



the Energy to Lead

R&D for Threat Prevention

-
- > PHMSA R&D Forum
 - > June 25th 2009
 - > Alicia Farag and Rick Pevarski

Overview

- > DIMP Risk Model
- > Remote and Automated QA/QC
- > Virginia Pilots
- > Gaps

DIMP Risk Model

Project Objective

- > Develop a risk model to assist operators in DIMP compliance
 - > Industry standard, vendor neutral
 - > Flexible, open, customizable
 - > Comprehensive
 - > Asset/threat combinations
 - > Roll-up or drill-down
 - > Combination of statistical and SME approaches

Asset/Threat Matrix - Example

	Excavation Damage	Corrosion	Material Failure	Natural/Outside Force	Inappropriate Operation	Equipment Failure
Metallic Mains	Statistical	Statistical	Statistical	Statistical	SME	SME
Metallic Services	Statistical	SME	SME	SME	SME	SME
Plastic Mains	Statistical	NA	Statistical	SME	SME	SME
Plastic Services	Statistical	NA	SME	SME	SME	SME
Meter Sets	NA	SME	Statistical	SME	SME	SME
Reg Stations	NA	SME	SME	Statistical	SME	SME

Deliverables

>Phase 1

- >Open, “paper” model

 - > Customizable

 - > Integratable

- >Commercially available software

>Phase 2

- >Electronic version

- >Implementation

Remote and Automated QA/QC

Remote QA/QC

- > Program Objective
 - > Develop and implement technologies that can remotely monitor the quality of operations and maintenance activities
- > GPS-enabled cameras
 - > Butt fusion quality
 - > Exposures
 - > Repairs



Virginia Pilots

Overview

1. Virginia Pilot Program
 - > Phase I, II, III and IV
2. Adopt a Community
 - > E911 Alert
 - > ROW Encroachment Notice
 - > Building Permit Notification
3. Satellite imagery

Phase I Electronic White Line



Phase I Electronic White Line



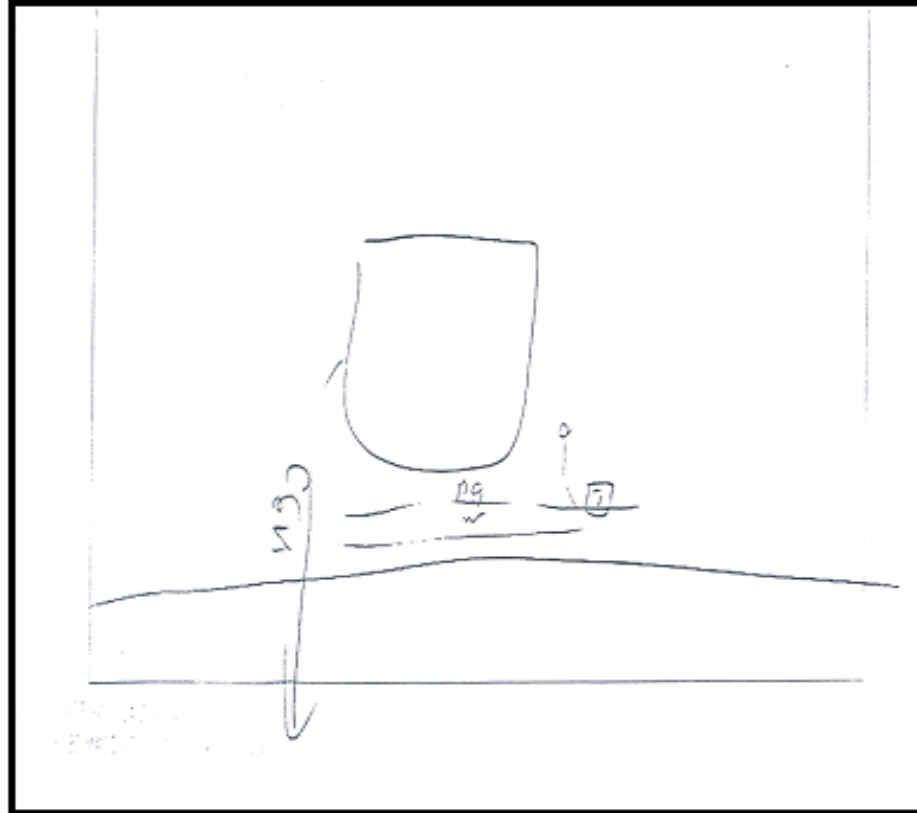
Phase I Metrics – Polygon Size



Phase II Electronic Manifest

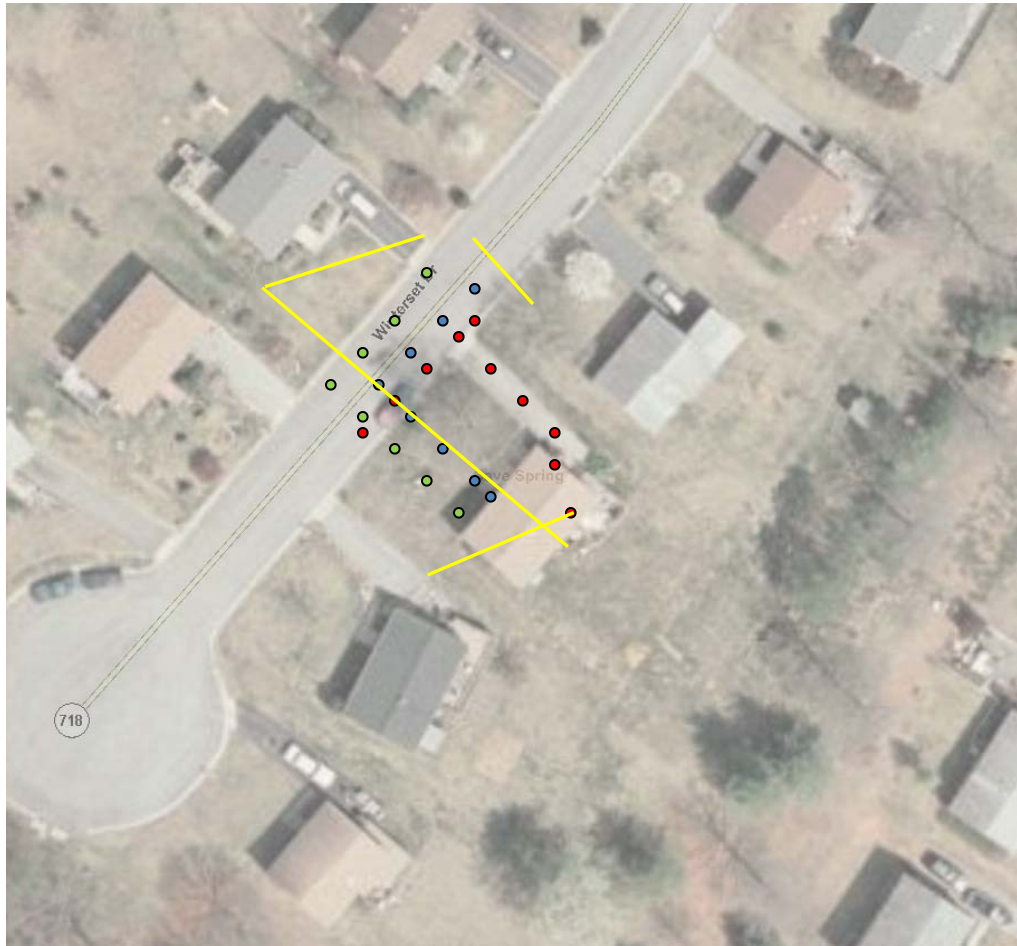
- Collection of GPS points of the field locate through the use of a GPS enabled locating instrument
- Overlay the GPS points on VUPS' ortho-photography / land-base.
- Archive the electronic manifest within VUPS' ticket history

Phase II Electronic Manifest



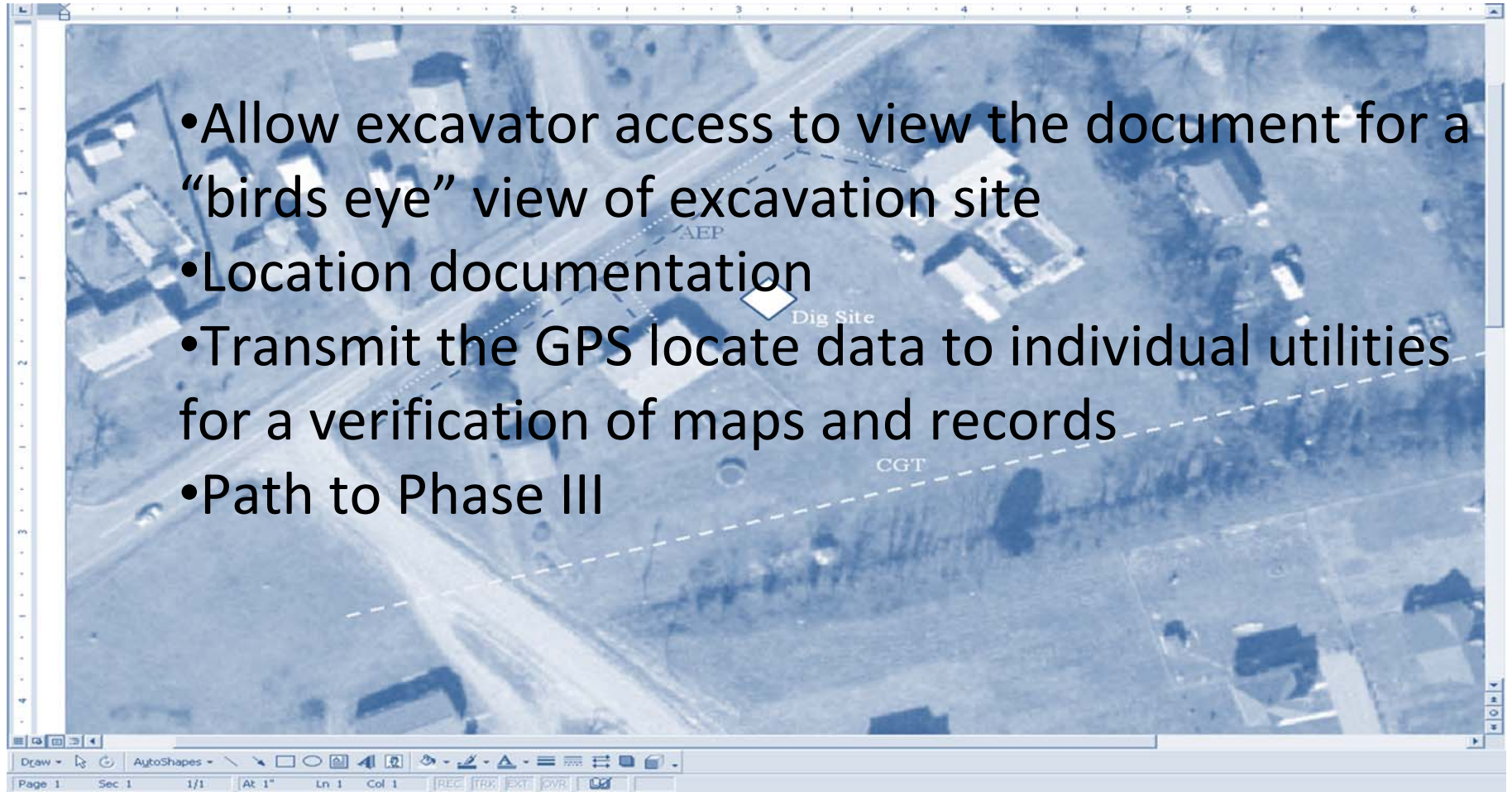
Current manifest record

To This



Phase II Benefits

- Allow excavator access to view the document for a “birds eye” view of excavation site
- Location documentation
- Transmit the GPS locate data to individual utilities for a verification of maps and records
- Path to Phase III



Phase 3

>Objective

- Develop and demonstrate a GPS-based excavation monitoring system
- Phase 3A - Protect against excavators that do not utilize the one-call center or accidentally leave the valid ticket area
- Phase 3B - Protect against excavator encroachment

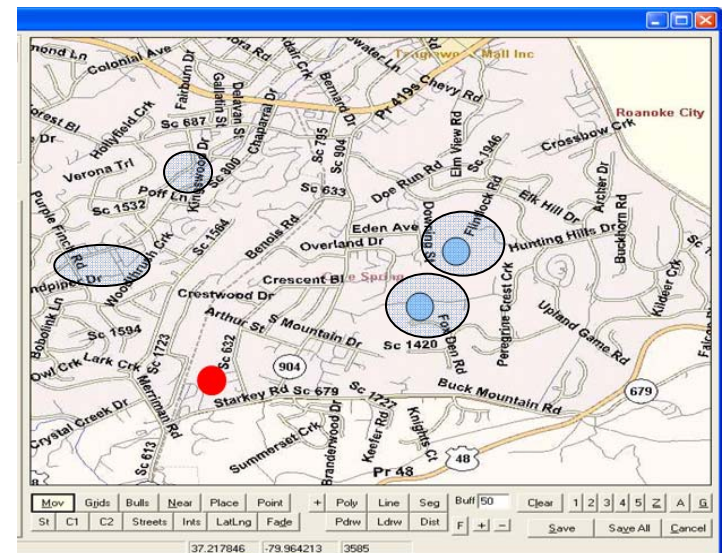
Phase 3A

> GPS Excavation Monitoring

- Low cost, low accuracy
- Commercially available
- Additional benefits

> Portal

- Central data repository
- Monitoring software to detect excavation activity that is occurring outside of a valid one-call ticket



Phase 3A

> Digging Trigger

- How does the system know when digging is occurring?
- Retrofit Sensors
 - > Motion or pressure sensors
 - > Diagnostics
- Next Generation Equipment



Phase 3A

> Pilot Project

- Fall 2009
- Soliciting participation from excavators
- Selecting equipment types



Phase 3B

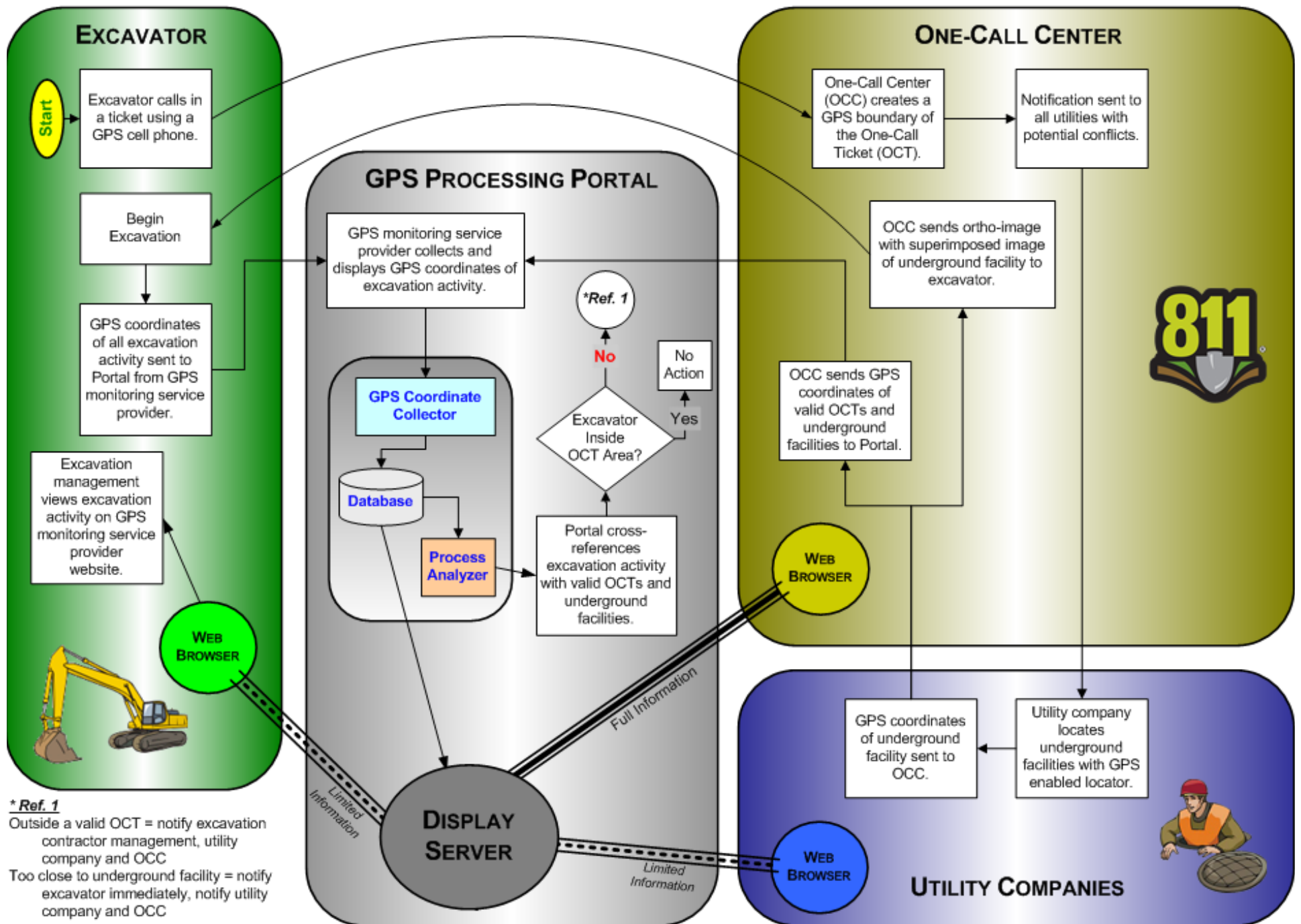
- > GPS grade control system
 - High accuracy, high cost
 - Commercially available
 - Additional benefits
- > Real-Time Portal
 - Monitoring software to warn excavator of imminent encroachment
 - Low and high cost options
- > GPS-Enabled Locator
 - High accuracy GPS



Phase 3B

- > Equipment Manufacturers
 - Next Generation Equipment

- > Pilot Project
 - Summer 2010



* Ref. 1
 Outside a valid OCT = notify excavation contractor management, utility company and OCC
 Too close to underground facility = notify excavator immediately, notify utility company and OCC

Phase 4

> Objective

- > Develop a central repository for utility data for large projects
- > Develop protocols and procedures for using GPS, smart tags and other advanced technologies for capturing and storing utility data in the central repository

> Status

- > Defining scope

Gaps

- > Model to prioritize risk mitigation techniques
 - > Risk based inspection intervals
- > Remote and automated QA/QC
- > Continued implementation of GPS-based technologies (Phase 1-4)
- > Integration of other monitoring technologies with one-call operations (satellite, geophone, acoustic, video, etc)
 - > Phase 3 portal

VUPS, Inc.

E-911 Alert Server

Emergency Notification Entry

- > Current need (continued)
 - Natural gas
 - > DOT 192.615 “Emergency Plans”
 - “Each operator shall establish and maintain liaison with appropriate fire, police, and other public officials.”

E-911 Alert Server

- > A system designed to enhance communications between E-911 dispatchers and utility operators.

E-911 Alert Server

- > 2 types of notifications
 - County-wide
 - Specific area

County-Wide Notification

Main Menu



Server A

Wednesday, June 11, 2008

E911 Alert Server

Enter
Notification

Log Out



TicketEntry (1.0.110.0)

Inquire Normal

Ticket **E-911**

Taken Oper TEST06 Chan 007

Company # 540-989-4757 Caller MARCY HUTCHINSON

Direct Line 540-989-4757 Ext

Email mhutchinson@VUPS.ORG Fax

Company VUPS E911 TESTING

Address 1829 BLUE HILLS CIR NE

Zip 24012 State VA City ROANOKE

State VA County/City ROANOKE Place

Subdivision Lot #

Address Street

Cross Street 1

Cross Street 2

Lat Long

Instructions

AMBER ALERT: CHILD MISSING
DESCRIPTION: GIRL AGE 5
BLOND HAIR, BLUE EYES
HEIGHT: 2'5"
LAST SEEN IN PARKING LOT OF WALMART ON
CHALLENGER AVE.

3. E-911 dispatcher enters free text to describe the emergency

4. E-911 Dispatcher selects the "Get Mbrs" tab

Get Map Get Mbrs Abort SUBMIT

Any additional information - not related to the Excavation Area

TicketEntry (1.0.110.0)

Ticket **E-911**

Taken Oper TEST06 Chan 007

Company # 540-989-4757 Caller MARCY HUTCHINSON

Direct Line 540-989-4757 Ext

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AMBER ALERT: CHILD MISSING
DESCRIPTION: GIRL AGE 5
BLOND HAIR, BLUE EYES
HEIGHT: 2'5"
LAST SEEN IN PARKING LOT OF WALMART ON CHALLENGER AVE.

Code	Description	Type	A/R

TicketEntry

Do you really want to notify all members in the county?

Get Map Get Mbrs Abort SUBMIT

Any additional information - not related to the Excavation Area

Step 5: System prompts dispatcher to verify county-wide notification?

Inquire Normal

Ticket E-911
 Taken Oper TEST06 Chan 007

Company # 540-989-4757 Caller MARCY HUTCHINSON
 Direct Line 540-989-4757 Ext
 Email mhutchinson@VUPS.ORG Fax
 Company VUPS E911 TESTING
 Address 1829 BLUE HILLS CIR NE
 Zip 24012 State VA City ROANOKE

Code	Description	Type	A/R
ATT392	AT&T - ATLANTA	0	
BRM890	BLUE RIDGE MANOR APTS	BG	
CBE216	CRAIG-BOTE. ELEC. COOP.	R	
CISA65	CITY OF SALEM-ELECTRIC	R	
CMC067	COMCAST	0	
CMC069	COMCAST	0	
CMC320	COMCAST	0	
CSWS65	SALEM - WATER & SEWER	BG	
CXRO68	COX COMM. - PROMARK	0	
EMB056	EMBARQ CORPORATION	0	
ETNG94	EAST TENN. NATURAL GAS	Y	
FwM774	F & W	Y	
NTL105	NTELOS	0	
PPL002	PLANTATION PIPELINE-ROAN	Y	
RBT126	NTELOS	0	
RBT427	NTELOS	0	
RBT489	NTELOS	0	
ROGC62	ROANOKE GAS	Y	
TDS251	NEW CASTLE TELEPHONE	0	
TEST05	TEST05 - RICK	0	
TLC172	TELCOVE OF VIRGINIA	0	
TLC481	TELCOVE OF VIRGINIA, LLC	0	
TOV983	TOWN OF VINTON	BG	
USSP22	SPRINT - LONG DISTANCE	0	
VZN163	VERIZON-ROANOKE AREA	0	
WVW853	WESTERN VIRGINIA WATER	BG	

State VA County/City ROANOKE Place
 Subdivision Lot #
 Address Street
 Cross Street 1
 Cross Street 2
 Lat Long

Instructions
 AMBER ALERT: CHILD MISSING
 DESCRIPTION: GIRL AGE 5
 BLOND HAIR, BLUE EYES
 HEIGHT: 2'5"
 LAST SEEN IN PARKING LOT OF WALMART ON
 CHALLENGER AVE.

Step 6: Members to be notified are displayed.

Step 7: E-911 Dispatcher submits notification

Get Map Get Mbrs Abort SUBMIT

E-911 County Wide Notification

- > Submitting the notification will deliver the alert to the utility operators/owners within the specified county
- > Multiple delivery types based on choice of utility owner/operator
 - E-mail
 - Text Message
 - Voice Delivery
 - Combination of all

Notification of Specific Area

TicketEntry (1.0.110.0)

Inquire Normal

Ticket **E-911**

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Direct Line 540-989-4757 Ext

Email mhutchinson@VUPS.ORG Fax

Company VUPS E911 TESTING

Address 1829 BLUE HILLS CIR NE

Zip 24012 State VA City ROANOKE

Code	Description	Type	A/R

State VA County/City ROANOKE CITY Place

Subdivision Lot #

Address Street ORANGE AVE

Cross Street 1 WILLIAMSON RD

Cross Street 2

Instructions Lat Long

Get Map Get Mbrs Abort SUBMIT

Nearest cross street to the excavation site

A

Step 1: E-911 dispatcher information automatically populated based on username and password.

Step 2: E-911 dispatcher enters county, address and cross street (if known) of the emergency.

Inquire

Normal

Ticket

E-911

Taken Oper Chan

Company # Caller

Direct Line Ext

Email Fax

Company

Address

Zip State City

Code	Description	Type	A/R

State County/City Place

Subdivision Lot #

Address Street

Cross Street 1

Cross Street 2

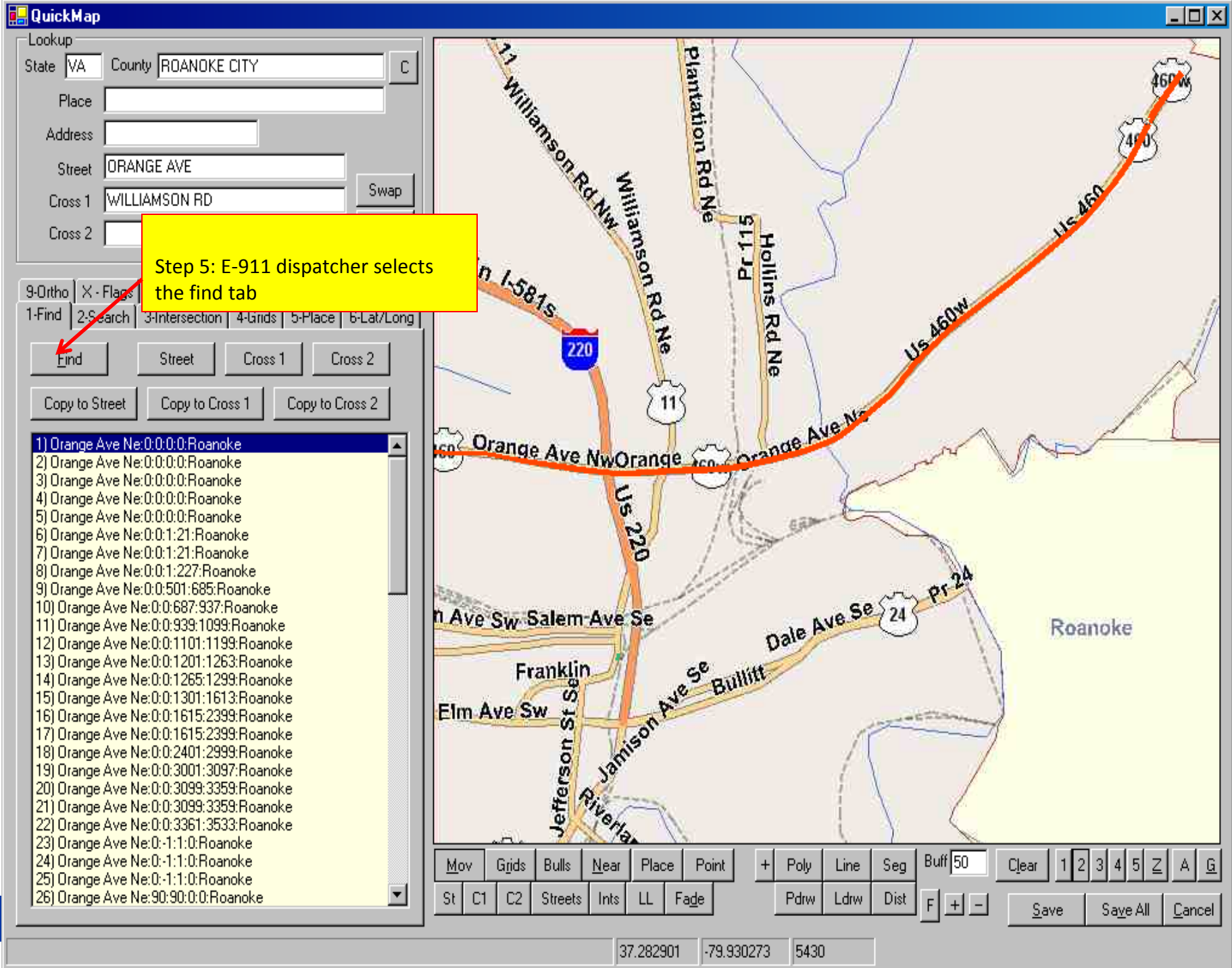
Lat Long

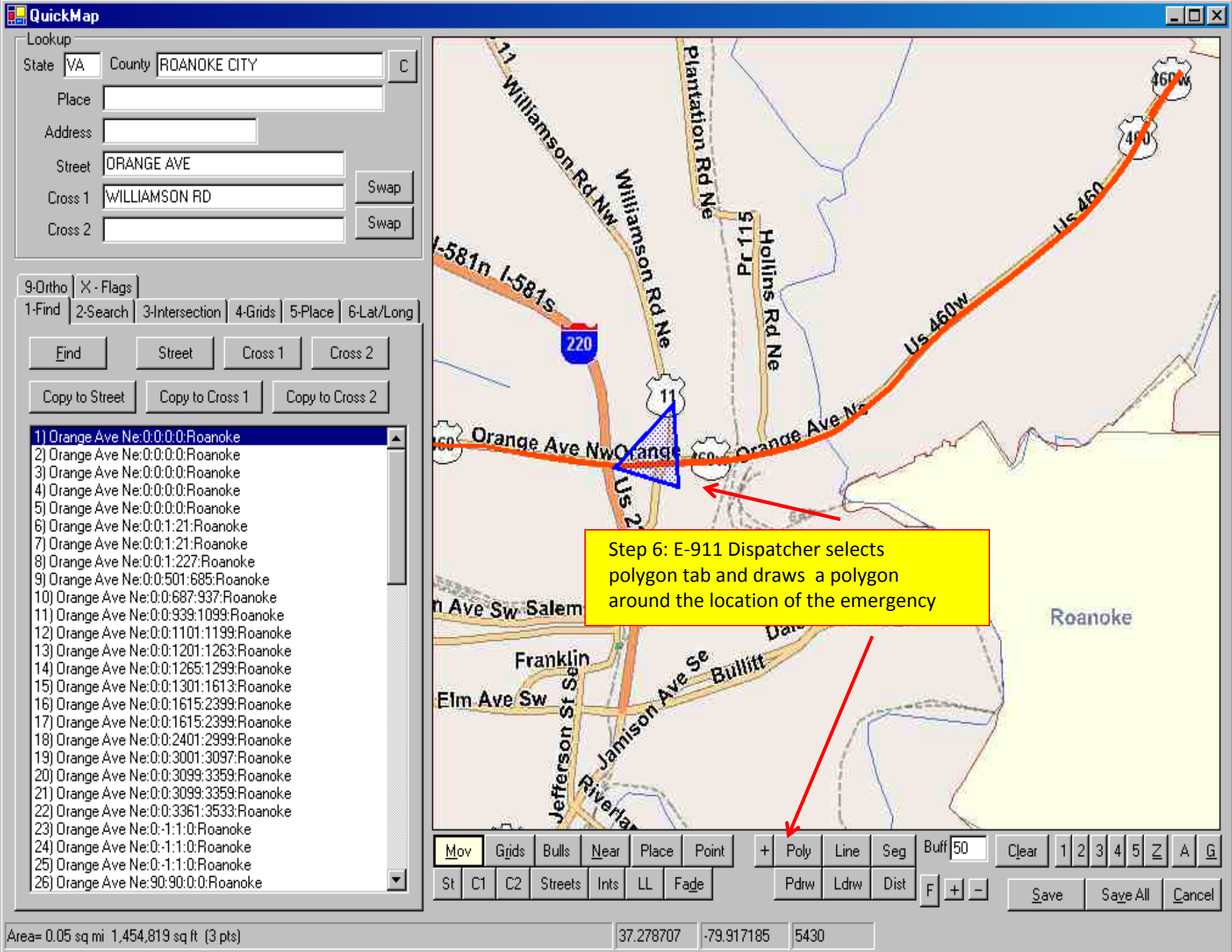
Instructions

FIRE AT THE INTERSECTION OF ORANGE AVE. AND WILLIAMSON RD.
 UNSURE OF UTILITIES INVOLVED

Step 3: E-911 Dispatcher enters the emergency in free form text.

Step 4: E-911 dispatcher selects "Get Map" tab.





QuickMap

Lookup
State **VA** County **ROANOKE CITY** C
Place
Address
Street **ORANGE AVE**
Cross 1 **WILLIAMSON RD** Swap
Cross 2 Swap

1-Find 2-Search 3-Intersection 4-Grids 5-Place 6-Lat/Long
9-Ortho X-Flags

Show Hide Streets
Transparency 0.4
Colors
Red 1.0
Green 1.0
Blue 1.0
Gamma 1.0
Reset

Step 7: E-911 Dispatcher can show the ortho-photography of the map by selecting the Ortho tab and the show tab.

Step 8: E-911 Dispatcher saves the map by selecting the "Save All" tab

Area= 0.07 sq mi 2,003,737 sq ft (3 pts) 37.281036 -79.933585 1000

TicketEntry (1.0.110.0)

Inquire Normal

Ticket **E-911**

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Direct Line 540-989-4757 Ext

Email mhutchinson@VUPS.ORG Fax

Company VUPS E911 TESTING

Address 1829 BLUE HILLS CIR NE

Zip 24012 State VA City ROANOKE

Code	Description	Type	A/R
AEP111	AEP-ROANOKE	R	
CMC069	COMCAST	0	
CXRO68	COX COMM. - PROMARK	0	
ROA853	CITY OF ROANOKE SIGNAL	0	
ROGC62	ROANOKE GAS	Y	
TLC481	TELCOVE OF VIRGINIA, LLC	0	
VZN163	VERIZON-ROANOKE AREA	0	
WWW853	WESTERN VIRGINIA WATER	BG	

State VA County/City ROANOKE CITY Place

Subdivision Lot #

Address Street ORANGE AVE

Cross Street 1 WILLIAMSON RD

Cross Street 2

Lat Long

Instructions

FIRE AT THE INTERSECTION OF ORANGE AVE. AND WILLIAMSON RD.
UNSURE OF UTILITIES INVOLVED

Get Map Get Mbrs Abort SUBMIT

Lookup members for the given location

Step 9 : E-911 Dispatcher selects the "Get Mbrs" tab to display the utilities to be notified.

Step 10: E-911 Dispatcher selects the "Submit " tab to send the notification.

Notifications to Specific Area

> Submit notification

- Notifications delivered to utility operators who have underground utilities in the specified area

> Deliveries

- E-mail
- Text Message
- Voice Delivery
- Combination of all

E911 Center Status Monitor

Newtin - B (Roanoke, VA)

E911 Monitor

Exit

Refresh

Refreshed at 12/01/08 13:19:00 Latest response only.

B833600255-00B	12/01/08 08:29:48		
AEP111	APPALACHIAN POWER		
CXRO68	COX COMMUNICATIONS	12/01/08 08:46:58	9888 E911 -- No need to respond to this incident
E91:1	bob.renaud@cox.com		
E91:2	joel.lawless@cox.com		
E91:3	edward.acams@cox.com		
ROGC62	ROANOKE GAS COMPANY	12/01/08 08:40:02	9888 E911 -- No need to respond to this incident
E91:2	E911@Roanokegas.com		
VZN163	VERIZON	12/01/08 08:32:32	9930 E911 -- ETA to site is 30 minutes
E91:1	8046442714		
WVW853	WESTERN VIRGINIA WATER AUTHORITY	12/01/08 08:39:16	9888 E911 -- No need to respond to this incident
E91:1	5403802687		
E91:1A	5403804659		

Exit

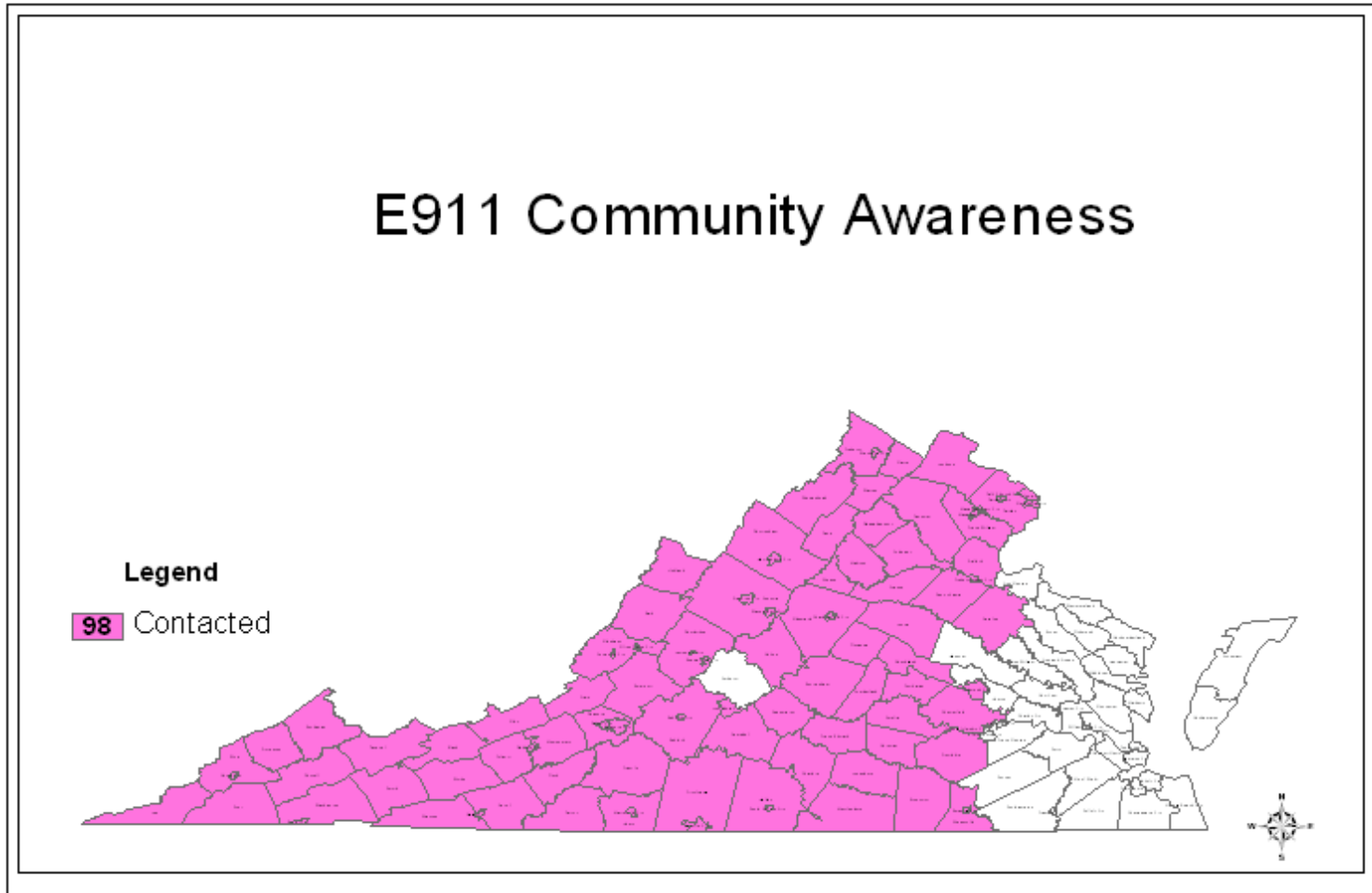
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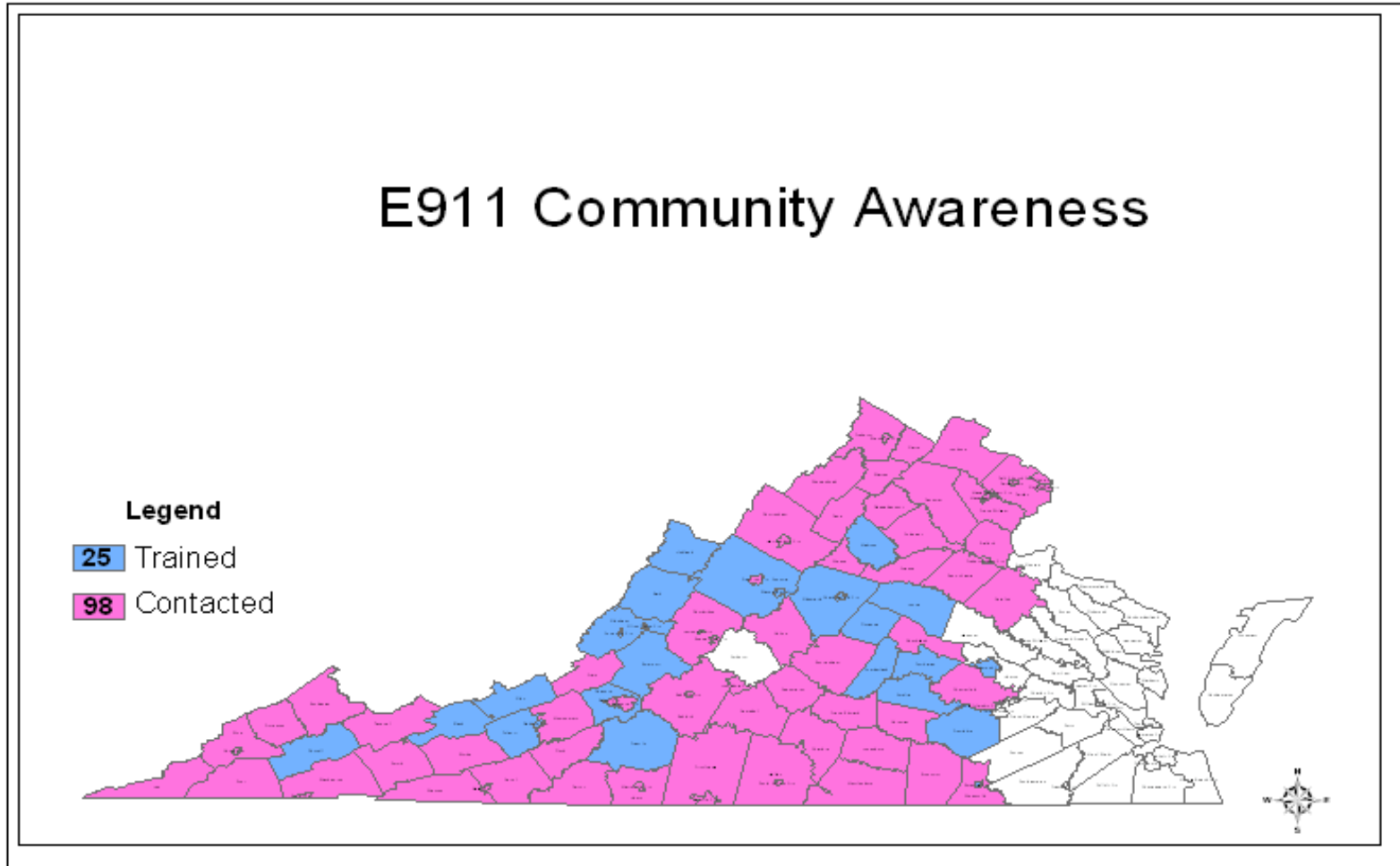
Emergency Notification Entry

- > Potential needs
 - Traffic notification.
 - > Overturned tanker truck
 - > VA Tech; April 16th
 - Multiple utility incident
 - Fire
 - > Gas and electric
 - > Water system SCADA
 - Amber Alerts
 - > Citizens alerts

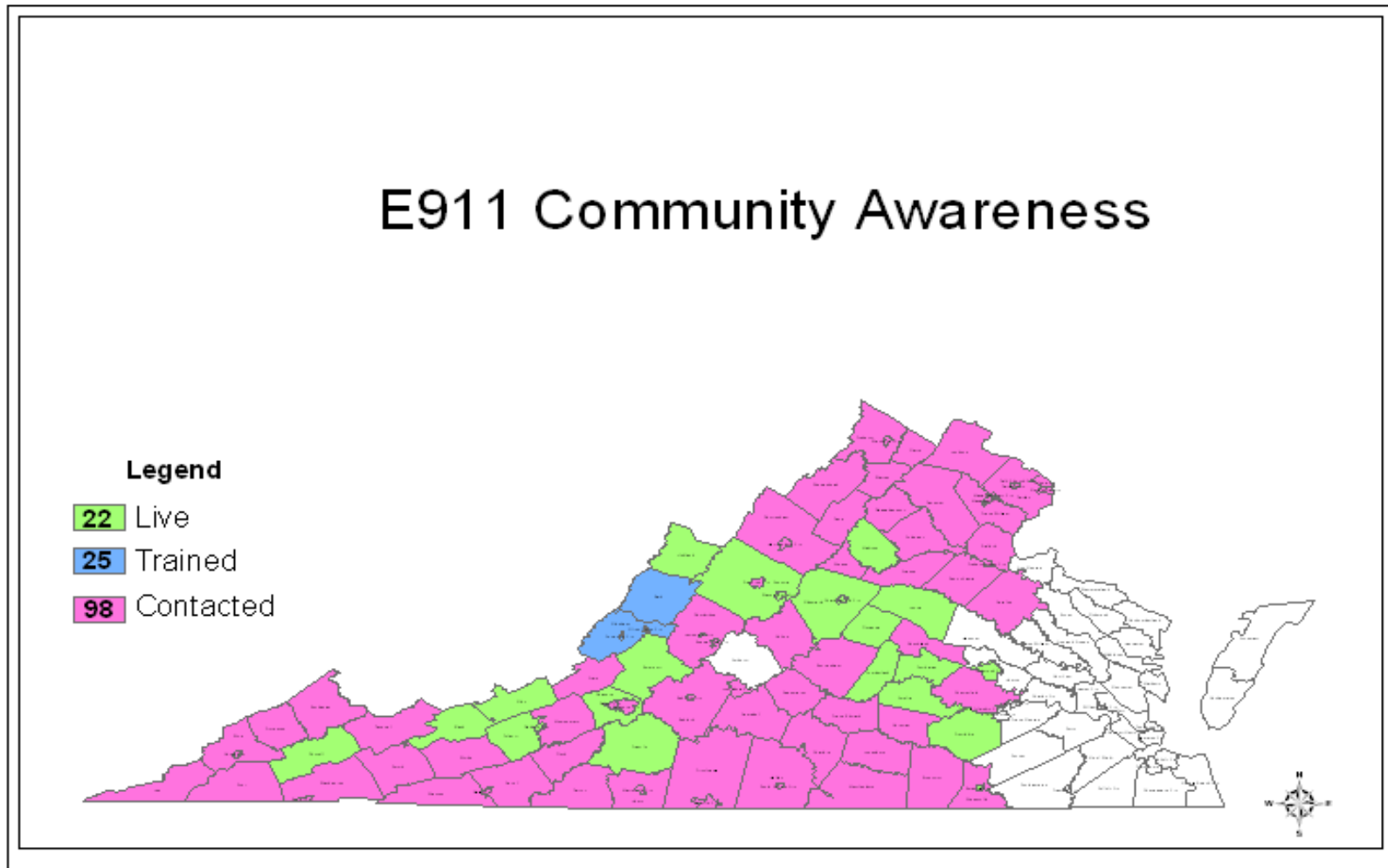
98 E-911 Centers Contacted



25 E-911 Centers Trained



22 E-911 Centers live



Member Participation

County/City	Member Participation (%)
Albemarle County	13%
Amelia County	11%
Botetourt County	40%
Charlottesville City	30%
Emporia City	22%
Franklin County	68%
Powhatan County	13%
Pulaski County	17%
Roanoke County	65%



VUPS Encroachment Notification System

Current Facility Registration

Encroachment Ticket - Microsoft Word

Home H Insert N Page Layout P References S Mailings M Review R View W Add-Ins X

Print Layout Full Screen Reading Web Layout Outline Draft Document Views


Ruler Gridlines Message Bar Show/Hide

Document Map Thumbnails Zoom 100%

One Page Two Pages Page Width

New Window Arrange All Split View Side by Side Synchronous Scrolling Reset Window Position Window

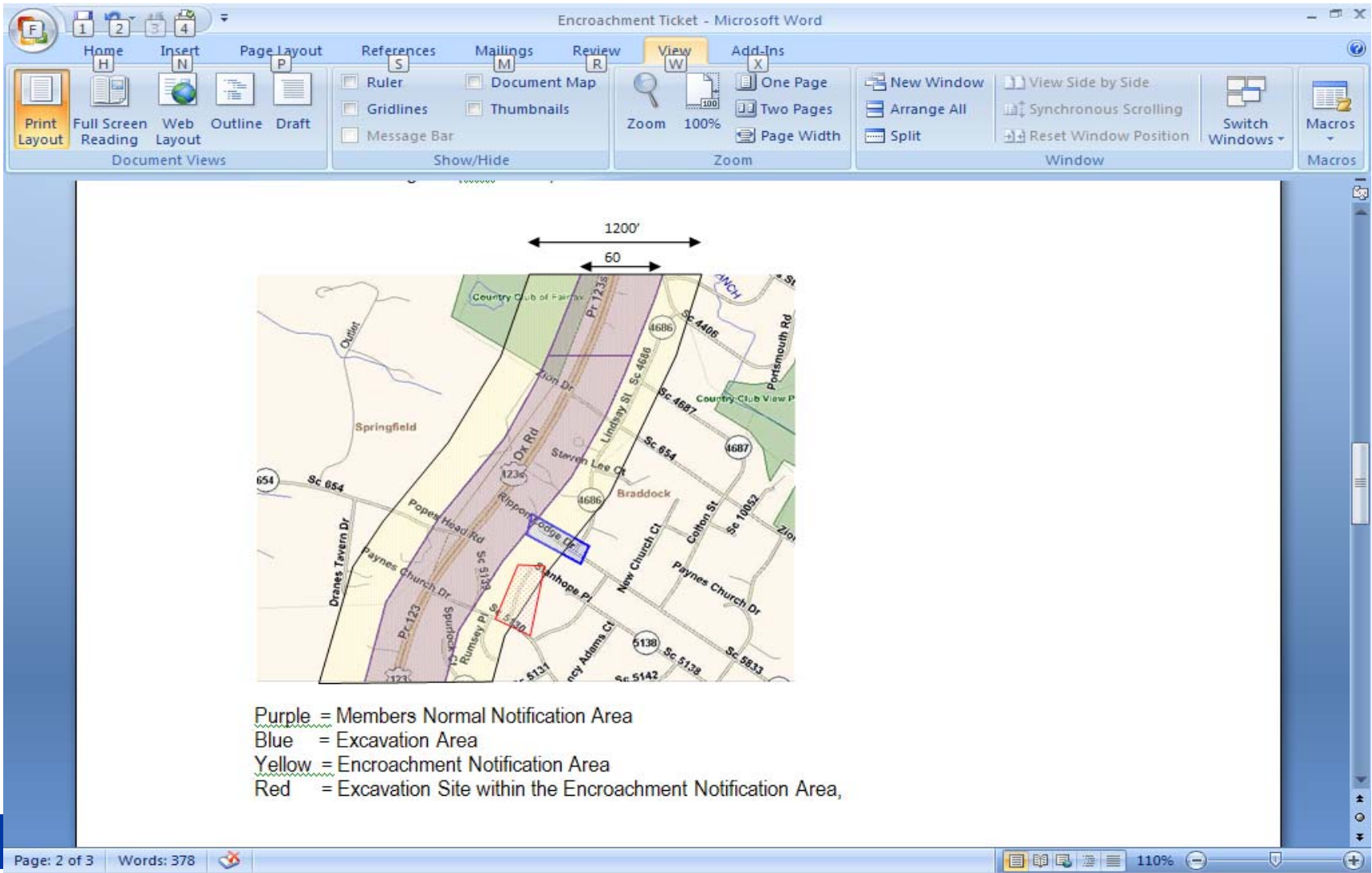
Switch Windows Macros



Purple = Members Normal Notification Area (600' wide)
Blue = Excavation Area

Page: 1 of 3 Words: 378 110%

Encroachment Notification



The screenshot shows a Microsoft Word document titled "Encroachment Ticket". The ribbon is set to "View", showing options like "Zoom" (100%), "One Page", "Two Pages", and "Page Width". The main content is a map of a residential area with various streets and colored notification zones. A legend below the map explains the colors: Purple for Members Normal Notification Area, Blue for Excavation Area, Yellow for Encroachment Notification Area, and Red for Excavation Site within the Encroachment Notification Area. The map includes a scale bar showing 1200' and 60'.

1200'

60'

Purple = Members Normal Notification Area
Blue = Excavation Area
Yellow = Encroachment Notification Area
Red = Excavation Site within the Encroachment Notification Area,

Page: 2 of 3 Words: 378 110%

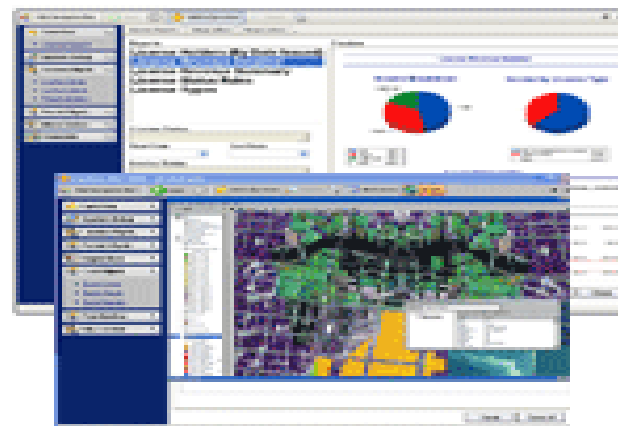
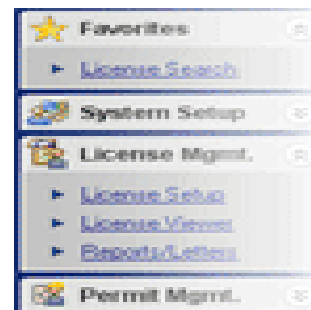
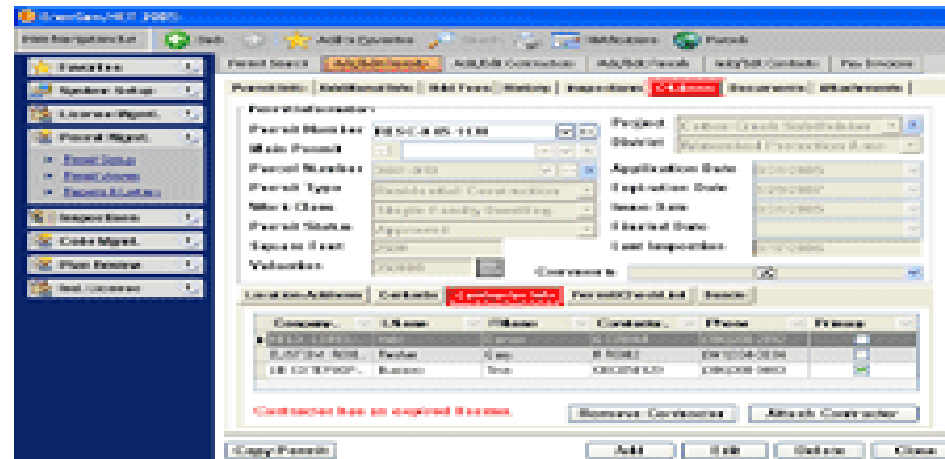
Encroachment Alert

- > Track excavating activities
- > VUPS to send end of day listing of excavators and contact information
- > Utility can send individualized public safety message prior to excavating
 - Pipeline safety
 - Overhead lines
 - Damage prevention

VUPS

Building Permit Notification System

Capture Permit Data



Building Permit

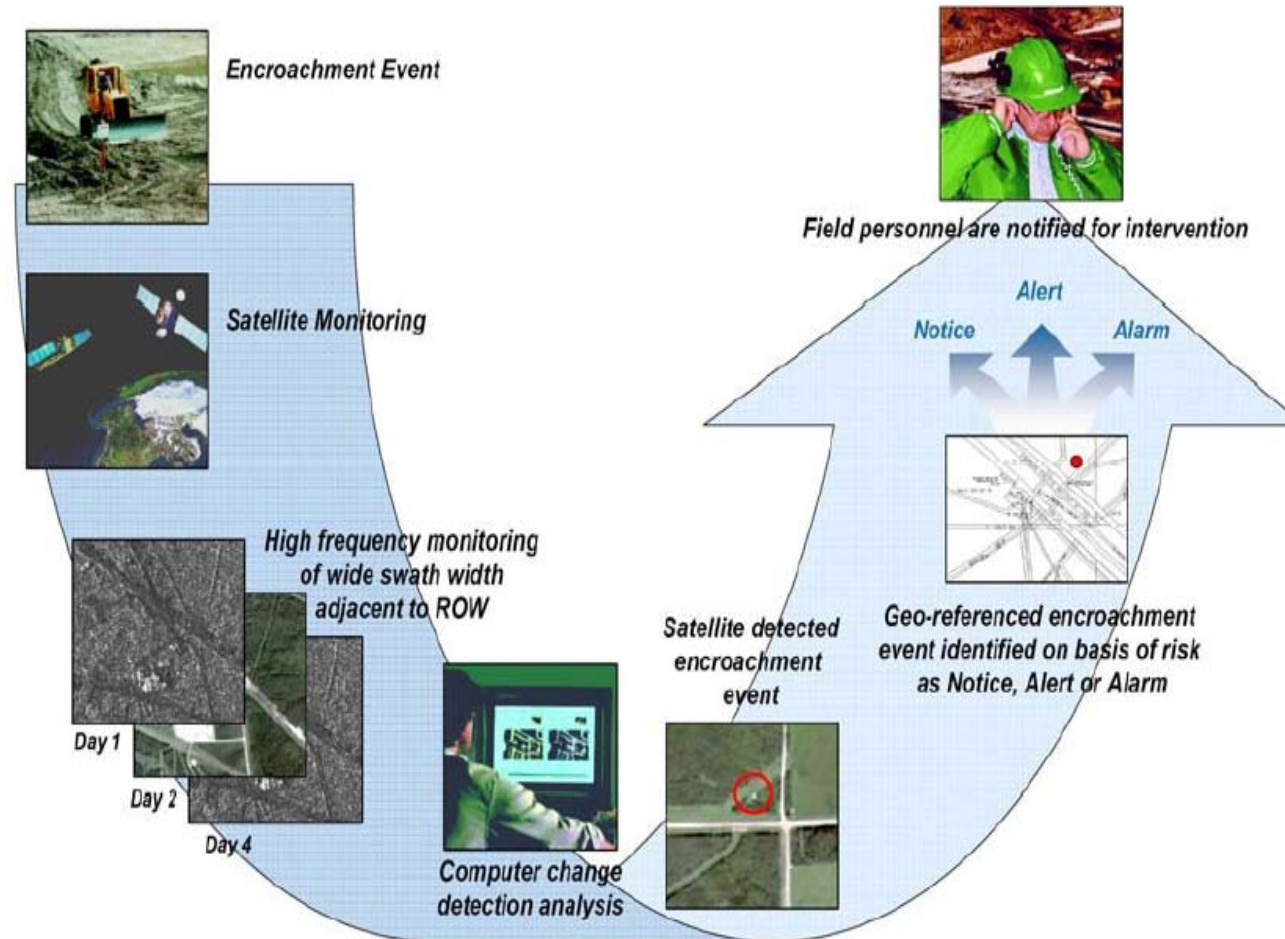
- > Identify a community with an automated building permit process
- > Ensure ability to geo-code each permit with an address or lat / long
- > Map the location within VUPS mapping system
- > Correlate the permit location with VUPS member registration
- > Transmit the notice

Building Permit

- > Potential users
 - Pipeline
 - > Gas and liquids
 - Cross country fiber
 - Electric transmission lines
 - Water transmission lines
 - Railroads

VUPS Satellite Imagery

Process flow



Satellite Imagery Tile

