SOUTH FLORIDA WATER MANAGEMENT DISTRICT

STRIVE for Flow Monitoring

Chandra Pathak, Ph.D., P.E.

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sfwmd.gov

Presentation will include following topics:

- What is STRIVE ?
- What are the objectives ?
- What is the context ?
- What are the details ?
- Summary of presentation

STRIVE

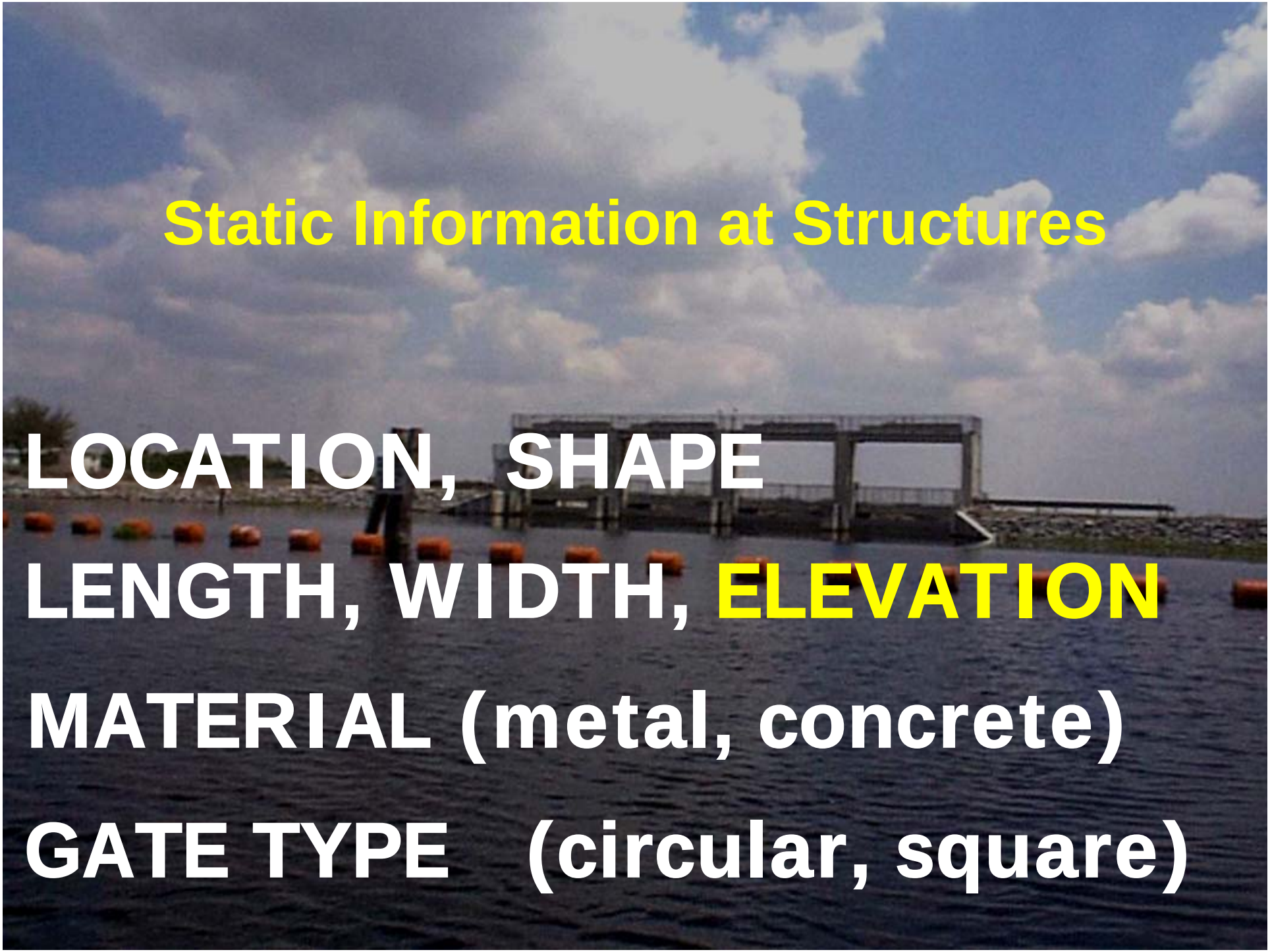
STRucture

Information

VErification

Objectives

1. Verify static information on the District's water control structures culverts, pumps, weirs, and spillways by performing field surveys.
2. Use revised structure static data in flow computations and revise historical flow data series, where appropriate.



Static Information at Structures

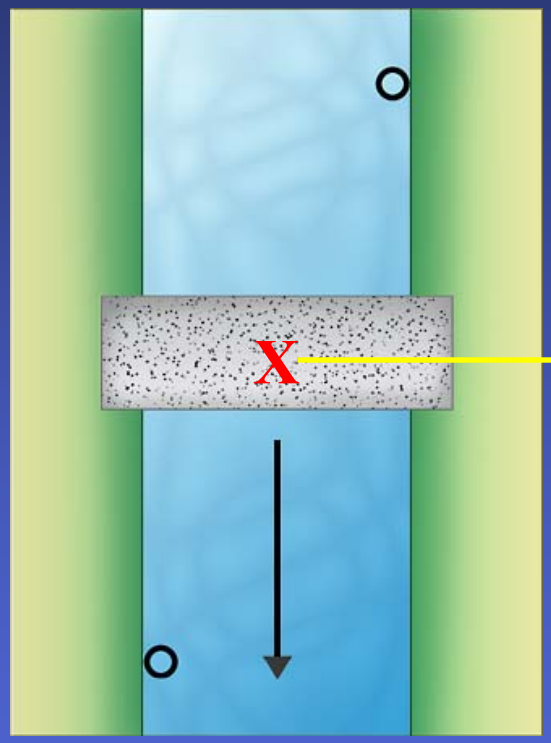
LOCATION, SHAPE

LENGTH, WIDTH, ELEVATION

MATERIAL (metal, concrete)

GATE TYPE (circular, square)

Data Needs at Flow Structures



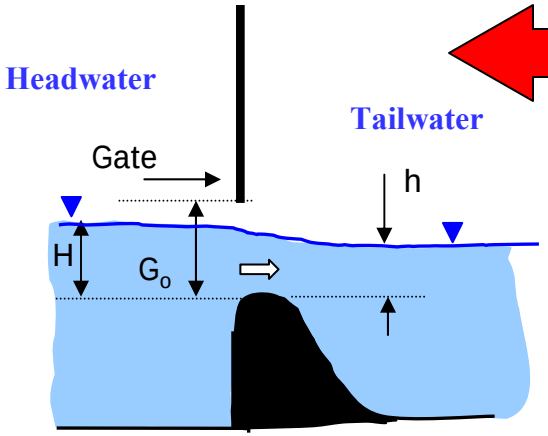
Monument Benchmark

Dynamic Data

Static Data

(±0.01 ft); $\text{Elevation}_{\text{Errors}} \alpha \; Q^2_{\text{Errors}}$

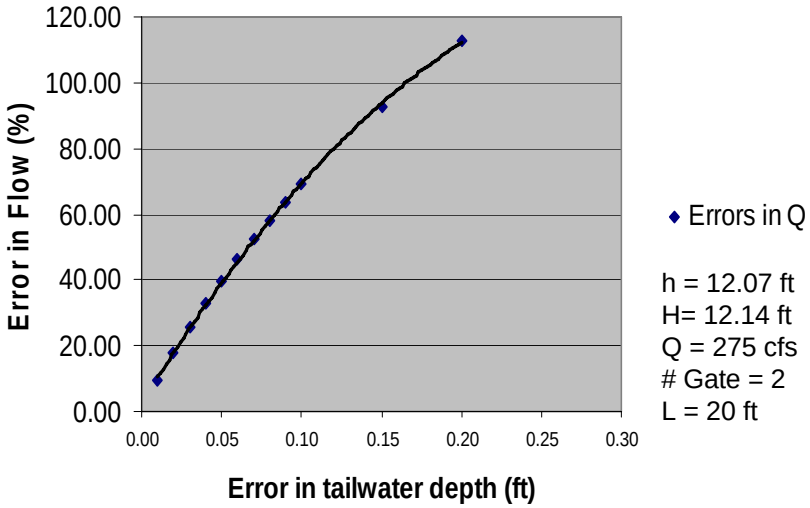
SMALL ERRORS in water level measurements result in LARGE ERRORS in computed flow



S18C

Under Uncontrolled Submerged Condition

Errors in Q from small head differentials



Accuracy of Vertical Data Sought at Flow Structures

First Order:

4 mm * √ (Distance in Kilometers)

Second Order:

6 mm * √ (Distance in Kilometers)

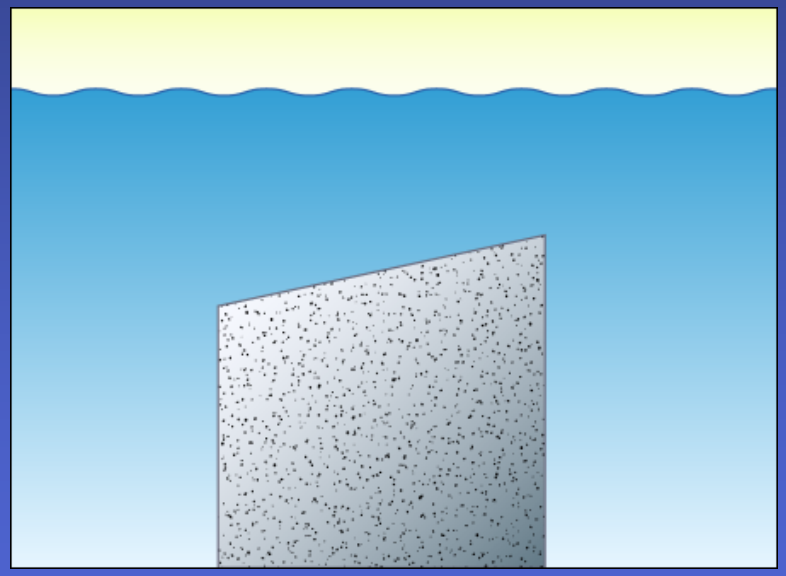
Third Order:

12 mm * √ (Distance in Kilometer)

OR 0.05 ft * √ (Distance in Miles)

Design and Construction

Cut Section Across Flow Line



- The sill elevations of the spillways and weirs shall be established within NGS **THIRD ORDER** closure. Where applicable, the sill shall have no change in elevation across the flow line.

Examples of miss-alignment of sills

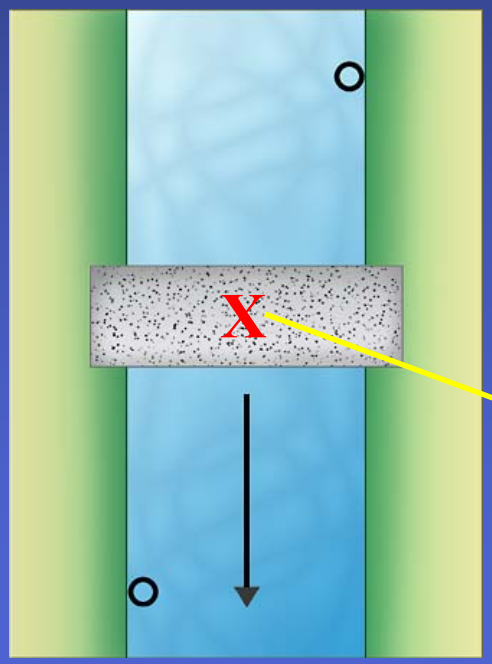
(±0.01 ft); $\text{Elevation}_{\text{Errors}} \alpha \; Q^2_{\text{Errors}}$

Post Construction

- Typically "as-built" drawings are provided to determine the flow structure static data that are used for flow estimation purpose.
- These "as-built" drawings do NOT meet the accuracy and precision needed for flow monitoring purpose.

Survey Requirements for Post Construction

- All the survey work shall be tied with these two (primary and secondary) monuments only – no exceptions.



Monument Benchmark

Stilling Wells

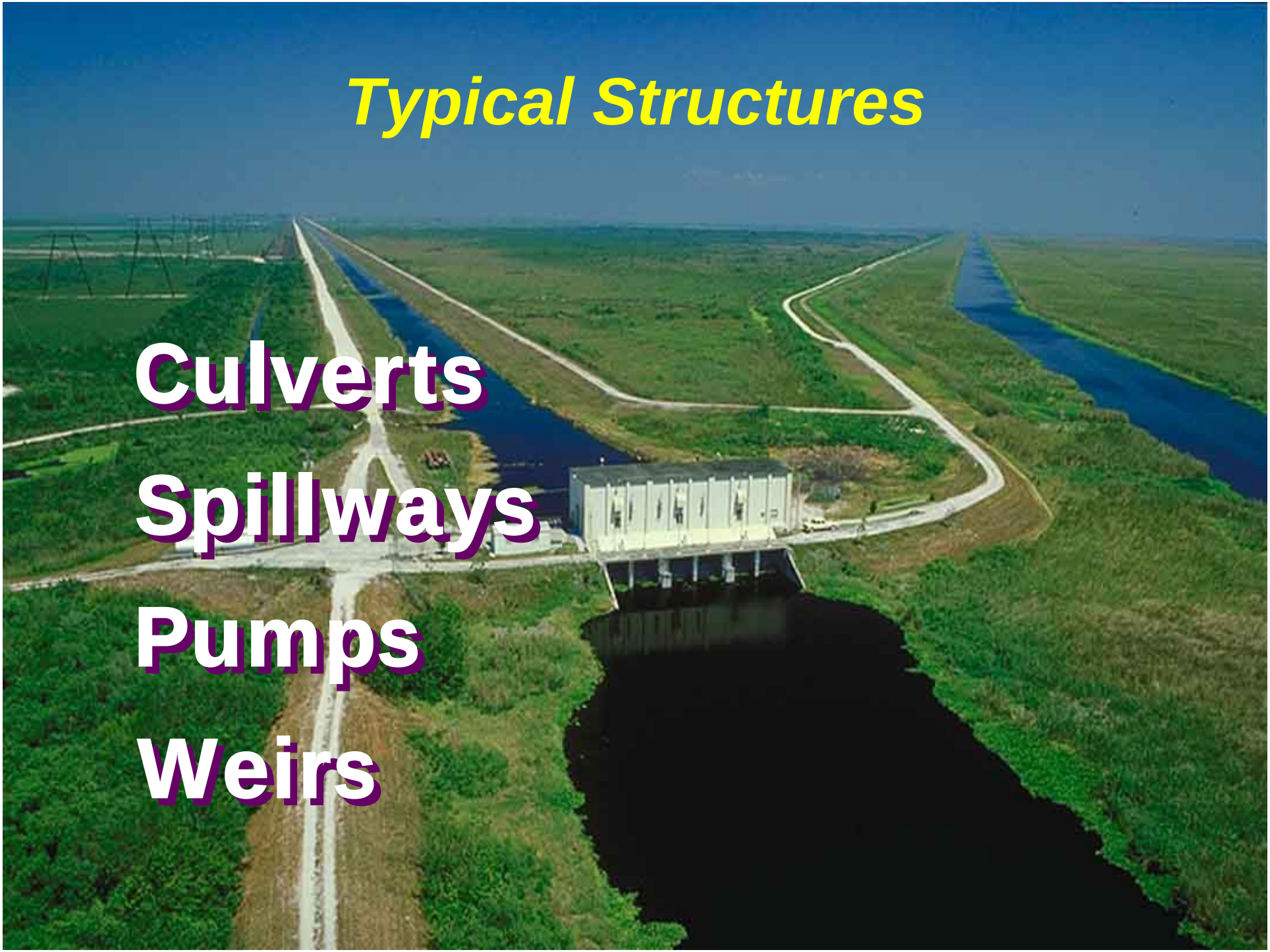
Structure Data

Survey Requirements for Post Construction

- For vertical data, all the survey will be performed to NGS's THIRD ORDER closure standard.
- All the elevation(s) shall be provided in NAVD 1988 and NGVD 1929.

Survey Requirements for Post Construction

- One survey form is used for each structure type.
- Four structure types are identified and used.



Typical Structures

Culverts

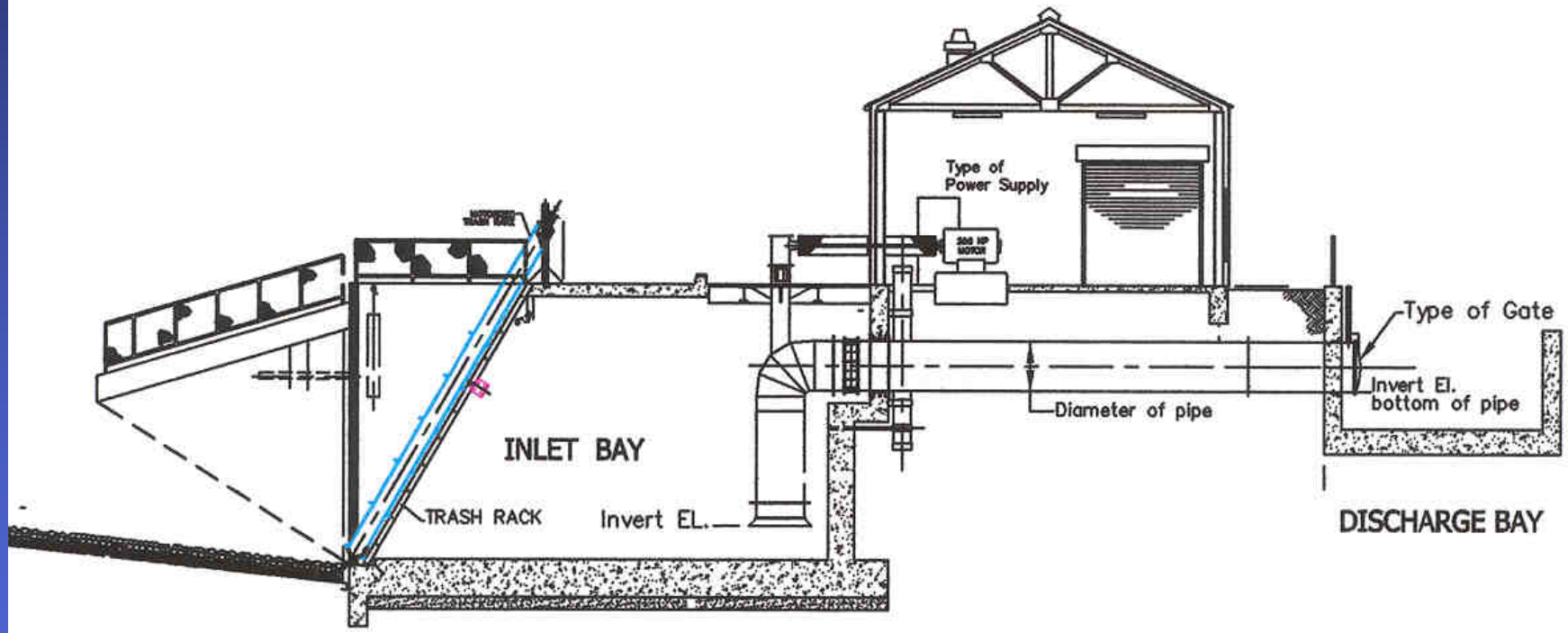
Spillways

Pumps

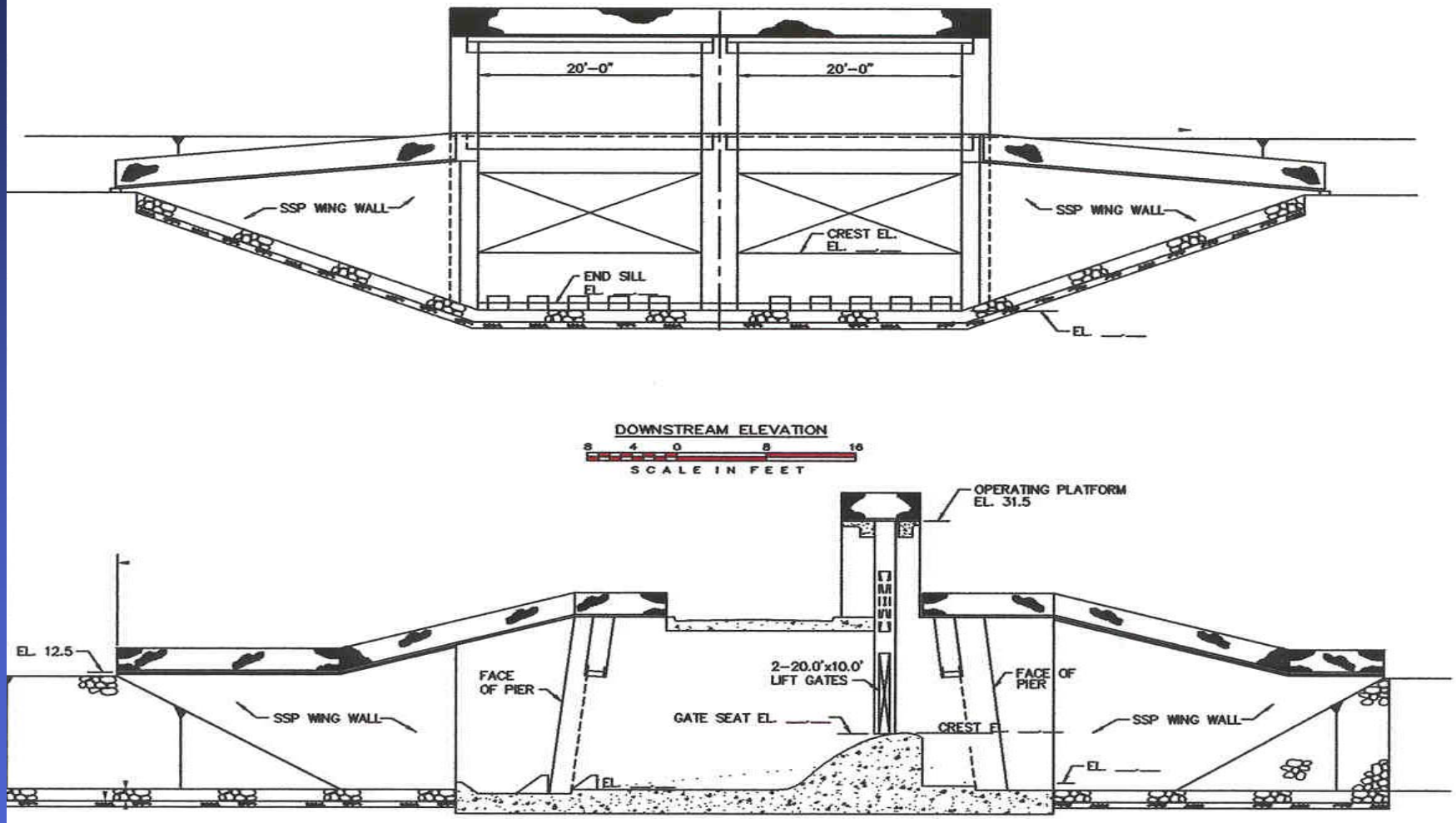
Weirs

Typical Structures

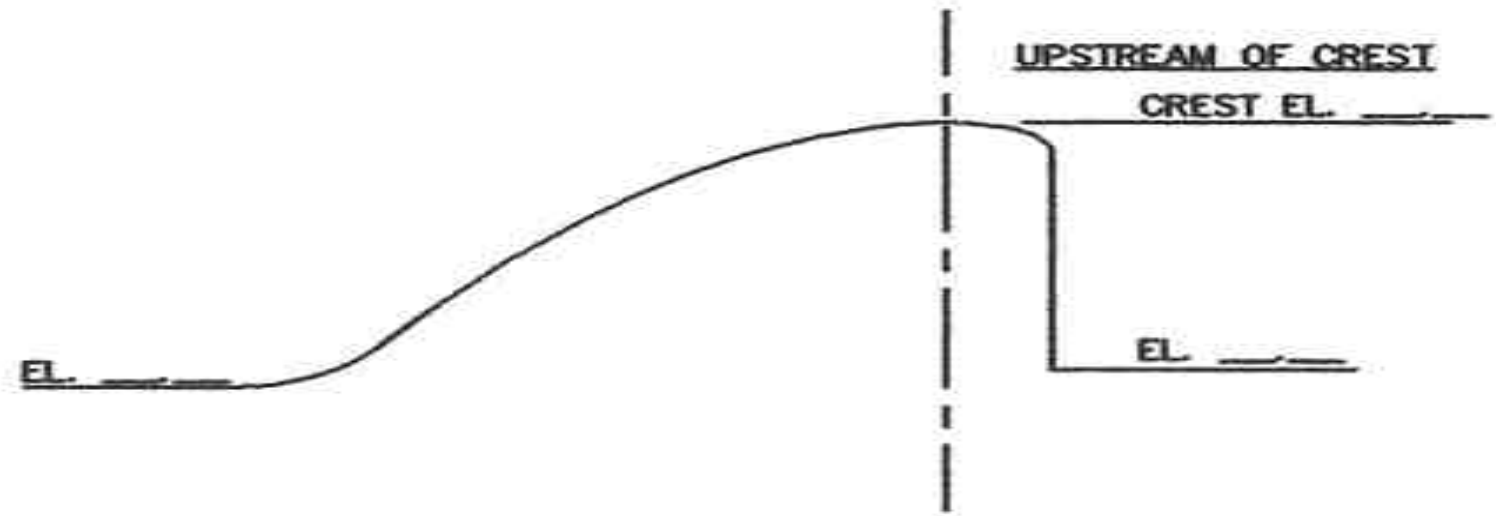
Pump Section



Gated Spillway Structure

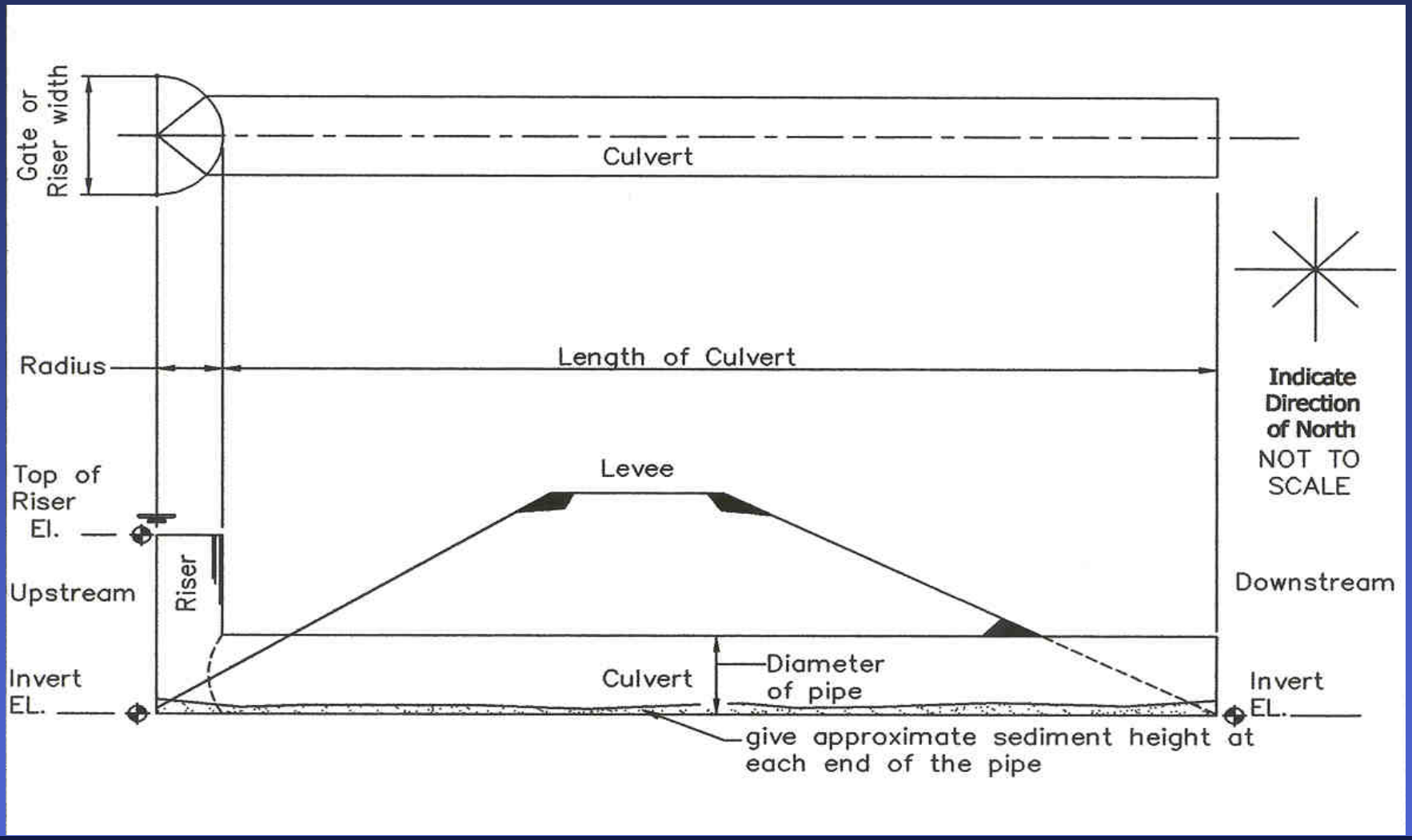


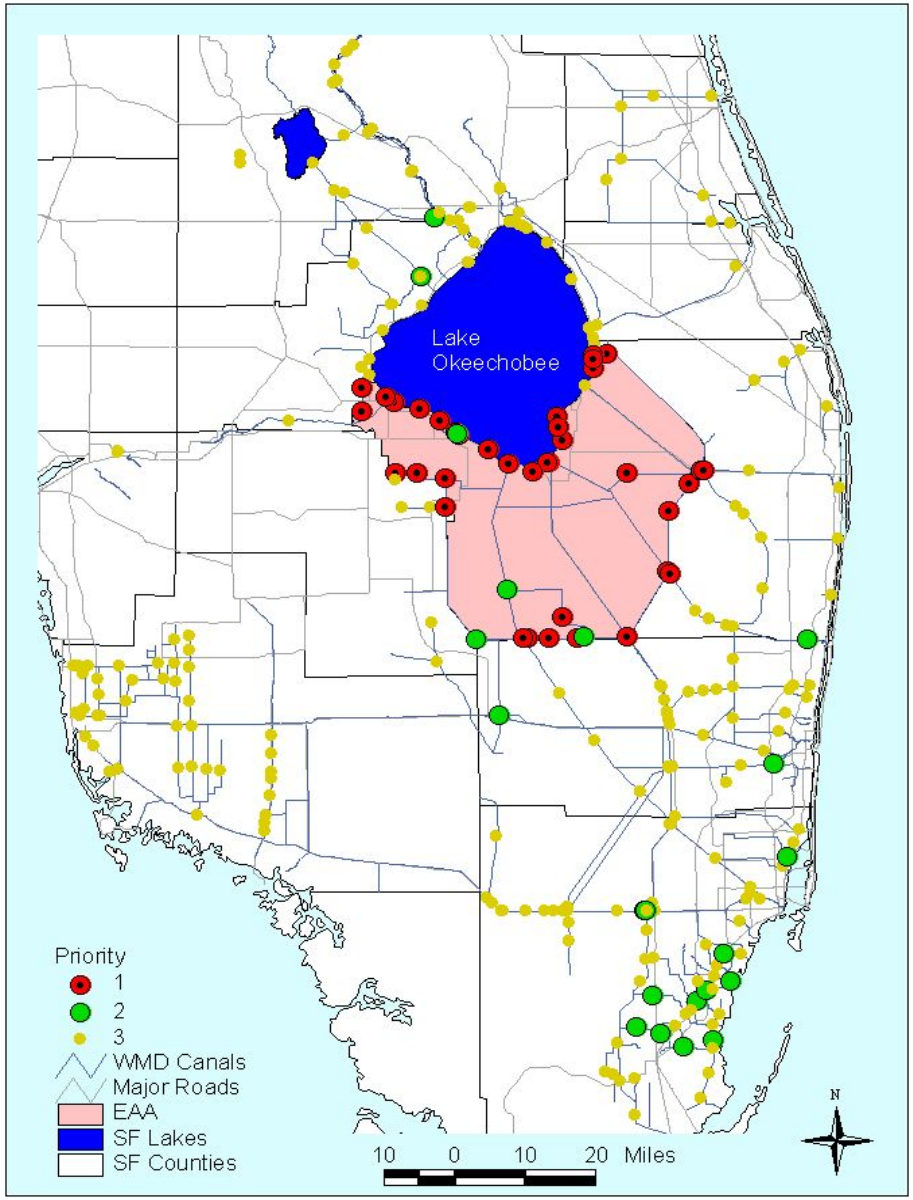
Weir Section



CREST SHAPE DETAIL
NOT TO SCALE

Culvert Section





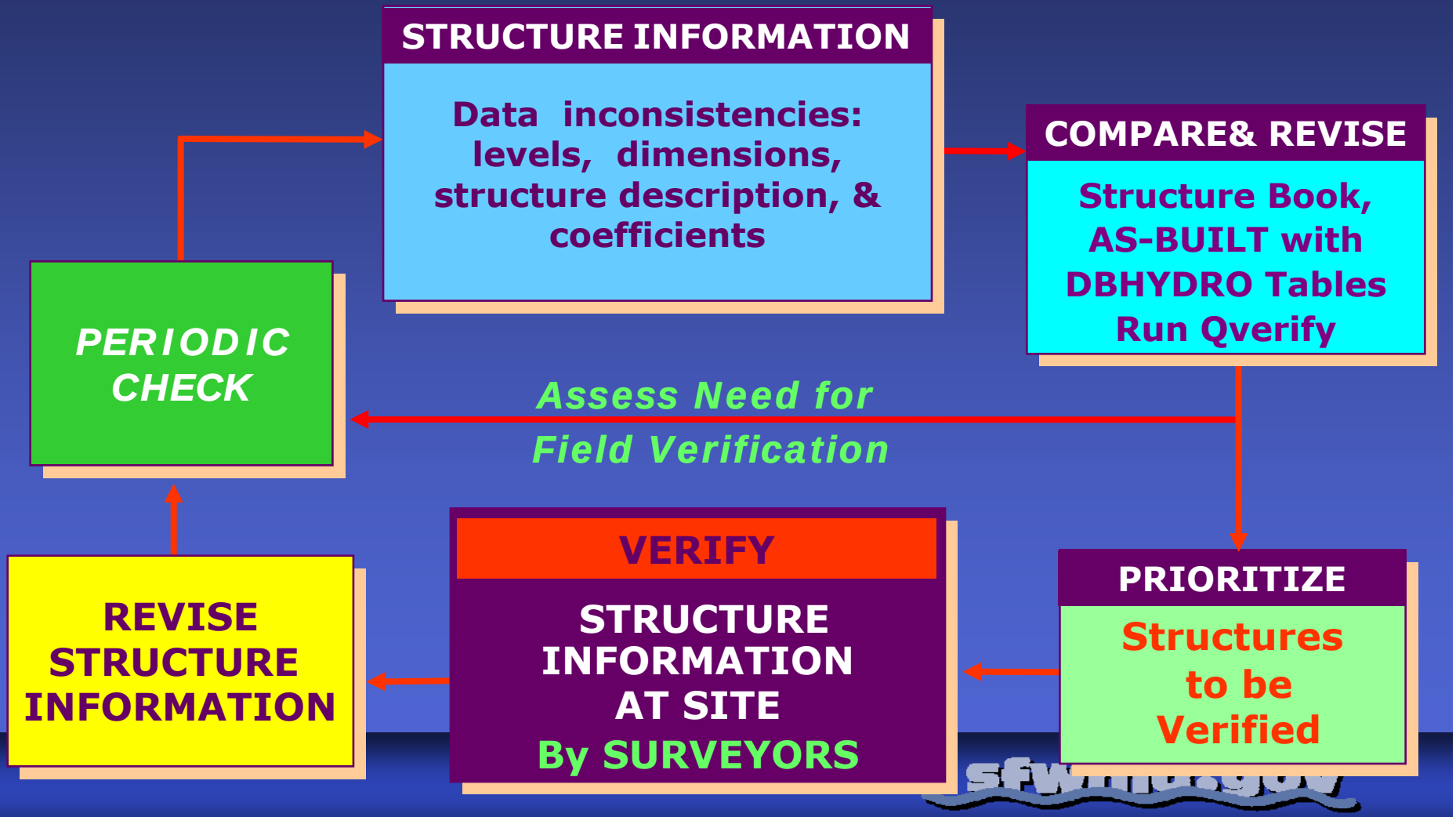
Structure Priority

Legal Mandate

% Flow Error

Other

The STRIVE CYCLE



IMPACTS OF REVISING FLOW DATA

- Historical data may need to be changed
- Legal impacts must be assessed
- District clients must be informed, if revised
- FLOW program may need to be revised
- Equations/coefficients may change

STRIVE

- **Current Status for Objectives 1 and 2:**
  - Completed field survey data for about 210+ structures. All of these data are available from Howard Ehmke.
  - Field survey data were compared with the existing static data in the DBHYDRO database tables for 200+ structures.
  - Historical flow data series from DBHYDRO are being compared with the new flow data computed using the new static data.

STRIVE

- **Next Steps for Objectives 1 and 2:**
  - Howard Ehmke is continuing to perform field surveys of structures every fiscal year.
  - Revise the structure static data in DBHYDRO database tables, where warranted.
  - For changed static data, compare the historical flow data from DBHYDRO with new flow data computed using new static data.
  - If new flow data are significantly different, then use "Data Change Procedures" for revising the historical flow data series in DBHYDRO.

In summary, STRIVE project is needed and will benefit flow monitoring for the existing and future projects.

- This field survey will provide benefit by improving flow estimates for the existing and future projects.

EMA Dept Chief Surveyor
Mr. Howard Ehmke, PLS

Questions?

THANK YOU