~~ ~~IIII~~ I	26
Automobile		
Automobile		
Automobile		
Motorcycle		
Motorcycle		
Motorcycle		
Motorcycle		
Light-Duty Trucks	~~IIII~~	5
Light-Duty Trucks		
Light-Duty Trucks		
Light-Duty Trucks		
Heavy-Duty Trucks	~~IIII~~ IIII	9
Heavy-Duty Trucks		
Heavy-Duty Trucks		
Heavy-Duty Trucks		

Date 4/30/02
Time 5:12 pm
Roadway 45th St.
Noise Monitoring Location #3
Average Travel Speed 45 mph.

#3

AMBIENT SOUND LEVEL MEASUREMENTS

Project: SWA Biosolids/Lime

Sheet No. ________

Date: 4/30/02

Time: 4:15 pm

Location: #4

Field Personnel: meghan Capaldo
Suzanne meyer

Noise Levels (dBA)

Calibration Level ________

L_{10} 51.2 dB
L_{90} 45.7 dB
L_{eq} 48.9 dB

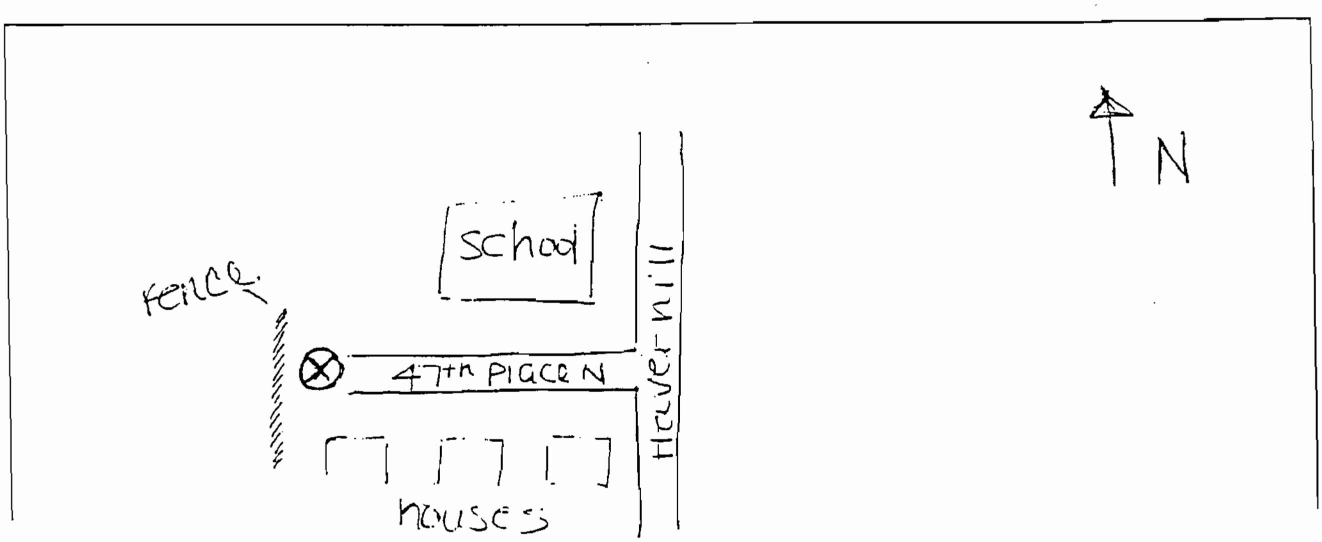
Weather Conditions

Sky Cover: Sunny
Temperature (°F): 85°
Humidity (%): 62%
Wind Speed (mph): 6mph
Wind Direction: NNE

Field Notes

Traffic count was taken on Haverhill, which was about 500 ft from monitor. 47th place N had no traffic. There were some birds in area.

Sketch



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PALM BEACH COUNTY SWA
TRAFFIC COUNT DATA

VEHICLE TYPE	TRAFFIC COUNTS	TOTAL
Automobile		
Automobile		
Automobile		
Automobile		291
Motorcycle		0
Motorcycle		
Motorcycle		
Motorcycle		
Light-Duty Trucks		6
Light-Duty Trucks		
Light-Duty Trucks		
Light-Duty Trucks		
Heavy-Duty Trucks		10
Heavy-Duty Trucks		
Heavy-Duty Trucks		
Heavy-Duty Trucks		

Date [illegible]

Time 4:15pm

Roadway Haverhill + 47th Place N.

Noise Monitoring Location #4

Average Travel Speed 45 mph

#4

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Night 11:30pm - 1:am

AMBIENT SOUND LEVEL MEASUREMENTS

Project: SWA Noise Monitoring
Date: 4/30/02
Time: 11:57pm
Location: 4 - Near School
Field Personnel: Justin Gattuso / Dennis Egilmez

Sheet No. 1

Noise Levels (dBA)

Calibration Level: 114
L_{10}:
L_{90}:
L_{eq}: 113.5

Noise Levels (dBA)

Testing Results
L_{10}: 50.3
L_{90}: 42.7
L_{eq}: 48.1

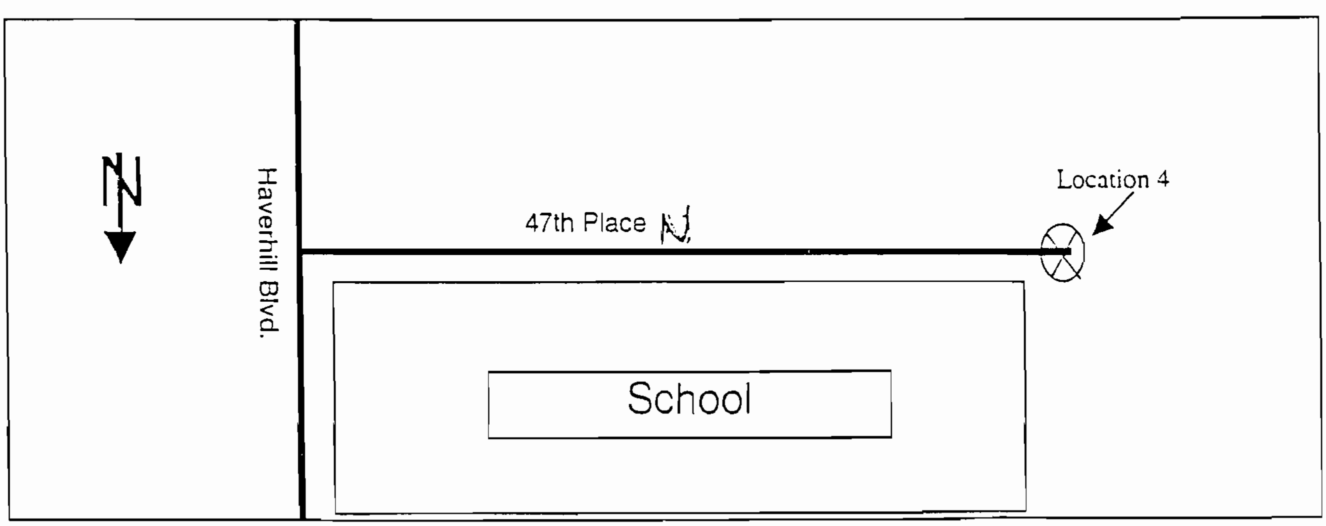
Weather Conditions

Sky Cover: Clear
Temperature (°F): 86
Humidity (%):
Wind Speed (mph): 0
Wind Direction: 0

Field Notes

11:59pm - Plane flying over / Frogs / Crickets
Start: 54.3, 54.5, 54.8, 54.6, 54.4, 54.0, 53.8, 53.3, 53. 52.8, 52.6, 52.3, 51.9, 50.9, 50.3, 50. 49.9, 49.8, 49.5, 49.4, 48.9, 48.7, 48.9, 48.5, 50, 49.9, 49.8, 49.5, 49.4, 48.9, 48.7, 48.9, 48.5, 48.3, 48.1. Finished 12:14am

Sketch



PALM BEACH COUNTY SWA
TRAFFIC COUNT DATA

Plane -Flying Directly Over 12:01am

VEHICLE TYPE	TRAFFIC COUNTS	TOTAL
Automobile	48	48
Automobile		0
Automobile		0
Automobile		0
Motorcycle	1	1
Motorcycle		0
Motorcycle		0
Motorcycle		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0

Date	5/1/02
Time	12:00am
Roadway	Haverhill Blvd &
Noise Monitoring Location	4
Average Travel Speed	35-45
Field Personnel	Denis Egilmez / Justin Gattuso

AMBIENT SOUND LEVEL MEASUREMENTS

Project: SWA Noise Monitoring
Date: 5/1/02
Time: 12:40am
Location: 2 - Neighborhood
Field Personnel: Justin Gattuso / Dennis Egilmez

Sheet No. 3

Noise Levels (dBA)

Calibration Level	114
L_{10}	
L_{90}	
L_{eq}	113.5

Noise Levels (dBA)

Testing Results

L_{10}	45.3
L_{90}	43.1
L_{eq}	44.4

Weather Conditions

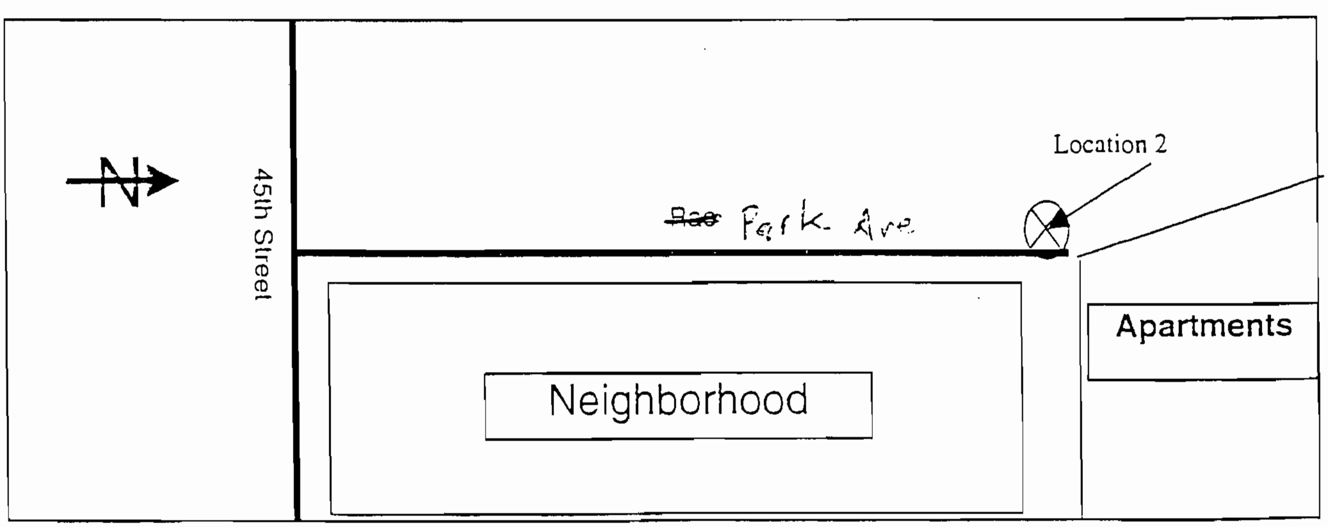
Sky Cover	Clear
Temperature (°F)	86
Humidity (%)	
Wind Speed (mph)	0
Wind Direction	0

Field Notes

12:40am Start: 46.6, 44.5, 44.4, 44.3, 44.2, 44.1, 44.0, 44.0, 44.2(car), 44.2, 44.2, 44.3, 44.4, 44.4. Finished 12:55am

A/C Units from nearby apartments / Crickets / Birds

Sketch



PALM BEACH COUNTY SWA
TRAFFIC COUNT DATA

VEHICLE TYPE	TRAFFIC COUNTS	TOTAL
Automobile	2	2
Automobile		0
Automobile		0
Automobile		0
Motorcycle		0
Motorcycle		0
Motorcycle		0
Motorcycle		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0

Date	5/1/02
Time	12.40am
Roadway	
Noise Monitoring Location	2
Average Travel Speed	30-35
Field Personnel	Denis Egilmez / Justin Gattuso

AMBIENT SOUND LEVEL MEASUREMENTS

Project	SWA Noise Monitoring
Date	5/1/02
Time	12:20 a.m.
Location	3-Neighborhood
Field Personnel	Justin Gattuso/Dennis Egilmez

Sheet No. 2

Noise Levels (dBA)

Calibration Level	114
L_{10}	
L_{90}	
L_{eq}	

Noise Levels (dBA)

Testing Results

L_{10}	48.9
L_{90}	41.7
L_{eq}	47.2

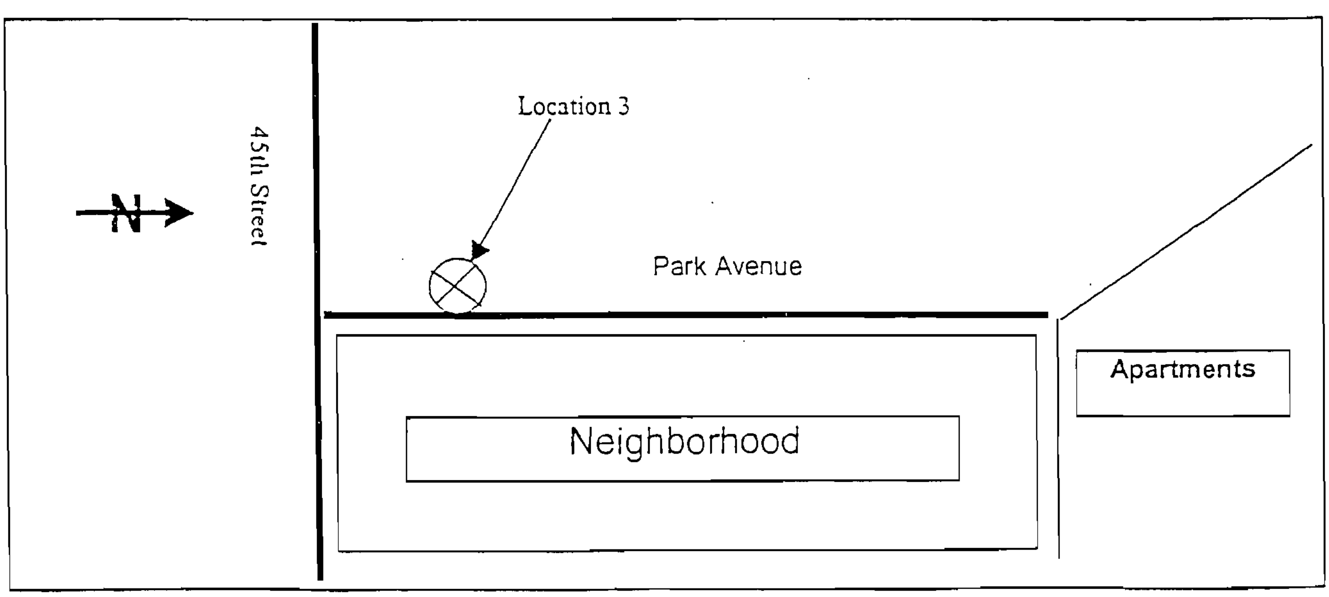
Weather Conditions

Sky Cover	Clear
Temperature (°F)	86
Humidity (%)	
Wind Speed (mph)	0
Wind Direction	0

Field Notes

12:20 a.m. Start 41.5, 42, 42.4, 43.4, 47.4, 47.2 Finished 12:35 am.

Sketch



PALM BEACH COUNTY SWA
TRAFFIC COUNT DATA

VEHICLE TYPE	TRAFFIC COUNTS	TOTAL
Automobile	5	5
Automobile		0
Automobile		0
Automobile		0
Motorcycle		0
Motorcycle		0
Motorcycle		0
Motorcycle		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0

Date	5/1/02
Time	12:20am
Roadway	45th
Noise Monitoring Location	3
Average Travel Speed	35-45
Field Personnel	Denis Egilmez / Justin Gattuso

AMBIENT SOUND LEVEL MEASUREMENTS

Project	SWA Noise Monitoring	Sheet No.	4
Date	5/1/02		
Time	1:00am		
Location	1 - SWA		
Field Personnel	Justin Gattuso / Dennis Egilmez		

Noise Levels (dBA)

Calibration Level	114
L_{10}	
L_{90}	
L_{eq}	113.5

Noise Levels (dBA)

Testing Results

L_{10}	46.1
L_{90}	43.5
L_{eq}	45

Weather Conditions

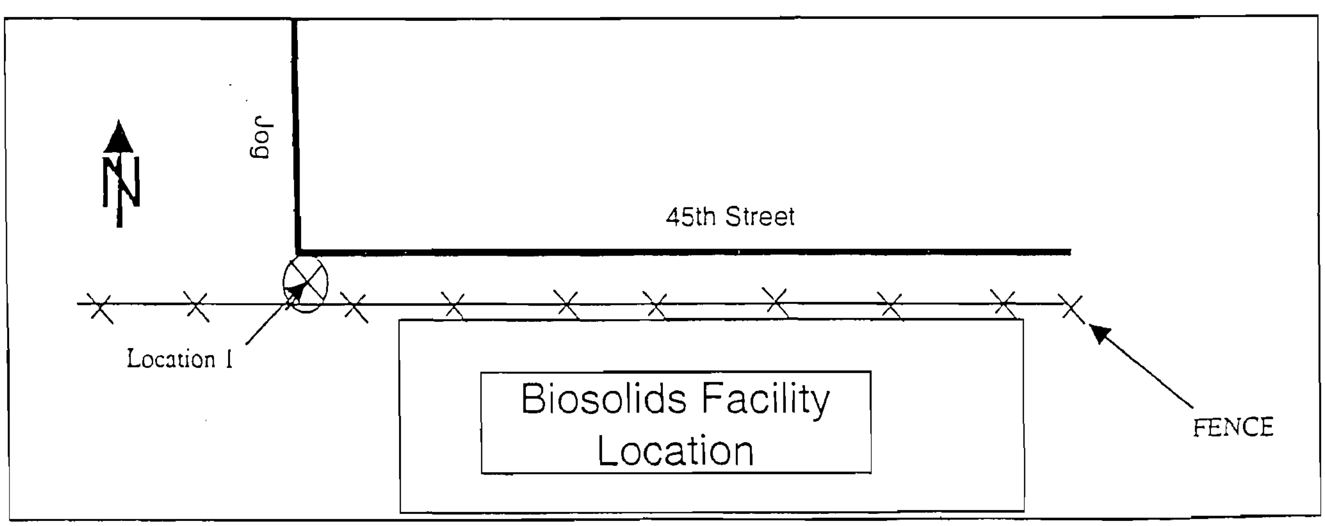
Sky Cover	Clear
Temperature (°F)	86
Humidity (%)	
Wind Speed (mph)	1 mph
Wind Direction	SE

Field Notes

1:00am Start: 45.5, 44.9, 44.7, 44.6, 44.7, 44.6, 44.6, 44.7, 45, 45. Finished 1:15am

Birds / Crickets / Frogs / Class 1 Flare

Sketch



PALM BEACH COUNTY SWA
TRAFFIC COUNT DATA

VEHICLE TYPE	TRAFFIC COUNTS	TOTAL
Automobile		0
Automobile		0
Automobile		0
Automobile		0
Motorcycle		0
Motorcycle		0
Motorcycle		0
Motorcycle		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Light-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0
Heavy-Duty Trucks		0

Date	5/1/02
Time	1:00am
Roadway	45th & Jog
Noise Monitoring Location	1
Average Travel Speed	0
Field Personnel	Denis Egilmez / Justin Gattuso

Appendix H
Wetlands Survey

Contents - Wetlands Survey

Appendix H
Wetlands

H.1 Introduction

This report is a presentation of data on the three mandatory technical criteria for determining wetlands under the jurisdiction of the U.S. Army Corps of Engineers (ACOE). The parcel that is the subject of this evaluation is the location of a Lime Recalcination Facility (LRF) and Biosolids Pelletization Facility (BPF).

The purpose of this report is to describe the extent of jurisdictional wetlands and to provide the data that support a wetland delineation. Wetlands are defined as areas that are inundated or saturated at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (40 CFR 230.3). The three mandatory technical criteria for determining a wetland include periodic inundation or flooding, hydric soil conditions and a dominance of hydrophytic vegetation. A jurisdictional wetland must have site-specific hydrology that results in hydric soil conditions that support hydrophytic vegetation. Each of these criteria will be described for the approximately 15-acre subject parcel in Palm Beach County, Florida.

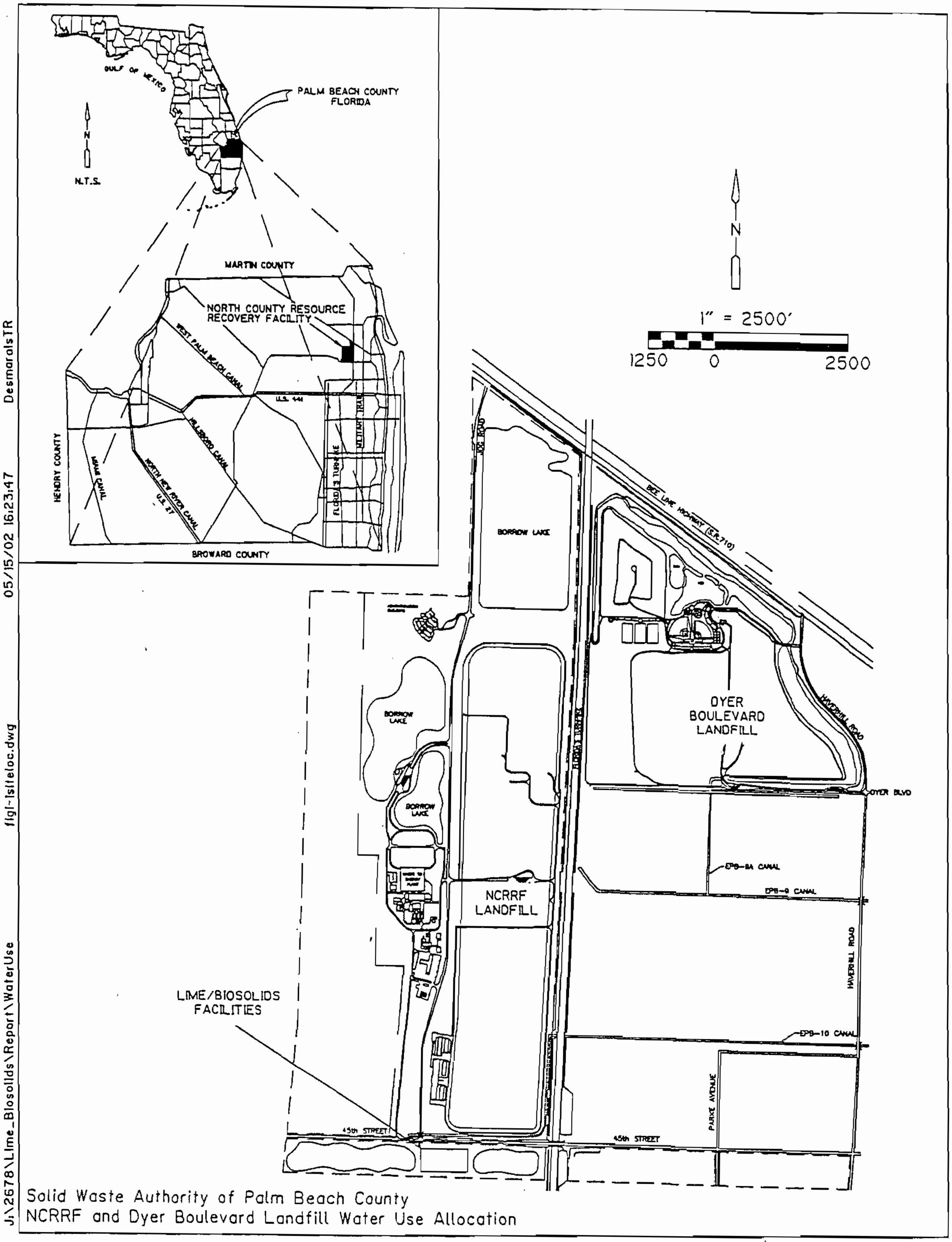
H.2 Site Description

Figure H-1 shows the location of the property in Section 3, Township 43 South, Range 43 East, Palm Beach County, Florida. The subject parcel is located at the southwest corner of Jog Road and 45th Street, east of the Florida Turnpike and adjacent to and south of the SWA North County Resource Recovery Facility (NCRRF). The rectangular shaped parcel is approximately 15 contiguous acres. The site is located in a rural area that is bordered by the Florida Turnpike on the east side, cypress marsh on the south side, borrow pond on the west side, and the SWA NCRRF on the north side. The entire site is a recently filled site with Bahia grass and sand. **Figure H-2** is a high altitude aerial photo (2001) showing the site and adjacent features. Figure E-3 in Appendix E shows approximate wetland boundaries.

Note that the parcel fronts on the SWA NCRRF to the north separated by 45th Street. Wetlands surrounding the parcel include roadside ditches, borrow ponds and natural cypress wetlands that contain hydric soils, hydrophytic vegetation and are seasonally flooded - satisfying the criteria for wetlands. The 15-acre parcel is an upland (borrow pond that was recently filled in with sand).

H.3 Field Survey

From April 16 to April 18, 2002, a comprehensive field inspection was conducted to identify any potential wetlands on the parcel. Five sample sites at the 15-acre parcel (see Figure E-3 in Appendix E) were chosen to represent dominant vegetation, determine elevations, and to confirm the presence of soils mapped by the Natural

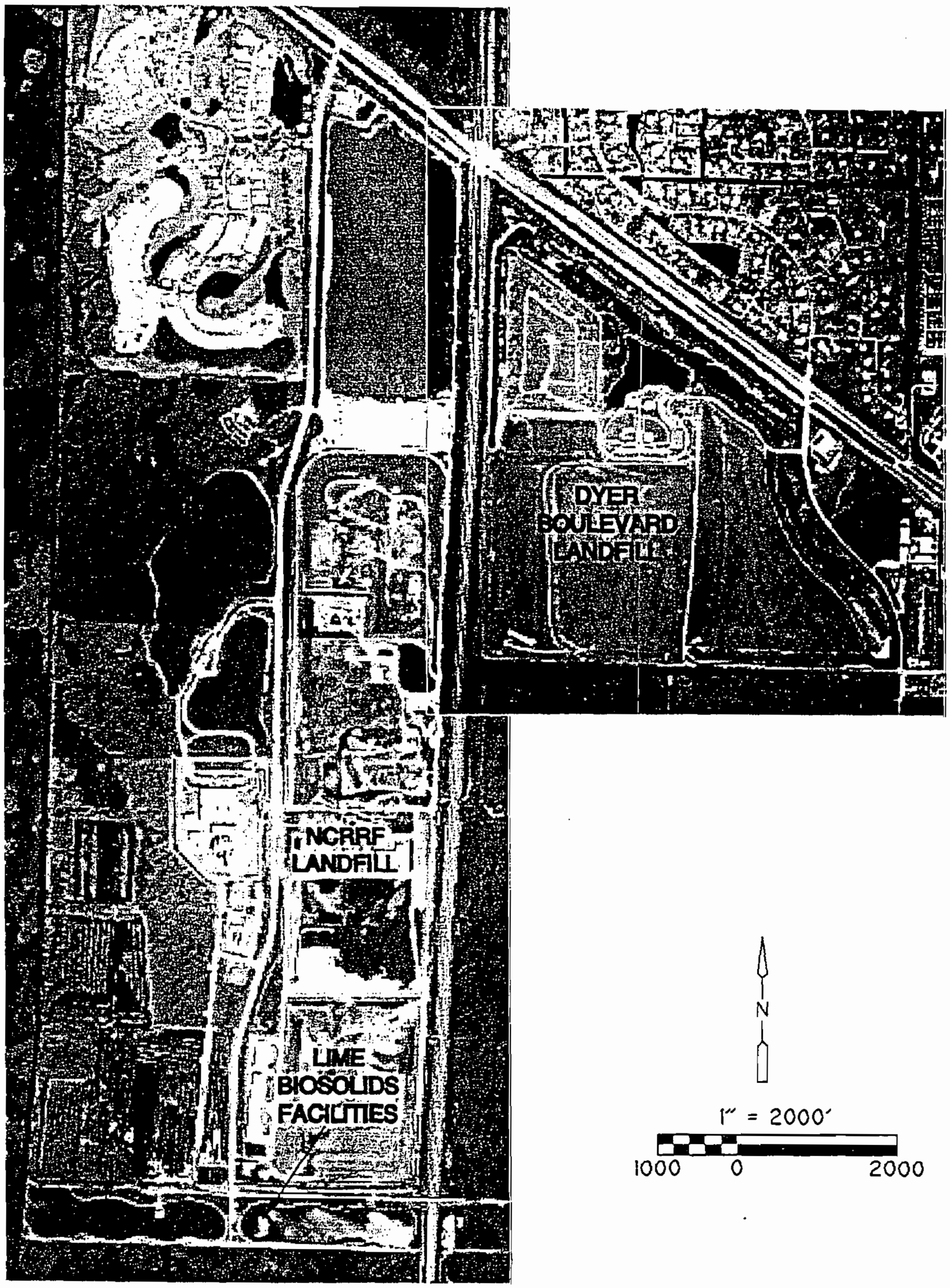


CDM

Figure No. H-1
Site Location Map

BEST AVAILABLE COPY

J:\2678\Lime_Biosolids\Report\WaterUse\   figH-2aerial.dwg   05/16/02   DesmaraisTR



Solid Waste Authority of Palm Beach County
NCRRF and Dyer Boulevard Landfill Water Use Allocation

Flight date: 4/15/98

Figure No. H-2
Aerial Photograph

CDM

Resource Conservation Service (NRCS). At each sample location dominant vegetation species and soil types were recorded along with observations on hydrologic conditions. The field data sheets are contained in Exhibit A.

H.4 Field Data

H.4.1 Soils

The Soil Survey of Palm Beach County, Florida shows the subject parcel is underlain by six soil classifications: Pits (Pf), Arents- Urban Land Complex, (AU), Floridana fine sand, Hallandale fine sand, Jupiter fine sand, and Riviera fine sand, depressional. Riviera fine sand, depressional soils are considered nearly level, poorly drained with a loamy subsoil and have hydric soil characteristics by the SFWMD in *Soil Survey of Palm Beach County, 1995*(PB-SSURGO-E00). Arents Urban land complex soils are areas where sandy fill material was placed over low mineral soils to make for suitable urban use. Typically, filled areas do not exhibit hydric soil conditions.

Samples were collected to a depth of 16 inches at all sample locations. Each sample was described and compared to the published descriptions provided by the NRCS and *Hydric Soils of Florida Handbook*, Second Edition (1995). The field data sheets are contained in Exhibit A.

The soils sampled within the project area were sampled in both well-drained and wet conditions. Low chromas, and reducing soil conditions consistent with hydric soils were observed for all of the sites sampled in the lower elevations. At sample sites A1, through A5, indications were found that saturated soils were present with groundwater during some part of the growing season. Also observed were low chromas (10 YR 3/2) associated with the Pits Soils, Floridana, Jupiter, and Riviera. Saturated soils, organic muck, and streaking were also observed in these areas. These soil profiles are consistent with wetland soils.

To help refine the wetland upland interface, soil samples were also taken in better-drained areas adjacent to the fifteen locations described above. These samples exhibited higher chromas of 3's and 4's in the middle 4 to 12 inches with little or no mottling found throughout the soil profiles. These soils were not saturated and the soil profiles were found to be consistent with the upland soils mapped for the area. Oxidized root channels were not found in the wetland soil profiles.

H.4.2 Vegetation

Vegetative species observed and identified at the sample locations are listed on the attached data sheets (Exhibit A). The majority of the parcel is barren land with ruderal grasses and Bahia grass as groundcover that was been recently filled in with sandy material within the last 2 to 3 years. The majority of the 15-acre parcel does not contain wetlands. However, wetland conditions and wetland indicator plant species are found outside the bermed area of the parcel.

The wetland vegetation on the perimeter of the parcel was observed to have from one to three plant community zones. The palustrine herbaceous emergent marsh (PEM) is along the berm with the palustrine shrub-scrub species (PSS) and Cypress trees that ware classified as palustrine forest (PFO).

The project parcel is considered upland open land with a perimeter of wetland forest and herbaceous communities. The tree community is dominated by cypress (*Taxodium ascendens*), myrsine (*Marsine floridana*), and cabbage palmetto (*Sabal palmetto*). The herbaceous wetland areas were vegetated by white top sedge (*Dichromena sp.*), beakrush (*Rhynchospora microcarpa*) and torpedo grass (*Panicum repens*). The herbaceous areas are part of the stormwater ditch system that extends along 45th Street that occupies wetter habitat and soils. The understory contains cocoa plum (*Chrysobalanus icaco*), greenbrier (*Smilax sp.*) and saw palmetto (*Serenoa repens*). The upland open barren area contains planted Bahia grass, ruderal grasses, and sedges, including undesirable herbaceous species such as wedelia (*Wedelia trifolium*) and torpedo grass (*Panicum repens*).

H.4.3 Hydrology

The parcel's drainage has been improved due to the recent placement of sand fill material into the west half of a borrow pond, including a berm around the perimeter of the parcel. The parcel is nearly level with surface drainage that migrates surface water across the property toward the west corner of the parcel.

The parcel was visited from April 16 to April 18, 2002 towards the beginning of the official growing season. Pits dug throughout the wet portions of the parcel were partly filled with water, and at areas above the water table, no saturated soils were encountered within the top 12 inches. There was no evidence of surface flooding on the parcel, most likely a direct result of the improved drainage created by the external ditches and swales and sandy soils. Therefore, sample sites that did not have saturated soils were considered upland and all sites with saturated soils were considered positive for the hydrology parameter.

Due to the flat, drained sandy surface, the parcel exhibits limited wetland hydrology during wet periods early in the year. It appears that the rectangular shaped parcel has limited saturated soils at least for several weeks during the early part of the growing season.

H.5 Conclusions

The parcel is in an area that was almost entirely underlain by hydric solids. The improvements removed all wetland conditions from the parcel that has relieved the majority or the flooding that once occurred on parcel. This changed the hydrological characteristics of the parcel to drier conditions. Typically, the area has a lower water table occurring during the wetter periods, including early spring, which drains offsite quickly through percolation. Throughout much of the parcel, the groundwater no longer saturates the solids long enough for the parcel to be considered wetlands. The only wetland areas are located outside the berm long the perimeter of the parcel.

There are no vegetative wetlands within the project area inside the bermed area. The areas outside the berm contain potential wetlands that are approximately 0.18-acres. Areas designated as wetland may be under the jurisdiction of the ACOE.

Exhibit A
Field Data Sheets

Field Data Sheets
Available Upon Request

CDM

consulting · engineering · construction · operations