# IDNR – Office of Mines and Minerals

## Abandoned Mine Land Reclamation Division

## Emergency Unit

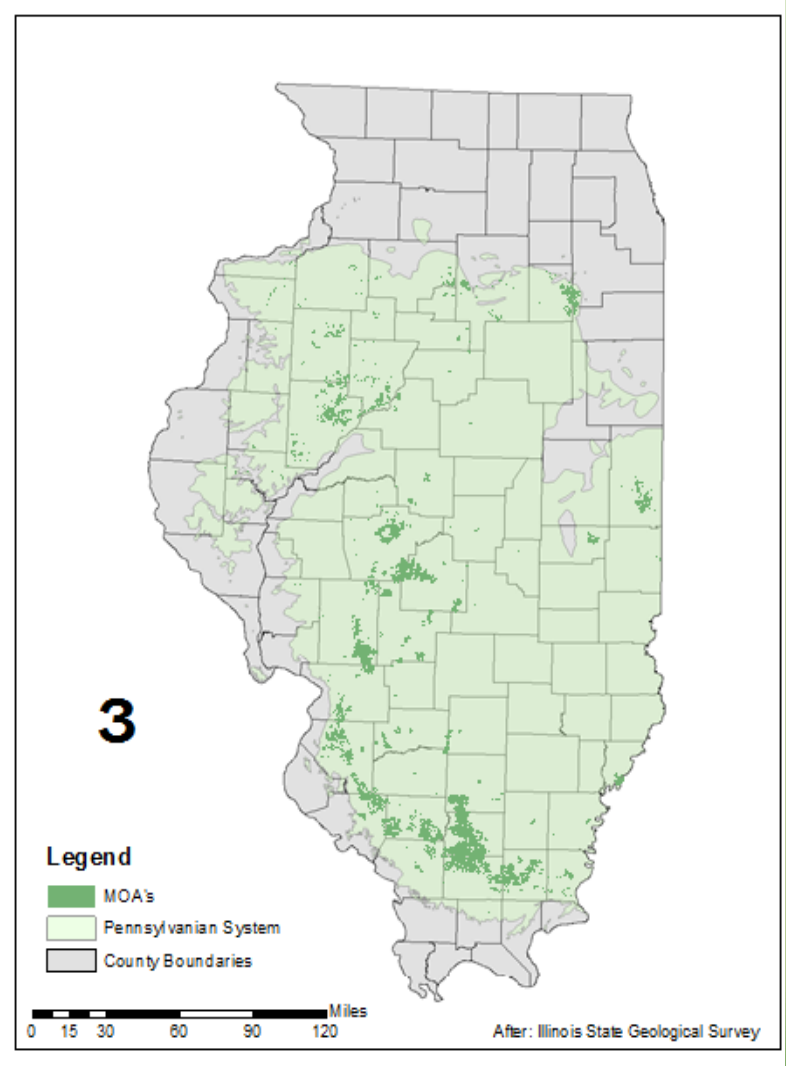
# Who is AMLRD ?

- AMLRD is a division of Illinois Department of Natural Resources (IDNR)
- Recipient of federal funds (taxes) gathered from coal production for use in addressing abandoned mined land (AML) issues
- Investigate and inventory abandoned mine hazards and environmental issues
- Remediate problems with projects prioritized with worst  taken care of first
- Emergencies (problems considered too severe to wait) are given special consideration with streamlined procedures

# Underground Mine Facts

- In Illinois, 178,000 acres of developed land is undermined (From: Treworgy, ISGS)
- Another 878,000 acres of undermined land is located within 1 mile of existing developed areas (From: Treworgy, ISGS)
- Conflicts between land use and past mining activity will become more prevalent because of increased exposure

# Coal and Mined Out Areas of Illinois



# Herrin Coal Depth

The digital files and maps used for this study were compiled from data obtained from a variety of public and private sources and have varying degrees of completeness and accuracy. They present reasonable interpretations of the geology of the area and are based on available data. However, the interpretations are based on data that may vary with respect to accuracy of geographic location, the type and quantity of data available at each location, and the reliability of the data sources. Consequently, the accuracy of features shown in these files varies from place to place.


ISGS
Illinois State Geological Survey

**DRAFT**

**Legend**

**Herrin Depth**

**Depth in Feet**

- < 200 ft
- 200 to 300 ft
- 300 to 400 ft
- 400 to 500 ft
- 500 to 600 ft
- 600 to 700 ft
- 700 to 800 ft
- 800 to 900 ft
- 900 to 1000 ft
- 1000 to 1100 ft
- 1100 to 1200 ft
- 1200 to 1300 ft

This map is made available at this time in DRAFT form only. It has not yet been reviewed to the normal standards of the Illinois State Geological Survey (ISGS) review process. It is made available in this manner as an 'open file' in order to deliver a product to our customers as fast as possible and to meet a particular need that we have encountered in public requests for this information

http://www.isgs.uiuc.edu
http://www.isgs.uiuc.edu/isgshome/coal.htm

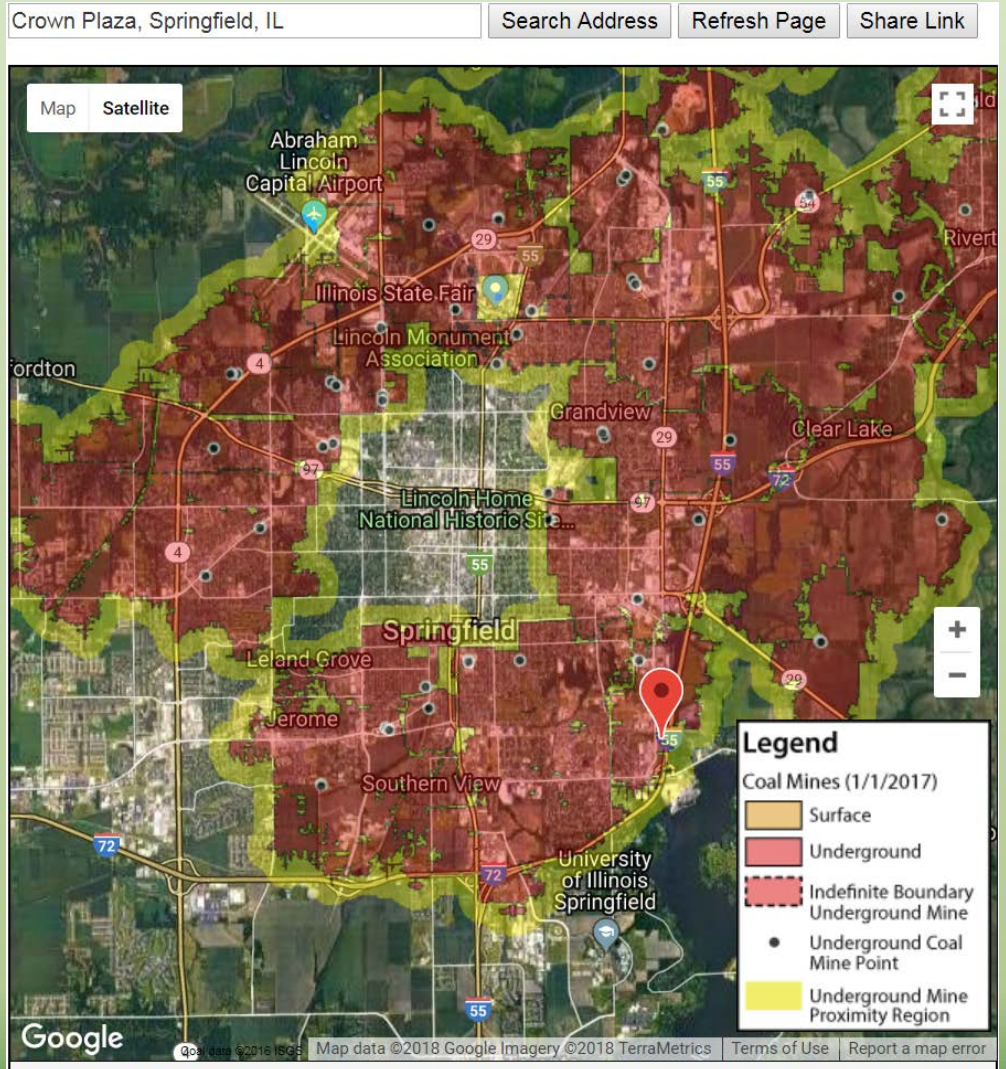
0 20 40
Miles

N

1:2,350,000

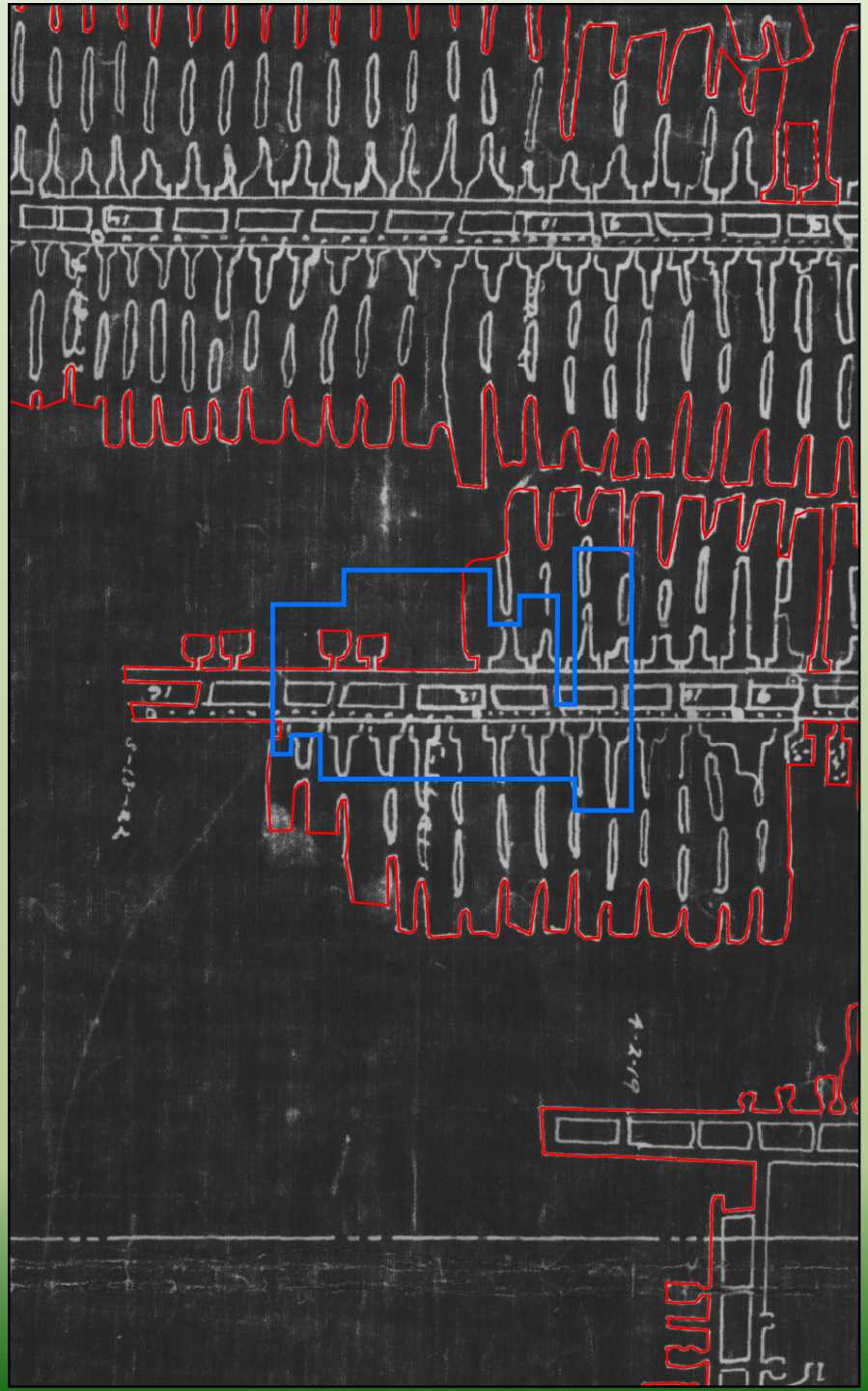
# ISGS Mined Out Area Maps

Coal Mines in Illinois Viewer (ILMINES) http://isgs.illinois.edu/ilmines




Springfield East Quadrangle - Quadrangle coal mine study at 1:24,000 scale. This provides a higher level of detail than County-scale mined area compilations, but may not be up-to-date in areas of recent or currently active mining. PDF file.

Sangamon County - County coal mine map(s) at 1:100,000 scale. County web page also links to coal resource maps and coal log data reports.




CROWNE PLAZA

# Federal Assistance – OSMRE

- Imposes and collects coal fee monies based on Surface Mining Control and Reclamation Act of 1977 – federal law
- Re-allocates coal tax money to fund state AML programs
- Provides technical assistance for state AML programs
- Provides oversight of state AML programs
- Declares EMERGENCY – finding of fact & authorization to proceed
  - *Mine related*
  - *Suddenly occurring*
  - *Life threatening (High probability of substantial physical harm to the health, safety or general welfare of people)*

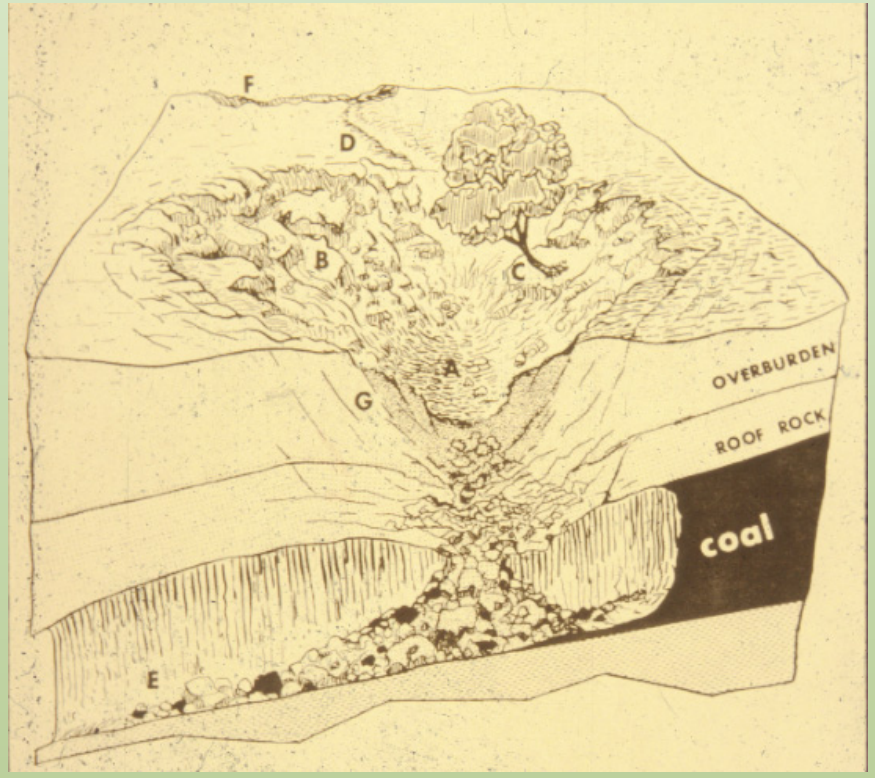
# State Assistance
# IDNR – Office of Mines & Minerals
# AML Emergency Program

- Provides technical evaluation of problem
- Abates extreme hazards associated with eligible mine related problems
- Obtains federal funding to abate hazards
- Designs abatement measures, solicits and awards construction contracts, monitors construction activities

# Abandoned Mined Land Emergency Concerns

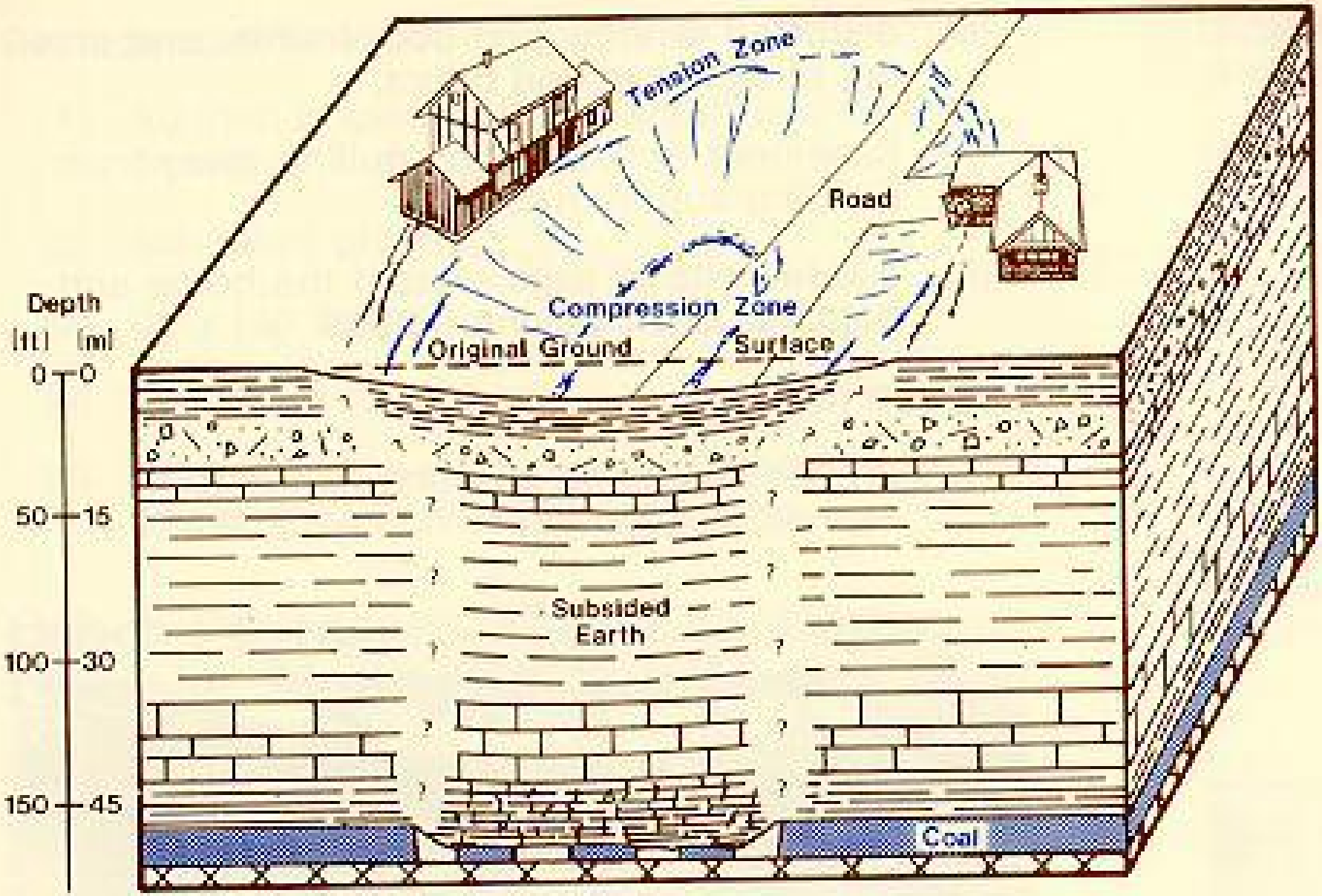
- Structure in danger of collapse due to mine subsidence
- Subsidence pits that develop in urban areas near homes
- Open or improperly sealed mine shafts and slope entrances
- Methane gas leaks
- Mine refuse fires
- Gas leaks from mining operations
- Underground fires and coal refuse pile fires
- Dilapidated mine buildings and equipment
- Barren or eroding mine spoils and refuse piles
- Hazardous highwalls (vertical cut) left from mining

# Pit (Sinkhole) Subsidence

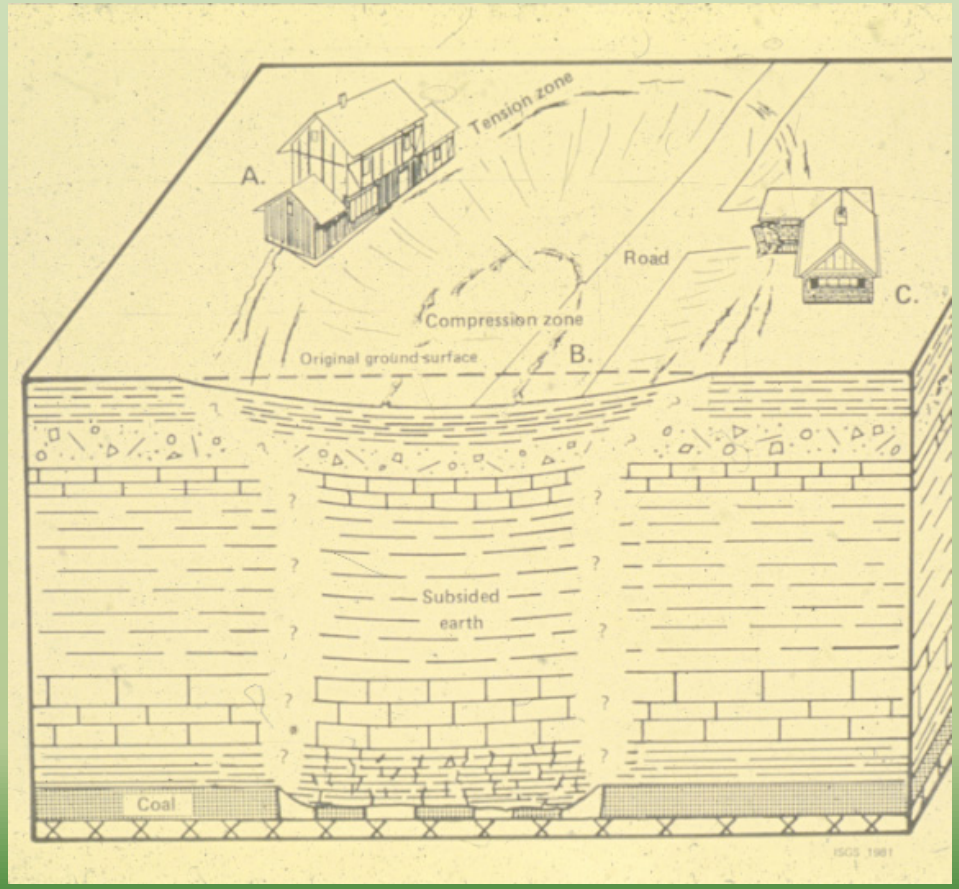



In shallow underground mining areas, falls of mine roof are frequently followed by surface subsidence causing pit holes or sinkholes.

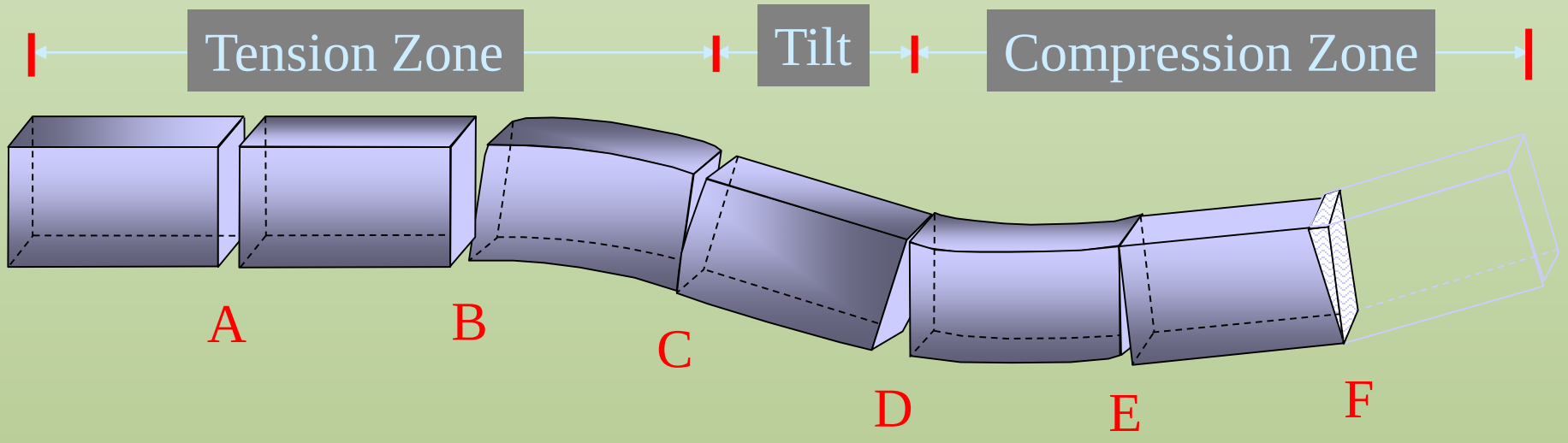
# Sag Subsidence



# Sag Subsidence



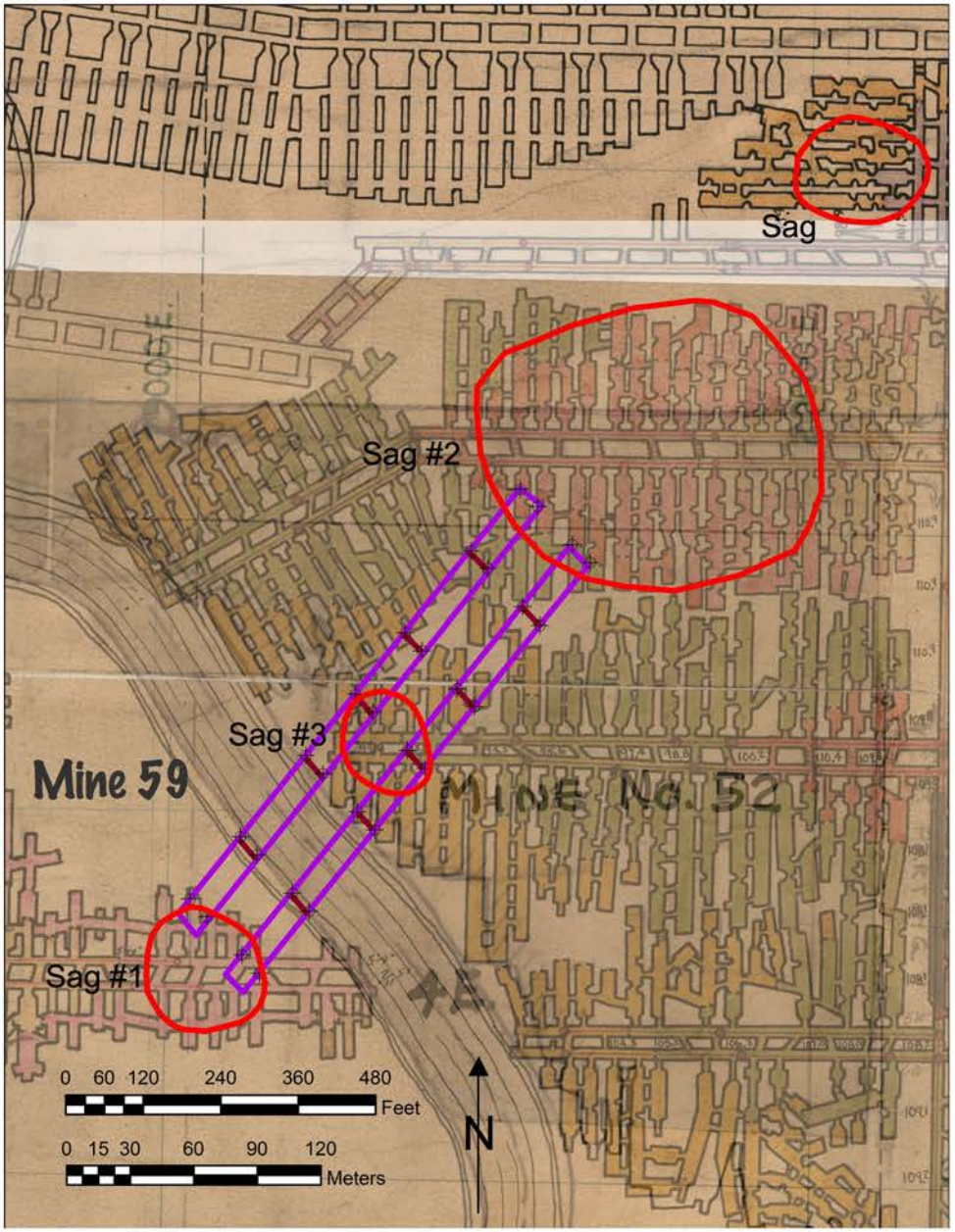

# Block Diagram of Sag Subsidence




**Schematic illustrating crack patterns and element distortions commonly associated with sag type subsidence**

# Mine Grouting Emergency Projects

# Interstate 72 over the Sangamon River

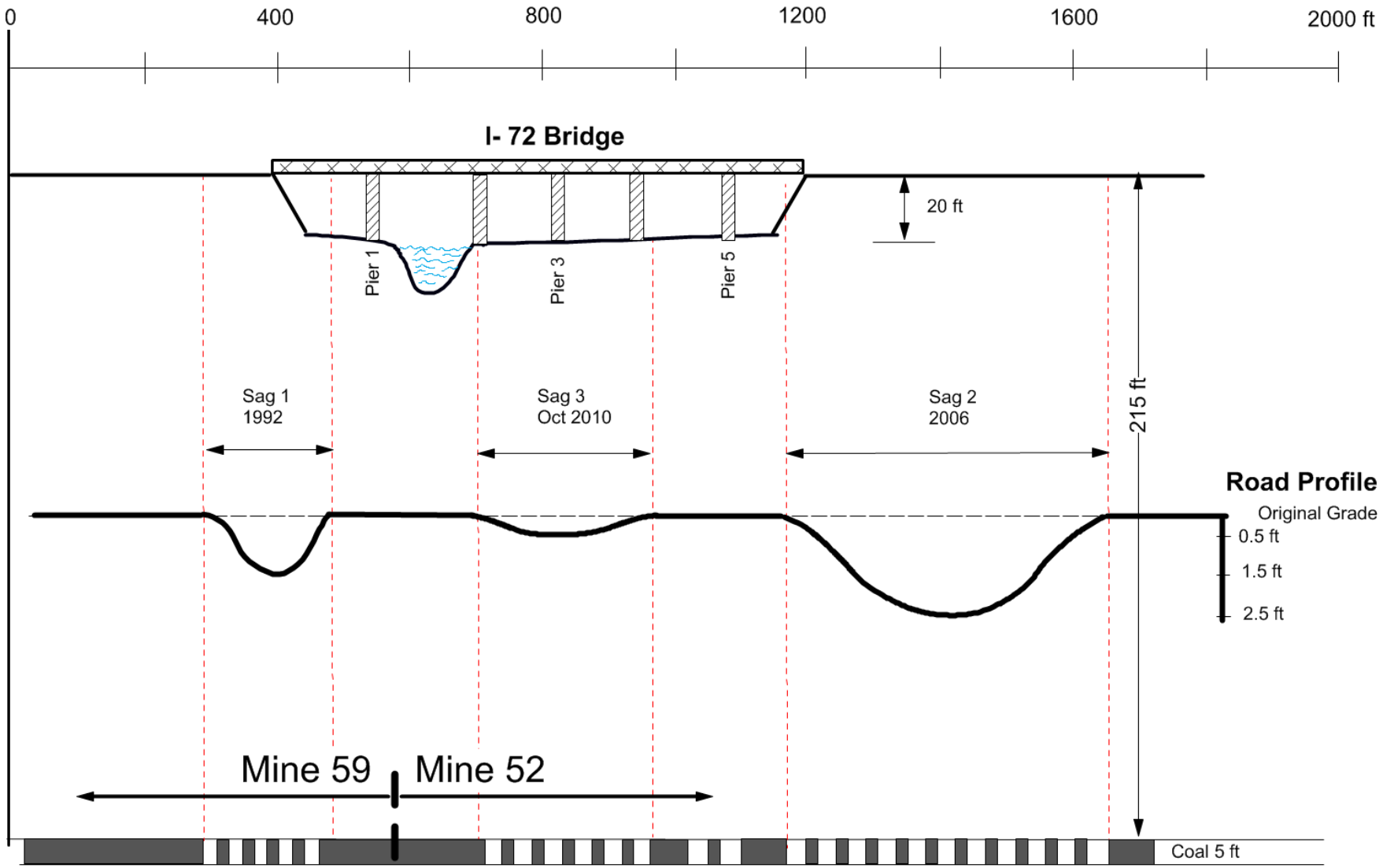



# Mining, Subsidence and The I-72 Bridge System

## Legend

- Sag Subsidence
- Bridge Decking
- Bridge Pier

Mine Map Source:
Pb_969_04 dated 3.20.1932
Pb_608_01 dated 9.21.1954


0
400
800
1200
1600
2000 ft
I- 72 Bridge
20 ft
Pier 1
Pier 3
Pier 5
Sag 1
1992
Sag 3
Oct 2010
Sag 2
2006
215 ft
Road Profile
Original Grade
0.5 ft
1.5 ft
2.5 ft
Mine 59
Mine 52
Coal 5 ft


Existing Subsidence Boundary, Anticipated Intermediate Sag Expansion Boundary, Grout Boreholes and Corehole Locations, Grout Infill Area and Bridge Piers Plotted Relative to Mine Workings and 2005 DOQ.

Bridge Piers

12/1/2010 Sag Boundary

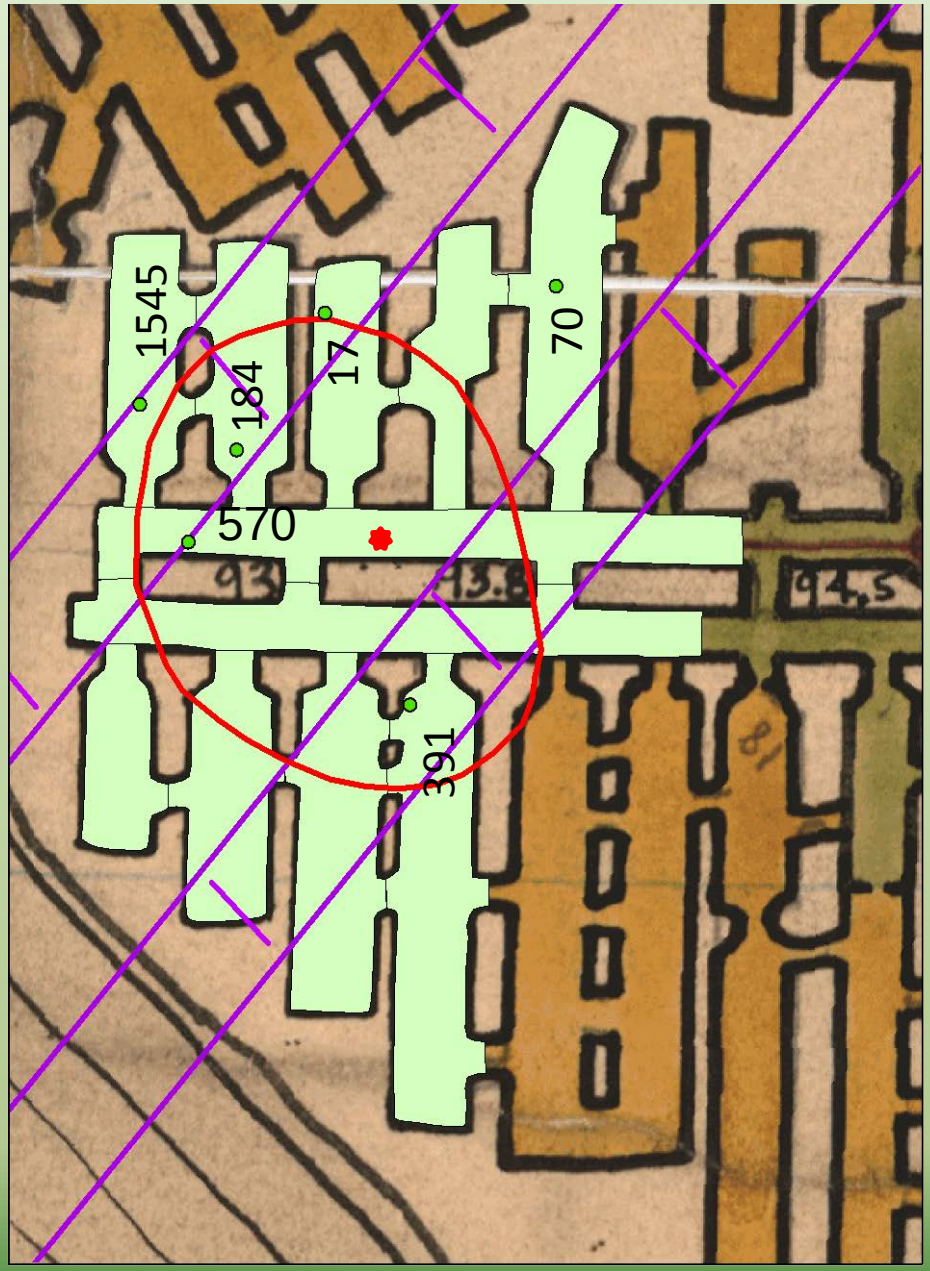
Anticipated Intermediate Sag Boundary.

Grout Infill

Source:
Mine Map Pb_969_04
ISGS 2005 DOQ

Prepared by:
R.D. Gibson and B.C. Schottel
IDNR-AMLRD
12_16_2010


HOWARD




# I-72 Pier 3 Sag

Grout Boreholes, Grout Take
And Approximate Grout Infill Area

Sag Boundary

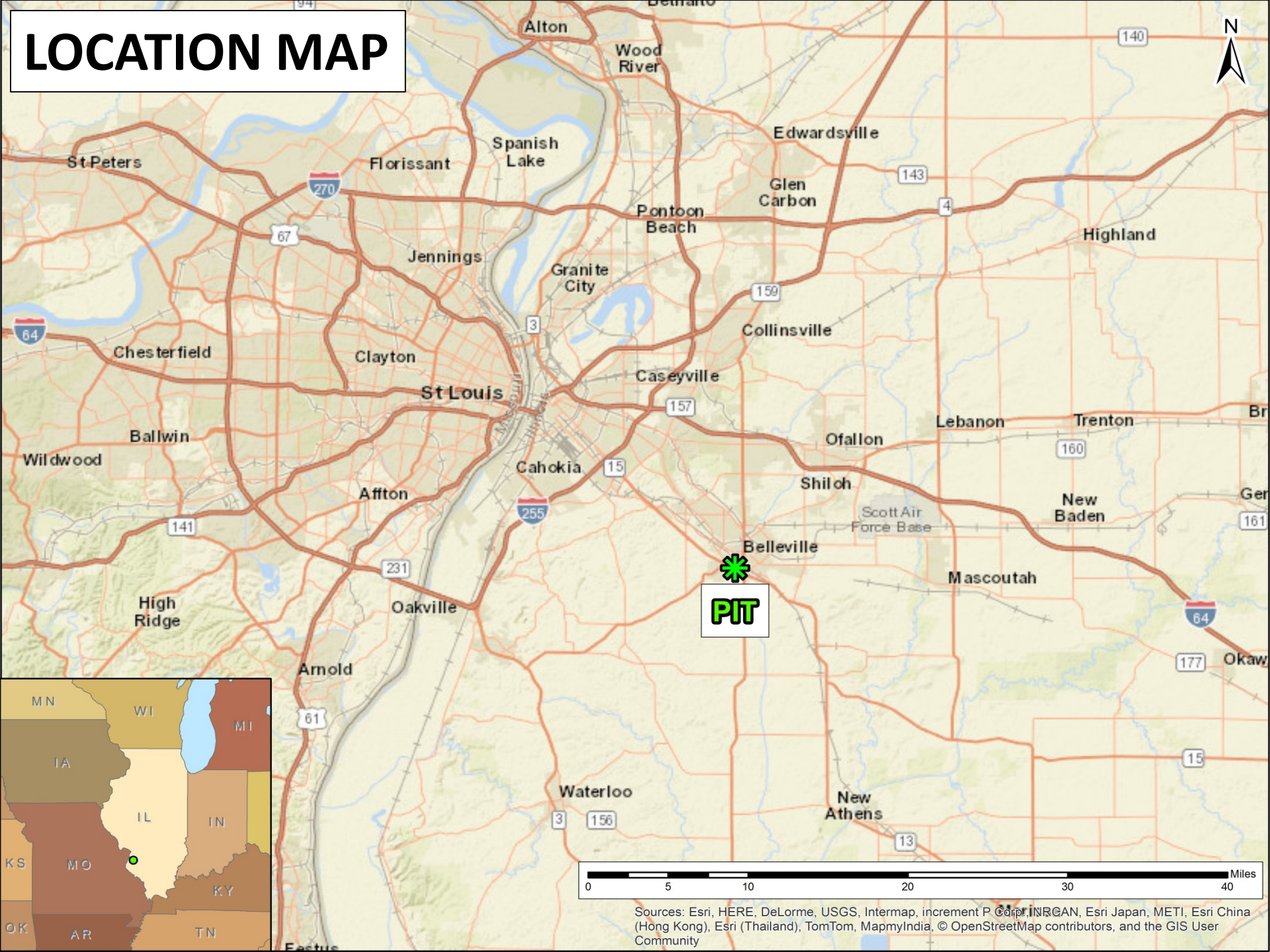
Borehole and Grout Infill

In Situ Grout Core Sample

**Approximate Phase I Cost = $675,000**
**Approximate Phase II Cost = $1M**

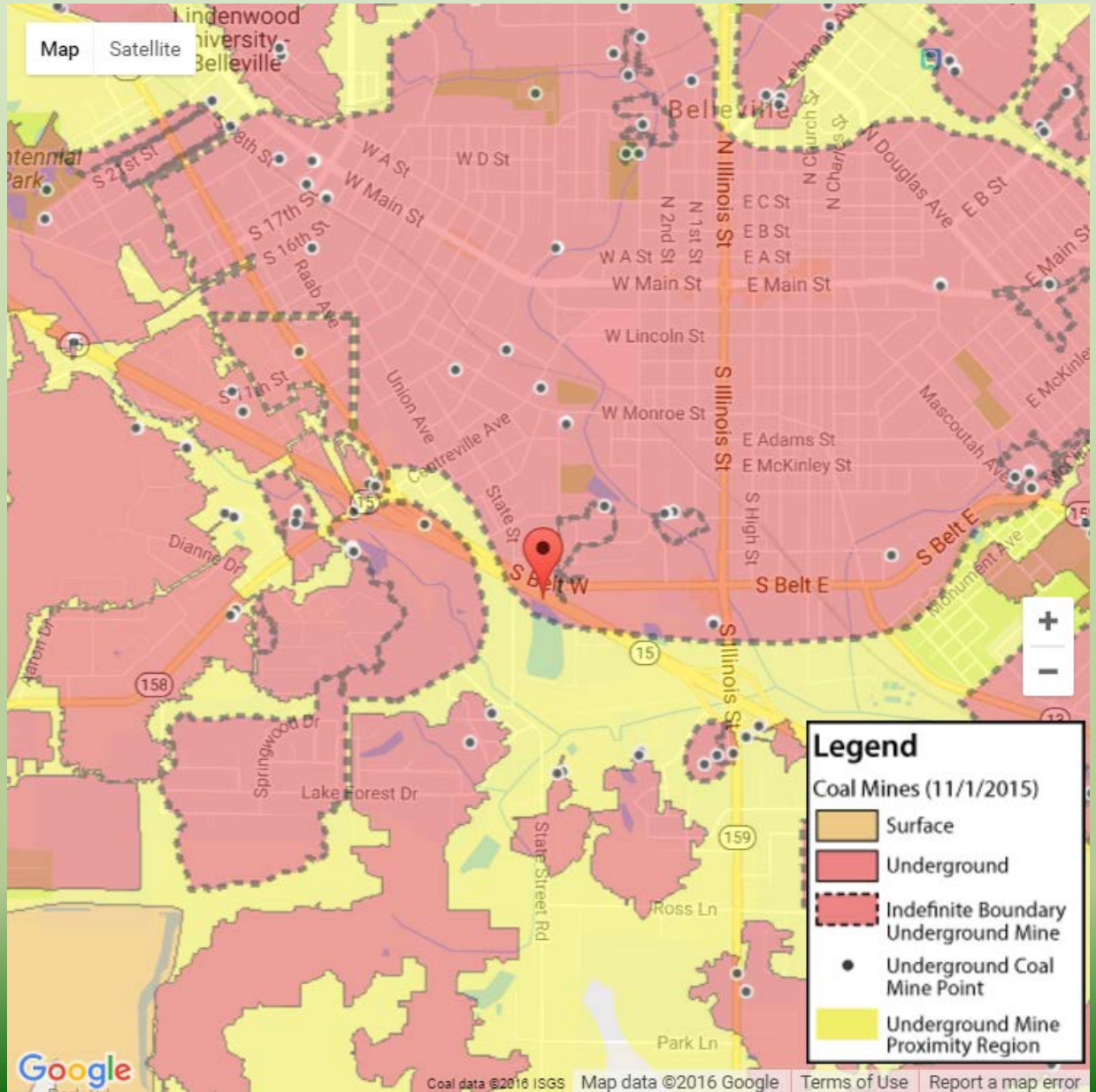
# Illinois Highway 15 Pit Subsidence

# LOCATION MAP

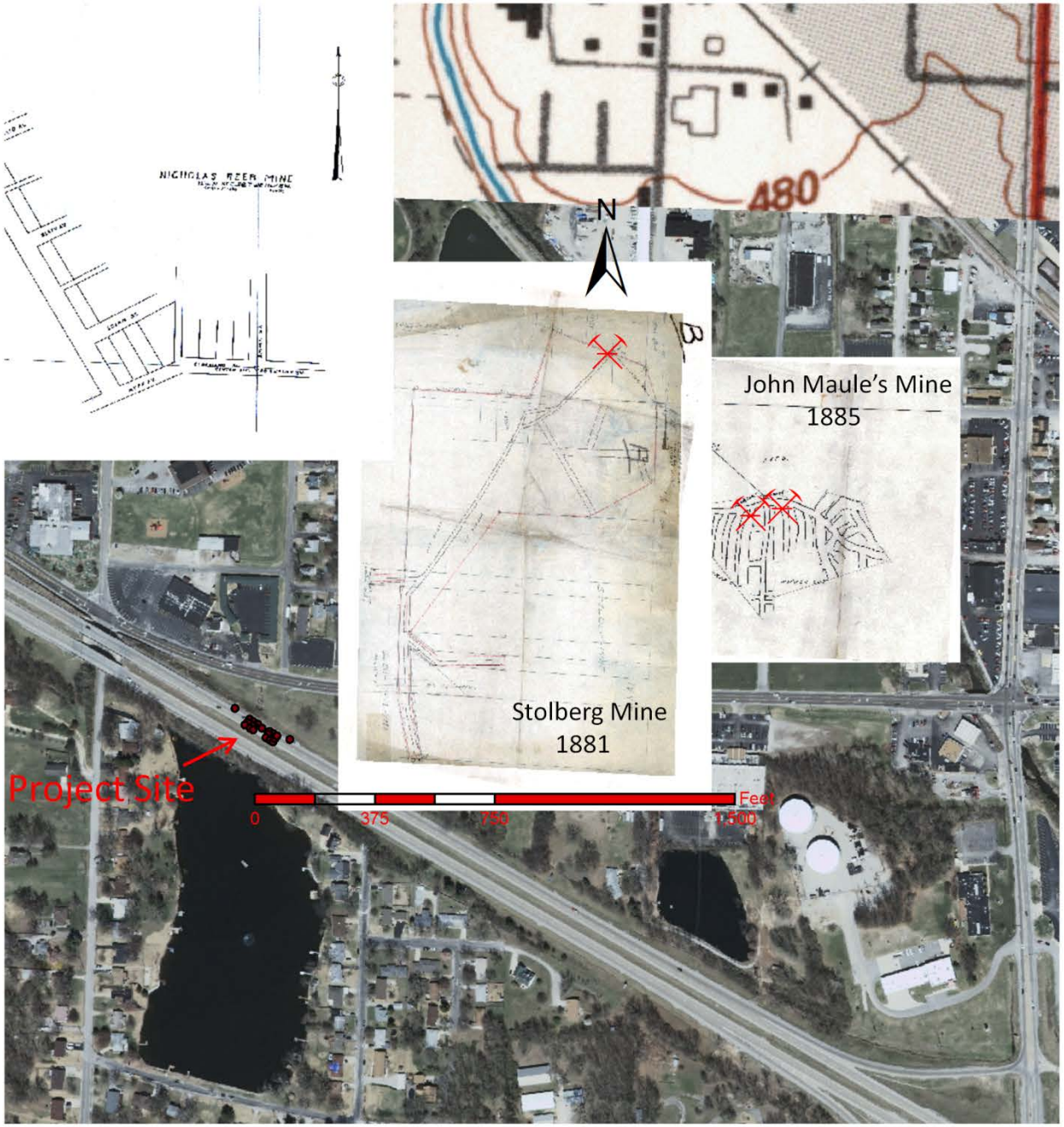



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

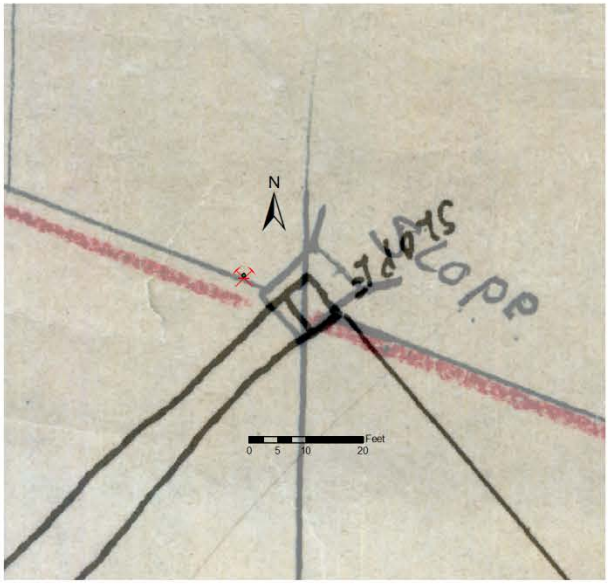
# Mined Out Area Map



# Nearest Known Mines




Mapped location of Stolberg mine shaft was confirmed by GPS field measurement.




Collapsed materials


September 15, 2014
330D
CAT
330 cubic yards of flowable fill


psm
REED

# Grout Quantities and Strengths

- 506 $yds^3$ of cement grout
- 100 $yds^3$ Mix A
- 406 $yds^3$ Mix B
- 7 day strength
    - Mix A:  930 – 1,010 psi  (Ave = 965 psi)
    - Mix B:  710 -1,140 psi  (Ave = 963 psi)

# IDNR – AML Project Costs

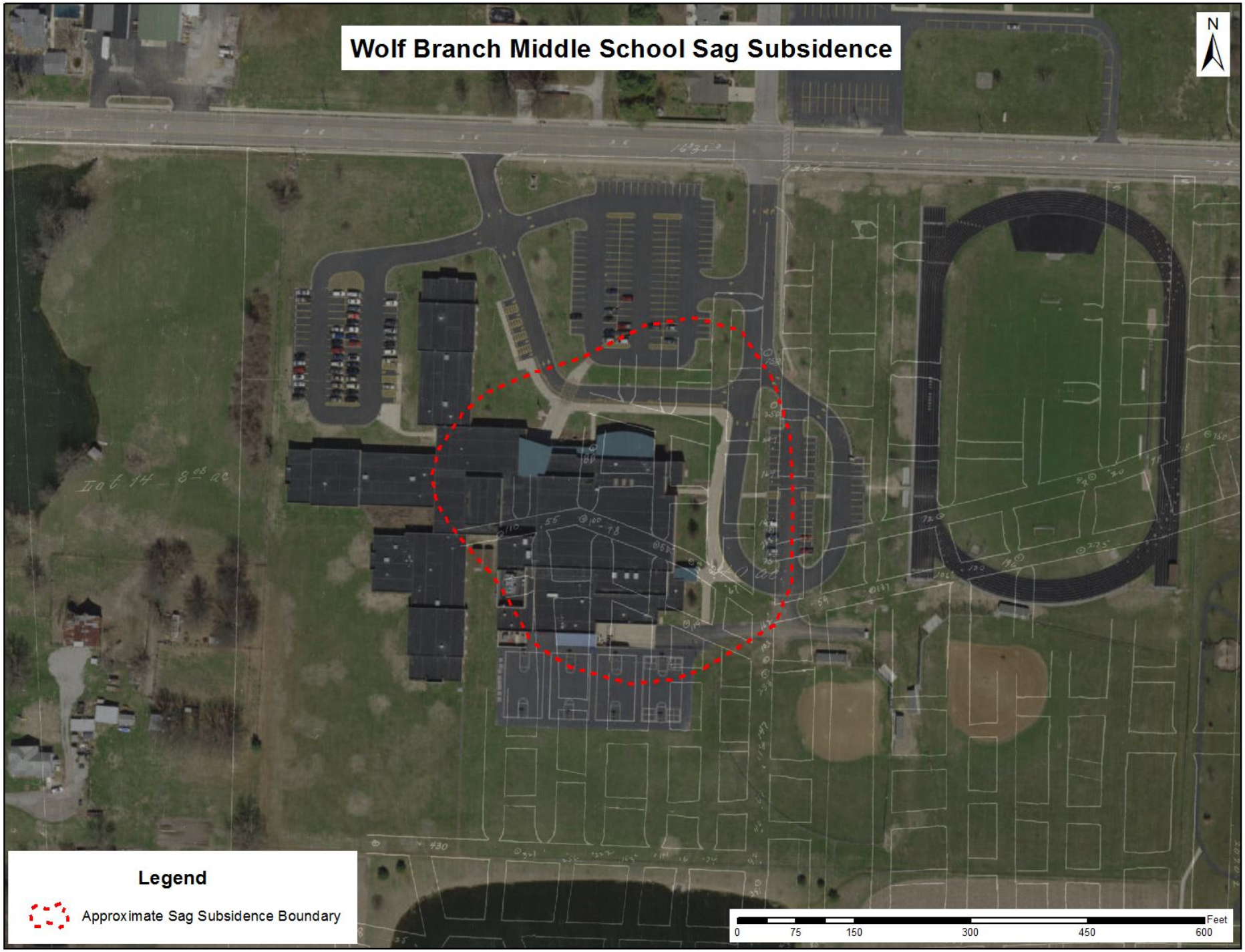
- Phase I - $37,000
- Phase II - $282,000
- Total AML Project Cost = $319,000

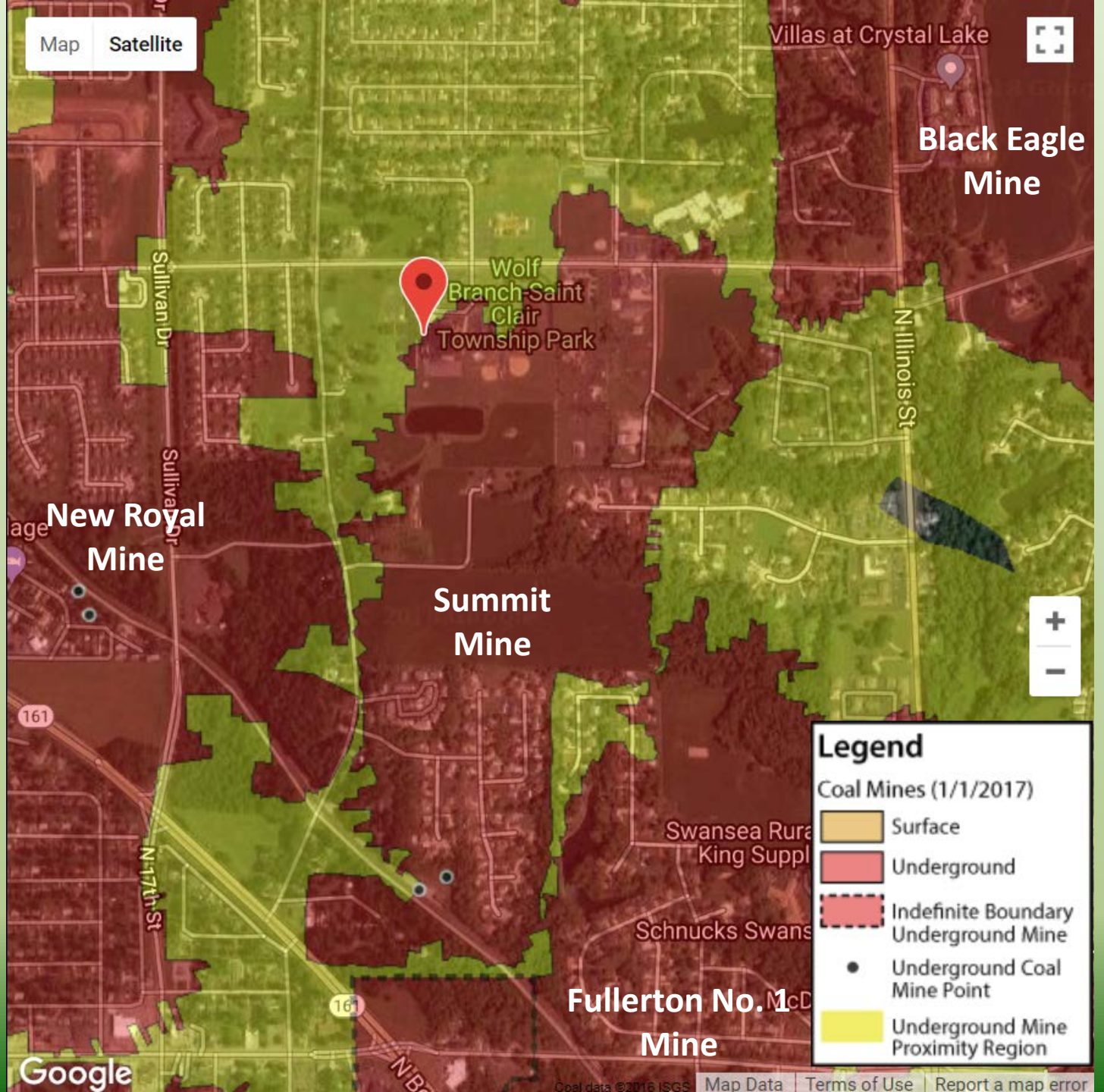
# Related Costs – IDOT

- Flowable Fill & Pavement Repairs - $152,000
- Crossover Lanes - $310,000
- Total IDOT Project Cost = $462,000

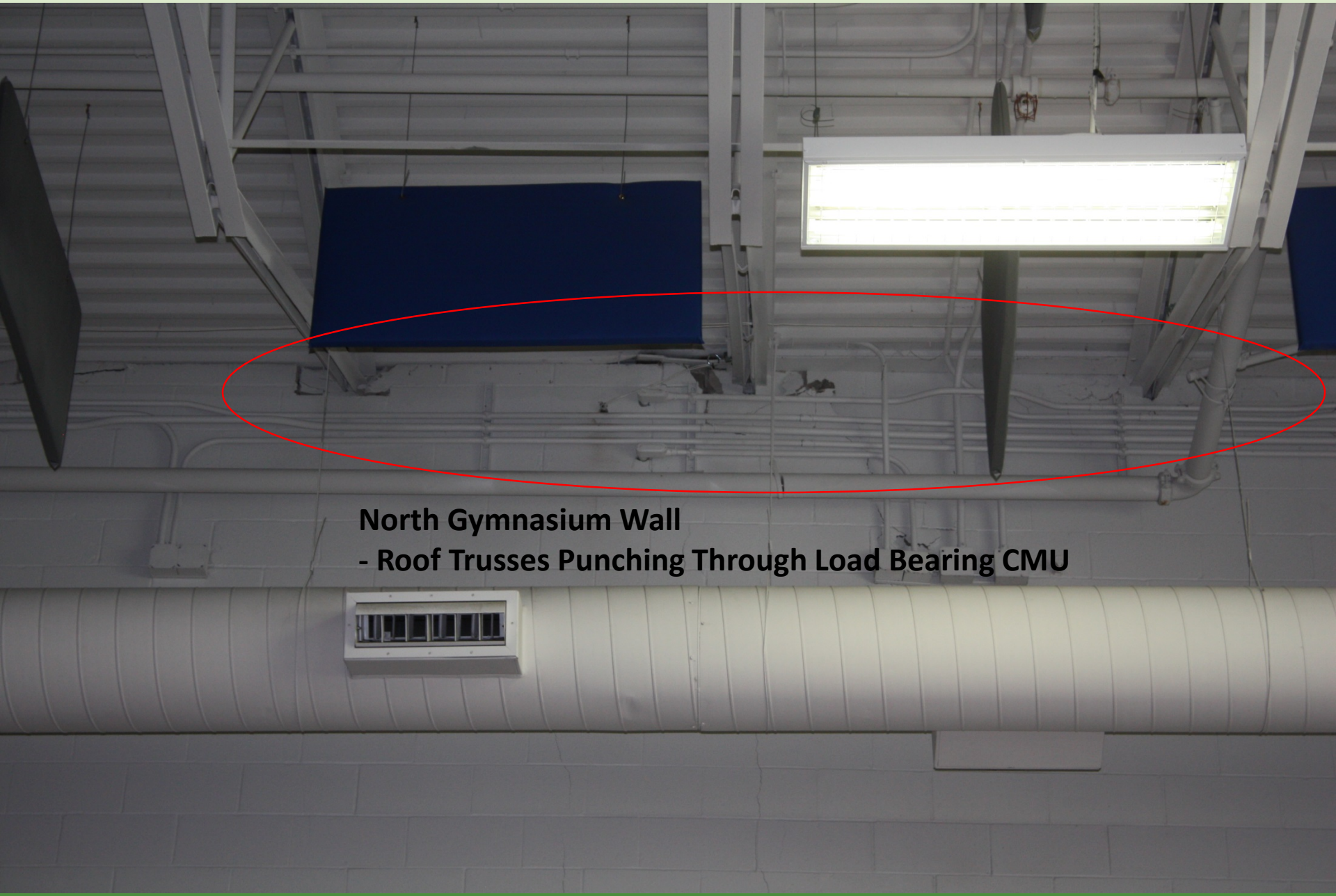
***TOTAL COSTS – IDOT & IDNR-AML = $781,000***


DIP


Wolf Branch Middle School Sag Subsidence
N
Legend
Approximate Sag Subsidence Boundary
0
75
150
300
450
600
Feet

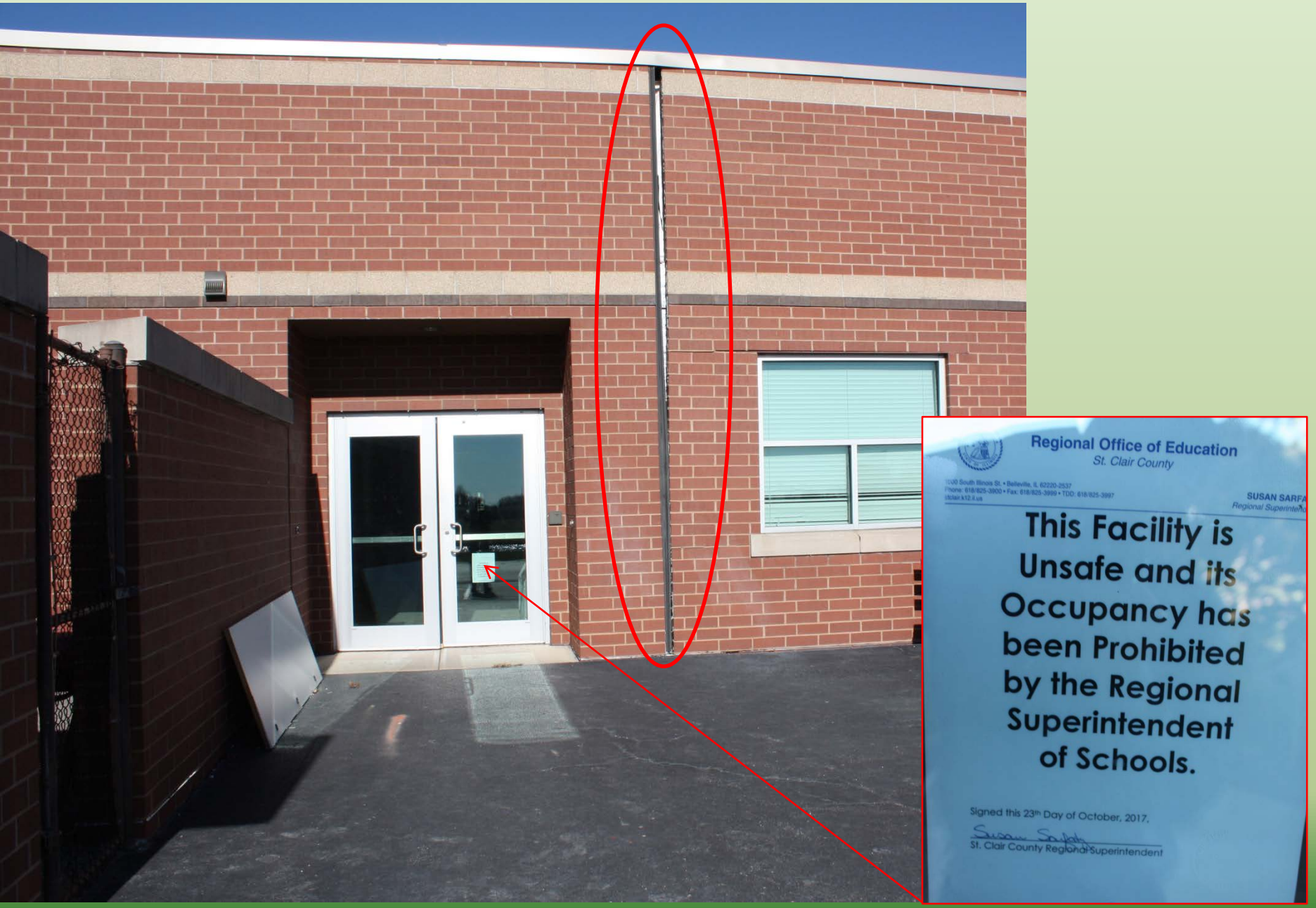

Map
Satellite
Villas at Crystal Lake
Black Eagle Mine
Wolf Branch Saint Clair Township Park
Sullivan Dr
N Illinois St
New Royal Mine
Summit Mine
161
N 17th St
Swansea Rura
King Suppl
Schnucks Swans
Fullerton No. 1 Mine
Google
Legend
Coal Mines (1/1/2017)
Surface
Underground
Indefinite Boundary Underground Mine
Underground Coal Mine Point
Underground Mine Proximity Region
Coal data ©2016 ISGS
Map Data
Terms of Use
Report a map error


DANGER DO NOT ENTER
DANGER DO NOT ENTER



**North Gymnasium Wall**
**- Roof Trusses Punching Through Load Bearing CMU**


Mechanical Penthouse
for Gymnasium
- Steel Frame Structure
- Masonry Infill
EXIT
Multipurpose
Room & Cafeteria
- Load Bearing Masonry
Hallway, Kitchen, &
Locker Rooms
- Steel Frame
- Masonry Infill


Regional Office of Education
St. Clair County
This Facility is Unsafe and its Occupancy has been Prohibited by the Regional Superintendent of Schools.
Signed this 23th Day of October, 2017,
St. Clair County Regional Superintendent

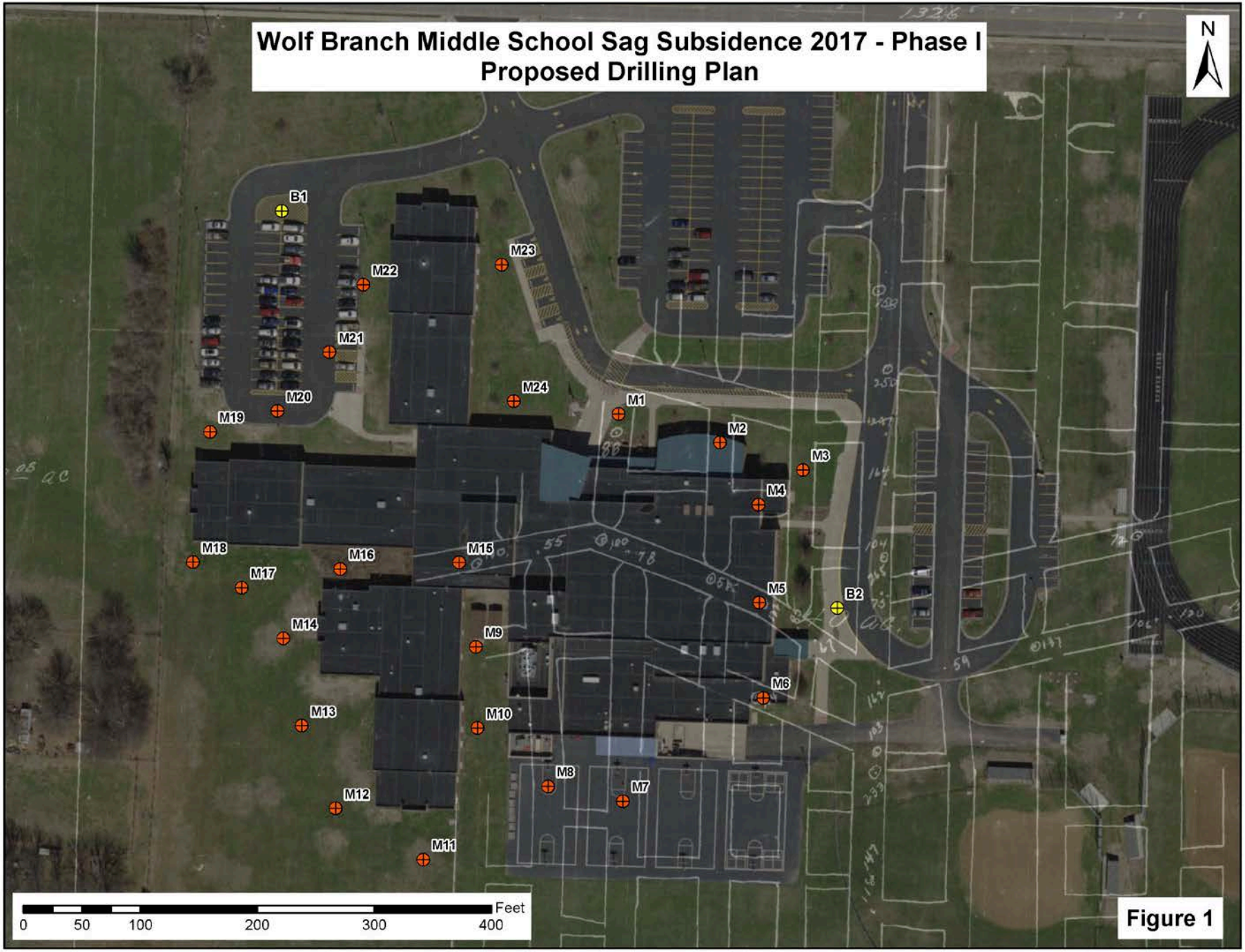
# Phase I Emergency Project Timeline

- October 5th - IDNR AMLRD Emergency Unit submitted Investigation Report (IR) to OSMRE, requesting a Finding of Fact (FoF) and Authorization to Proceed (AtP)

- October 5th - ***OSMRE Emergency Declaration (FoF and AtP)***

- October 10th - Onsite Prebid Meeting
- October 16th - Letting Date
- October 27th - Phase I work begins

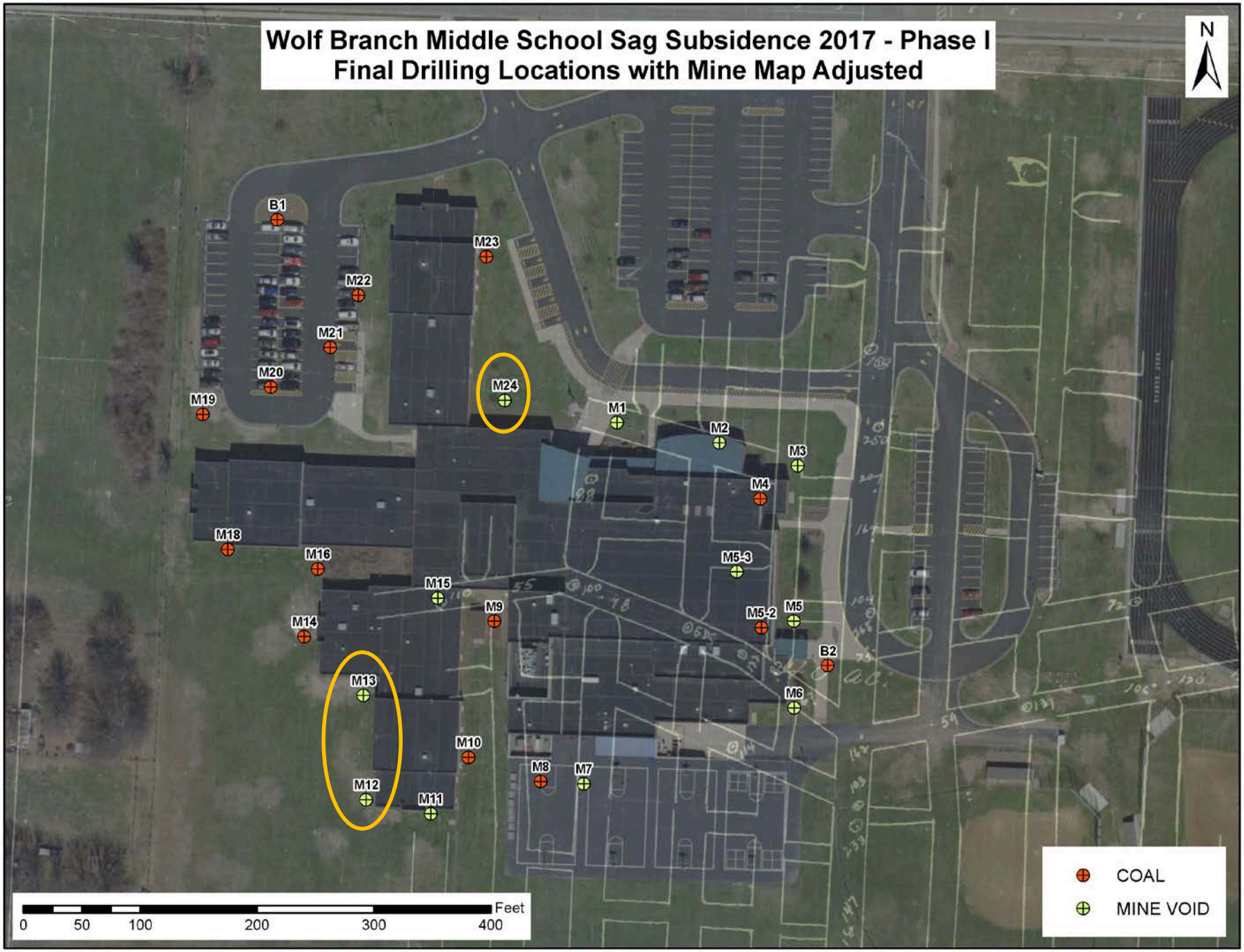
- December 12th - Phase I project substantially complete


Wolf Branch Middle School Sag Subsidence 2017 - Phase I
Proposed Drilling Plan
N
B1
M23
M22
M21
M24
M20
M19
M1
M2
M3
M4
M18
M16
M15
M17
M5
B2
M14
M9
M6
M13
M10
M8
M7
M12
M11
0
50
100
200
300
400
Feet
Figure 1


M1 = Void


4 inch ID Steel Casing Grouted in Place


***M4 = Coal***

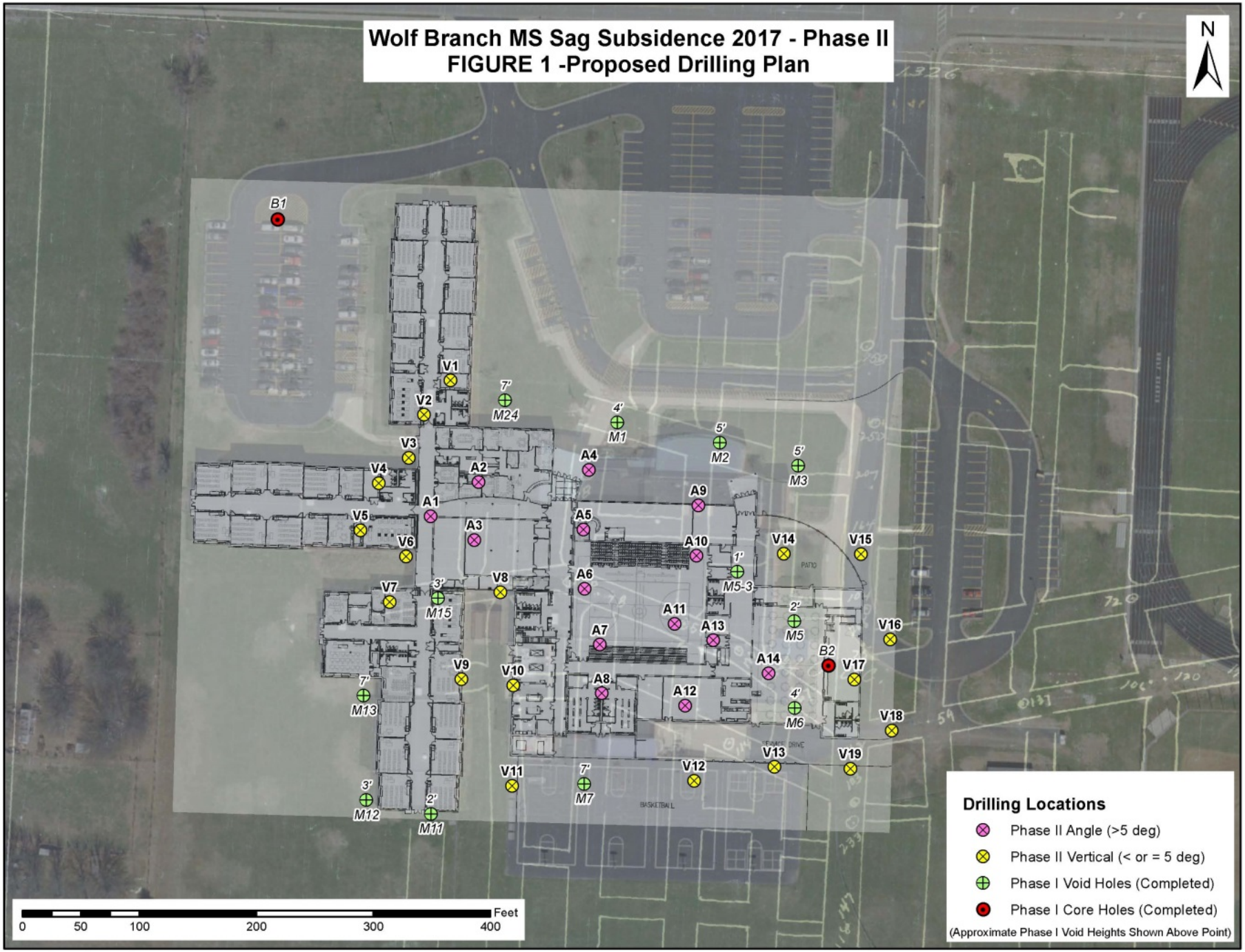

Wolf Branch Middle School Sag Subsidence 2017 - Phase I
Final Drilling Locations with Mine Map Adjusted
N
B1
M23
M22
M21
M20
M19
M24
M1
M2
M3
M4
M18
M16
M5-3
M15
M9
M5-2
M5
M14
B2
M13
M6
M10
M8
M7
M12
M11
0
50
100
200
300
400
Feet
COAL
MINE VOID

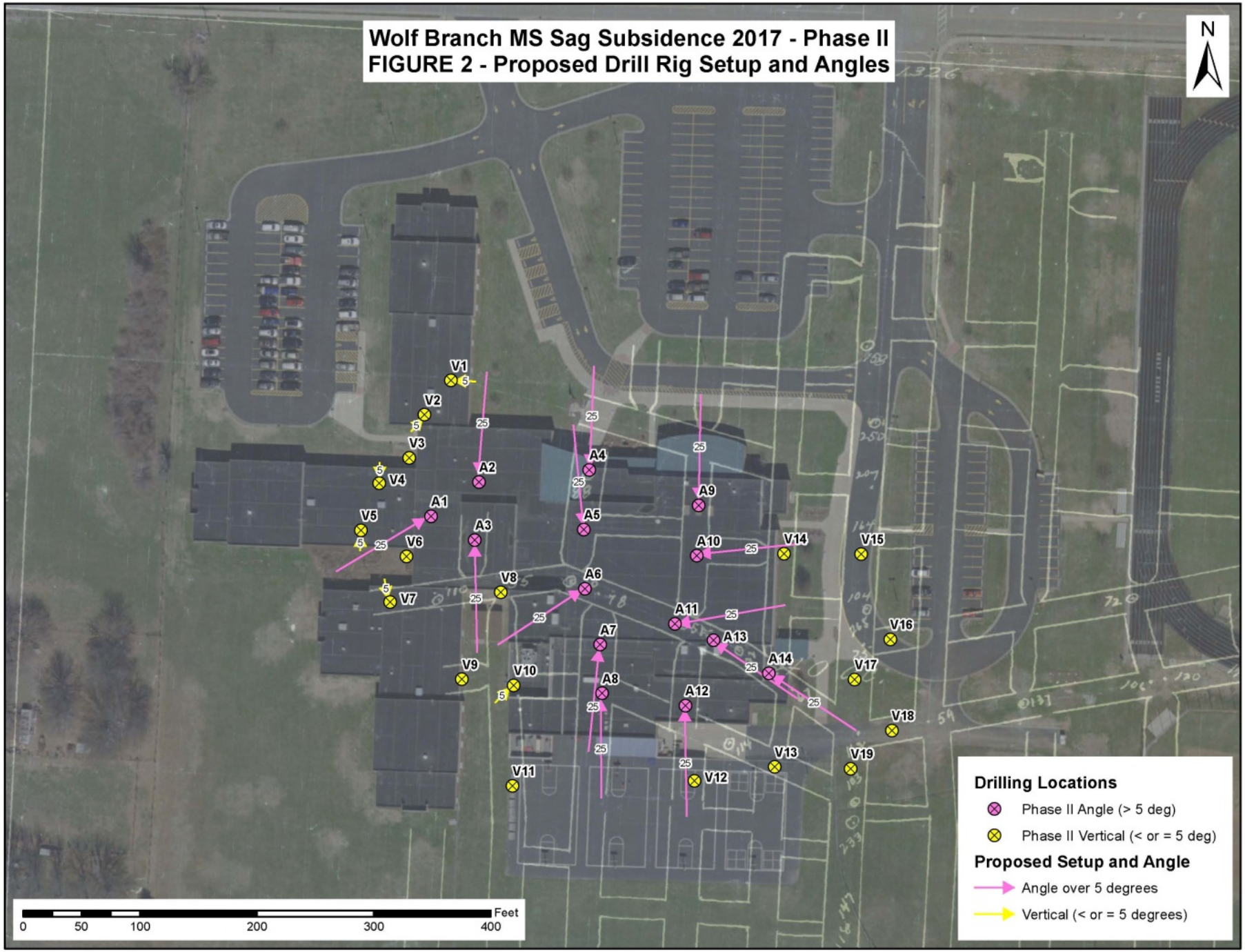
# Phase I Key Findings

- Depth to mine approximately 30 feet deeper than anticipated (185 - 190 feet)
- Mine works partially to completely inundated
- Coal seam thickness varies from 6 feet to 10 feet
- Voids heights range from 7 foot to less than 1 foot
- Mine map is both a blessing and a curse…

# Phase II Emergency Project Timeline

- January 12th - Wolf Branch School District's architect provides conceptual planning documents
- January 26th - Wolf Branch School District's Board of Education provides letter of intent to reoccupy/rebuild on existing middle school property
- February 10th - IDNR AMLRD Emergency Unit submits emergency justification and supporting documents to OSMRE
- February 12th - ***OSMRE Emergency Declaration***
- February 22nd - Onsite Prebid Meeting
- March 5th - Letting Date
- March 19th - Phase II work begins
- 100 calendar days to complete grouting work


Wolf Branch MS Sag Subsidence 2017 - Phase II
FIGURE 1 -Proposed Drilling Plan
N
B1
V1
V2
7'
M24
4'
M1
5'
M2
5'
M3
V3
A4
V4
A2
A9
A1
V5
A5
A3
A10
V14
V15
V6
1'
M5-3
A6
V8
V7
3'
M15
A11
2'
M5
V16
A7
A13
B2
V17
A14
V9
V10
A8
A12
7'
M13
4'
M6
V18
V13
V19
V11
7'
M7
V12
3'
M12
2'
M11
Feet
0
50
100
200
300
400
Drilling Locations
Phase II Angle (>5 deg)
Phase II Vertical (< or = 5 deg)
Phase I Void Holes (Completed)
Phase I Core Holes (Completed)
(Approximate Phase I Void Heights Shown Above Point)

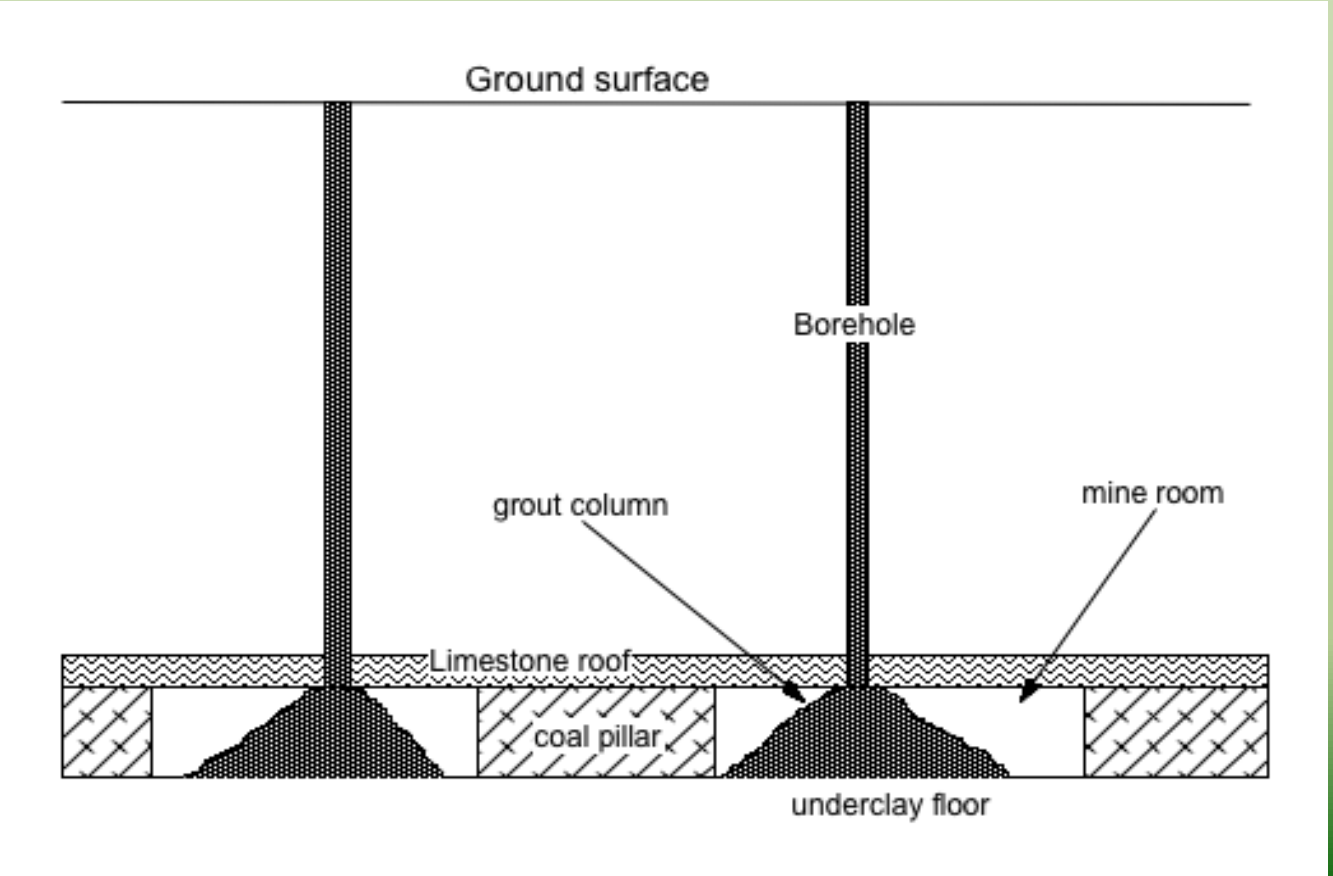

Wolf Branch MS Sag Subsidence 2017 - Phase II
FIGURE 2 - Proposed Drill Rig Setup and Angles
N
V1
V2
V3
V4
V5
V6
V7
V8
V9
V10
V11
V12
V13
V14
V15
V16
V17
V18
V19
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
5
25
0
50
100
200
300
400
Feet
Drilling Locations
Phase II Angle (> 5 deg)
Phase II Vertical (< or = 5 deg)
Proposed Setup and Angle
Angle over 5 degrees
Vertical (< or = 5 degrees)

# Phase II – Mine Grouting

Grout Mixes:

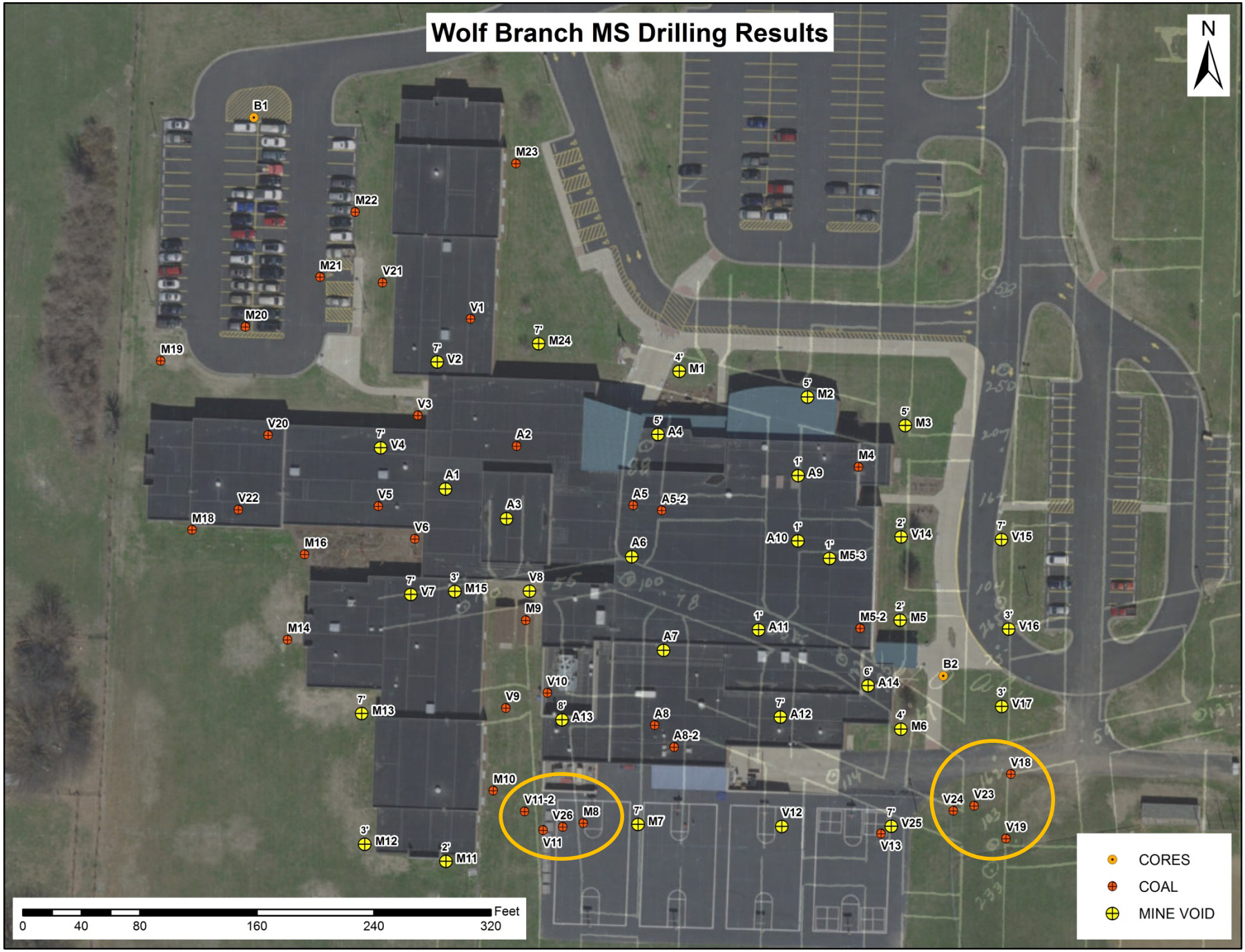
- Containment (Mix A) – 6 to 8 inch slump
- Infill (Mix B) – 30 to 60 second flow

➢ Strength requirements: 7 day = 400 psi, 28 day = 700 psi




A5 = Coal
(22.5 degree angle)


***V4 = Void***
***(5 degree angle)***


Wolf Branch MS Drilling Results
N
B1
M23
M22
M21
V21
V1
M20
M19
7' M24
7' V2
4' M1
5' M2
5' M3
V3
V20
5' A4
7' V4
A2
M4
1' A9
A1
V22
V5
A5
A5-2
A3
M18
V6
2' V14
7' V15
M16
A6
A10 1'
1' M5-3
7' V7
3' M15
V8
M9
M14
M5-2
2' M5
3' V16
1' A11
A7
B2
6' A14
V10
V9
3' V17
7' M13
8' A13
A8
7' A12
4' M6
A8-2
V18
M10
V11-2
V26
M8
V24
V23
7' M7
V12
7' V25
V19
3' M12
V11
V13
2' M11
CORES
COAL
MINE VOID
Feet
0
40
80
160
240
320


Beelman
TRUCK CO.
MACK


Beelman
TRUCK CO.
ModSpace.com 800-523-7918
ModSpace.com 800-523-7918
ModSpace
HQ


Power
Generation
HOWARD
DOOSAN


HOWARD
3
2

# Computer Controlled Batch Plant


HOWARD
412-257-1800
PITTSBURGH, PA.
216-579-1855
CLEVELAND, OH.
618-277-7510
BELLEVILLE, IL
CONCRETE PUMPING, INC
U.S. DOT 360861

# Containment Grouting Perimeter

# Infill Grouting

# Phase II Project Status

- Vertical Holes Drilled = 31  (11 into Void, 20 into Coal)
- Angled Holes Drilled = 20  (13 into Void, 7 into Coal)
- Total Grout Holes = 36  (12 Void Holes Drilled in Phase I)
- Containment Grout Placed = 6,456.4 Cubic Yards
- Infill Grout Placed = 6,304.4 Cubic Yards
- **Total Grout Injected = 12,760.8 Cubic Yards**
- Verification cores will be drilled after partial building demolition to confirm complete mine void fill beneath building
- Adjusted Contract Amount = $1,613,310.44

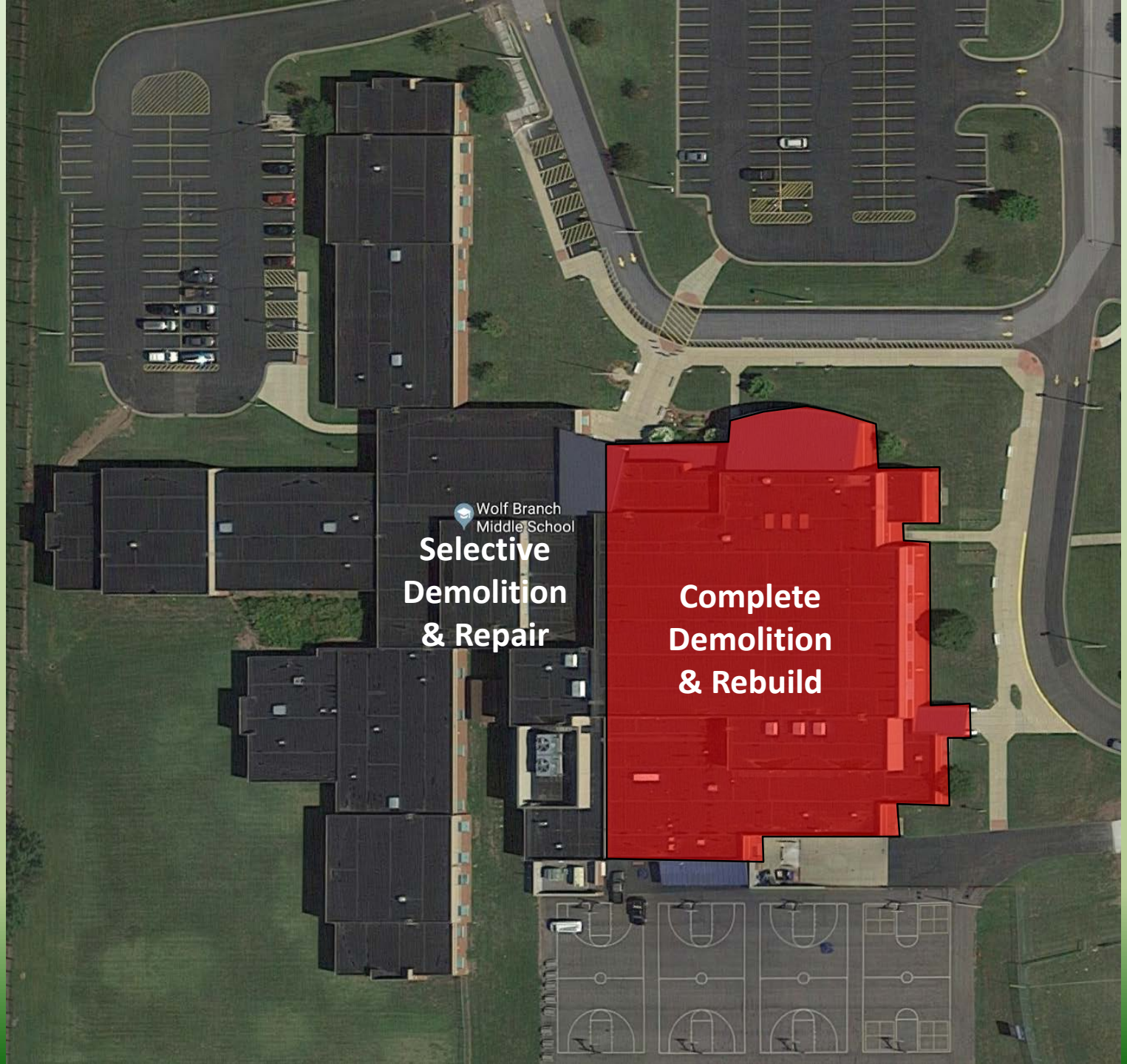
# Future Work

- IDNR AMLRD Emergency Unit's Subsidence Monitoring Response Team will continue to perform level surveys to monitor any additional ground settlement and corresponding building response

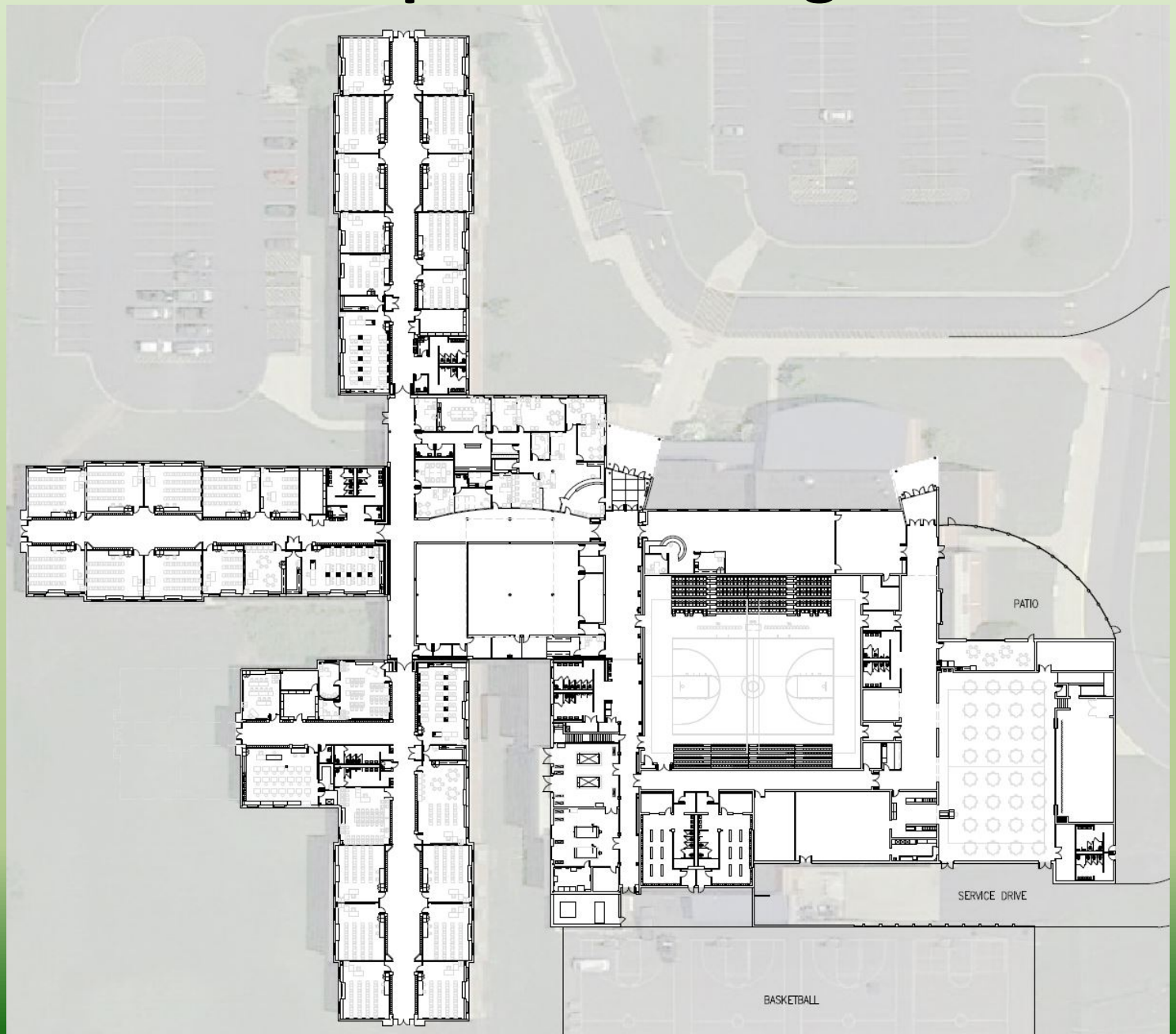
- Partial building demolition will utilize AML funding through an Intergovernmental Agreement with the Wolf Branch School District

- The Wolf Branch School District will obtain funding and rebuild the demolished eastern portions of the building

- Repairs will be made to address minor subsidence damage in the western portions of the building


Wolf Branch
Middle School
Selective
Demolition
& Repair
Complete
Demolition
& Rebuild

# Conceptual Building Plan



# QUESTIONS ?