

531-1POOL



DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

November 10, 2009

REPLY TO
ATTENTION OF:

Office of the Chief
Regulatory Division

C.J. Segerstrom and Sons
c/o Tony Bomkamp
Glenn Lukos Associates
29 Orchard
Lake Forest, California 92630-8300

Dear Mr. Bomkamp:

I am writing regarding Permit Number SPL-2000-0004, which authorized C.J. Segerstrom and Sons to discharge fill material into waters of the U.S. associated with the Home Ranch Improvement Project in the City of Costa Mesa, Orange County, California.

I received the most recent monitoring report for restoration dated September 11, 2009, and I conducted a field inspection on November 4, 2009. Based on the monitoring report and the field inspection, I have determined the restoration has met all performance standards. No further monitoring is required.

If you have any questions, please contact me at 951-898-6171 or via e-mail at Yong.J.Chung@usace.army.mil. Please refer to this letter and SPL-2000-00004 in your reply.

Sincerely,

A handwritten signature in cursive script that reads "Jae Chung".

Jae Chung
Senior Project Manager
South Coast Branch
Regulatory Division

**FAIRVIEW PARK VERNAL POOL
RESTORATION PROGRAM**

**FOR IMPACTS ASSOCIATED WITH
IKEA PORTION OF
HOME RANCH PROJECT**

Prepared for:

**RBF Consulting
P.O. Box 57057
Irvine, California 92619-7057
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**Glenn Lukos Associates
23712 Birtcher Drive
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Contact:

Tony Bomkamp

March 15, 2002

INTRODUCTION

As a part of the IKEA portion of the Home Ranch project, C.J. Segerstrom & Sons is proposing to improve approximately 1,640 linear feet of the existing trapezoidal earth-bottom flood control channel and replace it with a reinforced concrete underground multi-cell box section as well as rebuild 305 linear feet of the Greenville-Banning and Gisler Channels. Implementation of the project would result in impacts to approximately 0.50 acre of channel subject to the jurisdiction of the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act and approximately 1.0 acre of channel subject to the jurisdiction of the California Department of Fish and Game.

The mitigation program associated with the project includes a number of components, including restoration or enhancement of approximately 1.1 acre of vernal pool habitat at Fairview Park in Costa Mesa. The purpose of this plan is to address the vernal pool restoration, including the restoration methods, monitoring methods, and performance standards.

BACKGROUND ON FAIRVIEW PARK VERNAL POOL

Existing Conditions

Fairview Park is located in Costa Mesa along the bluffs overlooking the Santa Ana River [Exhibit 1]. The existence of vernal pool habitat, at Fairview Park, was identified in August 1994. In 1995, biological surveys of the vernal pool habitat were initiated. The surveys identified approximately 3.40 acres of vernal pool habitat located within the park. In addition, it was determined that the largest pool (Vernal Pool 1) historically covered approximately 3.90 acres; however, approximately 1.80 acres, at the northern end of the basin was covered in the mid-1980s with stockpiles of soil [Exhibit 2 is a 1927 aerial photograph that depicts the historic extent of Vernal Pool 1].

The undisturbed 2.10-acre area of vernal pool basin was determined to exhibit high quality vernal pool habitat. Vegetation within center of the undisturbed portion of the pool consisted of dense stands of creeping spikerush (*Eleocharis macrostachya*, OBL) and water-wort (*Elatine brachysperma*, OBL). The perimeter of the basin is vegetated with a number of annual species typically found in vernal pool habitats. These include dwarf wooly-heads (*Psilocarphus brevissimus*, OBL), prostrate navarretia (*Navarretia prostrata*, OBL), Virginia rockcress (*Sibara virginica*, OBL), prostrate verbena (*Verbena bracteata*), water pygmy-weed (*Crassula aquatica*, OBL), spreading alkali-weed (*Cressa truxillensis*, FACW), hyssop-leaved loosestrife (*Lythrum hyssopifolium*, FACW), smooth spike-primrose (*Epilobium pygmaeum*, OBL), purslane speedwell (*Veronica peregrina*, OBL) and alkali mallow (*Malvella leprosa*, FAC).

Subsequent surveys of the 2.10-acre extant pool area, conducted in 1996 and 1997 identified additional plant species including a number of special-status species including

vernal barley (*Hordeum intercedens*), mud nama (*Nama stenocarpum*), and little mousetail (*Myosurus minimus* ssp. *apus*). In addition, other species, not previously known from Orange County, including Lemon's canary grass (*Phalaris lemonii*), and smooth boisduvalia (*Epilobium pygmaeum*) were also identified. Also, in 1996, the San Diego fairy shrimp (*Branchinecta sandiegonensis*) was identified in the vernal pool nearest Estancia High School, and in 1997, a small population of the San Diego fairy shrimp was identified in Vernal Pool 1.

In addition to the 2.10-acre pool, seven additional pools were identified, including a 0.90-acre vernal pool immediately adjacent to Estancia High School and a number of smaller pools. One of the additional pools was identified as a "vernal marsh" because it did not support (and has not supported during subsequent surveys) any vernal pool indicator plant species or fairy shrimp. Rather, this 0.25-acre pool, which ponds regularly following winter and spring storms supports mostly non-native grasses and forbs including cocklebur (*Xanthium strumarium*), bristly ox-tongue, curly dock (*Rumex crispus*), prostrate knotweed (*Polygonum aviculare*), bristly oxtongue (*Picris echioides*), and creeping spikerush (*Eleocharis macrostachya*).¹ [Exhibit 3 depicts the location of the "Vernal Marsh" as well as other pools identified within the park].

Previous Restoration Efforts

In 1996, restoration efforts within portions of Vernal Pool 1 were initiated. The restoration program was implemented by The Irvine Company in cooperation with the City of Costa Mesa. The mitigation was to provide compensation for Irvine Company impacts to seasonal wetlands at the University Research Park site. The initial phase of the restoration covered 0.81 acre of vernal pool basin. In 1997, an additional 0.14-acre of basin area was restored. In both instances, restoration was accomplished by carefully removing the stockpiled soil so as to minimize disturbance of the surface of the underlying pool.

As noted above, the 1927 aerial photograph indicated that historically, the pool covered approximately 3.90 acres. Approximately 1.80 acres was disturbed by the stockpiled soil with 2.10 acres remaining undisturbed. Since approximately 0.95 acres have been restored, approximately 0.85 acre of un-restored area remains [Exhibit 4 depicts the location of the 0.81-acre area, the 0.14-acre area, and the remaining 0.85-acre area to be restored pursuant to this plan and Exhibit 5, Photographs 1-3 depict views of extant and restored portions of Vernal Pool 1 along with views of the stockpiles that still cover portions of the 0.85-acre area.].

¹ It is important to note that the "vernal marsh" does not appear to be an historic pool. It does not appear in the 1927-aerial photograph or the 1947 aerial photograph. Rather it was likely created during undetermined earth-moving activities or other similar origins.

RESTORATION PROGRAM FOR FINAL 0.85-ACRE OF POOL 1 AND 0.25-ACRE VERNAL MARSH (POOL 8)

The 0.85-acre area of Pool 1, remaining to be restored, will be implemented in a manner consistent with the previous restoration efforts conducted in 1996 and 1997. Restoration/Enhancement of the Vernal Marsh is described below. In general, the Vernal Pool Restoration Plan for Vernal Pool 1 and the Vernal Marsh includes the following necessary components, which are discussed in detail in below.

- Identification of the necessary qualifications for the Project Biologist(s).
- Methods for removal of remaining stockpiled soils from Vernal Pool 1.
- Methods for enhancement of Vernal Marsh.
- Methodology for inoculum collection within the existing vernal pool area to be used in the restored or enhanced pool area.
- Development of a Five-Year Monitoring and Maintenance Program.
- Identification of specific success criteria.

QUALIFICATIONS OF THE PROJECT BIOLOGIST

The Project Biologist is required to have expertise in two specific areas, invertebrate biology and botany. If necessary, the role of Project Biologist can be performed by two biologists. For invertebrate sampling, the biologist will be permitted by the U.S. Fish and Wildlife Service (USFWS) to conduct fairy shrimp surveys, have a Bachelor's degree with an emphasis in biology, a familiarity with vernal pool flora and fauna (including vernal pool soils), and a minimum of 3 years of experience. The botanist will be an expert in vernal pool flora, have a Bachelor's degree with an emphasis in biology, and a minimum of 3 years of experience.

Prior to initiating soil stockpile removal, all contractors involved in the Fairview Park Restoration project will attend a site meeting with the Project Biologist(s). The Project Biologist(s) will provide the contractor(s) with a copy of this Restoration Program and will review all components of the program that relate to earth-moving.

REMOVAL OF STOCKPILED SOILS FROM COVERED PORTION OF VERNAL POOL 1

Stockpiled material has already been removed from the 0.95-acre area during 1996 and 1997. For restoration of the final 0.85-acre of Vernal Pool 1, adjacent to the previously restored habitat, soil removal will be accomplished using a front-end loader. The bucket of the front-end loader will be carefully scraped along the soil surface in a manner that does not compromise the underlying vernal pool soils or associated seed bank.² All soil removal will be directly monitored by the Project Biologist to ensure that no damage to functioning vernal pool habitat occurs [Exhibit 5, Photographs 4-6 depict removal of stockpiled materials from the 0.81-acre area and the undisturbed pool surface upon completion of stockpile removal]. Upon removal of stockpiled soils, the vernal pool basin will have been returned to topographic contours, which existed prior to addition of stockpiled material. No micro-topographic grading will be necessary to establish topography appropriate for the necessary vernal pool hydrology.³ Stockpile removal will be initiated no earlier than August 1, 2002 and will be completed no later than October 1, 2002.

ENHANCEMENT OF VERNAL MARSH

The vernal marsh currently exhibits suitable vernal pool hydrology, ponding to depths of approximately six inches, with ponding durations lasting up to one month. Hydrology does not require substantial enhancement. Enhancement is to consist of removal of non-native species, including, to the extent possible, seed banks of the non-native species [Exhibit 5, Photograph 7 depicts the vernal marsh during the dry 2002 season]. Removal of non-native seed bank could be accomplished by either one of two methods: 1) use of a front-end loader to carefully scrape the top one to two inches of soil (and associated seed bank) from the pool or 2) hand-removal of the top one to two inches using flat-end shovels. Topsoil and seedbank removal will be initiated no earlier than August 1, 2002 and will be completed no later than October 1, 2002.

² Extreme care was taken during removal of stockpiled soils during restoration of the 0.81-acre portion of the basin to ensure that none (or at least as little as possible) of the top crust of the native vernal pool soil was removed. Accordingly, the intact seed bank, upon germination following rains of November and December, 1996, provided for vegetative cover and biodiversity equivalent to that found in the existing portions of Vernal Pool 1 during the first year following stockpile removal. First year monitoring results for the 0.81-acre restoration area are included in: Michael Brandman Associates and Glenn Lukos Associates. 1997. *First Annual Monitoring Report, Fairview Park 0.81 Acre Vernal Pool Restoration Program*. Prepared jointly for The Irvine Company by MBA and GLA.

³ Microtopographic grading was not necessary during restoration of the 0.95-acre area and it is expected that grading will not be necessary during restoration of the final 0.85-acre restoration area.

INOCULATION METHODS

In order to enhance recovery of the vernal pool vegetation within the final 0.85-acre restoration area and the vernal marsh area, plant and/or soil inoculum from the existing vernal pools will be collected and redistributed within the restored areas.

Inoculum Collection

Plant inoculum will be collected using the two-percent collection methodology described by Bauder (cited in KEA Environmental 1995). Use of this method ensures that no more than two percent of the existing propagules are removed from the donor portions of the pool. Collection of inoculum is performed using a one-meter quadrat, which is placed at the one corner of the donor area. Two one-decimeter quadrats are randomly placed within the one-meter quadrat and the top one-centimeter of soil and vegetative material are collected from the area circumscribed by each one-decimeter quadrat, which is then placed in cardboard boxes for storage. The one-meter quadrat is moved to the adjacent one-meter plot and the process is repeated until each one-meter plot from the donor area is covered. The donor area is depicted on Exhibit 2 and covers approximately 2.10 acres.⁴ Inoculum collection will be performed between August 1 and September 1.

Introduction of the collected seed and organic matter from the donor area of Vernal Pool 1 will be accomplished by hand-broadcasting over the restored/enhanced pool surfaces. All hand-broadcasting will occur between September 15 and November 1. The inoculum collection and redistribution will be conducted for each of the five years of the monitoring period.

FIVE-YEAR MONITORING AND MAINTENANCE PROGRAM

The Five-Year Monitoring and Maintenance Program begins at the time hand-broadcasting of the topsoil and seed inoculum occurs. The purpose of this program is to evaluate the progress and success of the vernal pool restoration efforts at regular intervals so that remedial measures can be implemented in a timely fashion and the identified success criteria can be achieved. Because of the successful nature of the removal of the initial 0.95-acre of stockpiled material and excellent recovery of the restored 0.95-acre vernal pool habitat, monitoring of the final 0.85-acre restoration area and vernal marsh, to be started in 2002/2003 will be conducted using the same methodology

Specifically, the Five-Year Monitoring and Maintenance Program will consist of hydrological measurements, floral sampling and inventories, invertebrate sampling, and photo-documentation. All monitoring, will be conducted by the Project Biologist, or a

⁴ The donor area was selected because it exhibits the highest concentration of sensitive species including *Navarretia prostrata*, *Myosurus minimis* ssp. *apus*, and *Microseris douglasii* var. *platycarpha*, as well as supporting low densities of non-native species such as *Rumex crispus* and *Lythrum hyssopifolium*.

qualified biologist (under supervision of the Project Biologist) with commensurate qualifications. The control against which to measure the progress of the restored vernal pool area will be the non-disturbed 2.10-acre portion of Vernal Pool 1. The results of the Five-Year Monitoring and Maintenance Program will be summarized in yearly monitoring reports submitted to the Corps, CDFG and the RWQCB. Upon successful completion of five-year program (including submittal of a final report), The Applicant will request a letter from the Corps indicating compliance with all permit conditions.

Hydrology

Vernal Pool 1

The restored 0.81-acre area was monitored during the rainy season of 1996/97 and each rainy season through 2001. The additional 0.14-acre acre has been monitored between 1998 and 2001. Because neither the clay layer nor the underlying hardpan have been compromised within the historic extent of the vernal pool and the hydrological connection between the existing 2.10-acre area and restored 0.95-acre area is complete, it appears that full hydrologic function has been restored to the 0.95-acre area and it is expected that full hydrologic function will be restored to the final 0.85-acre restoration area following removal of stockpiled soil [Exhibit 5, Photograph 8 depicts the restored and existing pool areas at near full capacity during 1997]. Quantitative hydrological monitoring of the 0.85-acre restoration area will be conducted through the end of the five year monitoring program specific to that portion of the vernal pool. Water depths will be taken in the restored and existing pool areas at the height of ponding each season, during invertebrate sampling, and during the sampling of aquatic-phase vegetation. The timing of the sampling is expected to vary each season according to rainfall patters and will be determined by the Project Biologist. If during the five-year monitoring period, the depth or duration of ponding differ significantly between the restored and existing pool areas, the Corps and CDFG will be notified and remedial measures will be developed.

Vernal Marsh

As noted above, the vernal marsh exhibits suitable vernal pool hydrology, and although it supports non-native vegetation, the non-native vegetation consists predominately of wetland indicator species. Removal of the upper one-inch of topsoil/seed bank will not cause an appreciable change in hydrology. Monitoring will be performed, including measurements of depth and duration; however, no performance standards are proposed due to the minimal change in hydrology. Establishment of the target plant species will be the final standard by which the success of the enhancement program is measured.

Plant Richness

Vernal Pool 1

Vernal pool vegetative cover will be determined by conducting vegetative sampling along established transects within the restored and existing areas of the Vernal Pool. Sampling will be conducted up to three times each season: during the aquatic phase immediately adjacent to ponded areas, immediately upon drying of the basin, and approximately one month following drying of the restored and existing vernal pool areas. Two 50-meter transects will be placed randomly (using a random numbers table or similar device). Beginning at 5 meters and continuing at 5-meter intervals through 50 meters, a two-decimeter quadrat will be placed adjacent to the transect tape. Percent cover of all species combined, percent cover of non-native species (also combined) along with all species identified within the quadrat will be recorded [a sample data sheet is included as Appendix 1].

Vernal pool species richness will be determined during plant species inventories for the existing 2.10-acre area of Vernal Pool 1 during the aquatic, drying and dry phase as well as for the restored pool areas. The total number of plant species, including native species, vernal pool indicator and associate species, for the restored areas will be recorded and compared against the species present in the undisturbed 2.10 acre area of Vernal Pool 1. Floral inventories will be conducted at times determined by rainfall and site-specific rates of vegetative development.

Vernal Marsh

Vernal pool vegetative cover will be determined by conducting vegetative sampling along established transects within the enhanced pool. Sampling will be conducted up to three times each season: during the aquatic phase immediately adjacent to ponded areas, immediately upon drying of the basin, and approximately one month following drying of the restored and existing vernal pool areas. Two 20-meter transects will be placed randomly (using a random numbers table or similar device). Beginning at 5 meters and continuing at 5-meter intervals through 20 meters, a two-decimeter quadrat will be placed adjacent to the transect tape. Percent cover of all species combined, percent cover of non-native species (also combined) along with all species identified within the quadrat will be recorded [a sample data sheet is included as Appendix 1].

Vernal pool species richness will be determined during plant species inventories for the enhanced vernal marsh during the aquatic, drying and dry phase. The total number of plant species, including native species, vernal pool indicator and associate species will be recorded and compared against the species present in the undisturbed 2.10 acre area of Vernal Pool 1. Floral inventories will be conducted at times determined by rainfall and site-specific rates of vegetative development

Invertebrate Sampling

Vernal Pool 1

The diversity of invertebrate species will be determined by direct observation of the restored vernal pool area on the same days the hydrological monitoring is conducted. In addition to the direct observations, fairy shrimp will be collected and identified at the restored pool area according to the applicable USFWS survey protocol. Because San Diego fairy shrimp were identified in very low densities, within both the restored and existing areas of Vernal Pool 1, during late 1996 and early 1997 survey season (Bomkamp 1997), invertebrate monitoring will serve only to record the relative numbers/densities from season to season. Since the identification of the San Diego fairy shrimp during the 1996/97 rainy season, no mature fairy shrimp have been detected in Vernal Pool 1 (immature shrimp were detected in December of 1997 following a significant storm that dropped over five inches of rain on the pool in a 24-hour period; however these individuals did not reach maturity and fairy shrimp have not been detected since). Invertebrate sampling will continue; however, no performance standards are proposed.

Vernal Marsh

The diversity of invertebrate species will be determined by direct observation of the enhanced vernal marsh area on the same days the hydrological monitoring is conducted. In addition to the direct observations, fairy shrimp will be collected and identified at the enhanced marsh according to the applicable USFWS survey protocol. Because San Diego fairy have never been identified in this pool, invertebrate monitoring will serve only to record the relative numbers/densities from season to season, should cysts be transported in the plant/soil inoculum. Invertebrate sampling will be performed throughout the five-year monitoring period; however, no performance standards are proposed.

Photo-Documentation

A permanent photo-documentation station will be established to allow consistent photo-documentation of the development of the restored vernal pool area. Photographs will be taken during both the hydrological and vegetative field monitoring efforts [location of permanent photo-documentation station is depicted on Exhibit 2].

**TABLE 1
PERCENT COVER AND SPECIES RICHNESS SUCCESS CRITERIA⁵**

Year	Pool 1- 0.85 Acre Area		Vernal Marsh	
	Vegetative Cover of Restored Area of Vernal Pool 1 as Percent of Existing 2.10-acre Area	Species Richness of Restored Area in Vernal Pool 1 as Percent of Existing 2.10-acre Area	Vegetative Cover of Restored Area of Vernal Marsh as Percent of Existing 2.10-acre Vernal Pool	Species Richness of Restored Area of Vernal Marsh as Percent of Existing 2.10-acre Vernal Pool
First 2003- 2004	25-percent	50-percent	10-percent	10-percent
Second	40-percent	60-percent	20-percent	20-percent
Third	55-percent	70-percent	35-percent	30-percent
Fourth	65-percent	80-percent	45-percent	35-percent
Fifth	80-percent	90-percent	60-percent	40-percent

SUCCESS CRITERIA

Specific criteria used in evaluating the success of the restored vernal pool area, or the need for remedial action, will largely be based upon a comparison with the conditions in the existing 2.10 acre area of Vernal Pool 1 as documented during monitoring visits.

Hydrology

Vernal Pool 1

Removal of the stockpiled soils from the 0.81-acre restoration area has apparently reestablished full hydrologic function to the 0.81-acre area and 0.14-acre area. Water depths and ponding duration will be taken in the final 0.85-acre area of the restored pool area and the 2.10-acre pool area at the height of ponding each season, during invertebrate sampling, and during the sampling of aquatic-phase vegetation. The timing of the

⁵ Vegetative cover and species diversity can vary significantly within the vernal pools from year to year depending upon the rainfall regime. The figures (goals) provided for percent cover and species diversity may vary naturally; therefore, where goals are not achieved, the Project Biologist(s) will make a determination, in coordination with the Corps and CDFG, whether the lack of compliance is due to natural conditions or conditions potentially requiring remediation.

sampling is expected to vary each season according to rainfall patterns and will be determined by the Project Biologist. If during the five-year monitoring period, the depth or duration of ponding differ significantly between the restored and existing pool areas, the Corps and CDFG will be notified and remedial measures will be developed as required.

Vernal Marsh

As noted above, the 0.25-acre vernal marsh exhibits suitable vernal pool hydrology,⁶ and although it supports non-native vegetation, the non-native vegetation consists predominately of wetland indicator species. Removal of the upper one-inch of topsoil/seed bank will not cause an appreciable change in hydrology. Monitoring will be performed, including measurements of depth and duration; however, no performance standards are proposed due to the minimal change in hydrology. Establishment of the target plant species will be the final standard by which the success of the enhancement program is measured.

Plant Richness

Vernal Pool and Vernal Marsh

Acceptable plant species cover and richness within the restored basin area is provided in Table 1.⁷ If the target species cover and richness are not achieved, corrective measures will be taken as deemed appropriate by the Project Biologist(s).

Remedial Measures would include:

- Removal of exotic species such as *Lythrum hyssopifolium*, *Rumex crispus*, *Polygomon monspeliensis*, and *Solanum rostratum*.

Invertebrate Sampling

Vernal Pool 1

Because the restored vernal pool area is contiguous with the already existing portions of Vernal Pool 1, and because fairy shrimp are mobile, it is expected that densities of the fairy shrimp will be consistent throughout the existing and the restored pool areas. Specimens of the San Diego fairy shrimp were collected and identified during December of 1996, prior to the listing of the San Diego fairy shrimp. The April 19, 1996 survey

⁶ During monitoring conducted in 1995 (a wetter than average year) this basin was ponded from January 15 to March 11, with some local ponding that persisted until April 30.

⁷ Performance Standards are lower for the vernal marsh due to 1) the smaller size of the basin which would in turn be expected to support a lower diversity of species and lower cover because there will be no existing seed bank that will provide for native cover – all native vernal pool species will be introduced from the inoculum collected from the existing pools. As such both cover and diversity will be lower during the five-year monitoring program, however, if the five-year goals are achieved, it is fully expected that the cover will continue to increase until equilibrium is reached within the pool.

guidelines do not authorize collection of voucher specimens from a basin once the initial voucher specimens have been obtained. Since voucher specimens were obtained in 1996, no fairy shrimp will be collected from Vernal Pool 1. A qualitative assessment of the fairy shrimp population will be provided as part of the annual report; however, since the fairy shrimp have been identified as present but in what appears to be naturally low numbers no performance standards are proposed.⁸ No additional collection, for purposes of identification or obtaining voucher specimens will be performed. No remedial measures are recommended if the fairy shrimp are not detected in future years.

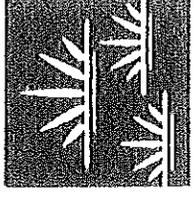
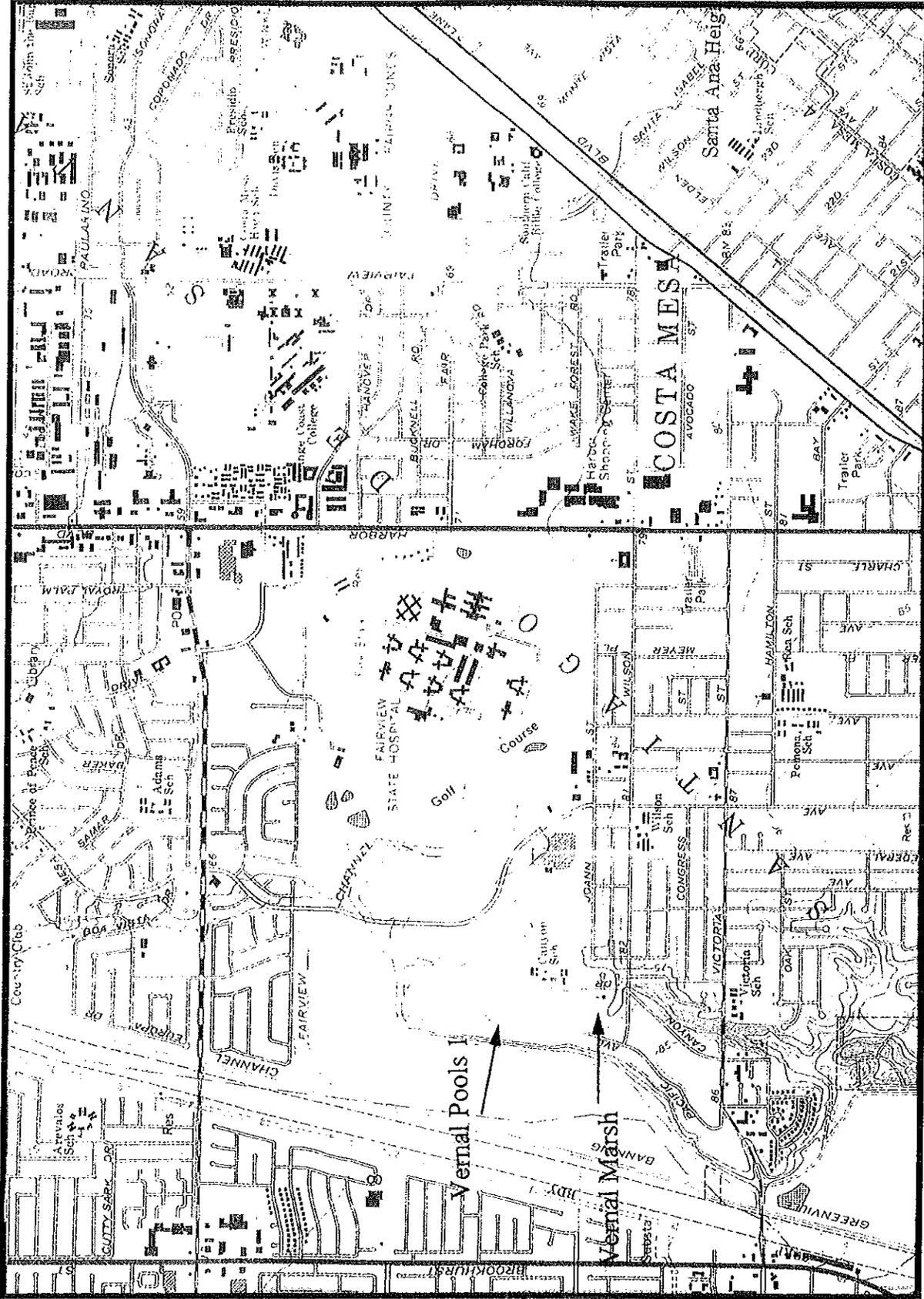
Vernal Marsh

As noted above, the diversity of invertebrate species will be determined by direct observation of the enhanced vernal marsh area on the same days the hydrological monitoring is conducted. In addition to the direct observations, fairy shrimp will be collected and identified at the enhanced marsh according to the applicable USFWS survey protocol. Because San Diego fairy have never been identified in this pool, invertebrate monitoring will serve only to record the relative numbers/densities from season to season, should cysts be transported in the plant/soil inoculum. Invertebrate sampling will be performed throughout the five-year monitoring period; however, no performance standards are proposed.

ANNUAL REPORTS

Annual qualitative and quantitative monitoring of hydrology, vegetation, and invertebrates would be completed by July of each year (earlier in years of light rainfall or where rainfall is early in the season). Annual reports will be prepared that address the performance of the restored 0.85-acre portion of the pool compared with the 2.10-acre extant portion of the pool. Included in the reports will be tables comparing floral diversity and cover for the restored and extant pool areas as well as hydrological measurements. In addition, a qualitative discussion that addresses invertebrate observations, including the San Diego fairy shrimp will be provided.

⁸ The density of fairy shrimp was very low during the 1996 surveys (Bomkamp, Tony. 1997. Personal Observation). During the previous two seasons (1994 and 1995) fairy shrimp were not identified during surveys, indicating that they were not present or present in such low numbers that they were essentially not detectable. Based upon the above it is apparent that the population of the San Diego fairy shrimp in Vernal Pool 1 is naturally very small and is not expected to exhibit significant density.



GLENN LUKOS ASSOCIATES
EXHIBIT 1

**FAIRVIEW PARK VERNAL
POOL RESTORATION**
Site Location Map



GLENN LUKOS ASSOCIATES

EXHIBIT 2



Historical Aerial Photograph (1927)

Fairview Park Vernal Pool Habitat Jurisdictional Delineation

FAIRVIEW PARK
VERNAL POOL HABITAT
LANDSCAPE ARCHITECTURE



THIS MAP IS A PRELIMINARY LAYOUT AND SHOULD NOT BE CONSIDERED A FINAL DESIGN. THE PROJECT IS SUBJECT TO APPROVAL BY THE CITY OF COSTA MESA AND THE CALIFORNIA DEPARTMENT OF WATER RESOURCES. THE PROJECT WILL BE SUBJECT TO A FINAL DESIGN AND CONSTRUCTION PERMITTING PROCESS.

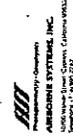
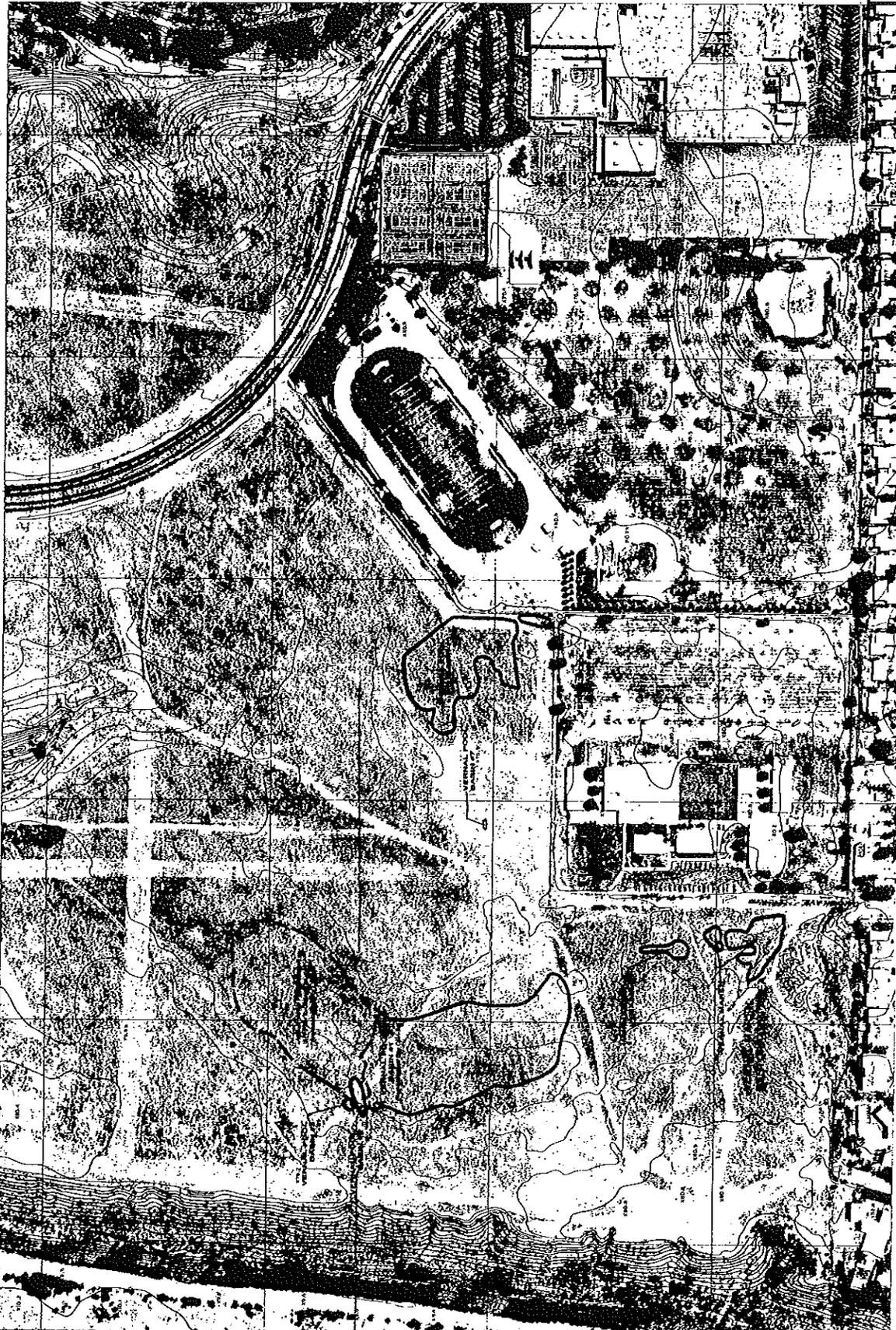
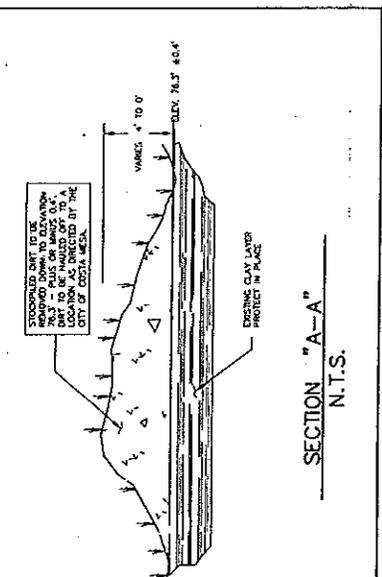
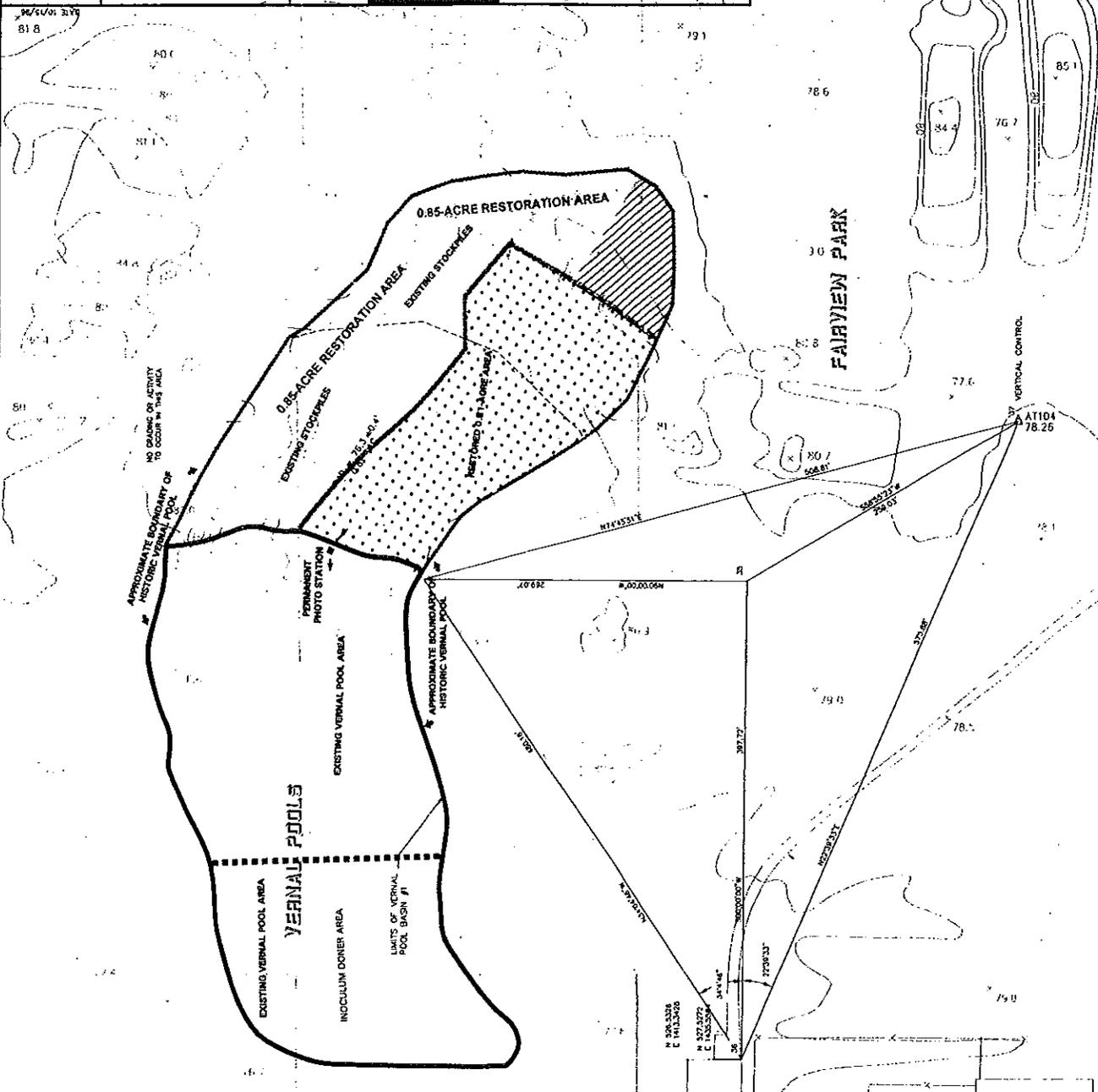


EXHIBIT 3

ORTHOPHOTO MAP
CITY OF COSTA MESA
SHEET 150 OF 24

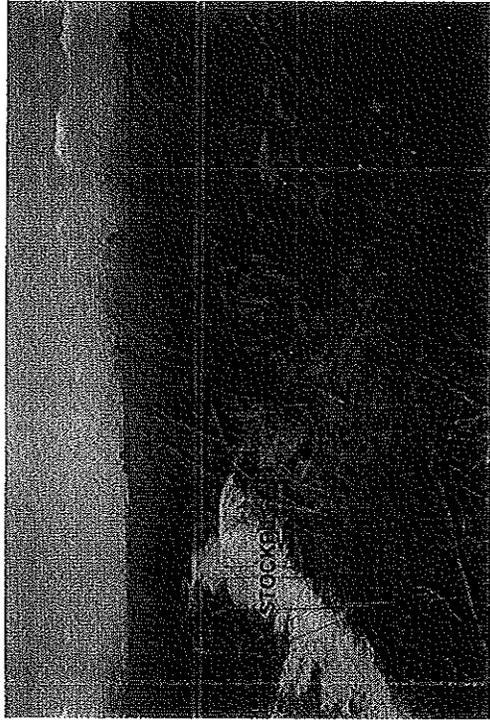
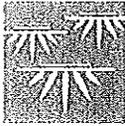




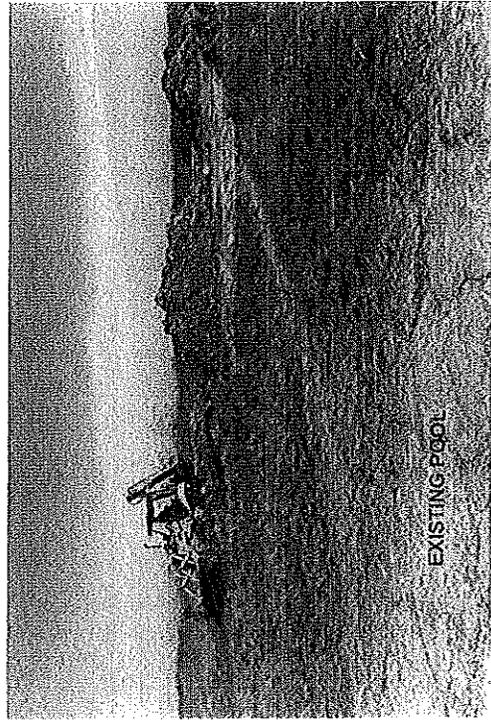
FAIRVIEW PARK VERNAL
 POOL RESTORATION
 Restoration Area
 10-97

GANNIKER ASSOCIATES
 ENGINEERS & ARCHITECTS

ESTANCIA H.S.



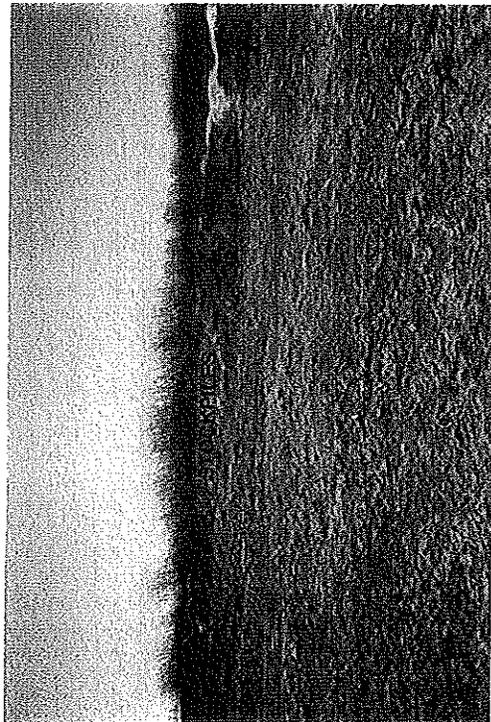
Photograph 2 – View of Stockpiles within 0.85 acre area to be restored.



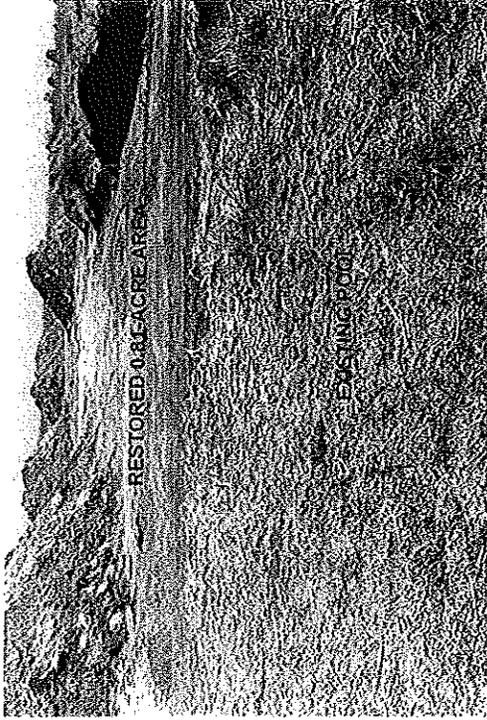
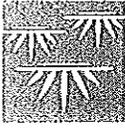
Photograph 4 – 1996 photograph showing Stockpile removal from 0.81-acre restored area.



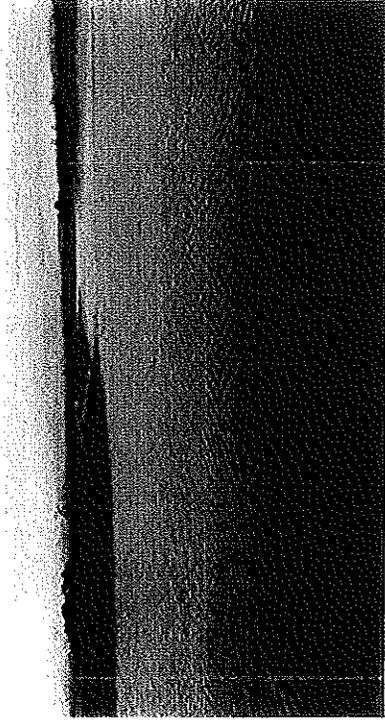
Photograph 1 – View of restored 0.81-acre area from extant pool Area. Stockpiles to be removed from 0.85-acre area in left-center of photograph.



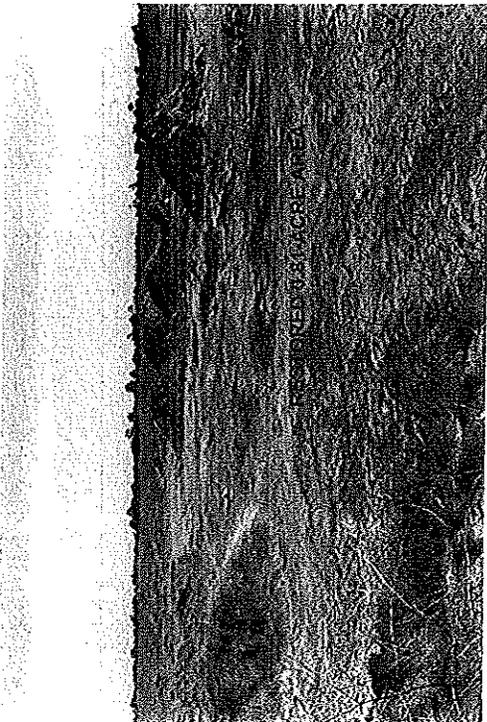
Photograph 3 – View of Stockpiles within 0.85 acre area to be Restored looking west from 0.81-acre restored area.



Photograph 6 -- View of restored pool surface following stockpile removal
In 1996.



Photograph 8 -- View from existing pool area to 0.81-acre restored area.
Photograph was taken in late 1996 or early 1997 following heavy rains.



Photograph 5 -- View of restored pool surface following stockpile removal
In 1996.



Photograph 7 -- View of Vernal Marsh looking north.