

# Field Inspections using Collector and Survey123

Chris Ridgway, PG

Vulcan Materials Company

*2016 ESRI USER CONFERENCE*

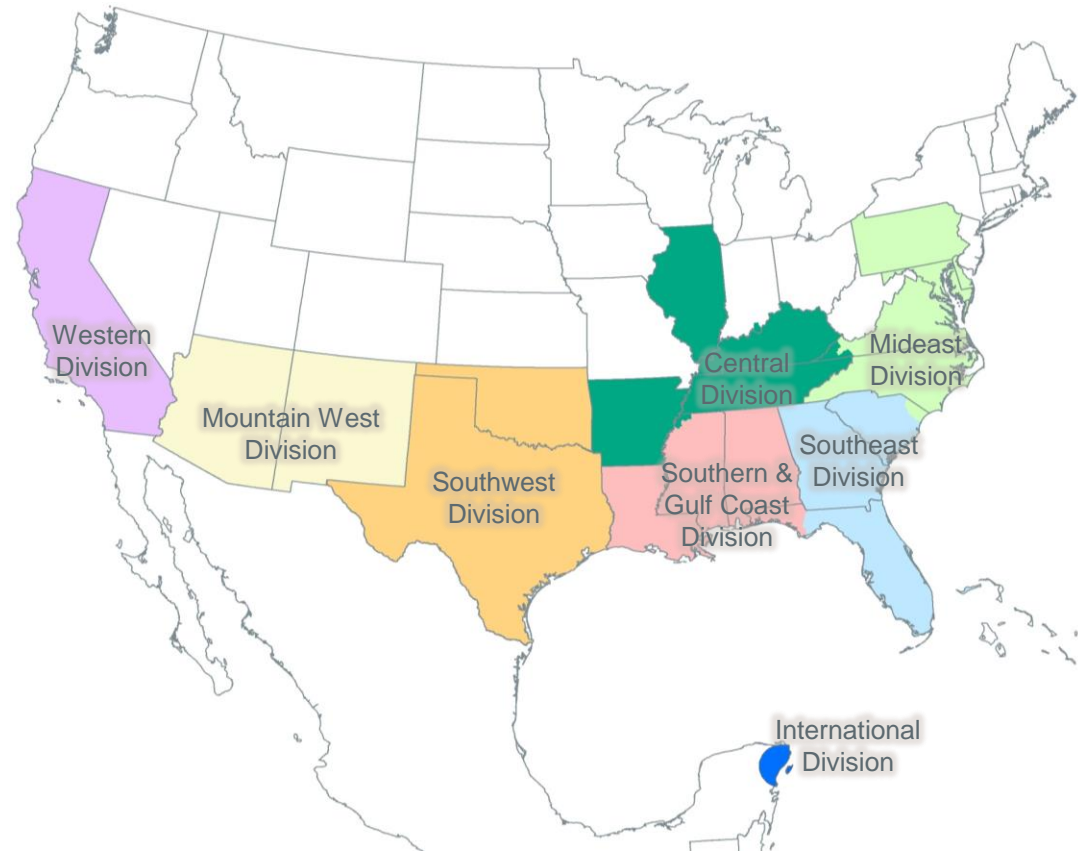
*June 29, 2016*



**Vulcan**  
Materials Company

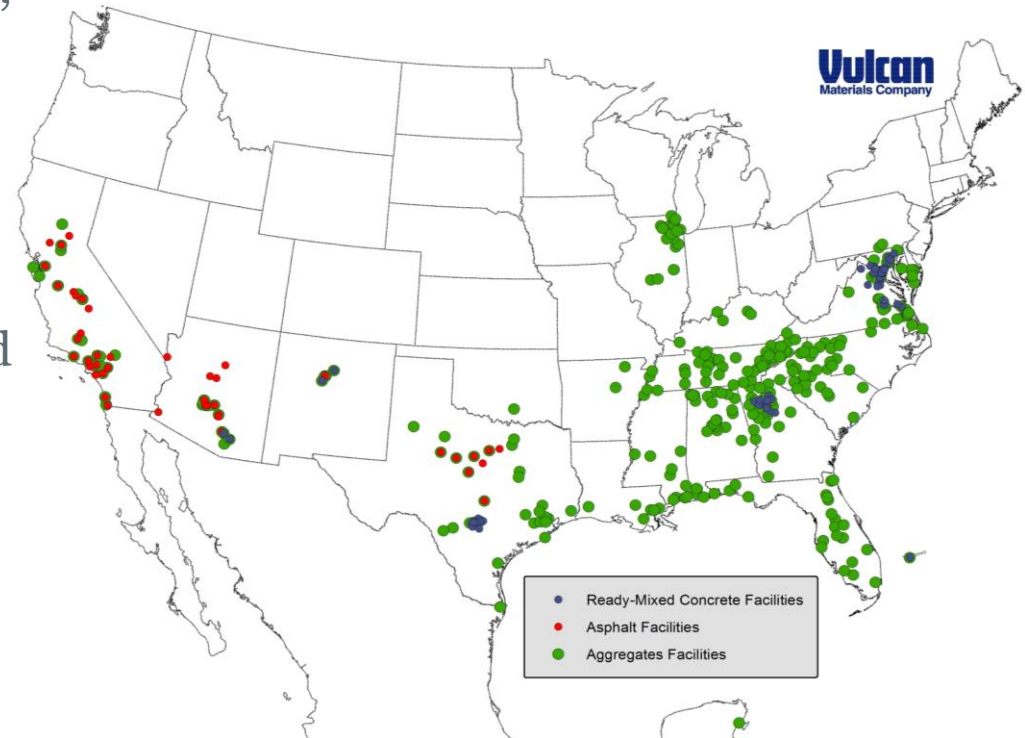
# OUTLINE

- Introduction
- GIS History
- Problem/Needs
- Solution(s)
- Demonstration
- Summary



# INTRODUCTION

- Operating 335 aggregates facilities, serving markets in 20 states, the District of Columbia, Mexico and the Bahamas
- Employs over 7,000 people
- Public company with shares traded on the NYSE
- 2015 Shipments – 15.9 MT
- A major producer of asphalt and concrete
- Headquartered in Birmingham, Alabama



# GIS HISTORY



VMap  
Roll Out



Imagery  
Consolidation

Collector and  
Survey123

Pilot Project

Jan  
2008

Aug  
2009

April  
2010

Sept  
2010

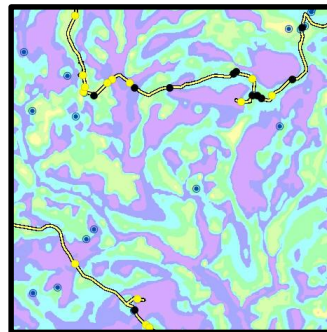
2011

2014

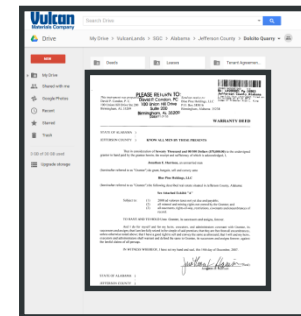
2016

Land DB  
and  
Web Interface  
Design and  
Development

Exploration  
DB Migration

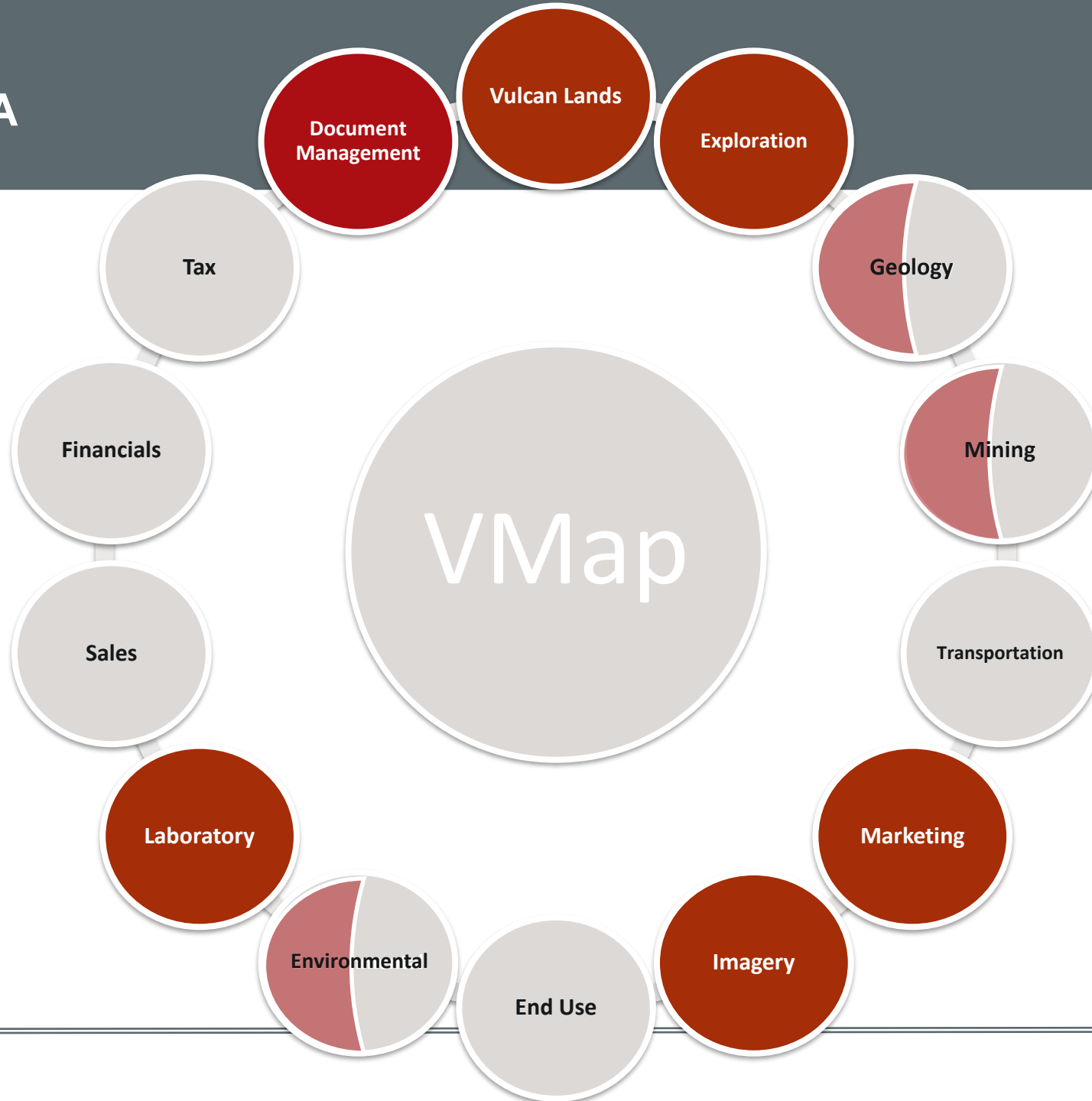


Land Records





**DATA**



# THE INSPECTION PROCESS



## Research

- Aerial photography & topography
- Previous inspections
- Interview plant manager



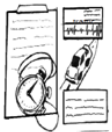
## Field Investigation

- Observe and map geologic features



## Sampling

- Collect samples if necessary
- Test

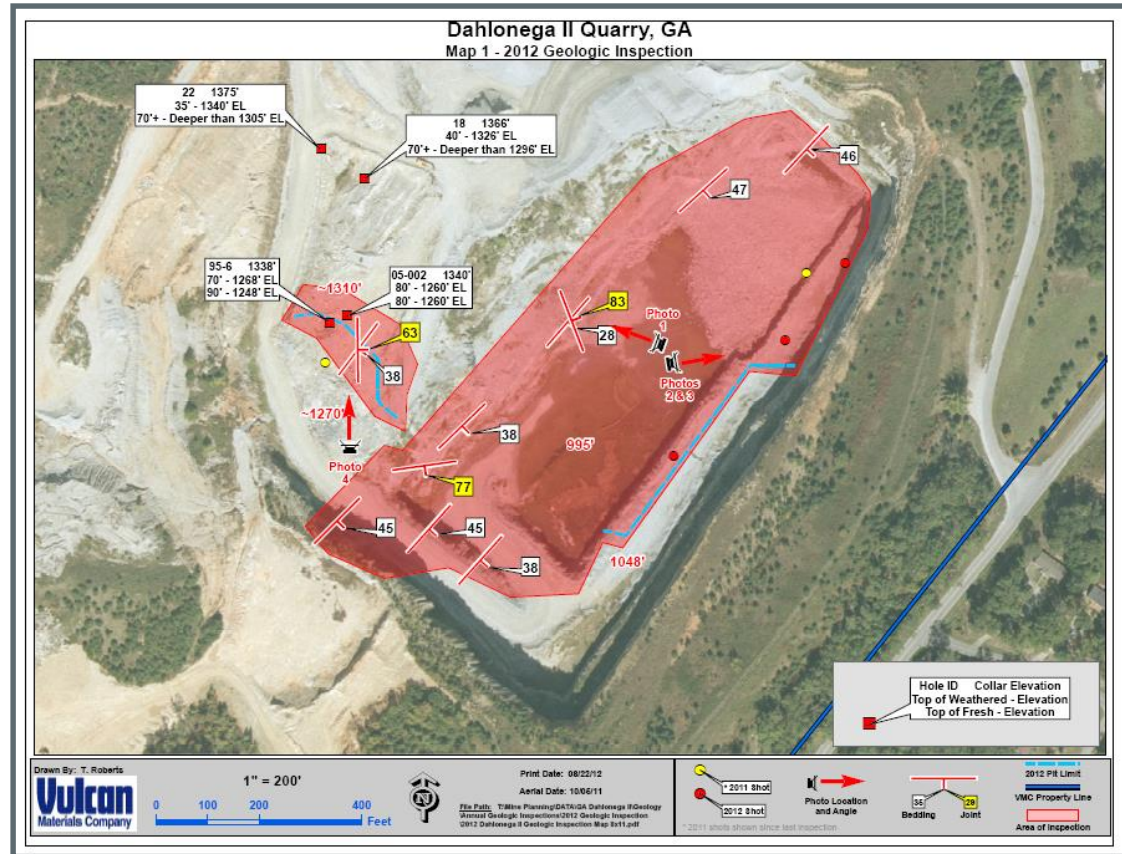


## Reporting

- Document

# GEOLOGIC INSPECTIONS PROBLEM

- Annual inspections conducted at over 80 sites
- Lengthy process
- Several checklists utilized
- Form must be completed
- Report and map must be generated



# GEOLOGIC INSPECTIONS NEEDS



- Streamline the process
- Collect uniform data
- Utilize existing data and services
- Eliminate multiple steps

## Quarry Site Review

Site	<input type="text"/>	Date	<input type="text"/>
Site number	<input type="text"/>	Date last review	<input type="text"/>
Reviewed by:	<input type="text"/>	Reviewed by:	<input type="text"/>

OK	Note (#)		OK	Note (#)		
<input type="checkbox"/>	<input type="checkbox"/>	<b>Quality</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Planning/Timing</b>	
<input type="checkbox"/>	<input type="checkbox"/>		Ledges are mined as planned	<input type="checkbox"/>		Following plan
<input type="checkbox"/>	<input type="checkbox"/>		Deleterious Material	<input type="checkbox"/>		10K reserve review
<input type="checkbox"/>	<input type="checkbox"/>		Other Quality Issues	<input type="checkbox"/>		Stripping schedule on track
<input type="checkbox"/>	<input type="checkbox"/>	<b>Geologic Structures</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Systems status</b>	
<input type="checkbox"/>	<input type="checkbox"/>		New formation being mined	<input type="checkbox"/>		Development to next lower bench
<input type="checkbox"/>	<input type="checkbox"/>		Structural influences	<input type="checkbox"/>	<input type="checkbox"/>	Discharge quality systems functional
<input type="checkbox"/>	<input type="checkbox"/>		Floor buckling	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>		Water issue	<input type="checkbox"/>	<input type="checkbox"/>	Space for stripping material available
<input type="checkbox"/>	<input type="checkbox"/>		Change in overburden thickness	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>		Karst feature issues	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>		Clay cutters	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<b>Operations Practices</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Timing of infrastructure change</b>	
<input type="checkbox"/>	<input type="checkbox"/>		Weathering issues, Pinnacles	<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>		Trim blast effectiveness	<input type="checkbox"/>	<input type="checkbox"/>	power
<input type="checkbox"/>	<input type="checkbox"/>		Suitable catch areas and measures to warn in place	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	Are Catch benches able to contain fallen material	<input type="checkbox"/>	<input type="checkbox"/>	Access to any ledge	
<input type="checkbox"/>	<input type="checkbox"/>	Overburden slopes - are they stable	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	Ground control issues - perimeter	<input type="checkbox"/>	<input type="checkbox"/>	<b>Compliance</b>	
<input type="checkbox"/>	<input type="checkbox"/>	Ground control issues - production benches	<input type="checkbox"/>	<input type="checkbox"/>		Environmental compliance
<input type="checkbox"/>	<input type="checkbox"/>	<b>Legal/community</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Needs</b>	
<input type="checkbox"/>	<input type="checkbox"/>		Mineral right lines, setbacks	<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Neighbor issues	<input type="checkbox"/>	<input type="checkbox"/>	Update mine plan -short/long term	
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	Exploration - drilling, etc	



# GEOLOGIC INSPECTIONS SOLUTION (in progress)

## Collector

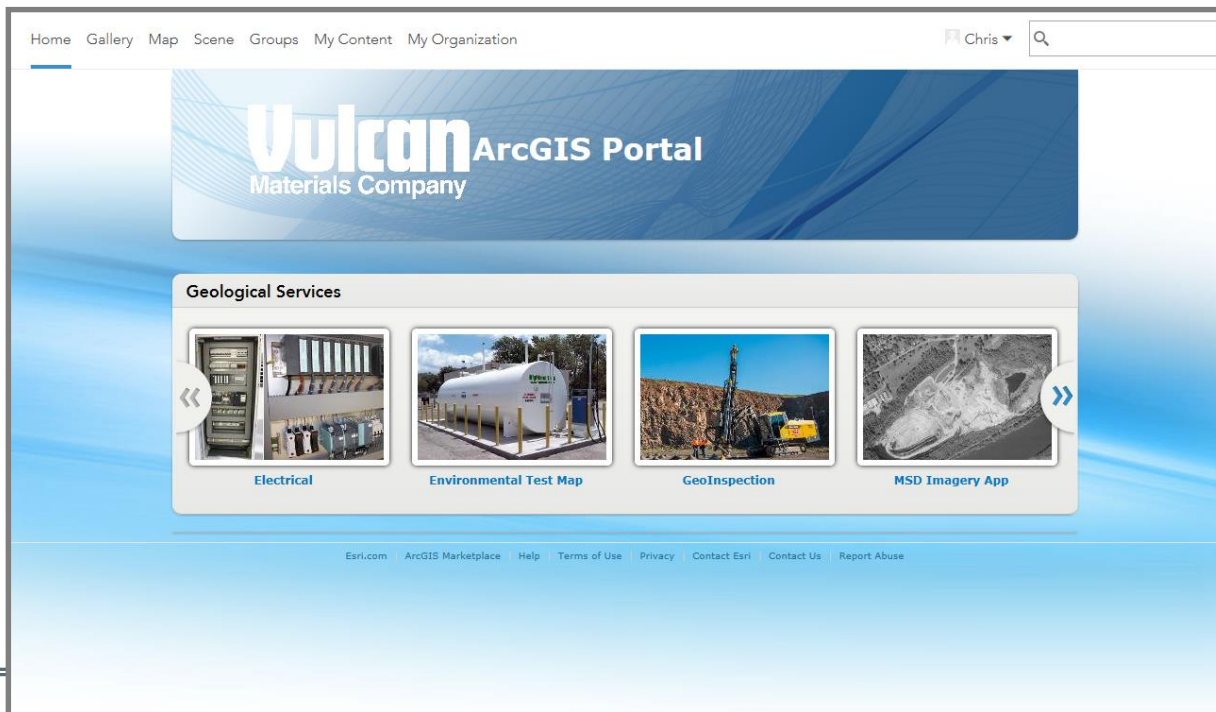


- Utilize Collector for mapping features
- Store in .sde

## Survey123



- Utilize Survey 123 for documentation
- Publish as report



# GEOLOGIC INSPECTIONS DEMONSTRATION

Details Add Edit Basemap Analysis Save Share Print Directions Measure Bookmarks Find address or place

About Content Legend

Contents

- GeoInspections Template - Quality Issue
  - Deleterious Material
  - New Formation
  - Specific rock types
- GeoInspections Template - Geologic Structures
  - Change in overburden thickness
  - Clay Cutters
  - Floor Buckling
  - Karst features
  - Structural problems or influences
  - Water issues
  - Weathering issues
- GeoInspections Template - Inspection Areas
  - Floor
  - Muck pile
  - Stripping Area
  - Wall
- Vulcan Land (iPad)
- Alabama 2015 1m
- Imagery

Map navigation: +, Home, -, Refresh

Dolcito

0 150

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  - Wall
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- Alabama 2015 1m
- Imagery

0 150



# ENVIRONMENTAL INSPECTIONS DEMONSTRATION

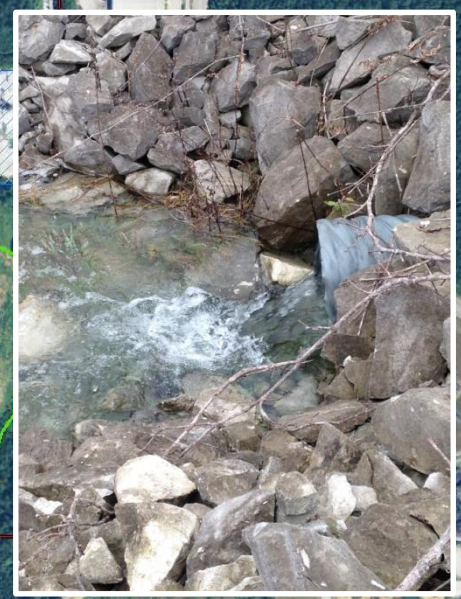


Details Add Basemap Analysis Save Share Print Directions Measure Bookmarks Find address or place

About Content Legend

Contents

- SGC land
- Environmental
  - Outfalls
    -
  - Permit Signs
    -
  - Culverts
    -
  - Flow Direction
    -
  - Plant
    -
  - Pump Directions
    -
  - Buildings
    - Office
    - Shop
  - Containments
    -
  - DisturbedArea
    -
  - Ponds
    -
  - Pumps
    -
- Imagery





# ELECTRIC INSPECTIONS DEMONSTRATION

Details Add Basemap Analysis

Save Share Print Directions Measure Bookmarks Find address or place

Change Style

Electrical - Electrical Features

1 Choose an attribute to show

FEATURE\_TYPE

2 Select a drawing style

Types (Unique symbols)

Heat Map

Location (Single symbol)

DONE CANCEL



- Control House
- Disconnect
- E House
- Pipe
- Pole
- Pump
- Remote Panel
- Transformer



# GEOLOGIC INSPECTIONS SOLUTION (in progress)

- Utilize Survey 123 for documentation
- Store data
- Create report



### Geology Survey

#### Review Details

Site Name

Site Number

Reviewer Name

Plant Manager

Date  
Wednesday, June 01, 2016

Photo of pit



# GEOLOGIC INSPECTIONS DEMONSTRATION



## Geology Survey

### Inspection Areas

Which areas were inspected?

- Active Wall
- Floor
- Muck Pile
- Stripping Area
- Other

Enter other areas inspected

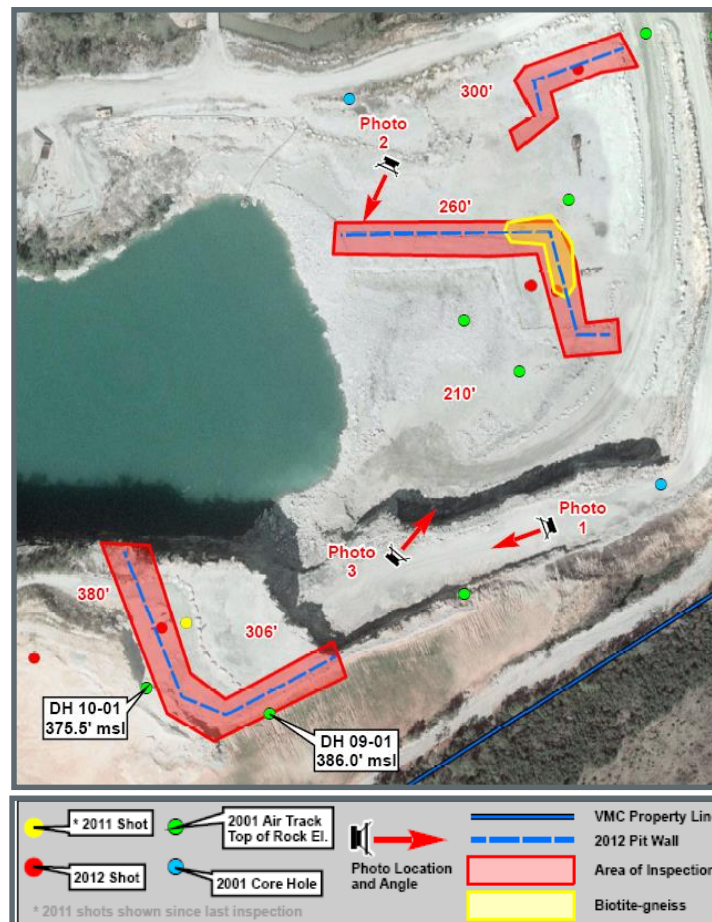
Draw the areas inspected

*GPS coordinates can only be collected when outside.*

No Location

**Press to capture location using a map**

Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, FSA, USGS, AEX,...



# GEOLOGIC STRUCTURES DEMONSTRATION

## Geology Survey

### Geologic Features

Are geologic features present that may effect mining?

- Yes  
 No

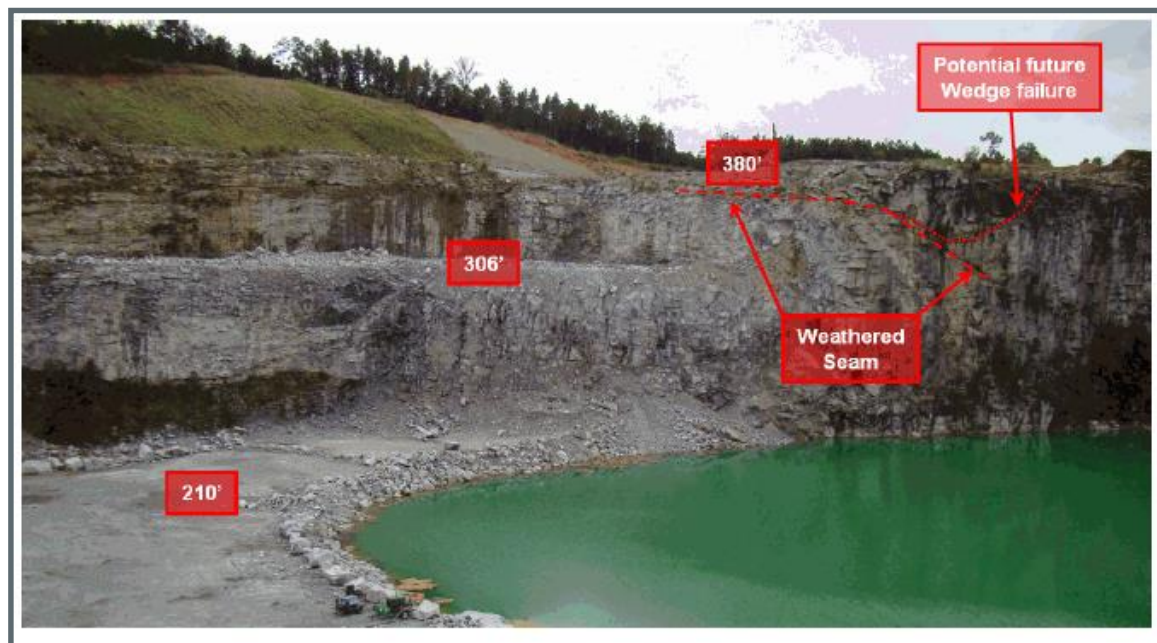
Which geologic features are present?

- Structural Features  
 Floor Buckling  
 Water Issues  
 Changes to Overburden Thickness  
 Karst Features  
 Clay Cutters  
 Weathering Issues  
 Other

### Notes

wedge failure, bench 306

Photo of geologic structures





**Geology Survey**

**Quality Issues**

Are quality issues that may effect mining?

Yes  
 No



Which quality issues are present?

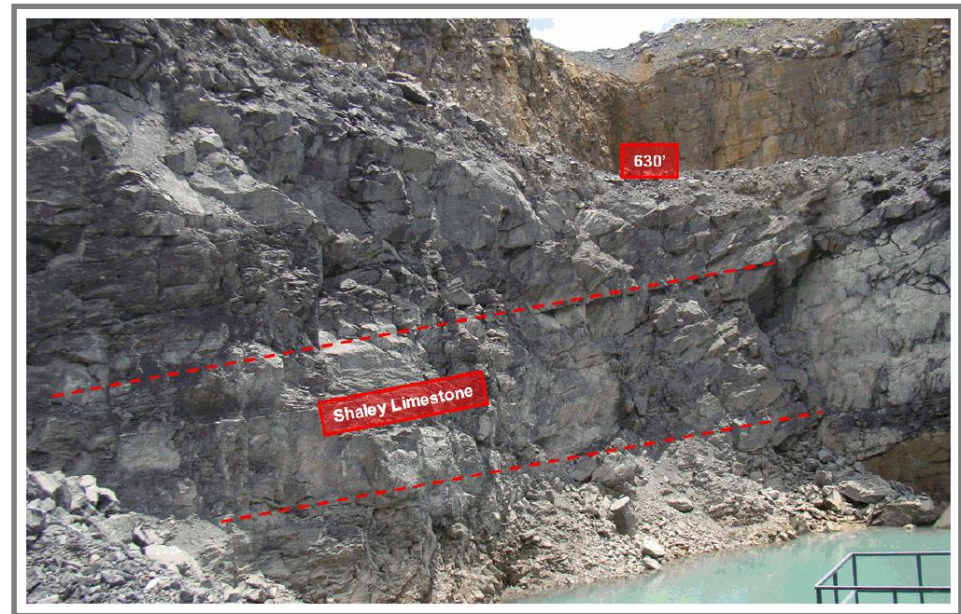
Ledges are mined as planned  
 Deleterious material present  
 New formations being mined  
 Other quality issues

Notes

Testing and approval of zone

Photo of quality issues



# SUMMARY AND WISHES



## Collector

- Useful for more many disciplines...
- Environmental, electrical, health and safety

## Wishes

- Improve position accuracy
- Limit the need to switch between Collector and Survey123



## Survey123

- Streamlined approach to collecting necessary data
- Create focused surveys

## Wishes

- Allow more than one geofeature type per survey
- Ability to easily create a report document



# QUESTIONS

