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X = 3,276,282.82

P.O.B.  
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X = 3,276,793.34

P.O.B.  
ISLAND 2  
Y = 13,699,201.85  
X = 3,276,383.64

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Y = 13,698,828.47  
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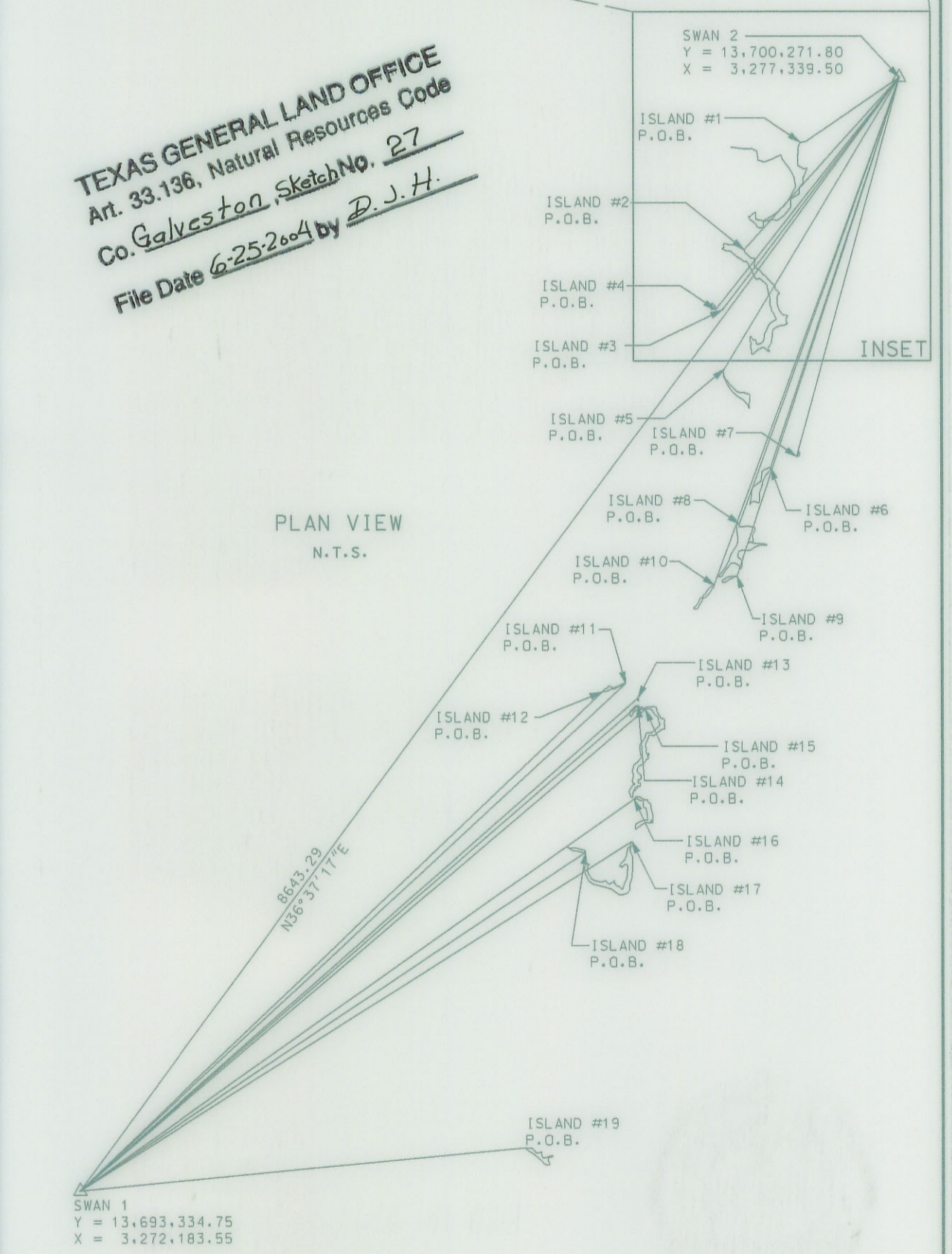
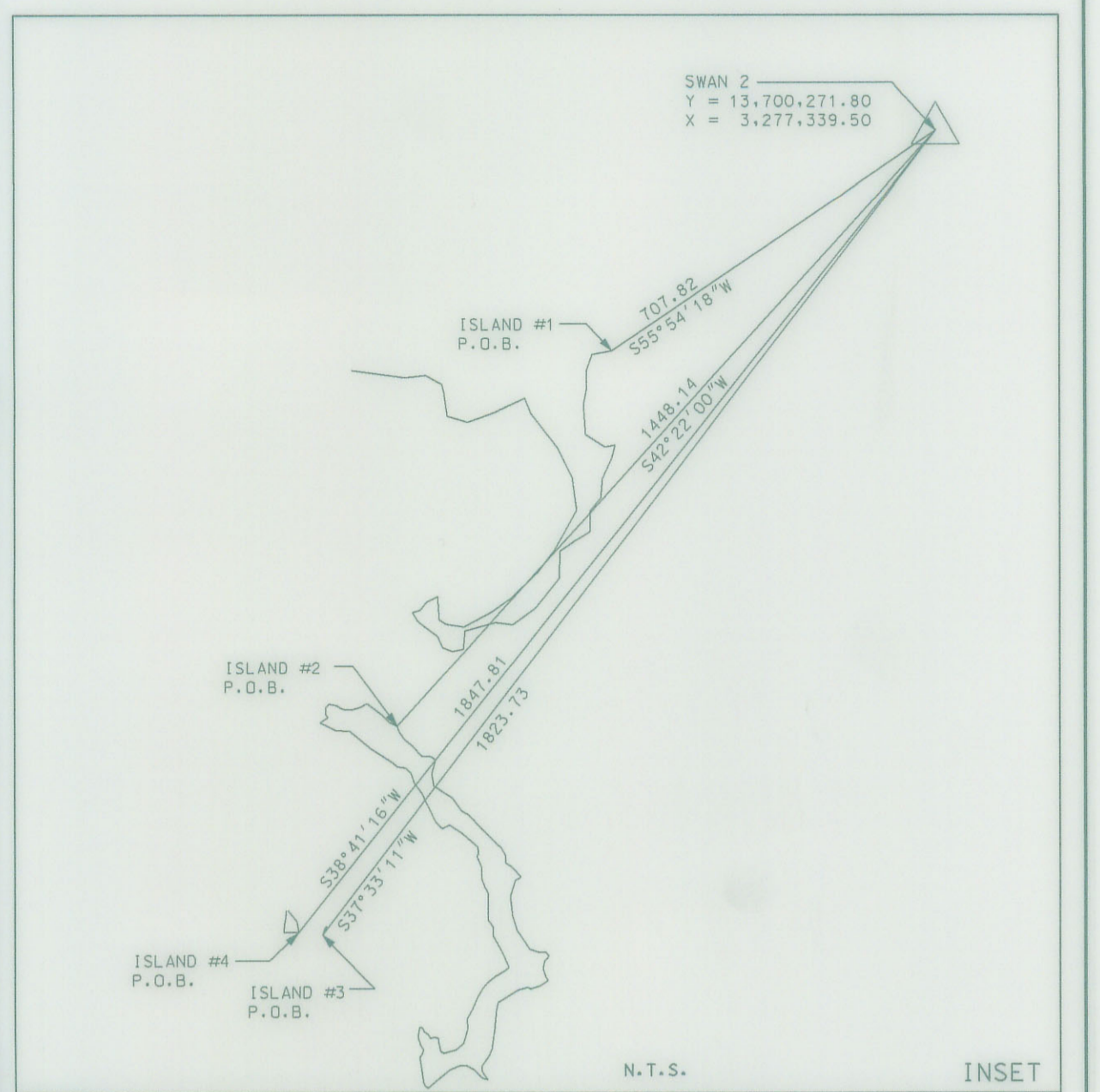
ISLAND #1

ISLAND #4

ISLAND #3

ISLAND #2

MATCH LINE SHEET 3 OF 6



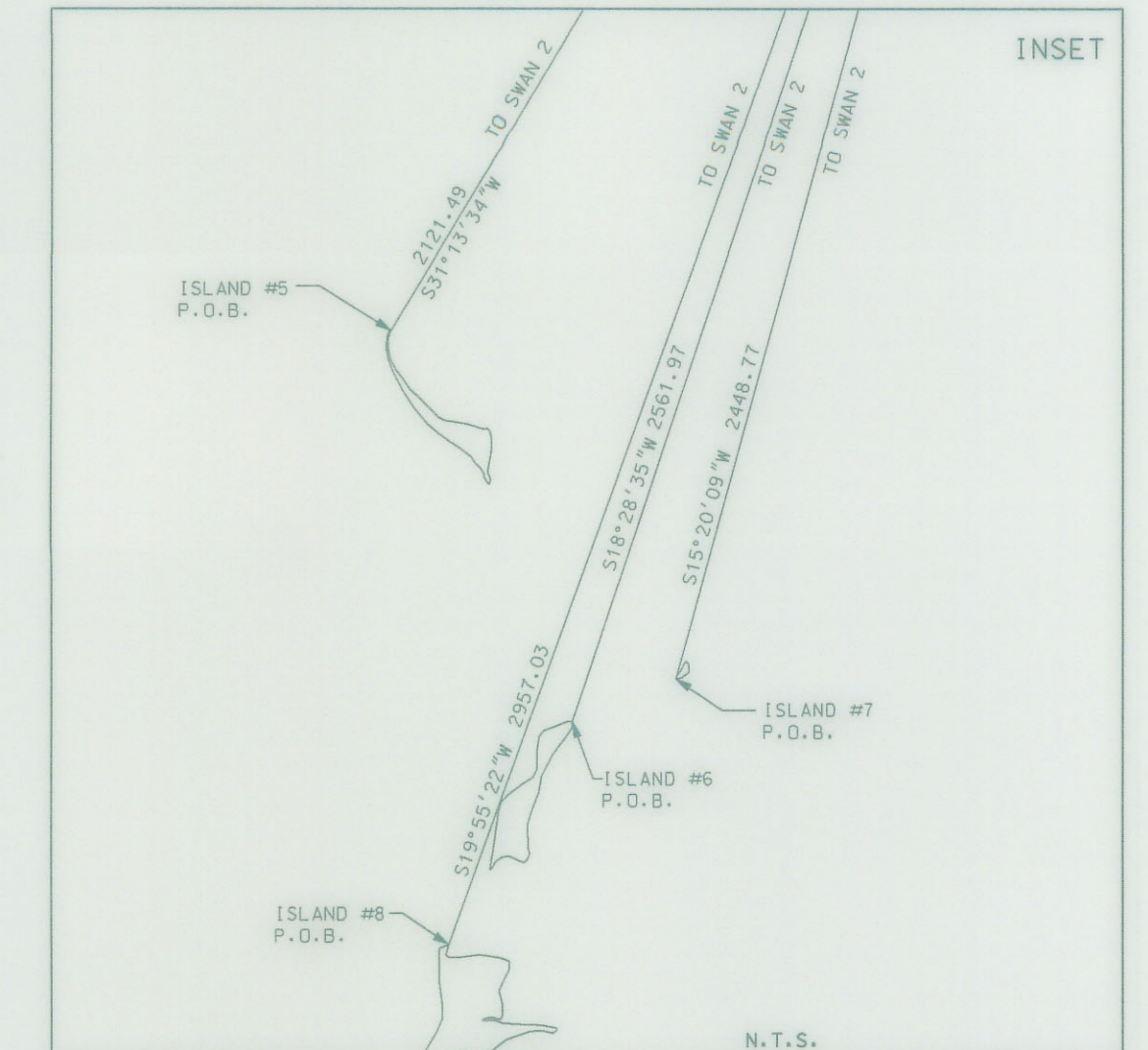
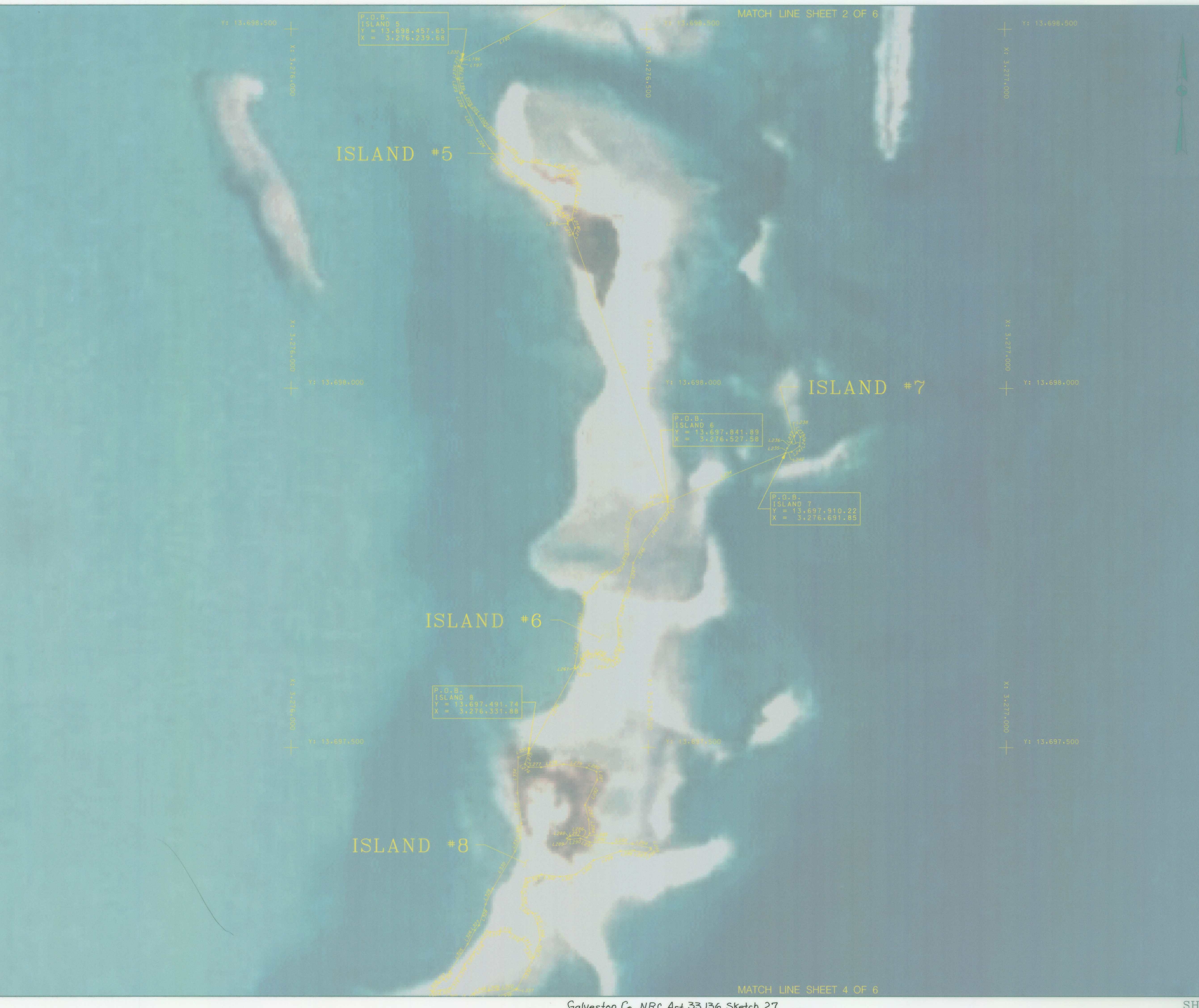
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Art. 33.136, Natural Resources Code  
Co. Galveston, Sketch No. 27  
File Date 6-25-04 by D.J.H.

NOTE: Date of Photography is January 1995

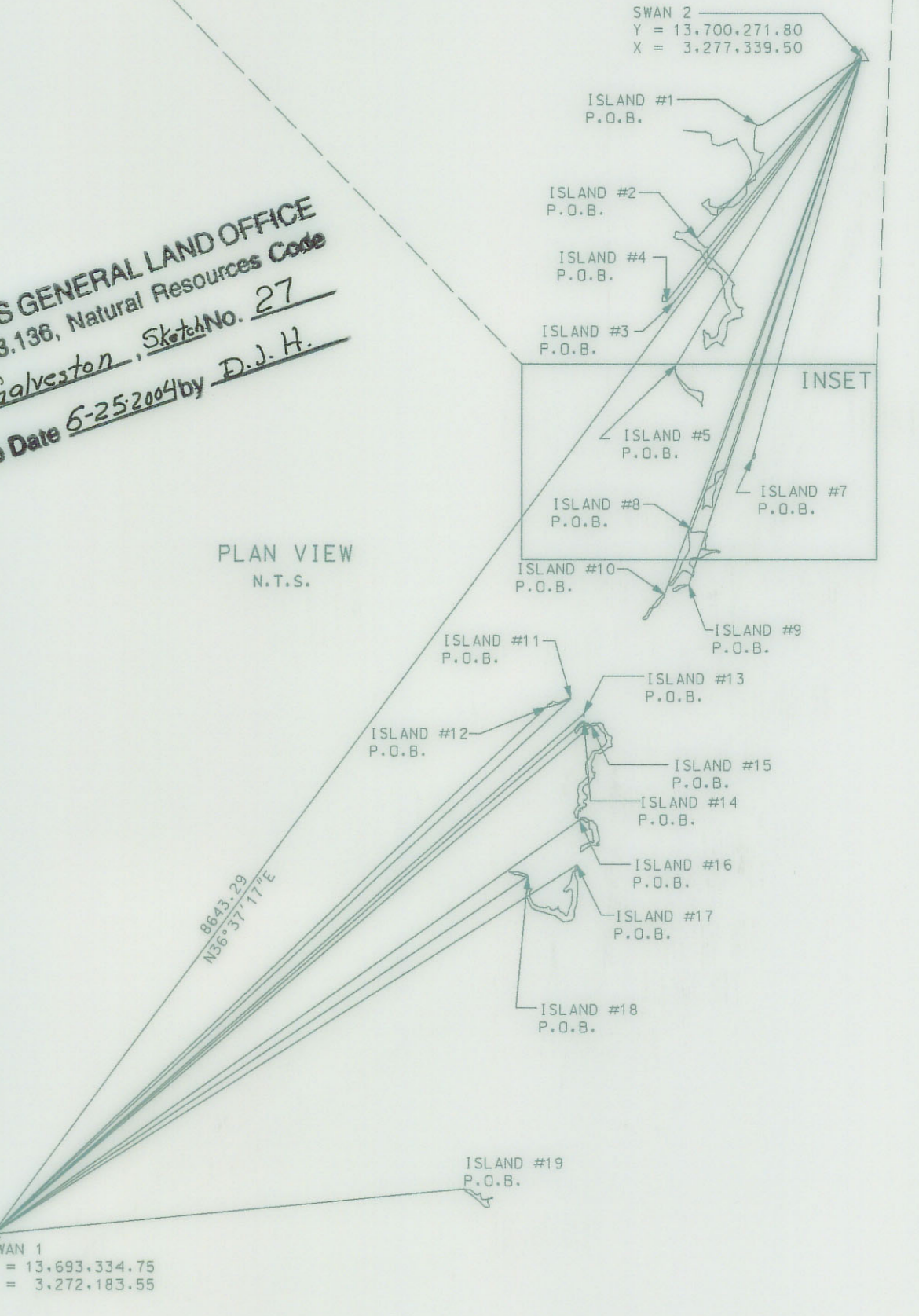
SURVEY OF  
APPROXIMATELY 7000 LINEAR FEET OF A  
BARRIER PENINSULA SEPARATING SWAN  
LAKE FROM GALVESTON BAY  
ALONG A PORTION OF THE H.B. LITTLEFIELD  
SURVEY, ABSTRACT NUMBER 143,  
IN GALVESTON COUNTY, TEXAS

**SURVCON INC.**  
PROFESSIONAL SURVEYORS  
5767 WOODWAY, SUITE 101 WEST  
HOUSTON, TEXAS 77057  
PH. (713) 780-4123  
www.survcon.com

SCALE: 1" = 60'	JOB NO. 8196-10-05000
DATE: 8-05-03	F.B. NO. 1
DRAWN BY: RFH/OAM	PROJECT: SWAN LAKE



TEXAS GENERAL LAND OFFICE  
Art. 33.136, Natural Resources Code  
Co. Galveston, Sketch No. 27  
File Date 6-25-2004 by D.J.H.

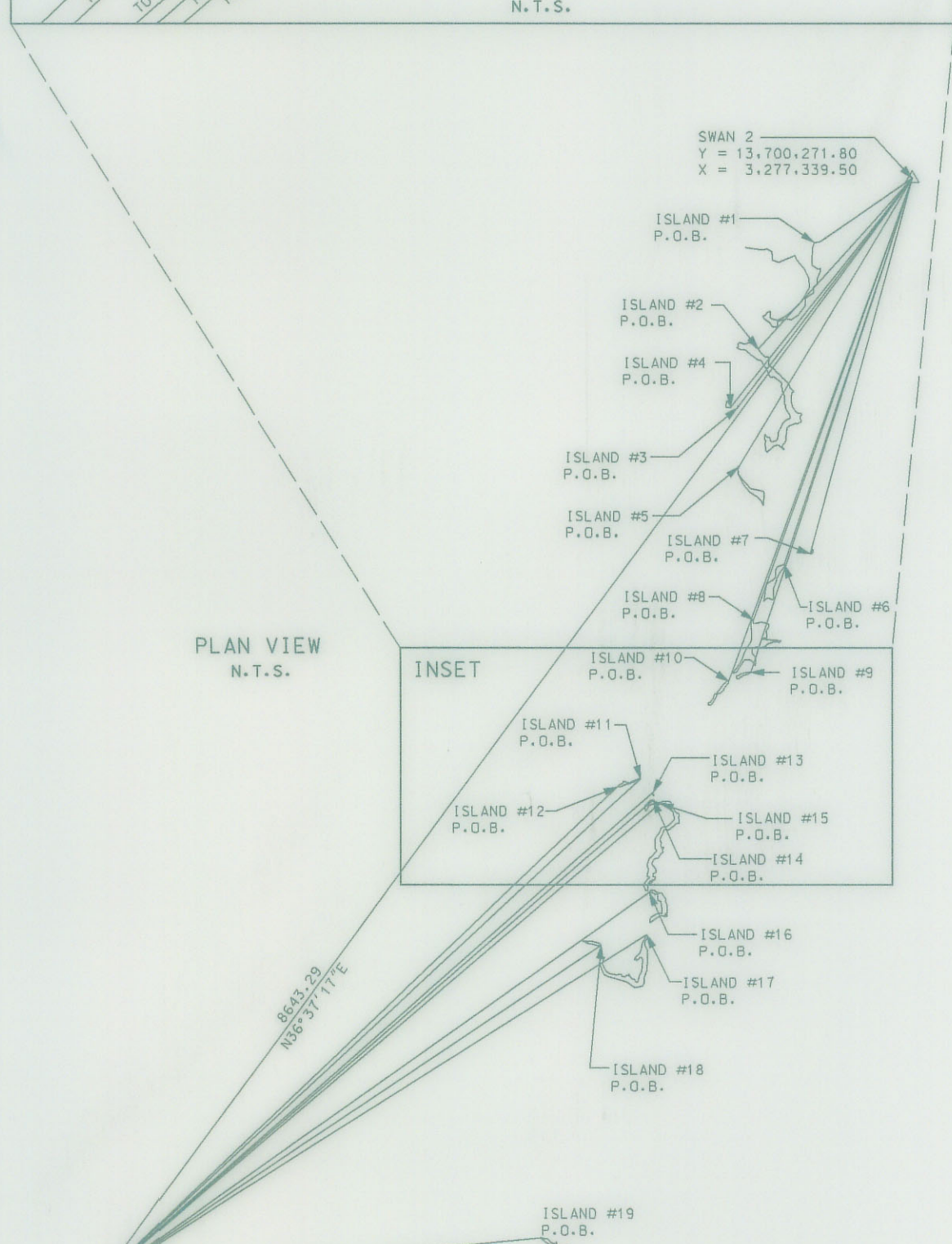
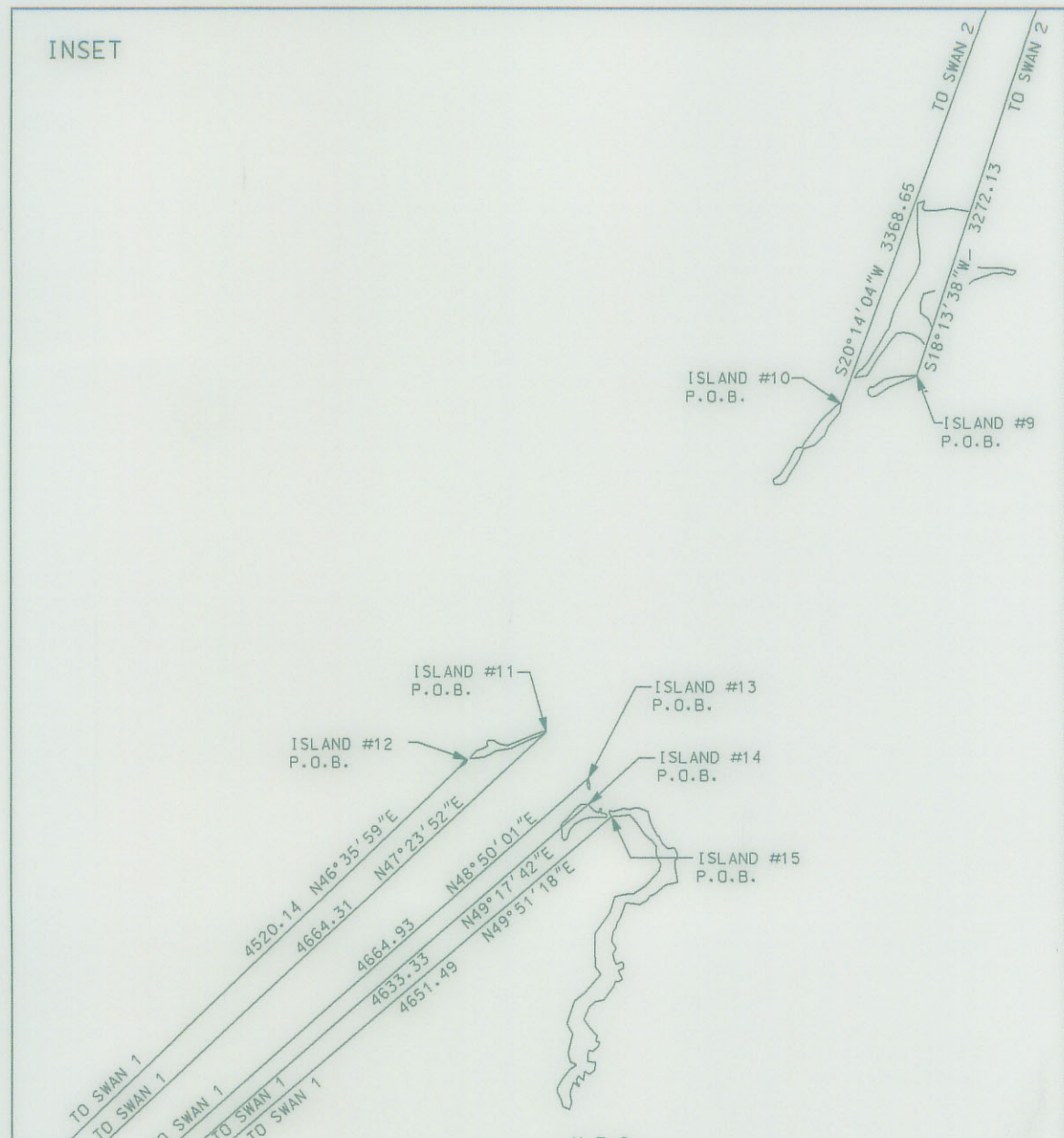


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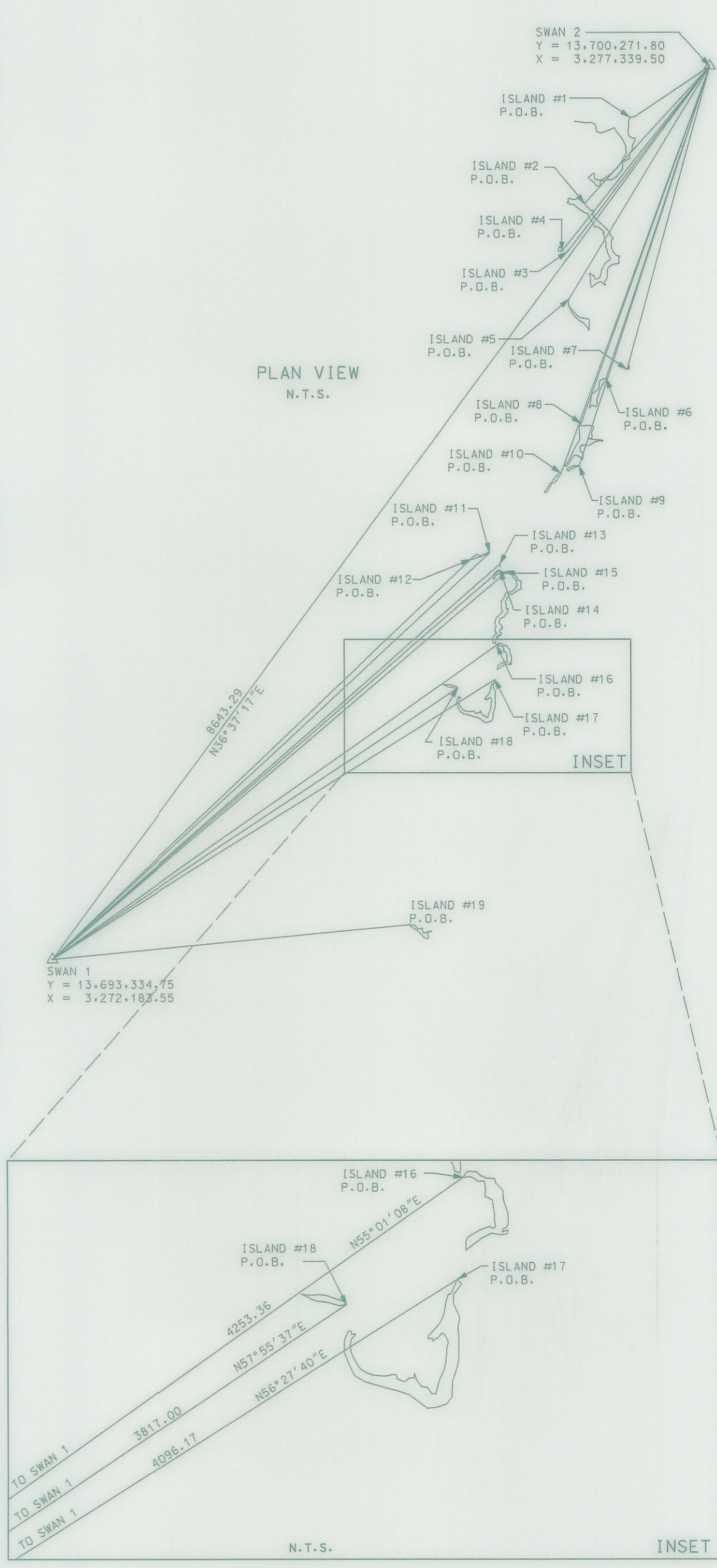
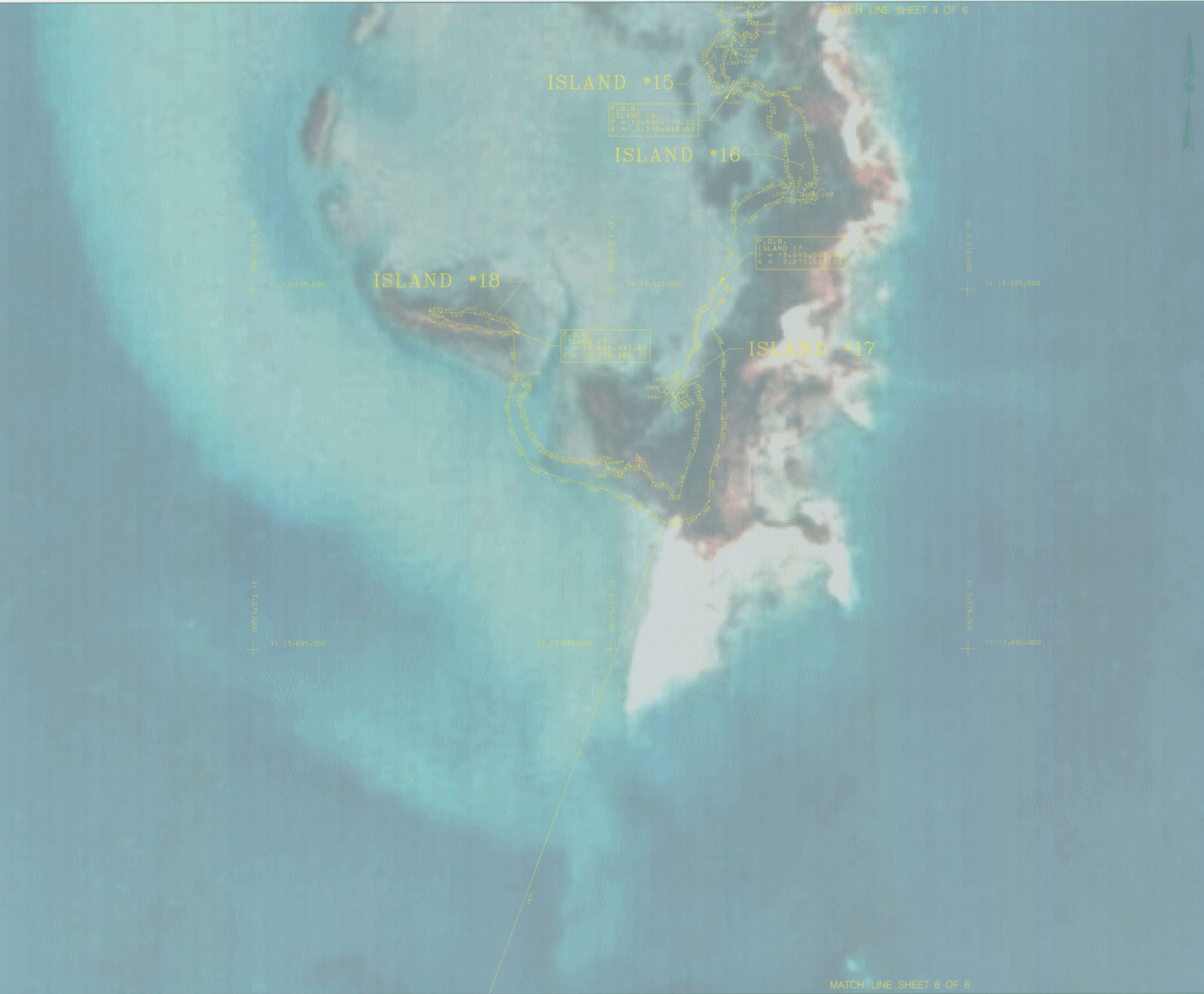
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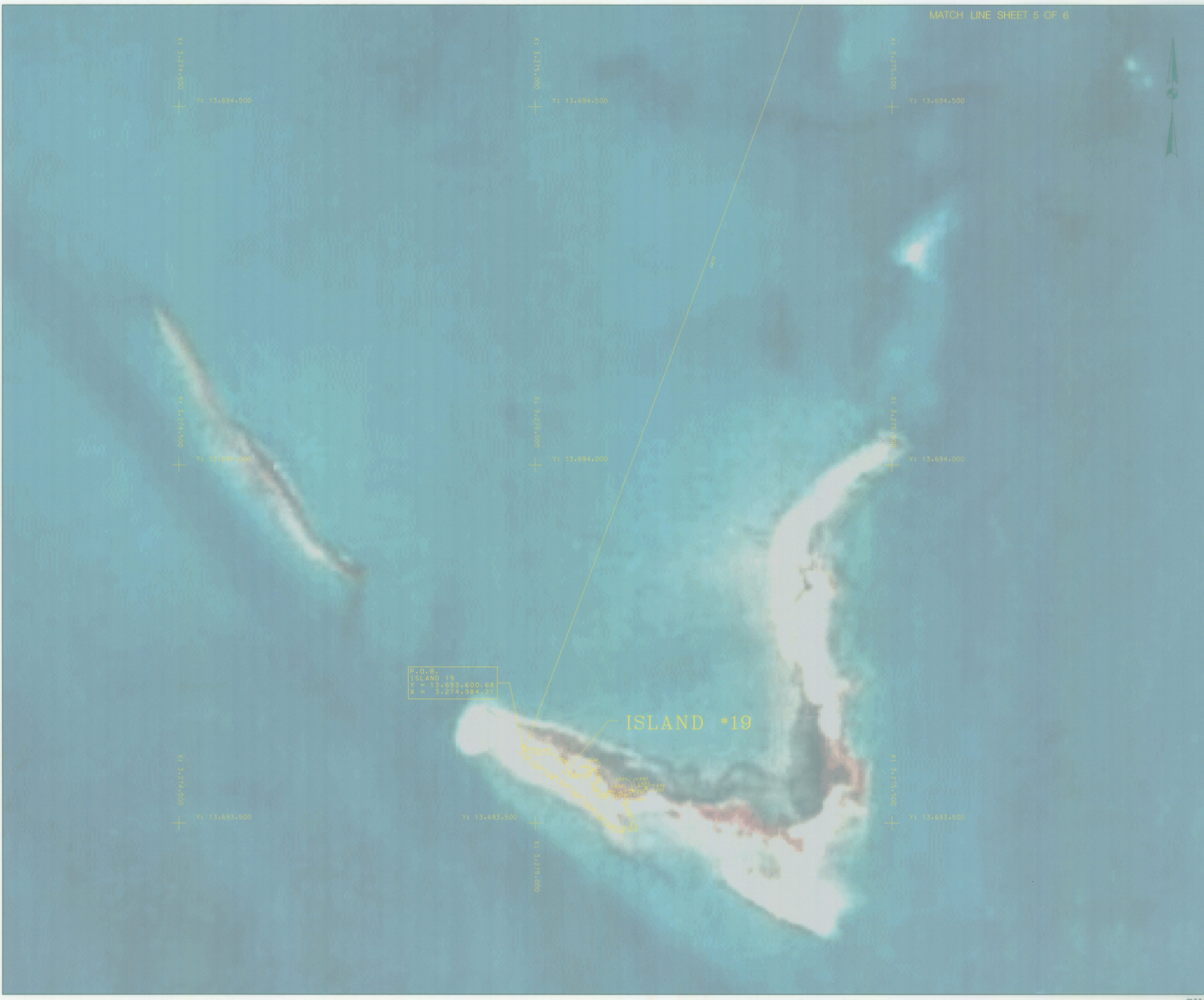
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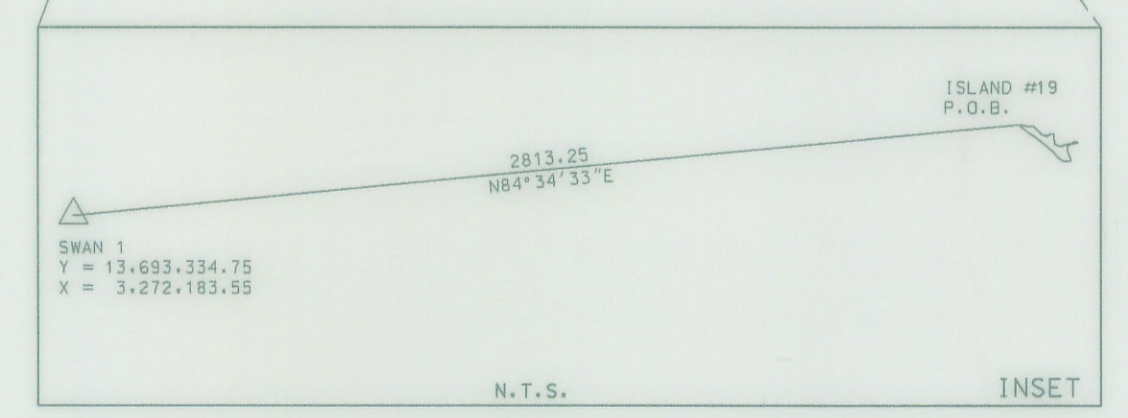
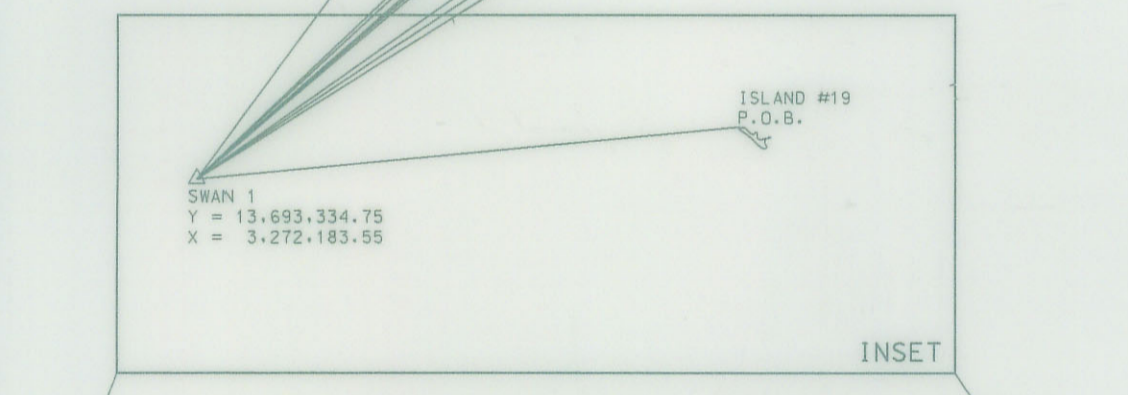
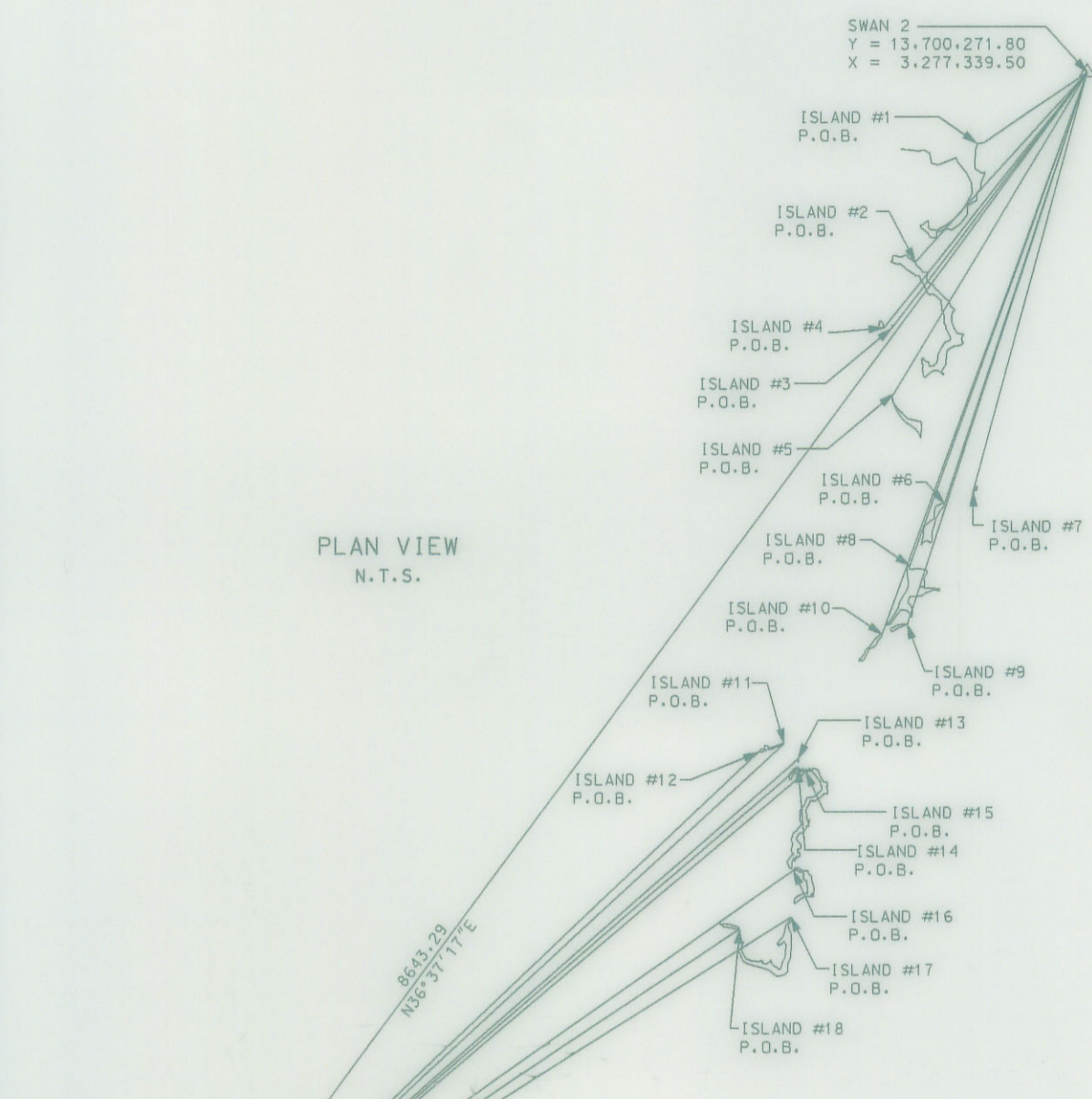
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 ALONG A PORTION OF THE H.B. LITTLEFIELD  
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 HOUSTON, TEXAS 77057  
 PH. (713) 760-4123  
 www.survcon.com

SCALE: 1" = 60'	JOB NO. 8196-10-05000
DATE: 8-05-03	F.B. NO. 1
DRAWN BY: RFH/DAM	PROJECT: SWAN LAKE



PLAN VIEW  
N.T.S.



P.O.B.  
ISLAND #19  
Y = 13,693,600.68  
X = 3,274,984.21

ISLAND #19

TEXAS GENERAL LAND OFFICE  
Art. 33.136, Natural Resources Code  
Co. Galveston, Sketch No. 27  
File Date 6-25-2004 by D.W.H.

NOTE: Date of Photography is January 1995

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WWW.SURVCON.COM

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DATE: 8-05-03	F.B. NO. 1
DRAWN BY: RFH/DAM	PROJECT: SWAN LAKE

SURVEYORS REPORT  
 SURVEY OF THE LINE OF MEAN HIGH WATER  
 ALONG A PORTION OF THE H. B. LITTLEFIELD SURVEY  
 GALVESTON COUNTY, TEXAS

At the request of the Survcon, Inc. and in my capacity as a Licensed State Land Surveyor in Texas, I have determined the line of Mean High Water along a portion of the H. B. Littlefield Survey, Abstract Number 143, in Galveston County, Texas. This survey was performed as per the requirements outlined in the Coastal Public Lands Management Act of 1973, as amended, Chapter 33, Natural Resources Code, and specifically per Section 33.136, Natural Resources Code, "Property Rights: Preservation of Littoral Rights".

The purpose of this survey was to evidence "...the location of the shoreline in the area depicted in this survey as that shoreline existed before commencement of erosion response activity..."(Section 33.136(b), Natural Resources Code).

The H. B. Littlefield Survey borders on Galveston Bay and surrounds Swan Lake and was a first class headright grant surveyed on April 24, 1850 and was patented on June 20, 1850. Swan Lake is a tidally influenced lake that adjoins Galveston Bay.

In the case of Humble Oil & Refining Co. vs. Sun Oil Co. (190 F 2d 191), the court held that "grants issued by the King of Spain and the Mexican State before the adoption of common law in Texas, the boundary between sea and upland must be determined in accordance with principals announced in Las Siete Partidas, the basic law of Spain and Mexico which defines "shore" as all ground covered with water at high tide during the whole year, whether in winter or summer."

In a decision by the Texas Supreme Court in the case of Luttes vs. State (324 SW 2nd 167, on remand 328 SW 2nd 920) it was found that the littoral boundaries for civil law grants differs from the boundaries of common law grants. The court states that for civil law grants (grants by Spain and Mexico) the boundary is the line of Mean Higher High Water (MHHW) and for common law grants (grants made by the Republic and State of Texas) the boundary is the line of Mean High Water (MHW). This case described that the best method of determining MHHW and MHW is to employ the use of scientific tide gauges.

The Luttes case defined MHHW as a tidal datum that is the average of the higher of the two daily tides observed over a specific 19 year period (epoch) and MHW as a tidal datum that is the average of all high tides over a specific 19 year period (epoch). Tides being defined as the regular and predictable rise and fall in sea level due to the gravitational pull of the sun and moon. Also, sea levels are influenced by weather conditions, geographical location and topography of the coastline. The combination of these conditions can result in a wide variation in the elevation of the tidal datum from location to location.

Due to this variation, the tidal datum had to be determined at the project location. Because of the impracticality of obtaining 19 years of tide readings at a specific location, methods have been developed to correct short term observations between project site staff gauges and a primary tide gauge (gauges with more than 19 years of observations).

Tide gauges along the Texas coastline are installed, operated and maintained by a joint effort involving the National Oceanic and Atmospheric Administration (NOAA), the Conrad Blucher Institute (CBI) and Lamar University. Tidal datum's, benchmarks and gauge readings are published and available from NOAA and CBI.

The project site is located in the general vicinity of the Galveston Pier 21 Tide Gauge, a primary gauge in use since 1908. Recently, NOAA has adopted new procedures to compute accepted tidal datum's in the Galveston area based on more recent observations. This procedural change is due to the rise in sea level in the Galveston area, being over 0.02 feet per year, which far exceeds the U.S. average rise of 0.005 feet per year. Currently the published tidal datum for the two gauges is based on the 19-year epoch from 1983 to 2001. Due to this relatively rapid change in sea level I felt it was necessary to compute data on a more current epoch in lieu of using the published datum's. A new tidal datum for the Galveston Pier 21 Tide Gauge was calculated for the 19-year epoch ending in March, 2003.

A site staff gauge was installed and observed simultaneously with the Galveston Pier 21 Tide Gauge for five days (ten high tide cycles). These reading were compared to the Galveston Pier 21 Tide Gauge using the amplitude ratio method resulting in a calculated elevation for mean high water at the site staff gauge.

The project site is along approximately 7000 linear feet of a barrier peninsula that separates Swan Lake on the west from Galveston Bay on the east. This barrier peninsula, over time and due to the effects of erosion and the rise in sea level mentioned above, has been reduced to a series of smaller "islands" of land above Mean High Water connected by submerged shallows.

Using the calculated elevation for the site staff gauge, points were located on the natural contour line of Mean High Water along the entire shoreline of each of the "islands" for the entire project length. These points were incorporated into surveyed meanders delineating the littoral boundary between the state owned seabed and privately owned uplands.

The surveyed meander line was tied to the Texas Coordinate System of 1983, South Central Zone - NAD 83 using USACE Monument "SWAN 1" and "SWAN 2" for reference.



Surveyors Report  
H. B. Littlefield Survey  
Page 3 of 3

To the best of my knowledge no artificial fill or development that would cause alteration to the line of mean high water has occurred within the area surveyed.

A plat showing the results of this survey was prepared and filed with this report.

Respectfully submitted,



William E. Merten  
Licensed State Land Surveyor  
GeoSurv, LLC  
P.O. Box 246  
League City, Texas 77474  
281-554-7739  
August 5, 2003

