



Remote Sensing in studies of the past

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Definition of Remote Sensing

- "Remote sensing is the practice of deriving information about the earth's land and water surfaces using images acquired from an overhead perspective, using electromagnetic radiation in one or more regions of the electromagnetic spectrum, reflected or emitted from the earth's surface."
(Campbell, 1996)

Electromagnetic Spectrum

- Remote sensing images are taken within specific spectral regions

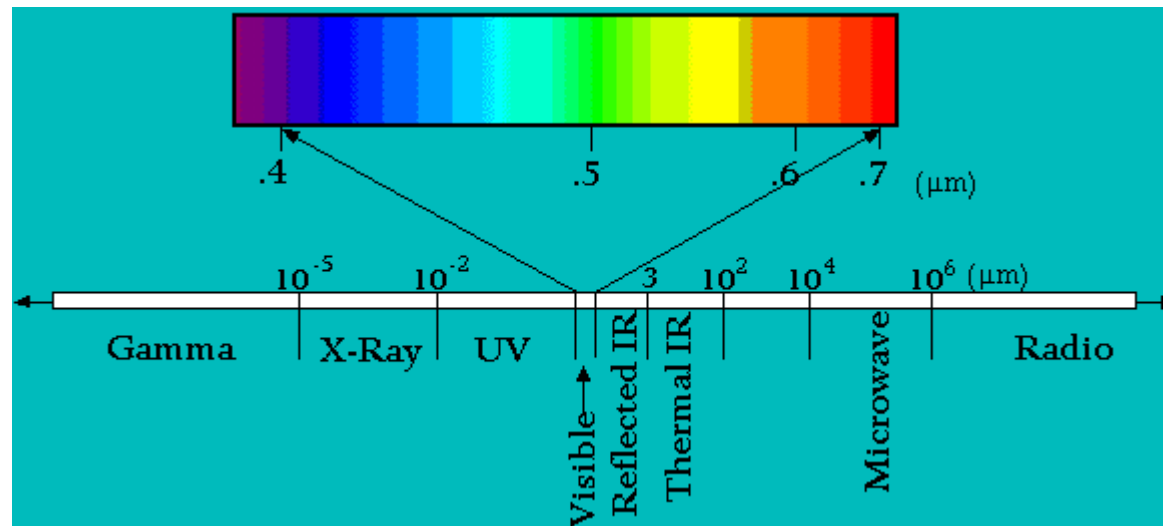


Photo-interpretation

- Aerial photographs are a classical form of Remote Sensing also known as photo-interpretation.
- The first aerial photographs taken in Puerto Rico was on 1930.
 - Porto Rico 1930 - these collections are at digital form (17 GB) at the Land Surveying Laboratory at the Civil Engineering and Surveying Department

[Porto Rico 1930]

- Porto Rico 1930 is a collection of Photographs of Puerto Rico taken in 1930. They are the oldest existing collection of aerial photographs of Puerto Rico. In order to preserve these photos we started transforming them into digital form and creating an indexed database.

[Porto Rico 1930 it history]

- This photographs were taken by Philadelphia Aerial Surveying, sponsored by the Department of Defense of the United States Government.
- The purpose of this photos was to know the spatial relationship of the topography of Puerto Rico.

Porto Rico 1930 it Plane

- This is the plane used for the compilation of these photographs.
- It is a C-8



Porto Rico 1930 it Camera

- Philadelphia Aerial Surveying was the company in charge of taking the photographs.
- This was the camera used to take this pictures. It was a Fairchild camera.
- The designer of the camera was Sherman Mills Fairchild (1896-1971).



Scale and Overlap

- Overlap of original photos is approximately 60%.
 - Characteristics
 - Overlapping vary (80%-60%).
 - Flight lines were W-E and E-W directions.
- Approximate scale – 1:10000
 - Calculated by comparing a geographical element from a 1930 photo with the same element on a scaled map.

[Raster Graphics]

- A raster image is generally defined to be a rectangular array of sampled values, known as pixels.
- Each pixel (picture element) has one or more numbers associated with it, generally specifying a color which the pixel should be displayed in.

Importance of Preservation

- Study, compare and document changes between (1930 – Present).
- Create models of changes that can occur taking in perspective the changes that took place during the (1930 – Present) time frame.
- To produce digital photographs.

[Quality]

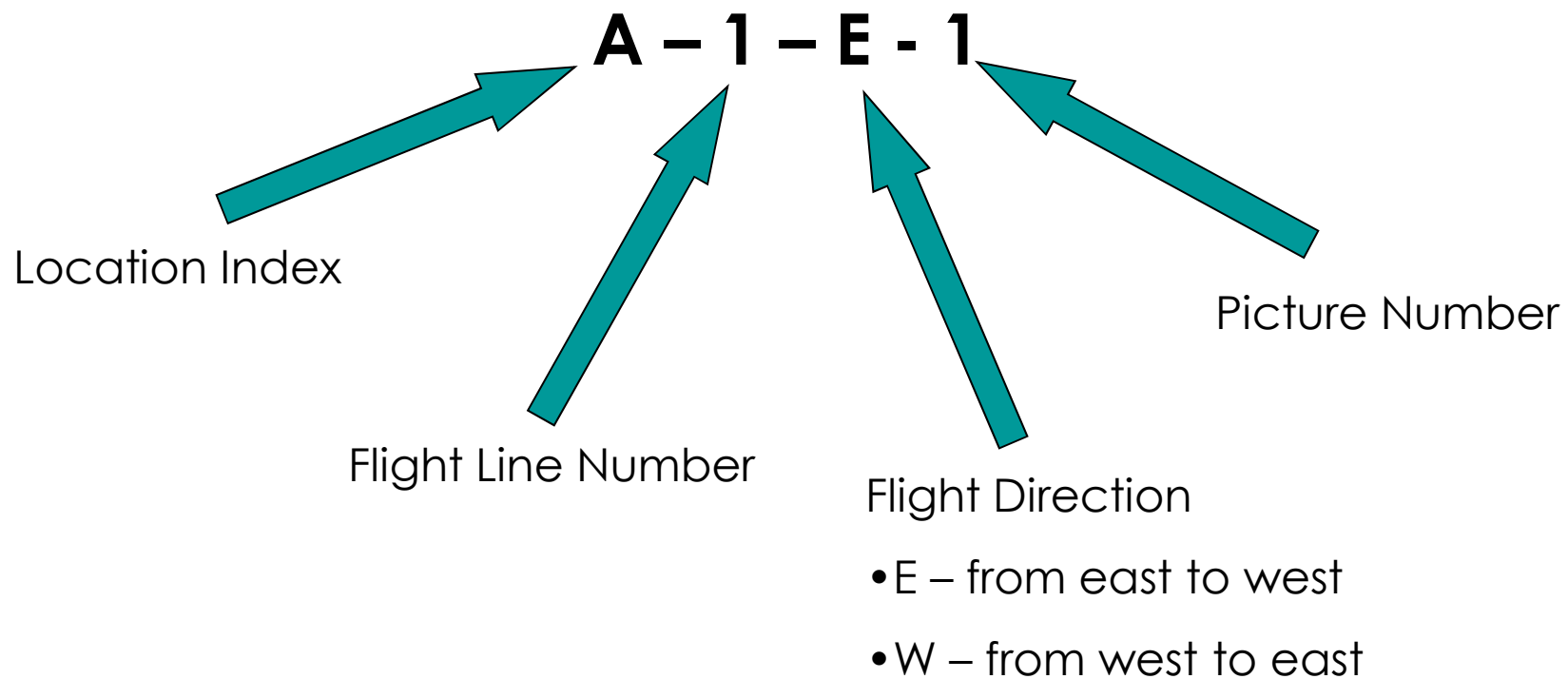
- Photos are being scanned using an 800dpi resolution. Different resolutions were tried but 800dpi gave enough detail while reducing problems using higher values:
 - Problems with the virtual memory to manage the photographs
 - Data base management
 - Quality did not compensate for image size
 - Storage – less photos, more space

Image Format

- Photographs scanned are being saved in grayscale format.
 - No information can be extracted from the colors of the original ones.
- The photographs are being saved in JPEG format because of its versatility.
- Compression is fairly reduced to create a balance between image size and quality

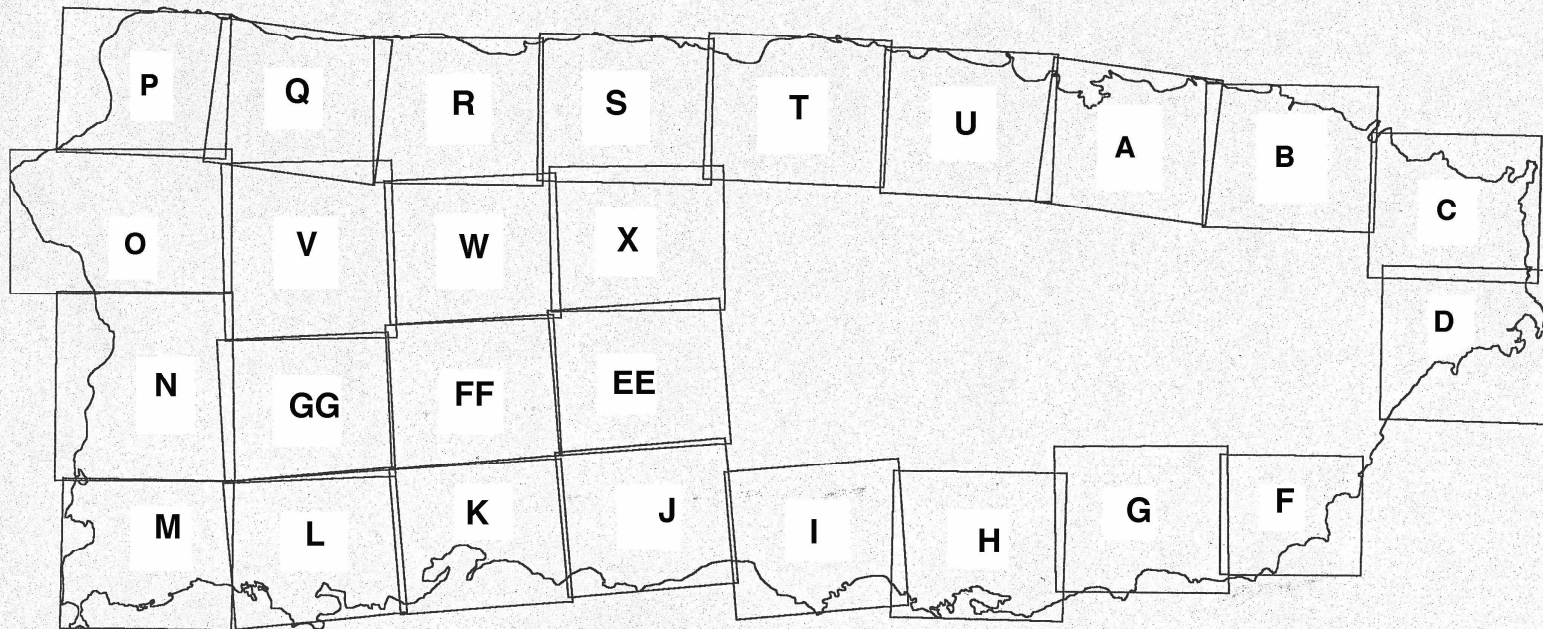
[Image Organization]

Example:

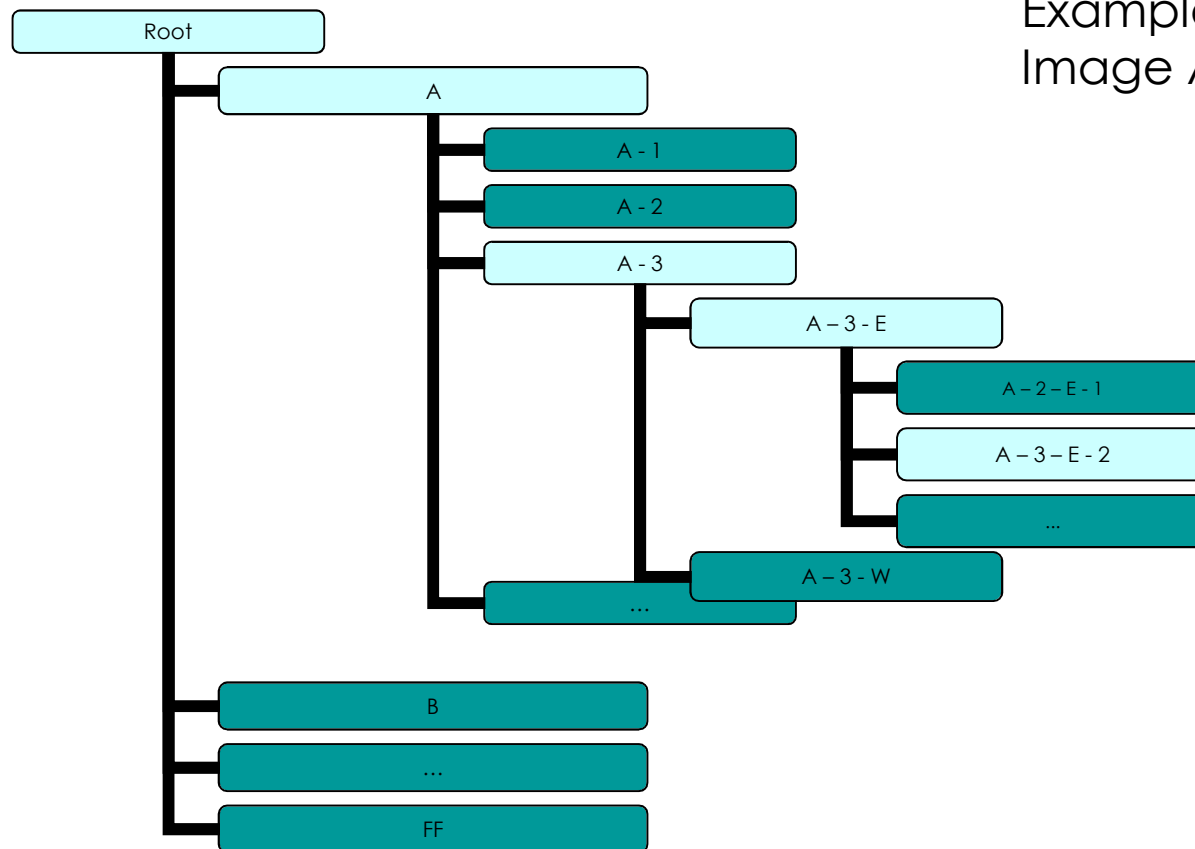


Location Index

Indice de Fotografías de Porto Rico 1930



Data Base Organization



Example: To obtain
Image A - 3 - E - 2

Estimated Photograph Totals

	E		W	
	Total	Missing	Total	Missing
A	168	83	160	125
B	69	32	123	15
C	41	22	31	29
D	19	4	86	8
F	48	31	76	29
G	37	1	0	0
H	120	25	59	37
I	40	48	46	31
J	79	63	79	61
K	79	5	108	7
L	81	59	38	27
M	111	55	124	67
N	24	95	69	119
O	86	22	194	33
P	234	5	332	17
Q	345	127	363	21
R	200	3	160	4
S	376	9	295	5
T	228	28	41	2
U	219	6	294	0
V	35	77	119	53
W	214	34	126	23
X	105	50	72	97
EE	28	0	49	3
FF	43	0	66	0
GG	78	72	52	57

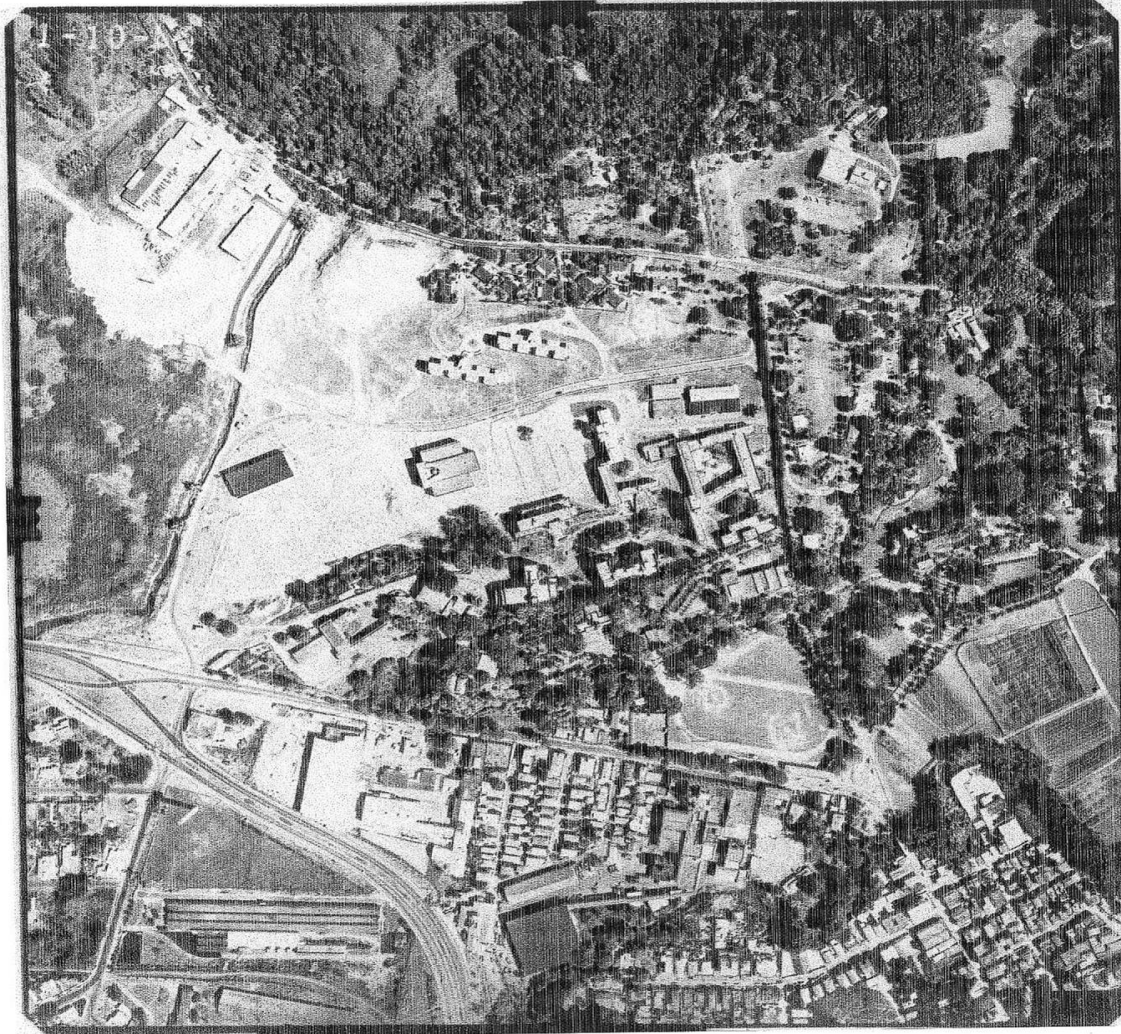
Total Photos
Available: 6269

Total Missing:
1826

RUM 1930



[RUM1963]



[RUM 1999]



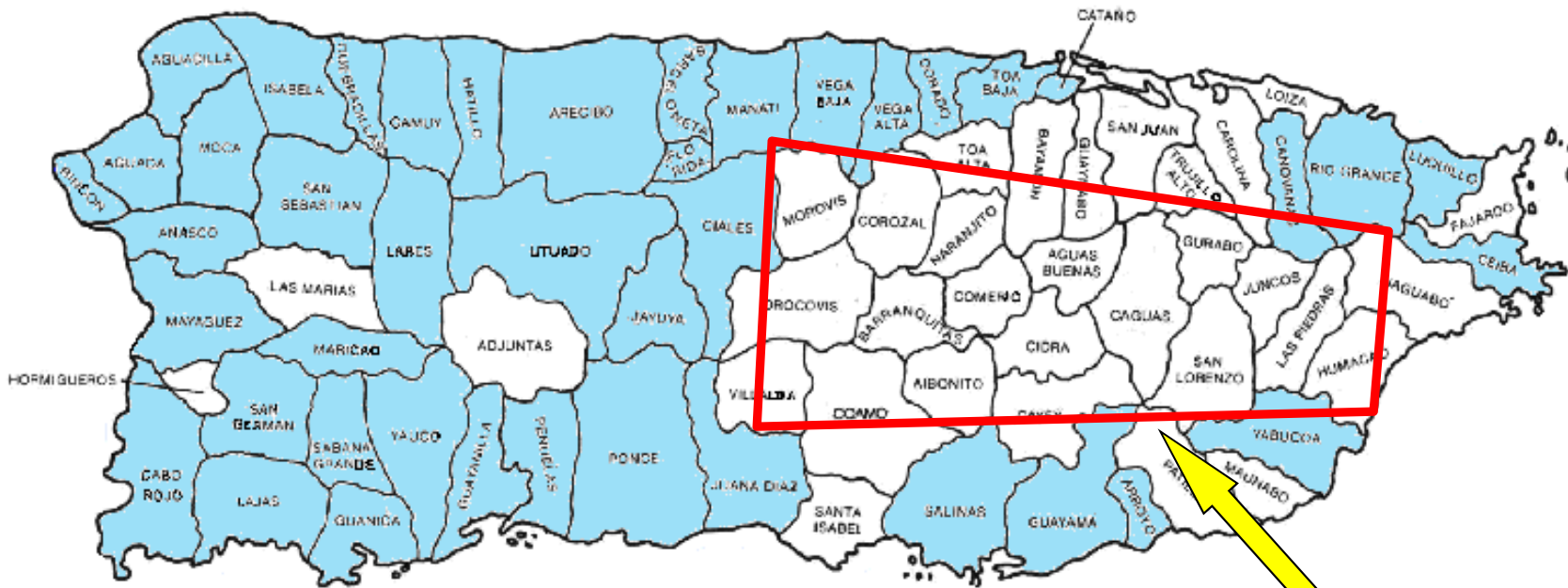
Boquilla 1930



Boquilla 1999

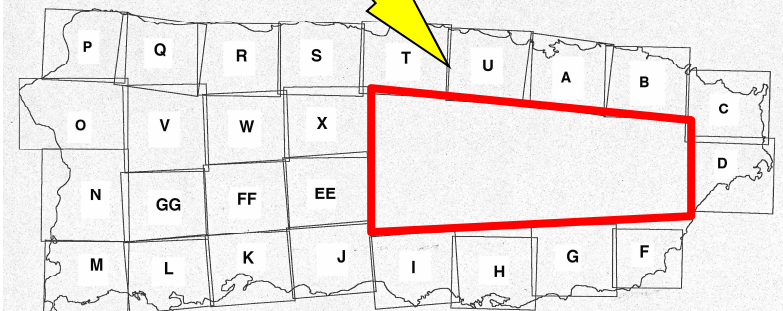


Towns in 1930 Located

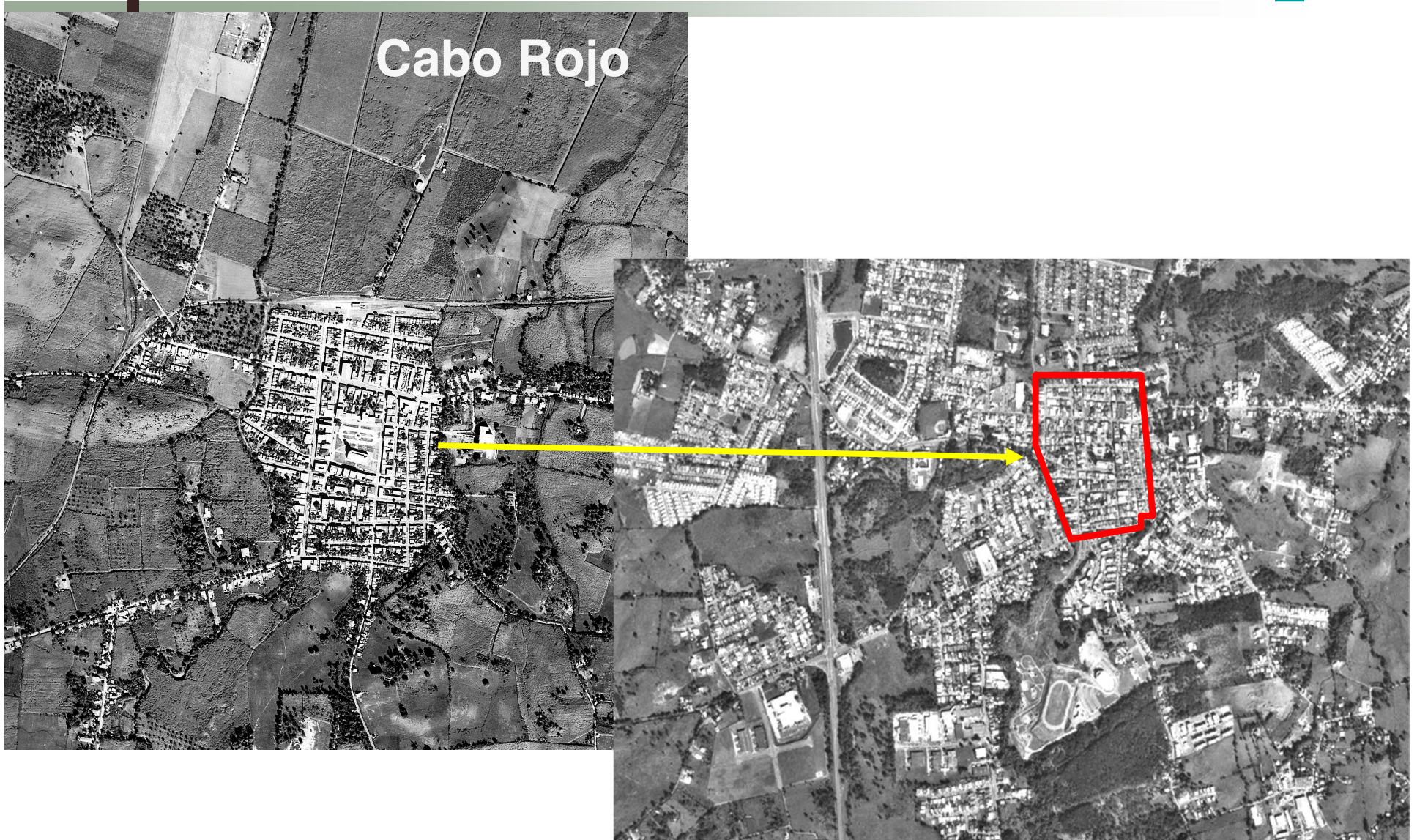


Towns Located = 45

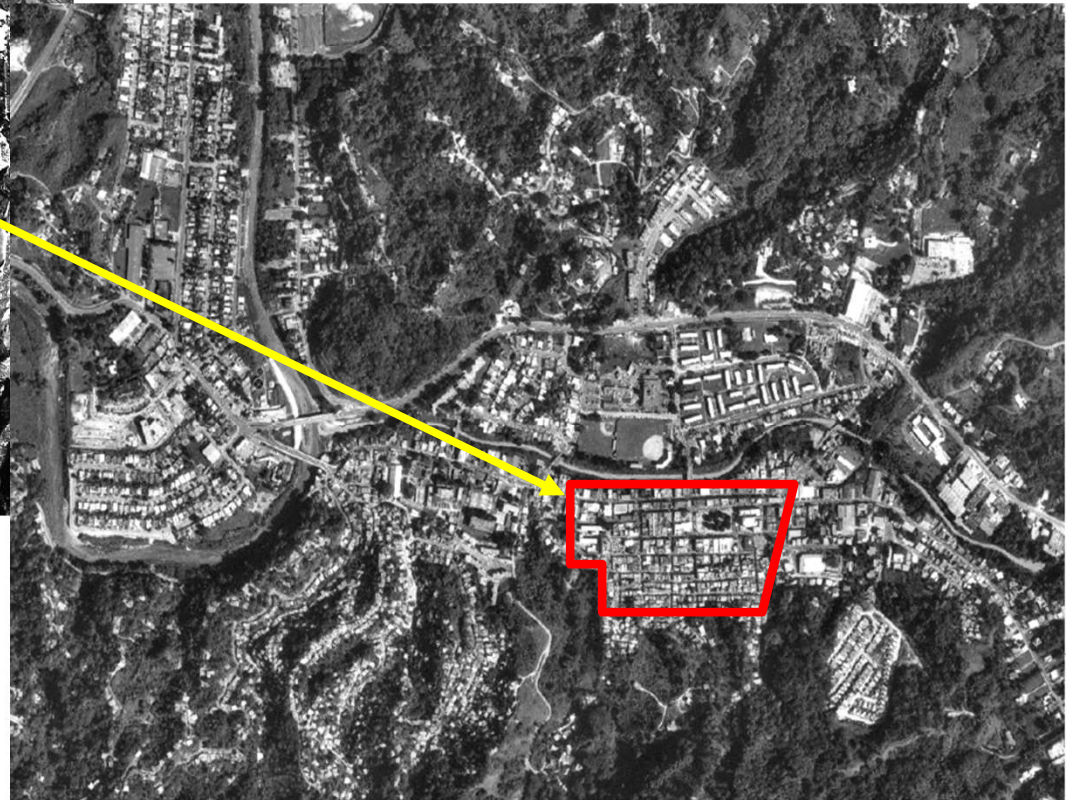
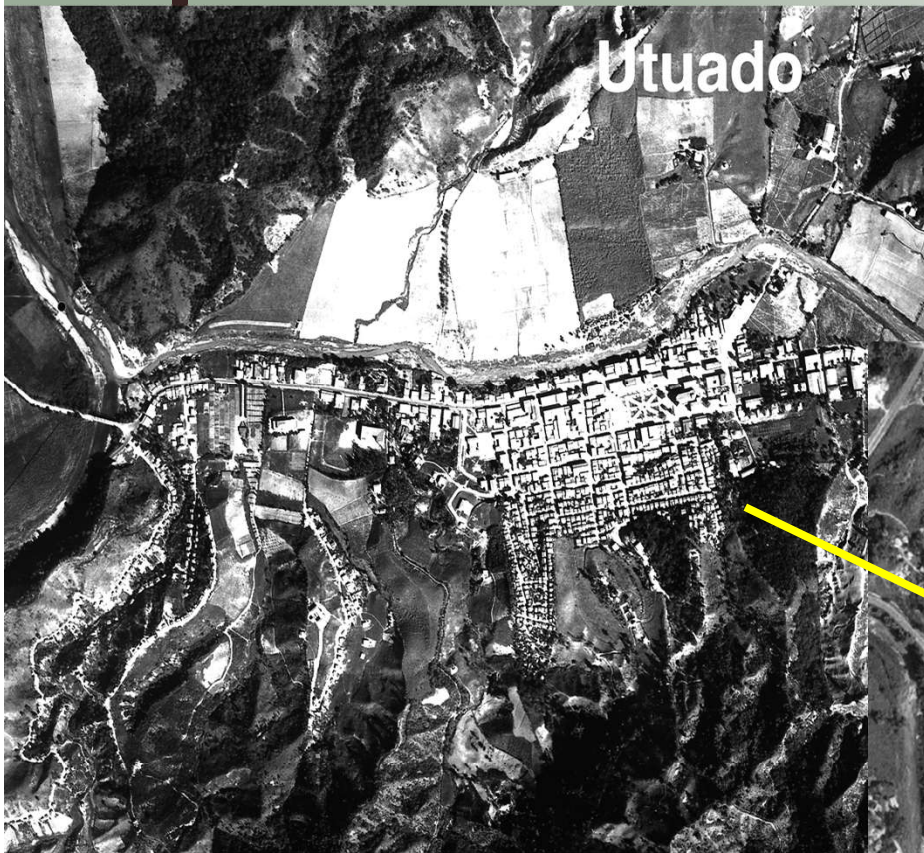
Indice de Fotografías de Porto Rico 1930



Example: Changes Between 1930 - 1995



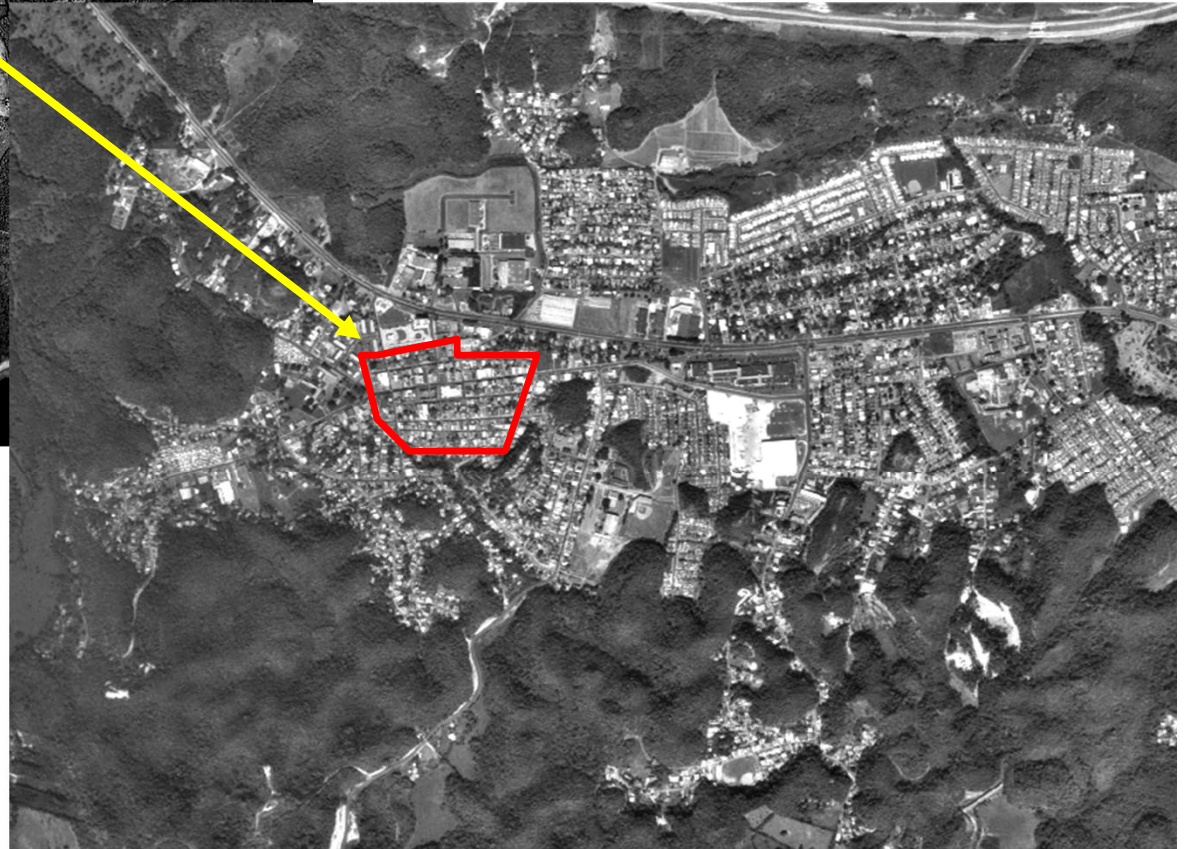
Example: Changes Between 1930 - 1995



Example: Changes Between 1930 - 1995



Example: Changes Between 1930 - 1995



San Jeronimo Fort Project

Project: Establishment of two Control Points and Search for the Boundaries of the Parcel of the San Jeronimo Fort

Location: Puerta de Tierra Ward San Juan, Puerto Rico

Petitionary: Instituto de Cultura Puertorriqueña

Date: May 2004 through December 2004

Work: Establishment of Two H & V Control Points using GPS that are Part of the NSRS, recover Boundaries of the Parcel using Old Maps and other Documents

Applications: Prove that the Fort had an Original Easement for it Access

San Jeronimo Fort Project



SAN GERONIMO FORT 1899

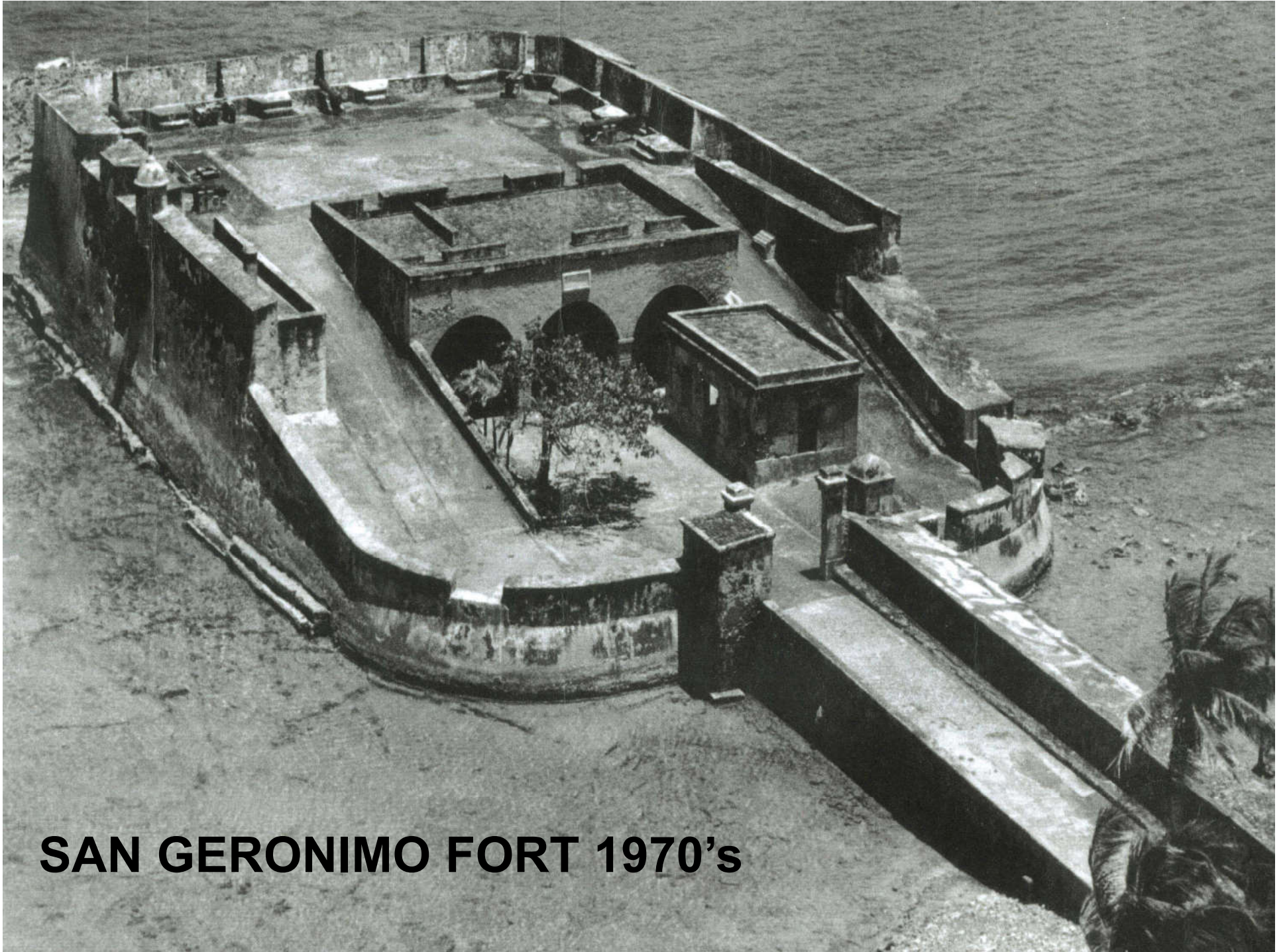


11407

SAN GERONIMO FORT EARLY 1900's

San Geronimo, San Juan, P.R.





SAN GERONIMO FORT 1970's

SAN GERONIMO FORT 1990's



Installation of Bronze Cap for GPS Observation



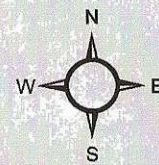
Data Gathering

- During July 29 and 30, 2004
- Using a Total Station Leica model TCR-407, a Recon data collector and four prisms

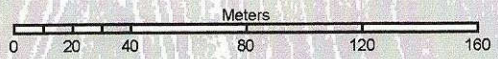




GPS Observation

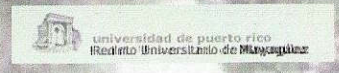


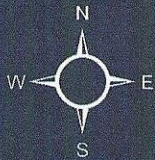
Levantamiento planimétrico realizado en julio de 2004
sobreimpuesto a plano titulado "Naval Reservations
at San Juan City" del 10 de diciembre de 1906



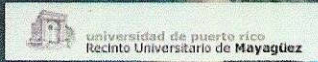


Levantamiento planimétrico realizado en julio de 2004
sobrepuesto a fotografía USGS DOQQ 1995





Levantamiento planimétrico realizado en julio de 2004
sobreimpuesto a fotografía IKONOS Space Imagine 2002





Levantamiento planimétrico realizado en julio de 2004 sobreimpuesto a plano titulado "Naval Reservations at San Juan City" del 10 de diciembre de 1906 y fotografía IKONOS Space Imagine 2002

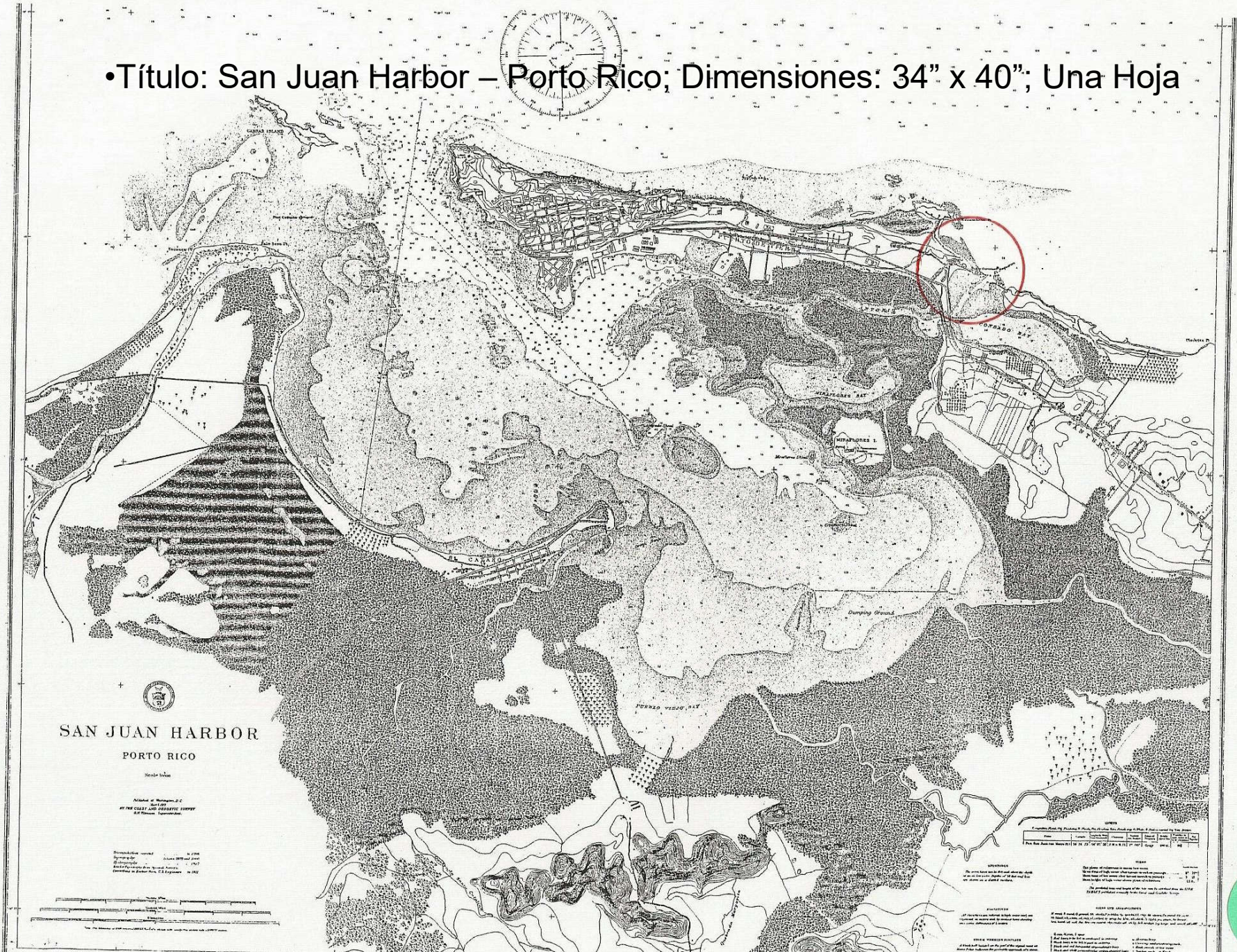


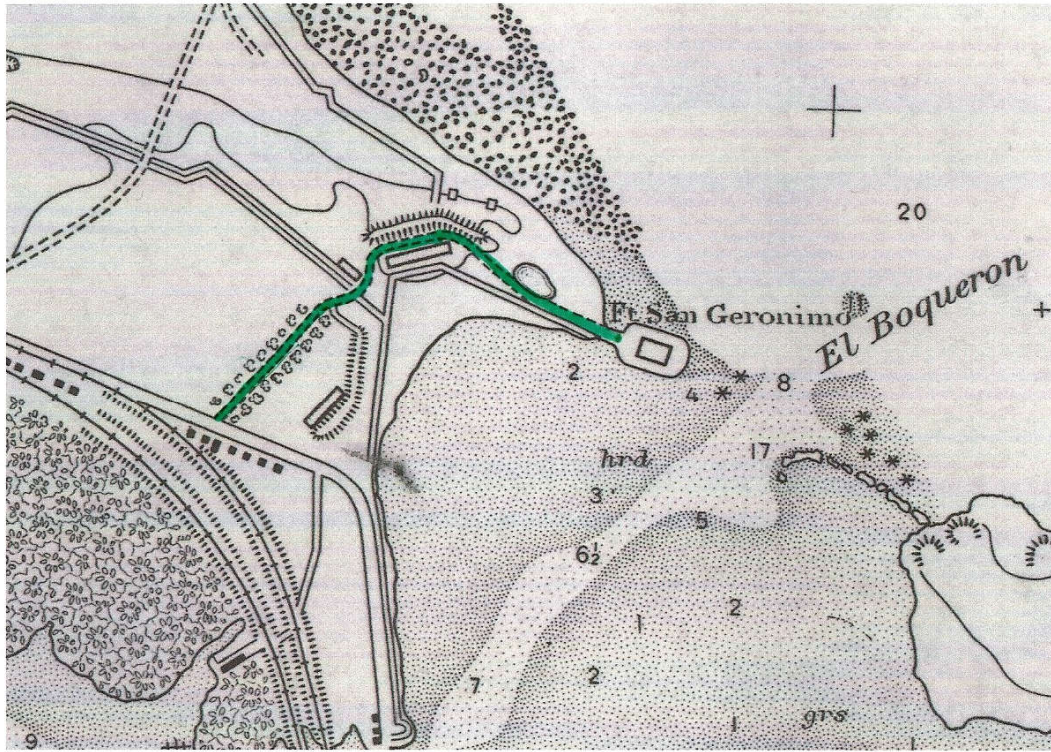
INSTITUTO
de CULTURA
PUERTORRIQUEÑA



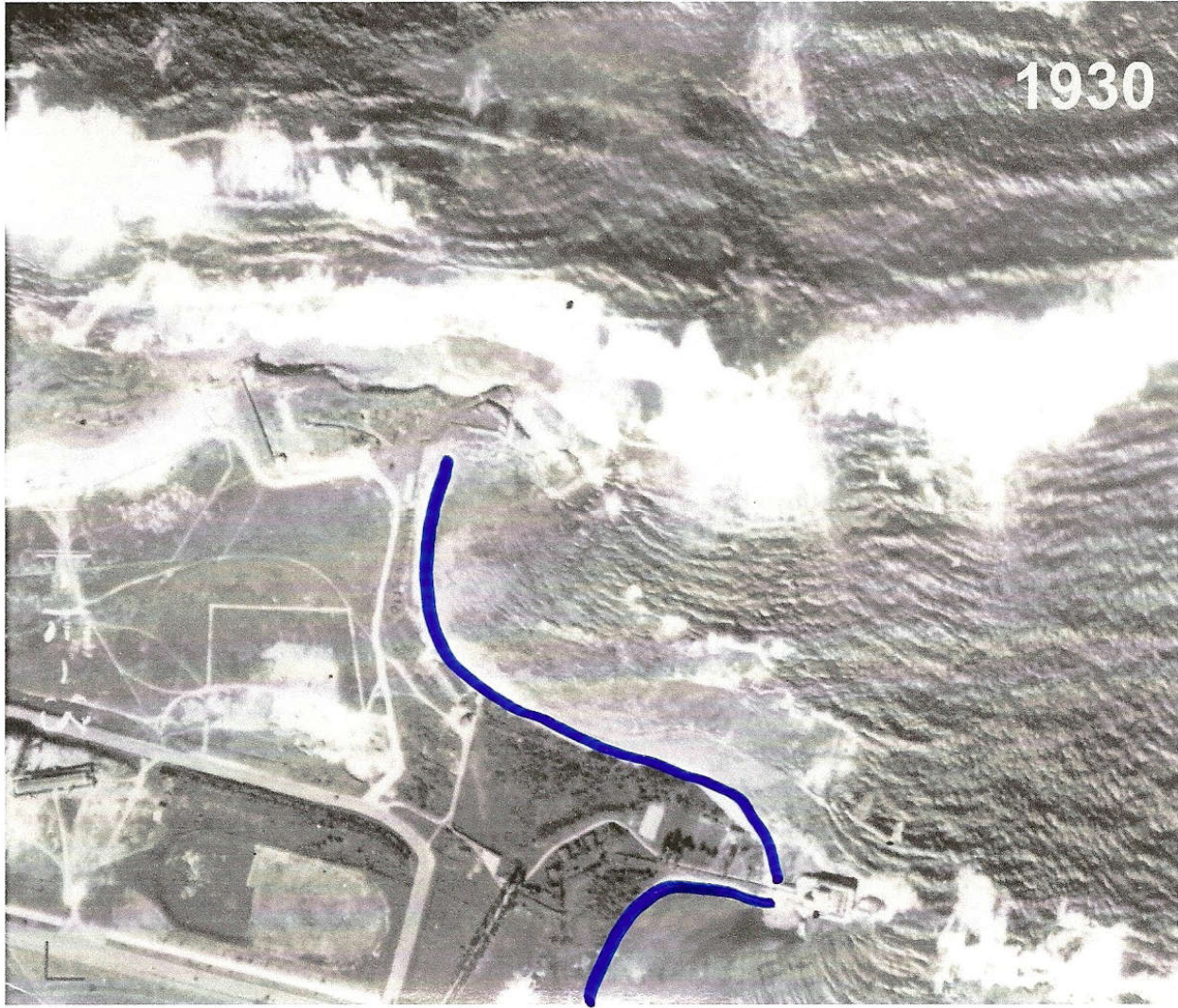
universidad de puerto rico
Recinto Universitario de Mayagüez

•Título: San Juan Harbor – Porto Rico; Dimensiones: 34" x 40"; Una Hoja

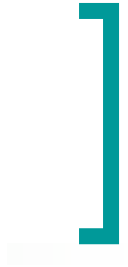
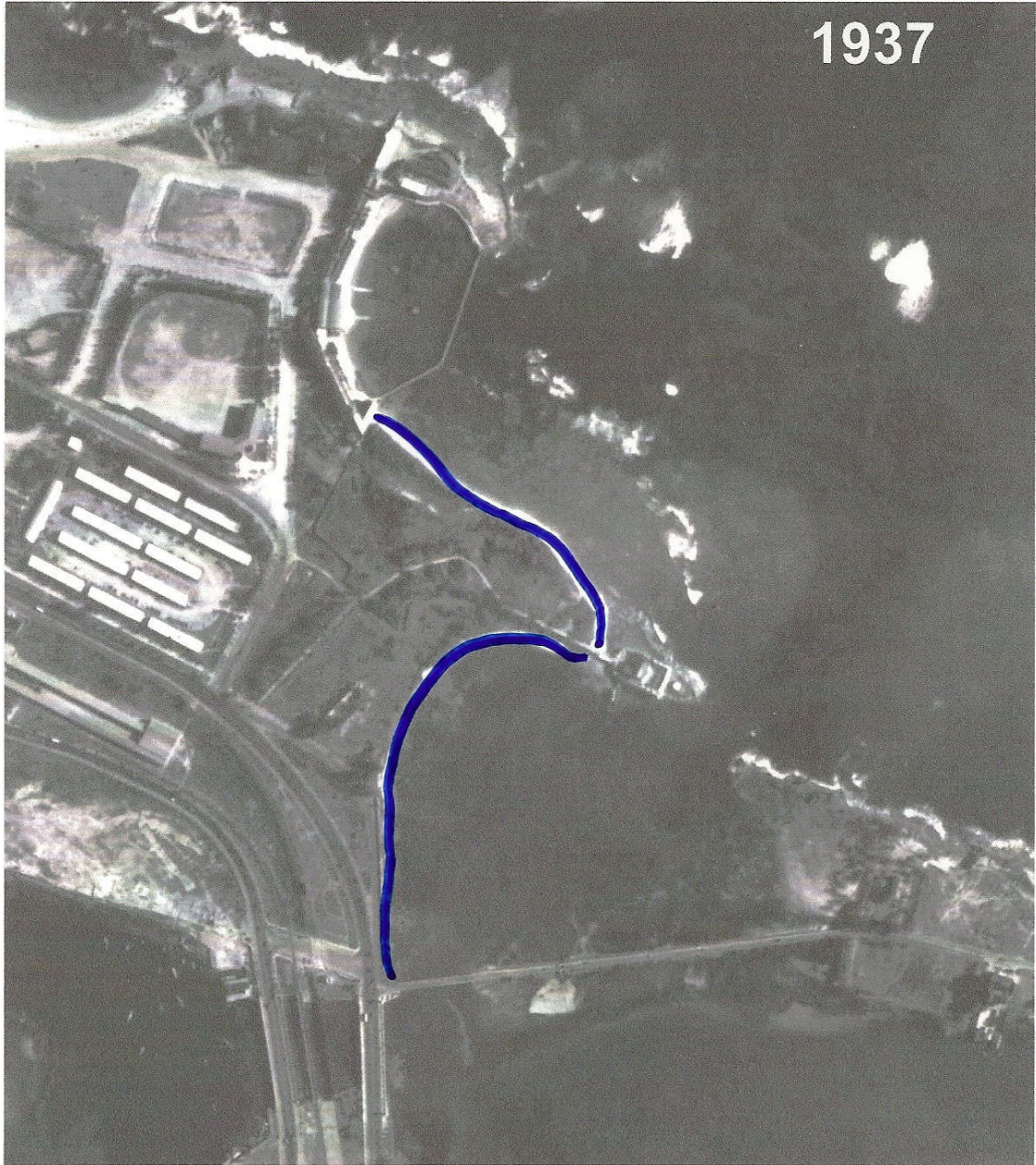


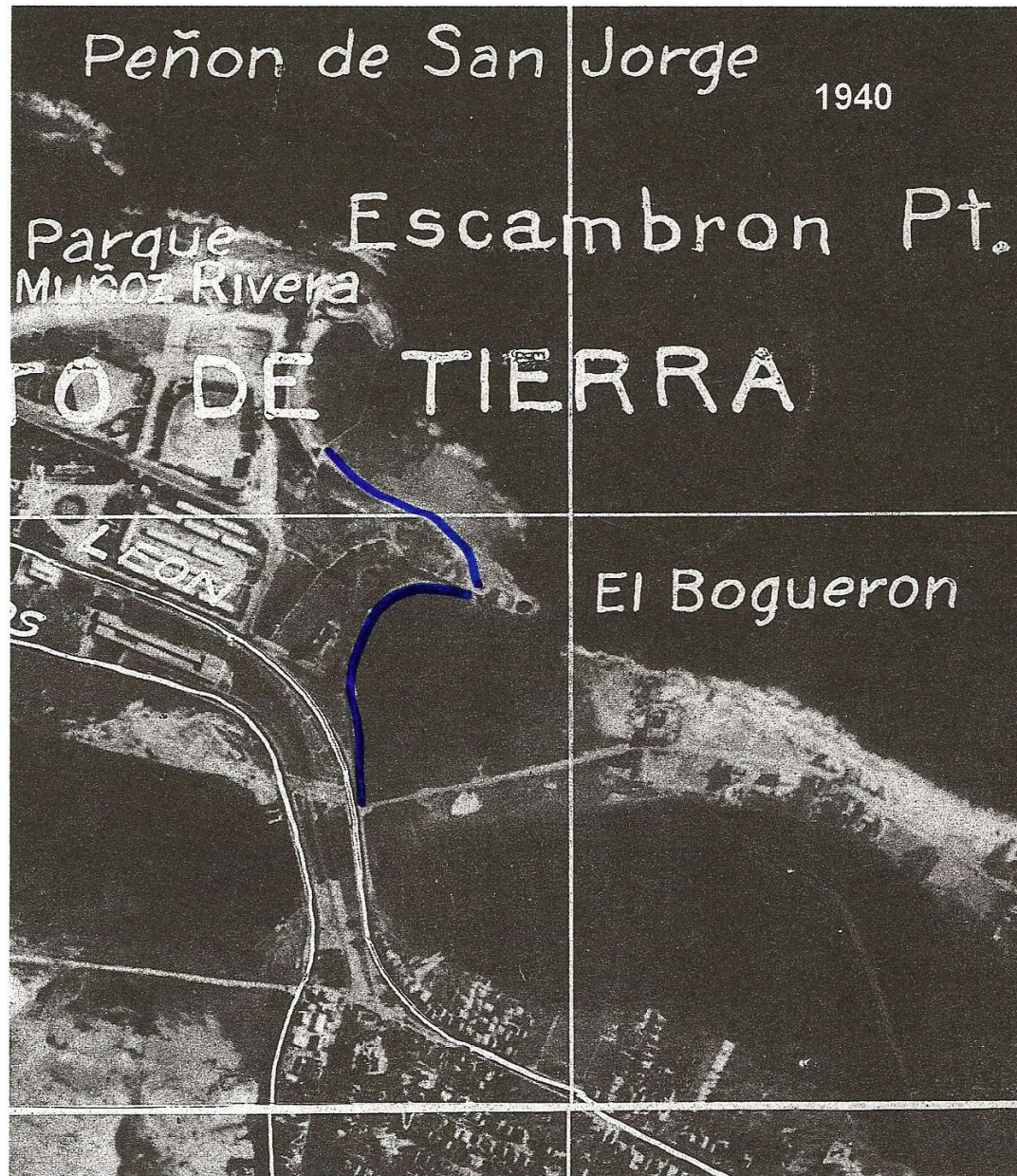


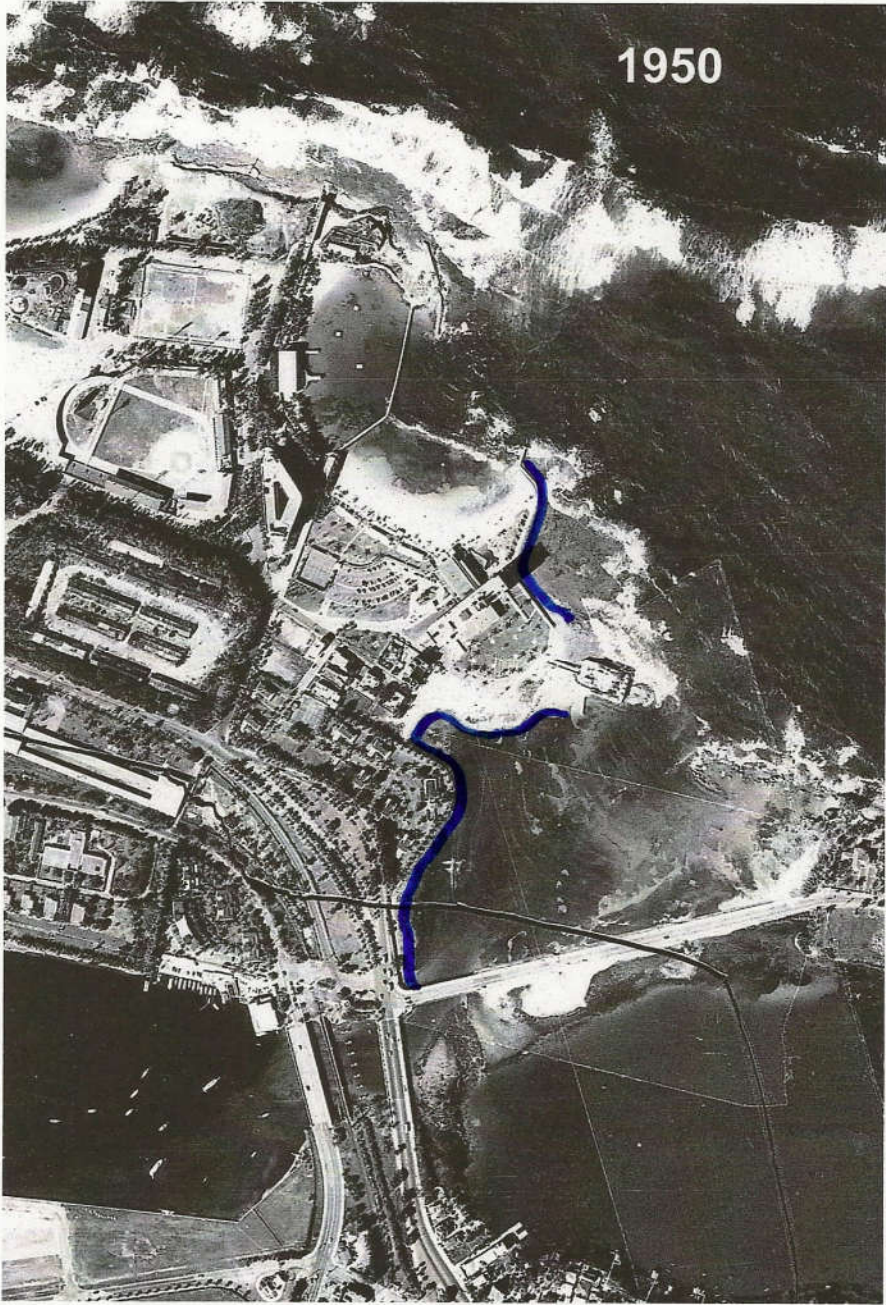
•Detail of the Fort San Gerónimo San Juan Harbor – Porto Rico

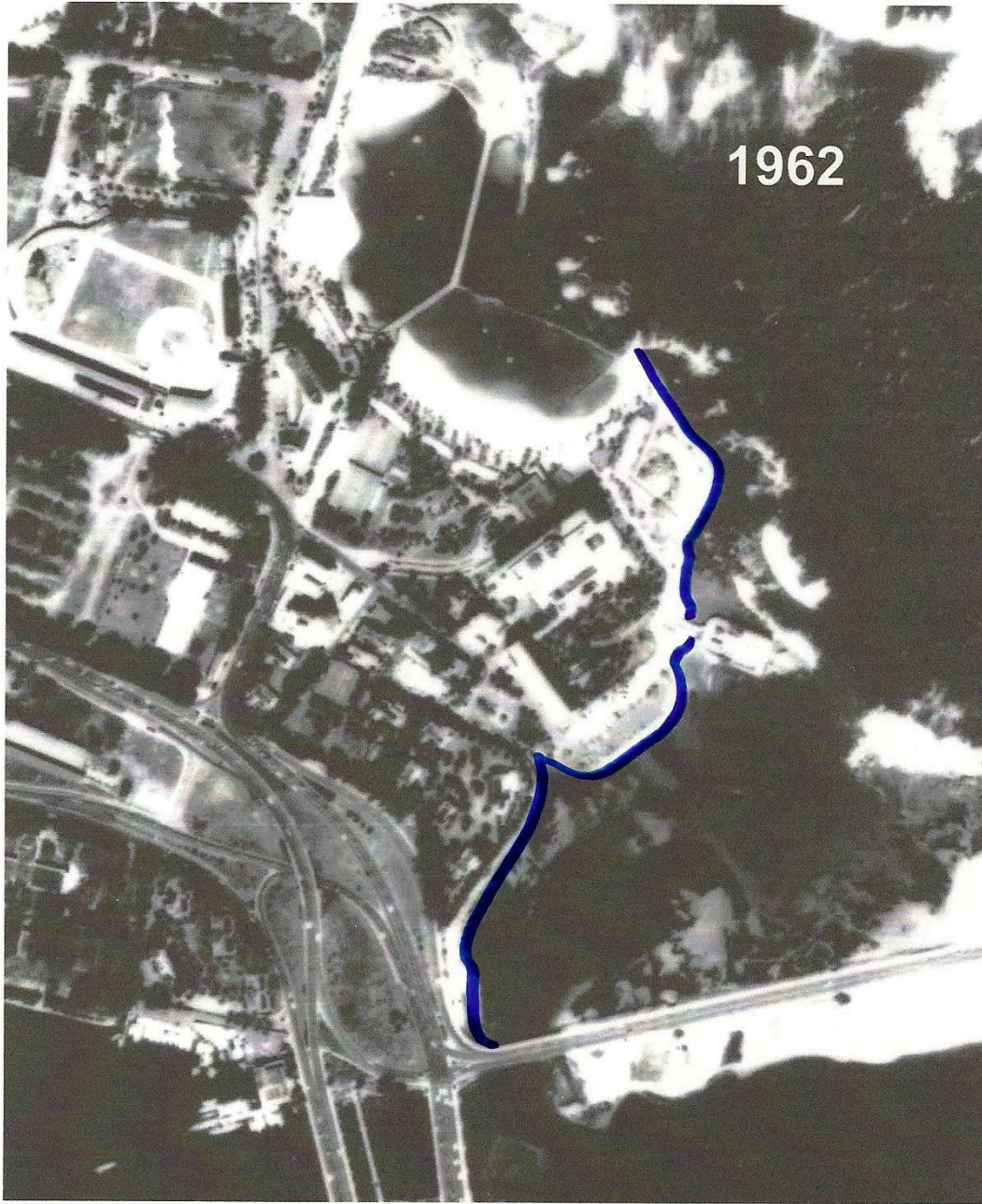


1930



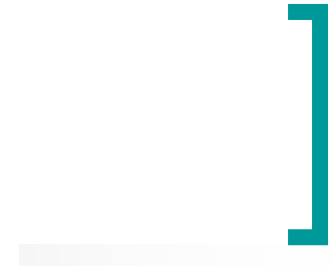
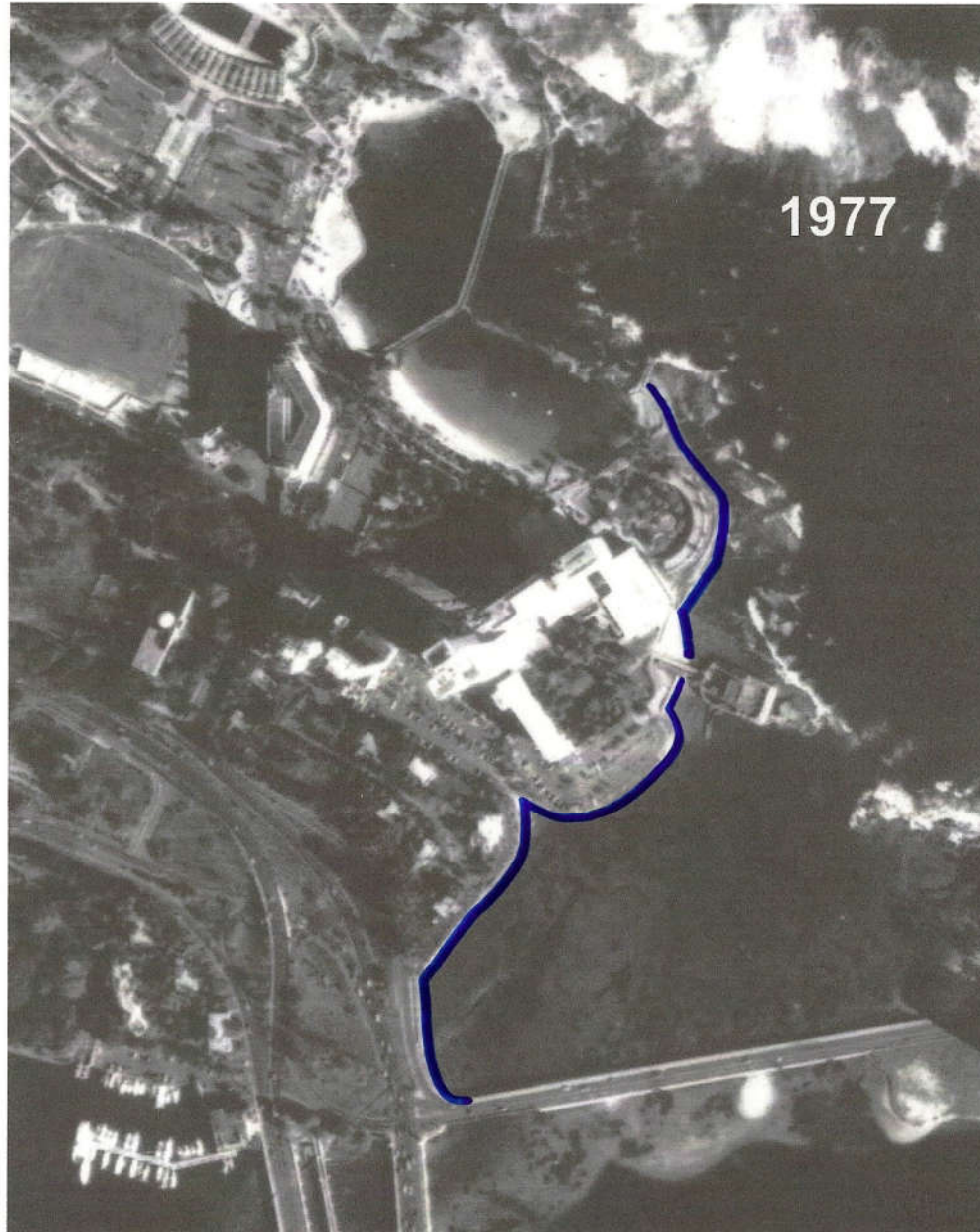




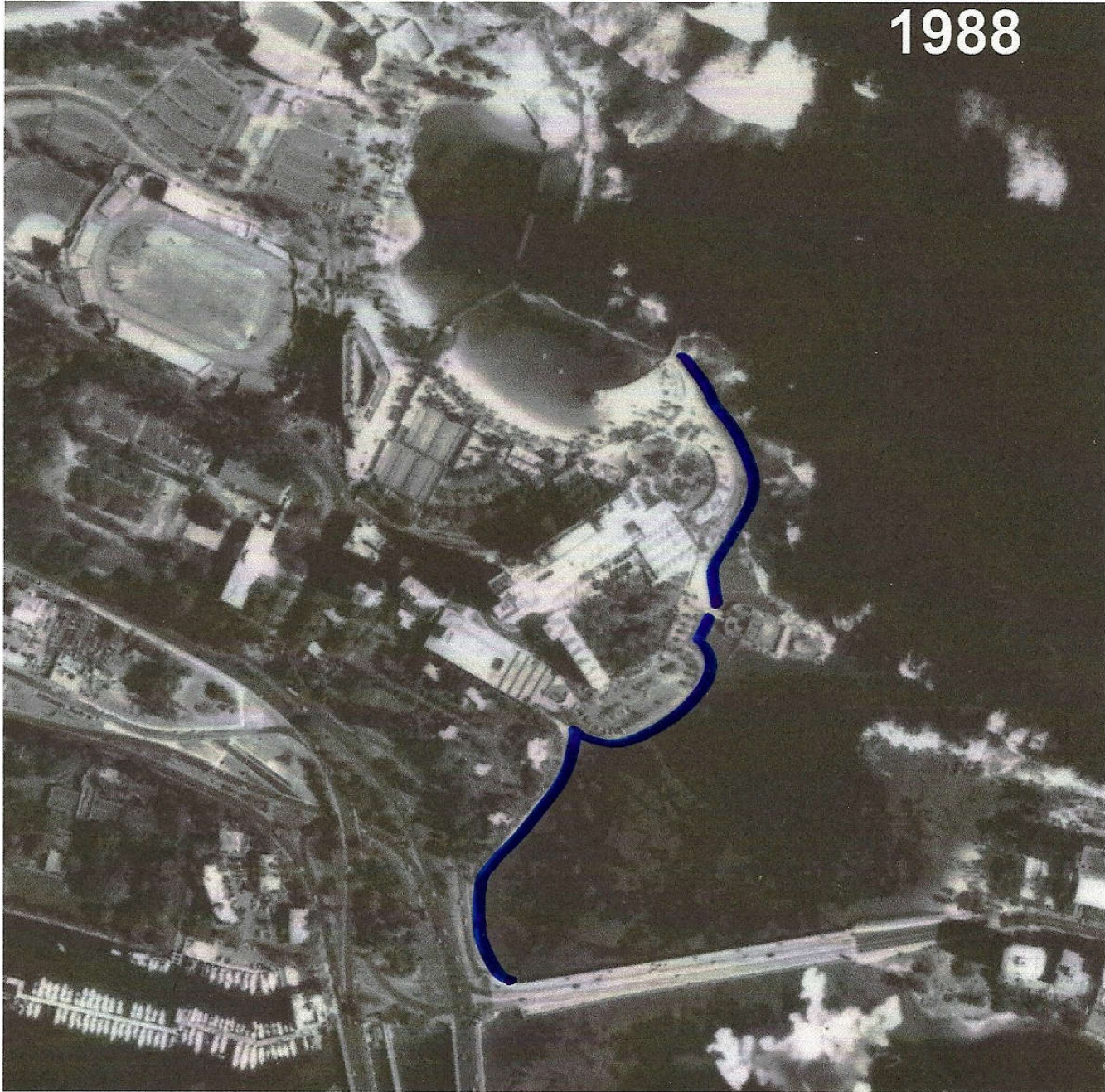


1962

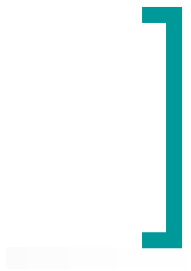
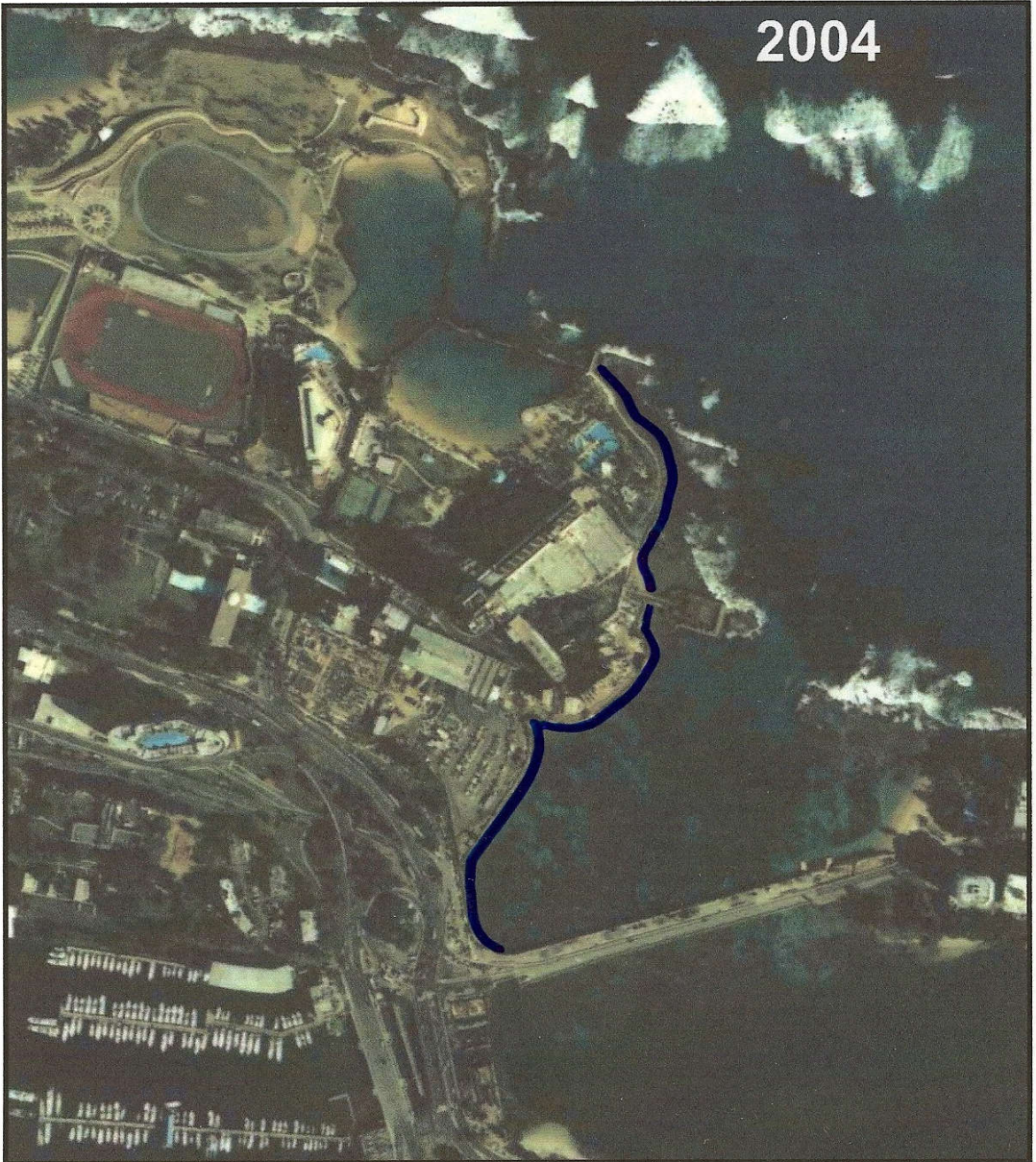




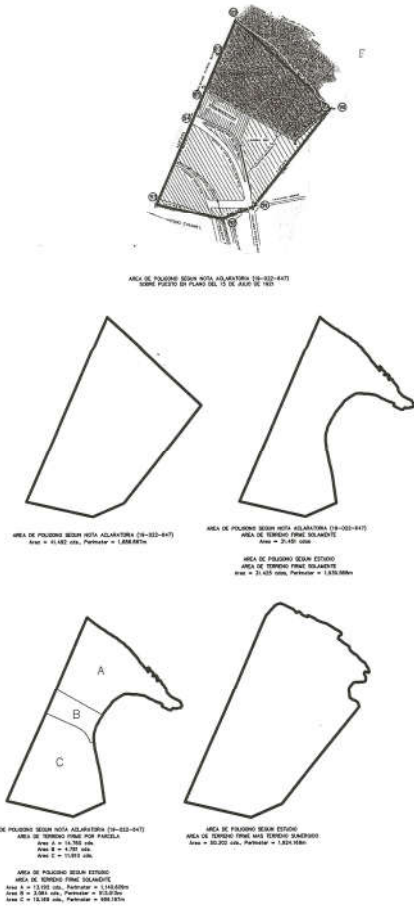
1988







Finca 196 and its relation with "Acta Aclaratoria" 19-022-647



-4-

-3-

-2-

19-022-647

NOTA ACLARATORIA

El Comisionado del Interior del Gobierno de Puerto Rico, que suscribe

CERTIFICA:-

que la finca que aparece inscrita a favor de Estados Unidos de América, en el Registro de la Propiedad de San Juan, Sección Primera, al folio 45 del tomo 9º de Puerto de Tierra, finca No. 196, inscripción 1a con la siguiente descripción redactada en idioma inglés:-

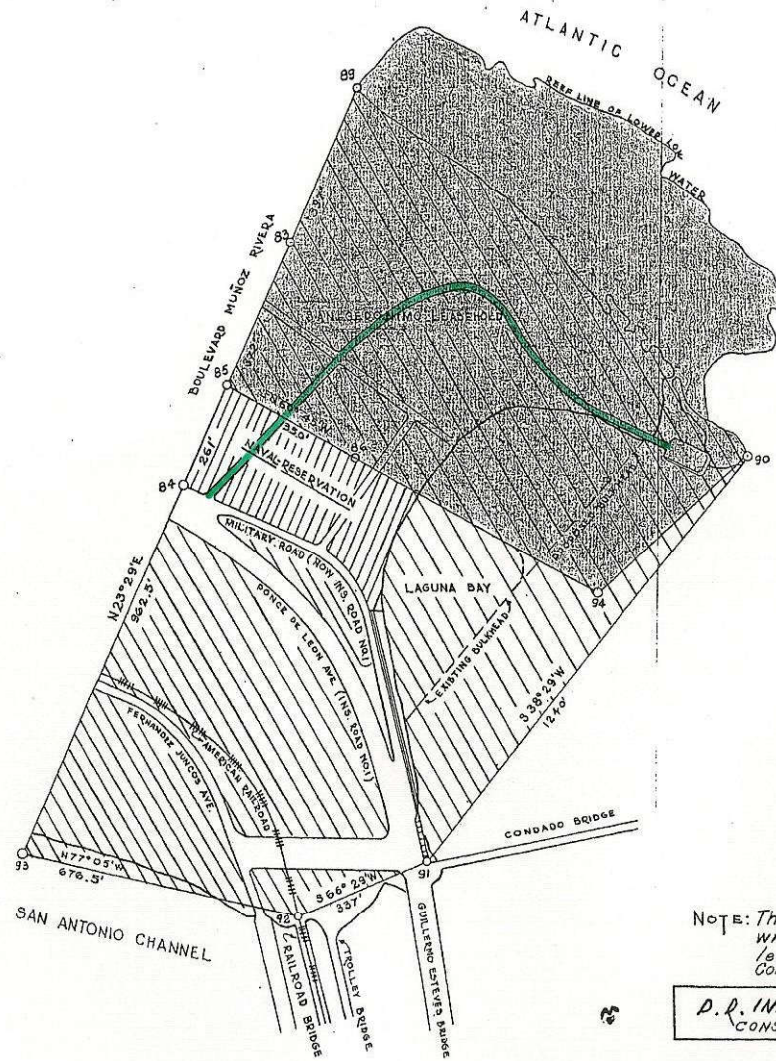
---Tract of land known as the San Gerónimo Naval Reservation and bounded as follows:- On the North by the sea; on the East, by the small inlet known as the Laguna; on the South by the San Antonio Channel; and on the West by tracts of land belonging to the People of Puerto Rico and by a tract of land belonging to the Treasury Department of the United States and by the Military Reservation of San Juan, Porto Rico. Said tract of land, the San Gerónimo Naval Reservation, is described by meter and bounds as follows:- Beginning at monument number eighty four (84) on the military road as shown on the Military Chart of the Military Reservation of San Juan, P. R. and extending north twenty three degrees twenty nine minutes east (N 23º 29' E) three hundred ninety seven (397) feet to the sea to point number eighty nine (89) thence easterly along the sea to point number ninety (90) on the rocks in front of the old Fort San Gerónimo; thence, south




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San Gerónimo Naval Reservation; Dimensions: 17" x 22"



-  Tract of Land Transferred to the People of Puerto Rico by Proclamation issued by the President of the United States on August 26, 1929.
-  Tract of Land Reserved for the Navy Department by the above mentioned proclamation
-  Lease granted to Lt. Commander Virgil Baker, U.S. Navy (Retired) Under Special Authority of the Congress of the United States on July 15, 1921.

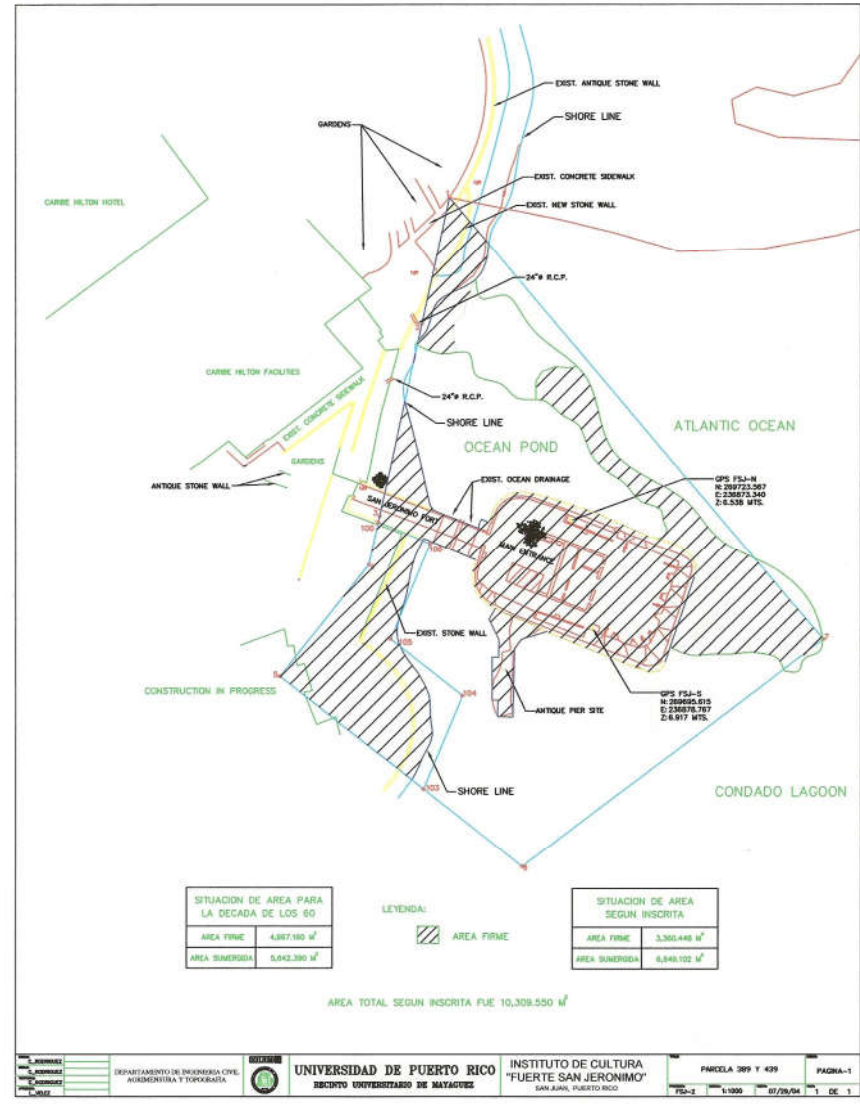
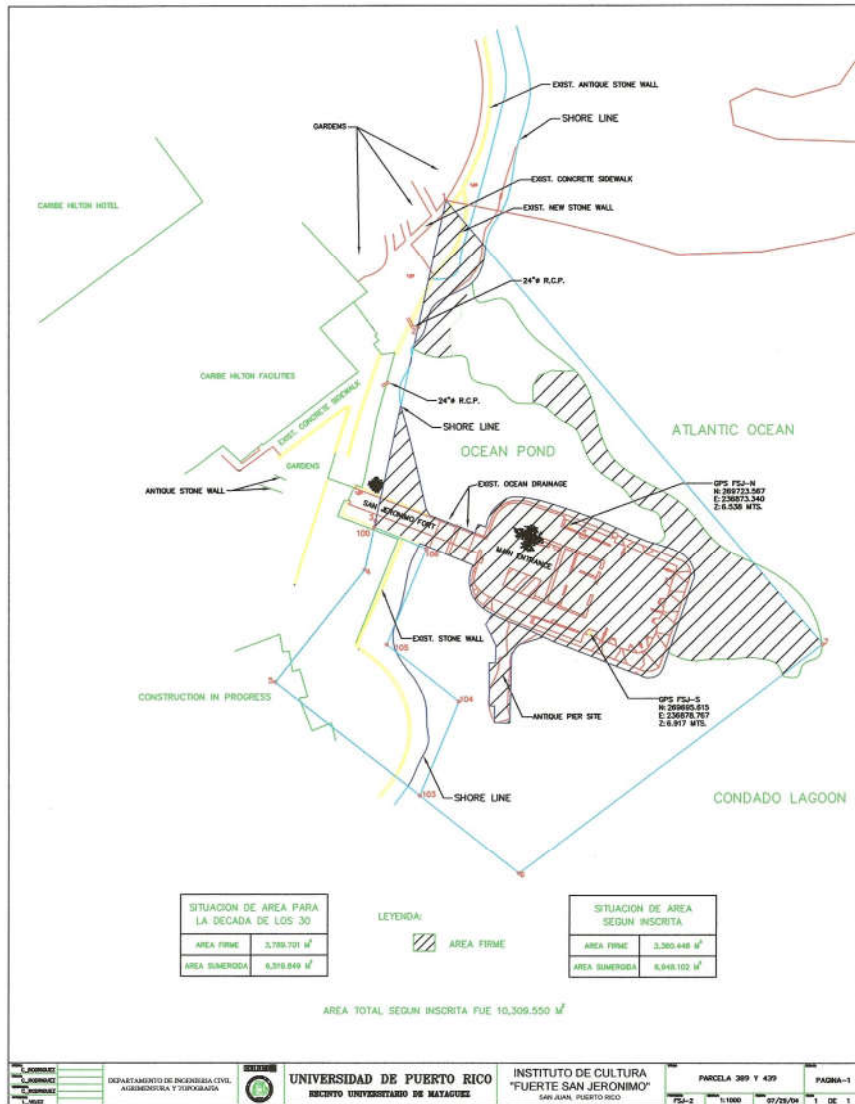
SCALE
1:2400

NOTE: This plan was made in accordance with the written description that appears on the lease granted by Congress of U.S.A. to Lt. Commander Virgil Baker, U.S. Navy (Retired) on July 15, 1921.

D. D. INDUSTRIAL DEVELOPMENT CO. CONSTRUCTION ENGINEERING DIVISION	NO.	DATE	BY	DESCRIPTION
	REVISIONS			
SURVEYED		DATE		
COMPUTED H.I.R.		DATE 3/23/47		
DESIGNED		DWG. NO.		
DRAWN H.I.R.		125-32		
RECOMMENDED	DATE	TRACED	H.I.R.	SHEET NO.
APPROVED	DATE	CHECKED		1 of 1 SHEETS

SAN GERONIMO NAVAL RESERVATION

1930 Versus 1960



2007

