Using ArcMap as a Tool for Viewing Sediment Sampling Data

US Army Corps of Engineers
Mobile District Spatial Data Branch
And Charleston District GIS Department

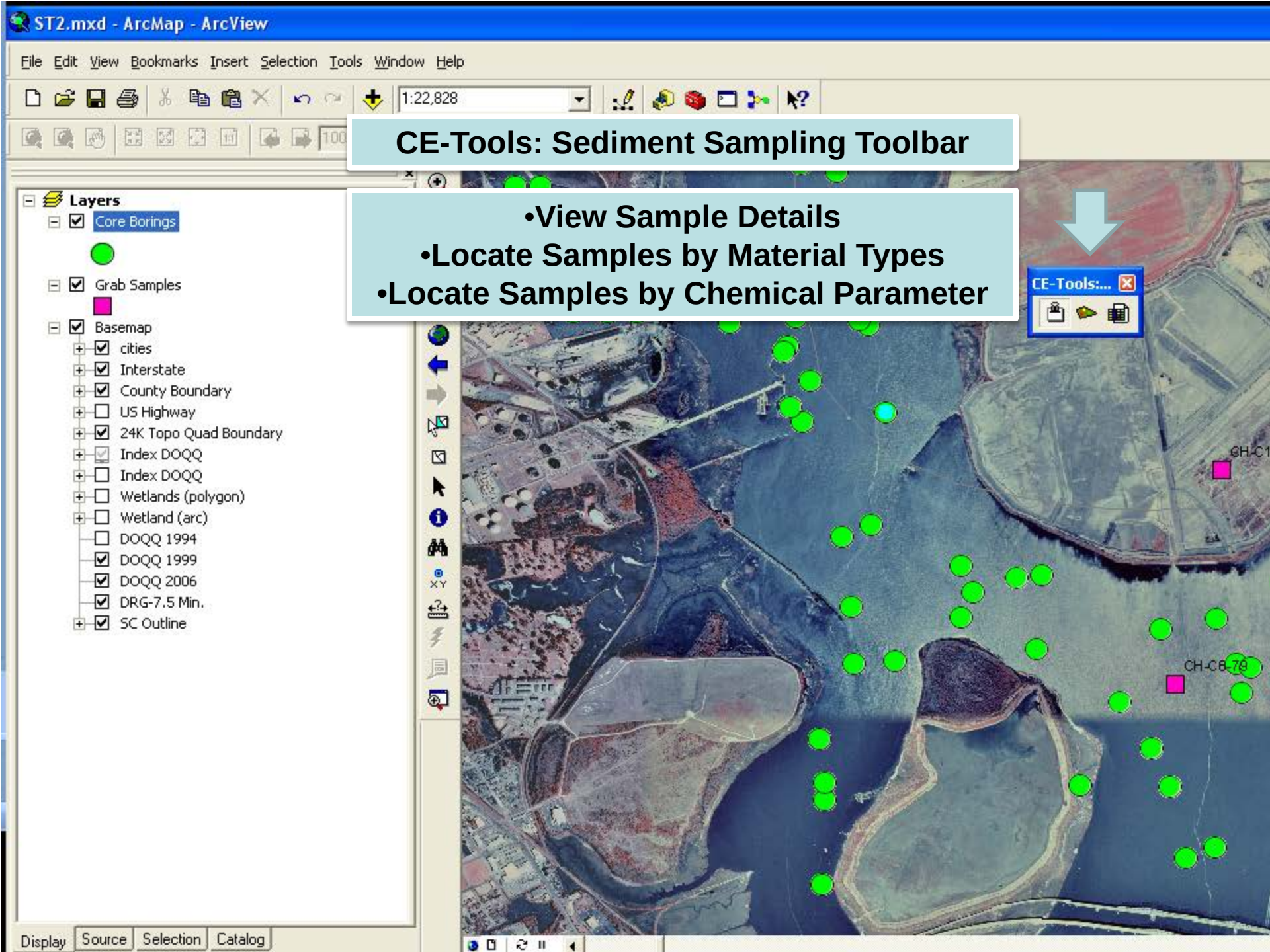
US Army Corps of Engineers
BUILDING STRONG®

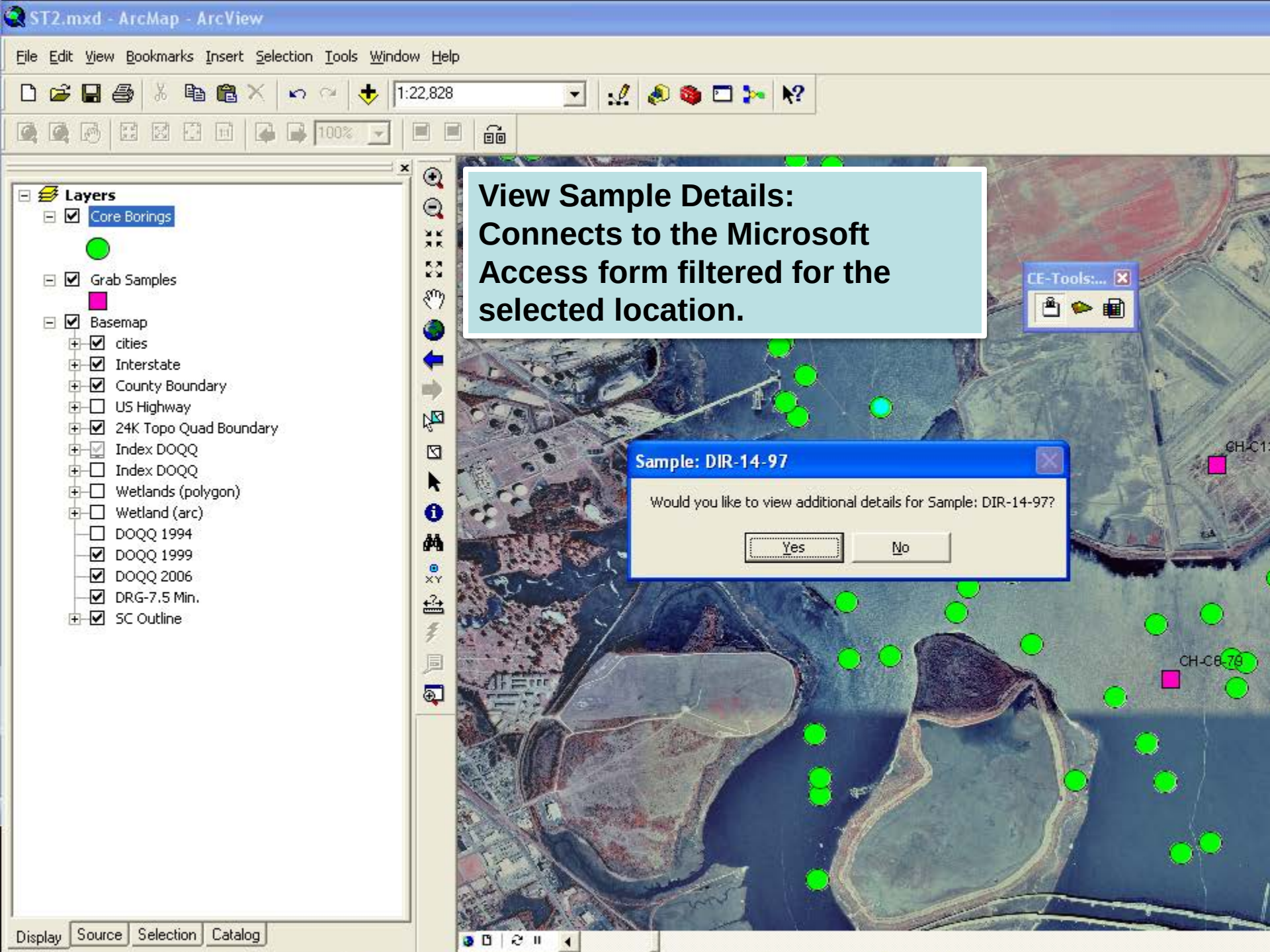
Overview

- Set of ArcMap tools (9.3 & 10) that extract sample locations from selected feature classes
  - Tools to allow users to query samples by criteria
  - Tools to allow users to easily view all related data and documents
- Uses a Non-Spatial SQL database tables to store supplemental sediment sample data
- Microsoft Access Database Forms are used to display data from linked SQL tables

Why Access?

- Access database forms are used so authorized users can easily modify the data display based on their research focus.
  - No programming is needed to add or remove data field and format form display


ST2.mxd - ArcMap - ArcView
File Edit View Bookmarks Insert Selection Tools Window Help
1:22,828
CE-Tools: Sediment Sampling Toolbar
•View Sample Details
•Locate Samples by Material Types
•Locate Samples by Chemical Parameter
Layers
Core Borings
Grab Samples
Basemap
cities
Interstate
County Boundary
US Highway
24K Topo Quad Boundary
Index DOQQ
Index DOQQ
Wetlands (polygon)
Wetland (arc)
DOQQ 1994
DOQQ 1999
DOQQ 2006
DRG-7.5 Min.
SC Outline
CE-Tools:...
CH-C1
CH-C8-78
Display
Source
Selection
Catalog


ST2.mxd - ArcMap - ArcView
File Edit View Bookmarks Insert Selection Tools Window Help
1:22,828
100%
Layers
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Index DOQQ
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Wetland (arc)
DOQQ 1994
DOQQ 1999
DOQQ 2006
DRG-7.5 Min.
SC Outline
Display Source Selection Catalog
View Sample Details:
Connects to the Microsoft Access form filtered for the selected location.
CE-Tools:...
Sample: DIR-14-97
Would you like to view additional details for Sample: DIR-14-97?
Yes
No
CH-C1
CH-C8-79

SedimentSampling_OFFLINE : Database (Access 2007) - Microsoft Access

Home | Create | External Data | Database Tools | Acrobat

DIR-14-97.pdf - Adobe Acrobat Pro

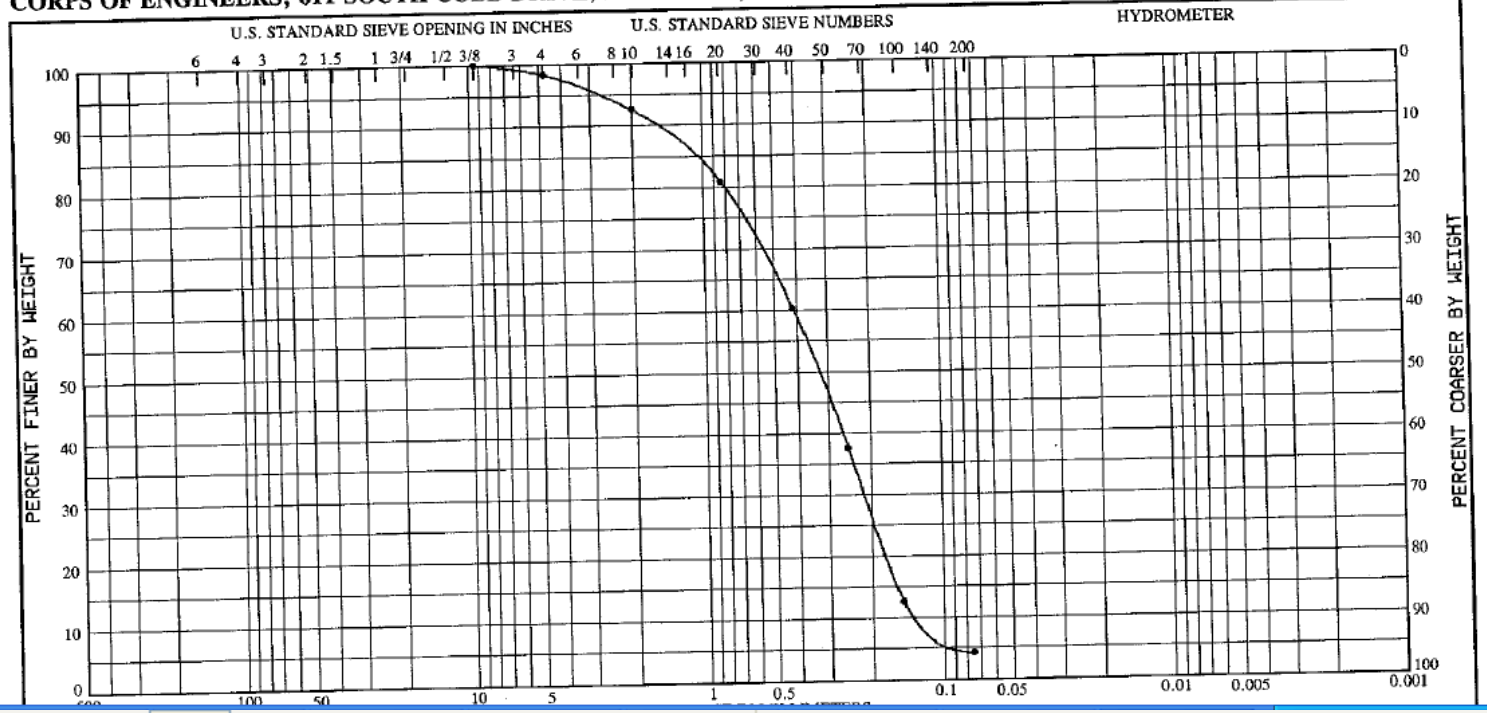
File Edit View Document Comments Forms Tools Advanced Window Help

Create | Combine | Secure | Sign | Forms | Multimedia | Comment

1 / 4 100%

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8297
REQUISITION: W8ID4A72245221



Navigation Pane

Elev of Groundwater: 0

MATERIAL @ ELEV

Elev at Bottom of Hole: 25.4 → SP INFO

Elev at Top of Rock: 31.8 → SC INFO

*** as sampled, in feet**

Record: 1 of 1 | Filtered | Search

Data load complete for this record. | Num Lock | Filter

SedimentSampling_OFFLINE : Database (Access 2007) - Microsoft Access

Home | Create | External Data | Database

View | Paste | Cut | Copy | Format Painter | Views | Clipboard

Database Manager | CORE BORINGS | VIBRAC

Filter by Sample ID: CR-LTC-1-04

Location | Additional Physical Charact | Sediment Tes

SAMPLE TYPE: CORE

CORE SAMPLE ID: CR-LTC-1-04

UNDERWATER? NO METHOD:

LOCATION: Charleston Harbor

PROJECT: Charleston Harbor

DATE SAMPLED: 6/8/2004 DATUM (as samp

View Sediment Testing Report(s) | View Lab Report(

Coordinates (as sampled):

X NAD1927: 0 PROJEC

Y NAD1927: 0

X NAD1983: 2330058 X DD:

Y NAD1983: 352370 Y DD:

Sediment Sample Details:

DEPTH LOCATION ELEV*

Elev at Top of Hole: -49.31 Top of F

Elev of Groundwater 0

Elev at Bottom of Hole: 6.75 → MARL

Elev at Top of Rock: 0 →

* as sampled, in feet

GENERAL COMMENTS:

Navigation Pane

Charleston Harbor FINAL.pdf - Adobe Acrobat Pro

File Edit View Document Comments Forms Tools Advanced Window Help

Create Combine

1 / 1165 66.7%

Please fill out the following form. If you are a form author, choose Distribute Form in the Forms menu to send it to your recipients.

Highlight Fields

FINAL REPORT

CHARLESTON HARBOR NAVIGATION PROJECT: LOWER TOWN CREEK/COOPER RIVER SECTION 103 TESTING AND EVALUATION

US Army Corps of Engineers
Charleston District
Charleston, South Carolina

8.50 x 11.00 in

Microsoft Access

Home | Create | External Data | Database Tools | Acrobat

Navigation Pane

CORE BORINGS | VIBRACORES | SEDIMENT SAMPLING DETAIL

Filter by Sample ID: CR-LTC-1-04 CR-LTC-1-04

Location | Sediment Testing

Select Sediment Sample: LTC-1 Chemistry

Chemical Summary

Chemical Summary

Select Chemical Category: Dioxins and Furans

RIM	PARAMETER	MATRIX	QUALIFIER		RESULT	DL	RL	DF	Units	METHOD
	1,2,3,4,6,7,8-HpCDD		B		24	0.15	5	1		SW 846 8290
	1,2,3,4,6,7,8-HpCDF		Q, B, J		1.5	0.12	5	1		SW 846 8290
	1,2,3,4,7,8,9-HpCDF		U	ND		0.11	10	1		SW 846 8290
	1,2,3,4,7,8-HxCDD		U	ND		0.11	5	1		SW 846 8290
	1,2,3,4,7,8-HxCDF		Q, B, J		0.34	0.084	5	1		SW 846 8290
	1,2,3,6,7,8-HxCDD		B, J		0.7	0.11	5	1		SW 846 8290
	1,2,3,6,7,8-HxCDF		U	ND		0.1	5	1		SW 846 8290
	1,2,3,7,8,9-HxCDD		B, J		0.99	0.089	5	1		SW 846 8290
	1,2,3,7,8,9-HxCDF		U	ND		0.096	5	1		SW 846 8290
	1,2,3,7,8-PeCDD		U	ND		0.21	1	1		SW 846 8290
	1,2,3,7,8-PeCDF		U	ND		0.076	5	1		SW 846 8290
	2,3,4,6,7,8-HxCDF		U	ND		0.15	5	1		SW 846 8290
	2,3,4,7,8-PeCDF		U	ND		0.086	5	1		SW 846 8290
	2,3,7,8-TCDD		U	ND		0.2	1	1		SW 846 8290
	2,3,7,8-TCDF		U	ND		0.15	5	1		SW 846 8290
	OCDD		B		280	0.17	5	1		SW 846 8290
	OCDF		B, J		4.6	0.16	10	1		SW 846 8290

Add Record

Microsoft Access

Home | Create | External Data | Database Tools | Acrobat

Navigation Pane

CORE BORINGS | VIBRACORES | SEDIMENT SAMPLING DETAIL

Filter by Sample ID: CR-LTC-1-04 CR-LTC-1-04

Location | Sediment Testing

Select Sediment Sample: LTC-1 Chemistry Biology

Biologic Summary

Biological Summary

Bioaccumulation | Bioassay Counts | Bioassay Water Quality | Solid Phase Acute Toxicity Test | Suspended Particulate Phase Acute Test

SPECIES	Mean % Survival	Std Dev	Tissue Chemistry Required	Analytes
Macoma nasuta	98	1.7	☐	
Nereis virens	95	9	☐	
			☐	

Add Record

Microsoft Access

Home | Create | External Data | Database Tools | Acrobat

Navigation Pane

CORE BORINGS | VIBRACORES | SEDIMENT SAMPLING DETAIL

Filter by Sample ID: CR-LTC-1-04 **CR-LTC-1-04**

Location | Sediment Testing

Select Sediment Sample: LTC-1 ○ Chemistry ○ Biology ◉ Physical Properties

Physical Summary

Physical Properties Summary:

CLASSIFICATION				AVERAGE GRAIN SIZE			SPECIFIC GRAVITY	
Moisture Content (% of solids)	Sand (%)	Silt (%)	Clay (%)	Sand (mm)	Silt (mm)	Clay (mm)	Fines (mg/L)	Sands (mg/L)
151.3	30.1	54.8	15.1	0.14	0.047	0.002	2.42	2.71

Liquid Limit:

Plastic Limit:

Plasticity Index:

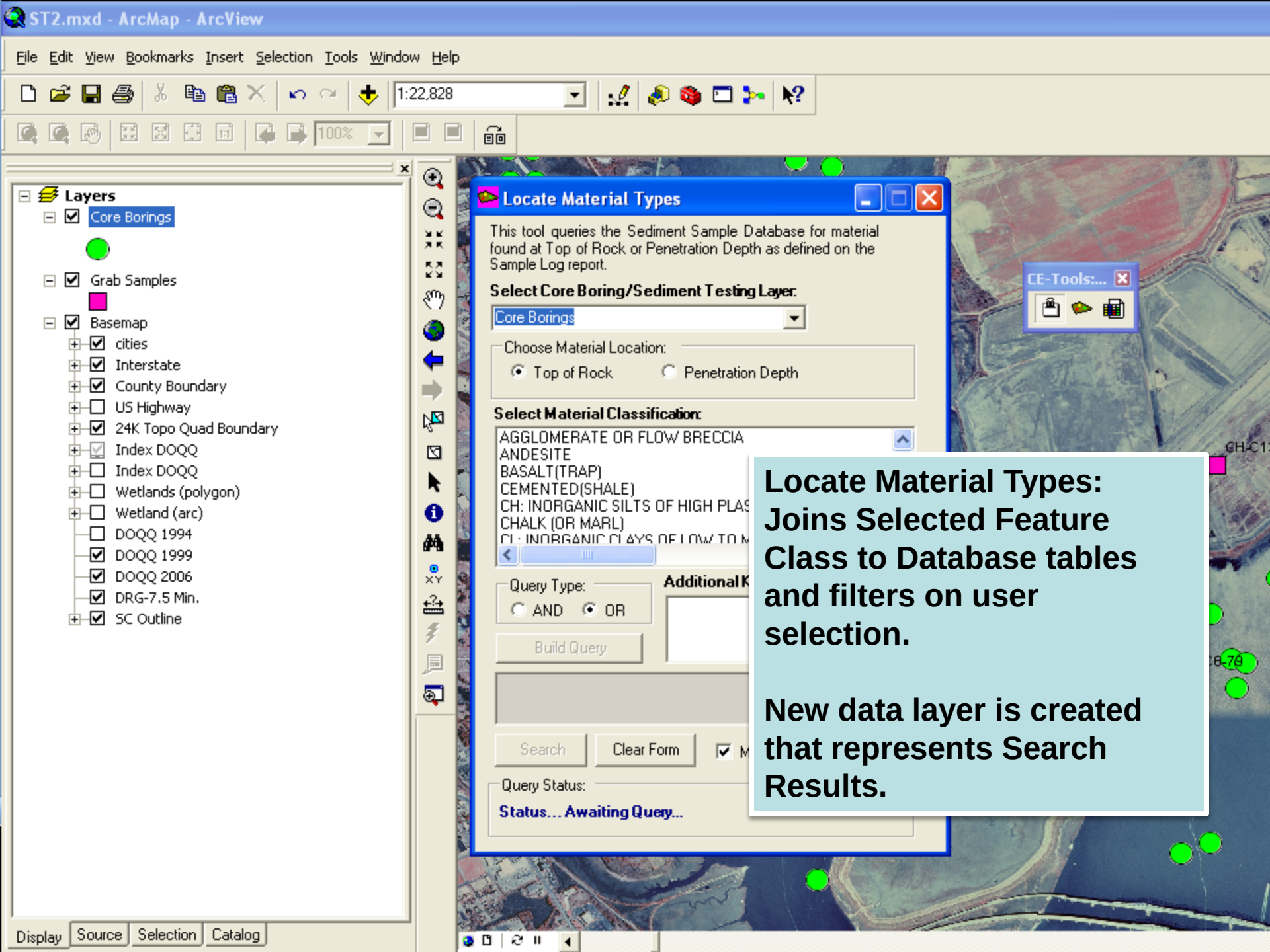
Sieve Test (size):

% Passing Through Sieve:

Add Record

Material Type Query

- Using Parameters in ArcMap to locate Samples with Specified Material Types
- Users can search for material type at penetration depth or bottom of harbor
  - Data is extracted from supplemental database and viewed in ArcMap with joined tables in a layer file.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100%
Layers
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Index DOQQ
Index DOQQ
Wetlands (polygon)
Wetland (arc)
DOQQ 1994
DOQQ 1999
DOQQ 2006
DRG-7.5 Min.
SC Outline
Display Source Selection Catalog
Locate Material Types
This tool queries the Sediment Sample Database for material found at Top of Rock or Penetration Depth as defined on the Sample Log report.
Select Core Boring/Sediment Testing Layer:
Core Borings
Choose Material Location:
Top of Rock
Penetration Depth
Select Material Classification:
AGGLOMERATE OR FLOW BRECCIA
ANDESITE
BASALT(TRAP)
CEMENTED(SHALE)
CH: INORGANIC SILTS OF HIGH PLAS
CHALK (OR MARL)
Query Type:
AND
OR
Additional K
Build Query
Search
Clear Form
Query Status:
Status... Awaiting Query...
CE-Tools:...
Locate Material Types: Joins Selected Feature Class to Database tables and filters on user selection.
New data layer is created that represents Search Results.

ST2.mxd - ArcMap - ArcView

File Edit View Bookmarks Insert Selection Tools Window Help

1:22,828

100%

Layers
- CH
- Core Borings
- Grab Samples
- Basemap
  - cities
  - Interstate
  - County Boundary
  - US Highway
  - 24K Topo Quad Boundary
  - Index DOQQ
  - Index DOQQ
  - Wetlands (polygon)
  - Wetland (arc)
  - DOQQ 1994
  - DOQQ 1999
  - DOQQ 2006
  - DRG-7.5 Min.
  - SC Outline

Display | Source | Selection | Catalog

Locate Material Types

This tool queries the Sediment Sample Database for material found at Top of Rock or Penetration Depth as defined on the Sample Log report.

Select Core Boring/Sediment Testing Layer:

Core Borings

Choose Material Location:

Top of Rock Penetration Depth

Select Material Classification:

AGGLOMERATE OR FLOW BRECCIA
ANDESITE
BASALT(TRAP)
CEMENTED(SHALE)
CH: INORGANIC SILTS OF HIGH PLASTICITY, FAT CLAYS
CHALK (OR MARL)
CL: INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY

Query Type:

AND OR

Additional Keywords:

Build Query

ENTRY_MATERIAL_AT_PENETRATION_DEPTH='CH'

Search Clear Form Make Layer from Selection

Query Status:

Complete ... 153 Features Selected in Map.

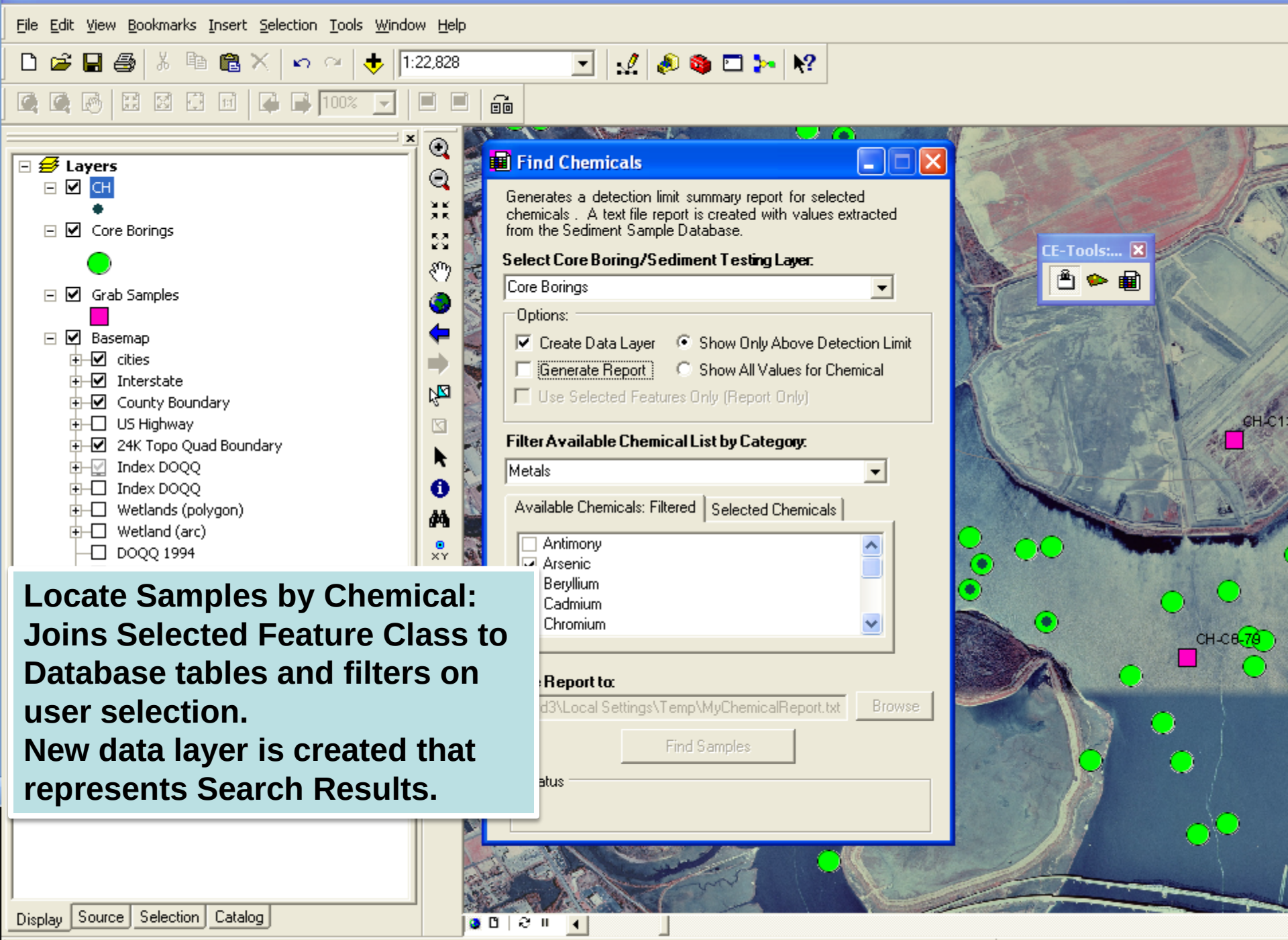
CE-Tools:...

CH-C8-79

New Data Layer is created so user can visually see the location of site that meets the criteria input.

Chemistry Query

- Using Parameters in ArcMap to locate Chemical Detection
- Users can search for material type at penetration depth or bottom of harbor
  - Data is extracted from supplemental database and viewed in ArcMap with joined tables in a layer file.



Locate Samples by Chemical: Joins Selected Feature Class to Database tables and filters on user selection.
New data layer is created that represents Search Results.

ST2.mxd - ArcMap - ArcView

File Edit View Bookmarks Insert Selection Tools Window Help

1:22,828

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Layers

Arsenic > DL (Core Borings)

CH

County Boundary

US Highway

24K Topo Quad Boundary

Index DOQQ

Index DOQQ

Wetlands (polygon)

Wetland (arc)

DOQQ 1994

DOQQ 1999

DOQQ 2006

DRG-7.5 Min.

SC Outline

Display Source Selection Catalog

Layers added to Table of Contents based on Form Options and Search Results.

Find Chemicals

Generates a detection limit summary report for selected chemicals . A text file report is created with values extracted from the Sediment Sample Database.

Select Core Boring/Sediment Testing Layer:

Core Borings

Options:

Create Data Layer

Show Only Above Detection Limit

Generate Report

Show All Values for Chemical

Use Selected Features Only (Report Only)

Filter Available Chemical List by Category:

Metals

Available Chemicals: Filtered | Selected Chemicals

Antimony

Arsenic

Beryllium

Cadmium

Chromium

Save Report to:

5opjrd3\Local Settings\Temp\MyChemicalReport.txt

Browse

Find Samples

e Table of Contents

Query results report status of query.

CE-Tools:...

CH-C1

CH-C8-78

ST2.mxd - ArcMap - ArcView

File Edit View Bookmarks Insert Selection Tools Window Help

Identify

Identify from: <All layers>

- Mercury > DL (Core Borings
  - 2707
  - 3418
- Lead > DL (Core Borings)
  - 2707
  - 3418
- Core Borings
  - 2707
  - 3418

Location: -79.947458 32.852634 Decimal Degrees

Field	Value
FOREIGN KEY JOIN to cmgenfac	<null>
Graphic Attribute Raster GValue	<null>
Boring Type Material Discriminator Code	<null>
FOREIGN KEY JOIN to gesuisti	<null>
FOREIGN KEY JOIN to cmgencrd	<null>
FOREIGN KEY JOIN to hysurcrs	1759
River Mile Reference Dimension	<null>
Design File Name	<null>
	NC-NSOUTH-S-N-99
	<null>
	<null>
	<null>
	<null>
	<null>
	<null>
	<null>
	<null>
	<null>
	<null>
	<null>
REF_UID	416
XREF_SEDTEST_ID	346
XREF_SAMPLE_ID	1759
ENTRY_PARAMETER	Mercury
XREF_SEDTEST_ID	346
ENTRY_DL	0.007
ENTRY_RESULT	0.1
ENTRY_RESULT_NOTE	<null>
ENTRY_METHOD	EPA 7471A
ENTRY_DL_UNITS	mg/kg
REF_UID	11770

Identified 6 features

Display Source Selection Catalog

< Identify from: ALL Layers

Using the "Identify tool, for the point selected, 2 detected parameters were found for the filtered layers (filtered layers must be built using the tool).

Chemical results displayed in joined attribute table for additional queries and analysis.

ST2.mxd - ArcMap - ArcView

File Edit View Bookmarks Insert Selection Tools Window Help

1:22,828

100%

Layers
- Chromium > DL (Grab Samples)
- Beryllium > DL (Grab Samples)
- Arsenic > DL (Grab Samples)
- Arsenic > DL (Grab Samples)
- Arsenic > DL (Core B
- CH
- Core Borings
- Grab Samples
- Basemap
  - cities
  - Interstate
  - County Boundary
  - US Highway
  - 24K Topo Quad Boundary
  - Index DOQQ
  - Index DOQQ
  - Wetlands (polygon)
  - Wetland (arc)
  - DOQQ 1994
  - DOQQ 1999
  - DOQQ 2006
  - DRG-7.5 Min.
  - SC Outline

Display | Source | Selection | Catalog

Users can also generate summary reports for a selection list of chemicals.

Find Chemicals

Generates a detection limit summary report for selected chemicals . A text file report is created with values extracted from the Sediment Sample Database.

Select Core Boring/Sediment Testing Layer:

Grab Samples

Options:

- [x] Create Data Layer
- [x] Generate Report
- [ ] Use Selected Features Only (Report Only)
- (•) Show Only Above Detection Limit
- ( ) Show All Values for Chemical

Filter Available Chemical List by Category:

Metals

Available Chemicals: Filtered | Selected Chemicals

- [x] Antimony
- [x] Arsenic
- [x] Beryllium
- [x] Cadmium
- [x] Chromium

Save Report to:

5opjrd3\Local Settings\Temp\MyChemicalReport.txt Browse

Find Samples

Status

1 Layer has been added to the Table of Contents

CE-Tools:...

CH-C13-

CH-C8-79

ST2.mxd - ArcMap - ArcView

File Edit View Bookmarks Insert Selection Tools Window Help

1:22,828

100%

Layers
- C:\Documents and Settings\k5opjrd3\My
  - landform
    - Chromium > DL (Grab Samples)
    - Beryllium > DL (Grab Samples)
    - Arsenic > DL (Grab Samples)
    - Arsenic > DL (Grab Samples)
    - Grab Samples
  - geology
    - Arsenic > DL (Core Borings)
    - CH
    - Core Borings
- _Development
  - dbo_TBL_SAMPLE_LOCATIONS
  - dbo_TBL_ANALYSIS_CHEMICAL
  - dbo_TBL_REL_SAMPLE_TO_SEDIMEN
- C:\Documents and Settings\k5opjrd3\Loc
  - MyChemicalReport.txt
- Basemap
  - cities
  - Interstate
  - County Boundary
  - US Highway
  - 24K Topo Quad Boundary

Display Source Selection Catalog

Attributes of MyChemicalReport.txt

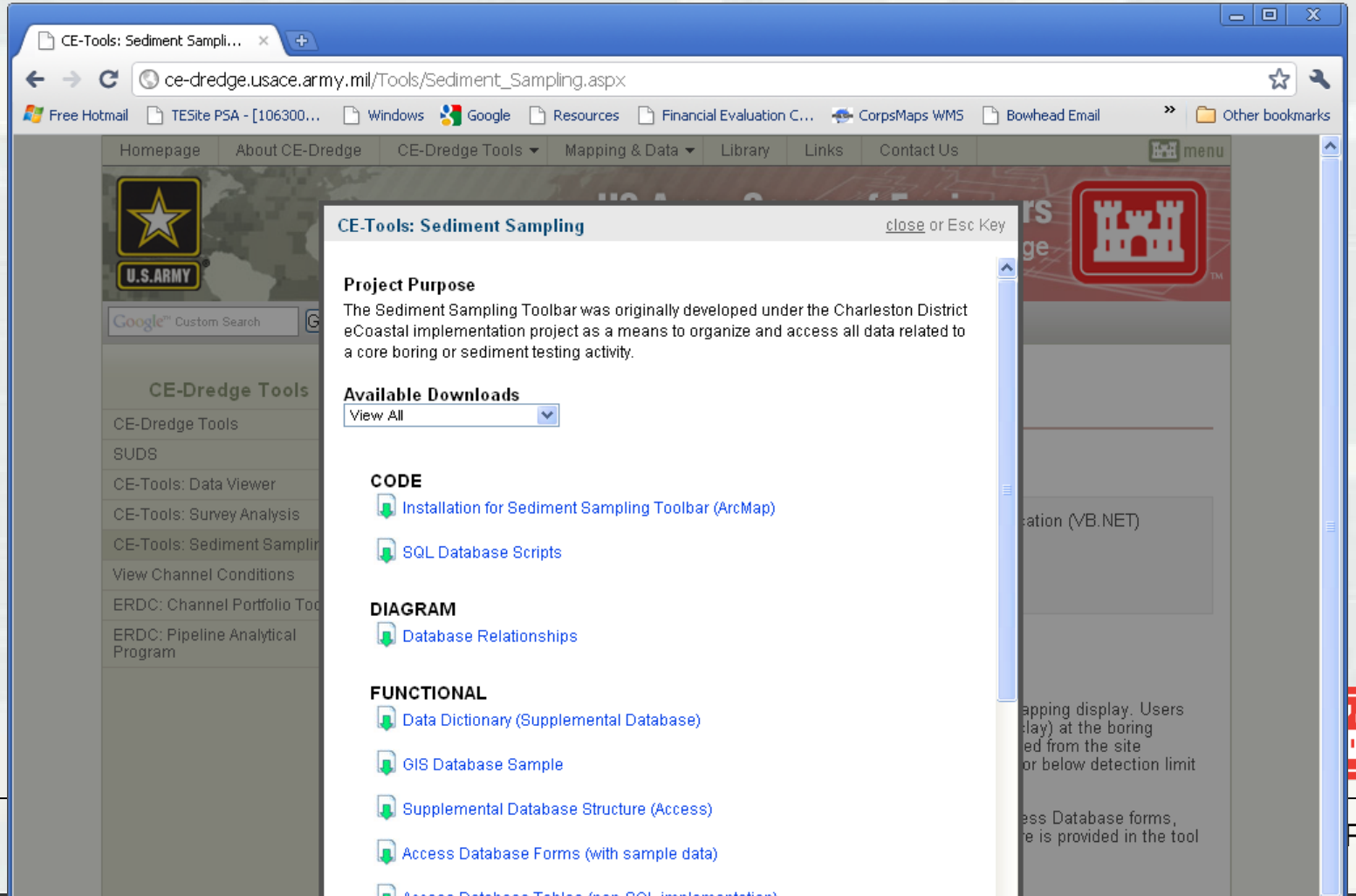
Y	Parameter	DL	
323632	Arsenic	0.45	6.9
321730	Arsenic	0.45	6.9
319432	Arsenic	0.45	6.9
323632	Beryllium	0.029	0.1
321730	Beryllium	0.029	0.1
319432	Beryllium	0.029	0.1
323632	Chromium	0.15	6
321730	Chromium	0.15	6
319432	Chromium	0.15	6

Record: 1 Show: All Selected Records (0 out of 9 Selected) Options

Non-spatial table is created that lists all Chemical Summary details for chosen records.

Download Tools

- http://ce-dredge.usace.army.mil/Tools/Sediment_Sampling.aspx



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Questions?

http://ce-dredge.usace.army.mil

US Army Corps of Engineers

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