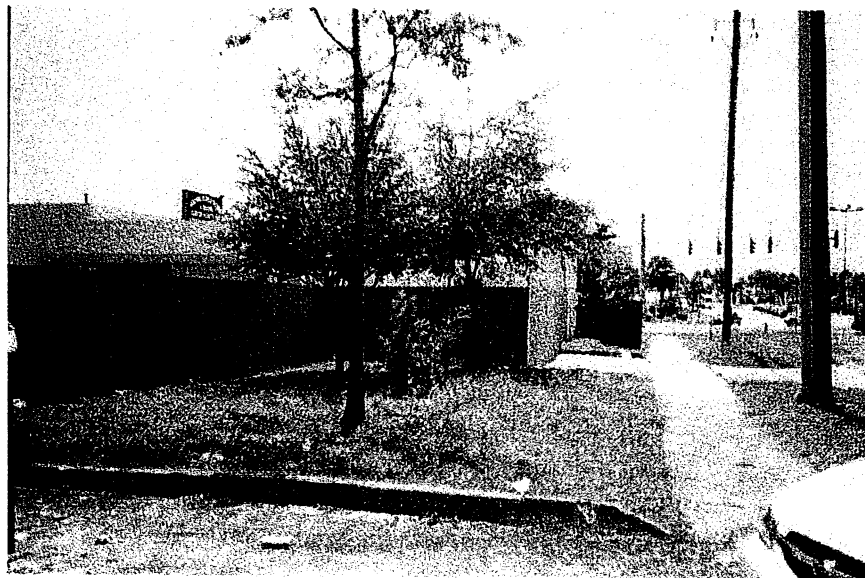
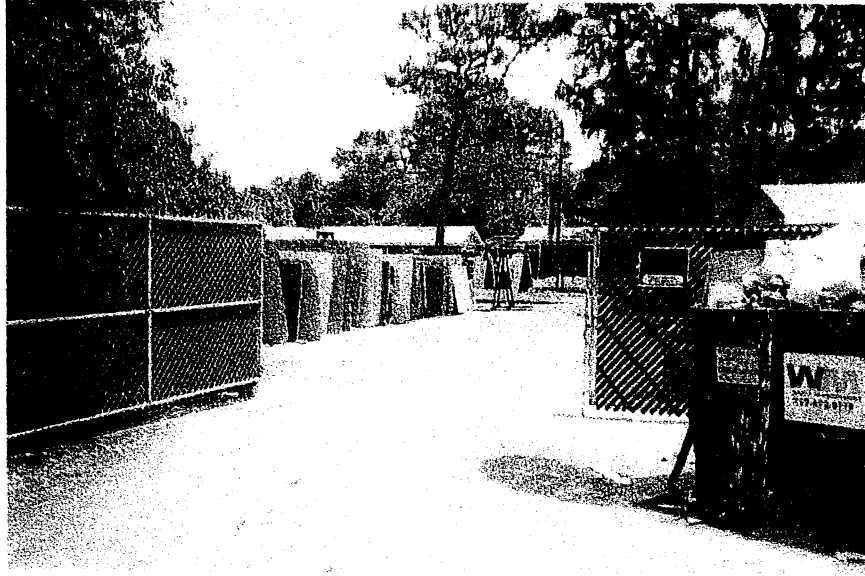


APPENDIX B
Site Specific Data and Photographs

Site No. 1 Rent-n-Roll





Site No. 2 Stephen's Amoco

AMOCO STATION # 194
3976 Park Blvd.
Pinellas Park, Florida

INITIAL REMEDIAL ACTION REPORT
DER FAC # 528623516

Prepared for:

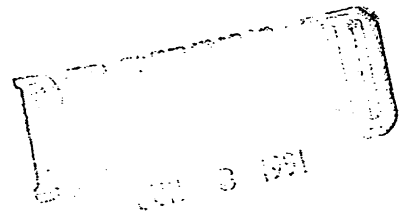
AMOCO OIL COMPANY
Ft. Lauderdale, Florida

Prepared by:

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.
Tampa, Florida

ECT No. 91042-0203

May 1991



AMOCO OIL - ENVIRONMENTAL

FILE

WELL 7-5-98
EMR

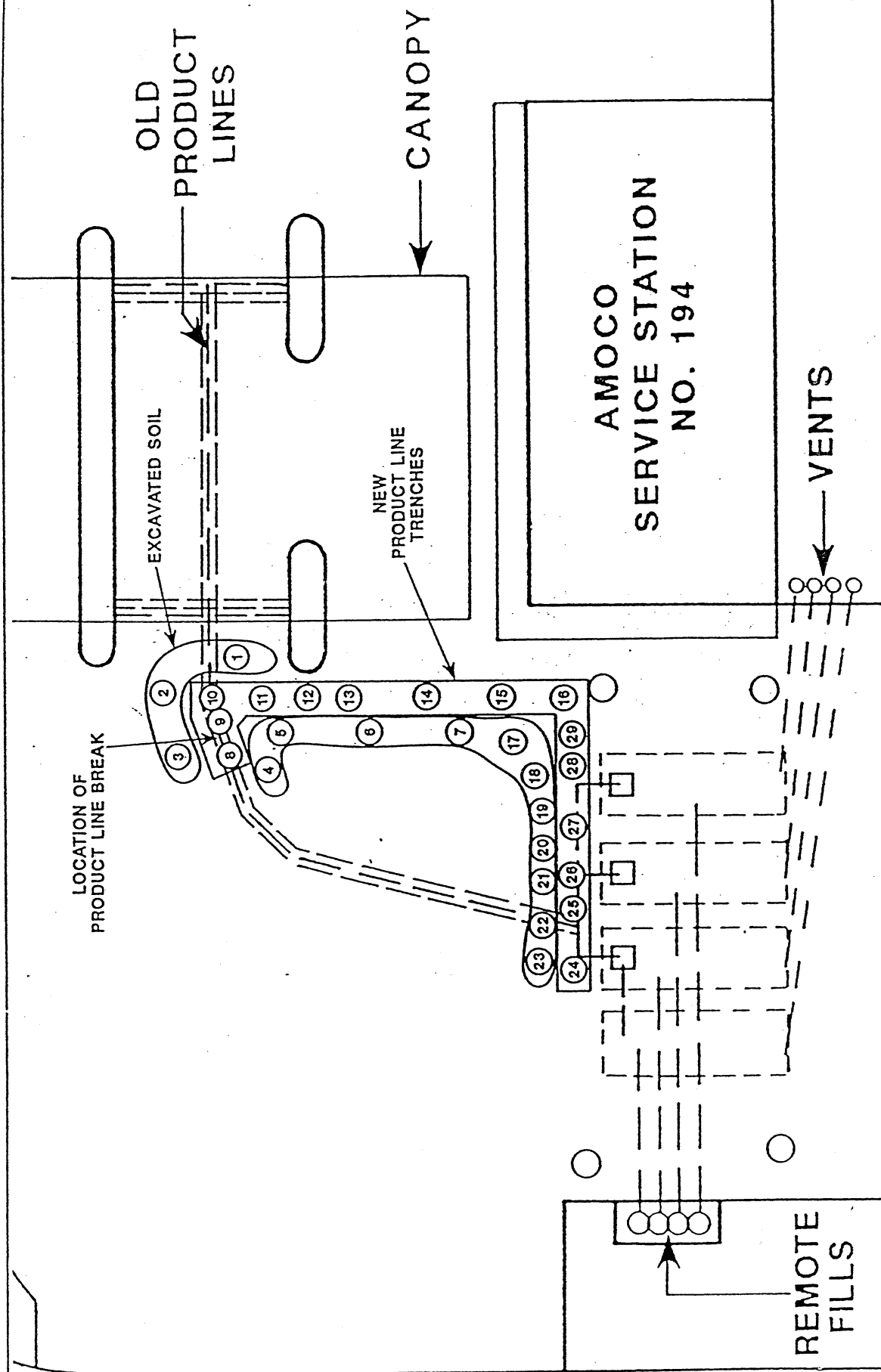


FIGURE 2
 AREA OF EXCAVATION AND TRENCHING (2/21/91)
 AMOCO STATION NO. 194
 PINELLAS PARK, FLORIDA

ECT

Environmental Consulting & Technology, Inc.

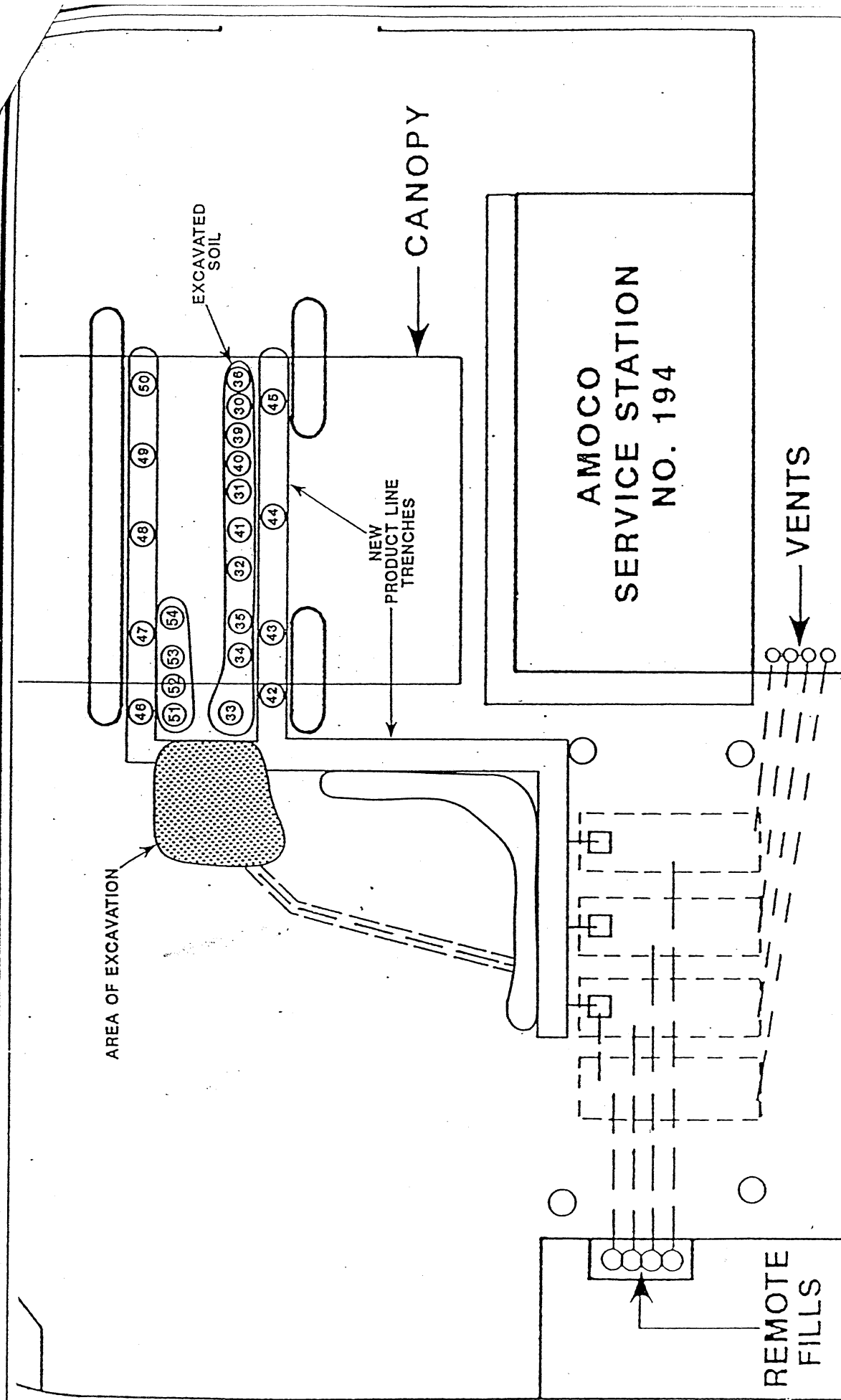


FIGURE 3
 AREA OF EXCAVATION AND TRENCHING (2/22/91)
 AMOCO STATION NO. 194
 PINELLAS PARK, FLORIDA

ECT

Environmental Consulting & Technology, Inc.



Site No. 3 JC Penney #12575 (part of Parkside Mall)



Department of Environmental Protection

Lawton Chiles
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Virginia B. Wetherell
Secretary

August 22, 1995

Mr. Michael E. Martin
J.C. Penney Company, Inc.
200 Westshore Plaza
Tampa, FL 33609

HRS/ PINELLAS COUNTY
PUBLIC HEALTH UNIT

AUG 24 1995

ENGINEERING

RE: J.C. Penney #1257-5
Pinellas Square Mall
7200 U.S. Highway 19
Pinellas Park, Pinellas County, Florida
DEP Facility ID# 528734681

Dear Mr. Martin:

Guillermo Wibmer of the Bureau of Waste Cleanup has reviewed the Contamination Assessment Report (CAR) dated March 17, 1995 (received March 21, 1995) submitted by Allied Environmental Consultants, Inc. for this site. In order to meet the requirements of Chapter 62-770, Florida Administrative Code (F.A.C.), the following comments need to be addressed:

- (1) The site map should be drawn to scale. It is almost identical to the site plan included in the Tank Closure Assessment Report (TCAR), which includes the notation "NOT TO SCALE". Although measurements are shown, those measurements do not correlate with each other and therefore are of little use in visualizing the relative locations of monitoring wells and soil borings.
- (2) Supplemental soil assessment in accordance with Rule 62-770.200(2), F.A.C., and the Department's May 1994 "Guidelines for Assessment and Remediation of Petroleum Contaminated Soil" should be performed around (just outside of) the area excavated during tank removal to confirm lack of soil contamination, since it is stated in the TCAR that some excessively contaminated soil could not be removed because of its proximity to the building. At each location, samples for OVA screening should be collected one foot below land surface and every foot thereafter until the water table is reached. The OVA values should be summarized in a table, and a figure should be provided showing the sampling locations and depicting the approximate extent of soil contamination, if any.
- (3) One additional, permanent water-table monitoring well should be installed a few feet south of the existing aboveground storage tank to define the horizontal extent of the groundwater contamination in the downgradient direction.

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- (4) The following sampling event should be performed so that this review can be completed and a decision reached on the type of action that is warranted:
 - (a) The new well should be sampled and analyzed for total Lead, Volatile Organic Aromatics, Polynuclear Aromatic Hydrocarbons and Total Recoverable Petroleum Hydrocarbons; and
 - (b) MW-4 should be sampled and analyzed for Volatile Organic Aromatics and Polynuclear Aromatic Hydrocarbons.

The sample for total Lead analysis should be collected using Quiescent Sampling (low flow purge at a rate of less than or equal to one liter per minute and sample collection at the same low flow within six hours of purging). The purging and sampling should be conducted with pumps that cause the least disturbance to the groundwater before, during and after use, such as peristaltic pumps. Turbidity measurements (using a turbidity meter) may be taken in conjunction with the metals sampling.

- (5) A copy of the Chain of Custody should be provided, as well as those corresponding to the two previous sampling events, which were not included in the CAR.
- (6) An Equipment Blank should be collected (one was not obtained during the February 7, 1995 sampling event).
- (7) A duplicate sample should have been collected during the January 5, 1995 sampling event.
- (8) Concurrent with the sampling event, a complete set of water-level measurements should be obtained in order to verify the direction of groundwater flow, to estimate fluctuations in the water table, and to determine whether a vertical hydraulic gradient is present. These data should be provided in tabular form (including top-of-casing elevations, depths to water, and corresponding water-level elevations) and in graphic form showing the consultant's interpretation of the groundwater flow direction.
- (9) The Boring Log prepared for the well requested in comment 3 should be provided, as well as those corresponding to the existing monitoring wells, which were not included in the CAR.
- (10) A field reconnaissance should be conducted to confirm lack of private supply wells within 1/4 mile of the site.

- (11) Mary Yeargan of the Southwest District's Groundwater Cleanup Section has been notified that non-petroleum contamination (vinyl chloride and 1, 2 - dichloroethane) have been detected at this facility.

Please note, all supplemental contamination assessment related documents should be signed and sealed by a registered professional in accordance with Section 62-770.500, F.A.C. The certification should be made by a registered professional who is able to demonstrate competence in the subject area(s) addressed within the sealed document.

Please provide two copies of the results of the supplemental assessment to me within sixty (60) days of receipt of this request. If you have any questions concerning this review, please contact me at (813) 744-6100, ext. 427 or Guillermo Wibmer at (904) 488-6222.

Sincerely,



Laurel Culbreth
Environmental Specialist III
Tanks Program
Division of Waste Management

LC/pp

cc: Steven A. Harrison, P.G., Allied Environmental Consultants, Inc.
Pedro Vagas-Prada, Pinellas County PHU
Guillermo Wibmer, FDEP-BWC

ALLIED ENVIRONMENTAL CONSULTANTS, INC.

TANK CLOSURE ASSESSMENT

HRS PINELLAS COUNTY
PUBLIC HEALTH UNIT

AT THE

SEP 21 1994

ENGINEERING

J. C. PENNEY RETAIL STORE
PINELLAS SQUARE MALL
7200 U.S. HIGHWAY 19
PINELLAS PARK, FLORIDA

Allied Project Number: 21110-0200
September 8, 1994

Prepared for:

Mr. Michael E. Martin
J. C. Penney Company, Inc.
200 Westshore Plaza
Tampa, Florida 33609

Prepared by:

Allied Environmental Consultants, Inc.
Bayfront Tower
42 First Street S.E.
St. Petersburg, Florida 33701

J.C. PENNEY RETAIL STORE



CONTAMINATED
SOIL PILE

PARKING LOT

LOCATION OF
EMERGENCY
GENERATOR ROOM

FPL ELECTRIC VAULT

22'8"

8'

SUPPLY LINE

12'

VENT LINE

EXCAVATION LIMIT

150 GALLON
ABOVE-GROUND
TANK

15'

2'

300 GALLON
TANK

FILL
PORT

CURB

6' DOORS

11'

8'

⊕ SOIL SAMPLING LOCATIONS

NOT TO SCALE

ALLIED

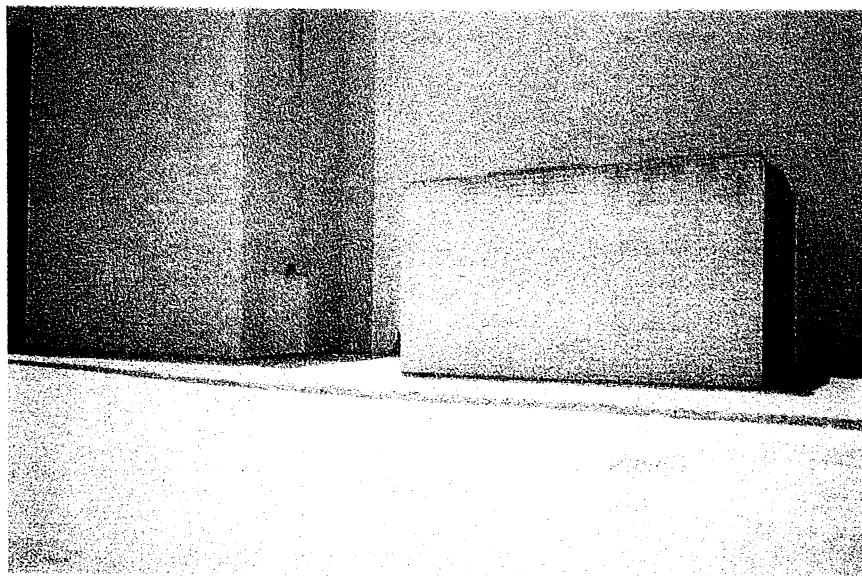
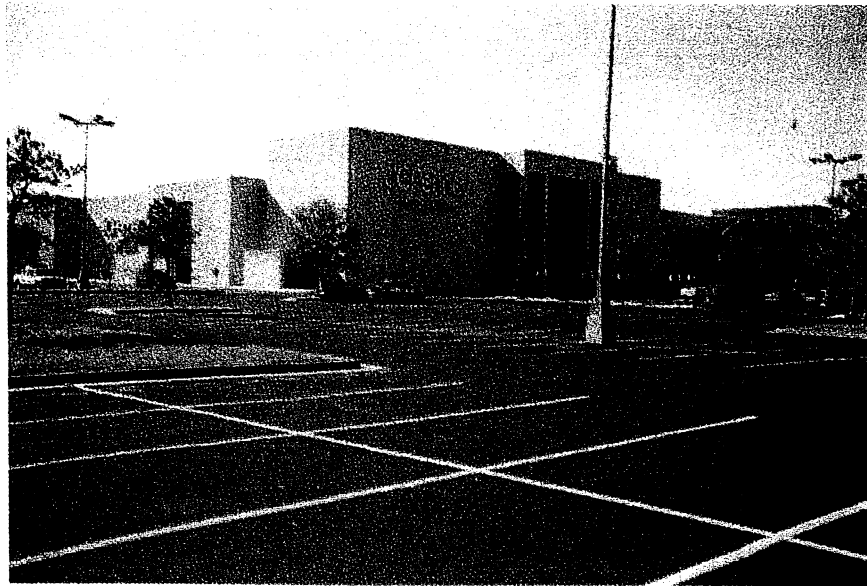
Environmental Consultants, Inc.

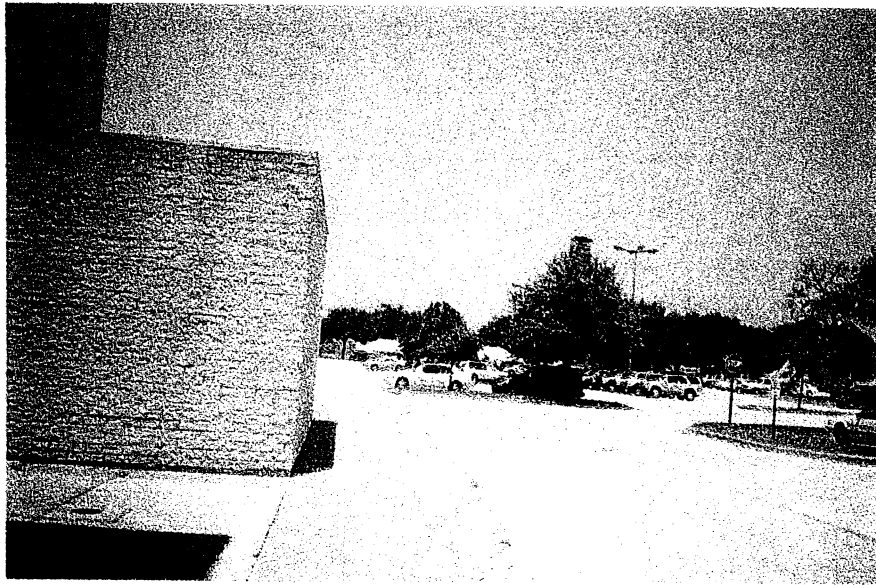
SOIL BORING LOCATION MAP
J.C. PENNEY STORE
PINELLAS SQUARE MALL
PINELLAS PARK, FLORIDA

PROJ. NO.: 21110-0200

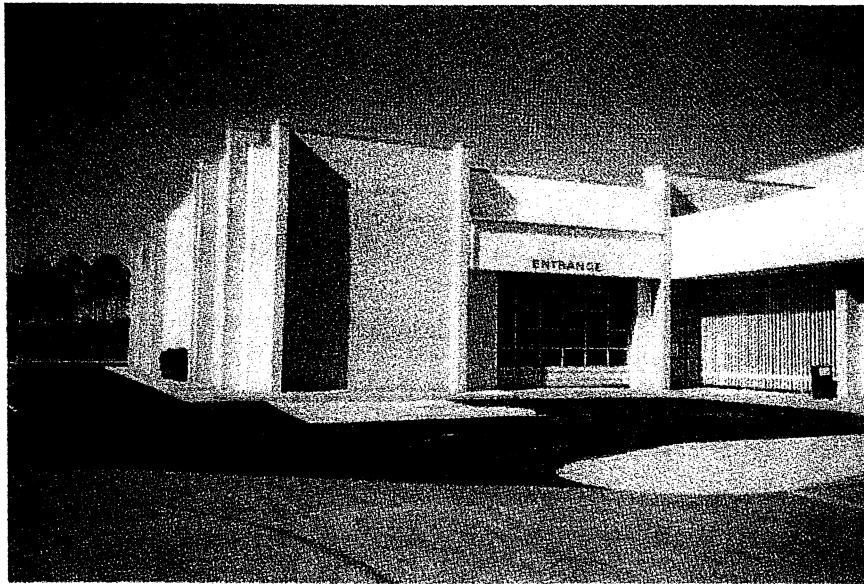
DRAWN BY: JJW

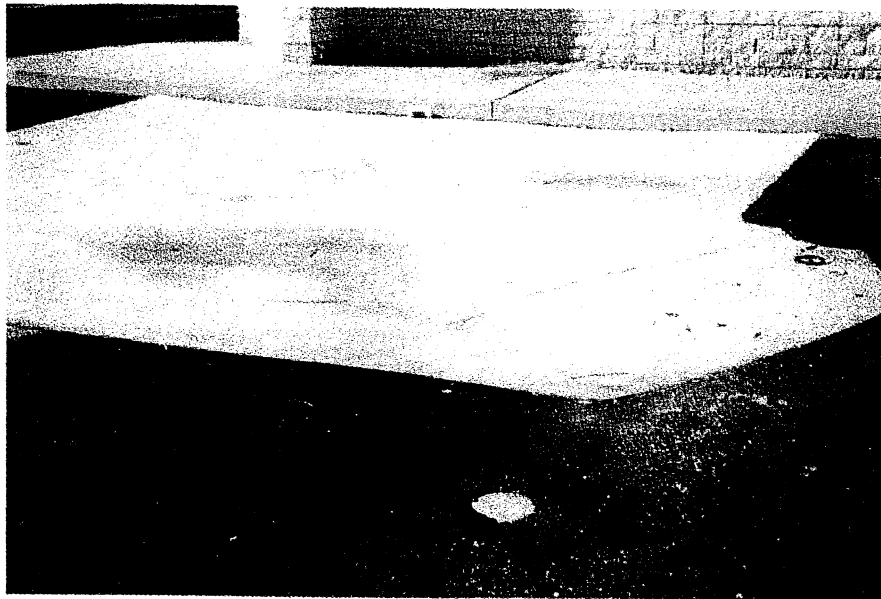
DATE: 09/12/94



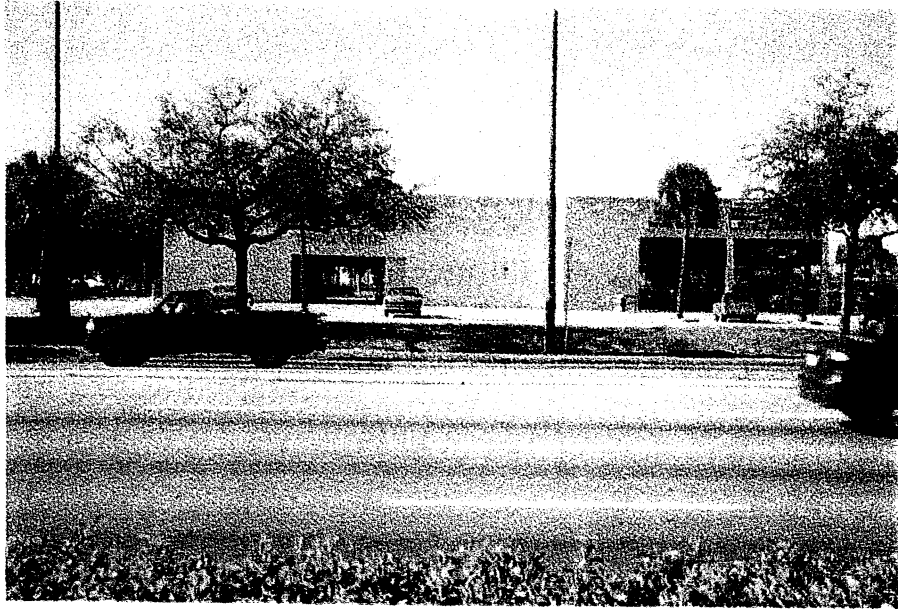


Site No. 4 Montgomery Ward (part of Parkside Mall)





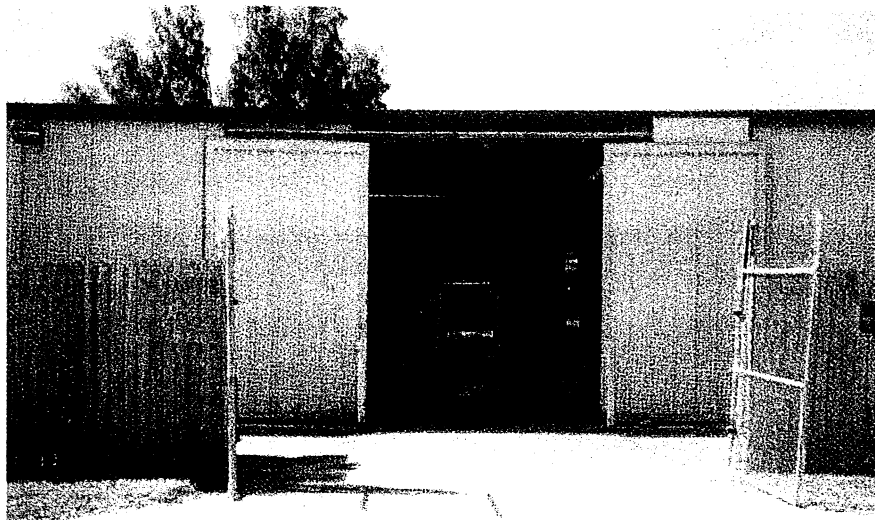
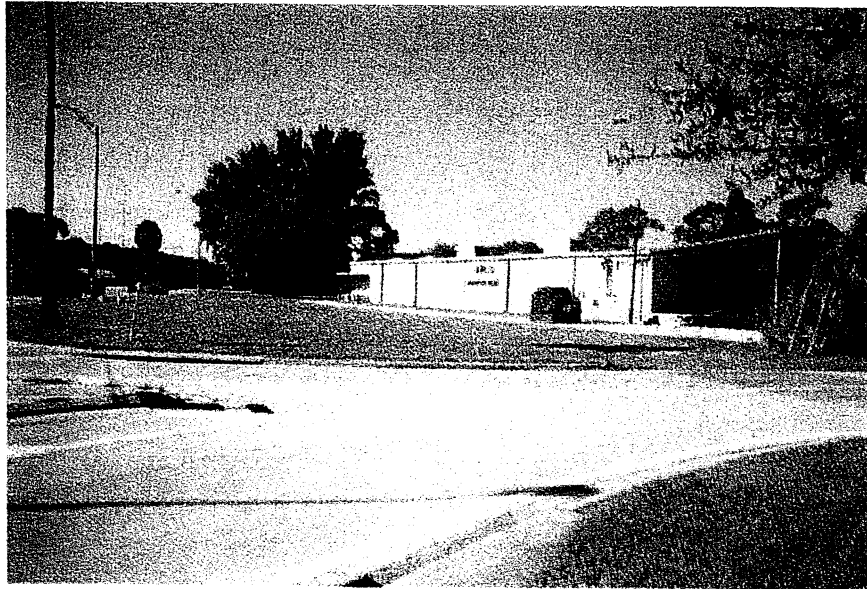
Site No. 5 Don Olson Tire & Auto



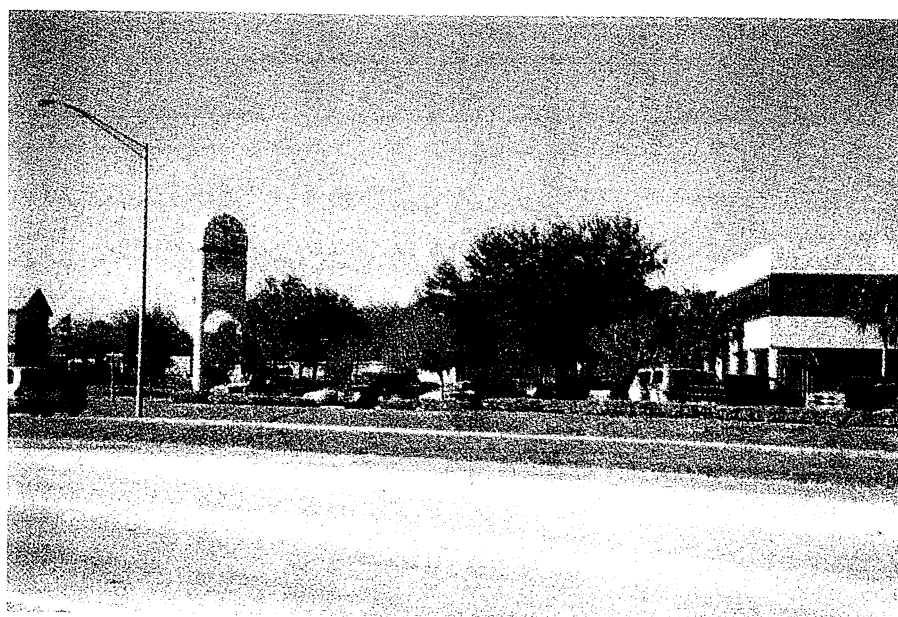
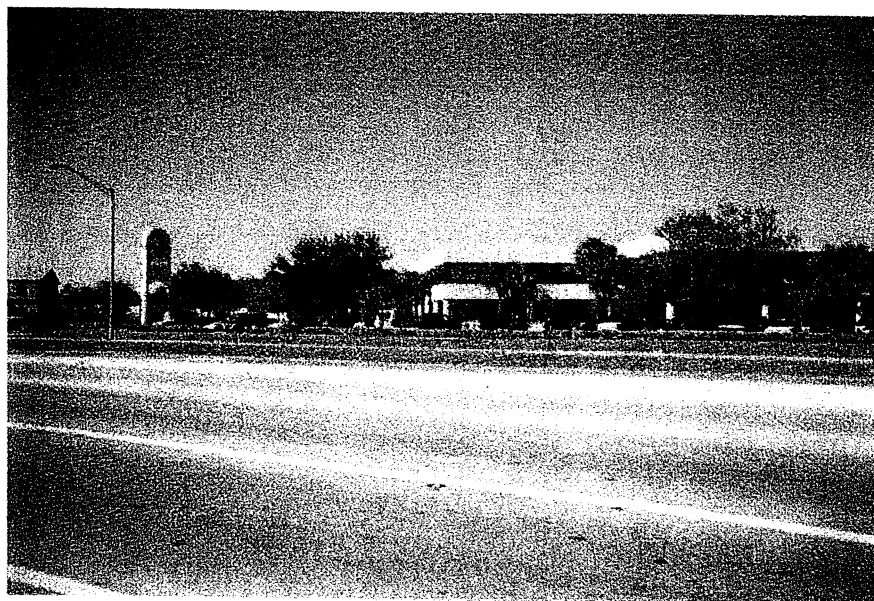
Site No. 6 Auto Body Express



Site No. 7 Anderson News Company



Site No. 8 PMA Printing



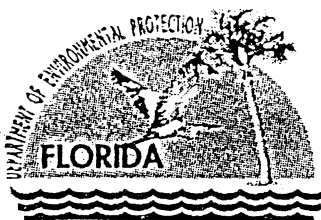
Site No. 9 Braewood Development Company



Site No. 10 Gateway Center



Site No. 11 SWFWMD Spoil Site at Sawgrass Park



Department of Environmental Protection

Jeb Bush
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

David B. Struhs
Secretary

February 24, 2000

Mr. David Moore
Deputy Executive Director
Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34609-6899

Dear Mr. Moore


Re: Contamination at Sawgrass Park, Pinellas County

The Department conducted a limited sampling event at Sawgrass Park last November to determine whether or not lead shot falling in the Skyway Trap & Skeet Club's "drop zone" easement was a threat to surface and ground water. Copies of the analytical results were forwarded to Manny Lopez of your office earlier this month. The results indicate that the lead, arsenic and antimony in the shot are contaminating surface and ground water in the park above state standards. In addition, it appears that the storm water canal running through the drop zone is spreading contamination to Sawgrass Lake. Sediments in the canal and lake were highly contaminated downstream of the drop zone.

The levels of contamination were high enough that if you dredge the canal or move soils as part of your maintenance activities, you should assess whether or not the soils are hazardous waste prior to storage or disposal. In addition, if your staff or county employees mow or spray herbicides in the drop zone, they should be provided with protective gear and trained to minimize their lead exposure. The soil samples we took all failed the test for the toxicity characteristic for lead.

The Department did not assess the full extent of contamination. I am requesting that you contact me within the next 2 weeks to schedule a meeting to discuss how best to assess and remediate this site. If you have any questions, please call William Kutash at 813/744-6100 ext. 353.

Sincerely,

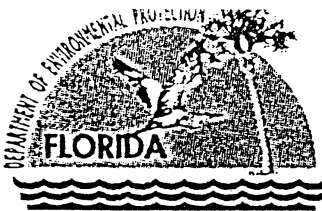

Deborah A. Getzoff
Director of District Management
Southwest District

DAG/ebk

cc: Manny Lopez, SWFWMD
J. W. Smith, Skyway Trap & Skeet Club
Christopher J. Valeriote, Ruden McClosky, Smith, Schuster & Russell, P.A.
William Kutash, Waste Program Administrator

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Department of Environmental Protection

Jeb Bush
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33609

David B. Struhs
Secretary

Skyway Trap & Skeet Club, Inc.
3200 74th Avenue North
St. Petersburg, Florida 33702
Attn: Mr. J.W. Smith, Registered Agent

Dear Mr. Smith

Re: Contamination Assessment at Skyway Trap & Skeet, Pinellas County

This letter is to follow up to our meeting of April 14, 2000 regarding the contamination at Sawgrass Park resulting from the operation of your skeet range. As you recall, the Department has taken environmental samples from the drop zone which demonstrate both surface and ground water contamination in excess of Florida standards found in Florida Administrative Code Rules 62-520 and 62-302.

The Southwest Florida Water Management District is proceeding with a contamination assessment at their property. However, the assessment will be incomplete unless the skeet club property is included. This assessment should include ground water monitoring to establish background contamination levels, as well as sediment and soil sampling to determine the vertical and horizontal extent of contamination. This information is necessary to develop an effective remedial plan for the site, so that environmental standards can be restored.

Elizabeth Knauss of this office met with you and Manny Lopez of SWFWMD at the park on Friday, May 12, 2000. At that time you said that you did not know whether the club officers had decided to proceed with hiring a consultant to conduct a site assessment. You are requested to respond in writing regarding your willingness to conduct a site assessment, and provide a preliminary schedule for hiring a consultant and submittal of a sampling plan to the Department.

If you have any questions, or wish to schedule a meeting to discuss development of a sampling plan, please call Elizabeth Knauss at 813/744-6100 ext. 383.

Sincerely,

William Kutash
Waste Program Administrator
Southwest District

WK/ebk

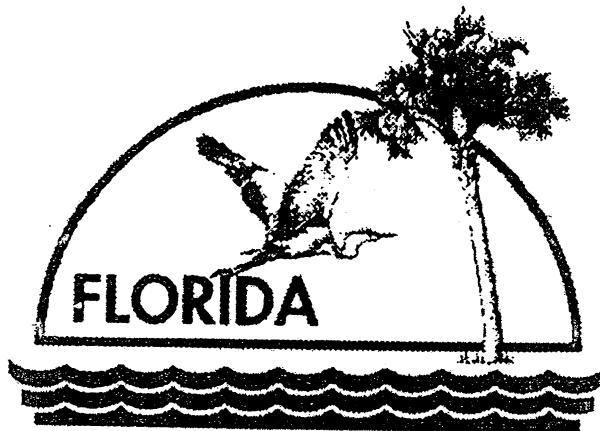
cc: Leon Ponce, President, Skyway Trap & Skeet Club, Inc.
Manny Lopez, SWFWMD
Christopher J. Valeriot, Ruden McClosky, Smith, Schuster & Russell, P.A.

"More Protection, Less Process"

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**PRELIMINARY ASSESSMENT
SAWGRASS LAKE PARK SKEET RANGE
AKA: SKYWAY TRAP & SKEET CLUB
PINELLAS COUNTY, FLORIDA**

EPA ID No: FLSFN0407112



FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
MAY - 4 2001
SOUTHWEST DISTRICT
TAMPA

Prepared By:

**Florida Department of Environmental Protection
Division of Waste Management
Bureau of Waste Clean-up
Technical Review Section
Site Screening Superfund Subsection**

**A. James McCarthy Jr., P.G.
Professional Geologist 1
May 1, 2001**

Date: 5/1/01

Prepared by:

A. James McCarthy Jr., P.G.
FDEP

Site:

Sawgrass Lake Park Skeet Range
Aka: Skyway Trap & Skeet Club
3200 34th Avenue North
St. Petersburg, Pinellas County, Florida
EPA ID No: FLSFN0407112

1.0 Introduction

Under the authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Re-authorization Act of 1986 (SARA), the Florida Department of Environmental Protection, Division of Waste Management, Site Screening Superfund Subsection conducted a Preliminary Assessment (PA) for the Sawgrass Lake Park Skeet Range in Pinellas County, Florida. The purpose of this investigation was to assess the threat posed to human health and the environment, and to determine the need for additional investigation under CERCLA/SARA or other action. The scope of the investigation included a review of available file information and a comprehensive target survey.

2.0 Site Background

2.1 Location

This site is located at 3200 34th Avenue North, St. Petersburg, Pinellas County, Florida. The site is centered on the following coordinates: Latitude 27° 50' 24" North and Longitude 82° 40' 29" West. The site's location is further defined as being in the SW 1/4 of Section 26, Township 30 South, Range 16 East. From St. Petersburg take U.S Highway 19 North. Just prior to Gandy Boulevard, turn right (northeast) onto South Frontage Road. Take a right (head south) on 74th Avenue North. 74th Avenue turns to the east. The site is located at the end of 74th Avenue. [1,32,34,38,39] (Figures 1,2,3).

2.2 Site Description and Surrounding Area

This site is used as a spent shot drop zone for a skeet range and currently consists of portions of the Skyway Trap and Skeet Club (Skyway), an easement and Sawgrass Lake Park. The Southwest Florida Water Management District (SWFWMD) and Skyway own sections of the easement. Skyway consists of a clubhouse, ten shooting stations and associated skeet launcher facilities. Recreational Vehicle (RV) staging sites, complete with electrical hookups, are also present. The Roberts's Mobile Home and RV Resort bounds the site to the west and northwest. The remainder of the Sawgrass Lake Park (Sawgrass Lake Water Management Area) is located north, east and southeast of the site. The Park is owned by the

SWFWMD but Pinellas County maintains the facilities. The park includes an environmental education center, park facilities and support structures. Nature trails for hiking, bird watching and jogging are also present. A mixture of commercial and residential properties exists to the southwest. [14,32,33,34] (Figures 1,2,3,7).

2.3. Local Climate

Pinellas County has a humid subtropical climate. Warm, humid summers and mild dry winters mark this climate. The mean annual temperature in the area is approximately 82° F. The lowest mean monthly temperature is 72° F (January) while the highest mean monthly temperature is 90° F (June-July-August). The mean annual rainfall in the area averages approximately 54.7 inches. More than half of the annual rainfall occurs between June and September during the area's rainy season. Most of this precipitation is the result of afternoon thunderstorms [12,28]. The Net Precipitation and 2-year, 24 hour rainfall values for this area of Pinellas County are approximately 4 and 5 inches, respectively [5,6].

3.0 Site History

3.1. Operational History and Waste Characteristics

Skyway, formerly the Lealman Rod and Gun Club, was founded in 1947. However, the site was reportedly used as a recreational trap and skeet shooting range since the 1930's. The Sawgrass Lake area was originally an extensive expanse of sawgrass wetlands that over time was succeeded by red maple wetlands. In 1976, as part of a cooperative effort, the SWFWMD, Pinellas County and the Pinellas County School Board established Sawgrass Lake Park. This park consists of 384 acres, which is used for surface water management, conservation, recreation and environmental education. In 1976, SWFWMD acquired the drop zone property from Skyway through eminent domain. However, Skyway was granted a perpetual easement for the continued use of the spent shot drop zone. Flood control improvements were implemented through the construction of a drainage canal (southern inflow canal) through the easement to Sawgrass Lake. Shot shells contain either lead or steel shot. The bullets of rifle cartridges contain lead, copper and antimony [34,38].

3.4 Regulatory/Permitting History

In 1991, the SWFWMD prepared a management plan for Sawgrass Lake Park. The plan cited that flood control protection was the primary management goal for the site. Preservation of the red maple wetlands and recreational and educational uses were listed as secondary goals. The plan noted the existence and the potential effect of gun club activities at the lake. The SWFWMD indicated that it would confer with the U.S. Fish and Wildlife Service and EPA to determine whether the adjacent Skyway activities posed a threat to wildlife or surface water quality [34].

On February 4, 2000, the FDEP Southwest District Office referred this site to the FDEP Site Screening Superfund subsection (SSSS) for CERCLA screening. On February 28, 2000, the FDEP SSSS completed a prescreening evaluation report (PSR) for the Sawgrass Lake Park Skeet Range. Based on the available information, the PSR noted that limited groundwater drinking water wells and sensitive environments existed in the site area. However, the report did indicate that the site was used as a Park and that residential areas existed nearby. FDEP recommended that this site be forwarded to the EPA

Emergency Response and Removal Branch (ERRB) for possible removal consideration. FDEP deferred a CERCLIS listing recommendation until after the removal evaluation. The PSR was subsequently forwarded to the EPA [30].

On May 24, 2000, FDEP and SWFWMD met to discuss the planned contamination assessment activities and to present some of their initial results on the Sawgrass Lake site. Due to pending litigation against Skyway, SWFWMD did not submit a formal contamination assessment plan (CAP) to FDEP for review. However, the SWFWMD met with FDEP while the plan was being developed. [36].

On July 13, 2000, EPA completed an emergency removal evaluation of the Sawgrass Lake site. EPA indicated that their Emergency Response and Removal Branch (ERRB) had contacted the FDEP Southwest District office and that the District had requested that no emergency removal be undertaken at the site. Based on the District's request, EPA decided not to conduct an emergency removal. However, EPA indicated that the site had been placed on the CERCLIS inventory and that a PA was warranted. Per EPA's request, the FDEP SSSS initiated the PA [31].

On February 21, 2001, the SWFWMD met with FDEP and submitted a Contamination Assessment Report (CAR) for the Sawgrass Lake Park site. The CAR indicated that antimony, lead and arsenic contamination was present in the soil, surface water and/or groundwater. Sediment samples collected from Sawgrass Lake showed lead and arsenic contamination in portions of the Lake. In addition, lead and arsenic were detected in Lake fish tissue samples. A more through discussion of the SWFWMD CAR is presented in Section 3.5 of the PA [35].

On March 27, 2001, the FDEP Southwest District forwarded comments to SWFWMD regarding the Sawgrass Lake CAR. A number of recommendations were made at that time. Additional assessment of the site was recommended. The recommended activities included metals sampling of the Sawgrass Lake Park supply well, further vertical delineation of metals in soils and initiating an ecological risk assessment [41].

FDEP currently has a case report pending against both SWFWMD and Skyway. Since shot falls beyond the court-ordered easement, SWFWMD has filed a "trespass" lawsuit against Skyway. Club members reportedly continue to shoot but at a reduced rate. Skyway has also repositioned the shot lanes in an effort to keep shot within their easement. In April 2001, the SWFWMD and FDEP entered into a Consent Order. FDEP plans to join the SWFWMD lawsuit against Skyway. Skyway had been requested to conduct a voluntary assessment and cleanup. However, to date, Skyway has refused to initiate these activities. Skyway only provided access for sampling their property after the issuance of a court order [32,33,35,42].

3.5 Sampling and Analysis

3.5.1 Initial Investigations

In 1979, SWFWMD completed a report regarding the environmental condition of Sawgrass Lake. This study was intended to support the development of a lake restoration plan. The report was submitted to the Pinellas-Anclote Basin Board. Four surface water and two sediment samples were collected. The samples were analyzed for antimony, arsenic, lead, nitrite, nitrate and polychlorinated aromatic

hydrocarbons (PAHs). Lead (0.020-0.025 milligrams per liter [mg/l]), nitrate (0.01-0.15 mg/l) and nitrite (0.01-0.02 mg/l) were detected in the water samples. Lead (10-100 micrograms per kilogram [ug/kg]) was detected in the sediment samples [34].

In 1980, the Florida Department of Environmental Regulation (FDER) evaluated the bacteriological problems of Sawgrass Lake. The study did not address potential contaminants related to the skeet drop zone. The FDER study concluded that the bacteriological problems were caused by stormwater runoff and the degraded condition of the lake [34].

3.5.2 FDEP 1999 Sampling Investigation

In November 1999, FDEP conducted a sampling investigation of the Sawgrass Lake site. This was in response to a complaint from the owner of the adjacent mobile home park. A number of groundwater, soil, surface water and sediment samples were collected. These samples were collected on November 4, 1999. A temporary well point groundwater sample, collected within the shot drop zone, contained elevated levels of lead (6,010 micrograms per liter [ug/l]) and arsenic (945 ug/l). Elevated levels of lead (1,620 ug/l) and arsenic (823 ug/l) were also detected in the filtered sample. These levels significantly exceeded the maximum contaminant levels (MCLs) for those contaminants [14,29,32,34] (Figure 3).

Elevated levels of heavy metals were detected in three soil samples collected from Station #5. This location was also located within the shot drop zone. Samples were collected at depth at this location. Lead (1,160 milligrams per kilogram [mg/kg] to 341,000 mg/kg), arsenic (9.9 mg/kg to 4,160 mg/kg) and antimony (9.3 mg/kg to 17,200 mg/kg) were detected in the soil samples. The results indicated that the highest levels of these metals were found approximately 42 to 48 inches below land surface. Toxicity characteristics leaching procedure (TCLP) analysis was conducted on the soil samples collected at Station#5. Lead (11.3 mg/l to 45.9 mg/l) was detected during the extraction analysis. These levels significantly exceeded the TCLP limit for lead of 5 mg/l. The highest level was detected in the 1" to 3" interval. Synthetic Precipitation Leaching Procedure (SPLP) analysis was also conducted and yielded lead concentrations of 3.1 mg/l (42-48" depth) to 23.6 mg/l (3-6" depth) [14,32] (Figure 3).

Surface water and sediment samples were collected from the slough (drop zone), the slough inlet to Sawgrass Lake and Sawgrass Lake near the slough outfall. Background surface water and sediment samples were collected for comparison. Elevated levels of arsenic (214 ug/l) and lead (354 ug/l) were detected in a surface water sample collected from the slough. This sample was collected within the shot drop zone. The levels of arsenic and lead detected in the slough sample were significantly higher than a background surface water sample collected upstream of the drop zone. The arsenic concentration exceeded the State surface water quality standard for that contaminant. However, arsenic and lead were not detected in the surface water sample collected from Sawgrass Lake [14,32,34] (Figure 3)

Lead (851 mg/kg to 3,040 mg/kg), zinc (410 mg/kg to 620 mg/kg) and copper (38.5 mg/kg to 67 mg/kg) were detected in sediment samples collected from the slough area. Lead (849 mg/kg), zinc (720 mg/kg) and copper (71 mg/kg) were detected in a sediment sample collected from Sawgrass Lake near the slough outfall. The levels of metals detected in the slough and Lake sediment samples were significantly higher than a background sediment sample collected upstream of the shot drop zone. In addition, many of the lead and zinc concentrations exceeded the State sediment quality assessment guideline (SQAG) probable effect levels (PELs) for those contaminants. SQAGs are used by FDEP to initiate toxicity

bioassay assessments at potentially hazardous waste sites. TCLP testing from a slough sediment sample collected within the shot drop zone yielded lead at 383 mg/l [14,32,34] (Figure 3)

3.5.3 SWFWMD 2000 Preliminary Environmental Assessment

In June 2000, SWFWMD completed a preliminary environmental assessment of the Sawgrass Lake site. Soil, groundwater, and surface water samples were collected as part of the assessment. Four temporary piezometers and 29 temporary observation wells were installed on-site. The wells were sampled and analyzed for arsenic, lead, calcium and magnesium. The four piezometers were installed with a 1-foot screen to a depth of 4 to 6 feet below land surface (bls). Nine pairs of observation wells were constructed. Each pair consisted of a shallow (1-2 feet depth) and deep (2-3 feet depth) well. The remaining observation wells were constructed as single well with a 2.5-foot well screen. The depths varied between either 2 to 4.5 feet bls or 7.5 to 8 feet bls [34] (Figures 4,5).

Elevated levels of lead and arsenic were detected in groundwater significantly above their respective MCLs. The highest levels of lead (537 to 1,260 ug/l) and arsenic (91.8 to 407 ug/l) were found in the spent shot zone. The focal points of the highest lead and arsenic concentrations were on the west side of the slough centered on Skyway shooting stations 3, 4 & 5. Water table elevation measurements indicated that groundwater flowed to the east in the northern portion of the study area. A southeasterly flow was determined in the southern half of the study area [34] (Figures 4,5).

Sediment and soil quality were evaluated from 35 sediment and 11 soil locations. The samples were collected from varying depths and analyzed for the contaminants of concern. (arsenic and lead). In conjunction with the preliminary environmental assessment, a limited pellet deposition survey was conducted in the spent shot drop zone. Eight sampling locations were selected on the western side of the southern inflow canal, east of the Skyway property. These locations were arranged along a north-south axis. Five sampling stations were randomly selected in the wetland area east of the southern inflow canal. Plastic drop cloths and small buckets were used to collect the airborne pellets/shot. A sampling period of 1 week was chosen. The results of the survey indicated that all the sampling locations, including the wetland locations, contained pellets or shot. The station with the highest pellet count (Station #5/919 pellets) was located at the center of the north-south axis. Subsamples of pellets from the thirteen sample locations, including a composite sample, were collected for metal assay analysis. The chemical analysis indicated the concentrations of lead in pellets ranged from 44 to 92% by weight [34] (Figure 6).

SWFWMD also collected soil/sediment cores from the wetland, south inflow canal and west side of Sawgrass Lake. The cores were 3-inches in diameter and consisted of the first 6 inches of soil. Shot pellets were detected in all the cores collected from the wetland. Results of soil screening, after the removal of pellets, showed that the highest levels of heavy metals were near the central portion of the spent shot zone and the central portion of the easement inline with the Skyway shooting stations. The highest lead concentration (44,000 mg/kg) was detected in this area. For the most part, the highest levels of lead were at or near land surface and generally decreased with depth. However, lead was detected throughout the entire soil/sediment profiles to a depth of 6 feet [34] (Figure 6).

Between April and June 2000, the SWFWMD conducted surface water monitoring at the Sawgrass Lake site. Surface water samples were collected monthly from the southern inflow canal (three locations),

Sawgrass Lake (three locations) and the outflow canal (one location). In addition, during the June sampling event, one surface water sample was collected from the western drainage ditch on the Skyway property and northern inflow canal to Sawgrass Lake. The western drainage ditch is situated between the shooting range and the southern inflow canal. The samples were analyzed for a number of parameters including arsenic and lead. During the April to June time period, elevated levels of lead (6.4 to 27.4 ug/l) were detected in the southern inflow canal. Lead (7 ug/l) was detected in the southern portion of Sawgrass Lake during the June sampling event. The highest level of lead (221 ug/l) was detected in the water sample collected from the western drainage ditch. These levels exceeded the State surface water calculated limit for lead. Lead was not detected in the northern inflow canal sample [29,34] (Figure 2).

Based on the results of the preliminary environmental assessment, SWFWMD concluded that lead from the Skyway gun club posed an environmental threat to local surface water and groundwater. SWFWMD also concluded that long term leaching of metals could impact the ecosystem of the lake. The Study recommended additional assessment to define the full areal and vertical extent of contamination [34].

3.5.4 SWFWMD/SCS 2000 Contamination Assessment

Fieldwork for the Sawgrass Lake site contamination assessment was conducted in August and September 2000. SCS Engineers, the SWFWMD contractor, performed the contamination assessment. The assessment included installation of monitor wells and the collection of groundwater, surface water, soil and sediment samples. An ecological quality assessment was also included [34]. The contamination assessment focused primarily on the Skyway property, spent shot drop zone, Sawgrass Lake and the wetlands associated with the Lake. A spoil site, located north of the spent shot drop zone, was also included in the assessment.

A grid system for environmental media sampling was established at this site. The results of previous investigations were consulted in the design of the grid layout. The grid consisted of east-west lines parallel to the centerline of the shooting stations. Additional east-west lines were established approximately 200 feet north and south of the exterior shooting stations. These two grid lines represented the outside boundary of potential contamination. The north-south grid lines were drawn at 250-foot intervals with the base line just west of the shooting stations. The last north-south grid line was established 1,000 feet from the base line. This limit was based on shotgun ballistic information that indicated a maximum shot travel range of 800 feet. [34] (Figure 7).

Seventeen surficial aquifer monitor wells (SLMW-1 to SLMW-17) were installed within both the contaminated area and at the peripheries of the contaminated area. Three of the wells (SLMW-5, 7 & 8) were installed in the spoil area located northwest of the Lake. The wells were constructed of 2-inch Schedule 40 PVC. The wells were installed with a ten foot slotted screen (0.01 slot) to depths of between 12-14 feet. A Floridan aquifer monitor well (SLFMW-1) was installed adjacent to monitor well SLMW-1 in the center of the spent shot drop zone. This well was constructed of 2-inch Schedule 40 PVC with a 6-inch PVC outer casing. The Floridan well was installed with a ten foot slotted screen (0.01 slot) to a depth of 60 feet. Groundwater samples were collected and analyzed for antimony, arsenic, lead, PAHs, nitrate and nitrite. SCS had determined that antimony, nitrate and nitrite were present in shotgun ammunition. PAHs could also be present in the binding agent used to produce clay skeet. This was based on information provided to SCS by the shotgun ammunition and clay skeet manufacturing industry [34] (Figure 7).

Groundwater samples were collected from the monitor wells between August 23 and 29, 2000. Elevated levels of antimony, in excess of the State MCL (6 ug/l), were detected in groundwater samples collected from SLMW-1 (51 ug/l), SLMW-3 (12 ug/l), SLMW-4 (23 ug/l) and SLMW-13 (55 ug/l). Arsenic was detected above the State MCL (50 ug/l) in monitor wells SLMW-1 (290 ug/l) and SLMW-3 (110 ug/l). Lead was detected above the State MCL (15 ug/l) in monitor wells SLMW-1 (28 ug/l) and SLMW-15 (40 ug/l). Nitrate (28 mg/l) was detected in the SLMW-16 monitor well sample in excess of the State MCL (10 mg/l). Benzo (a) pyrene (0.3 ug/l) was detected in SLMW-15 in excess of the State MCL (0.2 ug/l). Nitrite was not detected in the groundwater samples. The highest levels of heavy metals were detected in the spent shot drop zone. However, elevated levels of antimony and lead were also detected near the Skyway shooting stations. Groundwater elevations, measured on three occasions, indicated an easterly groundwater flow towards Sawgrass Lake. Antimony, arsenic, lead, and benzo (a) pyrene were not detected in monitor well SLMW-16. This well is located west of the shooting stations and upgradient of the site. Arsenic (6.2 ug/l) was detected in Floridan aquifer monitor well SLFMW-1. However, this level was considerably below the State MCL for that contaminant [34] (Figure 7, Table 2).

Soil samples were collected from eight locations during the contamination assessment. The soil samples were collected between August 7 and 21, 2000. Both the soil and sediment samples for lead analysis were analyzed for total and sieved lead. The sieved lead sample was passed through an U.S. Standard No. 14 sieve. The material retained by the sieve included spent shot and other residual material. This material was also analyzed for lead. The total lead concentration included both the sieved portion and retained portion (shot and/or residual media). The soil samples were collected from the Skyway property (STS-SS-1, STS-SS-2, STS-SS-3, SL-Soil 14), north (SL-Soil-6) and south (SL-Soil-4) of Skyway property, west of the Skyway Property (SL-Soil-16 & 17) and from the spent shot drop zone (SL-Soil-1 to SL-Soil-3). The SL soil samples were collocated with the monitor wells and were collected from 0-1 and 1-2 foot depth intervals. Selected locations included a soil sample from the 2-3 foot depth interval. One of the locations (SL-Soil-4-4) included a soil sample from the 3-4 foot depth interval. The SL soil samples were analyzed for antimony, arsenic, and lead (sieved and total). Three of the soil samples collected from the spent drop shot zone (SL-Soil-1-1, SL-Soil-1-2) and the Skyway property (SL-Soil-14) were analyzed for polynuclear aromatic hydrocarbons (PAHs). The SS samples were surface soil samples and were analyzed for nitrate and nitrite only [34] (Figure 7, Table 3).

Detectable levels of arsenic, antimony and lead (sieved & total) were found in the soil samples. In general, the highest levels of arsenic (1.1-24 mg/kg), antimony (48 & 92 mg/kg), sieved lead (720-12,000 mg/kg) and total lead (1,700-69,000 mg/kg) were detected in soil samples collected from the spent shot drop zone. However, elevated levels of sieved lead (1,700 mg/kg), total lead (720-4,600 mg/kg), arsenic (1.2-14 mg/kg) and antimony (27 mg/kg) were detected in soil samples collected from the SL-Soil-4 location. This location is south of the Skyway property. Total lead (720 mg/kg) was detected in a soil sample (SL-Soil-6-1) collected north of the Skyway property, near the Roberts's Mobile Home and RV Resort. Elevated concentrations of total lead (8,500 mg/kg) and arsenic (2.4 mg/kg) were detected in soil sample SL-Soil-14-1 collected within the Skyway shooting range. Elevated levels of PAHs including benzo (a) pyrene (3,500 ug/kg) and dibenz (a,h) anthracene (1,400 ug/kg) were also detected in the Skyway soil sample. Low levels of nitrate (1.4-4.7 mg/kg) and nitrite (0.86 mg/kg) were detected in the surface soil samples collected from the Skyway shooting range. Heavy metals were

either not detected or were detected at considerably lower concentrations in soil samples (SL-Soil-16 & 17) collected immediately west of the Skyway property [34] (Figure 7, Table 3).

SCS collected thirty-five sediment samples between September 7 and 14, 2000. The samples were collected from the northern inflow canal (SLSED-8), the southern inflow canal (SLSED-1, 2 & 3), the southeastern corner of the Lake at the outflow canal (SLSED-5), Sawgrass Lake (SLSED-4, 6, 7 & SLSED-30 to SLSED-35), western inflow drainage ditch (SLSED-9), the wetlands southwest of Sawgrass Lake (SLSED-10 to SLSED-24) and the wetlands west of the Lake (SLSED-25 to SLSED-29). The samples were collected as grab samples. A brass dredge was utilized to collect sediment samples from the canals and Lake. The sediment samples were analyzed for antimony, arsenic and lead (sieved & total). Elevated levels of these heavy metals were detected in the samples. Antimony and arsenic were detected in 25 and all-35 sediment samples, respectively. The highest levels of antimony (2,400 mg/kg) and arsenic (1,100 mg/kg) were found in sediment sample SLSED-14. This sample was collected from the wetland, east of the southern inflow canal. Total lead was detected in all the sediment samples. The highest concentrations of total lead were detected in sediment samples SLSED-2 (286,100 mg/kg), SLSED-9 (408,756 mg/kg), SLSED-14 (690,000 mg/kg), SLSED-18 (19,000 mg/kg), SLSED-21 (48,000 mg/kg) and SLSED-25 (240,000 mg/kg). The sieved lead concentrations found in the southern portion of Sawgrass Lake ranged from 320 to 770 mg/kg. Many of the lead and arsenic concentrations exceeded the State SQAG PELs for those contaminants. Heavy metals were either not detected or were detected at considerably lower concentrations in sediment sample SLSED-8. SLSED-8 was collected from the northern inflow canal, which is hydraulically upgradient of the Sawgrass Lake site [34] (Figure 7, Table 4).

Surface water samples were collected from twelve locations at the Sawgrass Lake site. The locations included the southern inflow canal (SLSW-1, 2 & 3), the northern inflow canal (SLSW-8), Sawgrass Lake (SLSW-4, 6 & 7), the southeastern corner of the Lake at the outflow canal (SLSW-5), western inflow drainage ditch (SLSW-9) and the wetlands southwest of Sawgrass Lake (SLSW-10 to SLSW-12). The samples were analyzed for antimony, arsenic, lead and hardness (calcium/magnesium). Samples from the canals and Lake were collected with a Wheaton Sciences sampler from approximately 1 foot below the water surface. Water samples from the other locations, in particular those locations covered by a vegetative mat, were collected by allowing the containers to gravity fill from the surface [34] (Figure 7).

Detectable levels of antimony, arsenic and lead were found in the surface water samples. Elevated levels of lead, in excess of State Surface water quality standards, were detected in surface water samples SLSW-2 (28 ug/l), SLSW-3 (7.2 ug/l), SLSW-4 (8 ug/l), SLSW-9 (1,100 ug/l), SLSW-10 (1,900 ug/l), SLSW-11 (43 ug/l) and SLSW-12 (520 ug/l). The highest levels of lead were detected in the western inflow ditch (SLSW-9) and Sawgrass Lake wetland samples (SLSW-10). Arsenic, antimony and lead were not detected in surface water sample SLSW-8. SLSW-8 was collected from the northern inflow canal which is hydraulically upgradient of the Sawgrass Lake site [34] (Figure 7, Table 4).

The ecological quality assessment consisted of wetland delineation and biota sampling. The biota sampling was conducted on September 6, 2000 and consisted of ten sampling locations. The locations included the northern inflow canal (NC-1 & NC-2), Sawgrass Lake (SL-1, 2 & 3), southern inflow canal (SC-1, 2 & 3) and the Sawgrass Lake outflow canal (OC-1 & OC-2). The biota included macroinvertebrates (mollusks) and fish. However, macroinvertebrates (Asiatic clams) were only found

in two locations (SC-2 & SC-3). Due to cross contamination introduced during the analytical process and the insufficient quantity of the clams, no macroinvertebrate analysis was conducted. The majority of the fish collected during the assessment were Florida gar. However, one fish sample from the southern inflow canal included Blue tilapia. The biotic samples were analyzed for arsenic, antimony and lead. The fish samples consisted of both fish tissue and liver samples [34] (Figure 7).

Detectable levels of antimony (0.59-4.6 mg/kg) were found in the fish liver samples. Antimony was not detected in any of the fish tissue samples. The highest levels of antimony were from fish collected from Sawgrass Lake (SL-1/4.6 mg/kg) and the outflow canal (4.2A mg/kg). Arsenic (1.5-7.6 mg/kg) was detected in both the fish tissue and liver samples. The highest levels of arsenic were generally found in the fish tissue samples. However, the highest level of arsenic (7.6 mg/kg) was detected in a fish liver sample (SC-2) collected from the southern inflow canal. Detectable levels of lead (0.75-3.1 mg/kg) were found in fish tissue and liver samples collected from Sawgrass Lake and the outflow canal. However the highest levels of lead (8.6 mg/kg & 250 mg/kg) were detected in fish liver samples collected from the southern inflow canal. It should be noted that lead was not detected in the fish samples collected from the northern inflow canal. The levels of arsenic and lead detected in the fish tissue samples exceeded the EPA risk-based concentrations (RBCs) for long term consumption of fish tissue. The ecological study noted that no relationship could be established between the sampling locations and the detected levels found in the fish. This was attributed to the mobile nature of the tested fish species. The study concluded that metals might also be present in other predatory species (i.e. largemouth bass) that may be consumed by humans. The study also noted that greater risks to the ecological food chain via bioaccumulation might exist [34].

A spoil site located near the Gandy Boulevard Park entrance was also evaluated. This area was reportedly used for the disposal of aquatic vegetation and construction and demolition (C & D) debris. However, dredge spoils from the southern inflow canal may have also been disposed. Assessment activities in this area consisted of backhoe trenching, monitor well installation and groundwater and soil sampling. The trenching activities confirmed the presence of C & D materials. These materials included concrete blocks, lumber, timber and steel cable. Four vertical composite soil samples, one from each quadrant, were collected from the spoil pile. Detectable levels of antimony, arsenic and lead were found. However, only one of the samples (SLTT-SE) had elevated levels of metals (arsenic/1.2 mg/kg). Groundwater samples were collected from three monitor wells (SLMW-5, 7 & 8) installed in the spoil pile area. The groundwater samples were analyzed for arsenic, antimony and lead. In addition, one of the samples (SLMW-7) was analyzed for nitrates, nitrites and PAHs. Only one of the groundwater samples (SLMW-8) had detectable levels of metals (arsenic/6.3 ug/l). However, this level was below the State MCL (50 ug/l) for that contaminant. No nitrites, nitrates or PAHs were detected in the groundwater samples collected from this area [34] (Figure 7).

4.0 Ground-Water Pathway

4.1 Regional Hydrogeologic Setting

This site is located on the Level Lowlands of the Gulf Coastal Lowlands Physiographic Province. This area consists of various karst terrain features including sinkholes (predominantly cover-collapse), sinkhole lakes and cypress heads. Three hydrostratigraphic units, the surficial

aquifer system, intermediate aquifer system/confining unit and the Floridan aquifer system, exist in the site area [8,9,12,15,17].

The surficial aquifer system generally consists of fine to medium grained quartz sand and shelly sand. These deposits grade downward to sandy clay, marl and some interbedded clay. These sediments are Pleistocene to possibly Pliocene age. Organic material and silt commonly form a hardpan layer 5 to 10 feet below land surface (bls). This hardpan acts as a semi-confining bed that restricts the vertical movement of water. A gray to white, tan, phosphatic limestone forms the base of the aquifer in some portions of Pinellas County. In the Clearwater-Dunedin area, organic rich, dark-brown to black, very fine-grained sand occurs near the base of the aquifer system. The surficial aquifer exists under unconfined conditions and the water table is found generally less than 5 feet bls in the County. However, the water table may be more than 10 feet bls in topographically high, well drained areas. The saturated thickness of the surficial aquifer in the County averages about 30 feet throughout most of the County. The aquifer ranges in thickness from approximately 40 feet along the Pinellas Ridge to more than 80 feet in the western part of St. Petersburg. Recharge to the surficial aquifer is primarily from local rainfall. The surficial aquifer is used primarily for lawn irrigation use and is of limited use for domestic purposes. Small diameter wells open to the aquifer yield between 5 to 30 gallons per minute. The water from this aquifer generally contains high levels of iron, which results in staining of fixtures and utensils [8,9,12,14].

Underlying the surficial aquifer system are the Middle and Upper Miocene Deposits, the lower Miocene age Arcadia Formation (Fm) and the Tampa Member of the Arcadia Fm. The Arcadia Fm and the Tampa Member comprise the Hawthorn Group in Pinellas County. These Miocene age deposits jointly form the intermediate aquifer system/confining unit in Pinellas County. Low permeability portions of the upper Tampa Member of the Arcadia Fm. form the base of the intermediate aquifer system/confining unit [7,8,9,12,14].

The Middle and Upper Miocene Deposits, also referred to as the Alachua Formation (Fm), consist predominantly of blue to gray clay, fine-grained sandstone and weathered lumps of limestone. These deposits are generally less than 50 feet thick. This unit is limited in lateral extent being present only between Clearwater and Palm Harbor. These deposits do not yield significant quantities of water due to their large clay content. The Arcadia Fm is composed predominantly of limestone and dolostone with various amounts of sand, clay and phosphate grains. Thin beds of quartz sand and clay are dispersed throughout the Arcadia Fm. The Arcadia Fm is generally present in the southern part of the county and thins to the north. The Arcadia Fm pinches out north of Coachman and is absent in northern Pinellas County. The top of the Arcadia Fm is found at sea level in the north-central part of the County to 50 feet below sea level in the St. Petersburg area. Thin beds of sand within the Hawthorn Group may yield water to domestic wells. However, these sands have low permeability and are discontinuous making them a poor water producer. The intermediate aquifer system thins to the north and is absent in central and northern Pinellas County. Low permeability beds within the Middle and Upper Miocene Deposits and/or Hawthorn Group restricts the vertical movement of water to and from the surficial and Floridan aquifer systems [7,8,9,12,14].

The Floridan aquifer system is the major source of potable groundwater in the area and consists of a series of limestones of Eocene to early Miocene age. These carbonate units effectively

function as a single hydrologic unit. The aquifer ranges in thickness from 1,000 feet (north Pinellas County) to 1,200 feet (southern Pinellas County) throughout the County. The Floridan aquifer system includes, in ascending order, the Ocala Limestone, Suwannee Limestone and permeable limestone beds (Tampa Limestone) of the Tampa Member of the Arcadia Fm. The Ocala Limestone is not an important component of the Floridan aquifer system in Pinellas County due to its depth and the productiveness of the Suwannee and Tampa Limestones. The Tampa Limestone, an early Miocene age deposit, forms the upper layer of the Floridan aquifer and is first encountered at between sea level in the Tarpon Springs area to 120 feet below sea level in the St. Petersburg area. Locally, the depths to the Tampa Limestone may vary over a wide range. This variability of depth reflects the irregular surface of the Tampa Member caused by numerous pinnacles and sinkholes. The Tampa Limestone contains numerous solution channels. The Tampa Limestone consists of white to light tan, sandy, fossiliferous limestone with chert fragments. The Suwannee Limestone underlies the Tampa Member and is composed of predominantly white to cream-colored, hard, fossiliferous limestone. Water in the Floridan aquifer system exists under water-table conditions north of Palm Harbor and west of Lake Tarpon. An 8-inch diameter well open the Upper Floridan aquifer system can yield several hundred gallons per minute (gpm) of water. Water from the Floridan aquifer is generally hard, particularly water from the Suwannee Limestone. In addition, saltwater intrusion generally precludes the aquifer for potable use along the portions of coastal Pinellas County. Regional groundwater flow in the Upper Floridan aquifer in the County is generally ill defined. However, near coastal areas flow is either towards Old Tampa Bay (east coast) or the Gulf of Mexico (west coast). Recharge to the Floridan aquifer system varies from none to very low in southern Pinellas County to low to moderate in north Pinellas County [8,9,12,13,14,16].

4.2 Site Hydrogeologic Setting

As a result of previous assessment work, a number of lithologic well logs are available for this site. The deepest boring, Floridan monitor well SLFMW-1, was installed to a depth of 60 feet. In addition, the drillers log for the Sawgrass Lake Supply well, installed in 1995, is also available. This well was drilled to a depth of 210 feet. The water table is generally encountered within 3 feet of land surface at this site. Groundwater elevations, measured on three occasions, indicated an easterly groundwater flow towards Sawgrass Lake and the southern inflow canal. The surficial aquifer is approximately 28 feet thick and consists of fine sand, dark gray to black silt and medium brown silt and sand. Peat was encountered in a number of the shallow borings. Blue green clay was first encountered between 28 to 38 feet bls. The clay exhibited high plasticity. Phosphate nodules and limestone gravel were components of the clay. The clay, interpreted as being the Hawthorn Group, is about 16 feet thick at the site. Permeability tests of the clay indicated a permeability of 1.9 to 9.2×10^{-8} cm/sec. The exact location of the Floridan aquifer is unknown. White clayey limestone was encountered approximately 46 feet bls during the installation of the deep monitor well. The limestone became less clayey with depth. However, during the installation of SLFMW-1, drilling fluid circulation was lost approximately 53 feet bls. Limestone was first encountered approximately 54 feet bls in the Park supply well. The limestone was interpreted as being the Tampa Member of the Arcadia Fm or the Suwannee Limestone. The water levels in Floridan monitor well SLFMW-1 were approximately 3 to 4 feet higher than the elevation in adjacent surficial monitor well SLMW-1 [34].

4.3. Ground-Water Targets

The Pinellas County Water System (PCWS) provides water to the City of St. Petersburg and the surrounding site area. Water for this system is provided by the Eldridge-Wilde, Cosme Odessa and East Lake wellfields. These wellfields tap the Floridan aquifer system and are located more than 20 miles north-northeast of the site. Three community/non-community well systems have been identified within 4-miles of the site. These wells collectively serve 26 people and are located between 3.7 and 4.0 miles northwest and north-northwest of the site [1,18,21]. A well inventory was conducted as part of the CAR. The inventory consisted of a review of local and State agency well permits and a field inventory of wells within 0.5 mile of the Sawgrass Lake site. Five irrigation wells were permitted for use within 0.5 mile of the site. In addition, a well was identified at the Roberts Mobile Home and RV Resort. The use of this well was not determined. However, none of the identified wells were located during the field inventory. The Sawgrass Lake Park Supply well is reportedly used for irrigation and is located approximately 2,200 feet east-southeast of the site. A breakdown of the community and non-community well systems, by distance, is presented in Table 1.

4.4 Ground-Water Conclusions

Elevated levels of arsenic, antimony, lead, nitrate and benzo (a) pyrene have been detected above State MCLs in surficial groundwater. These contaminants are likely attributable to the gun club activities. However, based on the available information, the Floridan aquifer, the aquifer of concern, appears to be confined by low permeability clays. Arsenic was the only contaminant of concern that was detected in the Floridan aquifer monitor well. However, this level was significantly below the State MCL for that contaminant. In addition, only a limited number of drinking water wells are located within 4 miles of the site. Based on these criteria, the groundwater migration pathway is not a major concern at this time.

5.0 Surface Water Pathway

5.1 Hydrology

The soils east of the southern inflow, in the area of the red maple wetlands, are classified by the Soil Conservation Service as Okeechobee muck. These soils are level, very poorly drained organic soils. The soils are commonly found in depressions and in broad swampy areas of Pinellas County. The water table is generally found at a depth of 10 inches. However, the soils are covered by water for 6 to 12 months of the year. The soils west of the canal, in the area of the Gun Club, are classified as Myakka fine sand. The soils are level, poorly drained and found on broad flat areas between sloughs and swamps [28] (Figure 7).

Sawgrass Lake is used by the SWFWMD for regional water management control, including flood control. The Lake is approximately 20 acres in size and about 3 feet deep in the center. Two canals, the northern inflow canal and southern inflow canal, collect drainage from the north and southwest, respectively into the Lake. An outflow canal is located on the southeastern edge of the Lake. Outflow from this canal is directed to the Turner Creek ditch. A flood control structure is located on the north end of the ditch adjacent to Interstate 275. This structure controls

6.2. Soil Exposure and Air Migration Targets

The nearest residential area, the Roberts's Mobile Home and RV Resort, is located within 200 feet of the site. The Lake and associated wetlands have been designated as special protection areas by the SWFWMD. In addition, a number of federal and state designated endangered or threatened terrestrial species may inhabit this area of the Park. Please refer to the Surface Water pathway for the species identification. The average persons per household (1990 U.S Census) for Pinellas County is 2.18. Based on the 1990 U.S Census, approximately 202 people live within 1/4 mile of the site. Approximately 166,959 people live within 4 miles of the site. [14,20,23,24,25,26,33,34] (Figures 2,7).

6.3. Soil Exposure and Air Migration Conclusions.

Elevated levels of heavy metals (arsenic, antimony and lead) and organic contaminants (benzo [a] pyrene, dibenz [a,h] anthracene) have been detected in surface soil samples collected from the site. An elevated concentration of lead was detected in a surface soil sample collected near the northwest corner of the site adjacent to the Roberts's Mobile Home and RV Resort. In addition, a portion of Sawgrass Lake Park occupies the site. As a result, a number of terrestrial sensitive environments may exist on-site. However, the majority of the Park's activity zones, including nature trails, picnic areas, the outdoor classroom and environmental education center, are more than 200 feet from the site. Based on the above information, the soil exposure pathway could be a concern at this site. Although located in a populated area, the majority of the site is heavily vegetated, as such the air migration pathway is not a major concern at this time.

7.0 Summary and Conclusions

This site is located at 3200 34th Avenue North, St. Petersburg, Pinellas County, Florida. This site is used as a shot drop zone for a skeet range and currently consists of portions of the Skyway Trap and Skeet Club (Skyway), an easement and Sawgrass Lake Park. The Southwest Florida Water Management District (SWFWMD) and Skyway own the easement. A drainage slough (Southern inflow canal) bisects the site. Skyway consists of a clubhouse, ten shooting stations and associated skeet launcher facilities. Skyway, formerly the Lealman Rod and Gun Club, was founded in 1947. However, the site was reportedly used as a recreational trap and skeet shooting range since the 1930's. The Roberts's Mobile Home and RV Resort bound the site to the west and northwest. The remainder of the Sawgrass Lake Park (Sawgrass Lake Water Management Area) is located north, east and southeast of the site. The Park is owned by the SWFWMD but Pinellas County maintains the facilities. The park includes an environmental education center, park facilities and support structures. Nature trails for hiking, bird watching and jogging are also present.

In 1999, FDEP received a complaint regarding the site from the owner of the adjacent mobile home Park. An investigation conducted by FDEP in November 1999 documented the presence of arsenic and lead in groundwater, soil, sediment and/or surface water samples collected from the site. The concentrations of arsenic and lead in groundwater significantly exceeded the State maximum contaminant levels (MCLs) for those contaminants. In February 2000, the site was referred to the FDEP Site Screening Superfund subsection for possible CERCLA consideration.

SWFWMD and/or its contractor conducted subsequent investigations. The investigations focused on the shot drop zone, southern inflow canal (slough), Sawgrass Lake wetlands and Sawgrass Lake. These investigations confirmed the presence of lead and arsenic in groundwater and soil samples collected from the site. Antimony was also detected. The antimony levels in groundwater exceeded the State MCLs for that contaminant. Elevated levels of two organic contaminants (benzo [a] pyrene and dibenz [a,h] anthracene) were detected in soil samples collected from the Skyway portion of the site. Elevated levels of arsenic, antimony and lead were detected in surface water and sediment samples collected from the southern inflow canal, Sawgrass Lake wetlands and the southern portion of Sawgrass Lake. Elevated levels of lead, in excess of State Surface water quality standards, were detected in surface water samples. Arsenic and lead were detected in the fish tissue samples in excess of the EPA risk-based concentrations (RBCs) for long term consumption of fish tissue. Shot shells contain either lead or steel shot. The bullets of rifle cartridges contain lead, copper and antimony.

Elevated levels of arsenic, antimony, lead, nitrate and benzo (a) pyrene have been detected above State MCLs in surficial groundwater. These contaminants are likely attributable to the gun club activities. However, based on the available information, the Floridan aquifer, the aquifer of concern, appears to be confined by low permeability clays. Arsenic was the only contaminant of concern that was detected in the Floridan aquifer monitor well. However, this level is significantly below the State MCL for that contaminant. In addition, only a limited number of drinking water wells are located within 4 miles of the site. Based on these criteria, the groundwater migration pathway is not a major concern at this time.

Elevated levels of arsenic, antimony and lead have been detected in water and/or sediment samples collected from Sawgrass Lake and the wetlands fronting the Lake. Arsenic and lead were detected in Sawgrass Lake fish tissue samples in excess of the EPA risk-based concentrations (RBCs) for long term consumption of fish tissue. Fishing is prohibited in Sawgrass Lake. However, fisheries have been identified downstream of the site. A number of sensitive environments have also been identified at the Lake. These include red maple wetlands and habitats for several endangered or threatened species. Based on the above information, the Surface Water migration pathway may be a concern at this site.

Elevated levels of heavy metals (arsenic, antimony and lead) and organic contaminants (benzo [a] pyrene, dibenz [a,h] anthracene) have been detected in surface soil samples collected from the site. An elevated concentration of lead was detected in a surface soil sample collected near the northwest corner of the site adjacent to the Roberts's Mobile Home and RV Resort. In addition, a portion of Sawgrass Lake Park occupies the site. As a result, a number of terrestrial sensitive environments may exist on-site. However, the majority of the Park's activity zones, including nature trails, picnic areas, the outdoor classroom and environmental education center, are more than 200 feet from the site. Based on the above information, the soil exposure pathway may be a concern at this site. Although located in a populated area, the majority of the site is heavily vegetated, as such the air migration pathway is not a major concern at this time.

Based on the conclusions of the results of the PA and a draft Hazard Ranking System (HRS) evaluation, further CERCLA action, including a Site Inspection (SI), is warranted for this site. However, the SWFWMD has entered into a Consent Order with the State to address further

assessment and remediation of the site. As a result, a low priority for further CERCLA action is recommended.

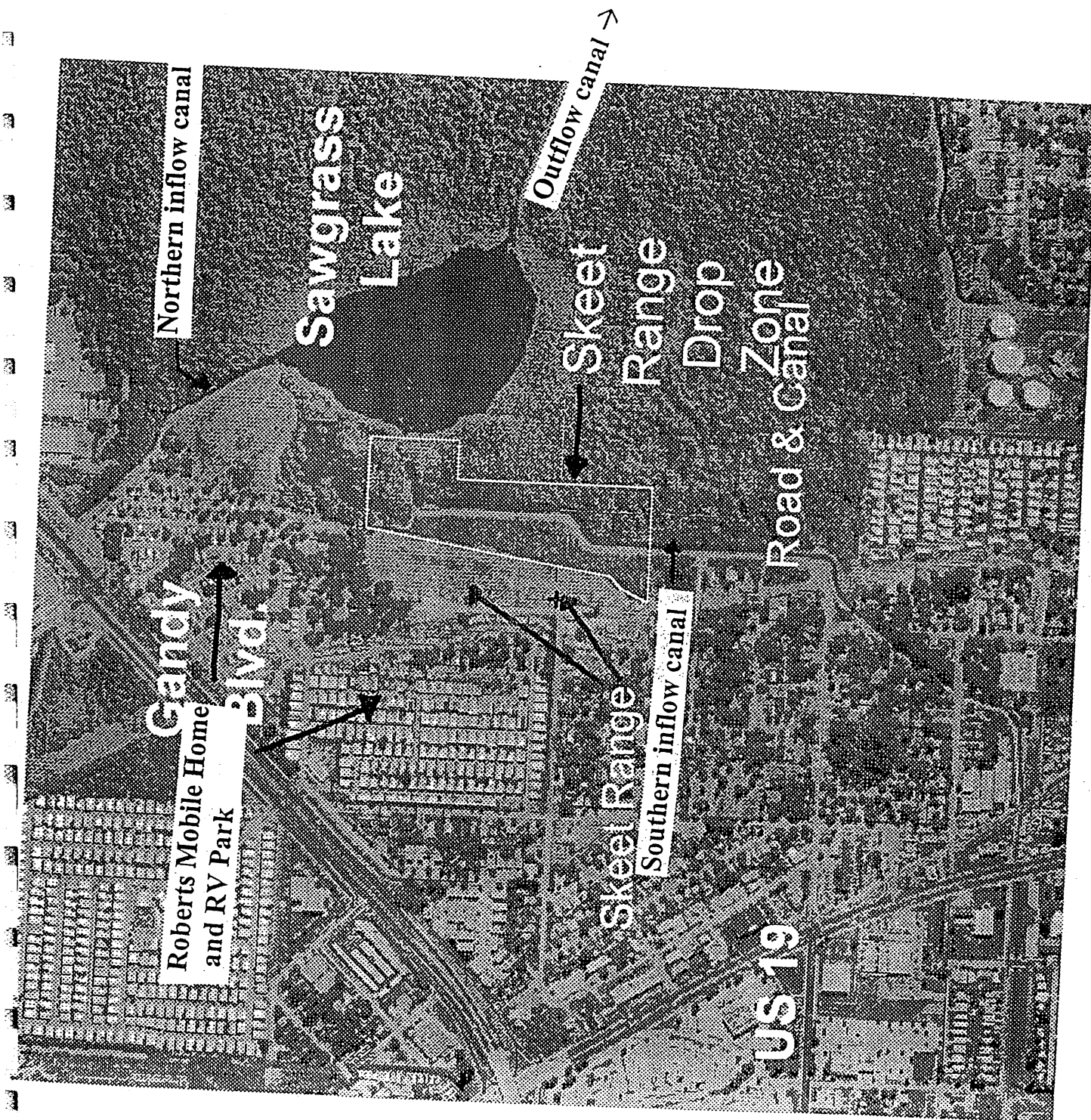


Figure 2

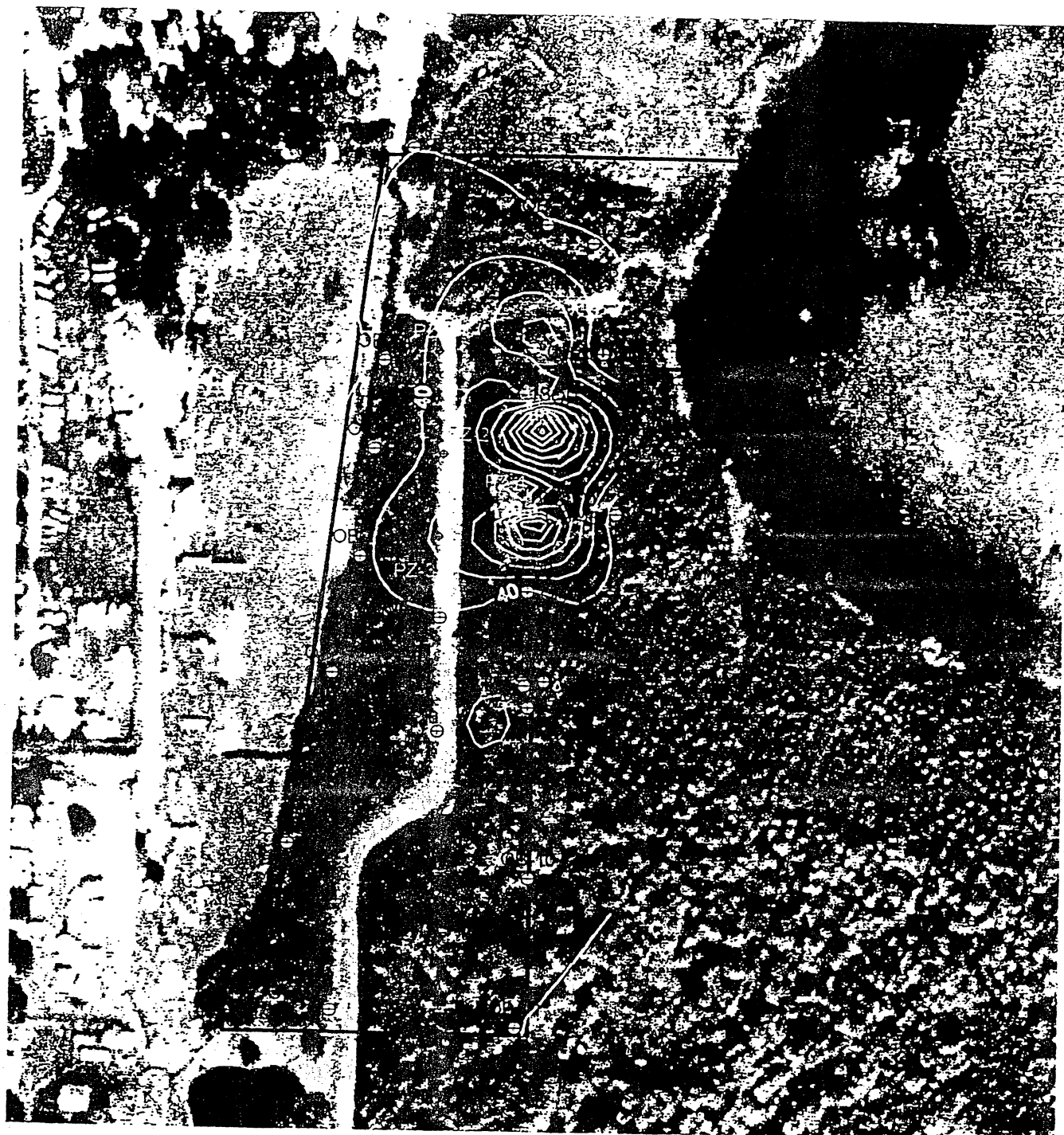


250 0 250 Feet

Source: Figure 8.1. Preliminary assessment extent of lead in Shallow Waters. SWFWMD Preliminary Environmental Assessment. SWFWMD Parcel No. 16-560-102 Pinellas, Florida, June 2000

Figure 6-2. Preliminary Assessment Extent of Lead ($\mu\text{g/L}$) in Shallow Waters

Figure 4
(Source SCS CAR Ref. 34)



250 0 250 Feet

Source: Figure 8.2. Preliminary assessment extent of arsenic in Shallow Waters. SWFWMD Preliminary Environmental Assessment. SWFWMD Parcel No. 16-560-102 Pinellas, Florida, June 2000

Figure 6-3. Preliminary Assessment Extent of Arsenic ($\mu\text{g/L}$) in Shallow Waters

Figure 5
(Source SCS CAR Ref. 34)

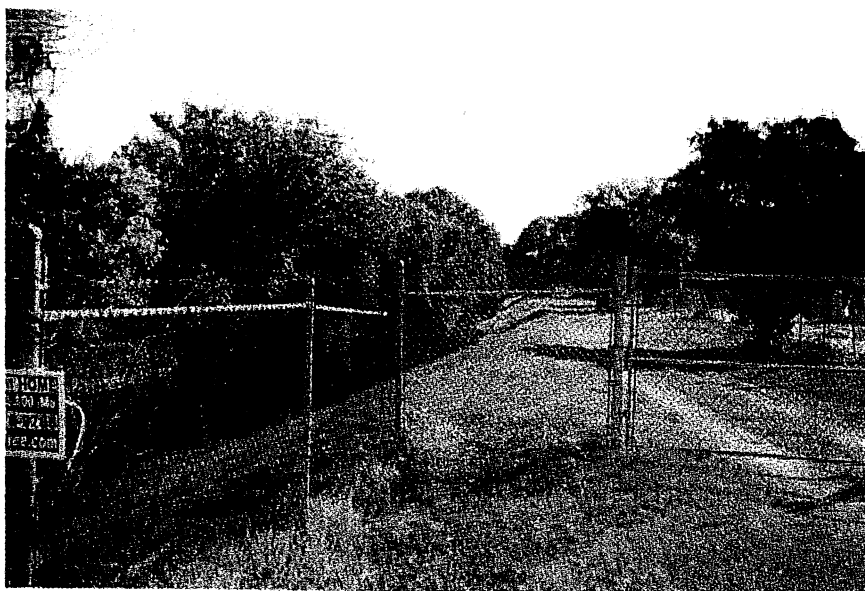


250 0 250 Feet

Source: Figure 7.1 Approximate soil lead concentrations ranging from land surface to 1-ft. BLS.
SWFWMD Preliminary Environmental Assessment. SWFWMD Parcel No. 16-560-102
Pinellas, Florida, June 2000.

Figure 7-1. Preliminary Assessment Approximate Soil Lead Concentrations (mg/kg) from
Land Surface to 1-ft. BLS

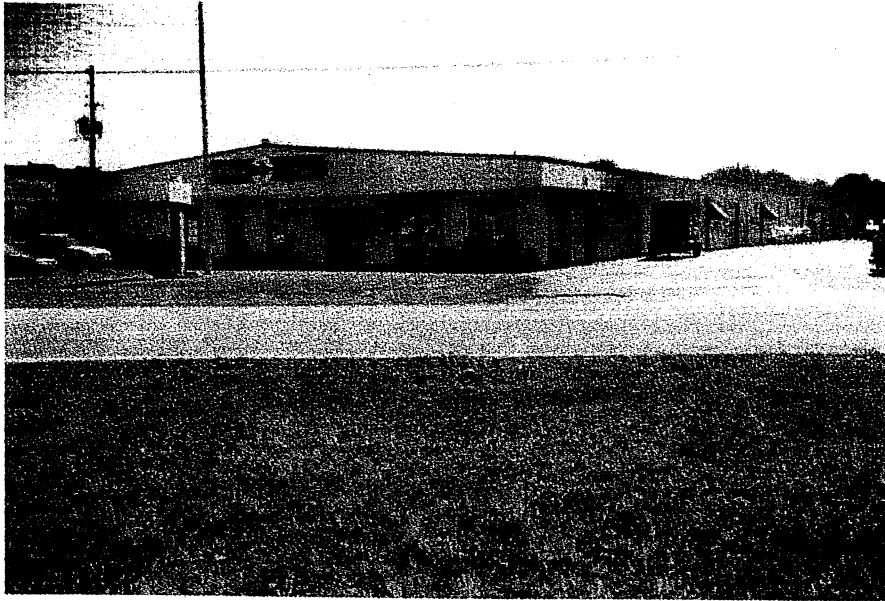
Figure 6
(Source SCS CAR Ref. 34)



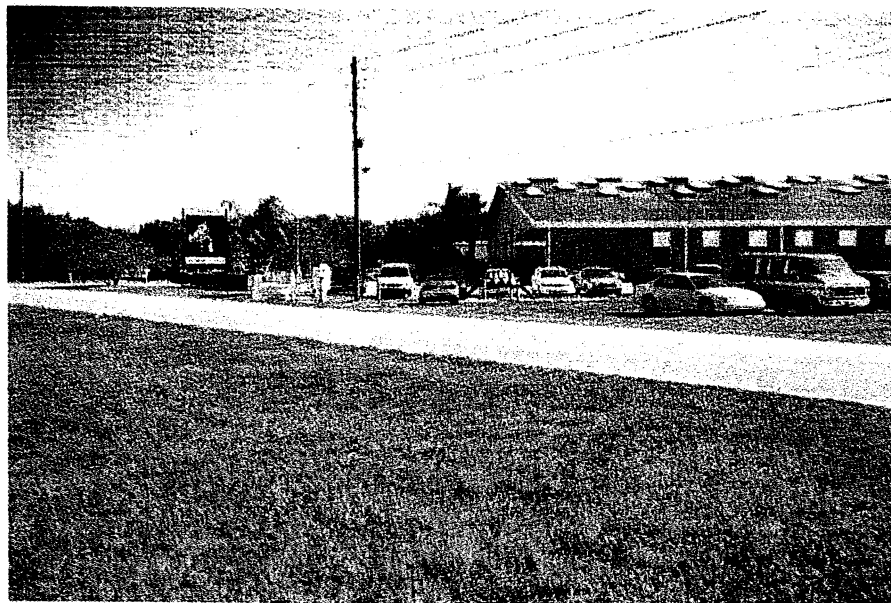
Site No. 12 Taco Metals



Site No. 13 Johnson Sails, Inc.



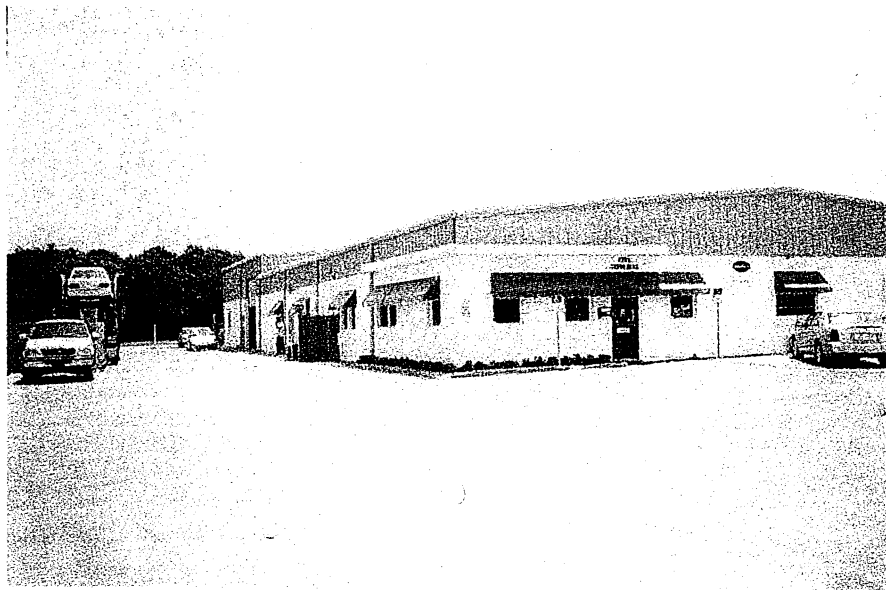
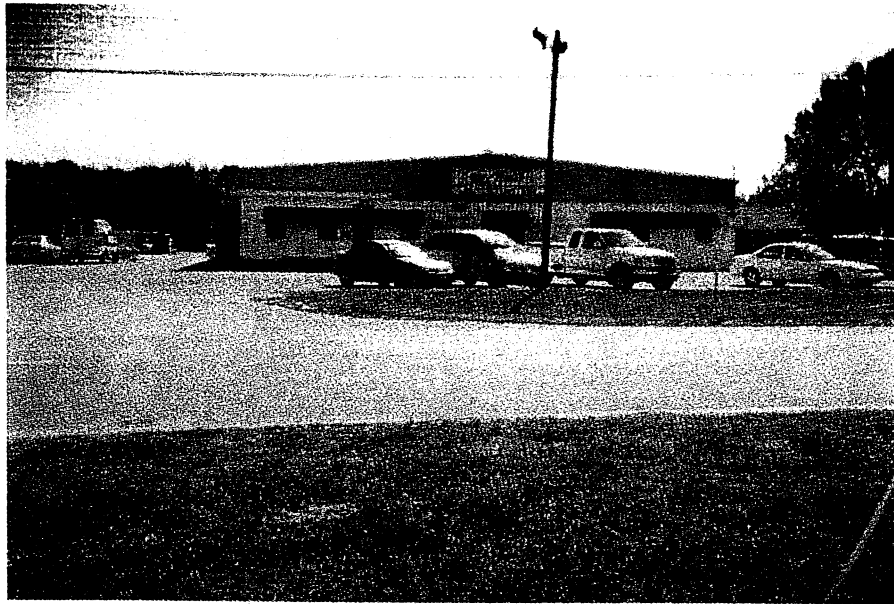
Site No. 14 Coca Cola Bottling Company



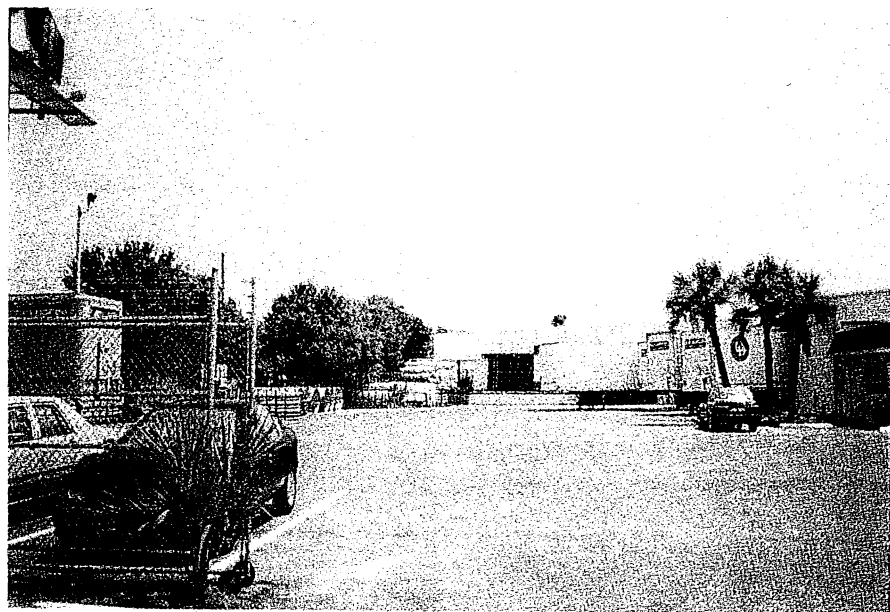
Site No. 15 60 Second Printing



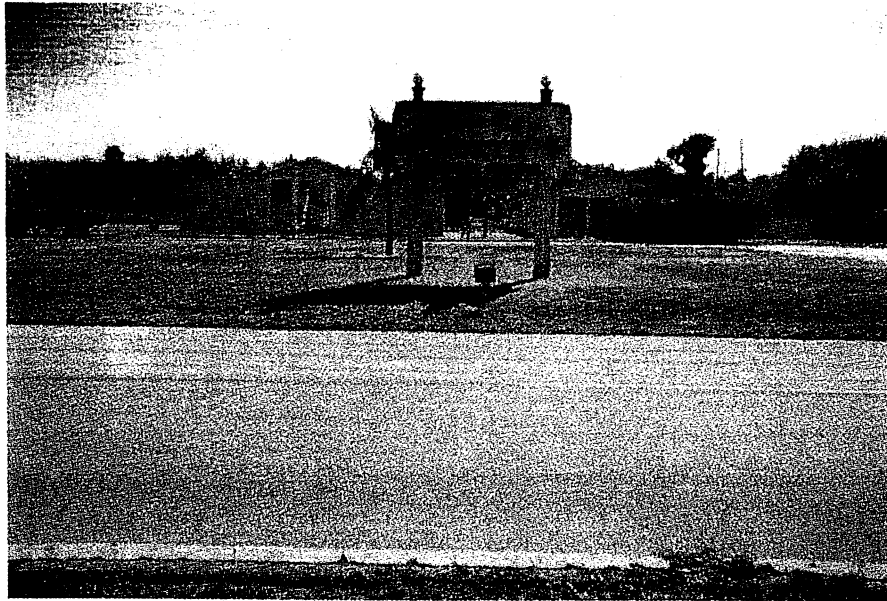
Site No. 16 McNeil Automotive, Inc.



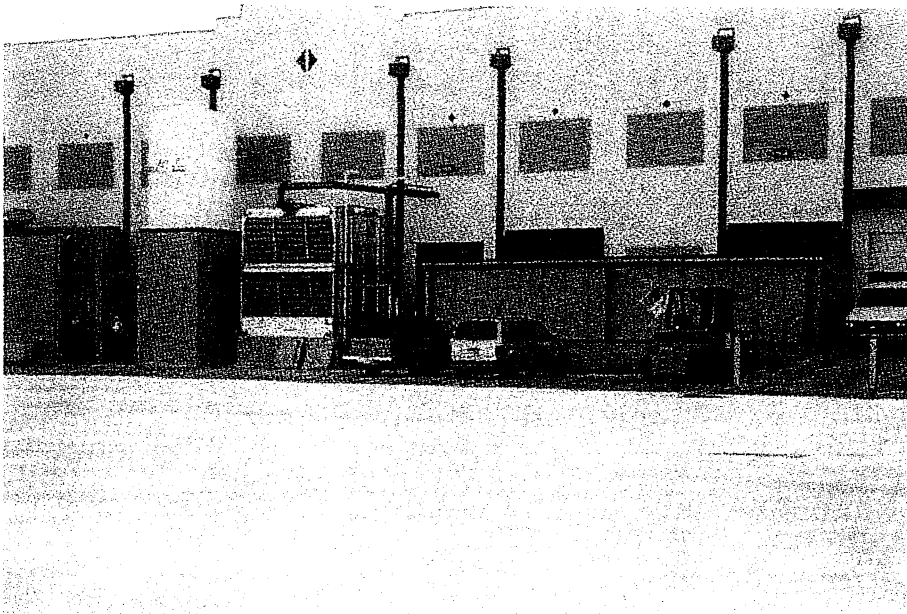
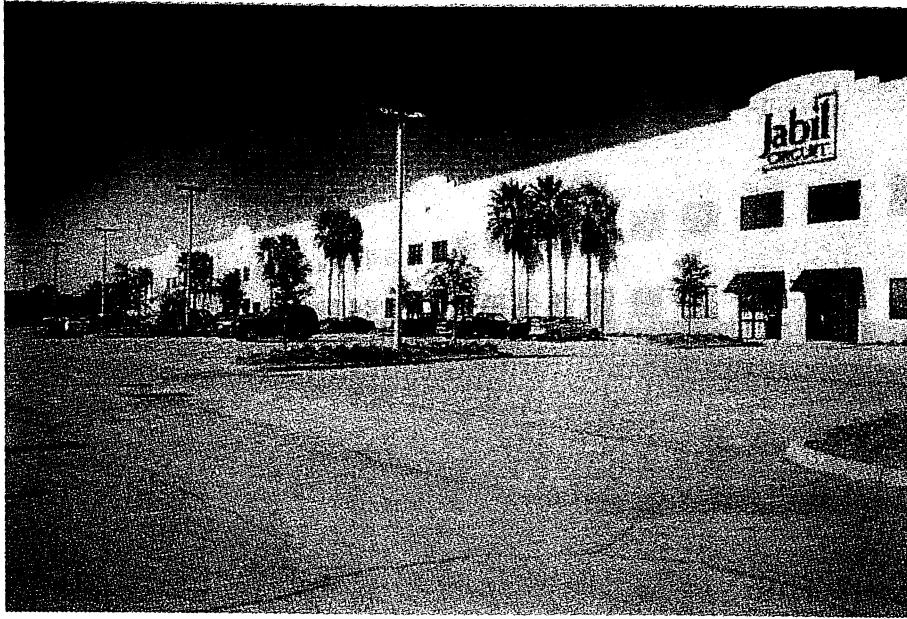
Site No. 17 Lindab, Inc./RV Money Company



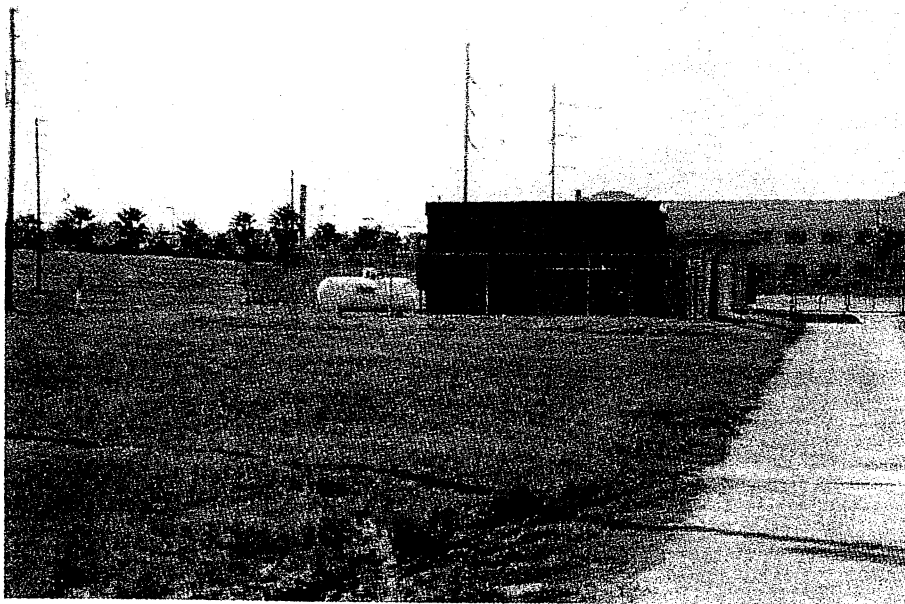
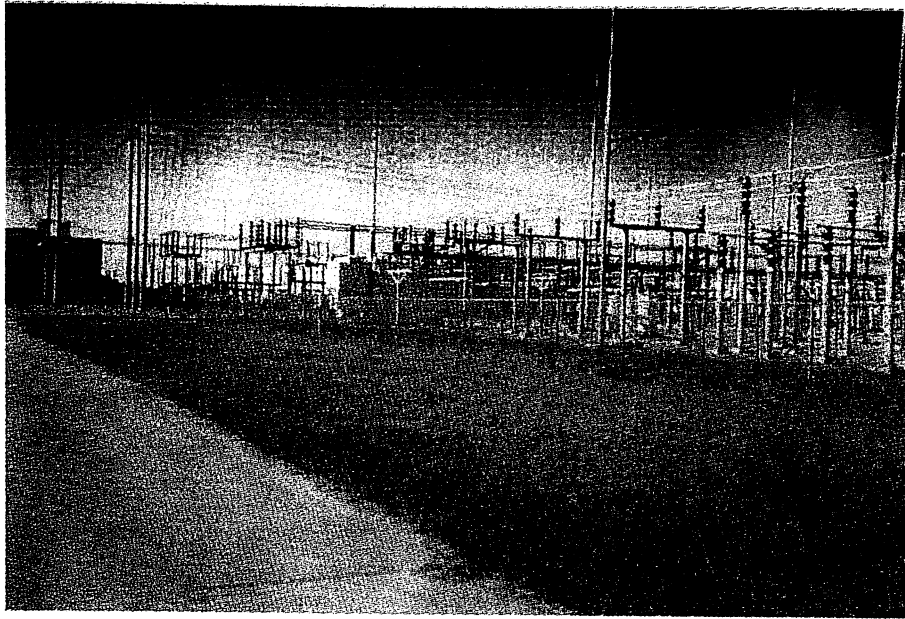
Site No. 18 Royal Palm North



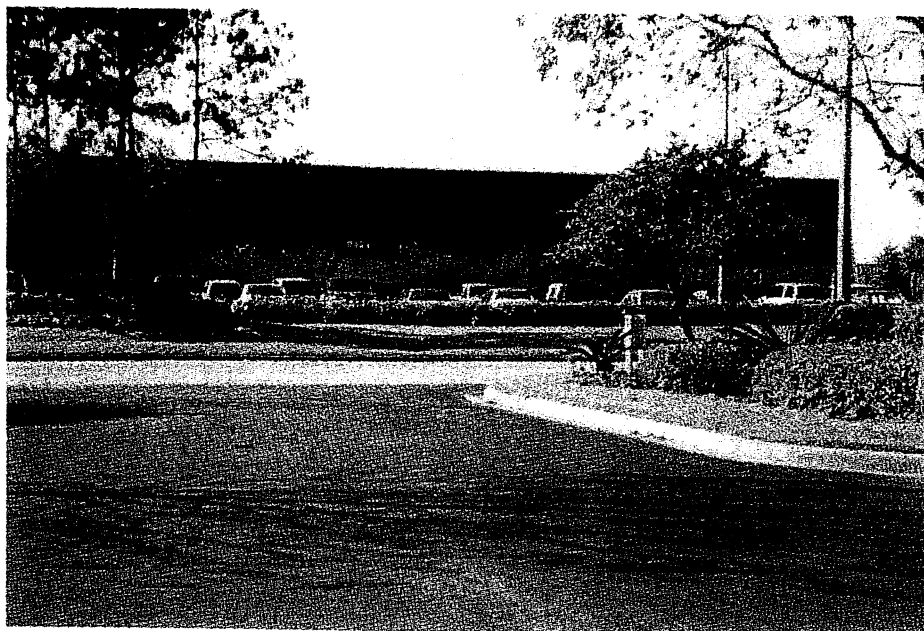
Site No. 19 Jabil Circuits



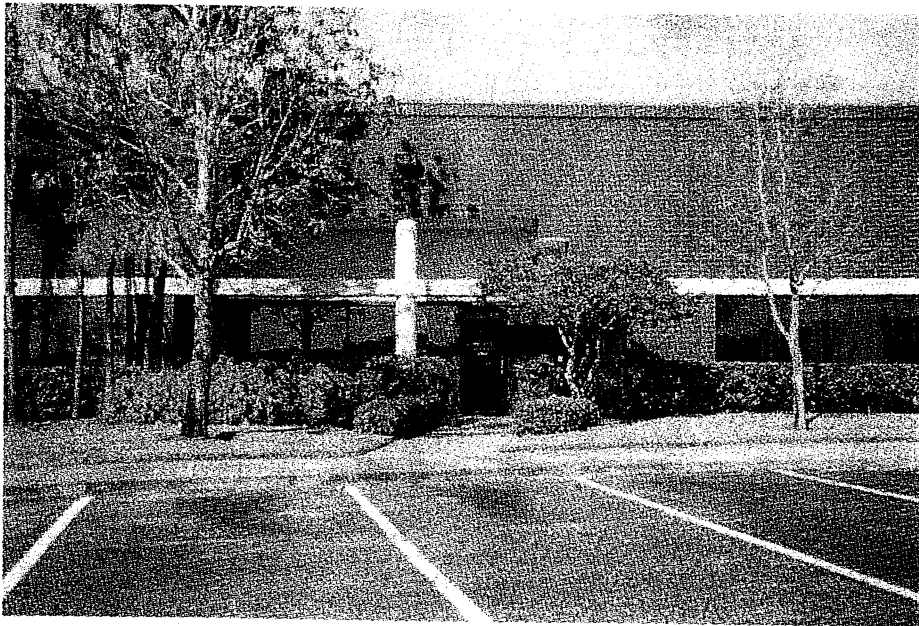
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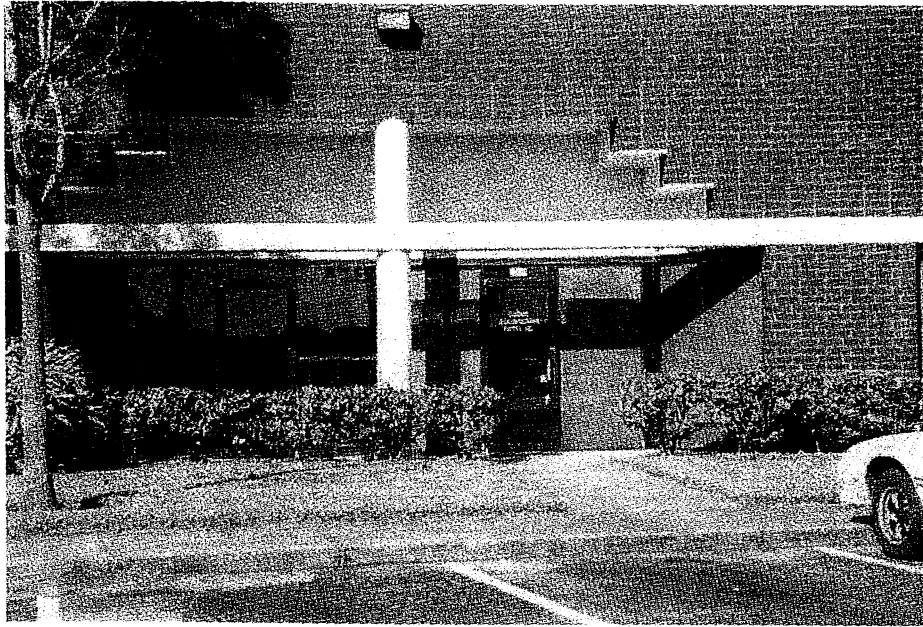
Site No. 21 West Bay Corporate Center



Site No. 22 Unaxis USA, Inc.



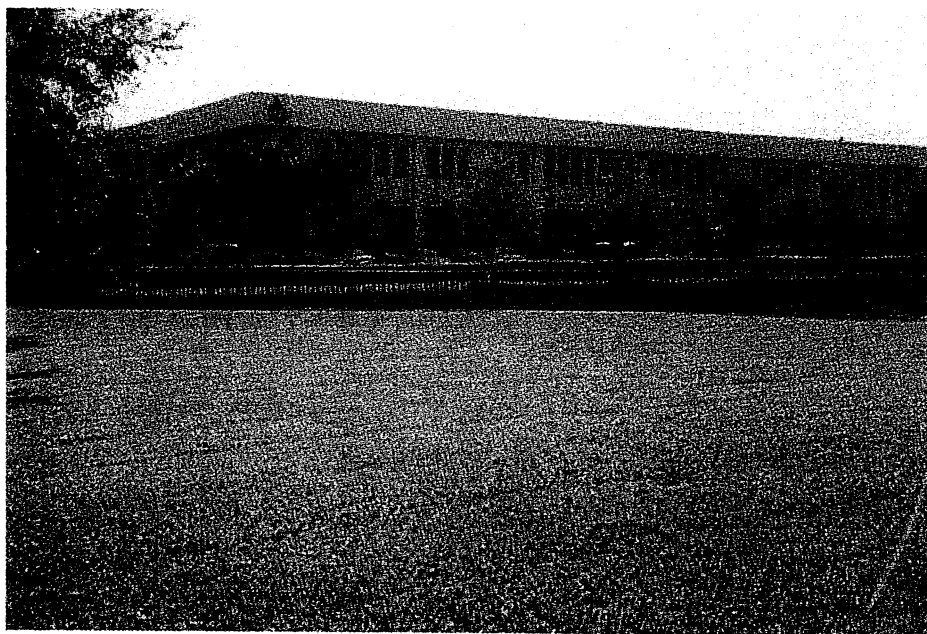
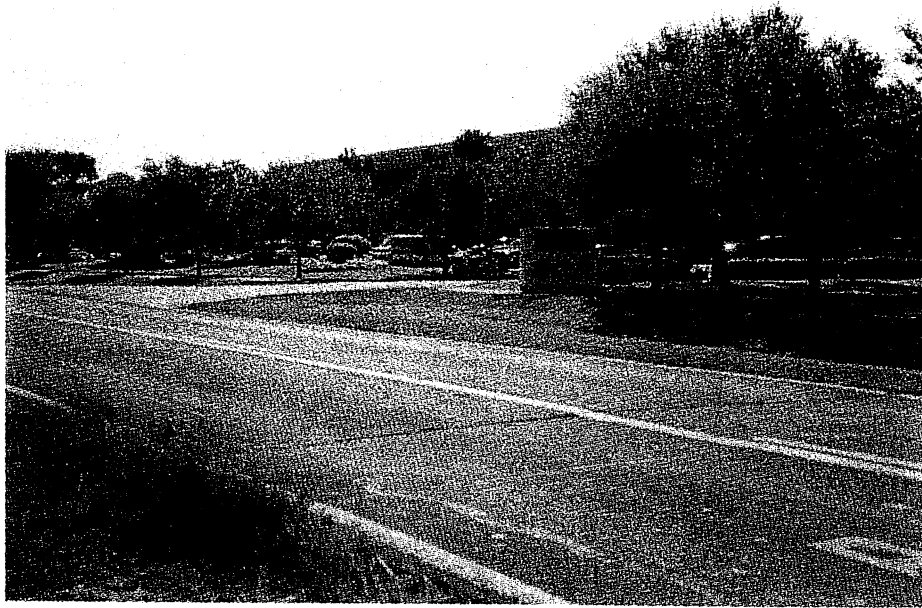
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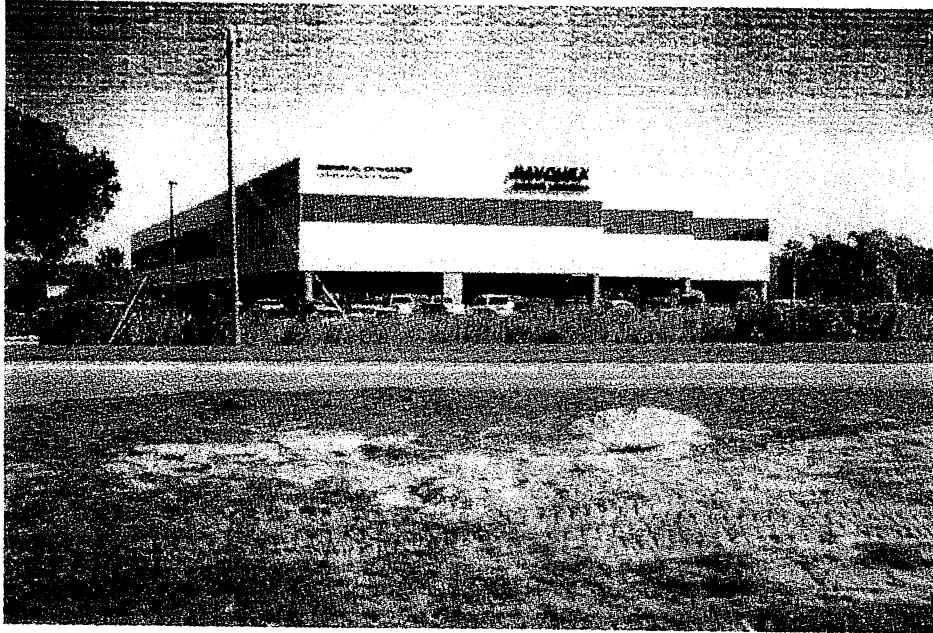
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Site No. 25 Florida Blood Services

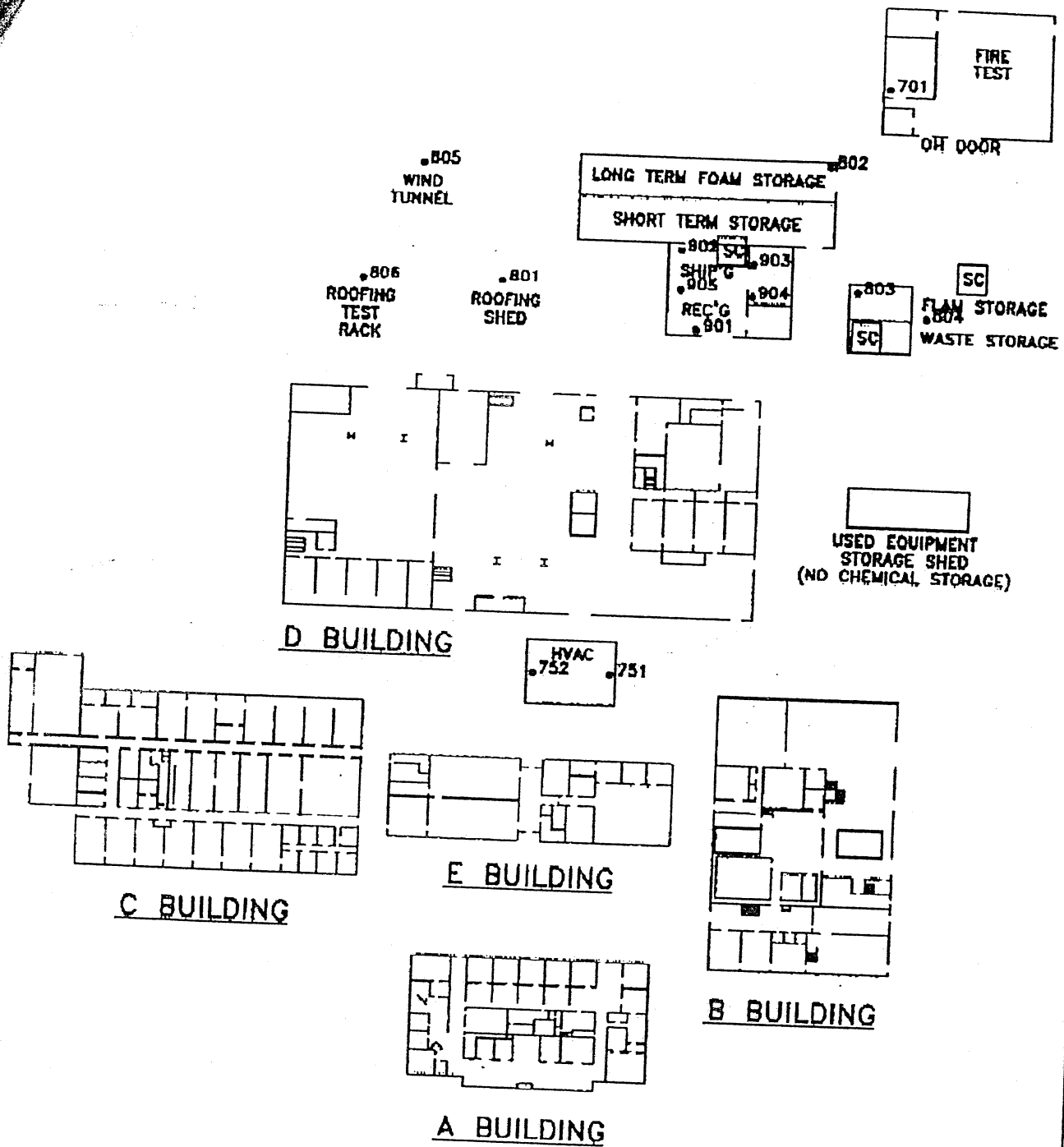


Site No. 26 Paychex/Primex



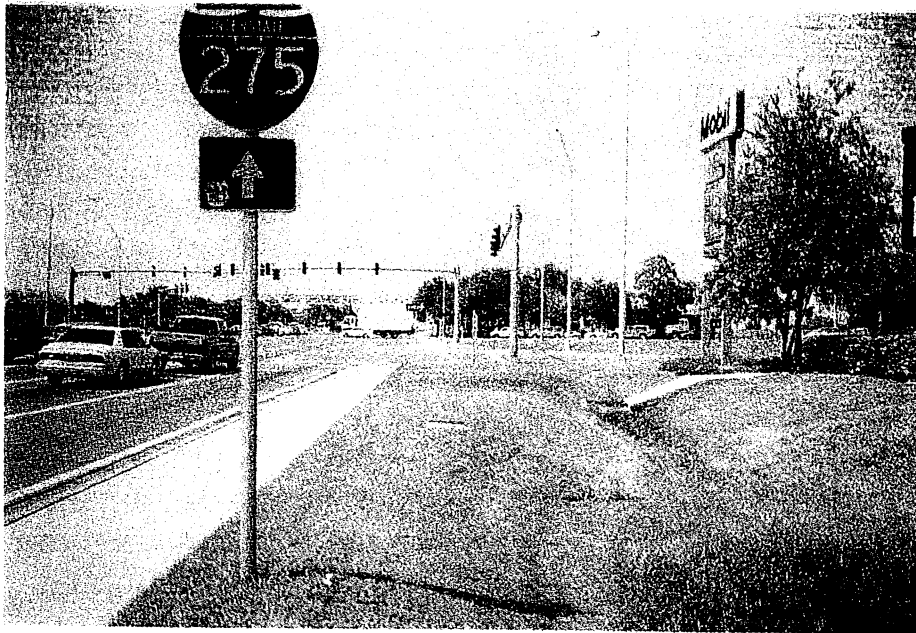
Site No. 27 Celotex Corporation

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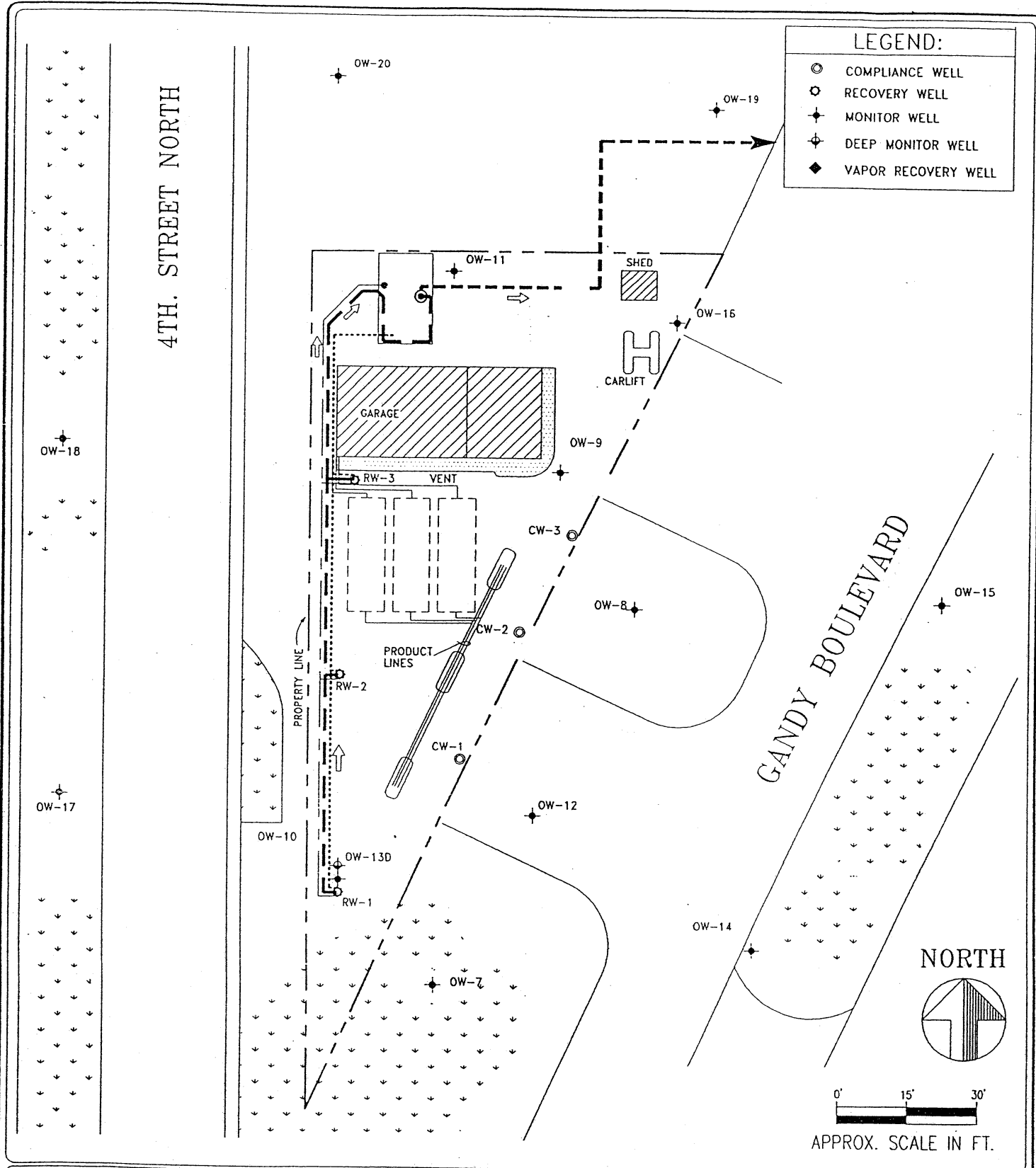


REVISIONS		FIRE EXTINGUISHER AND SPILL CONTROL LOCATIONS	
NO	DATE		
1			
2			
3			
4		REF SPEC	DRAWING NO
5		DATE: 2/95	16-A-0054

Site No. 28 Mobil Gas Station



Site No. 29 Alpha One Auto Repair



DRAWN BY:	DATE:
RBK	9/92
REVISED BY:	DATE:
CHECKED BY:	DATE:
APPROVED BY:	DATE:

SITE BASE MAP

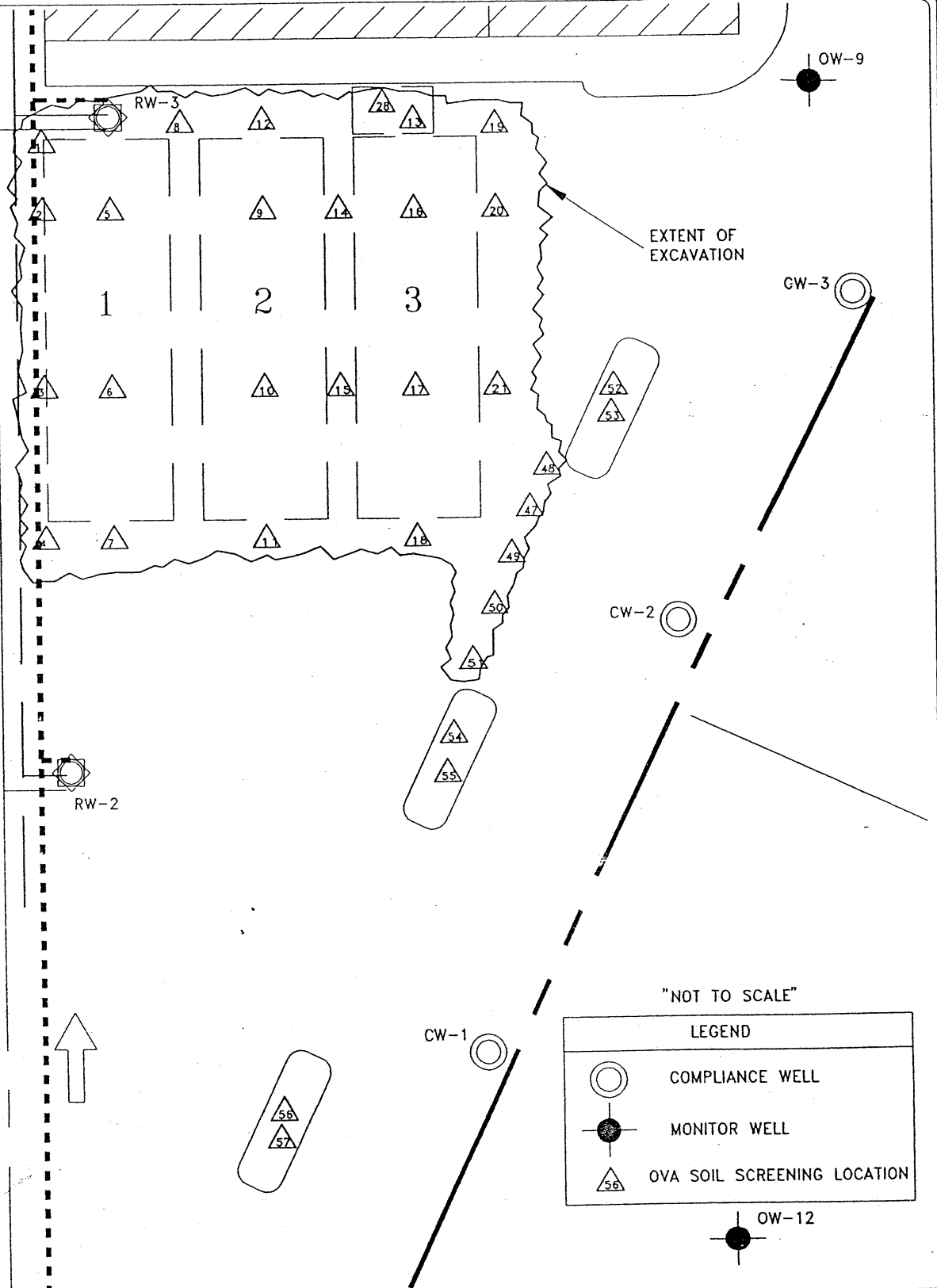
AMOCO STATION NO. 1463
AMOCO OIL COMPANY
9901 4TH. STREET NORTH
ST. PETERSBURG, FLORIDA

Water Equipment Services, Inc.

6389 TOWER LANE
SARASOTA, FLORIDA 34240
PH. (813) 371-7617
FAX (813) 378-5218

FIGURE 1

PROPERTY LINE

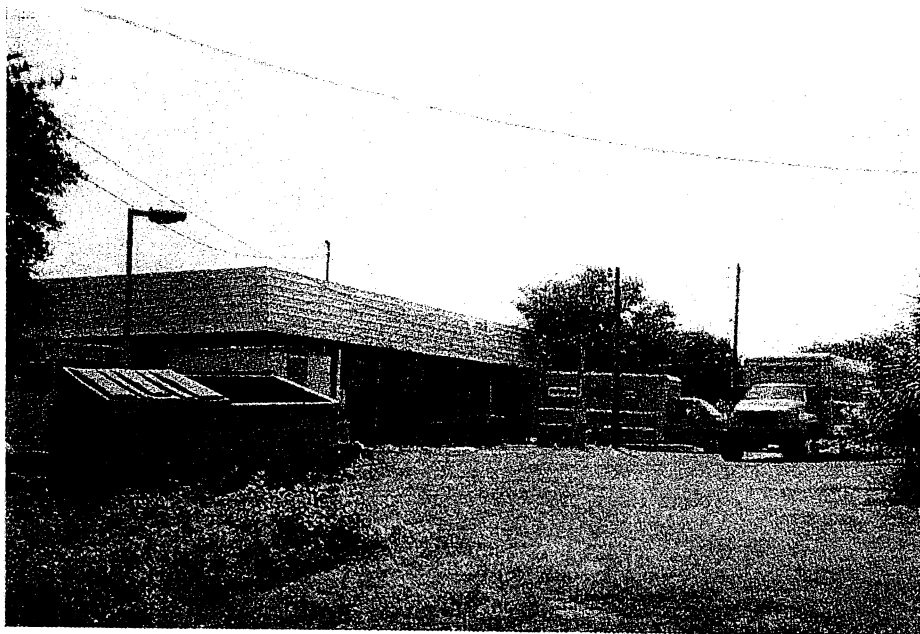


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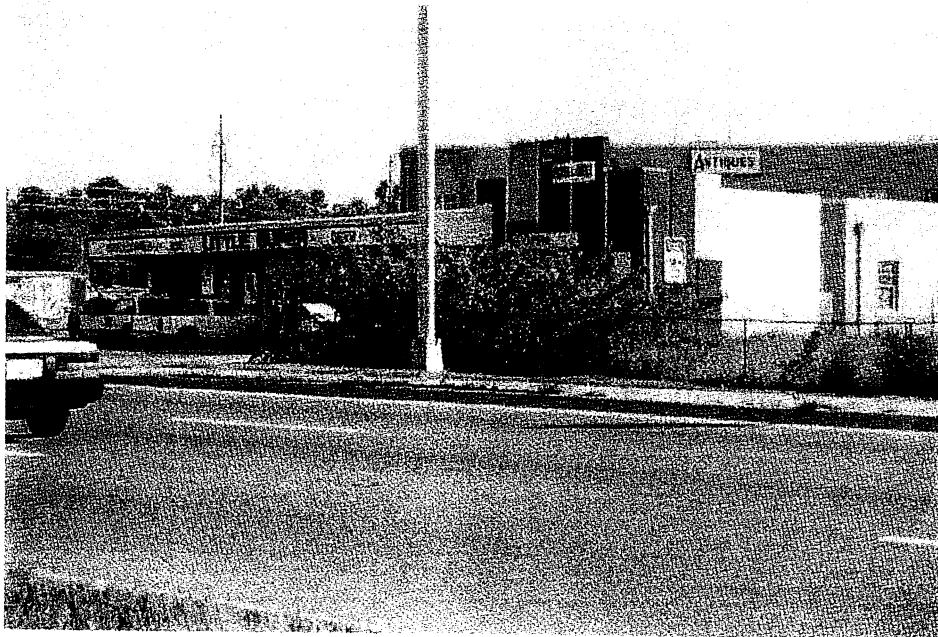
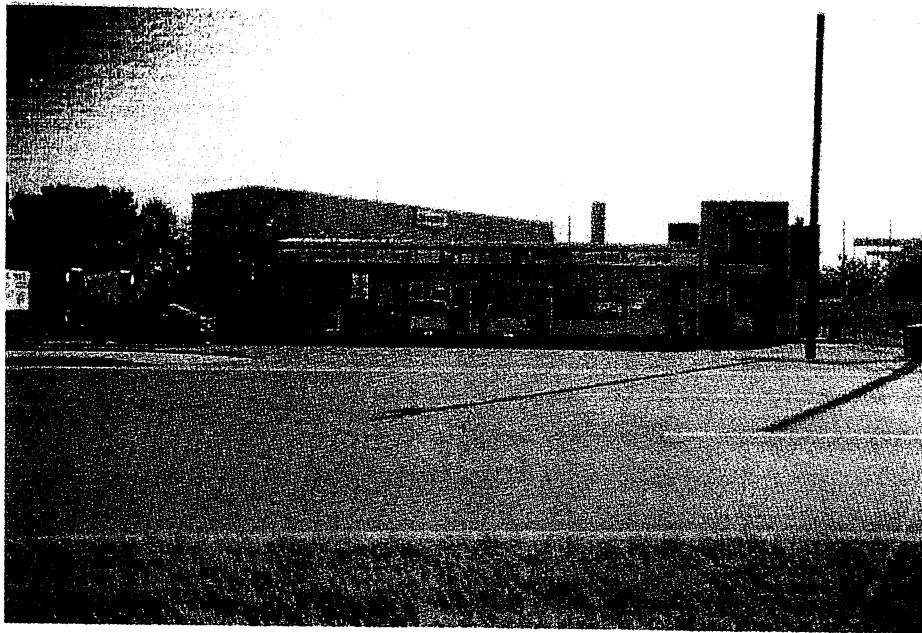
OVA SOIL SCREENING LOCATIONS
TANK PIT AREA
 AMOCO STATION NO. 1463
 AMOCO OIL COMPANY
 9901 4th STREET NORTH
 ST. PETERSBURG, FLORIDA

Water Equipment Services, Inc.
 6389 TOWER LANE
 SARASOTA, FLORIDA 34240
 PH. (813) 371-7617
 FAX (813) 378-5218

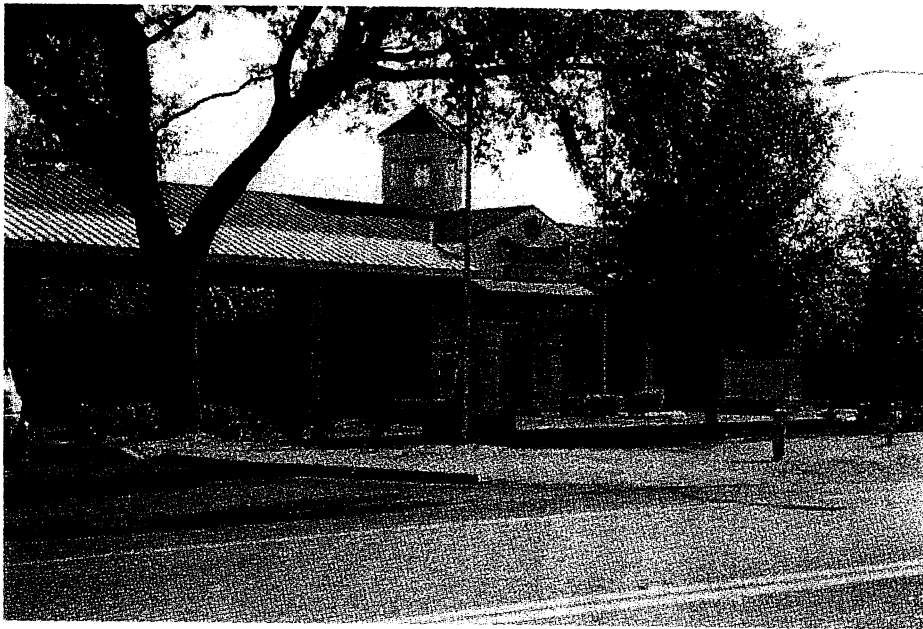
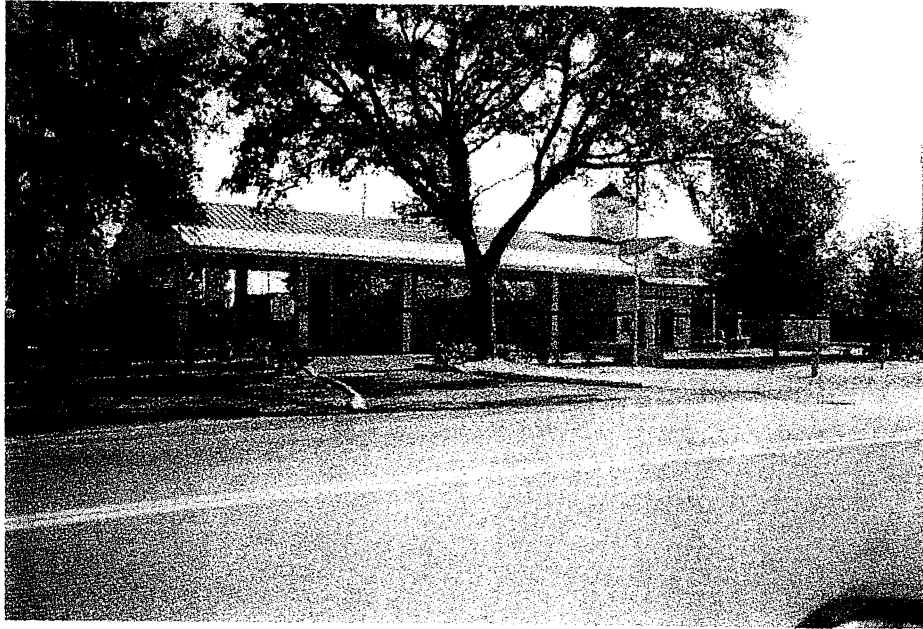
FIGURE 2



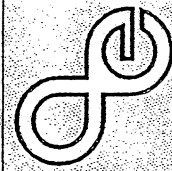
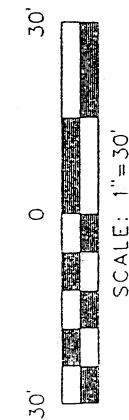
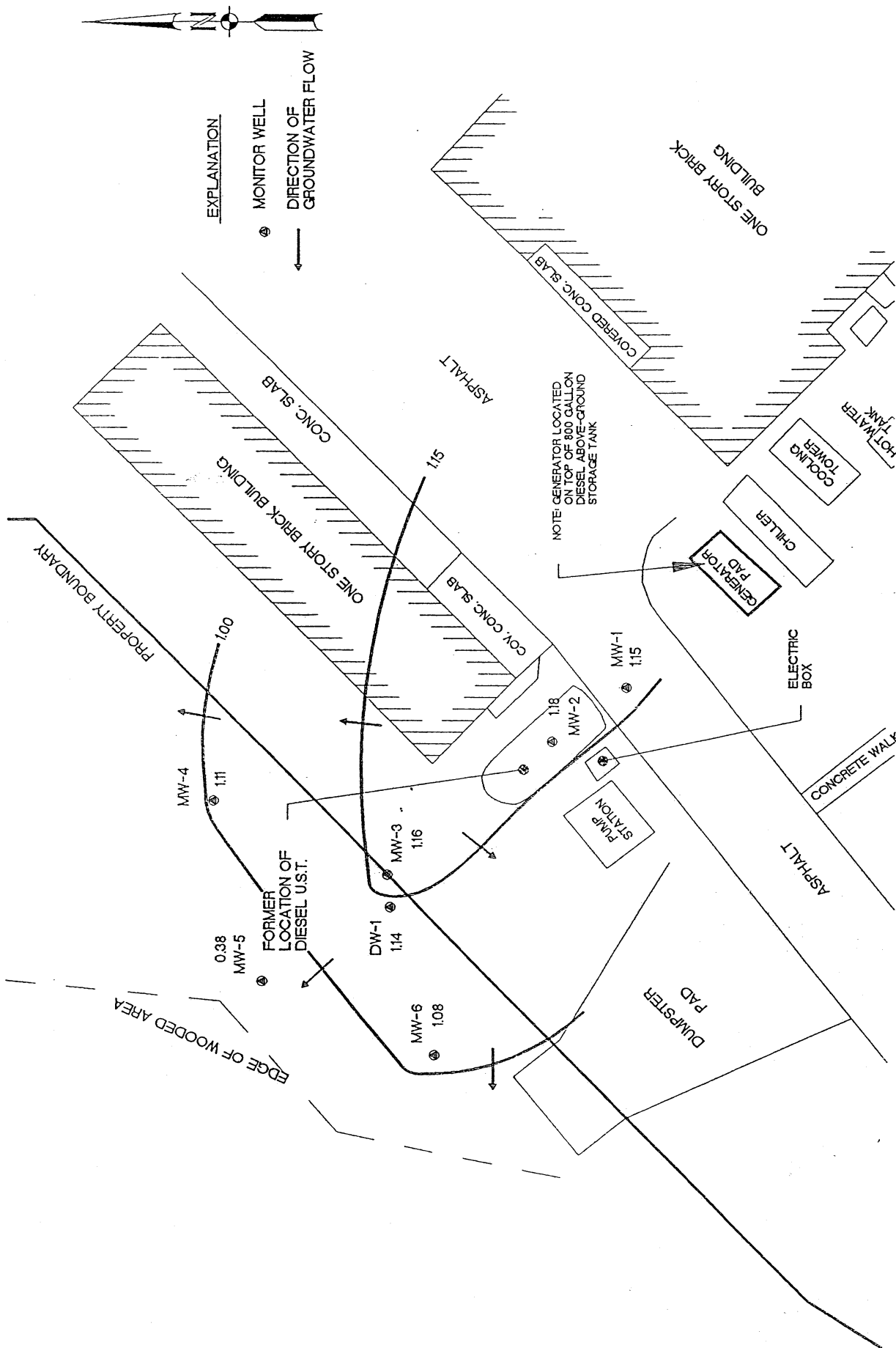
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Site No. 31 Crown Car Wash

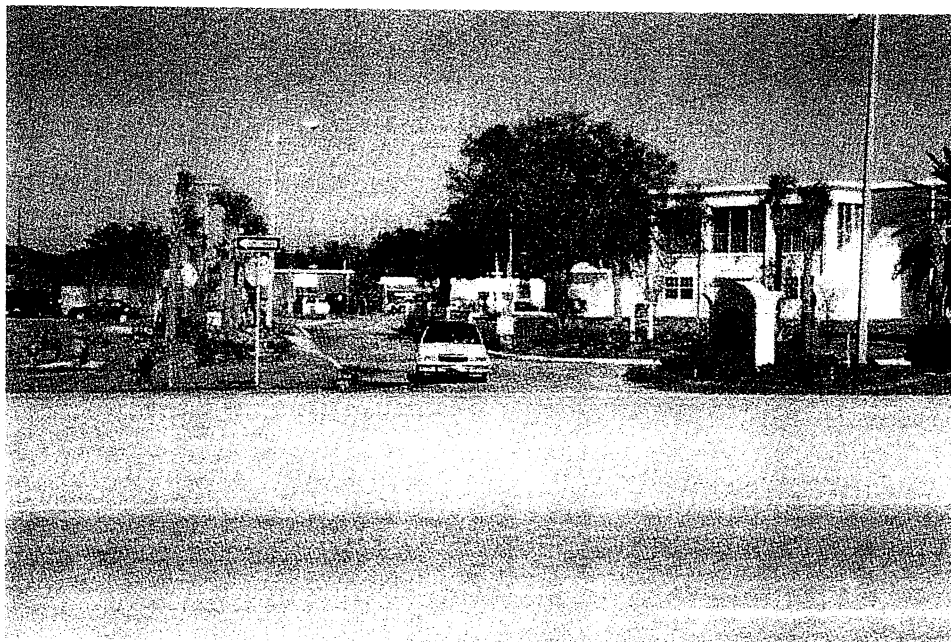
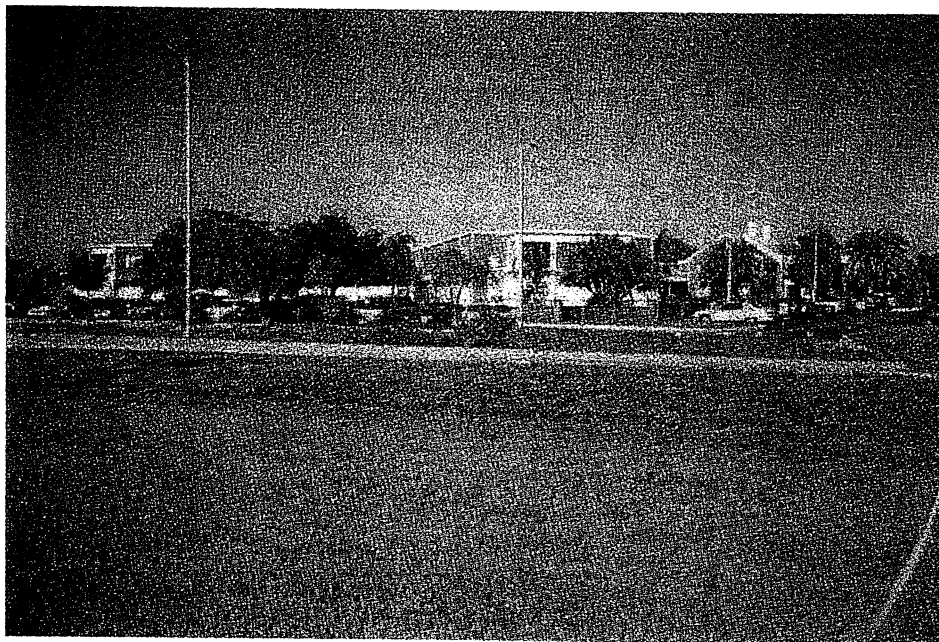


Site No. 32 Bon Secours – Maria Manor Nursing Home

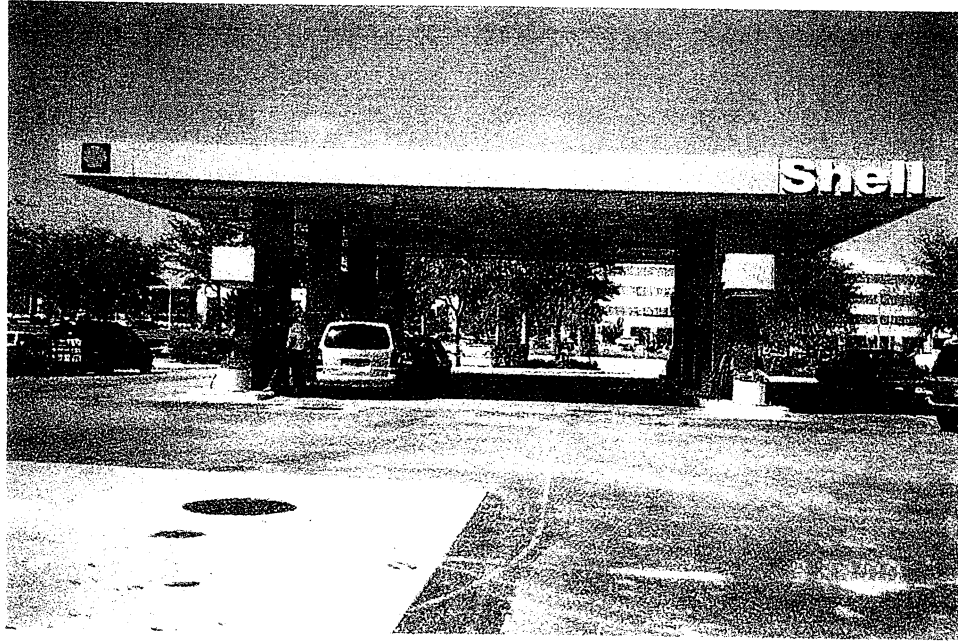


atlanta testing & engineering
 geotechnical, environmental, and construction consultants
 Georgia * Florida * Carolinas

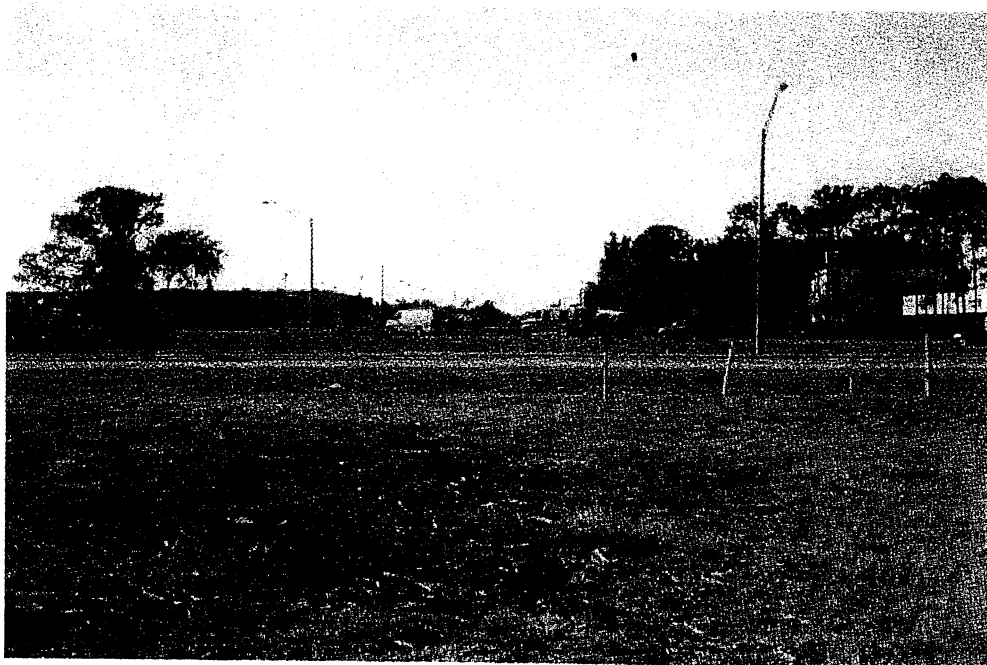
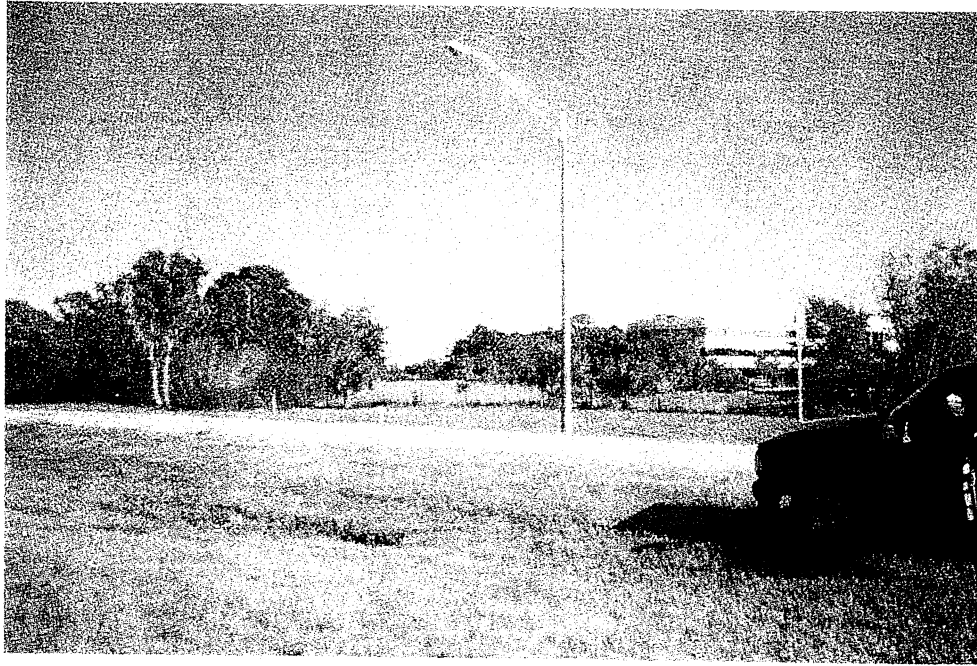
FIGURE 3
WATER TABLE CONTOUR MAP
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 LRAP - BON SECOURS MARIA MANOR
 ST. PETERSBURG, FLORIDA
 AT+E PROJECT NO: 4133



Site No. 33 Gateway Shall Gas Station



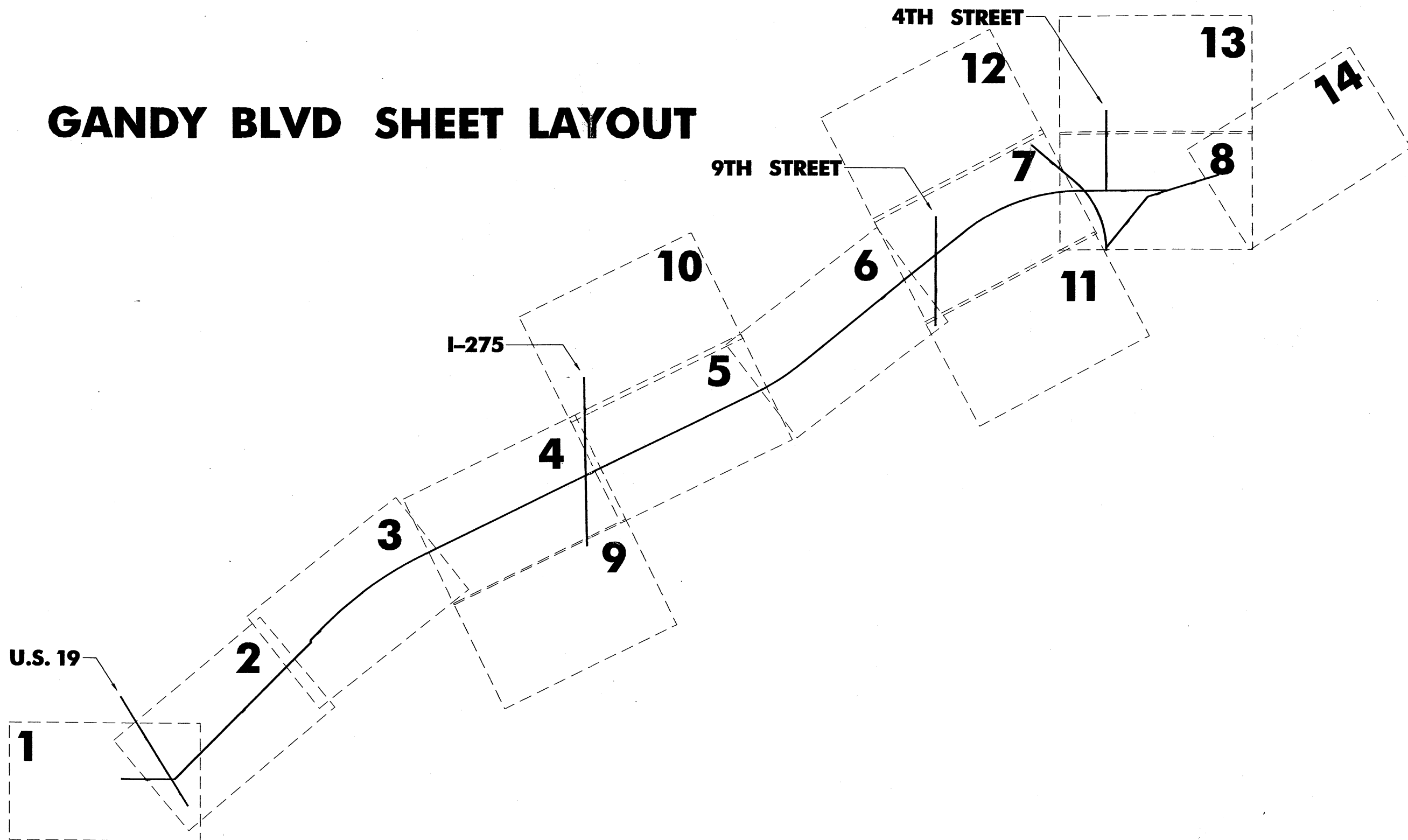
Site No. 34 Florida Power Corporation Utility Easement





APPENDIX C
Contamination Sites Depicted in Project Plan Sheets

GANDY BLVD SHEET LAYOUT



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5 PLAN SHEET LAYOUT

PBSJ ENGINEERING
PLANNING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-1

**SR. 694 (GANDY BLVD) PDE STUDY
FROM U.S. 19 TO EAST OF 4TH STREET
PINELLAS COUNTY, FLORIDA**

SHEET
NO.

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FLIGHT DATE : FEBRUARY 10, 2000

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— PROPOSED RIGHT OF WAY	— CENTERLINE OF CONSTRUCTION	— BRIDGE STRUCTURE OR RETAINING WALL	— RESIDENTIAL RELOCATION	— RECEIVER LOCATION
— EDGE OF PAVEMENT	— SIDEWALK	— EXISTING PAVEMENT	— POTENTIAL CONTAMINATION SITE	— NOISE WALL



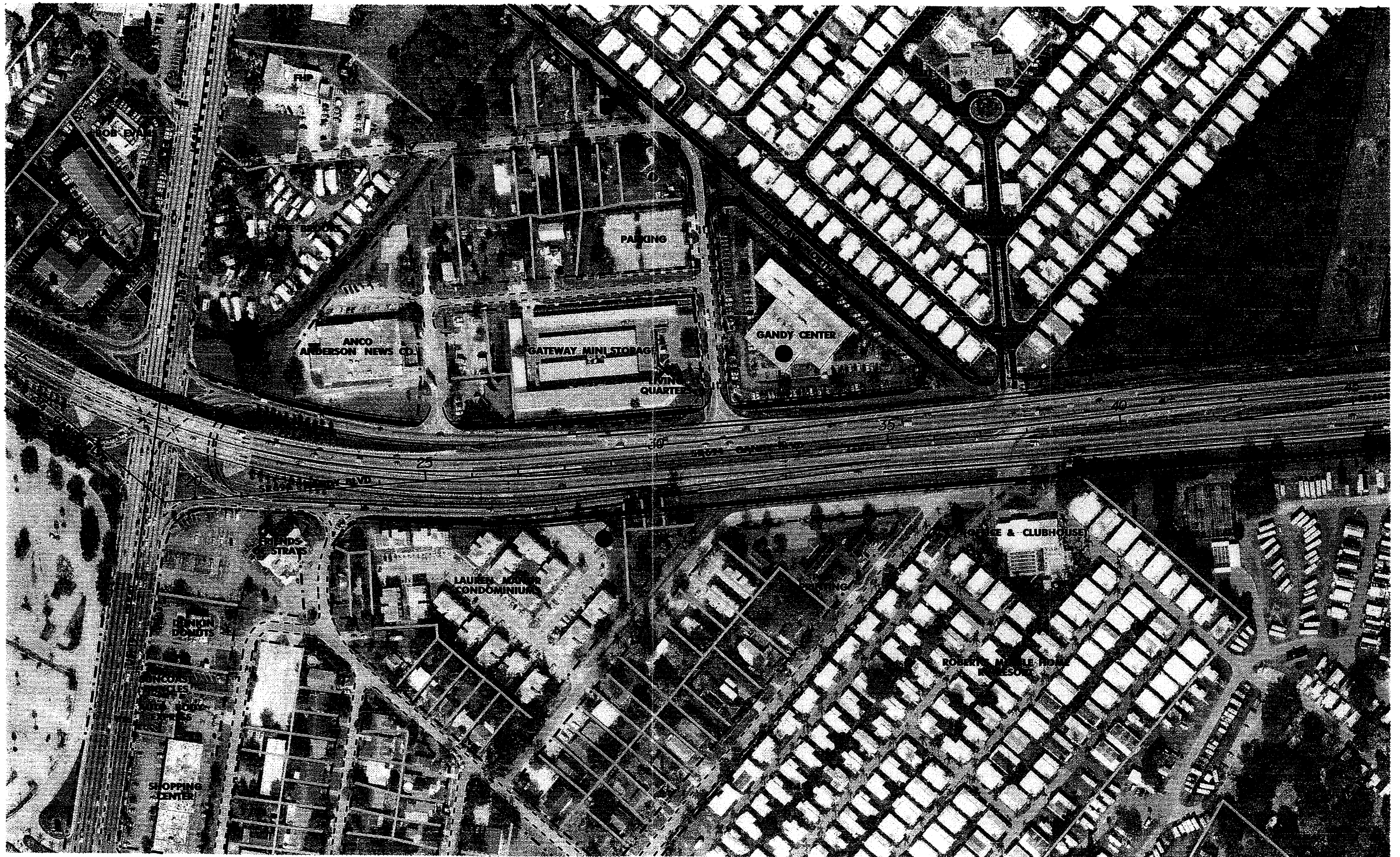
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-I

**SR. 694 (GANDY BLVD) PDE STUDY
FROM US 19 TO EAST OF 4TH STREET
PINELLAS COUNTY, FLORIDA**

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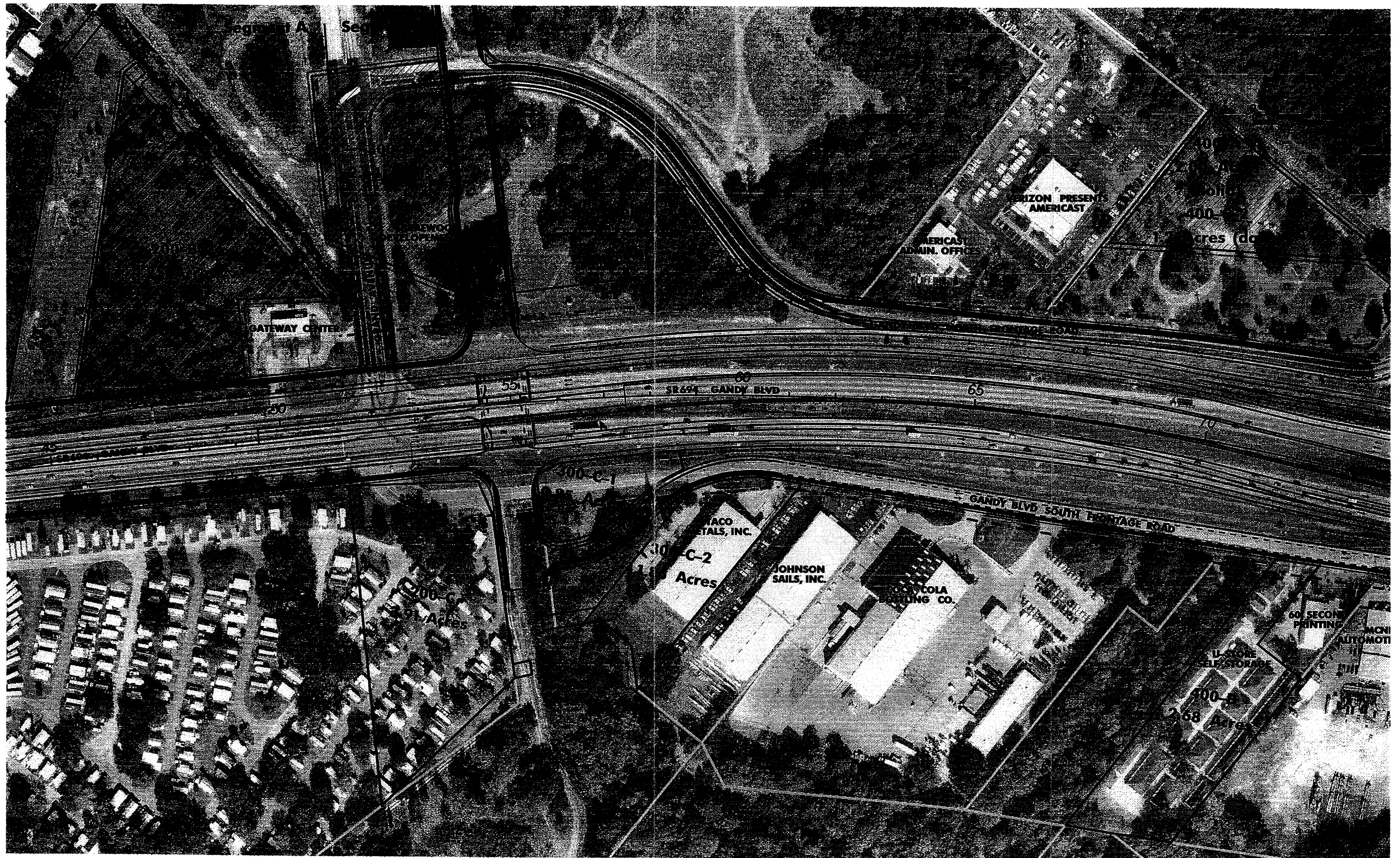
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— EDGE OF PAVEMENT	— SIDEWALK	— EXISTING PAVEMENT	▲ POTENTIAL CONTAMINATION SITE	— NOISE WALL

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SR 694	PINELLAS	256931-1

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PINELLAS COUNTY, FLORIDA**

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 - PROPOSED RIGHT OF WAY
 - EDGE OF PAVEMENT
 - PROPERTY LINES
 - CENTERLINE OF CONSTRUCTION
 - SIDEWALK
 - WETLAND BOUNDARY AND OTHER SURFACE WATERS
 - BRIDGE STRUCTURE OR RETAINING WALL
 - EXISTING PAVEMENT
 - POND SITE
 - RESIDENTIAL/BUSINESS RELOCATION
 - ▲ POTENTIAL CONTAMINATION SITE
 - NOISE WALL

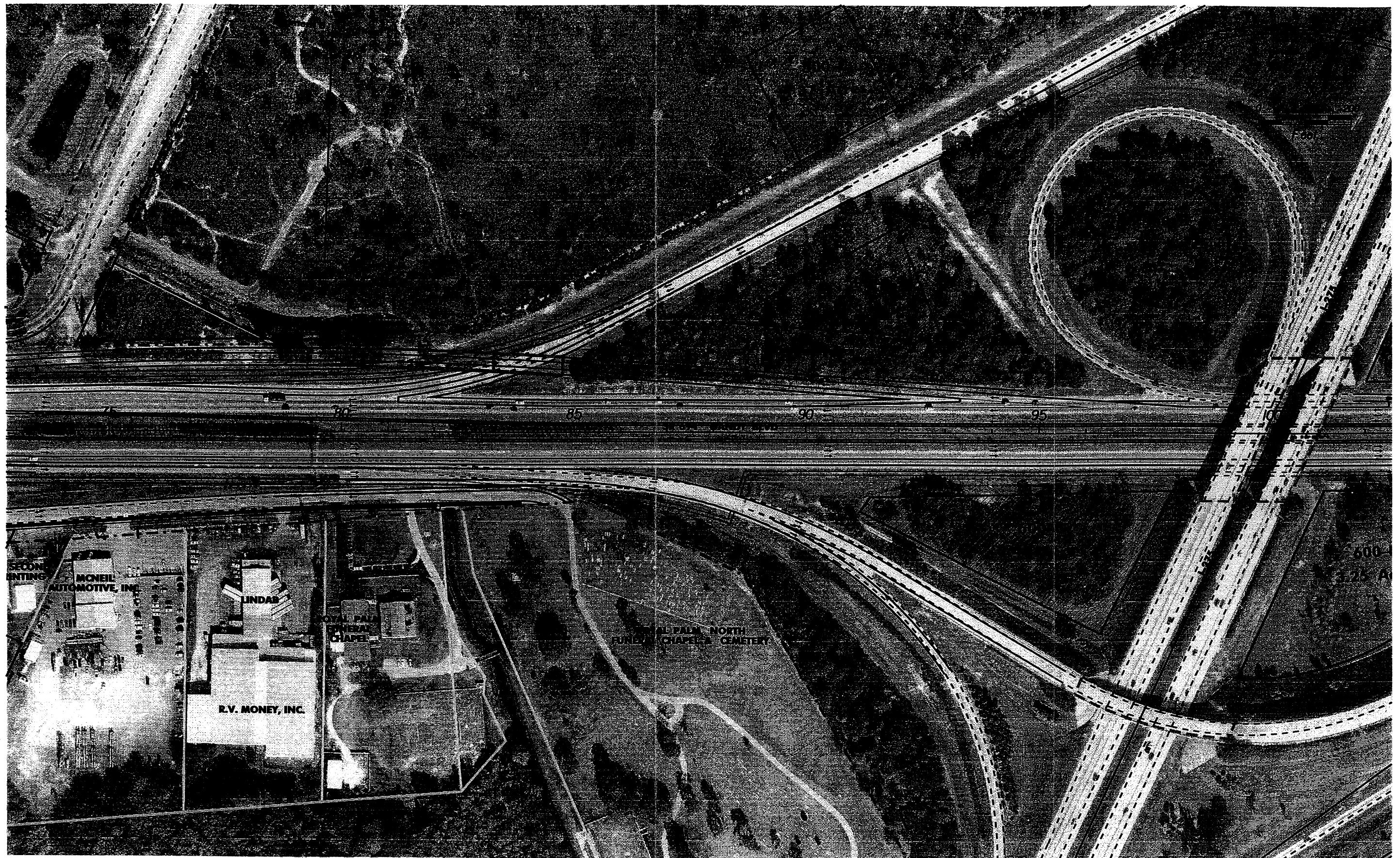
PBS&J ENGINEERING
PLANNING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-1

**SR. 694 (GANDY BLVD) PDE STUDY
FROM U.S. 19 TO EAST OF 4TH STREET
PINELLAS COUNTY, FLORIDA**

SHEET
NO.

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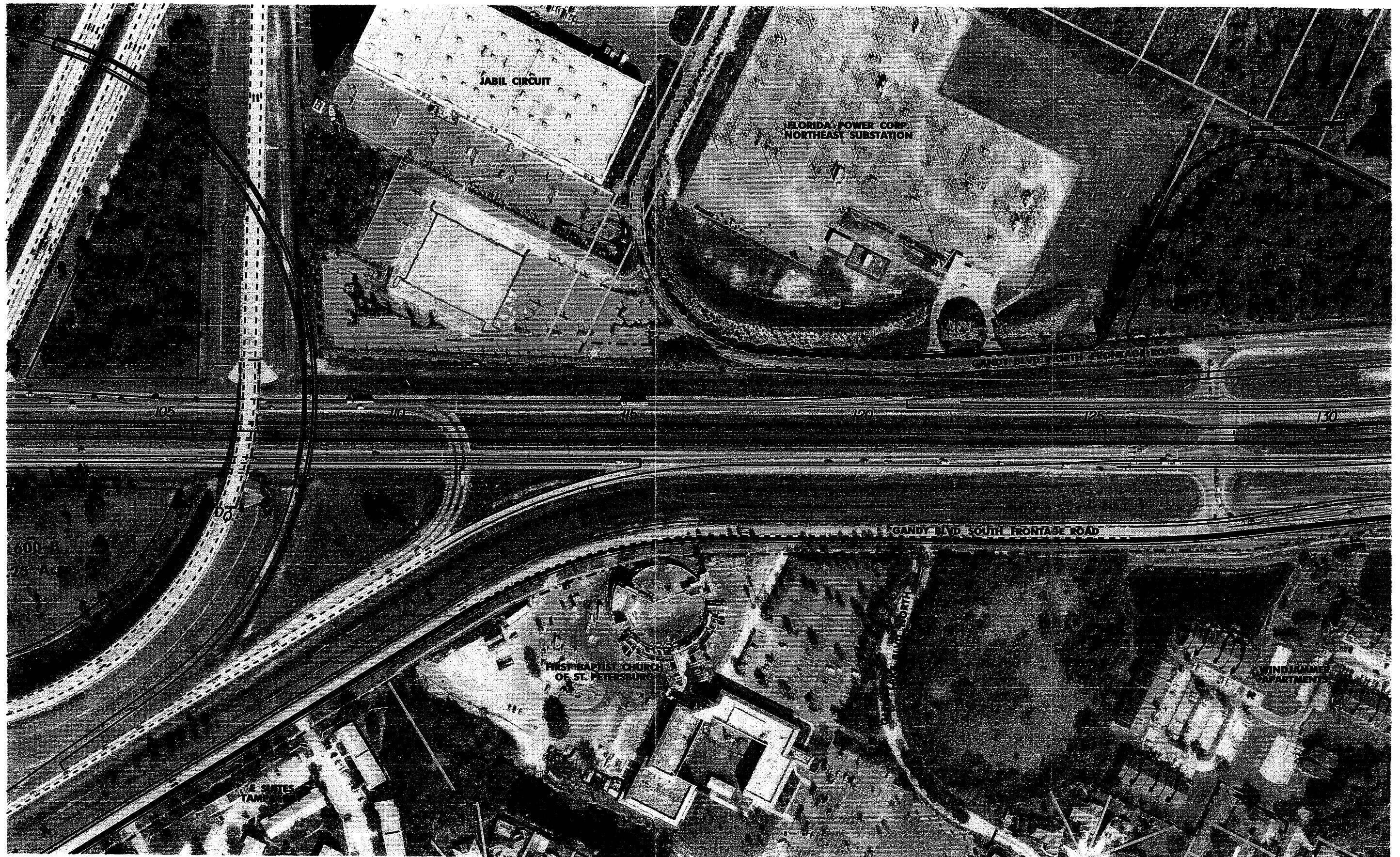
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— PROPOSED RIGHT OF WAY	— CENTERLINE OF CONSTRUCTION	— BRIDGE STRUCTURE OR RETAINING WALL	— RESIDENTIAL RELOCATION	— RECEIVER LOCATION
— EDGE OF PAVEMENT	— SIDEWALK	— EXISTING PAVEMENT	— POTENTIAL CONTAMINATION SITE	— NOISE WALL

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-1

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PINELLAS COUNTY, FLORIDA**

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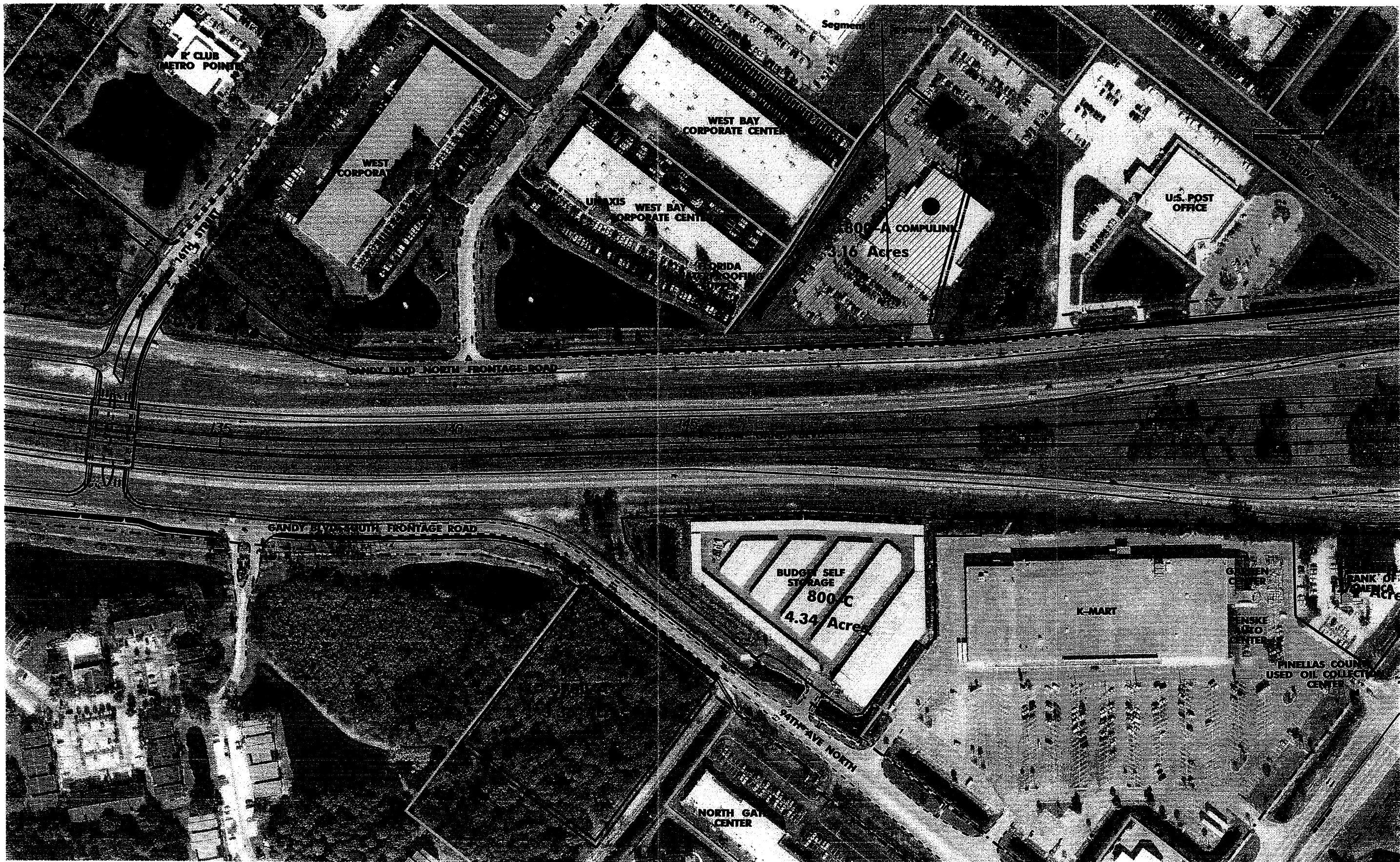
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— PROPOSED RIGHT OF WAY	— CENTERLINE OF CONSTRUCTION	— BRIDGE STRUCTURE OR RETAINING WALL	— RESIDENTIAL RELOCATION	— RECEIVER LOCATION
— EDGE OF PAVEMENT	— SIDEWALK	— EXISTING PAVEMENT	— POTENTIAL CONTAMINATION SITE	— NOISE WALL

PBSJ ENGINEERING PLANNING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-1

**SR. 694 (GANDY BLVD) PDE STUDY
FROM U.S. 19 TO EAST OF 4TH STREET
PINELLAS COUNTY, FLORIDA**

SHEET NO.
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— • — PROPOSED RIGHT OF WAY	— • — CENTERLINE OF CONSTRUCTION	— • — BRIDGE STRUCTURE OR RETAINING WALL	⊗ RESIDENTIAL RELOCATION	⊗ RECEIVER LOCATION
— • — EDGE OF PAVEMENT	— • — SIDEWALK	— • — EXISTING PAVEMENT	⊗ POTENTIAL CONTAMINATION SITE	⊗ NOISE WALL

PBS ENGINEERING PLANNING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-1

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PINELLAS COUNTY, FLORIDA**

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NO.

7



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—•— PROPOSED RIGHT OF WAY	—•— CENTERLINE OF CONSTRUCTION	—•— BRIDGE STRUCTURE OR RETAINING WALL	⊗ RESIDENTIAL RELOCATION	⊗ RECEIVER LOCATION
—•— EDGE OF PAVEMENT	—•— SIDEWALK	—•— EXISTING PAVEMENT	⊗ POTENTIAL CONTAMINATION SITE	⊗ NOISE WALL

PBS ENGINEERING PLANNING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-1

**SR. 694 (GANDY BLVD) PDE STUDY
FROM U.S. 19 TO EAST OF 4TH STREET
PINELLAS COUNTY, FLORIDA**

SHEET NO.

8



FLIGHT DATE : FEBRUARY 10, 2000

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— . PROPOSED RIGHT OF WAY	— . CENTERLINE OF CONSTRUCTION	— . BRIDGE STRUCTURE OR RETAINING WALL	● RESIDENTIAL RELOCATION	● RECEIVER LOCATION
— . EDGE OF PAVEMENT	— . SIDEWALK	— . EXISTING PAVEMENT	▲ POTENTIAL CONTAMINATION SITE	— . NOISE WALL



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-1

SR. 694 (GANDY BLVD) PDE STUDY FROM U.S. 19 TO EAST OF 4TH STREET PINELLAS COUNTY, FLORIDA	
SHEET NO. 9	



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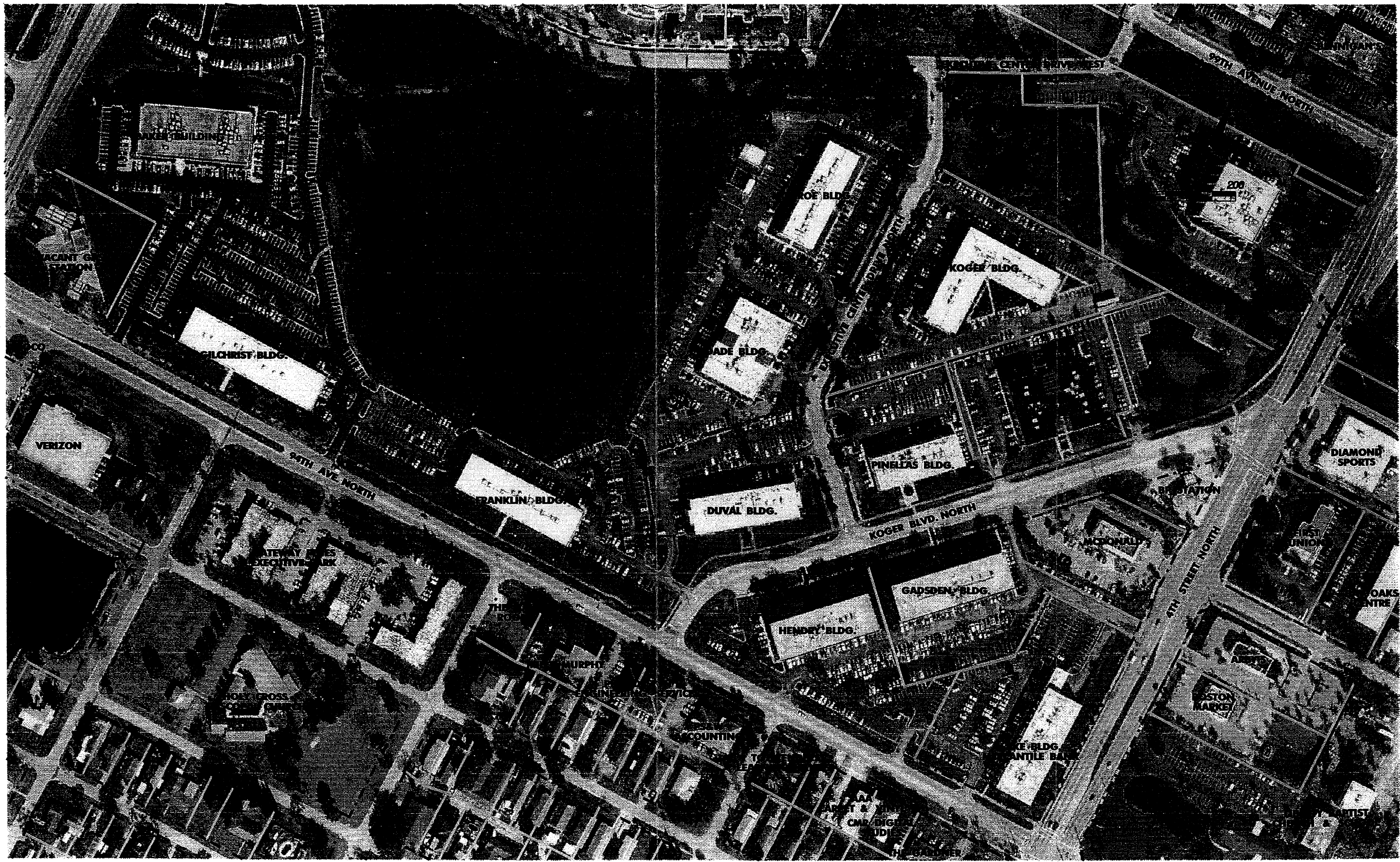
— EXISTING RIGHT OF WAY	— PROPERTY LINES	— WETLAND BOUNDARY AND OTHER SURFACE WATERS	⊗ POND SITE	⊗ AIR QUALITY RECEPTOR SITES
— PROPOSED RIGHT OF WAY	— CENTERLINE OF CONSTRUCTION	— BRIDGE STRUCTURE OR RETAINING WALL	⊗ RESIDENTIAL RELOCATION	⊗ RECEIVER LOCATION
— EDGE OF PAVEMENT	— SIDEWALK	— EXISTING PAVEMENT	⊗ POTENTIAL CONTAMINATION SITE	— NOISE WALL



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-1

**SR. 694 (GANDY BLVD) PDE STUDY
FROM U.S. 19 TO EAST OF 4TH STREET
PINELLAS COUNTY, FLORIDA**

SHEET NO.
10



FLIGHT DATE : FEBRUARY 10, 2000

<ul style="list-style-type: none"> EXISTING RIGHT OF WAY PROPOSED RIGHT OF WAY EDGE OF PAVEMENT 	<ul style="list-style-type: none"> PROPERTY LINES CENTERLINE OF CONSTRUCTION SIDEWALK 	<ul style="list-style-type: none"> WETLAND BOUNDARY AND OTHER SURFACE WATERS BRIDGE STRUCTURE OR RETAINING WALL EXISTING PAVEMENT 	<ul style="list-style-type: none"> POND SITE RESIDENTIAL RELOCATION POTENTIAL CONTAMINATION SITE 	<ul style="list-style-type: none"> AIR QUALITY RECEPTOR SITES RECEIVER LOCATION NOISE WALL
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-1

**SR. 694 (GANDY BLVD) PDE STUDY
FROM U.S. 19 TO EAST OF 4TH STREET
PINELLAS COUNTY, FLORIDA**

SHEET NO.
11

15 JUL 2002 11:23
G:\pde\pinellas\11.dgn



FLIGHT DATE : FEBRUARY 10, 2000

15-MAR-2002 11:59
G:\Geoprocessing\

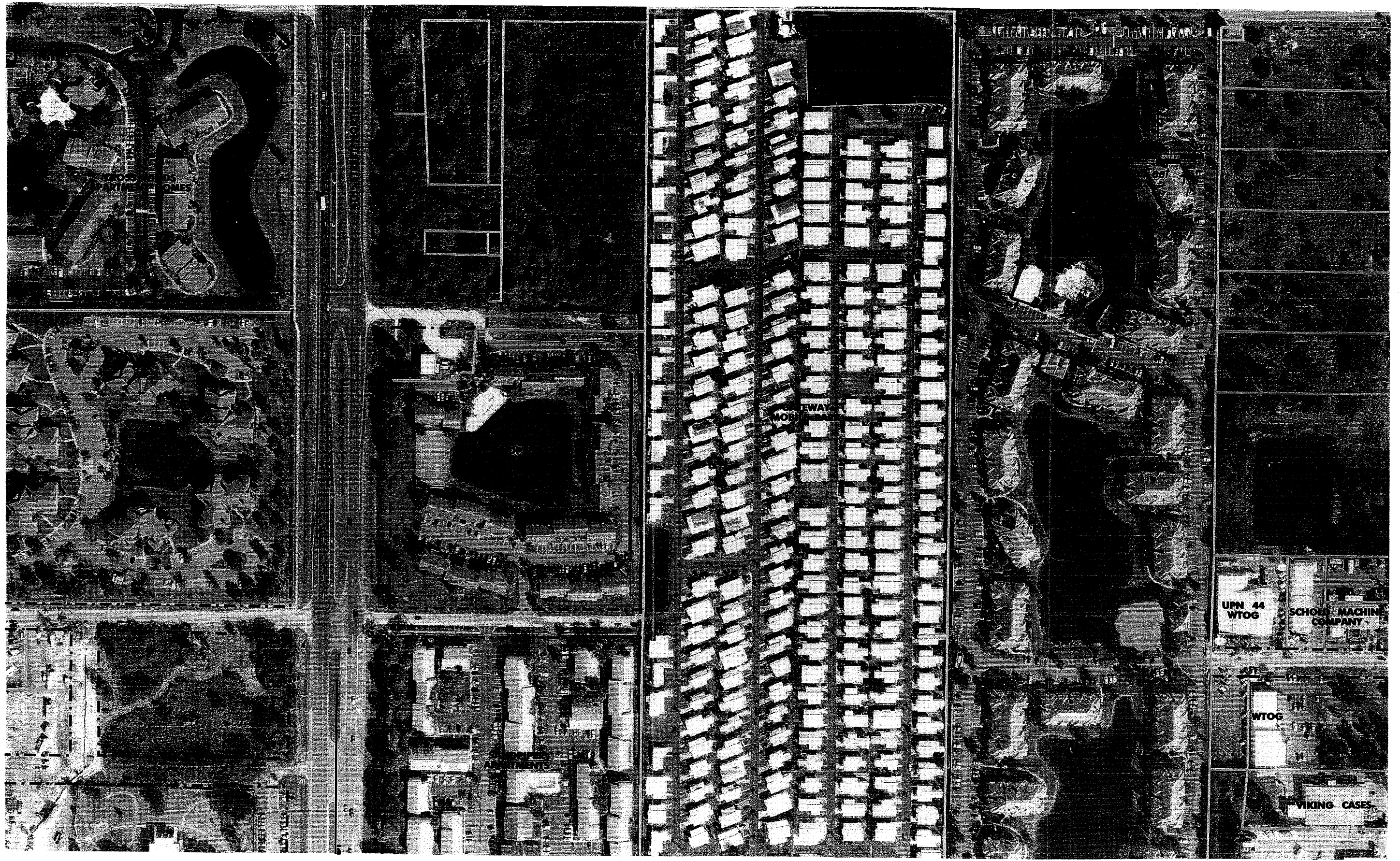
— . EXISTING RIGHT OF WAY	— . PROPERTY LINES	— . WETLAND BOUNDARY AND OTHER SURFACE WATERS	⊠ POND SITE	⊠ AIR QUALITY RECEPTOR SITES
— . PROPOSED RIGHT OF WAY	— . CENTERLINE OF CONSTRUCTION	— . BRIDGE STRUCTURE OR RETAINING WALL	⊠ RESIDENTIAL RELOCATION	⊠ RECEIVER LOCATION
— . EDGE OF PAVEMENT	— . SIDEWALK	— . EXISTING PAVEMENT	⊠ POTENTIAL CONTAMINATION SITE	— . NOISE WALL

PBSJ ENGINEERING PLANNING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-1

**SR 694 (GANDY BLVD) PDE STUDY
FROM US 19 TO EAST OF 4TH STREET
PINELLAS COUNTY, FLORIDA**

SHEET NO.
12



FLIGHT DATE : FEBRUARY 10, 2000

<ul style="list-style-type: none"> EXISTING RIGHT OF WAY PROPOSED RIGHT OF WAY EDGE OF PAVEMENT 	<ul style="list-style-type: none"> PROPERTY LINES CENTERLINE OF CONSTRUCTION SIDEWALK 	<ul style="list-style-type: none"> WETLAND BOUNDARY AND OTHER SURFACE WATERS BRIDGE STRUCTURE OR RETAINING WALL EXISTING PAVEMENT 	<ul style="list-style-type: none"> POND SITE RESIDENTIAL RELOCATION POTENTIAL CONTAMINATION SITE 	<ul style="list-style-type: none"> AIR QUALITY RECEPTOR SITES RECEIVER LOCATION NOISE WALL
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PBSJ ENGINEERING PLANNING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 694	PINELLAS	256931-1

**SR. 694 (GANDY BLVD) PDE STUDY
FROM U.S. 19 TO EAST OF 4TH STREET
PINELLAS COUNTY, FLORIDA**

SHEET NO.
13

