



Post-Landfill Mining Soils Testing Using Incremental Sampling Methodology

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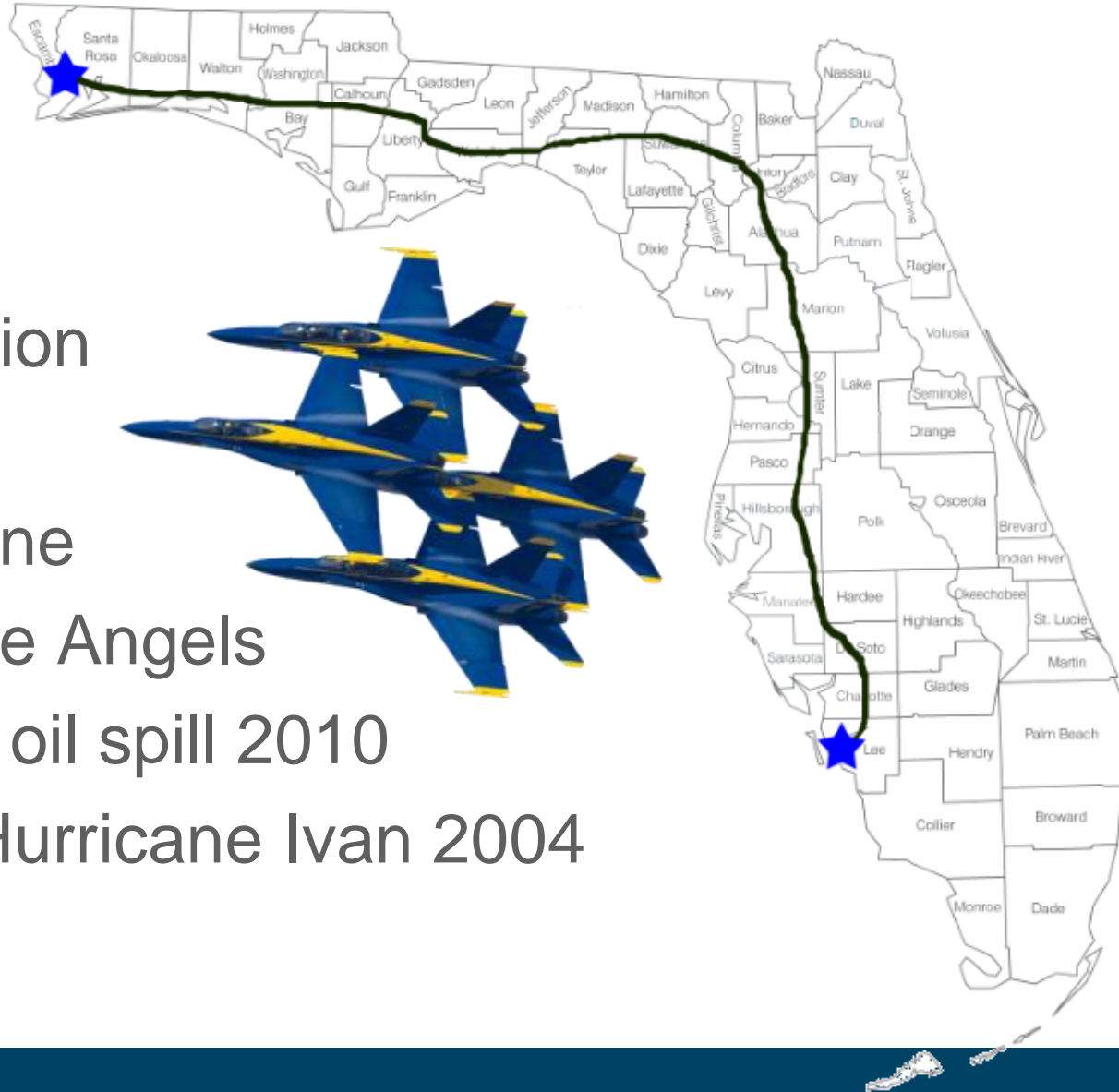
Project Team



THE LEADER IN ENVIRONMENTAL TESTING



Escambia County



- 310,000 population
- 600 miles away
- Central Time Zone
- Home of the Blue Angels
- Impacted by BP oil spill 2010
- Devastated by Hurricane Ivan 2004

Perdido Landfill



- 424 Total Acres
- 104 Acres of Class I LF
- 3 Years Current Capacity
- 30+ Years Additional Capacity
- 700 tpd

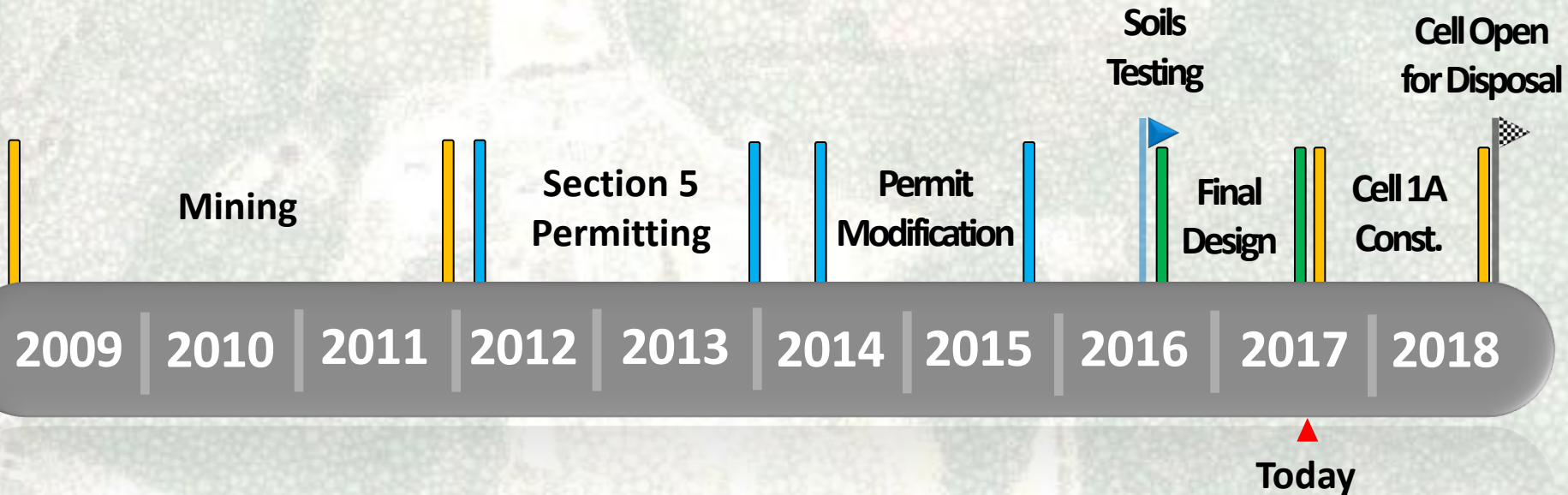
Section 5 Expansion



- Old unlined trench fill
- 45 Total Acres = Section 5
- 15 Acres Mined – Phase I = Section 5 Cell 1A
- 500,000 cy excavated
- 5 Yrs Cell 1A additional capacity
- 700 tpd



Timeline of Events



Phase 1 Landfill Mining



- 45 acres of unlined trench fill
- Phase 1 Mining = 500,000 cy
 - Phase Mining 2 -2019
 - Phase Mining 3 -2025

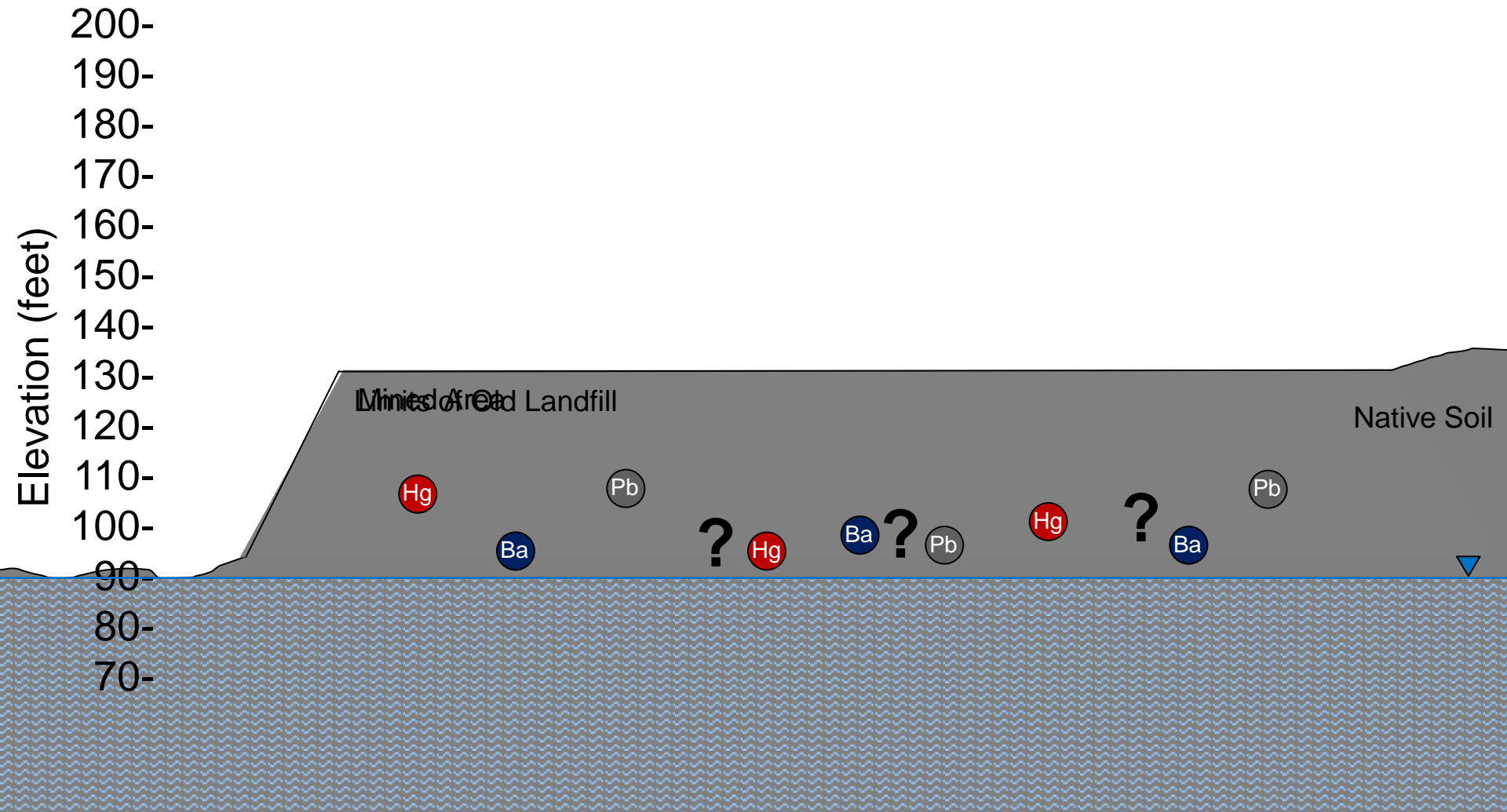
- 30% Clean Soil
- 30% Waste
- 40% Fines



Phase 1 Landfill Mining



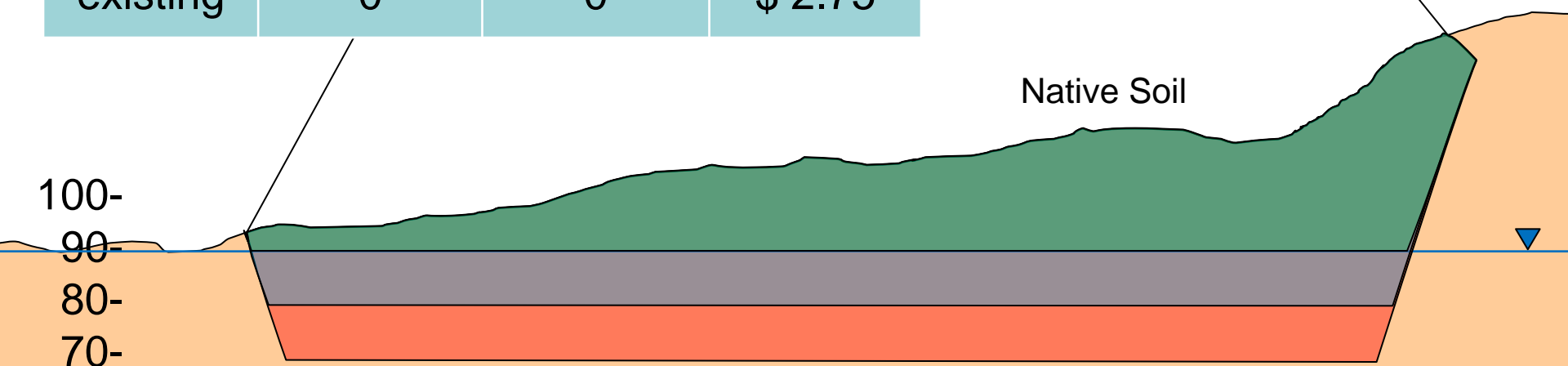
Section 5 Depth Design Options



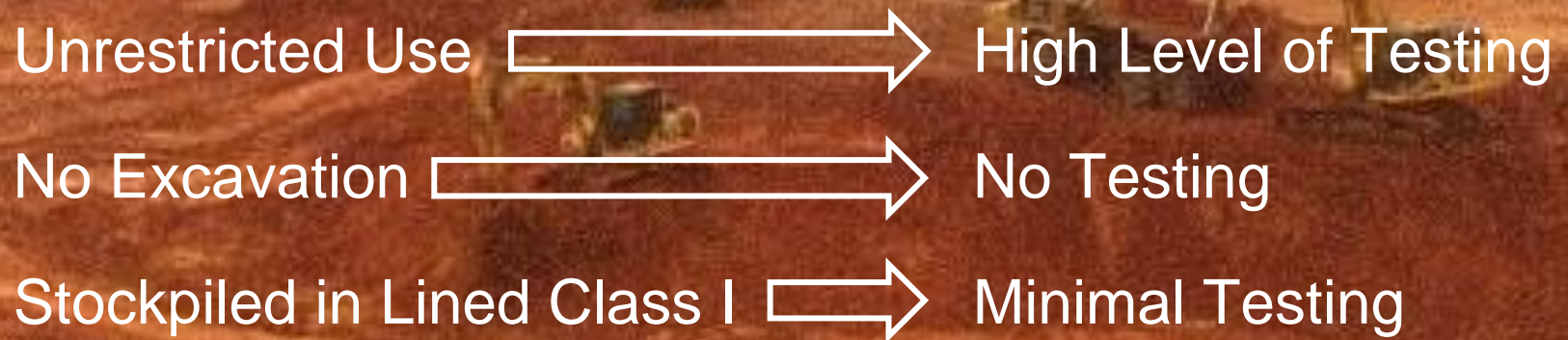
Section 5 Depth Design Options



Elevation	Excavation (CY)	Dewatering (gal)	Capacity Cost \$/CY
70	450,000	18 million	\$ 4.50
80	350,000	12 million	\$ 4.25
90	250,000	1 million	\$ 3.25
existing	0	0	\$ 2.75



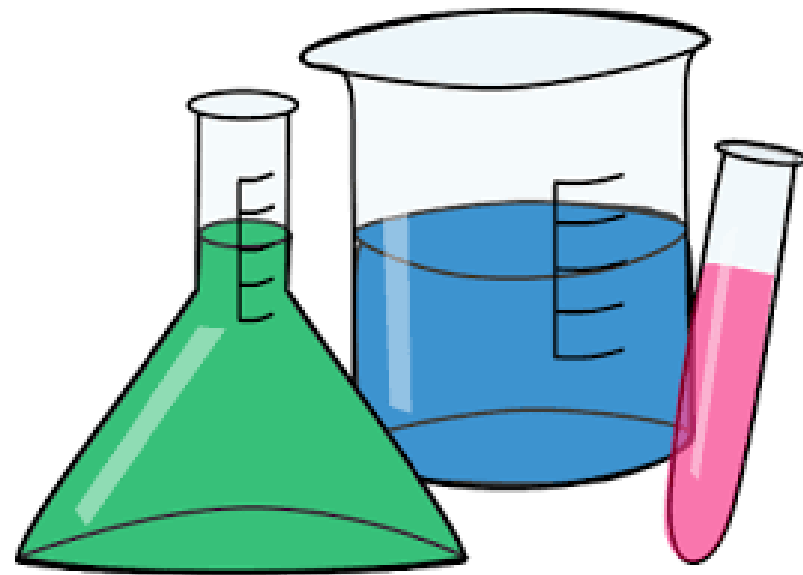
Balance of Use and Testing to Maximize Value While Minimizing Risk



Testing Plan Goals



- Comprehensive Risk Assessment
 - Direct Exposure - SCTL
 - Groundwater Risk - GWCTL
- Determine Soil Suitability
- Final Section 5 Cell Design

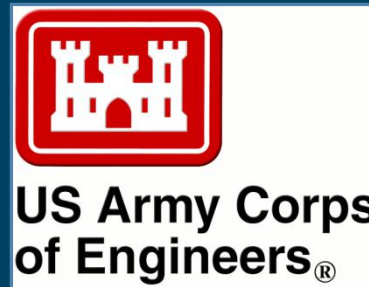


What is Incremental Sampling Methodology (ISM)?



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- Interstate Technical & Regulatory Council, 2012 (www.itrcweb.org)
- Contaminated Soil Clean-Up & Remediation
- Developed Specifically for Use by Regulatory Agencies
- Close to a Prescriptive Process



What is ISM?



Uses Compositing of a Large Number of Samples to:

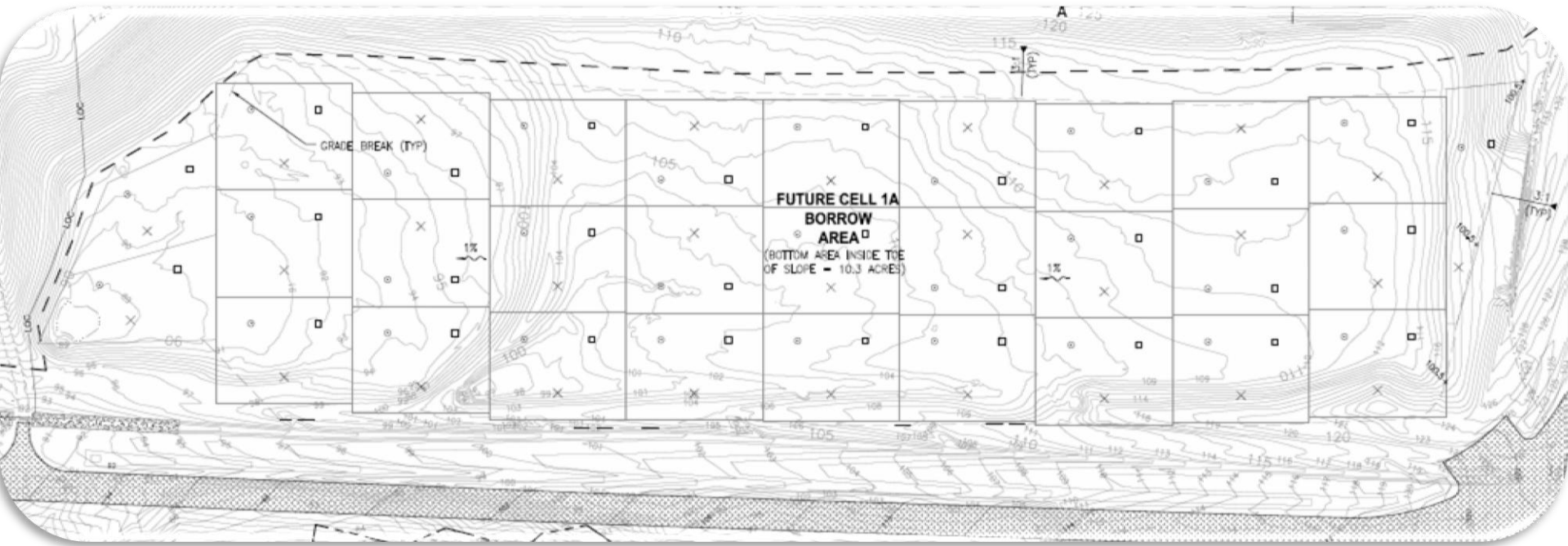
- Reduce Sampling Variability
- Provide Unbiased Statistically-Valid Results
- Produce High Level of Confidence
- Reduce Number of Tests



What is ISM?



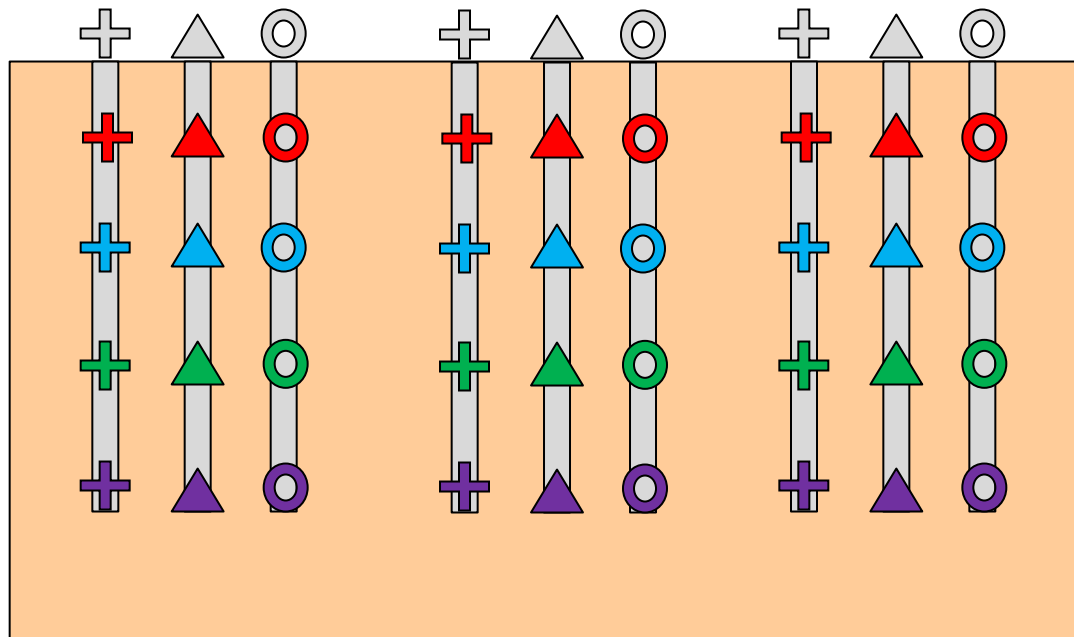
Perdido Landfill Cell 1A



What is Incremental Sampling Methodology



Perdido Landfill Cell 1A

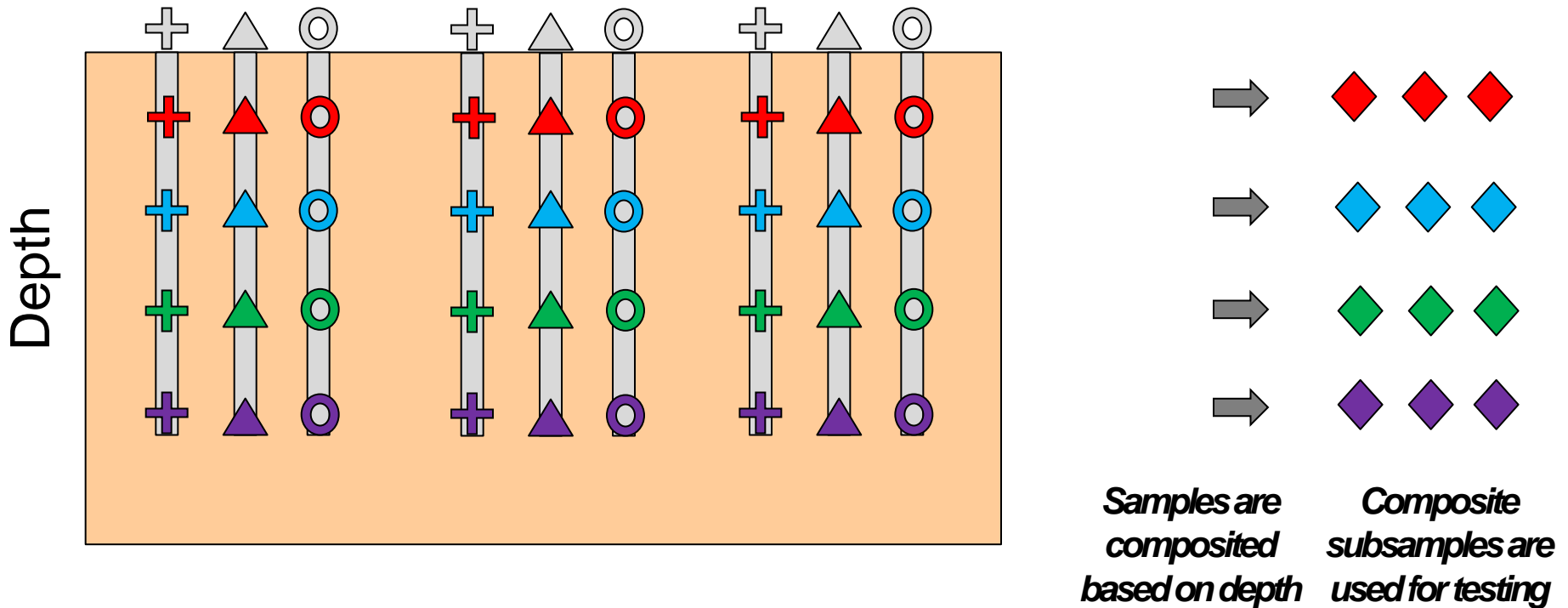


Samples were taken at 2 ft., 4ft., 6 ft., and 8 ft.

What is Incremental Sampling Methodology



Perdido Landfill Cell 1A



Samples were taken at 2 ft., 4ft., 6 ft., and 8 ft.

Primary Benefit of ISM



“if the 95% UCL for the DU is below the action level, the entire DU passes, even if the ISM result for one or more of the partitioned areas is above the action level...”

- *Incremental Sampling Methodology*
The Interstate Technology Regulatory Council



Four Key Components



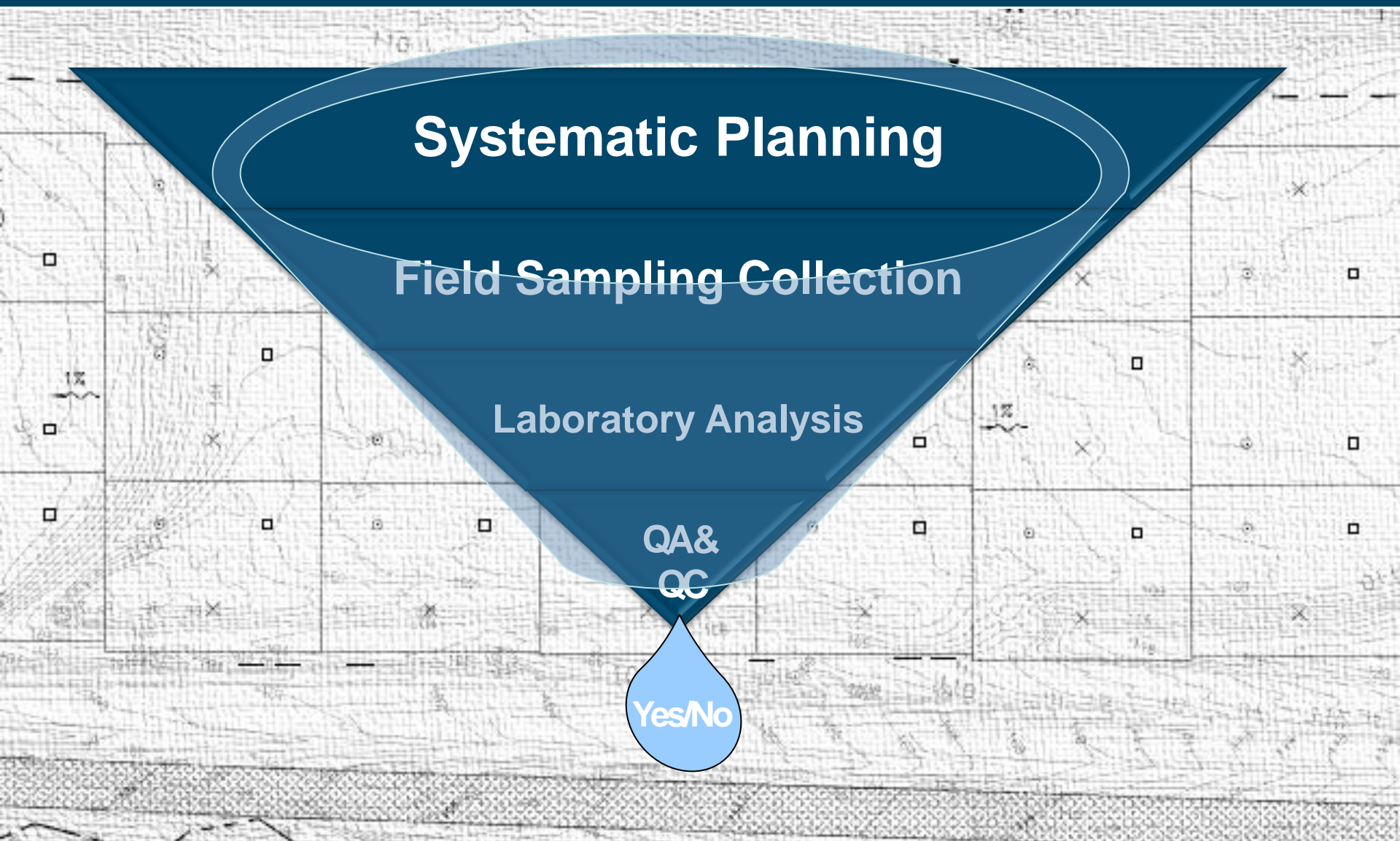
Systematic Planning

Field Sampling Collection

Laboratory Analysis

**QA &
QC**

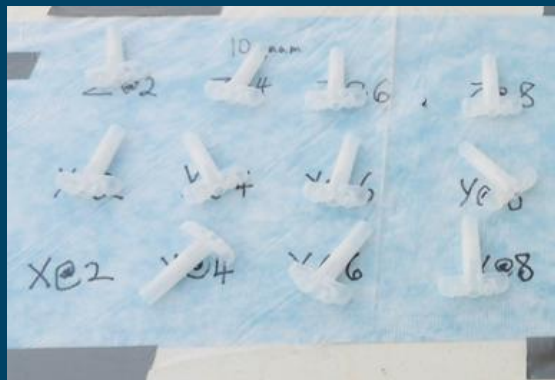
Yes/No



Systematic Planning



- Extensive Pre-planning
- Defining Decision Unit & Sub Units
- GPS Field Layout
- Prep of Boring Locations
- Practicing with Field Team
- Supplies & Logistics



Field Sample Collection



Team Effort

- 6 - Escambia County
- 2 - Drillers
- 2 - Test America
- 2 - Jones Edmunds



Laboratory Analysis



- Pre-identified Contaminates of Concern

- VOCs

- Vinyl Chloride
 - Benzene

- Metal

- Barium
 - Cadmium
 - Lead
 - Mercury

- Compared to Clean-up Standards

- Groundwater Risk Evaluation
 - Direct Exposure Risk



QA/QC Process



- Overall Field Manager
- Laboratory Tech On-Site
- Practice in the Office
- Checklist & Labeling



Analysis of Results



- Actual Number of samples tested (1800 Samples)
 - 12 for Total and SPLP Metals
 - 12 for VOCs (total concentration)
 - 30 for SPLP VOCs
- $\frac{54}{54}$
- Metals < Residential Soil Clean-up Target Levels
- VOCs < Residential Soil Clean-up Target Levels

Conclusion



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- **Use for Phase 2 & 3 Mining Projects**
- **Reduced ISM Development Cost**
- **Standardizes Post-Mining Process**



Questions

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