INNOVATIVE REMEDIATION SOLUTIONS FOR REMOTE LOCATIONS

Presented by:
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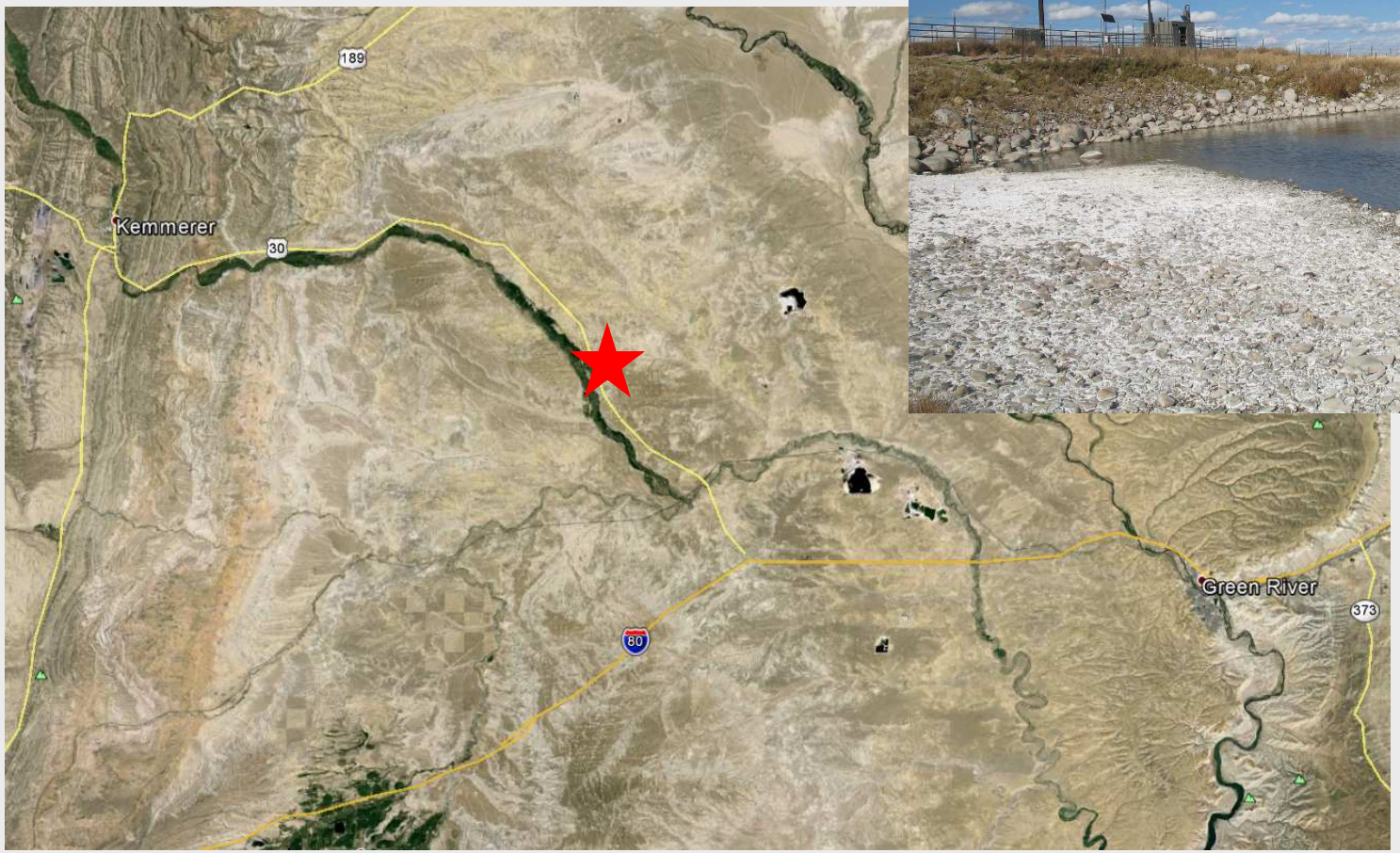
LT Environmental, Inc.
COMPLIANCE / ENGINEERING / REMEDIATION

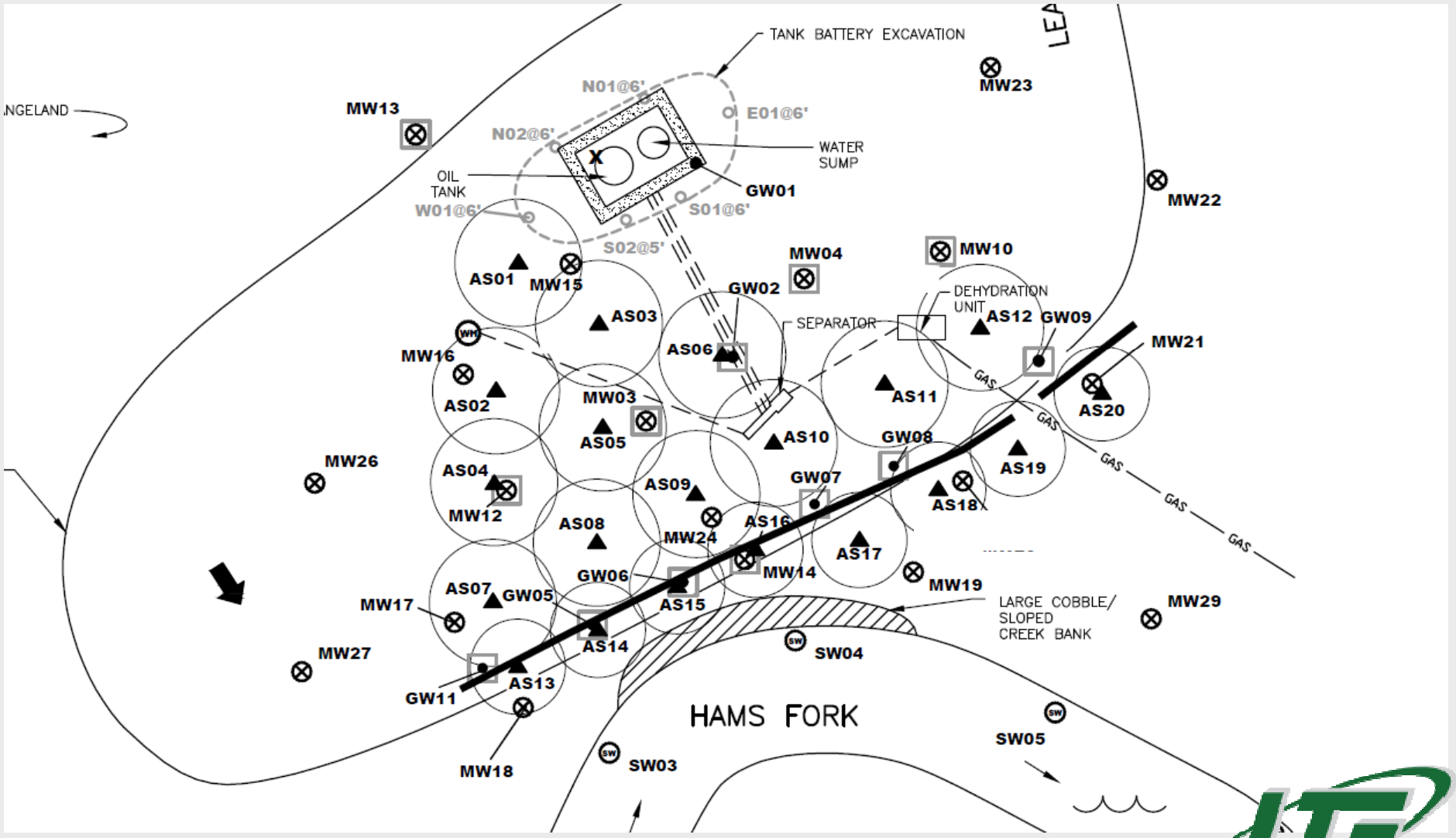
REMOTE SITE LIMITATIONS

- Infrastructure Limitations (Power)
- High Trucking Cost
- High Personnel Mobilization Cost

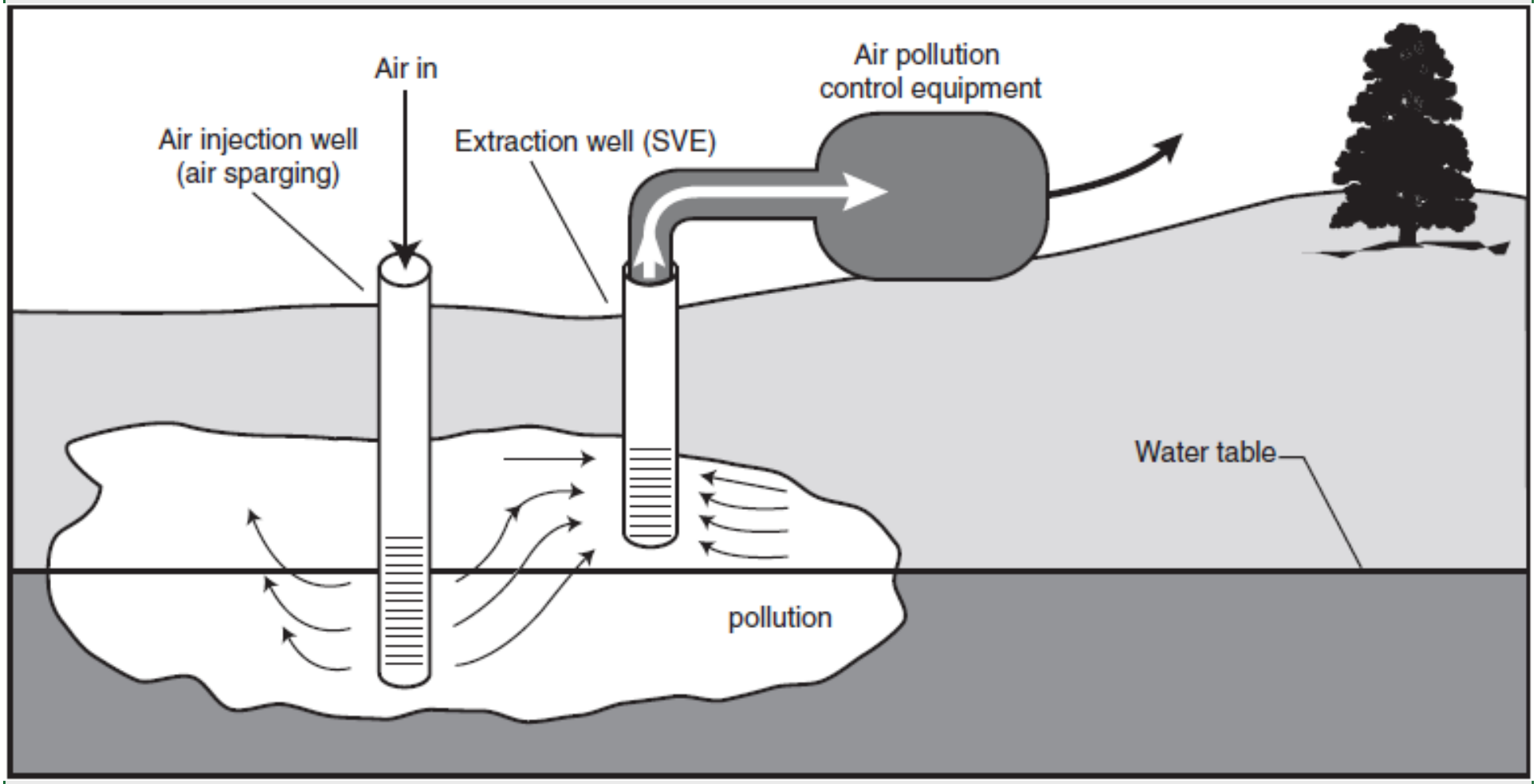
CASE STUDY #1



CASE STUDY #1

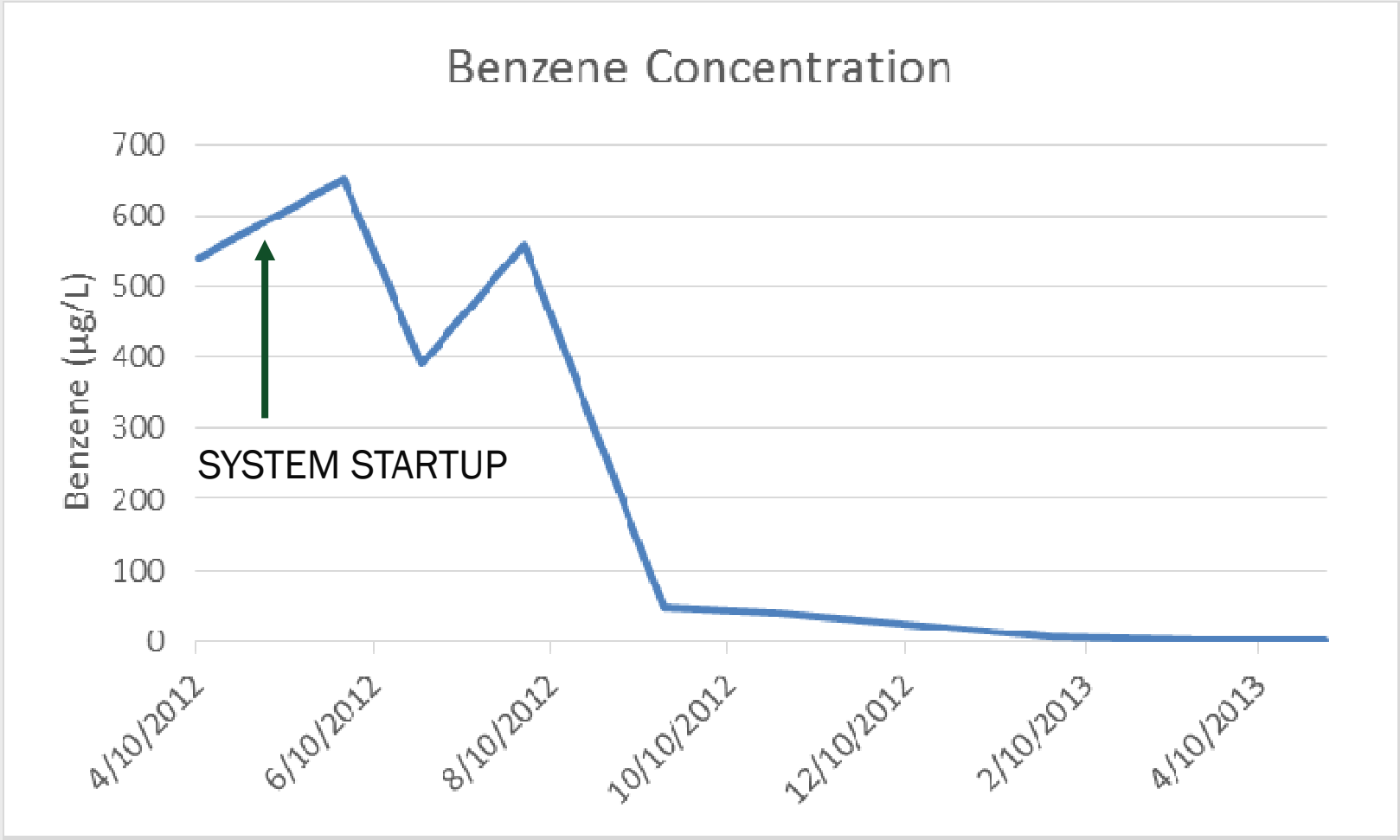

TANK BATTERY EXCAVATION
N01@6'
E01@6'
N02@6'
WATER SUMP
OIL TANK
GW01
W01@6'
S01@6'
S02@5'
MW13
MW23
MW22
MW04
MW10
AS01
MW15
GW02
DEHYDRATION UNIT
AS12
GW09
AS03
SEPARATOR
MW21
MW16
AS06
AS11
AS20
MW03
AS02
AS05
AS10
GW08
AS19
MW26
AS04
GW07
AS09
AS18
MW12
AS08
AS16
MW24
AS17
MW14
MW19
GW06
AS07
GW05
AS15
MW17
LARGE COBBLE/ SLOPED CREEK BANK
MW29
AS14
SW04
MW27
AS13
GW11
HAMS FORK
SW05
MW18
SW03
GAS

AIR SPARGING/SOIL VAPOR EXTRACTION



CASE STUDY #1

CASE STUDY #1


Benzene Concentration
Benzene (µg/L)
700
600
500
400
300
200
100
0
SYSTEM STARTUP
4/10/2012
6/10/2012
8/10/2012
10/10/2012
12/10/2012
2/10/2013
4/10/2013

CASE STUDY #1

KEY TAKE-AWAY POINTS

TIMEFRAME

- Receptor protected

MINIMAL MOBILIZATION

- O&M conducted by rental company

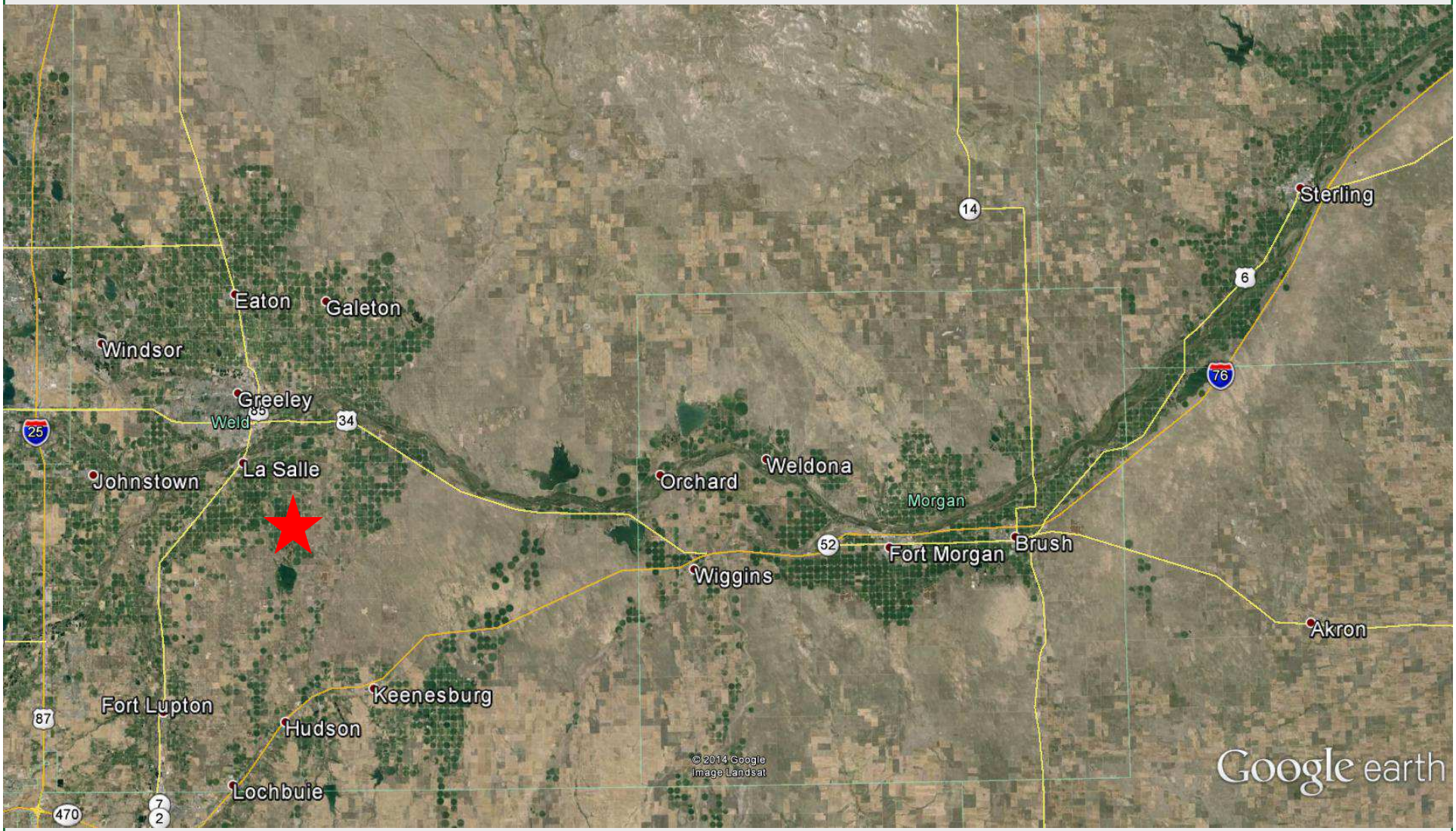
COST SAVINGS

- Saved $30k compared to injection technology

DIESEL POWER

- AS now feasible

CASE STUDY #2


Eaton
Galeton
Windsor
Greeley
Weld
La Salle
Johnstown
Orchard
Weldona
Morgan
Wiggins
Fort Morgan
Brush
Sterling
Akron
Keenesburg
Fort Lupton
Hudson
Lochbuie
14
6
76
25
34
52
87
470
7
2
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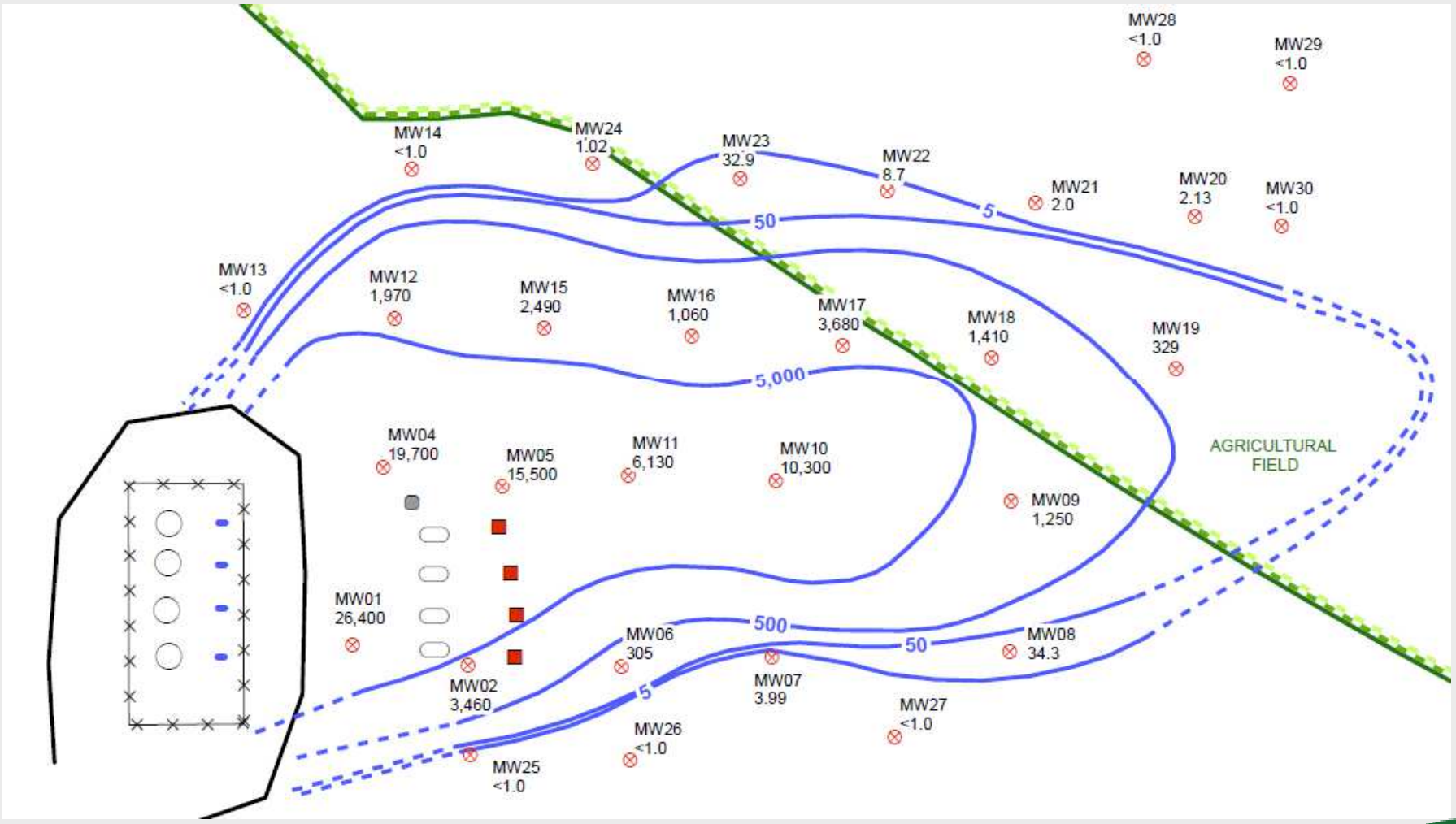
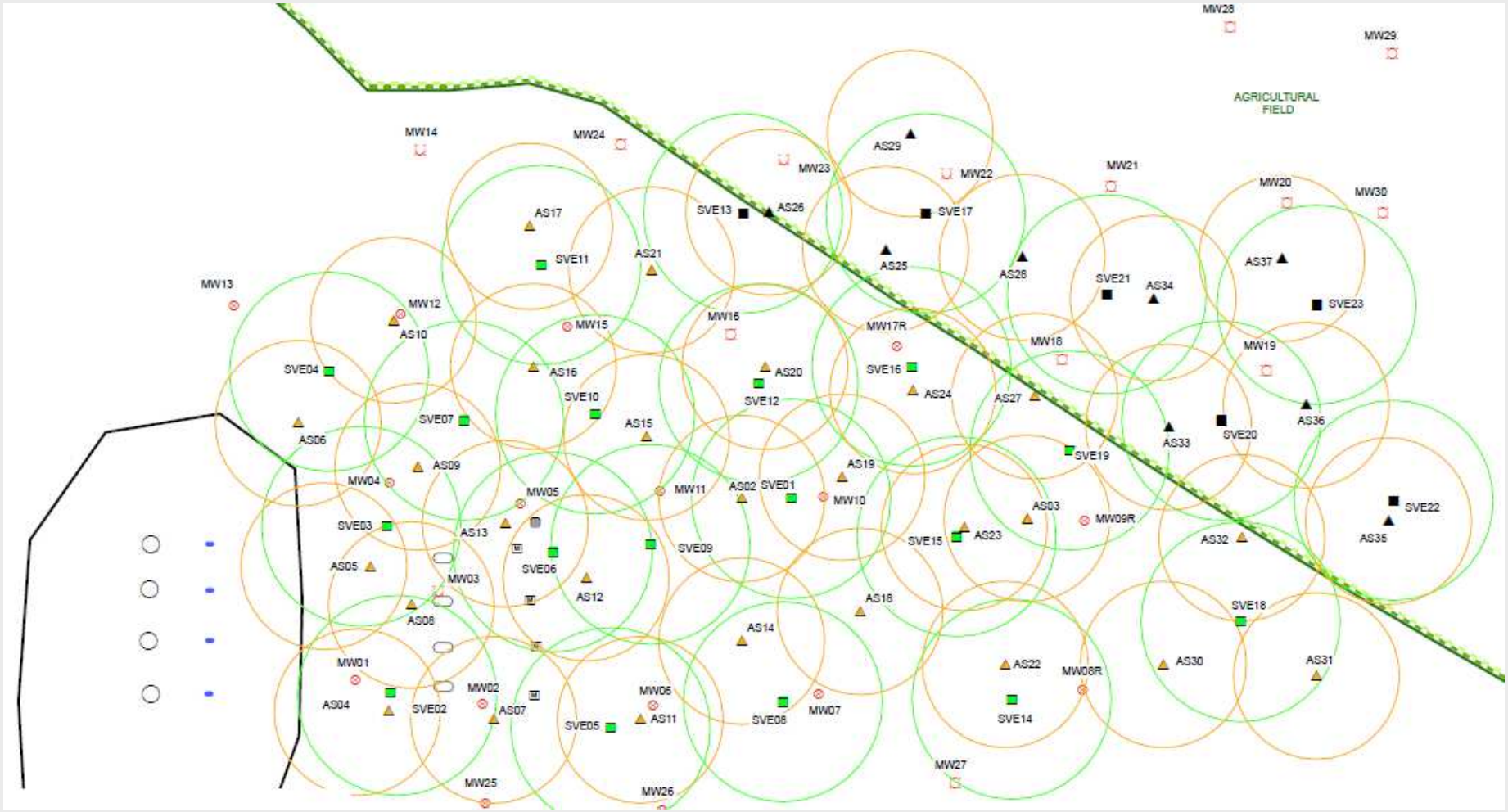
Google earth

CASE STUDY #2



Groundwater Plume 47,000 square feet

CASE STUDY #2



37 AS wells and 23 SVE wells

AIR SPARGING/SOIL VAPOR EXTRACTION - TRAILERS

- 14 Trailers in use by 2 top DJ Producers
- 10+ Year lifespan
- 1st Trailer is on 8th site since 2006

CASE STUDY #2

95% Reduction With AS/SVE

CASE STUDY #2

KEY TAKE-AWAY POINTS

NATURAL GAS GENERATOR

- Eliminates costly power drop
- Eliminates power cost to operate system
- Quick mobilization

TELEMETRY SYSTEM

- Reduces site visits
- Reduces O&M cost

COST SAVINGS

- $25k for power drop saved
- Above ground piping = faster timeframe (1-week) and $25k of labor and supplies

CASE STUDY #3

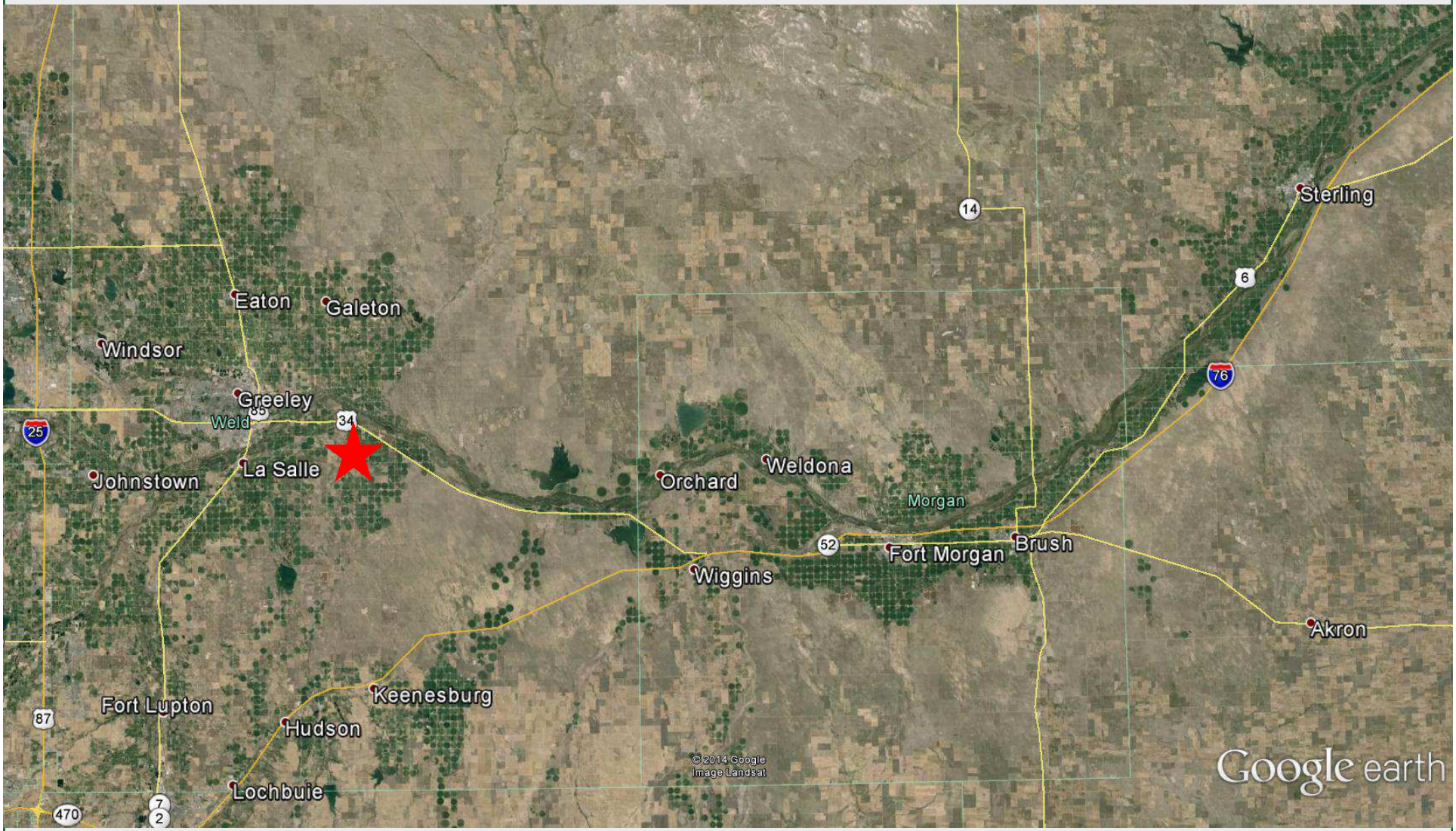

Eaton
Galeton
Windsor
Greeley
Weld
La Salle
Johnstown
Orchard
Weldona
Morgan
Wiggins
Fort Morgan
Brush
Sterling
Akron
Keenesburg
Fort Lupton
Hudson
Lochbuie
14
6
76
25
34
52
87
470
7
2
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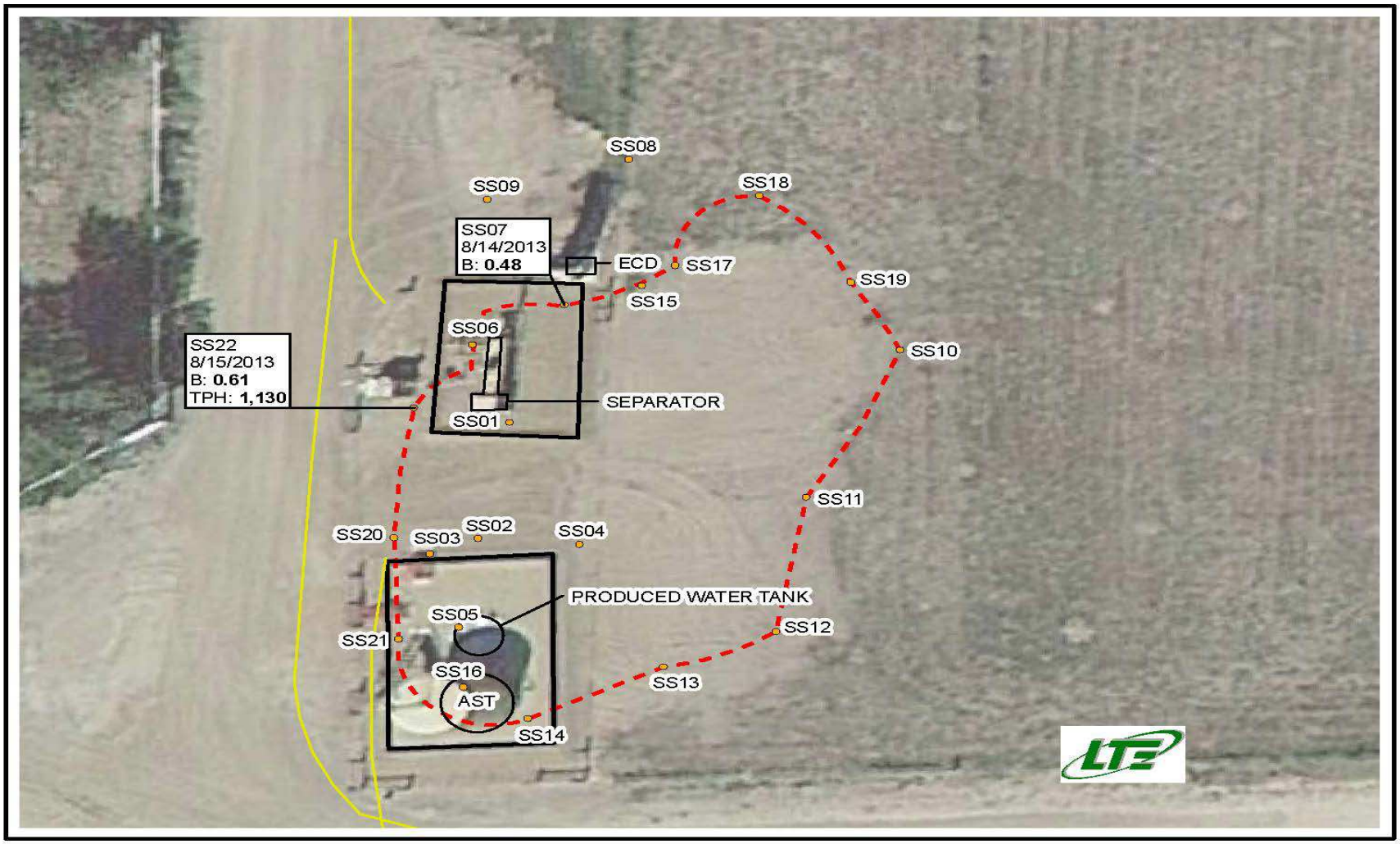
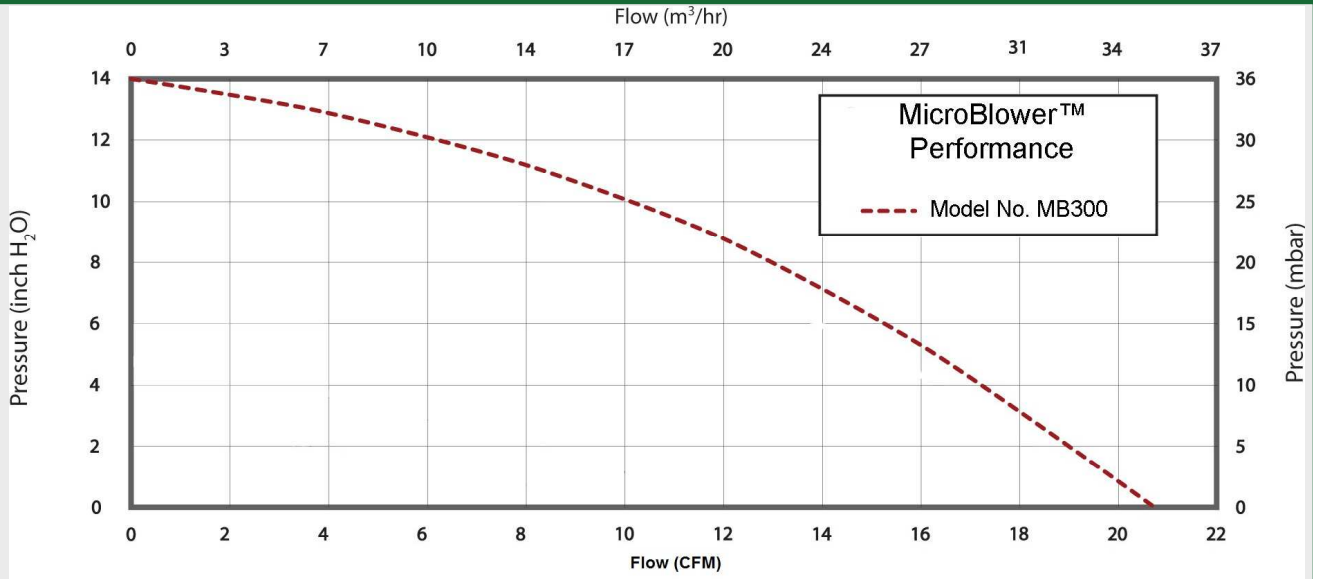
Image Landsat
Google earth

CASE STUDY #3

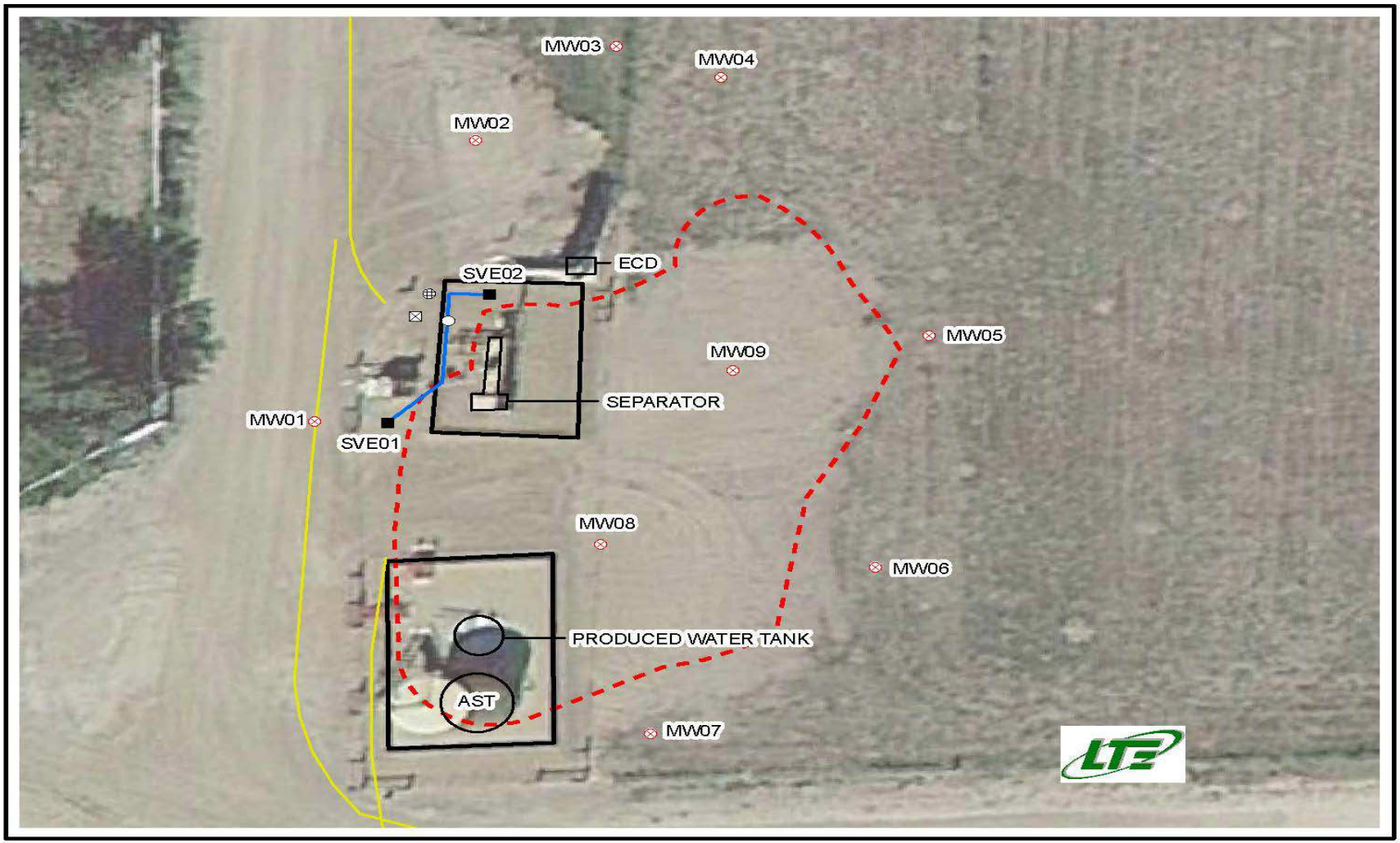

SS08
SS09
SS18
SS07
8/14/2013
B: 0.48
ECD
SS17
SS19
SS15
SS06
SS22
8/15/2013
B: 0.61
TPH: 1,130
SS10
SEPARATOR
SS01
SS11
SS20
SS03
SS02
SS04
PRODUCED WATER TANK
SS05
SS12
SS21
SS16
AST
SS13
SS14

CASE STUDY #3

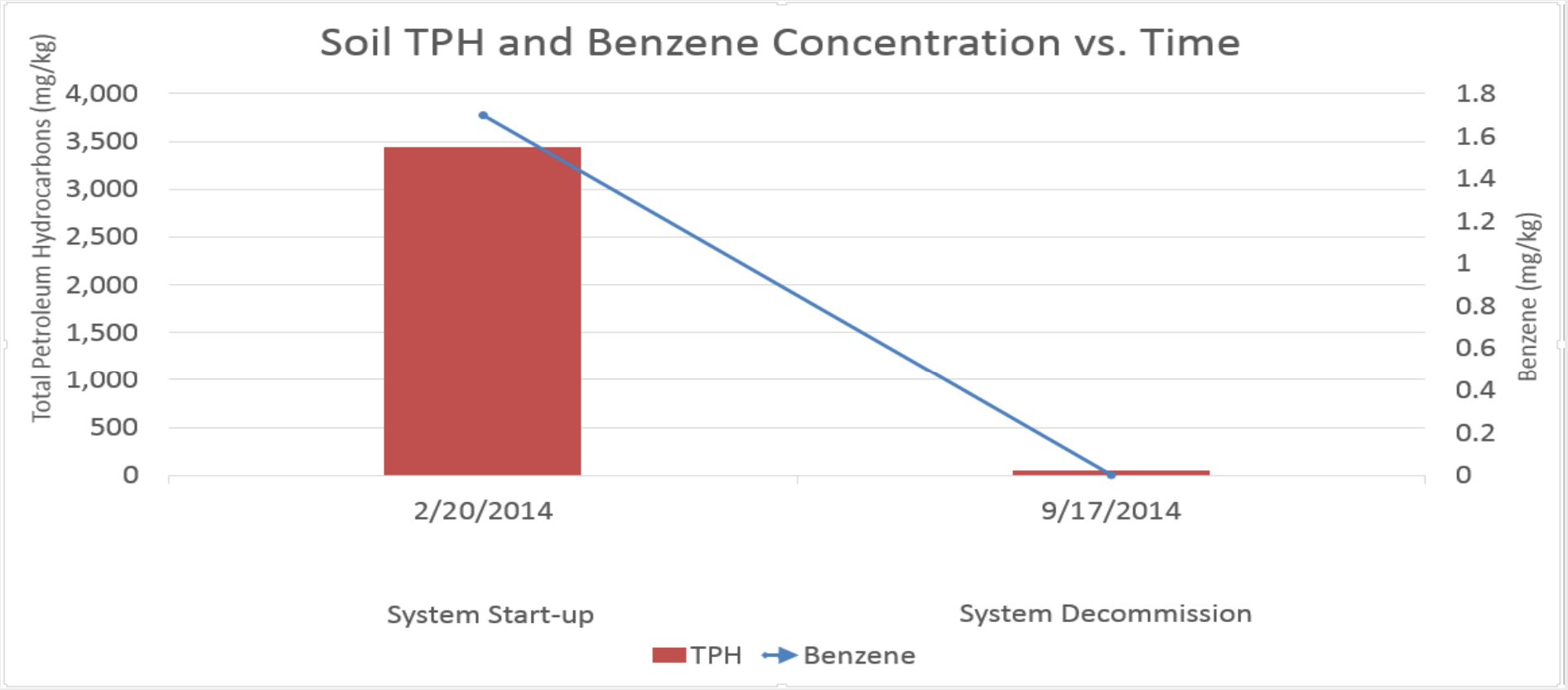
- Tersus Environmental Microblower™
- 24 volt DC power
- 130 watt solar panel
- 2 AGM batteries
- Timed operation
- 16 operating



CASE STUDY #3


MW03
MW04
MW02
SVE02
ECD
MW05
MW09
SEPARATOR
MW01
SVE01
MW08
MW06
PRODUCED WATER TANK
AST
MW07

CASE STUDY #3



- System Operation – 7 months; 1,500 hours
- Achieved soil cleanup goals for Benzene & TPH

CASE STUDY #3

KEY TAKE-AWAY POINTS

SOLAR POWER

- Eliminates costly power drop
- Eliminates power cost to operate system

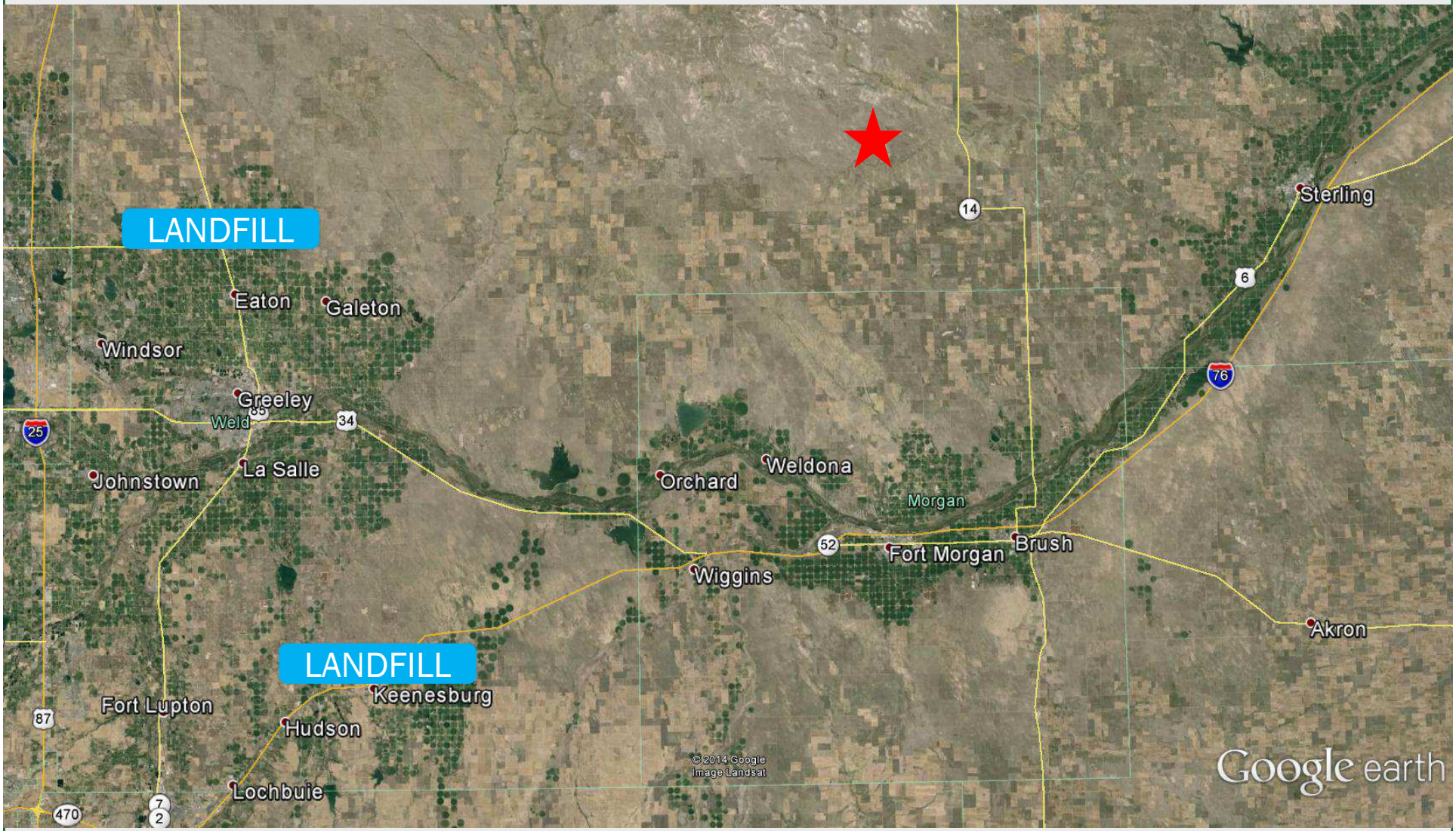
AUTOMATED SYSTEM

- Reduces site visits
- Reduces O&M cost

COST SAVINGS

- 50% vs. traditional excavation

CASE STUDY #4


LANDFILL
Eaton
Galeton
Windsor
Greeley
Weld
25
34
Johnstown
La Salle
Orchard
Weldona
Morgan
52
Fort Morgan
Brush
Wiggins
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Sterling
6
76
Akron
LANDFILL
Keenesburg
Fort Lupton
87
Hudson
Lochbuie
470
7
2
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CASE STUDY #4

- 23 Produced water skim pits
- 30,000 Cubic yards of impacted soil

CASE STUDY #4

CASE STUDY #4

COST OF 23 SITES

TRUCKING, FILL, & DISPOSAL AT LANDFILL

$1,560,000

SOIL SHREDDING

$1,050,000

COST SAVINGS = $510,000 OR 32%

CASE STUDY #4

KEY TAKE-AWAY POINTS

- Cost
- Reduced landfill waste
- Reduced truck traffic
- No imported fill material
- Reduced carbon footprint
  "Green Technology"

CONCLUSIONS

REMOTE LOCATIONS CAN BE EASIER THAN NON-REMOTE

- Less infrastructure overcome with alternative power
- Save time and money on installation
- Faster mobilization reducing timeframe
- Reduce O&M visits through automation or telemetry
- Think outside the box to save $