DICKINSON WRIGHT PLLC

150 E. GAY STREET, 24TH FLOOR
COLUMBUS, OH 43215-3192
TELEPHONE: (614) 591-5461
FACSIMILE: (844) 670-6009
http://www.dickinsonwright.com

CHRISTINE M.T. PIRIK
CPirik@dickinsonwright.com

September 27, 2021

Ms. Tanowa Troupe, Secretary
Ohio Power Siting Board
Docketing Division
180 East Broad Street, 11th Floor
Columbus, Ohio 43215-3797

**Re: Case No. 20-1605-EL-BGN -** In the Matter of the Application of Birch Solar 1, LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Allen and Auglaize Counties, Ohio.

**Response to Ninth Data Request from Staff of the Ohio Power Siting Board**

Dear Ms. Troupe:

Attached please find Birch Solar 1, LLC's ("Applicant") Response to the Ninth Data Request from the staff of the Ohio Power Siting Board ("OPSB Staff"). The Applicant provided this response to OPSB Staff on September 27, 2021.

We are available, at your convenience, to answer any questions you may have.

Respectfully submitted,

*/s/ Christine M.T. Pirik*

Christine M.T. Pirik (0029759)
(Counsel of Record)
Terrence O'Donnell (0074213)
Matthew C. McDonnell (0090164)
Dickinson Wright PLLC
150 East Gay Street, Suite 2400
Columbus, Ohio 43215
Phone: (614) 591-5461
Email: cpirik@dickinsonwright.com
todonnell@dickinsonwright.com
mmcdonnell@dickinsonwright.com

Cc: James O'Dell
Theresa White
Randall Schumacher
Jon Pawley

## CERTIFICATE OF SERVICE

The Ohio Power Siting Board's e-filing system will electronically serve notice of the filing of this document on the parties referenced in the service list of the docket card who have electronically subscribed to these cases. In addition, the undersigned certifies that a copy of the foregoing document is also being served upon the persons below this 27th day of September, 2021.

*/s/ Christine M.T. Pirik*
Christine M.T. Pirik (0029759)

Counsel:

jodi.bair@ohioattorneygeneral.gov
kyle.kern@ohioattorneygeneral.gov
jvankley@vankleywalker.com

Administrative Law Judge:

michael.williams@puco.ohio.gov

4831-2992-0507 v1 [92234-1]

**BEFORE**
**THE OHIO POWER SITING BOARD**

| | | |
|---|---|---|
| In the Matter of the Application of Birch Solar 1, LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Allen and Auglaize Counties, Ohio. | ) ) ) ) ) | Case No: 20-1605-EL-BGN |

**BIRCH SOLAR 1, LLC 'S**
**RESPONSE TO THE NINTH DATA REQUEST**
**FROM THE STAFF OF THE OHIO POWER SITING BOARD**

On February 12, 2021, as supplemented on March 25 and 31, 2021, and April 5, 2021, Birch Solar 1, LLC ("Applicant") filed an application ("Application") with the Ohio Power Siting Board ("OPSB") proposing to construct a solar-powered electric generation facility in Allen and Auglaize Counties, Ohio.

On September 17, 2021, the Staff of the OPSB ("OPSB Staff") provided the Applicant with OPSB Staff's Ninth Data Request. Now comes the Applicant providing the following response to the Ninth Data Request from the OPSB Staff.

**Ecological**

1. **Collection line mapping shows stream crossings. Is the applicant willing to commit to use HDD for all stream crossings? If this is not feasible, staff recommends that the applicant HDD all perennial streams in order to limit wildlife impacts. If some stream would require open cut installation for collection line, please provide an update on USACE and OEPA permitting.**

   **Response:** The Applicant has committed to horizontal directional drilling ("HDD") under streams. In addition to HDD under roadways and wetlands as committed to in the Application, HDD will also be used for all stream crossings, both ephemeral and perennial streams. Please note that the HDD under roadways will be in coordination with the local controlling entity as part of the Road Use Agreement or other agreements. As there is no anticipated need to install collection lines with an open cut method, no United States Army

Corp of Engineers ("USACE") and Ohio Environmental Protection Agency ("OEPA") permitting is anticipated for streams or wetlands.

2. **Staff would recommend that the Applicant construct the facility in a manner that incorporates post construction stormwater management under OHC00005 (Part III.G.2.e, pp. 19-27) in accordance with the Ohio Environmental Protection Agency's Guidance on Post-Construction Storm Water Controls for Solar Panel Arrays. Is the Applicant willing to commit to this recommendation?**

   **Response:** The Applicant has committed to incorporate post construction stormwater management under OHC000005 (Part III.G.2.e, pp.19-27) in accordance with the Ohio Environmental Protection Agency's Guidance on Post-Construction Storm Water Controls for Solar Panel Arrays in the Application and continues this commitment.

3. **Staff would recommend that the Applicant have an environmental specialist on site during construction activities that may affect sensitive areas (such as HDD near streams), and the environmental specialist have authority to stop construction activities for up to 48 hours if the construction activities are creating unforeseen environmental impacts. Is the Applicant willing to commit to this recommendation?**

   **Response:** The Applicant will commit to an environmental specialist on site during construction activities in environmentally sensitive areas. The environmental specialist will have the authority to stop construction activities for up to 48 hours if the construction activities are creating unforeseen environmental impacts.

4. **Please confirm if the project has the potential to impact any bat hibernacula. Was this confirmed in accordance with the recommendations provided in the September 30, 2020 ODNR letter**

   **Response:** The Project is not anticipated to impact bat hibernacula. As discussed in the Threatened and Endangered Species Habitat Survey Report included as Exhibit Q in the Application, a desktop assessment using the Ohio Department of Natural Resources ("ODNR") interactive tools revealed no karst features within Allen or Auglaize counties and an active lime mine, which is also mentioned in the ODNR response, is located outside the Project area or within the 0.25 mile buffer requested in the ODNR letter. Further, no steep topography was evident using topographic maps and aerial imagery did not reveal any obvious exposed rock within the Project area or surrounding vicinity. During field

surveys, Stantec did not observe winter hibernacula for Indiana bat, northern long-eared bat, little brown, or eastern tri-colored bats. This evaluation effort is consistent with the recommendations from ODNR's September 30, 2020 letter.

5. **Staff would recommend the following: That the Applicant take steps to prevent establishment and/or further propagation of noxious weeds identified in Ohio Adm. Code Chapter 901:5-37 during implementation of any pollinator-friendly plantings and other revegetation. The Applicant shall provide annual proof of weed control for the first four years of operation, with the goal of weed eradication significantly completed by year three of operation. Is that applicant willing to commit to this?**

   **Response:** The Applicant will commit to prevent the establishment and/or further propagation of noxious weeds identified in Ohio Adm. Code Chapter 901:5-37 during implementation of any pollinator-friendly plantings and other revegetation. The Applicant will provide annual proof of weed control effort for the first four years of operation with the goal of weed eradication significantly completed by year three of operation.

**Geotechnical**

**Figure 8-3 of the application filed 2/12/21 provides a proposed facility map showing several oil and gas well features within the project area. Page 51 of the application indicates: "The Applicant has completed electromagnetic surveys to better understand the location of the wells and any potential associated infrastructure related to the wells in order to site Project facilities to avoid these buried features." On April 13, 2021, Staff submitted a data request asking that the Applicant provide a copy of the electromagnetic survey report including a summary of the results, and discussion of any survey limitations. The April 28 response to the data request indicated although much of the investigation has been completed, the field work to identify magnetic anomalies that may suggest historic well and well associated infrastructure was ongoing. Thus no formal report was provided at that time. Please provide Staff with an oil and gas well assessment report addressing the following:**

6. **Full results of the well and well infrastructure survey including a summary of the findings interpreted by subject matter experts. This should include a summary of any consultation with ODNR – Division of Oil and Gas staff.**

   **Response:** The Applicant analyzed the potential of wells in the Project Area using ODNR – Division of Oil and Gas publicly available data. ODNR data depicted possible historical inactive wells within the Project Area. As committed in the Application filed February 12, 2021, at page 19, the facility will be setback 50 feet from the identified wells. In addition, the Applicant continued analysis of the well locations. The Applicant completed

electromagnetic ("EM") surveys with transect analysis around the ODNR well locations (see Attachment 2 to this response). Transect analysis is defined as a survey around a coordinate well (based on ODNR data) target, using a 5-foot spacing around the coordinate well target. Transect analysis extended up to a distance of approximately 150 feet beyond the survey target. The EM transect analysis found 76 individual anomalies indicating the presence of metallic features. Approximately 21 horizontal features were identified indicating the presence of potential horizontal metallic features. Metallic features can be associated with historical agricultural actives (irrigation, water features, implements), as well as oil and gas production. Figure 1 contained in Attachment 1 to this response shows the ODNR data overlayed with the transects which were surveyed using EM technology to identify anomalies.

Due to the inability for the anomalies to be clearly identified as wells, the Applicant then proceeded to pothole (excavate) the anomaly locations using vacuum or hydro-vac excavation methods. Potholing allows for physical verification of any potential well structure without damaging subsurface utilities or other infrastructure. As shown in Figure 2 in Attachment 1 to this response, out of the 38 potholed locations, fragments of case iron pipe and metal fragments were found at only one location. No oil or gas wells nor related infrastructure associated with oil and gas wells were found. When an anomaly was not physically verified as a well, the area was included for panel usage.

The Project will physically verify all EM survey anomalies. If well components are physically verified, a 50-foot setback will be placed around the well and the Project will consult with ODNR on any mitigation strategies required.

In addition, the Project has committed to an "Unanticipated Contamination Discovery Plan." This Plan was included as Attachment 4 in the Applicant's Response to the Fifth Data Request from the OPSB Staff ("Plan"). The objective of this Plan is to prescribe measures for safely addressing unanticipated, potentially hazardous wastes found during construction of the Project. If such materials are encountered during construction, the actions contained in this Plan provide measures that the Project entity and its contractors would undertake.

7. **A figure depicting the locations of these wells and any associated infrastructure within the current project layout.**

**Response:** Please see Figure 1 and Figure 2 in Attachment 1 to this response.

8. **A figure depicting the locations of these wells and any associated infrastructure within any revised project layout observing a 50-foot setback from oil and gas well features.**

**Response:** Please see Figure 1 and Figure 2 in Attachment 1 to this response. Please note, setbacks were removed from any area which could not be physically verified through the methods outlined above.

9. **A modified Figure 8-3 that shows the well locations provided with the application, the identification of any new wells, and revised locations of wells previously identified.**

**Response:** Please see Figure 1 and Figure 2 in Attachment 1 to this response.

10. **With the wells identified, confirm the well status (i.e. in production, plugged, orphaned), provide a table with corresponding API numbers and latitude and longitude coordinates. Include a description of the methods used to confirm the well status.**

**Response:** Wells were verified using the above methodology. Figure 3 below includes the API Well Number, location and status.

**Figure 3:**

| API Well Number | Latitude | Longitude | ODNR Well Status | Field Verification Status |
|---|---|---|---|---|
| 34003639510000 | 40.672378 | -84.186996 | Plugged and Abandoned | Anomaly detected, not yet physically verified |
| 34003639520000 | 40.685786 | -84.185761 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003639530000 | 40.685464 | -84.20235 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003639540000 | 40.678131 | -84.199742 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003639550000 | 40.677261 | -84.199915 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003639560000 | 40.676455 | -84.202198 | Historical Production Well | Anomaly detected, not yet physically verified |

| API Well Number | Latitude | Longitude | ODNR Well Status | Field Verification Status |
|---|---|---|---|---|
| 34003639580000 | 40.676679 | -84.185624 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003639590000 | 40.674666 | -84.190513 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003639600000 | 40.673435 | -84.185523 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003639610000 | 40.672315 | -84.185484 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003639620000 | 40.672257 | -84.199307 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003639630000 | 40.672205 | -84.202194 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003639640000 | 40.682345 | -84.221788 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003639660000 | 40.675614 | -84.204863 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003640560000 | 40.668397 | -84.17786 | Historical Production Well | Anomaly detected, potholed and no evidence of well found. |
| 34003640570000 | 40.668391 | -84.175249 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003640590000 | 40.667829 | -84.169372 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003640620000 | 40.664996 | -84.183268 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003640710000 | 40.66749 | -84.185217 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003640720000 | 40.665034 | -84.185173 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003640730000 | 40.66498 | -84.186603 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003640740000 | 40.665089 | -84.188325 | Historical Production Well | Anomaly detected, potholed and no evidence of well found. |
| 34003640760000 | 40.663799 | -84.185282 | Historical Production Well | No anomaly detected |
| 34003640770000 | 40.66383 | -84.188416 | Historical Production Well | No anomaly detected |
| 34003640780000 | 40.661441 | -84.188463 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003640920000 | 40.669615 | -84.21628 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34003640960000 | 40.681131 | -84.221641 | Plugged and Abandoned | Anomaly detected, not yet physically verified |
| 34011604950000 | 40.67947 | -84.234014 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011604990000 | 40.672045 | -84.231566 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011605000000 | 40.672836 | -84.229928 | Historical Production Well | Anomaly detected, not yet physically verified |

| API Well Number | Latitude | Longitude | ODNR Well Status | Field Verification Status |
|---|---|---|---|---|
| 34011605010000 | 40.673527 | -84.228879 | Historical Production Well | Anomaly detected, potholed and no evidence of well found. |
| 34011605020000 | 40.671993 | -84.228276 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011605030000 | 40.671932 | -84.22689 | Historical Production Well | Anomaly detected, potholed and no evidence of well found. |
| 34011605040000 | 40.681769 | -84.223807 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011605050000 | 40.680597 | -84.223751 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011605060000 | 40.679092 | -84.223766 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011605070000 | 40.678834 | -84.225032 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011605080000 | 40.678186 | -84.223786 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011605100000 | 40.670381 | -84.229074 | Historical Production Well | No anomaly detected. |
| 34011605130000 | 40.668037 | -84.225736 | Historical Production Well | No anomaly detected. |
| 34011605140000 | 40.668092 | -84.228975 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011605150000 | 40.668072 | -84.230132 | Historical Production Well | No anomaly detected. |
| 34011605160000 | 40.668098 | -84.231694 | Historical Production Well | No anomaly detected. |
| 34011605230000 | 40.6637 | -84.223301 | Historical Production Well | Anomaly detected, potholed and no evidence of well found. |
| 34011605240000 | 40.663749 | -84.225152 | Historical Production Well | Anomaly detected, potholed and no evidence of well found. |
| 34011605250000 | 40.663769 | -84.22728 | Historical Production Well | No anomaly detected |
| 34011605300000 | 40.661566 | -84.223008 | Historical Production Well | Anomaly detected, potholed and no evidence of well found. |
| 34011605340000 | 40.661329 | -84.229596 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011605350000 | 40.66021 | -84.224076 | Historical Production Well | Anomaly detected, potholed and no evidence of well found. |
| 34011605360000 | 40.659732 | -84.226263 | Historical Production Well | Anomaly detected, potholed and no evidence of well found. |
| 34011605370000 | 40.660689 | -84.231627 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011605390000 | 40.659131 | -84.229351 | Historical Production Well | Anomaly detected, potholed and no evidence of well found. |
| 34011605400000 | 40.658861 | -84.231604 | Historical Production Well | No anomaly detected. |
| 34011605430000 | 40.657269 | -84.231563 | Historical Production Well | Anomaly detected, not yet physically verified |

| API Well Number | Latitude | Longitude | ODNR Well Status | Field Verification Status |
|---|---|---|---|---|
| 34011605440000 | 40.657126 | -84.229547 | Historical Production Well | Anomaly detected, not yet physically verified |
| 34011605450000 | 40.657218 | -84.227654 | Historical Production Well | Anomaly detected, potholed and no evidence of well found. |
| 34011605460000 | 40.65702 | -84.226015 | Historical Production Well | Anomaly detected, potholed and no evidence of well found |
| 34011605470000 | 40.659345 | -84.223314 | Plugged and Abandoned | Anomaly detected, potholed and no evidence of well found |
| 34011605480000 | 40.657093 | -84.223216 | Plugged and Abandoned | Anomaly detected, potholed and no evidence of well found |

**11. A determination of whether the oil/gas well(s) poses a risk to public health, safety, or the environment.**

**Response:** Given the results of the physical verification of the wells to date and the inability to confirm the presence of any wells, it is not anticipated that there will be any risk to public health, safety, and environment. However, through the Applicant's continued efforts to identify any well locations in the Project Area, if a well is found through ground-truthing, consultation will occur with ODNR and OEPA and the facility will setback 50 feet from any identified well.

In addition, the Project has committed to an "Unanticipated Contamination Discovery Plan." This Plan was included as Attachment 4 in the Applicant's Response to the Fifth Data Request from the OPSB Staff. The objective of this Plan is to prescribe measures for safely addressing unanticipated, potentially hazardous wastes found during construction of the Project. If such materials are encountered during construction, the actions contained in this Plan provide measures that the Project entity and its contractors would undertake.

**12. Discuss plans to remediate any oil and gas wells and the associated cost estimates.**

**Response:** If wells are found in the Project through ground-truthing, consultation will occur with ODNR and OEPA.

Costs for properly abandoning a well is approximately $70,000, however, the cost can vary widely. Generally capping of a well is estimated at $40,000.

Respectfully submitted,

*/s/ Christine M.T. Pirik*

Christine M.T. Pirik (0029759)
(Counsel of Record)
Terrence O'Donnell (0074213)
Matthew C. McDonnell (0090164)
Dickinson Wright PLLC
150 East Gay Street, Suite 2400
Columbus, Ohio 43215
Phone: (614) 591-5461
Email: cpirik@dickinsonwright.com
todonnell@dickinsonwright.com
mmcdonnell@dickinsonwright.com

***Attorneys for Birch Solar 1, LLC***

4818-0406-1691 v3 [92234-1]

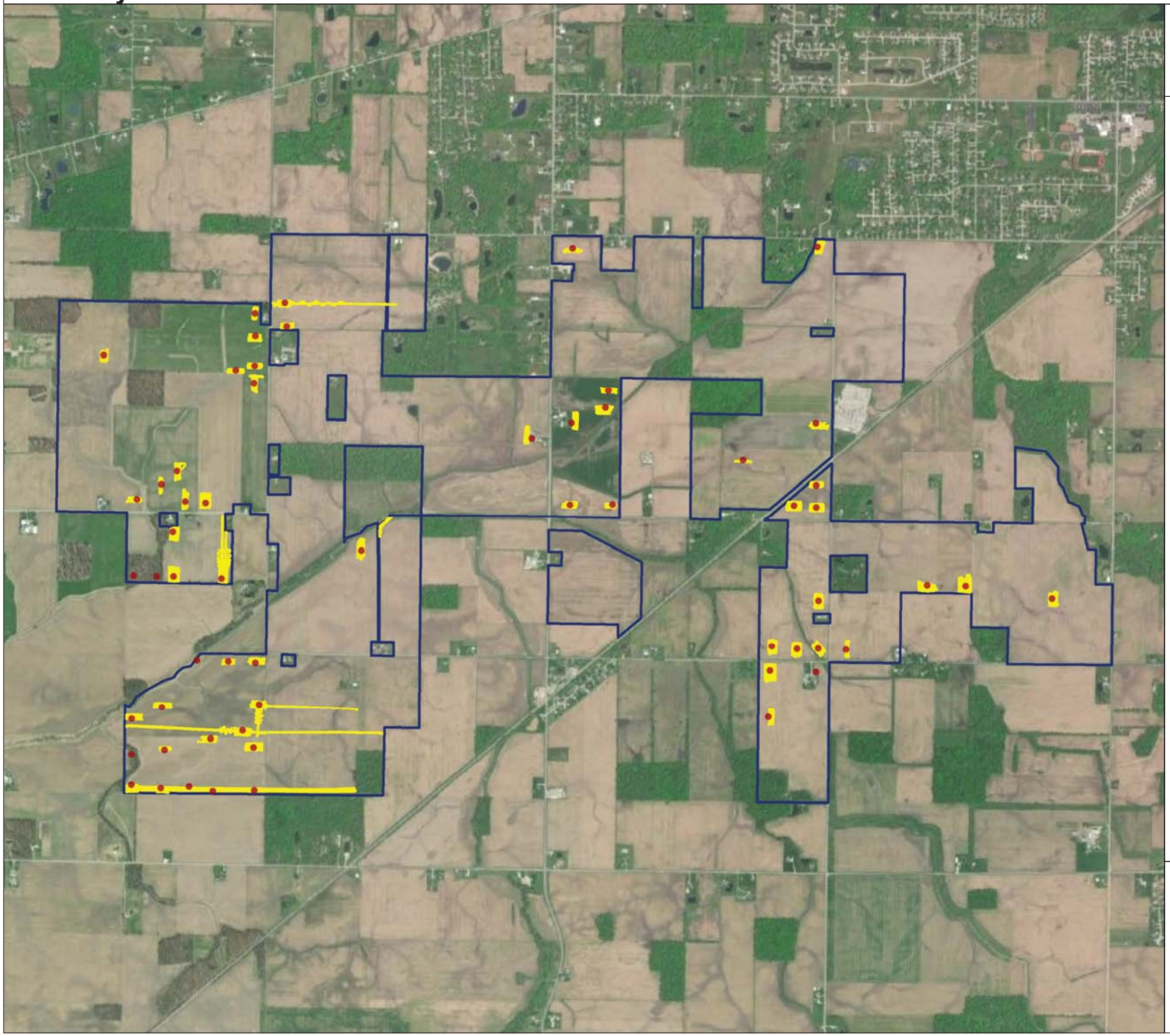
# Attachment 1

Figures

- Figure 1 – Electromagnetic Survey Transects
- Figure 2 – Potholing/Physical Verification and Current Setbacks

# EM Survey Transects

Lightsource BP, advancing solar



Birch Solar
Allen & Auglaize Counties, OH
Date: September 24, 2021

Birch Project Area

Inactive Historical Production Wells (ODNR)

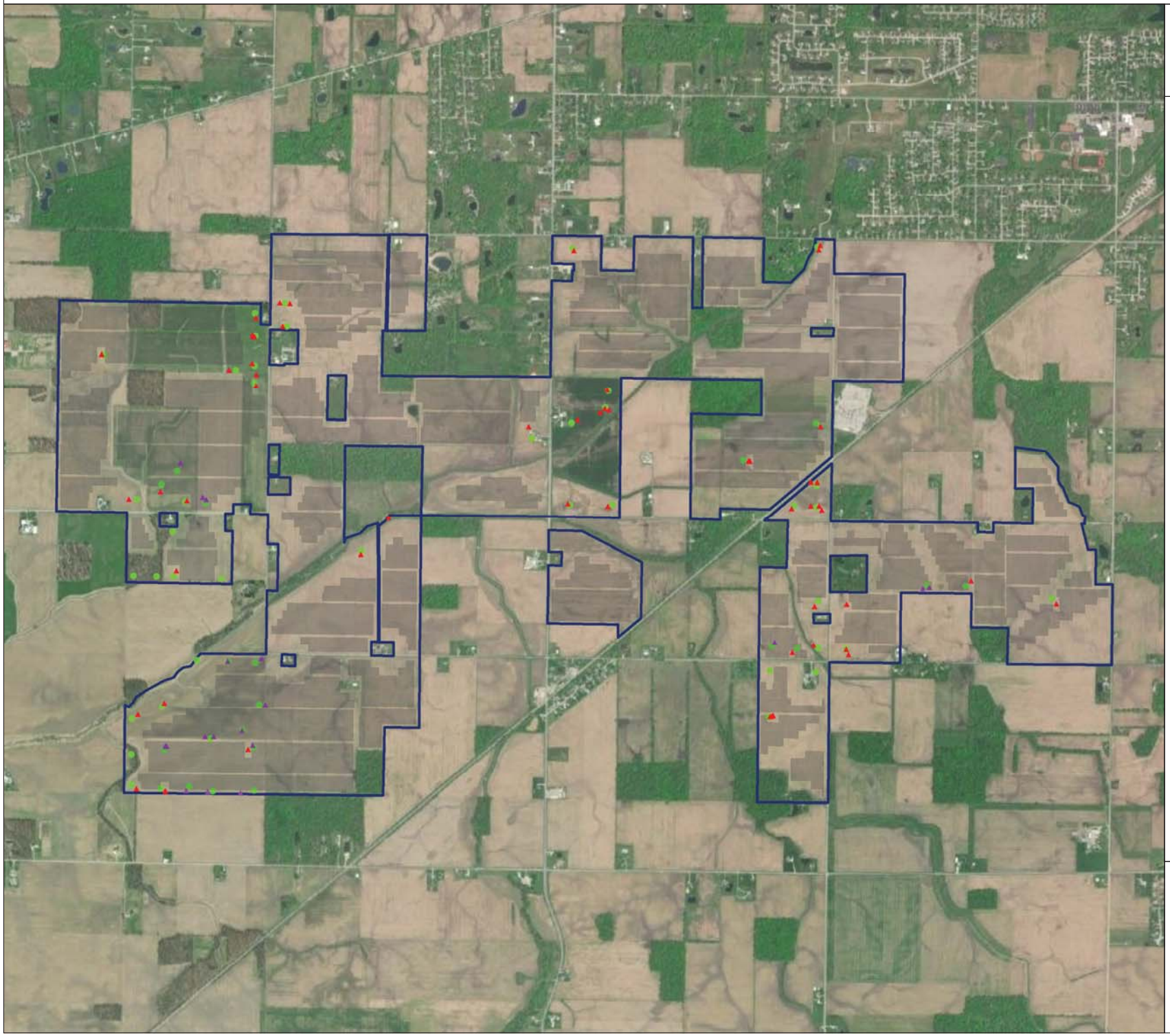
Transects that were surveyed using EM technology to identify anomalies

NORTH

0 1,900 3,800
Feet

# Setback from EM Anomalies

Lightsource BP, advancing solar



Birch Solar
Allen & Auglaize Counties, OH
Date: September 24, 2021

- Birch Project Area
- Modules - Preliminary Design
- Inactive Historical Production Wells (ODNR)
- EM anomalies, potholed to provide physical evidence. No evidence of well found.
- Physical verification through potholing will be completed to determine if well exists. If well exists, 50ft setback will remain and coordination will occur with ODNR.

NORTH

0 1,900 3,800
Feet

# Attachment 2

## Electromagnetic Investigation Summary Report
## Kleinfelder
## September 27, 2021

DICKINSON WRIGHT PLLC

# ELECTROMAGNETIC INVESTIGATION SUMMARY REPORT
# BIRCH SOLAR PROJECT
# ALLEN AND AUGLAIZE COUNTIES, OHIO
# KLEINFELDER PROJECT NO. 20212135.001A

**September 27, 2021**

**Copyright 2021 Kleinfelder**
**All Rights Reserved**

**ONLY THE CLIENT OR ITS DESIGNATED REPRESENTATIVES MAY USE THIS DOCUMENT AND ONLY FOR THE SPECIFIC PROJECT FOR WHICH THIS REPORT WAS PREPARED.**

Report Prepared for:

Mr. Joshua Larimer
Lightsource bp
400 Montgomery St, 8th Floor
San Francisco, California 94104

**ELECTROMAGNETIC INVESTIGATION SUMMARY REPORT**
**BIRCH SOLAR PROJECT**
**ALLEN AND AUGLAIZE COUNTIES, OHIO**

**KLEINFELDER PROJECT NO. 20212135.001A**

Prepared by:

Daniel L. Harpstead, PE (OH)
Senior Vice President
Risk Mitigation Director

Terry Jennings
Project Manager

**KLEINFELDER**
707 17th Street, Suite 3000
Denver, Colorado 80202
303.237.6601

September 27, 2021
Kleinfelder Project No. 20212135.001A


© 2021 Kleinfelder

## TABLE OF CONTENTS


| Section | | Page |
|---|---|---|
| **1** | **INTRODUCTION** | **1** |
| **2** | **ELECTROMAGNETIC FIELD EVALUATION AND ANOMALY EXCAVATION** | **2** |
| | 2.1 ELECTROMAGNETIC FIELD EVALUATION | 2 |
| | 2.2 ANOMALY EXCAVATION | 3 |
| **3** | **RESULTS** | **4** |
| | 3.1 RESULTS | 4 |
| **4** | **LIMITATIONS** | **5** |

**FIGURES**

1. ODNR Well Locations
2. ODNR Wells and EM Evaluation Anomalies
3. (Figures 3, 3A – 3J) EM Evaluation Anomalies
4. Anomaly Location 60A Debris Photographs

**TABLES**

1. Coordinates for Anomalies Identified as Possible Wells
2. Coordinates for Anomalies Identified as Possible Horizontal Infrastructure.

**APPENDIX**

A Round Rock Geophysics Report – Location of Wells And Associated Structures Using Em61, Birch Solar Project




© 2021 Kleinfelder

# ELECTROMAGNETIC INVESTIGATION SUMMARY REPORT
# BIRCH SOLAR PROJECT
# ALLEN AND AUGLAIZE COUNTIES, OHIO

## 1 INTRODUCTION

---

This report presents the results of an electromagnetic (EM) evaluation of the proposed Birch photovoltaic (PV) solar electric generation facility (Project) planned in Allen and Auglaize Counties, Ohio. The intent of the EM evaluation was to locate and confirm the presence of historical abandoned oil and gas wells and associated subsurface infrastructure in the Project area that were identified in the Ohio Department of Natural Resource (ODNR) Division of Oil & Gas Resources Oil & Gas Well Database.

The scope of Kleinfelder's EM evaluation effort consisted of a targeted EM evaluation of potential oil and gas wells in the Project area identified in the ODNR Oil & Gas Well Database, followed by potholing (excavation) of EM anomalies identified during the EM evaluation that could potentially indicate the presence of historical oil and gas wells.

In summary, numerous EM anomalies were identified in the vicinity of ODNR database well coordinates that indicated the presence of metallic features. Anomalies identified as possible oil and gas wells and associated infrastructure with the greatest potential to impact the layout of the Project were subsequently potholed to depths up to 10 feet below ground surface. Of the anomalies potholed, only one location yielded small scraps of metal potentially associated with former oil and gas well infrastructure. No oil or gas wells were found to be present or associated with the other EM anomaly locations that were potholed.


© 2021 Kleinfelder

# 2 ELECTROMAGNETIC FIELD EVALUATION AND ANOMALY EXCAVATION

## 2.1 ELECTROMAGNETIC FIELD EVALUATION

Using the ODNR Oil & Gas Well Database, Kleinfelder identified 60 historical oil and gas wells potentially located within the Project area (Figure 1). Using the ODNR database coordinates for these wells, Kleinfelder's EM evaluation subcontractor, Round Rock Geophysics (Round Rock), conducted a targeted EM evaluation of these locations to confirm the presence of wells. Round Rock utilized an EM61 time-domain electromagnetic induction type instrument designed specifically for detecting buried metal objects. This technology is described in more detail in the attached EM evaluation report provided by Round Rock (Appendix A).

Round Rock conducted the EM evaluation over the course of approximately six weeks and three mobilizations to the site in October 2020 and March and April 2021. Round Rock initiated their EM evaluation of ODNR well coordinates using a survey-grade A325 GNSS Smart Antenna GPS unit with a base station and mobile components, as described in Round Rock's EM evaluation report, provided as Appendix A to this summary report. The EM evaluation of each well target was then conducted along a 5-foot grid spacing expanded out to a distance of approximate 150 feet from each location.

Following post-processing of the preliminary EM evaluation data collected in October 2020, Round Rock returned in March and April 2021 to conduct an additional EM evaluation of horizontal anomalies identified during the initial October 2020 EM evaluation. These anomalies indicated the potential presence of subsurface infrastructure (e.g., metal piping) that could be associated with historical oil and gas wells.

Using the target list of 60 potential oil and gas wells from the ODNR database, Round Rock identified 76 individual metallic anomalies which could indicate the presence of potential oil and gas wells. Numerous anomalies were clustered in some locations, indicating the potential for metallic fragments or scrap material. Round Rock also identified approximately 21 horizontal features indicating the potential presence of metallic pipelines or other horizontal infrastructure. The EM anomalies identified are presented in Figure 2. Coordinates for the 76 individual anomalies are presented in Table 1; coordinates for horizontal anomalies are presented in Table 2.


© 2021 Kleinfelder

It should be noted that the coordinates in Table 2 represent the end points and inflection points (bends) for each horizontal anomaly. Table 2 also presents coordinates for target locations that were excavated along several of the horizontal anomalies (Section 2.2, below).

## 2.2 ANOMALY EXCAVATION

Kleinfelder conducting multiple groundtruthing efforts in February, March, and April 2021 to verify the presence and nature of the anomalies identified during the EM evaluation efforts. Groundtruthing efforts in February and March consisted of locating the EM anomaly locations with a handheld, survey-grade GPS device, staking the locations, then excavating (potholing) the target locations with a vacuum truck capable of excavating to depths up to 15 feet below ground surface. Potholing efforts in February were unsuccessful due to freezing and wet weather conditions.

During the March 2 through March 5, 2021, potholing effort, seven EM anomalies (Table 1 anomaly locations 33, 34A, 59A, 85, 92A, 97A, and 100A) were excavated to approximately 8 feet below ground surface. No oil or gas wells, or other metallic features, were identified at these locations. These locations were selected based on their potential to impact the PV solar array layout and their accessibility to the excavation equipment.

Groundtruthing efforts conducted April 5 through April 12, 2021, consisted of locating additional EM anomaly locations using survey-grade GPS equipment, staking the locations, then potholing the target locations with a hydro-vac truck capable of excavating to depths up to 20 feet below ground surface. Kleinfelder and its hydro-vac contractor potholed 21 EM anomaly locations potentially associated with historical oil or gas wells and 17 target locations along several horizontal EM anomaly features. At several of the horizontal anomalies, multiple transects (trenches) were excavated across the presumed location of the anomaly to verify the presence of suspected horizontal subsurface infrastructure. At several of the anomalies having strong or multiple EM signatures, multiple potholes were excavated at and within 2 to 3 feet of each EM signature. In addition, all seven of the anomalies potholed during the March potholing effort were re-potholed to ensure accuracy of anomaly locations and to verify that no oil and gas wells were present at these locations.

Except for one location (anomaly location 60A), no oil or gas wells, or infrastructure were found or indicated. At location 60A, several fragments of cast iron pipe and metal were found. EM anomaly locations that were potholed are shown in Figures 3A through 3J and summarized in


© 2021 Kleinfelder

Tables 1 and 2. Photographs of the metal fragments found at well location 60A are shown in Figure 4.

# 3 RESULTS

## 3.1 RESULTS

38 total EM anomaly locations were potholed to identify and/or confirm the presence of potential historical oil and gas wells and associated infrastructure on the Project site. Except for one anomaly location (location 60A) no oil or gas wells, or associated infrastructure was found. As previously stated, cast iron pipe and metal fragments were observed at anomaly location 60A location.

Although numerous transects were excavated (trenched) across several locations corresponding to potential horizontal metallic features, no metal piping was identified. Plastic drain tile was observed at two locations (locations 33 and 92C, and horizontal anomaly 33B).

Based on the EM evaluation and the targeted potholing, Kleinfelder concludes that oil and gas wells and former associated infrastructure are not present in the areas potholed and will not impact the solar arrays in those areas. Given the site history, contractors installing the solar arrays should be observant and request follow-up evaluations if unanticipated features are identified during construction that may be associated with historical oil and gas activities.


© 2021 Kleinfelder

# 4 LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions, and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

This report may be used only by Lightsource bp and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report.

The work performed was based on project information provided by Lightsource bp and obtained from the Ohio Department of Natural Resources. If Lightsource bp does not retain Kleinfelder to review any plans and specifications that may be impacted by the findings of this evaluation, Kleinfelder assumes no responsibility for the interpretation or implementation of our findings.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. Lightsource bp and key members of their Project team should discuss the issues covered in this report with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk and expectations for future performance and maintenance.

The scope of services for this EM evaluation and groundtruthing effort did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

This report, and any future addenda or reports regarding this site, may be made available to bidders to supply them with only the data contained in the report regarding subsurface conditions at the point and time noted. Bidders may not rely on interpretations, opinions, recommendations,


© 2021 Kleinfelder

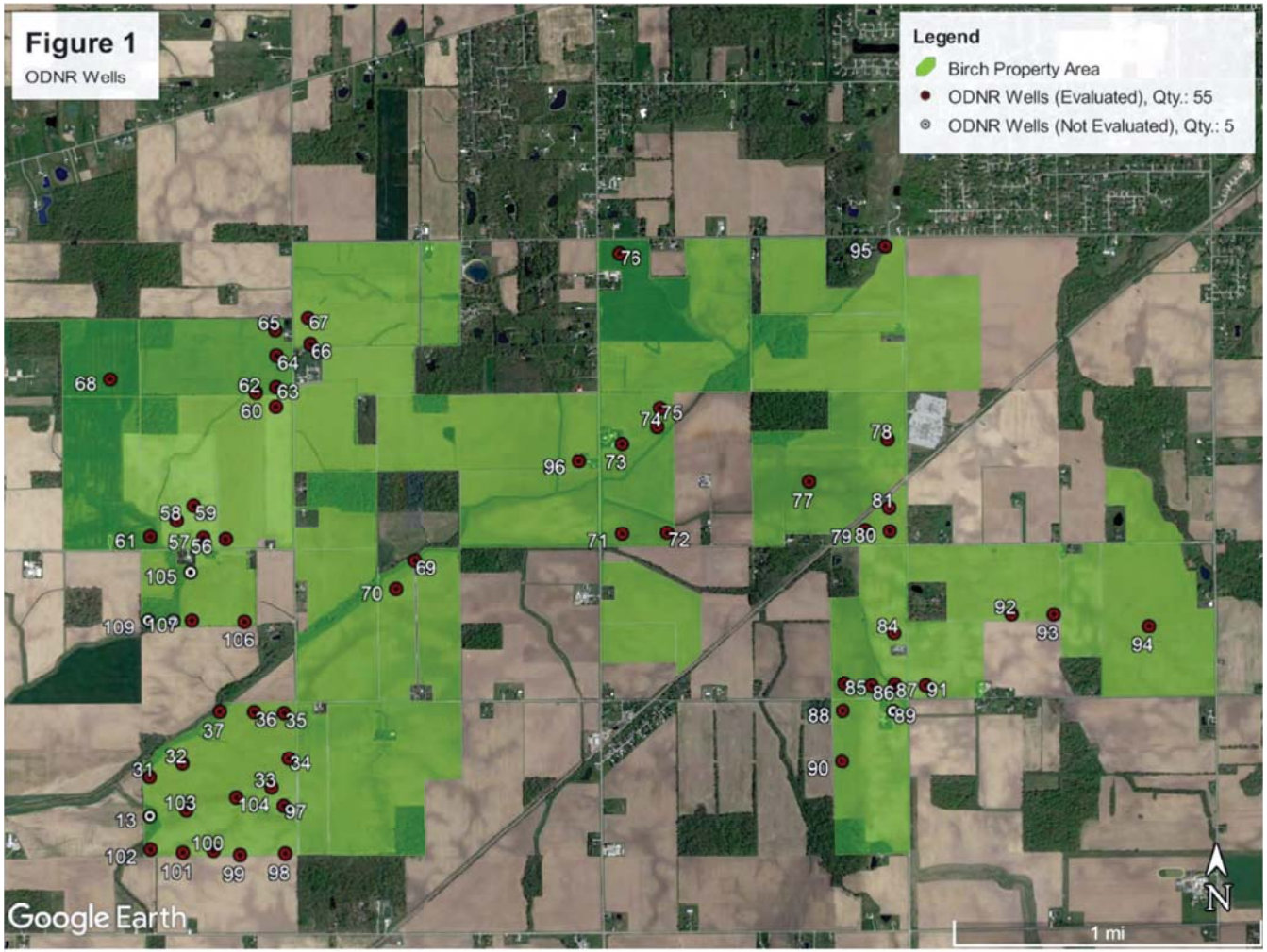
or conclusions contained in the report. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in this report. We recommend the contractor describe the nature and extent of the differing conditions in writing and that the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during construction.


© 2021 Kleinfelder

KLEINFELDER

Bright People. Right Solutions.

# Figures



The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

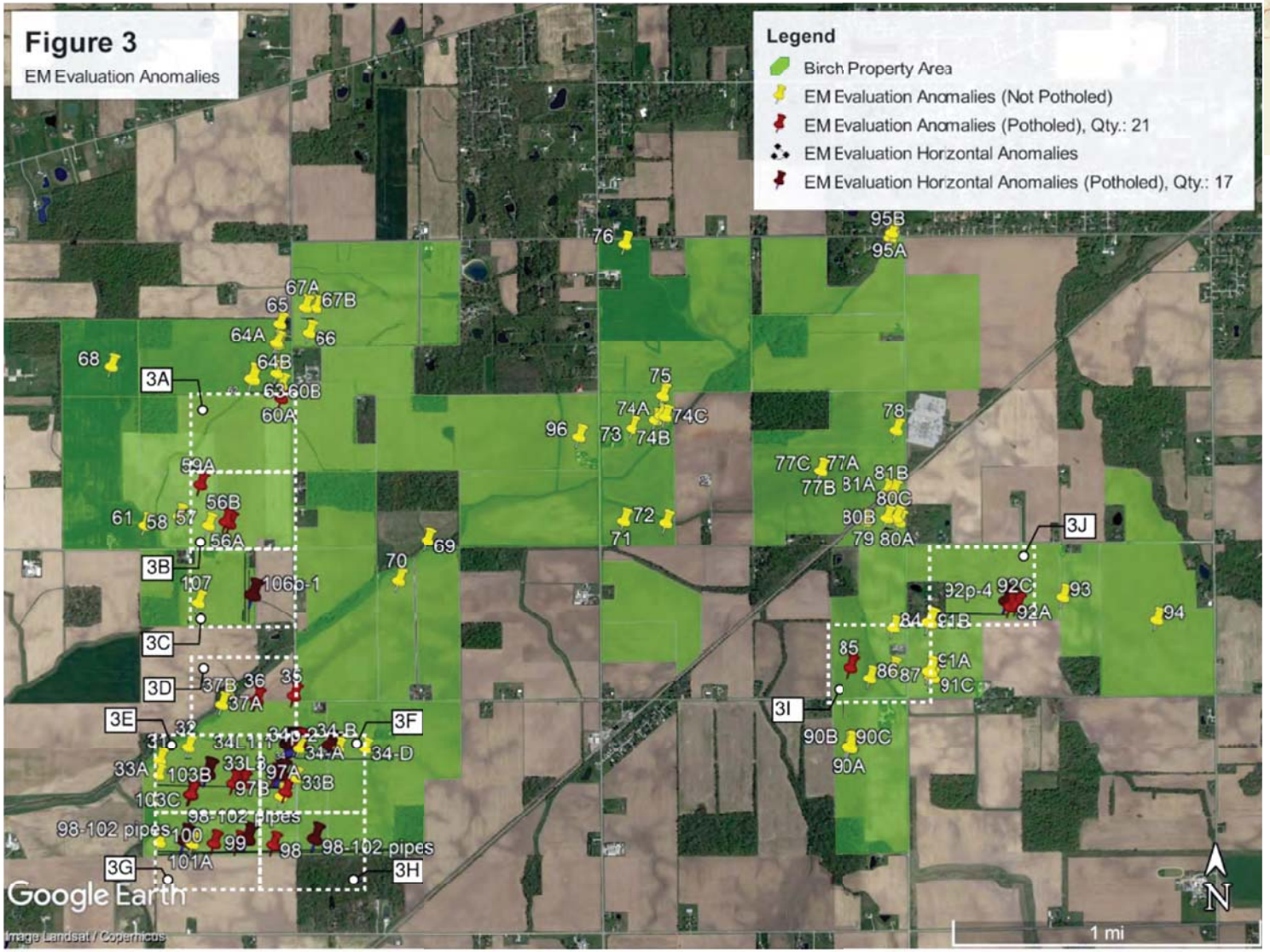
| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 1 |

**ODNR WELLS**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**1**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx



N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 3 |

**EM EVALUATION ANOMALIES**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**3**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 3A |

**EM EVALUATION ANOMALIES**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**3A**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 3B |

**EM EVALUATION ANOMALIES**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**3B**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 3C |

**EM EVALUATION ANOMALIES**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**3C**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 3D |

**EM EVALUATION ANOMALIES**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**3D**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 3E |

**EM EVALUATION ANOMALIES**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**3E**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 3F |

**EM EVALUATION ANOMALIES**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**3F**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 3G |

**EM EVALUATION ANOMALIES**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**3G**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 3H |

**EM EVALUATION ANOMALIES**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**3H**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 3I |

**EM EVALUATION ANOMALIES**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**3I**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.

| | |
|---|---|
| PROJECT NO | 20212135.001A |
| DRAWN: | 9/27/2021 |
| DRAWN BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 3J |

**EM EVALUATION ANOMALIES**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counties, Ohio

FIGURE
**3J**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar\20212135_BirchSolar.aprx

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.
www.kleinfelder.com

| | |
|---|---|
| PROJECT NO. | 20212135.001A |
| CREATED: | 9/27/2021 |
| CREATED BY: | AL |
| CHECKED BY: | TJ |
| FILE NAME: | Figure 4 |

**SCRAP METAL EXCAVATED AT ANOMALY 60A**

Lightsource BP
Birch Solar Project
Allen and Auglaize Counites, Ohio

FIGURE
**4**

Document Path: \\azrgisstorp01\GIS_Projects\Client\LightsourceBP\20212135_BirchSolar_Portrait\20212135_BirchSolar_Portrait.aprx

KLEINFELDER

Bright People. Right Solutions.

# Tables

# TABLES


© 2021 Kleinfelder

**Table 1. Coordinates for Anomalies Identified as Possible Wells**

| Anomaly ID | Digitized Points (Northing) | Digitized Points (Easting) | Potholed (Y/N) | Notes |
|---|---|---|---|---|
| 31 | 40.66088886 | -84.23121324 | No | |
| 32 | 40.6615108 | -84.22944973 | No | |
| 33 | 40.66014491 | -84.224141 | Yes | Potholed to 8 ft, then trenched 5 ft N and 8 ft S. Plastic drain tile found north of anomaly at depth of 3 ft. |
| 34 | 40.66152323 | -84.22258703 | Yes | Potholed to 7 ft. |
| 35 | 40.66391467 | -84.22289808 | Yes | Potholed to 8 ft. |
| 36 | 40.66371307 | -84.22520889 | Yes | Potholed to 8 ft. |
| 56A | 40.67207943 | -84.22688226 | Yes | Potholed to 10 ft. |
| 56B | 40.67217743 | -84.22711674 | Yes | Potholed to10 ft. |
| 57 | 40.67199981 | -84.22817697 | No | |
| 58 | 40.67243059 | -84.2299998 | No | |
| 59A | 40.67391863 | -84.22868108 | Yes | Potholed to 10 ft. |
| 60A | 40.67799571 | -84.22366457 | Yes | Potholed to 10 ft; additional potholes 2 ft SE and 2 ft SW; cast iron pipe and metal fragments found at depth of 1.5-2 ft. |
| 60B | 40.67859521 | -84.22366126 | No | |
| 61 | 40.67200293 | -84.23211378 | No | |
| 62 | 40.67879668 | -84.2255121 | No | |
| 63 | 40.67917566 | -84.22394247 | No | |
| 64A | 40.68062111 | -84.22395153 | No | |
| 64B | 40.68052968 | -84.22393709 | No | |
| 64C | 40.68052932 | -84.22383801 | No | |
| 65 | 40.68150807 | -84.22374932 | No | |
| 66 | 40.68109526 | -84.22192732 | No | |
| 67A | 40.68231337 | -84.22216837 | No | |
| 67B | 40.6822913 | -84.22146285 | No | |
| 68 | 40.67948997 | -84.23417468 | No | |
| 69 | 40.67129946 | -84.21449828 | No | |
| 70 | 40.66939208 | -84.21632818 | No | |
| 71 | 40.67221821 | -84.20234671 | No | |
| 72 | 40.67213529 | -84.19964483 | No | |
| 73 | 40.67657756 | -84.20178306 | No | |
| 74A | 40.67717193 | -84.19996808 | No | |
| 74B | 40.67696359 | -84.20030096 | No | |
| 74C | 40.67711917 | -84.19968106 | No | |
| 75 | 40.67815207 | -84.19984772 | No | |
| 76 | 40.68531454 | -84.20227528 | No | |


© 2021 Kleinfelder

**Table 1. (Continued) Coordinates for Anomalies Identified as Possible Wells**

| Anomaly ID | Digitized Points (Northing) | Digitized Points (Easting) | Potholed (Y/N) | Notes |
|---|---|---|---|---|
| 77A | 40.67459336 | -84.19015001 | No | Weak response per Round Rock Geophysics |
| 77B | 40.67459366 | -84.19009323 | No | Weak response per Round Rock Geophysics |
| 77C | 40.67456837 | -84.19004115 | No | Weak response per Round Rock Geophysics |
| 78 | 40.67647465 | -84.18530131 | No | |
| 79 | 40.67218662 | -84.18717873 | No | Multiple anomalies; possible metal fragments per Round Rock Geophysics. |
| 80A | 40.67215264 | -84.18511349 | No | Multiple anomalies; possible metal fragments per Round Rock Geophysics. |
| 80B | 40.67234231 | -84.18587293 | No | Multiple anomalies; possible metal fragments per Round Rock Geophysics. |
| 80C | 40.67234957 | -84.18530392 | No | Multiple anomalies; possible metal fragments per Round Rock Geophysics. |
| 81A | 40.67357395 | -84.18591037 | No | Multiple anomalies; possible metal fragments per Round Rock Geophysics. |
| 81B | 40.6735696 | -84.18545968 | No | Multiple anomalies; possible metal fragments per Round Rock Geophysics. |
| 84 | 40.6671485 | -84.18547737 | No | Multiple anomalies; possible metal fragments per Round Rock Geophysics. |
| 85 | 40.66527203 | -84.18813865 | Yes | Potholed to 8 ft. |
| 86 | 40.66474747 | -84.18692858 | No | |
| 87 | 40.66516685 | -84.185519 | No | |
| 90A | 40.66145578 | -84.18816531 | No | |
| 90B | 40.66141657 | -84.18823128 | No | |
| 90C | 40.66139473 | -84.18835784 | No | |
| 91A | 40.66496129 | -84.18328864 | No | Most prominent anomaly in cluster. |
| 91B | 40.66730829 | -84.18330663 | No | |
| 91C | 40.66469825 | -84.18311985 | No | |
| 92A | 40.66817425 | -84.17816447 | Yes | Potholed to 10 ft. |
| 92C | 40.66824846 | -84.17772572 | Yes | Potholed to 10 ft; plastic drain tile found at depth of 3 ft. |
| 93 | 40.66862839 | -84.17489455 | No | |
| 94 | 40.66754034 | -84.16910089 | No | |
| 95A | 40.6858323 | -84.18557113 | No | |
| 95B | 40.68559619 | -84.18566417 | No | |
| 96 | 40.67617779 | -84.20512071 | No | |
| 97A | 40.65941596 | -84.22341714 | Yes | Potholed to 8 ft. |
| 97B | 40.65920363 | -84.22370505 | No | |


© 2021 Kleinfelder

**Table 1. (Continued) Coordinates for Anomalies Identified as Possible Wells**

| Anomaly ID | Digitized Points (Northing) | Digitized Points (Easting) | Potholed (Y/N) | Notes |
|---|---|---|---|---|
| 98 | 40.65691472 | -84.22416895 | Yes | Potholed to 8 ft. |
| 99 | 40.65694714 | -84.2263767 | Yes | Potholed to 8 ft. |
| 100 | 40.65698109 | -84.22784472 | Yes | Potholed to 8 ft. |
| 101A | 40.65694986 | -84.22918738 | No | |
| 101B | 40.65691797 | -84.22923129 | Yes | Potholed to 8 ft. |
| 101C | 40.65694234 | -84.2292854 | No | |
| 102 | 40.65702245 | -84.2312313 | No | |
| 103A | 40.65927265 | -84.22932954 | Yes | Potholed to 8 ft. Drain tile found at depth of 2.5 ft. |
| 103B | 40.65929023 | -84.22926388 | Yes | Potholed to 8 ft. |
| 103C | 40.65929939 | -84.22924375 | Yes | Potholed to 8 ft. |
| 104A | 40.65979646 | -84.22664901 | Yes | Potholed to 8.5 ft; located in loose sand seam. |
| 104B | 40.65981629 | -84.22605347 | Yes | Potholed to 8 ft. |
| 107 | 40.66835877 | -84.22880401 | No | |


© 2021 Kleinfelder

**Table 2. Coordinates for Anomalies Identified as Possible Horizontal Infrastructure**

| Anomaly ID | Digitized Points* (Northing) | Digitized Points* (Easting) | Potholed (Y/N) | Notes |
|---|---|---|---|---|
| 32L | 40.66151099 | -84.22944956 | No | |
| | 40.66148632 | -84.22923561 | No | |
| | 40.66150199 | -84.22903516 | No | |
| 33L | 40.66012879 | -84.22402613 | No | |
| | 40.66016893 | -84.22368066 | No | |
| | 40.66023011 | -84.223679 | No | |
| | 40.66013864 | -84.2237248 | No | |
| 33A | 40.66023527 | -84.23126369 | No | |
| 33B | 40.66010373 | -84.22277191 | No | |
| 33-2 | 40.66016575 | -84.22830289 | Yes | Horizontal anomaly target between 33A and 33B. Potholed to 8 ft. |
| 33L1 | 40.66013088 | -84.22395188 | Yes | Horizontal anomaly target associated with 33L. Potholed to 8 ft. |
| 33L2 | 40.6601314 | -84.22387401 | Yes | Horizontal anomaly target associated with 33L. Potholed to 8 ft. Trenched 5 ft N and 5 ft S to depth of 4 ft. Plastic drain tile found at depth of 3 ft. |
| 33L3 | 40.66013219 | -84.22377227 | Yes | Horizontal anomaly target associated with 33L. Potholed to 8 ft. |
| 34L | 40.66153363 | -84.22259599 | No | |
| | 40.66145225 | -84.21640102 | No | |
| | 40.66157348 | -84.22263201 | No | |
| | 40.66157756 | -84.22340944 | No | |
| | 40.66153018 | -84.22297039 | No | |
| | 40.66152235 | -84.22349032 | No | |
| | 40.66145767 | -84.21640394 | No | |
| 34L1-1 | 40.66157713 | -84.2233315 | Yes | Horizontal anomaly target associated with 34L. Potholed to 8 ft. |
| 34L1-2 | 40.66157256 | -84.2230731 | Yes | Horizontal anomaly target associated with 34L. Potholed to 8 ft. |
| 34L1-3 | 40.66157141 | -84.22287588 | Yes | Horizontal anomaly target associated with 34L. Potholed to 8 ft. |
| 34L1-4 | 40.66156684 | -84.22262605 | Yes | Horizontal anomaly target associated with 34L near 34. Potholed to 8 ft.; trenched N and S 4 ft to a depth of 4 ft. |
| 34L2-1 | 40.66151768 | -84.22332693 | Yes | Horizontal anomaly target associated with 34L. Potholed to 8 ft. |
| 34L2-2 | 40.66152225 | -84.22317886 | Yes | Horizontal anomaly target associated with 34L. Potholed to 8 ft. |


© 2021 Kleinfelder

**Table 2. (Continued) Coordinates for Anomalies Identified as Possible Horizontal Infrastructure**

| Anomaly ID | Digitized Points* (Northing) | Digitized Points* (Easting) | Potholed (Y/N) | Notes |
|---|---|---|---|---|
| 34L2-3 | 40.66152797 | -84.22298735 | Yes | Horizontal anomaly target associated with 34L. Potholed to 8 ft. |
| 34A | 40.66151243 | -84.22257383 | No | |
| 34B | 40.661516 | -84.22001649 | No | |
| 34p-2 | 40.66149369 | -84.22059781 | Yes | Horizontal anomaly target associated with 34 L near 34B. Trenched N and S of anomaly coordinate 5 and 6 ft, respectively, to depths of 10 ft and 8 ft, respectively. |
| 34C | 40.6615147 | -84.22001754 | No | |
| 34D | 40.66148257 | -84.21836289 | No | |
| 62L | 40.67879668 | -84.2255121 | No | |
| | 40.67880271 | -84.22451612 | No | |
| 67A | 40.68231337 | -84.22216837 | No | |
| 67B | 40.6822913 | -84.22146285 | No | |
| 80A | 40.67215473 | -84.18511428 | No | |
| | 40.67217125 | -84.1851619 | No | |
| | 40.67212073 | -84.18518938 | No | |
| 80B | 40.67235095 | -84.18529883 | No | |
| | 40.67238046 | -84.18578819 | No | |
| | 40.67237751 | -84.18553947 | No | |
| 80C | 40.67238175 | -84.1858954 | No | |
| | 40.67241231 | -84.18580164 | No | |
| | 40.6724169 | -84.18561512 | No | |
| 88L | 40.66362447 | -84.18842974 | No | |
| | 40.66403004 | -84.18843255 | No | |
| | 40.66383847 | -84.18841666 | No | |
| | 40.66411933 | -84.18841647 | No | |
| | 40.6633731 | -84.18845153 | No | |
| | 40.66403277 | -84.18844931 | No | |
| 92L | 40.66832284 | -84.17818413 | No | |
| | 40.66835427 | -84.18191142 | No | |
| 92p-4 | 40.66832768 | -84.1784112 | Yes | Horizontal anomaly target associated with 92L. Potholed to 10 ft; trenched 5 ft N and S to a depth of 8 ft. |
| 100L | 40.65713417 | -84.23140525 | No | |
| 100L | 40.65697707 | -84.23111995 | No | |
| 100L | 40.65719752 | -84.21640961 | No | |


© 2021 Kleinfelder

**Table 2. (Continued) Coordinates for Anomalies Identified as Possible Horizontal Infrastructure**

| Anomaly ID | Digitized Points* (Northing) | Digitized Points* (Easting) | Potholed (Y/N) | Notes |
|---|---|---|---|---|
| | 40.6572541 | -84.21640603 | No | |
| 98-102 pipes | 40.65701431 | -84.2297174 | Yes | Horizontal anomaly target associated with 100L near anomaly cluster 101A, B, and C. Potholed to 8 ft. |
| 98-102 pipes | 40.65707866 | -84.22582879 | Yes | Horizontal anomaly target associated with 100L near anomaly 99. Potholed to 8 ft. |
| 98-102 pipes | 40.65708785 | -84.22160003 | Yes | Horizontal anomaly target associated with 100L east of anomaly 98. 3 total holes, 8 ft ea.; 1, 2 ft N of target; 1, 2 ft S of target. Trenched between each, then extending a total of 5 ft N of initial target. |
| 106L | 40.67118088 | -84.22571065 | No | |
| | 40.67036448 | -84.22546933 | No | |
| | 40.66801331 | -84.22585659 | No | |
| | 40.66856324 | 84.22582105 | No | |
| | 40.66793685 | -84.22570141 | No | |
| | 40.66787027 | -84.22549187 | No | |
| 106p-1 | 40.66862953 | -84.22548447 | Yes | Horizontal anomaly associated with 106L. Potholed to 10 ft; trenched 4 ft E and W to a depth of 8 ft. |
| 107L | 40.66788356 | -84.2292237 | No | |
| | 40.66808301 | -84.22922339 | No | |

* Digitized points represent endpoint or inflection point coordinates for horizontal anomalies identified during the EM evaluation. Potholed locations were provided as target locations along the horizontal anomalies to verify the presence of horizontal features such as metallic piping.


© 2021 Kleinfelder

KLEINFELDER

Bright People. Right Solutions.

# Appendix A

# APPENDIX A

# ROUND ROCK GEOPHYSICS REPORT – LOCATION OF WELLS AND ASSOCIATED STRUCTURES USING EM61, BIRCH SOLAR PROJECT


© 2021 Kleinfelder

# Location of Wells and Associated Structures Using EM61

# Birch Solar Project

## Kleinfelder Project No: 20211357

**Prepared for: Kleinfelder, Inc.**

**Prepared by:**
Round Rock Geophysics, LLC
1803 County Road 140
Georgetown, TX 78626

File 20KL09
April 20, 2021
Updated on July 2, 2021

Copyright: Round Rock Geophysics, LLC

File 20KL09
April 20, 2021
Updated on September 24, 2021.

Terry Jennings
Project Manager

707 17th Street, Suite 3000
Denver, CO 80202
o| 303.297.5665
m| 720.244.8266

Re: Geophysical Evaluation Results
Birch Solar Project
Lima, OH

Dear Mr. Jennings,

In this report. We summarize the results of the geophysical evaluation conducted by Round Rock Geophysics, LLC as part of the subject project, in the Lima, OH area. The specific scope of the geophysical evaluation is described within this summary report.

## Introduction

The primary challenges to locating abandoned wells is the significant uncertainty of the location information from the available GPS coordinates. They are usually covered below the ground surface and therefore impossible to locate by visual observation or similar means. The search and location of these wells depend on non-invasive geophysical methods that detect the physical characteristics of them in an economically viable way.

Round Rock Geophysics was requested by Kleinfelder to locate inactive oil wells located throughout the project site using the appropriate geophysical method. On top of this, the location of the associated possible utility pipelines was added to the scope. For this, EM-61 Electromagnetic evaluation method was chosen considering the nature of the site and the expected responses of the wells and associated utility pipelines.

The evaluation covers around an area of about 2,000 acres on the Southwest boundary of the city of Lima, Ohio. The specific project site is shown in Figure 1. It is comprised predominantly of agricultural lands adjacent to the city.

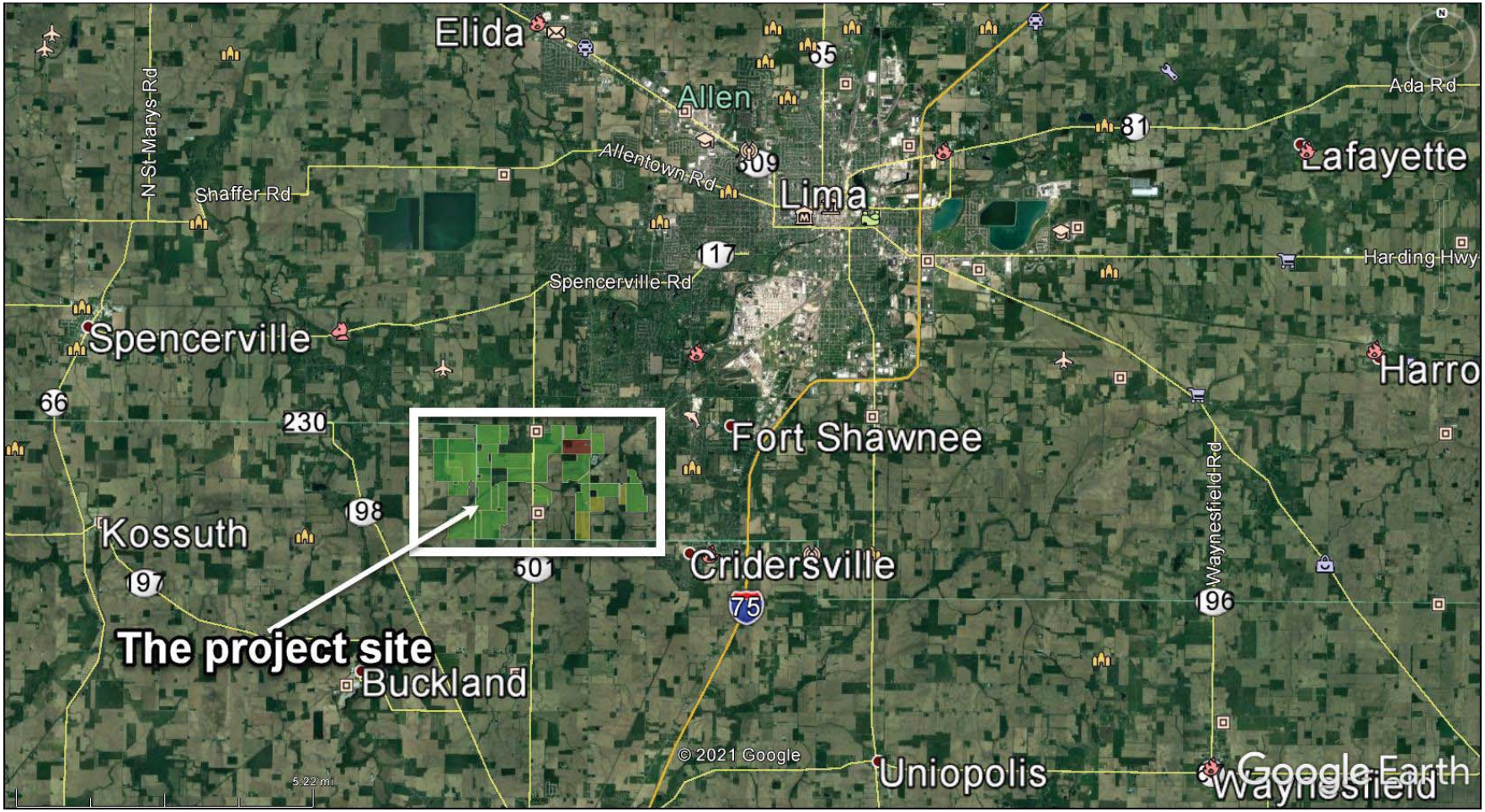



**Figure 1: The project site and the surrounding areas.**

## Objective

The objective of the geophysical evaluation was to detect, and if detected, to locate wells and associated utility pipelines.

## The Evaluation

Geophysicists from Round Rock Geophysics were able to conduct the field operations that took place from October 20, 2020, through April 12, 2021. The project was coordinated by Dr. Bereket M. Derie who was also present in most of the field data collection activities.

The geophysical evaluation was conducted using EM61 equipment manufactured by Geonics (www.Geonics.com). The field data was acquired at approximately 8-inch intervals along lines about 5 feet apart whenever possible.

## Geophysical Data Collection

The EM61 is a time-domain electromagnetic induction type instrument designed specifically for detecting buried metal objects. An air-cored 1-meter by 0.5-meter transmitter coil generates a pulsed primary magnetic field in the ground, thereby inducing eddy currents in nearby metal objects. The decay of the eddy current produces a secondary magnetic field that is sensed by the receiver coil.
By measuring the secondary magnetic field after the current in the ground has dissipated, but before the current in target metal objects has completely decayed, the instrument responds only to the secondary magnetic field produced by metal objects. Four channels of secondary response are measured in mV and are recorded on a digital data logger. The channels associated with the early time gates are more sensitive to shallower objects while the channels associated with the late time gates are mainly associated to deeper objects.

The Geonics EM61-MK2 time domain electromagnetic tool was towed by an ATV attached with a square fiberglass tube approximately eight feet behind the vehicle. Traverses were established by a A325 GNSS Smart Antenna GPS unit with a base station and rover components. Real time DGPS corrections were made using the data sent by the base station via radio transmission. Data was collected as unreferenced coordinate system in decimal degrees. Projection of the GPS data

was performed as part of the post processing procedure. Field data was collected along grids spaced at approximately 5-ft. The four-channel electromagnetic data and the corresponding GPS coordinates were stored in an Archer hand-held computer.

**Figure 2: EM61 Equipment setup used at the site.**

**Site Conditions**

A significant number of interferences to the geophysical evaluation existed in the site. Natural barriers included vegetation, marshes, muddy areas and trees. Interferences that would affect instrument readings were such as above ground high tension towers/lines, utility lines and random metal scraps.

## Data Collection Procedures

The following specific QA activities apply to the implementation of the data collection procedures:

1. Perform the “null” of the instrument with each use to monitor instrument performance, the condition of the instrument battery, and setting the zero level or “null” of the instrument. Each evaluation location is noted in a logbook and the null was repeated once a day during the evaluation.
2. Calibration run was performed over known objects at the beginning of each evaluation.
3. All raw data files were maintained electronically in the project-specific folder and transmitted to our head office in Texas.
4. Each raw data was checked for quality at the end of each evaluation date. Noisy data or ambiguous anomaly indications were repeated the next day.
5. Once data collection of a specific location is completed satisfactorily, data processing was started.
6. The processed results and their interpretation were sent to the client in an image (jpeg) and kmz formats.
7. Final results were shared with the client as .shp or .dwg formats for integration with other project-related information.

## Data Validation

Data collected by the EM61-MK2 was formally validated. Data validation was performed continually on a qualitative basis by the field geophysicist in the field. The presentation of the data either in profile or contour form is peer reviewed prior to release of the data to the client.

## M61 Data Processing Procedures and File Naming Convention

EM-61 data were processed using the Geonics Dat-61MK-2 software package, Golden Software's Surfer 7.0 mapping and contouring package, and Corpscon V6.0 from the U.S. Army Corps of Engineers. EM-61 data processing flow and associated file suffix identifiers went as follows:

Once the final ".dat" file was created, the data were gridded and color-contoured in Surfer 7.0 using the following parameters:

- Kriging contour method
- Variable cell size
- variable search radius
- Custom made color level file named "EM61-ch3.lvl"

**Data Interpretation Procedures**

Data interpretation for anomaly locations involved:

1. Establishing baseline values for anomaly identification
2. Identifying anomalies for further investigation
3. Categorizing these anomalies into possible wells, pipes and scrap metals

The first step was to determine the criteria for an anomaly to be picked for further investigation for each evaluation dataset that was acquired. This step involved a thorough review of all data for buried wells and pipes and determination of the characteristic shape and smallest size and amplitude of a given type of anomaly that could be associated with buried target material. These were used to identify potential anomalies in the data. A summary of the criteria used is as follows:

1. All picks with an amplitude of 30 millivolts or greater above background, and
2. Anomaly dimensions of 5 feet by 5 feet to be covered by at least 2 transect evaluation lines.

Once the criteria for a given anomaly type were identified, the next step was to determine if a potential anomaly could be explained by elimination of any effects by other factors. This step involved the following procedures:

1. Plot the color contour map for the data type and location at the scale of the associated site map,
2. Overlay the color contour map on the associated site map (Google Earth), and
3. Identify anomalies caused by mapped cultural features (noise sources) and eliminate them from the anomaly list. "Pick" all remaining anomalies for further investigation (if needed)

Some example results are presented below for selected well locations. The complete results are presented and shared to the client in ArcView .shp and Google Earth .kmz file formats.

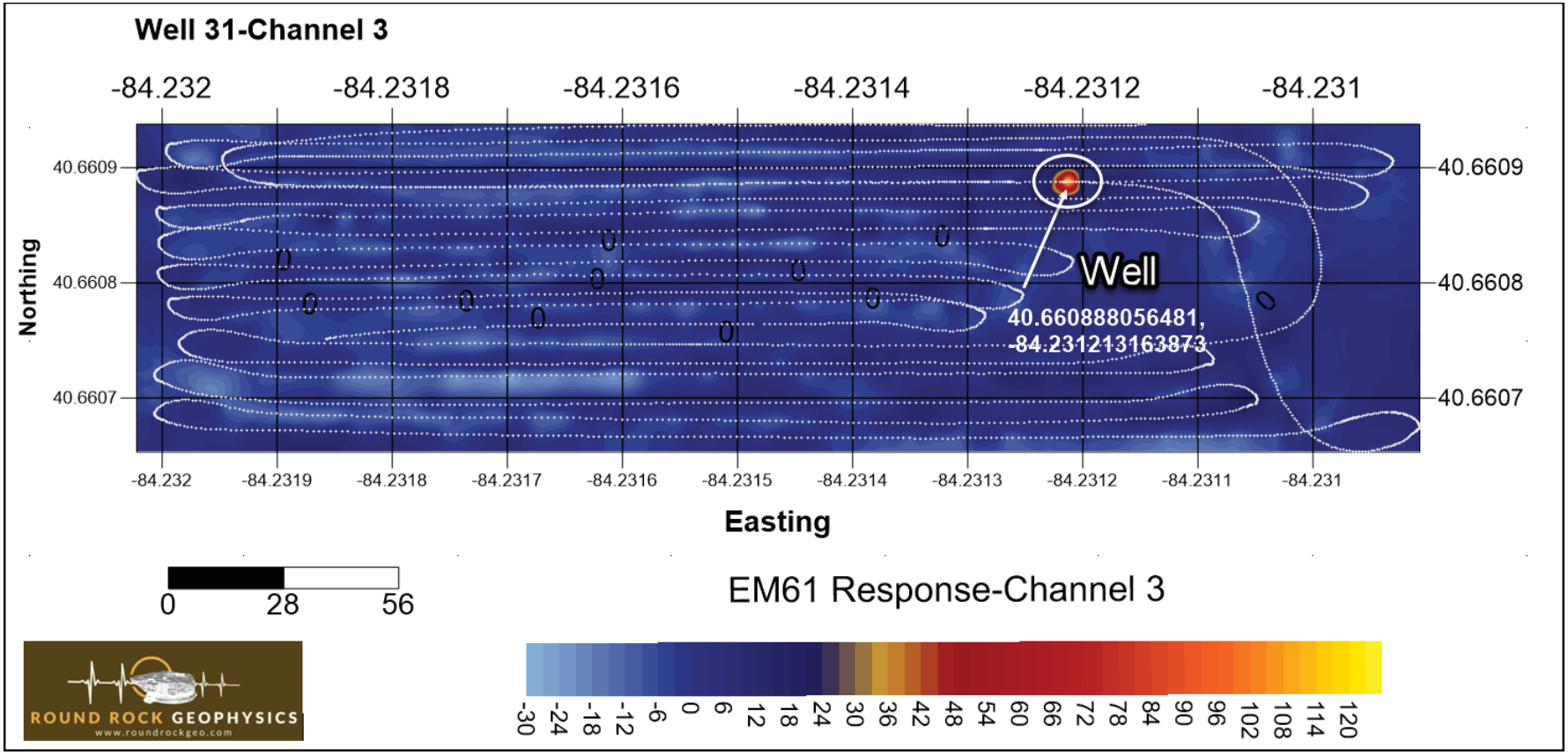



**Figure 3: Example result from the EM61 evaluation.**

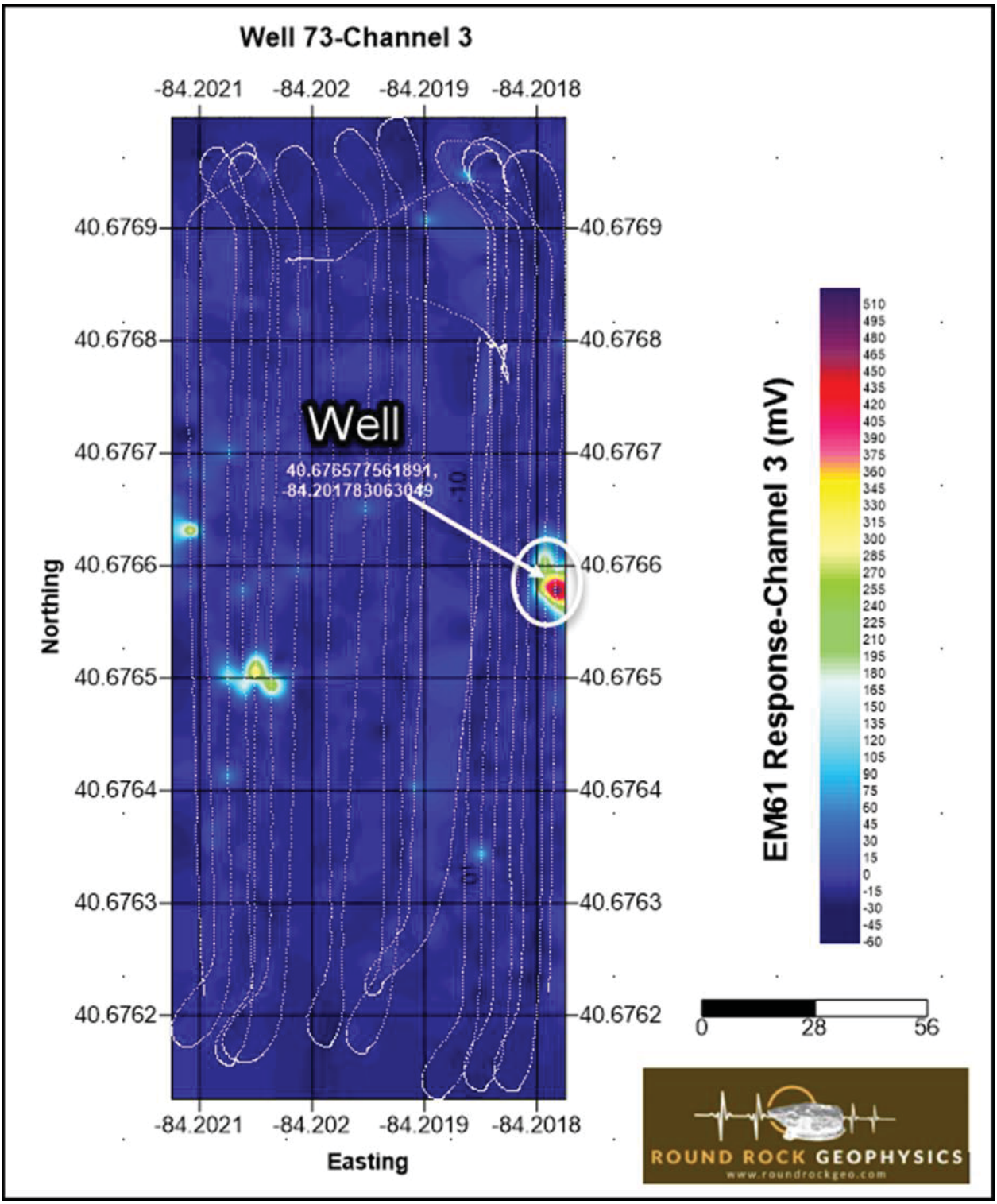



**Figure 4: Example result from the EM61 evaluation.**

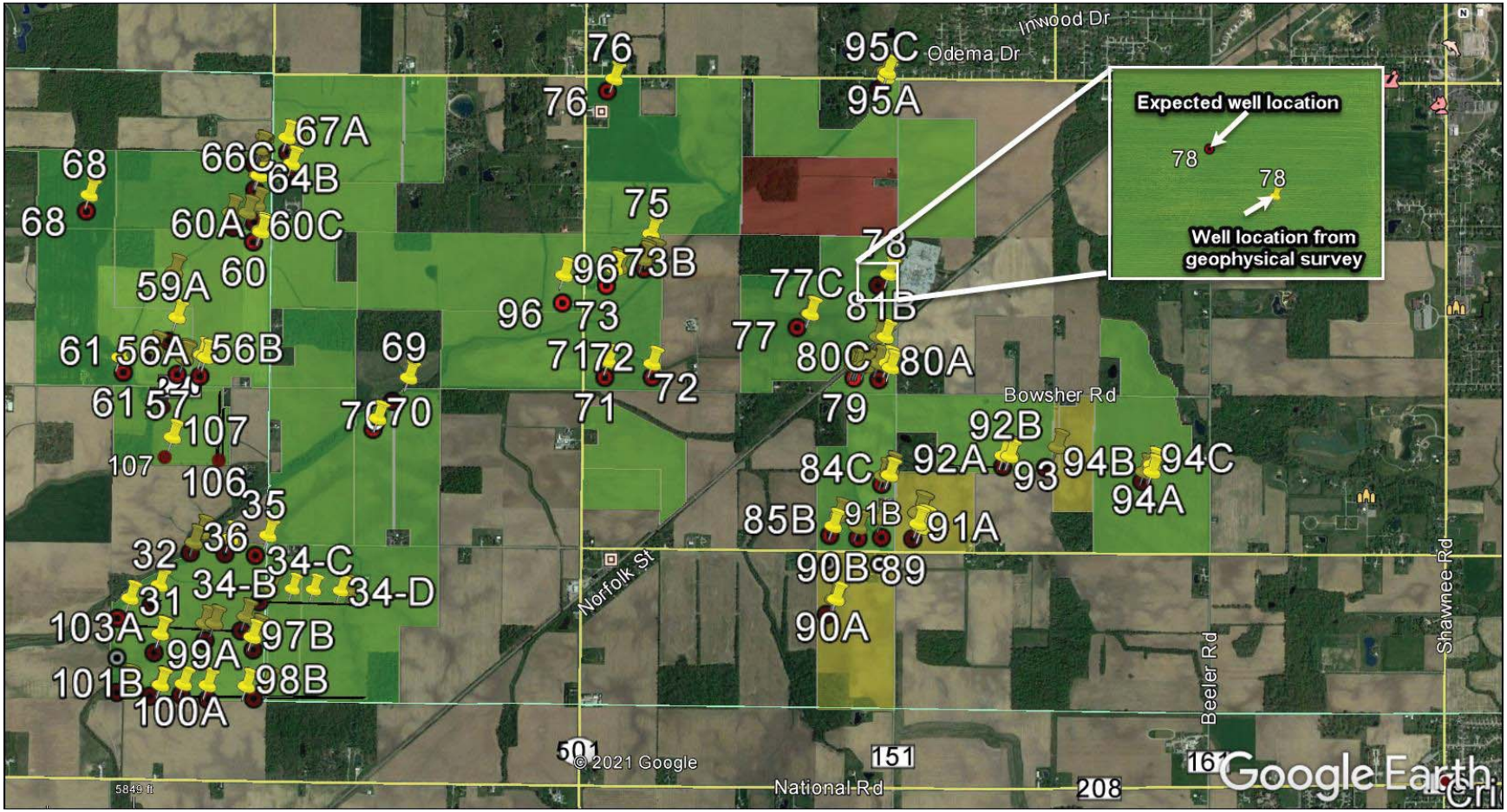



**Figure 5: Results of the EM61 evaluation shown on Google Earth.**

## Conclusions

The final results of the EM61 evaluation covering a total of 72 possible wells and associated pipelines are presented in the following pages. As can be seen from these results, the evaluation methodology and processing procedures were effective in locating anomalies of significant signatures. These anomalies may indicate potential wells with some pieces of metallic pipelines and scraps. The precise identification of wells and associated pipelines by eliminating other sources of anomaly requires additional intrusive investigation efforts such as potholing and excavation.

If any excavations are attempted near anomalies mentioned in this report, it is recommended that initial groundbreaking be conducted outside the anomalous area and slowly moved towards the anomaly. This procedure will reduce unnecessary digging of larger area and the probability of missing the target.

## Limitations of the Geophysics Evaluation

ROUND ROCK GEOPHYSICS, LLC MAKES NO GUARANTEE THAT ALL SUBSURFACE TARGETS OF INTEREST WERE DETECTED IN THIS EVALUATION. DESPITE ALL THE EFFORTS, WE CANNOT GUARANTEE THAT ALL OF THE ANOMLIES INTERPRETETD TO BE WELLS AND PIPES CANNOT BE ANYTHING DIFFERENT. SOME ANOMALIES MAY HAVE SIMILAR GEOPHYSICAL SIGNATURES AS THE TARGETS.

ALL THE NECESSARY EFFORTS WERE MADE TO PROVIDE PRECISE LOCATIONS INFORMATION. WE CANNOT GUARANTEE ANY ERRORS INTRODUCED DURING THE PROJECTION OR RE-PROJECTION OF THE DATA TO OTHER COORDINATE SYSTEMS AND DATUMS.

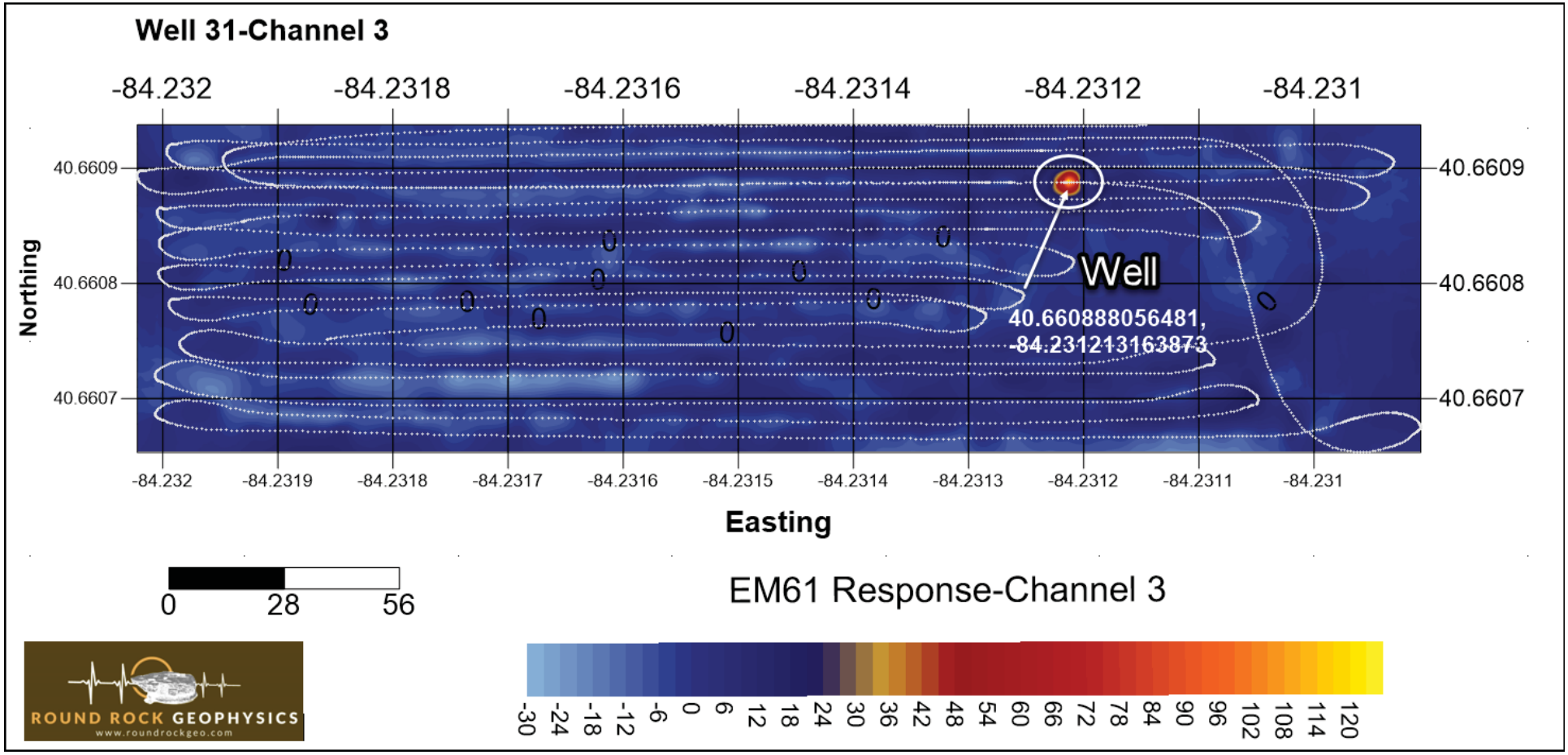
# RESULTS

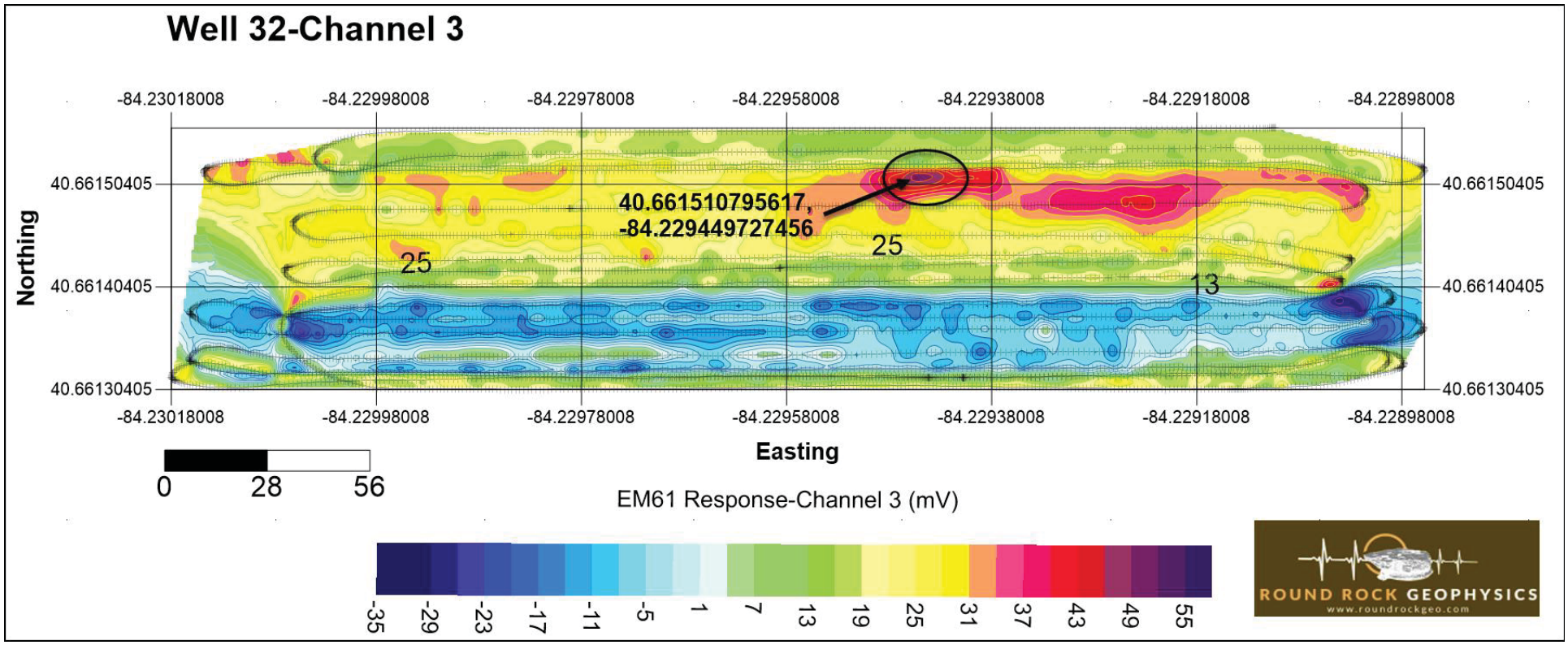
**The following results are reported as separate files:**

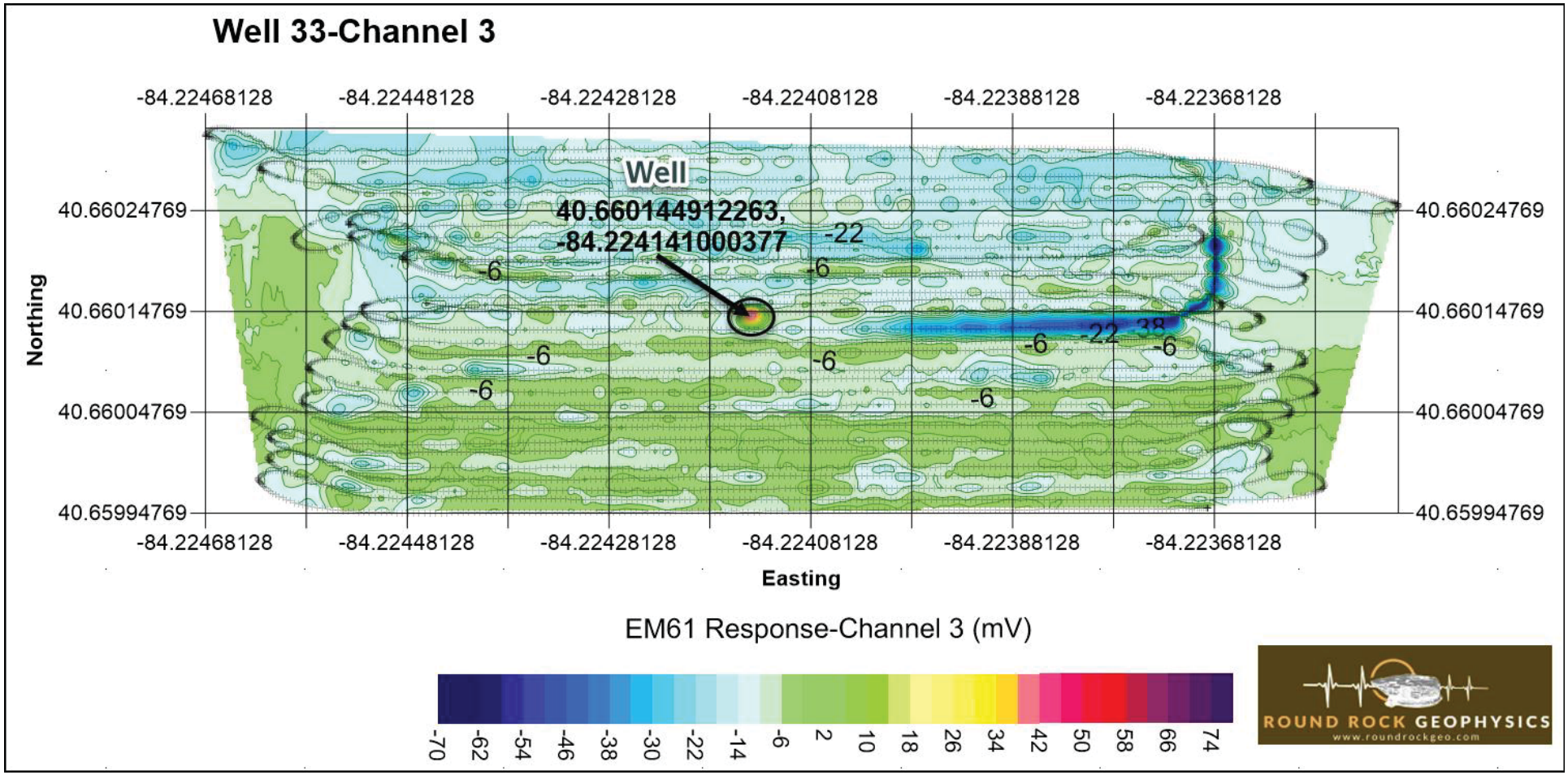
1. **Google Earth "kmz" files showing possible locations of pipelines, the expected locations of wells and their actual locations as indicated by the geophysics evaluation.**

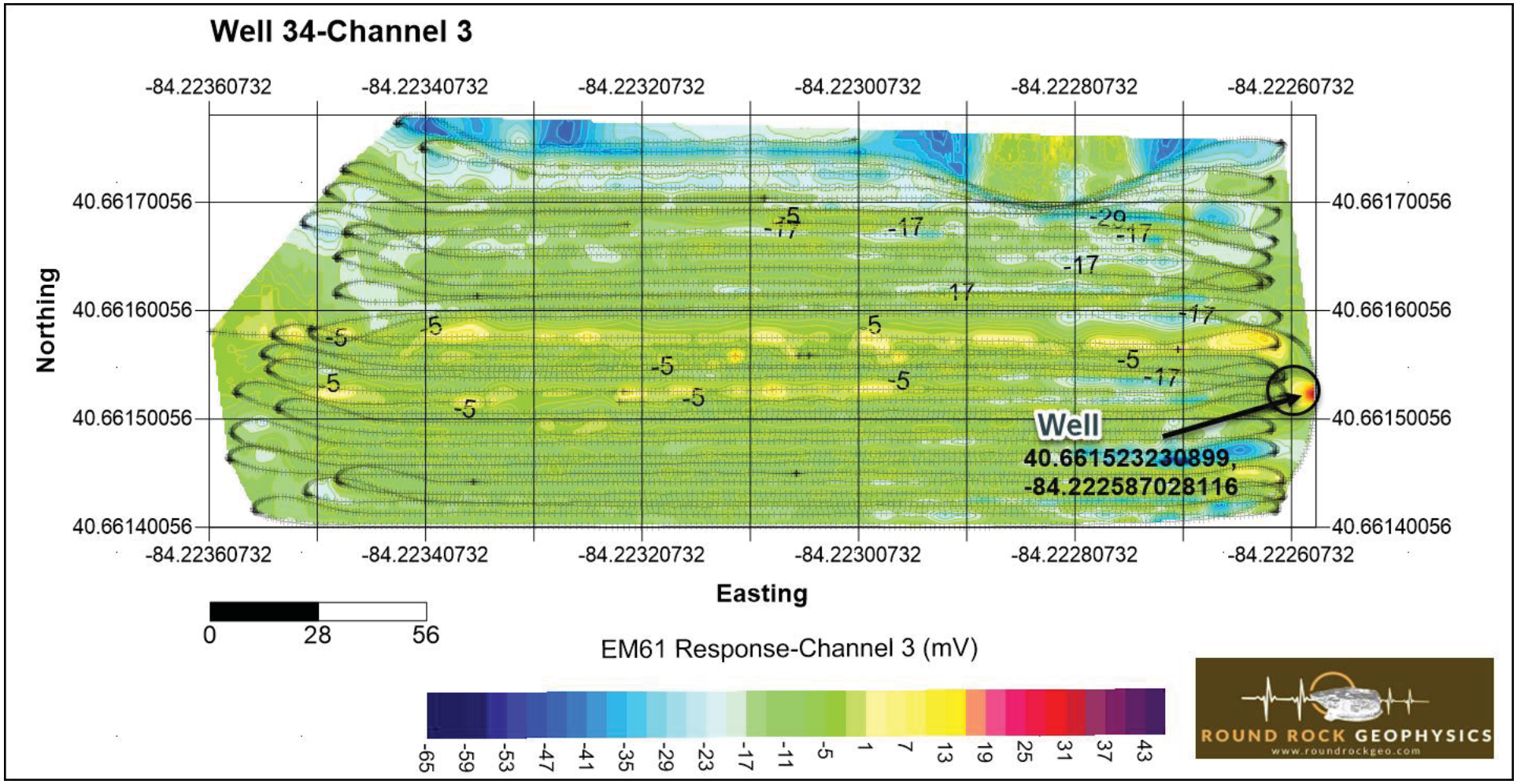
2. **The locations of wells as indicated by the geophysics evaluation and geophysical transect evaluation paths exported as ArcView .shp files.**

3. **Excel Spreadsheet with anomaly coordinates indicating the presence of possible wells and pipelines as indicated by the geophysics evaluation.**

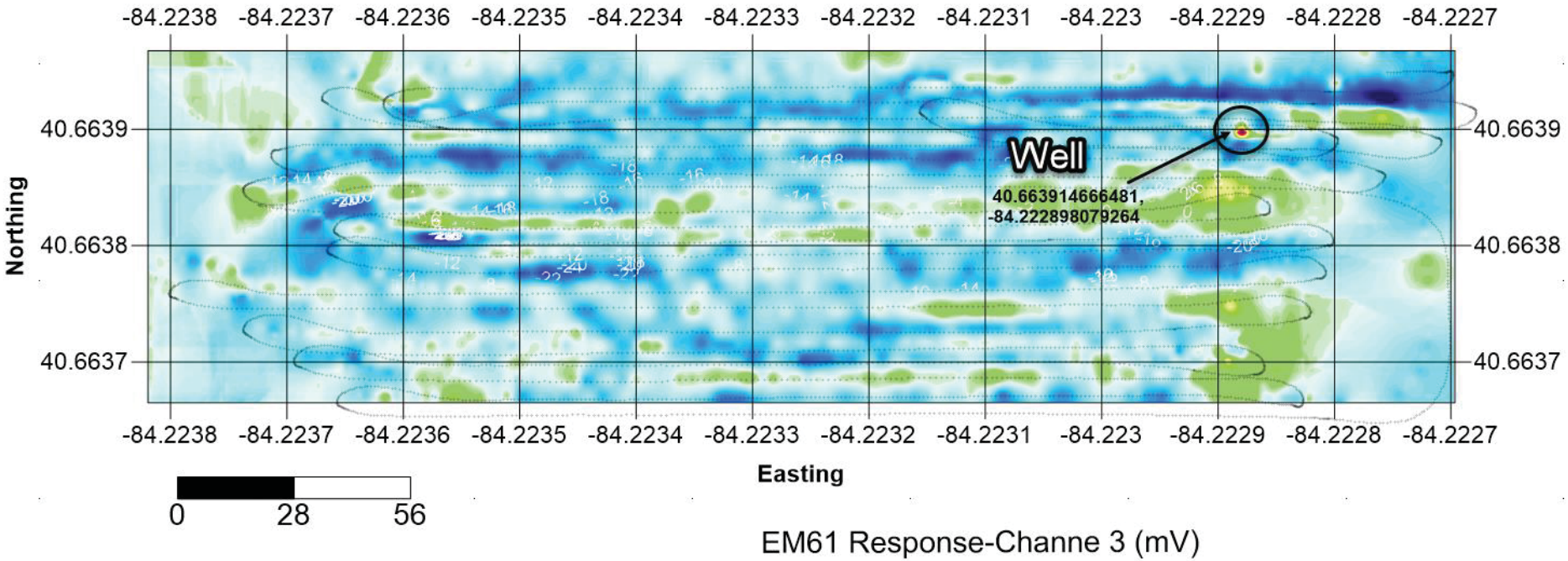

Well 31-Channel 3
-84.232
-84.2318
-84.2316
-84.2314
-84.2312
-84.231
40.6609
40.6608
40.6607
Northing
Well
40.660888056481,
-84.231213163873
-84.232
-84.2319
-84.2318
-84.2317
-84.2316
-84.2315
-84.2314
-84.2313
-84.2312
-84.2311
-84.231
Easting
0
28
56
EM61 Response-Channel 3
-30
-24
-18
-12
-6
0
6
12
18
24
30
36
42
48
54
60
66
72
78
84
90
96
102
108
114
120
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com


Well 32-Channel 3
-84.23018008
-84.22998008
-84.22978008
-84.22958008
-84.22938008
-84.22918008
-84.22898008
40.66150405
40.66140405
40.66130405
Northing
Easting
40.661510795617,
-84.229449727456
25
25
13
0
28
56
EM61 Response-Channel 3 (mV)
-35
-29
-23
-17
-11
-5
1
7
13
19
25
31
37
43
49
55
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

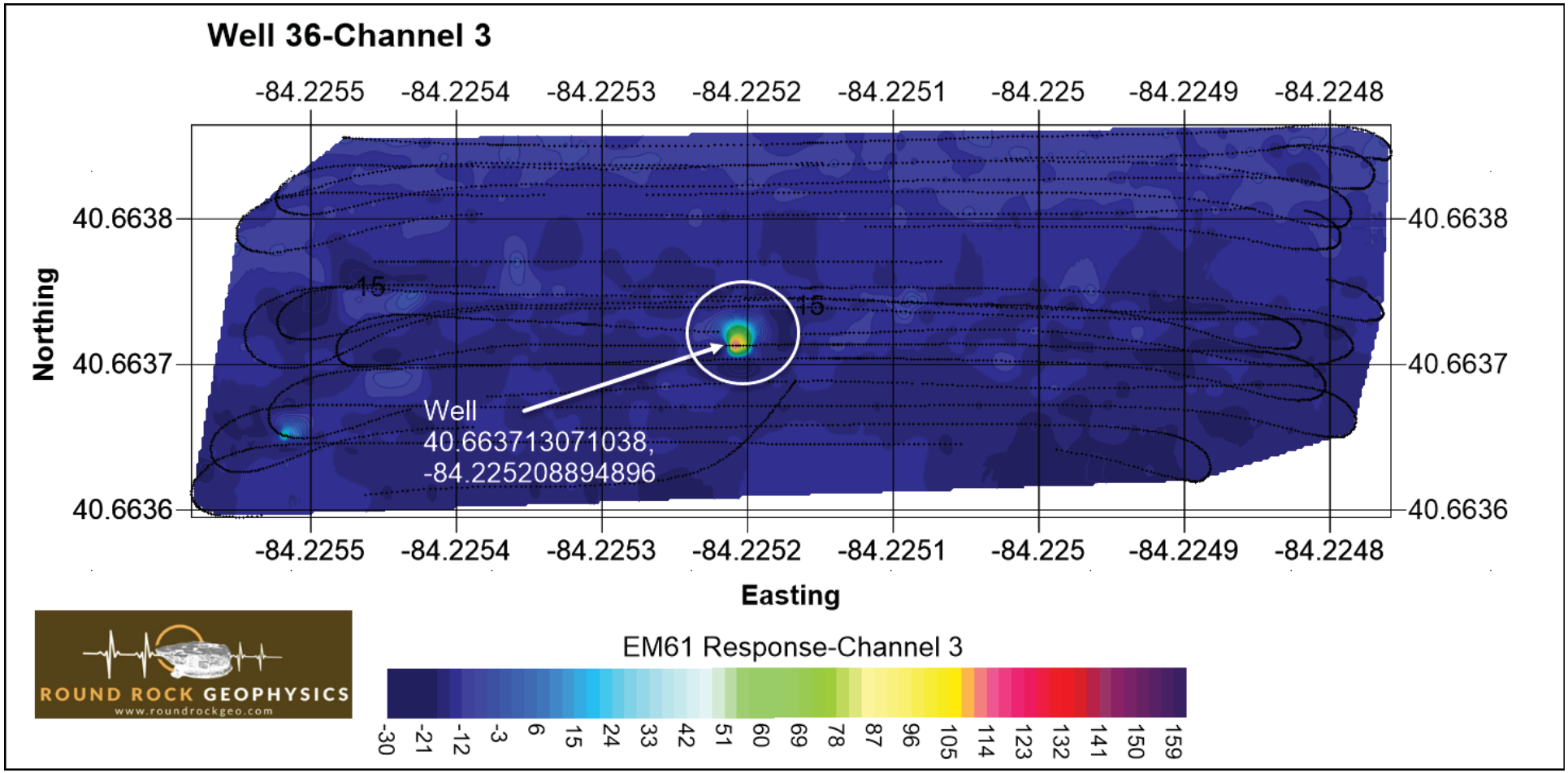

Well 33-Channel 3
-84.22468128
-84.22448128
-84.22428128
-84.22408128
-84.22388128
-84.22368128
Well
40.660144912263,
-84.224141000377
-22
-6
-6
-6
-6
-6
-6
-6
-22
38
-6
40.66024769
40.66014769
40.66004769
40.65994769
Northing
Easting
EM61 Response-Channel 3 (mV)
-70
-62
-54
-46
-38
-30
-22
-14
-6
2
10
18
26
34
42
50
58
66
74
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

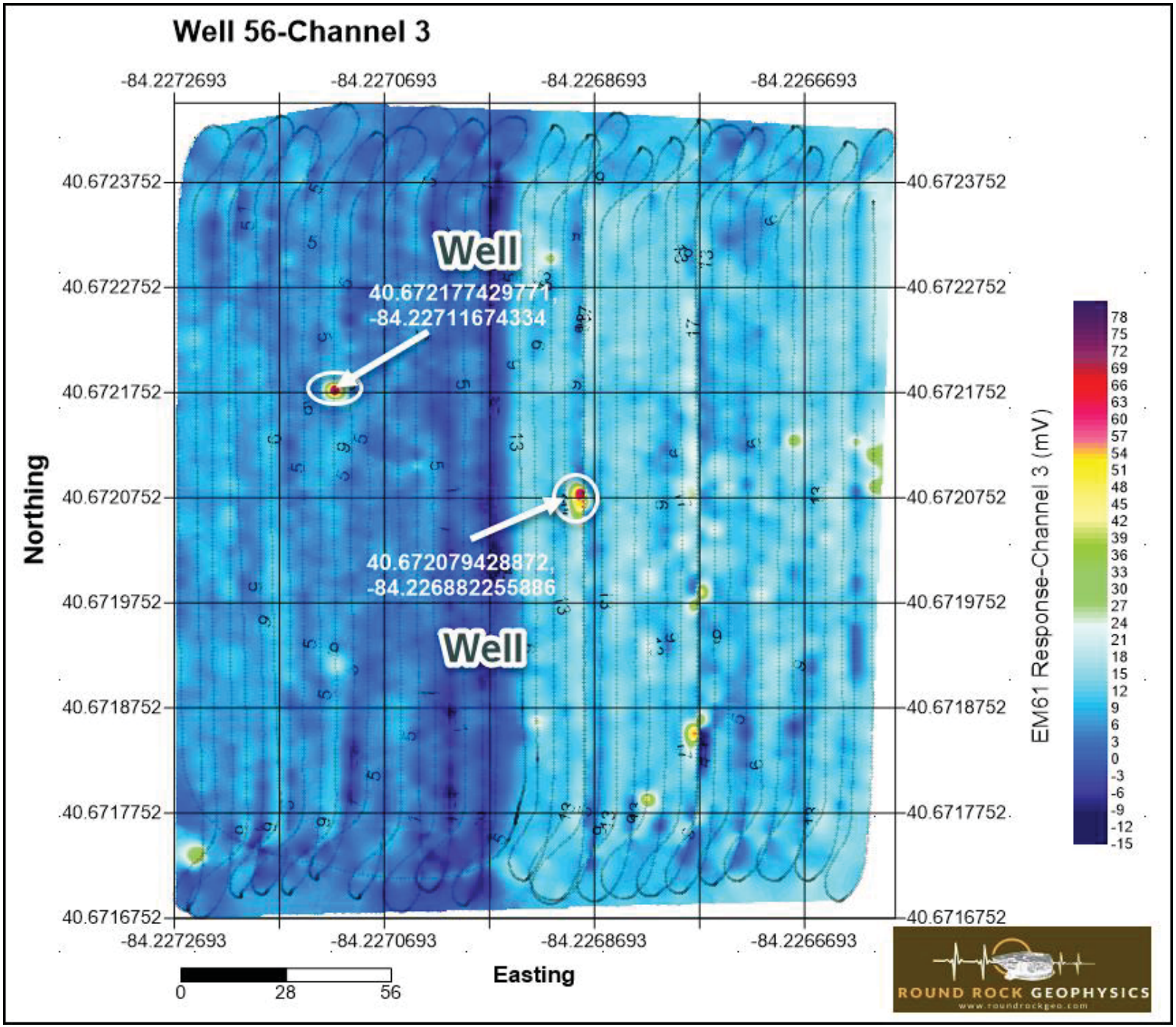

Well 34-Channel 3
-84.22360732
-84.22340732
-84.22320732
-84.22300732
-84.22280732
-84.22260732
40.66170056
40.66160056
40.66150056
40.66140056
Northing
Easting
Well
40.661523230899,
-84.222587028116
0
28
56
EM61 Response-Channel 3 (mV)
-65
-59
-53
-47
-41
-35
-29
-23
-17
-11
-5
1
7
13
19
25
31
37
43
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

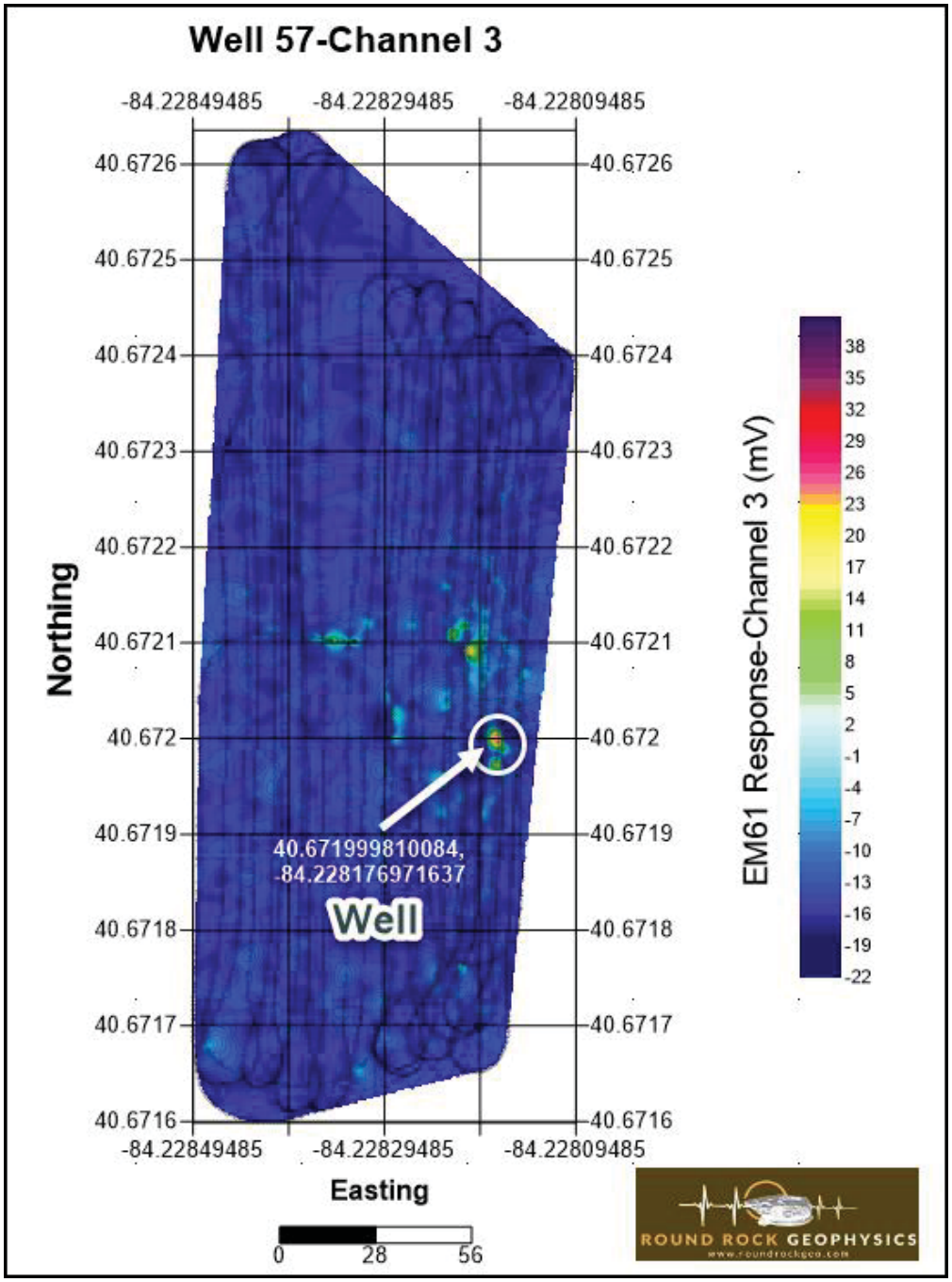
# Well 35-Channel 3

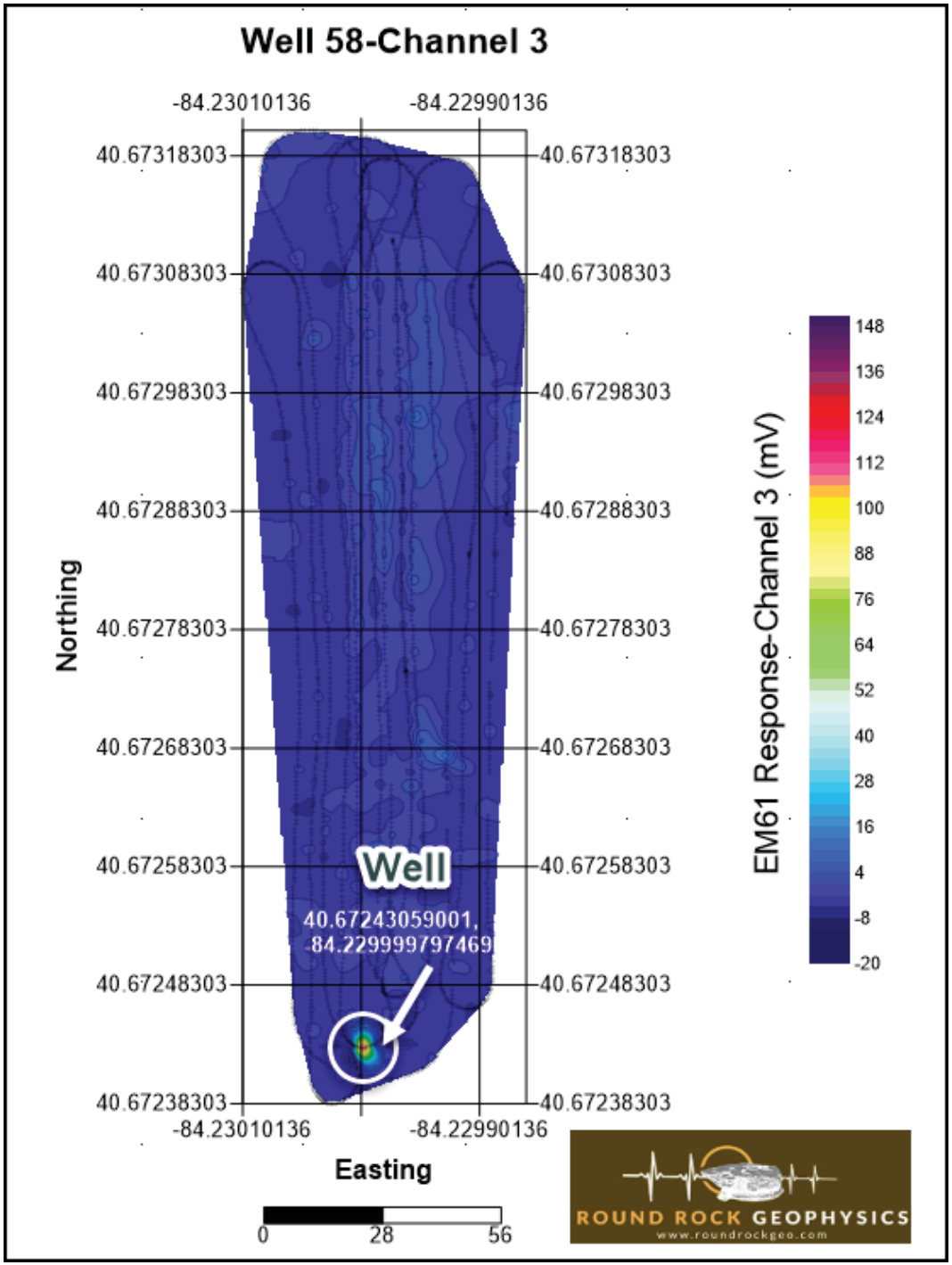



ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

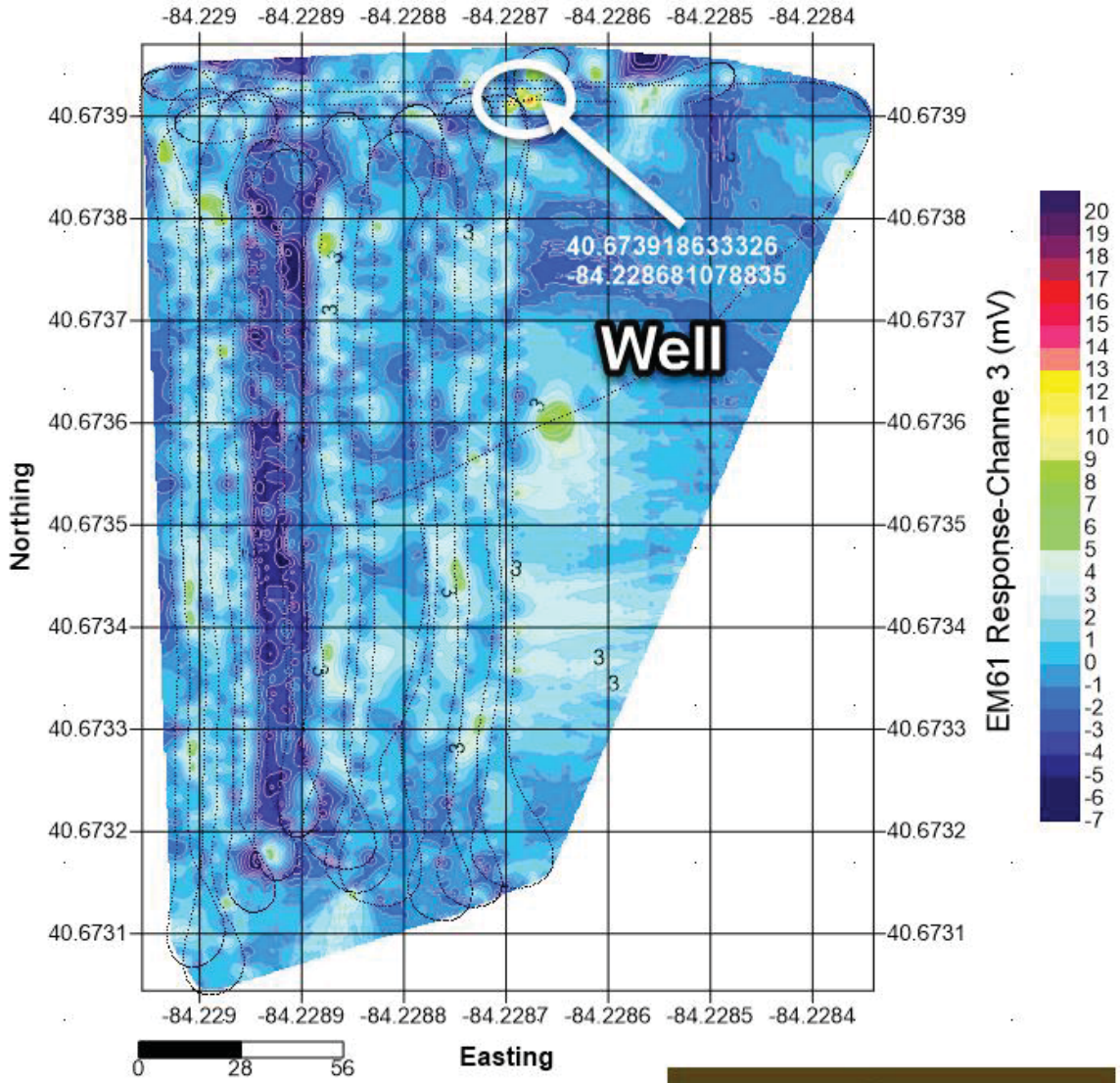

Well 36-Channel 3
-84.2255
-84.2254
-84.2253
-84.2252
-84.2251
-84.225
-84.2249
-84.2248
40.6638
40.6637
40.6636
Northing
Easting
15
15
Well
40.663713071038,
-84.225208894896
EM61 Response-Channel 3
-30
-21
-12
-3
6
15
24
33
42
51
60
69
78
87
96
105
114
123
132
141
150
159
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com


Well 56-Channel 3
-84.2272693
-84.2270693
-84.2268693
-84.2266693
40.6723752
40.6722752
40.6721752
40.6720752
40.6719752
40.6718752
40.6717752
40.6716752
Northing
Easting
Well
40.672177429771,
-84.22711674334
40.672079428872,
-84.226882255886
Well
EM61 Response-Channel 3 (mV)
78
75
72
69
66
63
60
57
54
51
48
45
42
39
36
33
30
27
24
21
18
15
12
9
6
3
0
-3
-6
-9
-12
-15
0
28
56
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

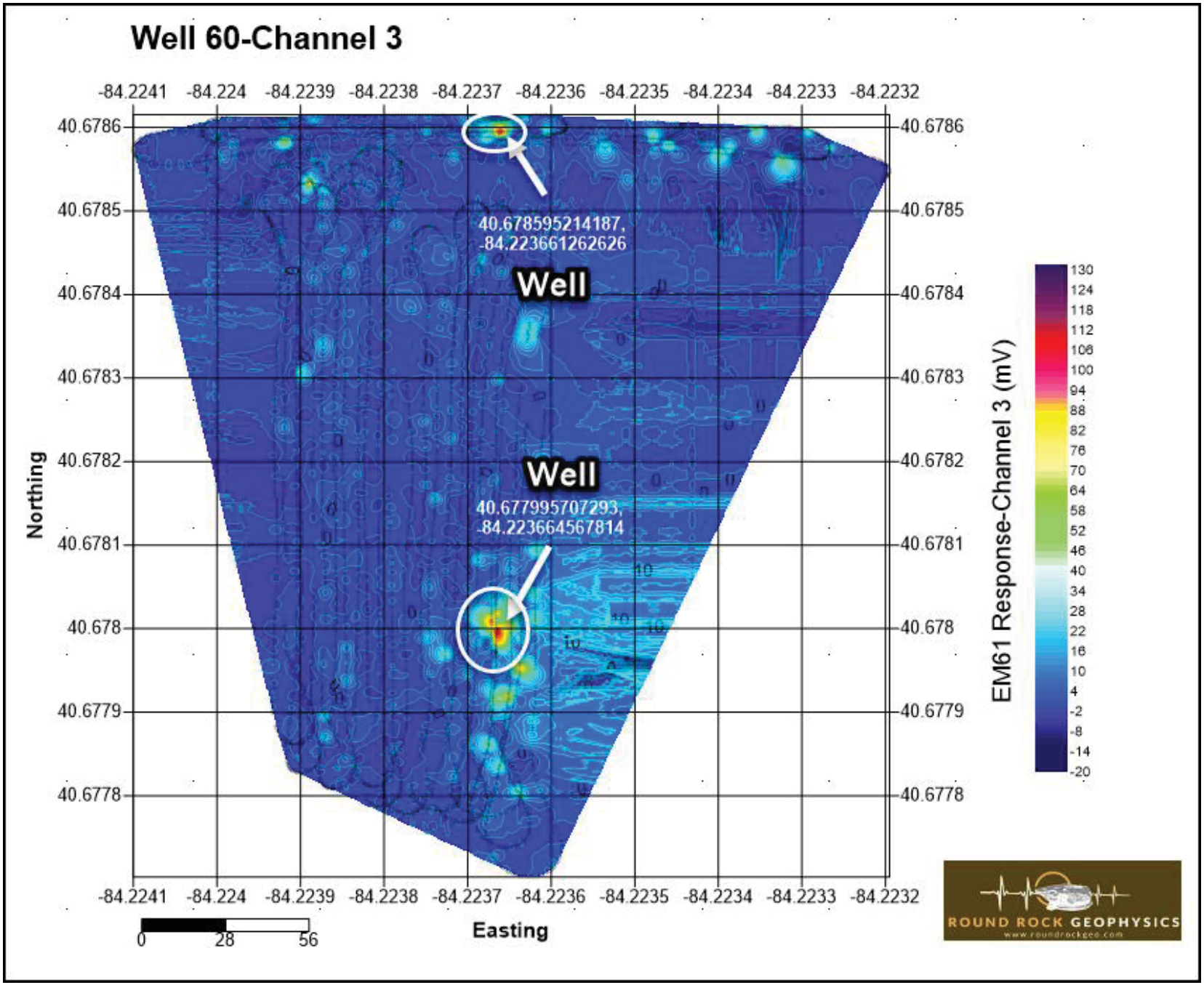

Well 57-Channel 3
-84.22849485
-84.22829485
-84.22809485
40.6726
40.6725
40.6724
40.6723
40.6722
40.6721
40.672
40.6719
40.6718
40.6717
40.6716
Northing
Easting
40.671999810084,
-84.228176971637
Well
EM61 Response-Channel 3 (mV)
38
35
32
29
26
23
20
17
14
11
8
5
2
-1
-4
-7
-10
-13
-16
-19
-22
0
28
56
ROUND ROCK GEOPHYSICS


Well 58-Channel 3
-84.23010136
-84.22990136
40.67318303
40.67308303
40.67298303
40.67288303
40.67278303
40.67268303
40.67258303
40.67248303
40.67238303
Northing
Easting
Well
40.67243059001,
-84.229999797469
EM61 Response-Channel 3 (mV)
148
136
124
112
100
88
76
64
52
40
28
16
4
-8
-20
0
28
56
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

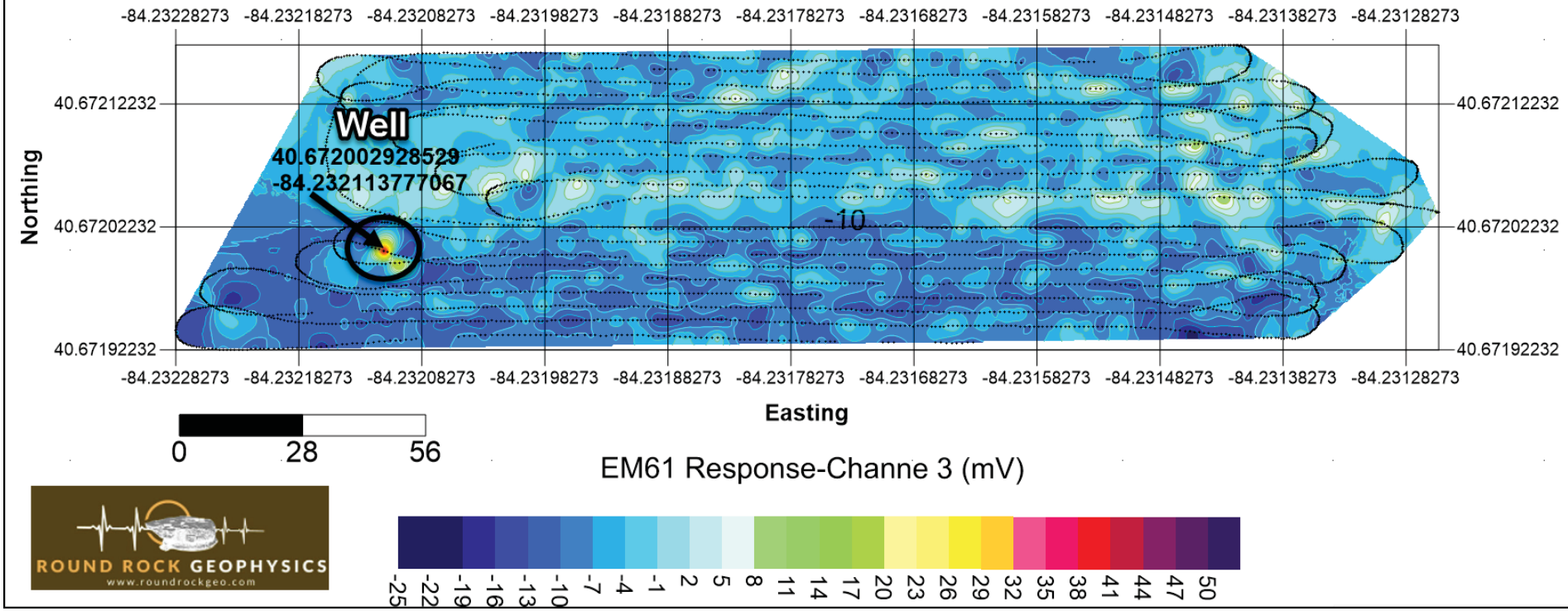
# Well 59-Channel 3



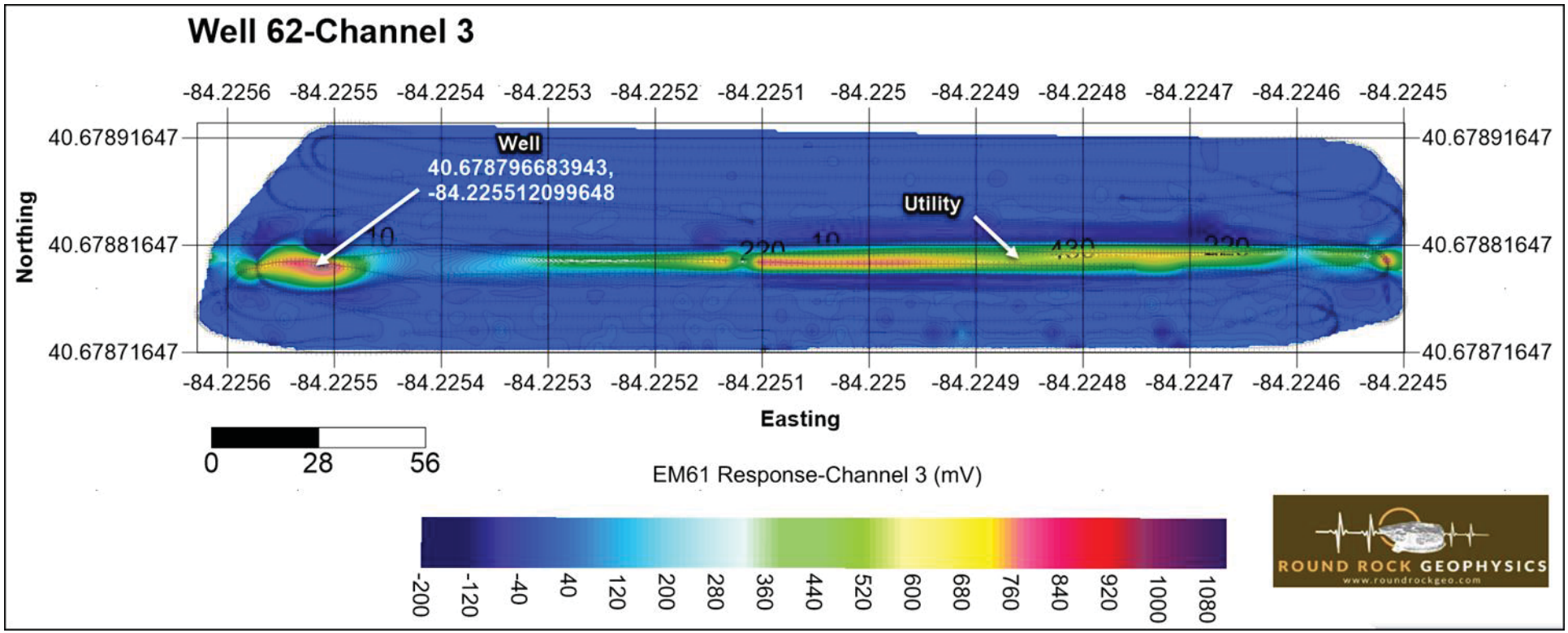

ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

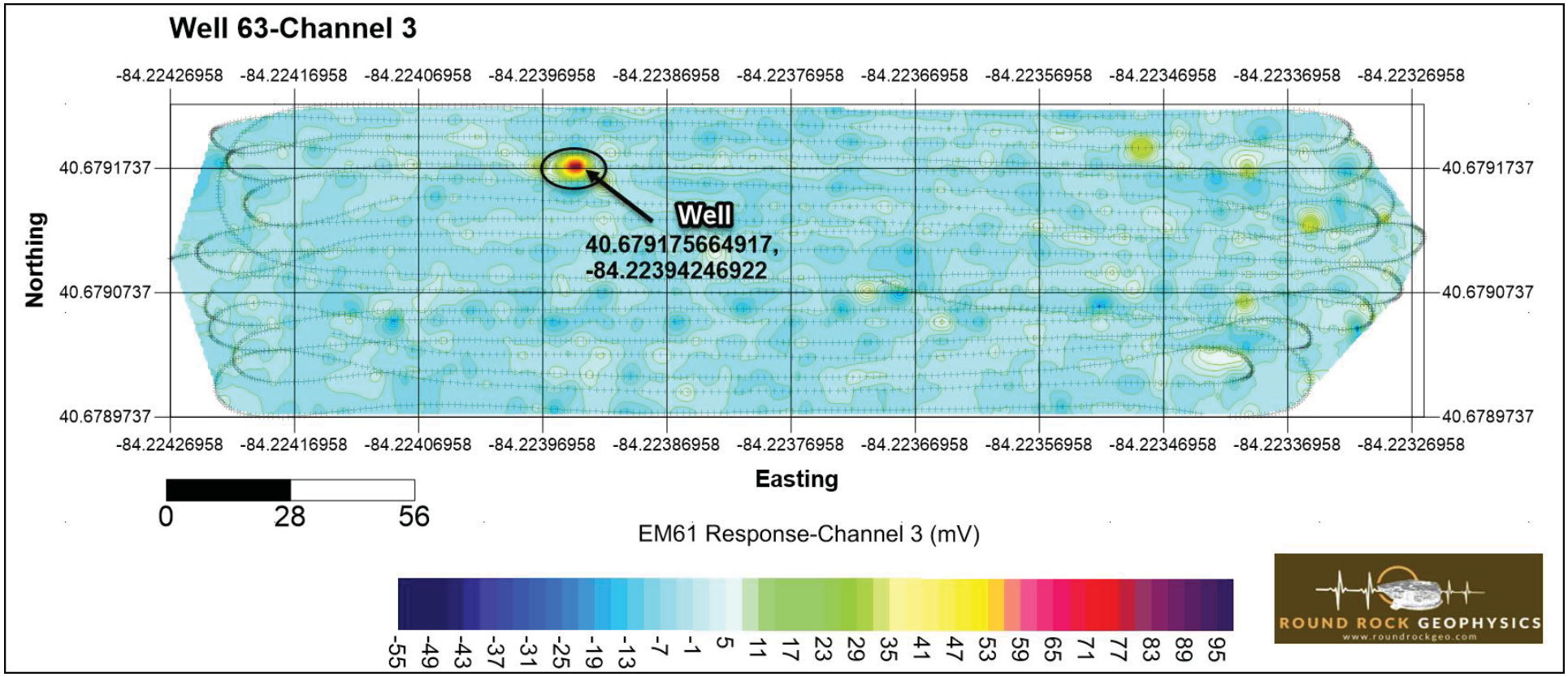

Well 60-Channel 3
-84.2241
-84.224
-84.2239
-84.2238
-84.2237
-84.2236
-84.2235
-84.2234
-84.2233
-84.2232
40.6786
40.6785
40.6784
40.6783
40.6782
40.6781
40.678
40.6779
40.6778
Northing
Easting
40.678595214187,
-84.223661262626
Well
Well
40.677995707293,
-84.223664567814
0
28
56
EM61 Response-Channel 3 (mV)
130
124
118
112
106
100
94
88
82
76
70
64
58
52
46
40
34
28
22
16
10
4
-2
-8
-14
-20
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

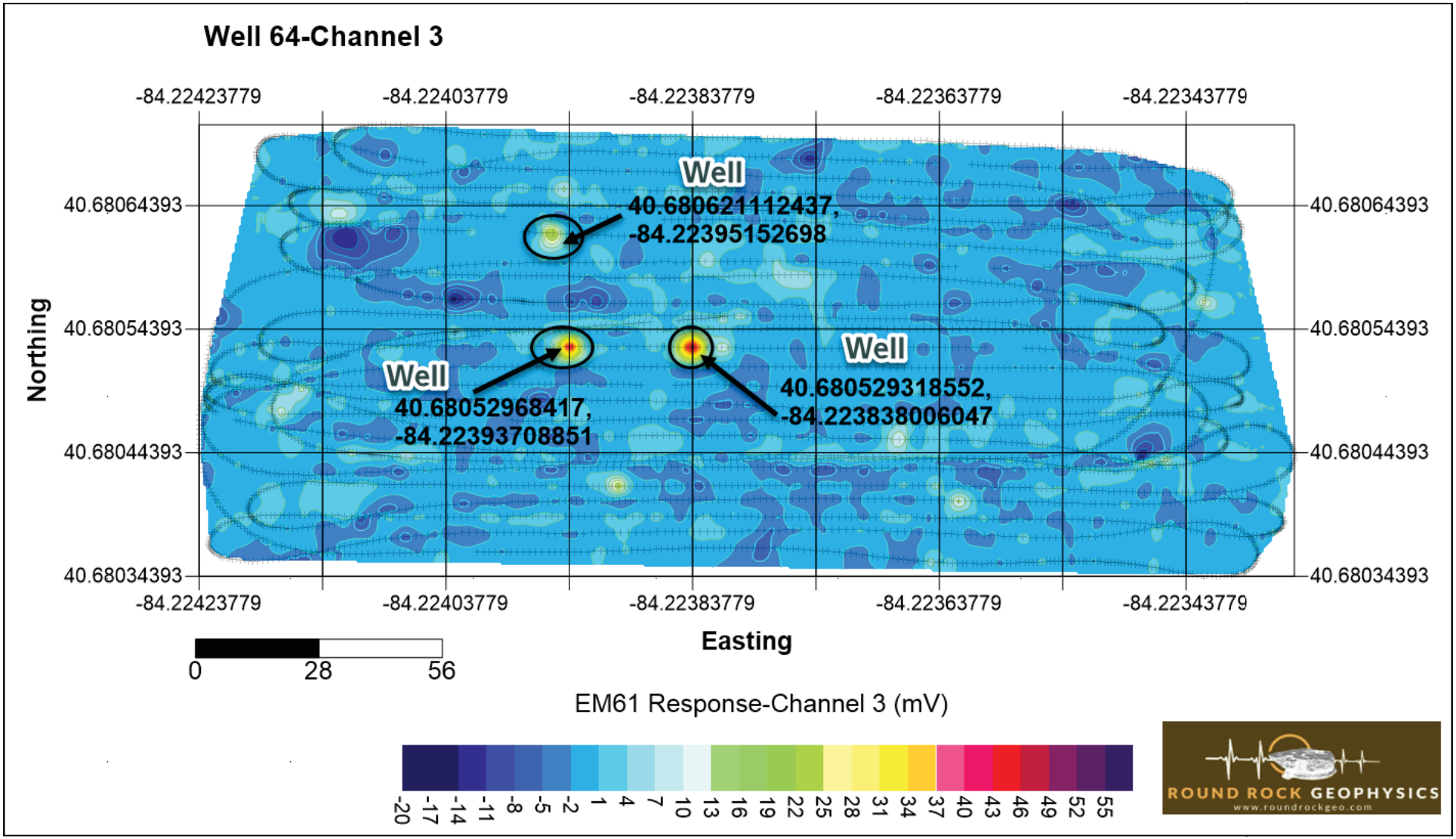
# Well 61-Channel 3

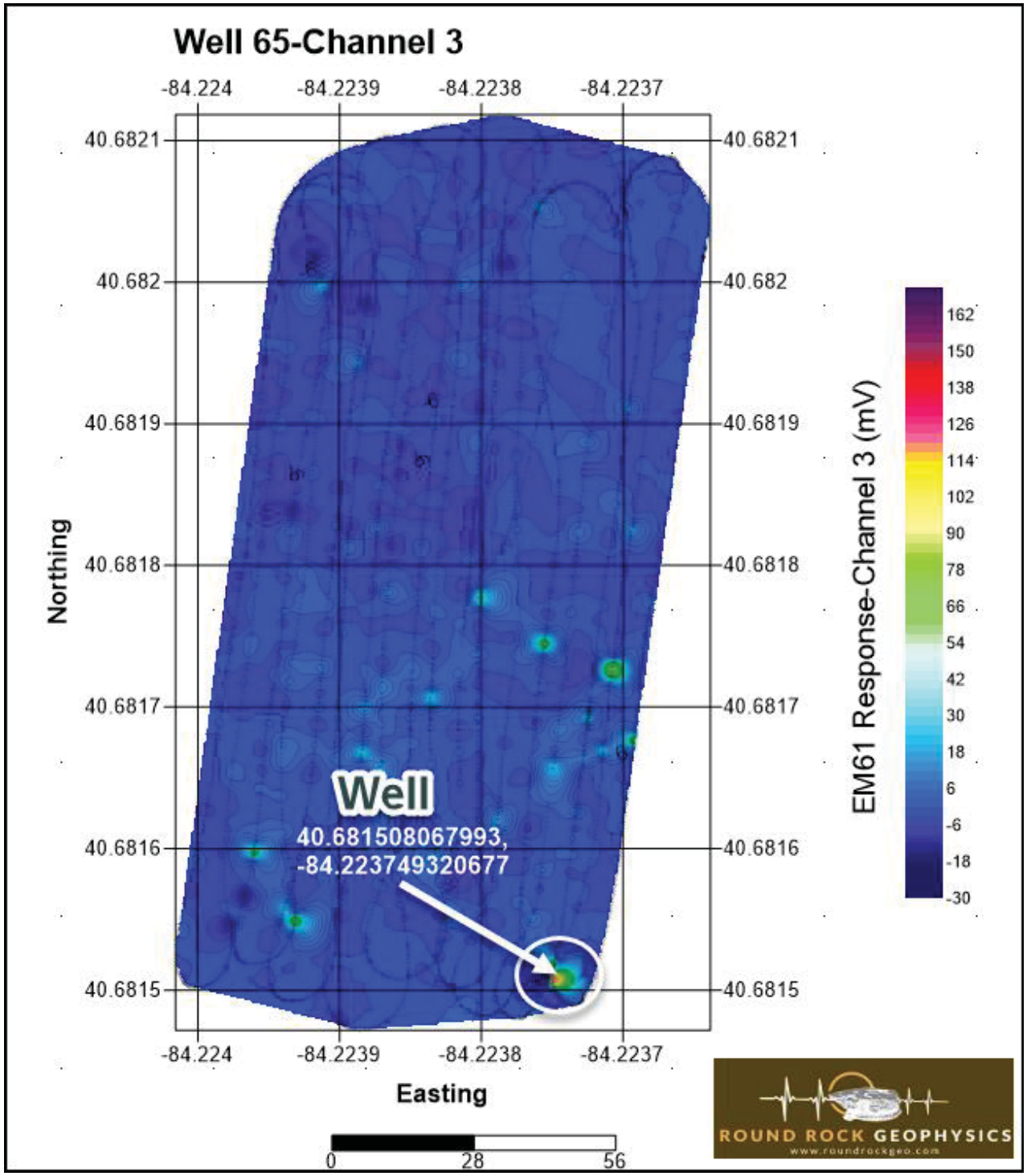



ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

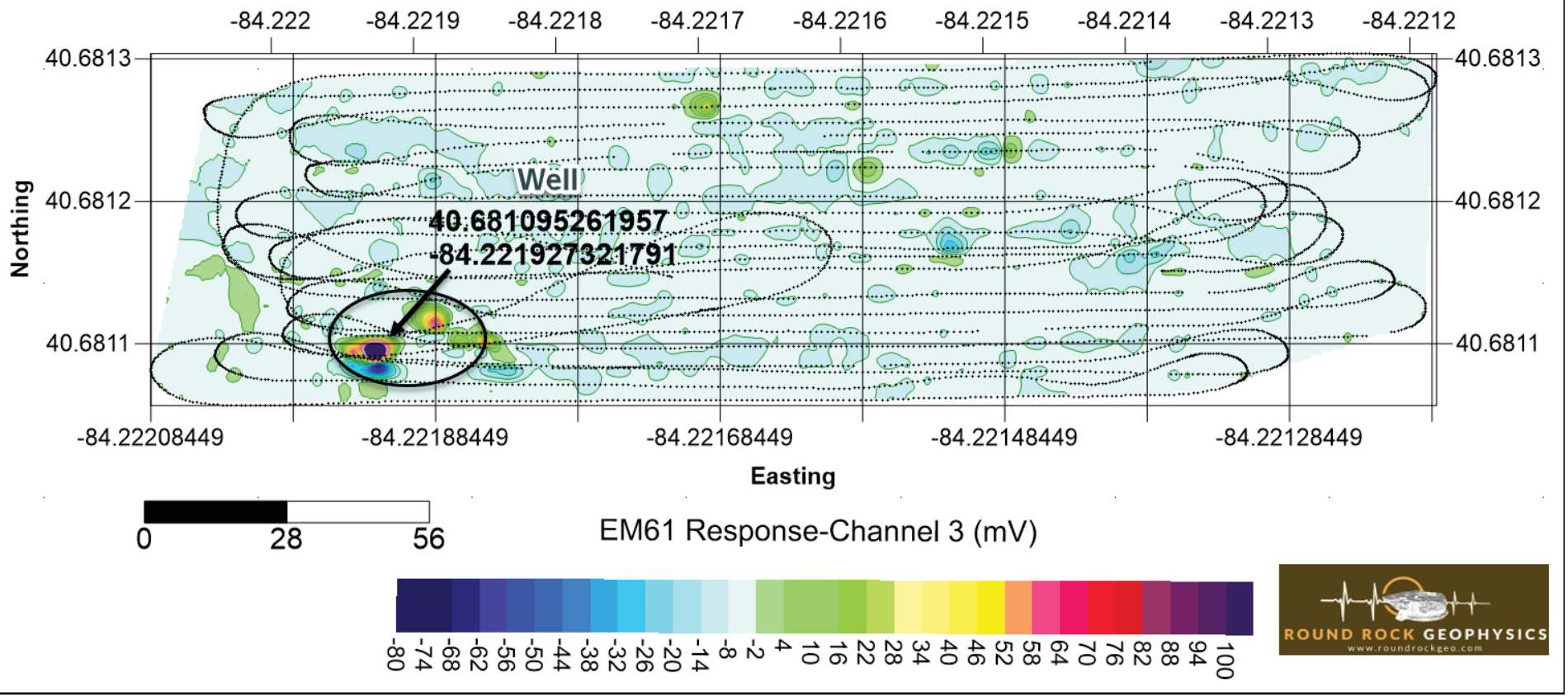

Well 62-Channel 3
-84.2256 -84.2255 -84.2254 -84.2253 -84.2252 -84.2251 -84.225 -84.2249 -84.2248 -84.2247 -84.2246 -84.2245
40.67891647
40.67881647
40.67871647
Northing
Easting
Well
40.678796683943,
-84.225512099648
Utility
0 28 56
EM61 Response-Channel 3 (mV)
-200 -120 -40 40 120 200 280 360 440 520 600 680 760 840 920 1000 1080
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com


Well 63-Channel 3
-84.22426958
-84.22416958
-84.22406958
-84.22396958
-84.22386958
-84.22376958
-84.22366958
-84.22356958
-84.22346958
-84.22336958
-84.22326958
40.6791737
40.6790737
40.6789737
Northing
Easting
Well
40.679175664917,
-84.22394246922
0
28
56
EM61 Response-Channel 3 (mV)
-55
-49
-43
-37
-31
-25
-19
-13
-7
-1
5
11
17
23
29
35
41
47
53
59
65
71
77
83
89
95
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

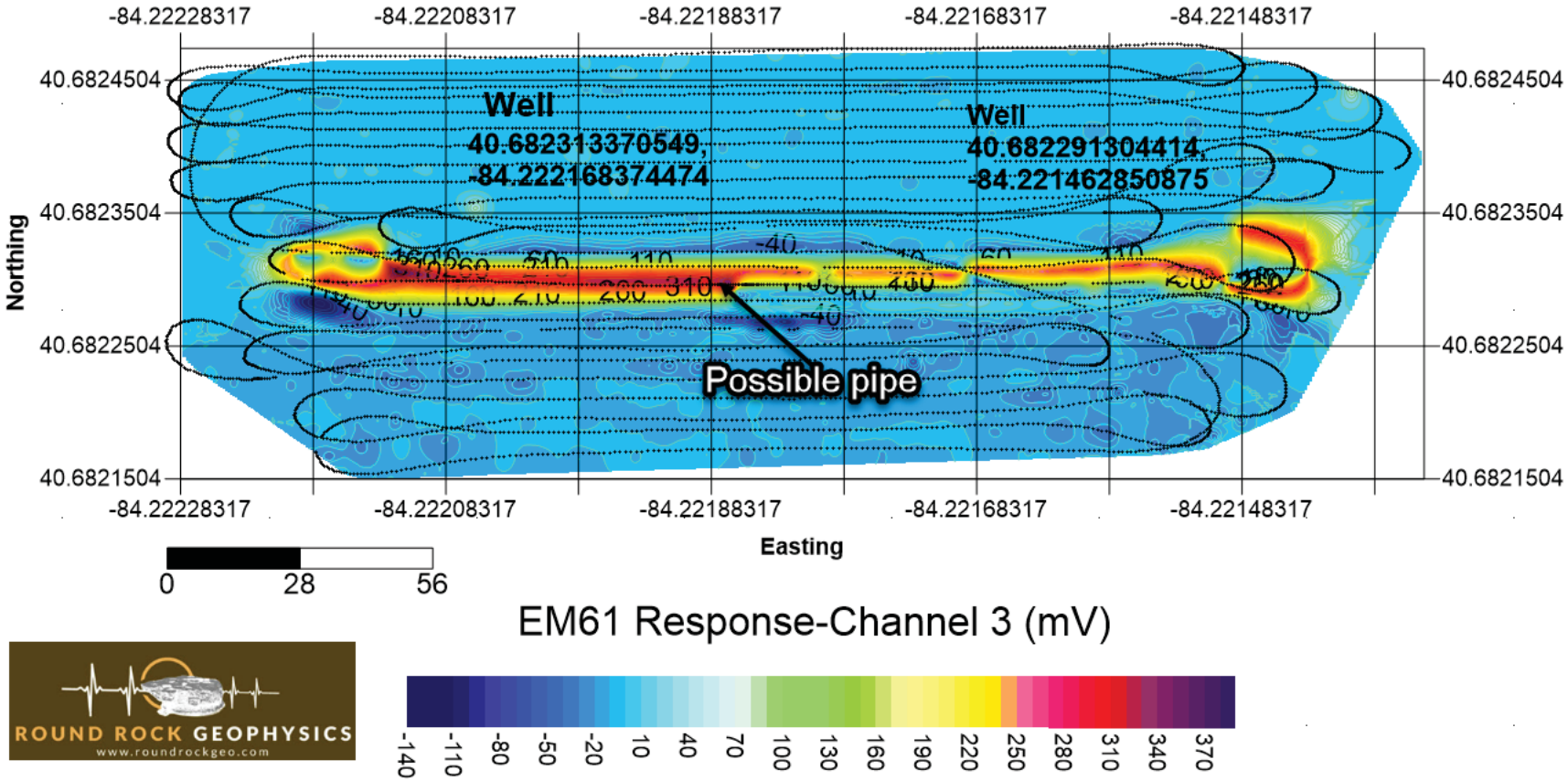

Well 64-Channel 3
-84.22423779
-84.22403779
-84.22383779
-84.22363779
-84.22343779
40.68064393
40.68054393
40.68044393
40.68034393
Northing
Easting
Well
40.680621112437,
-84.22395152698
Well
40.68052968417,
-84.22393708851
Well
40.680529318552,
-84.223838006047
0
28
56
EM61 Response-Channel 3 (mV)
-20 -17 -14 -11 -8 -5 -2 1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com


Well 65-Channel 3
-84.224
-84.2239
-84.2238
-84.2237
40.6821
40.682
40.6819
40.6818
40.6817
40.6816
40.6815
Northing
Easting
Well
40.681508067993,
-84.223749320677
EM61 Response-Channel 3 (mV)
162
150
138
126
114
102
90
78
66
54
42
30
18
6
-6
-18
-30
0
28
56
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

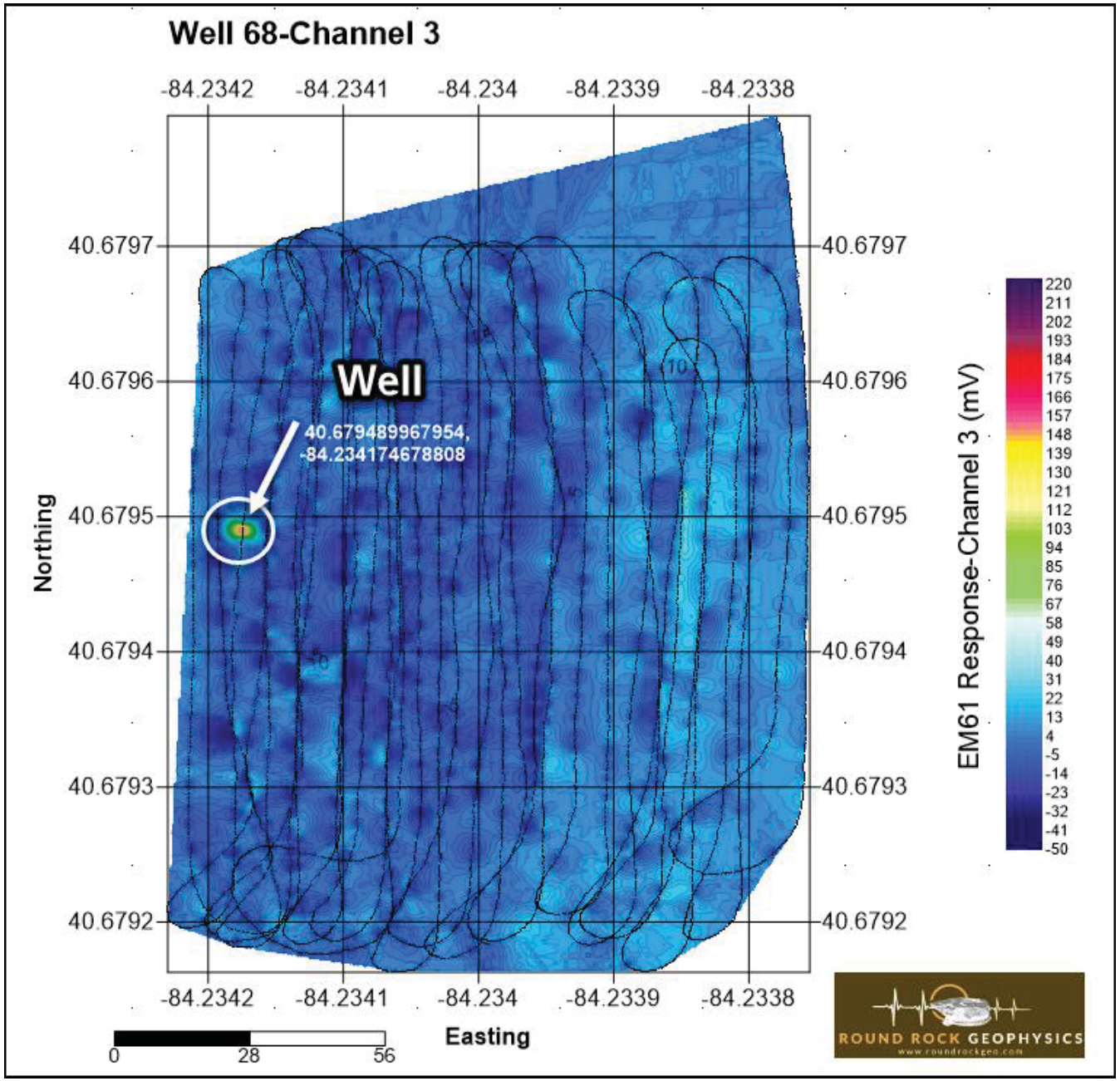
# Well 66-Channel 3

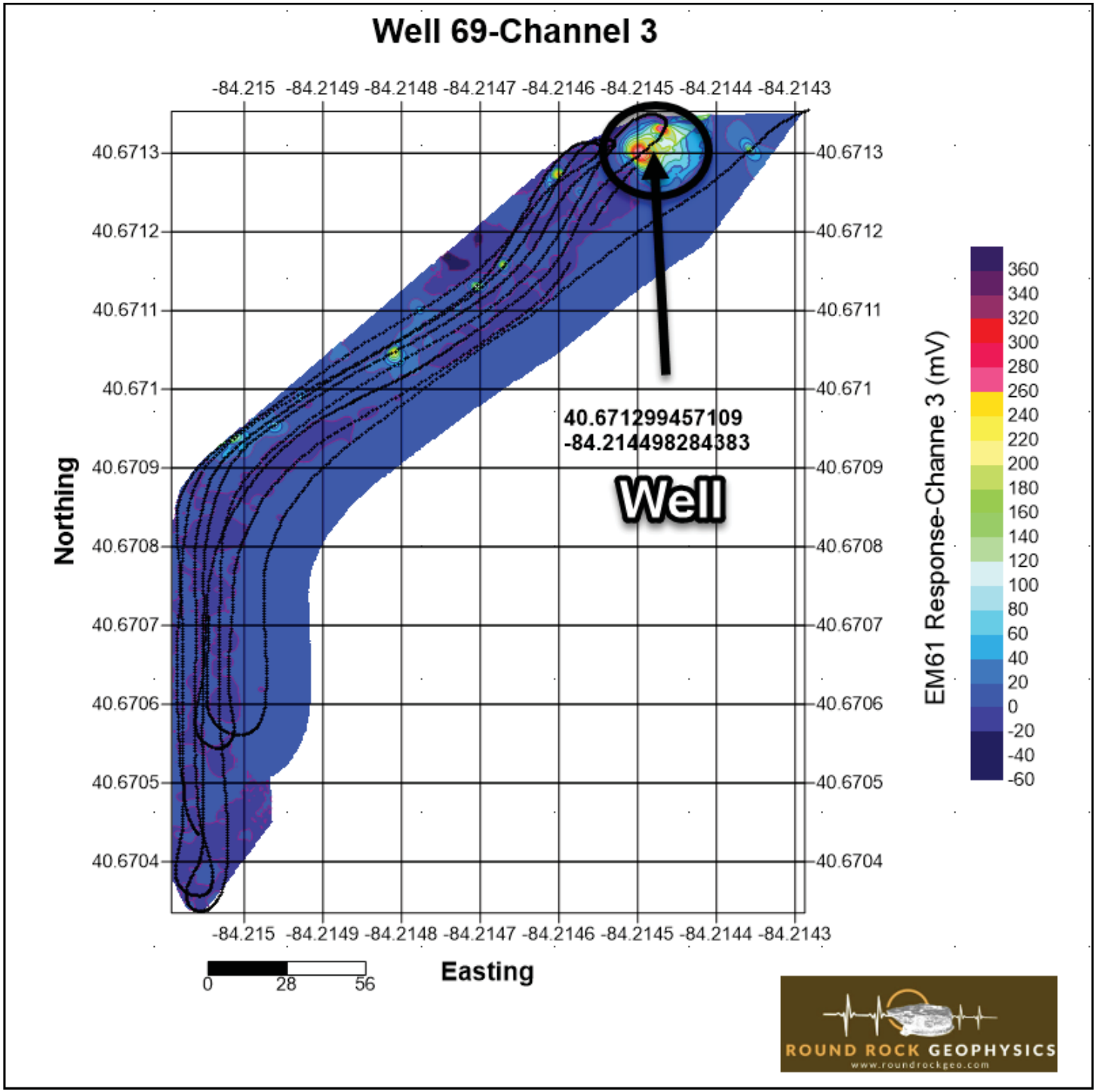


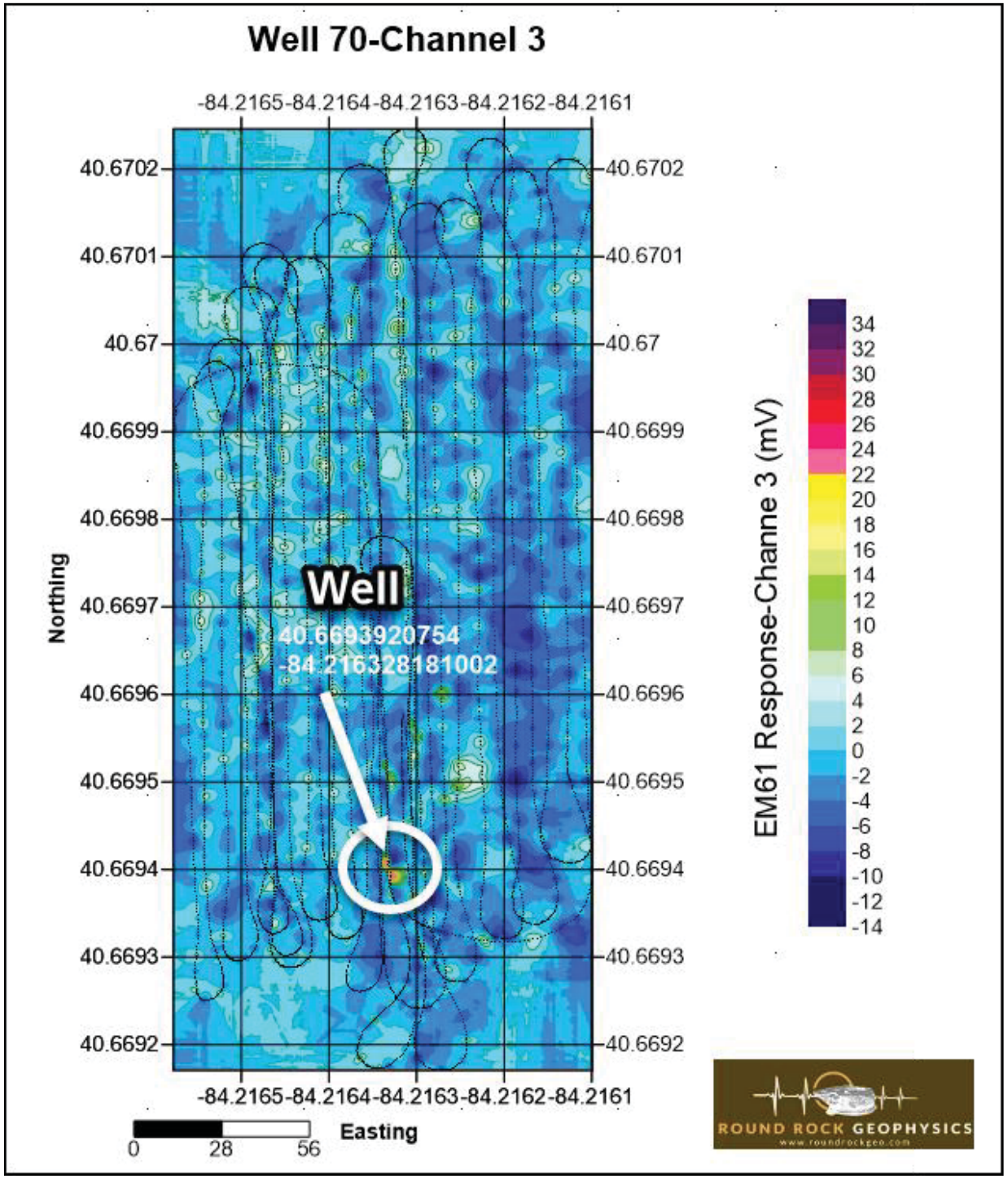
# Well 67-Channel 3



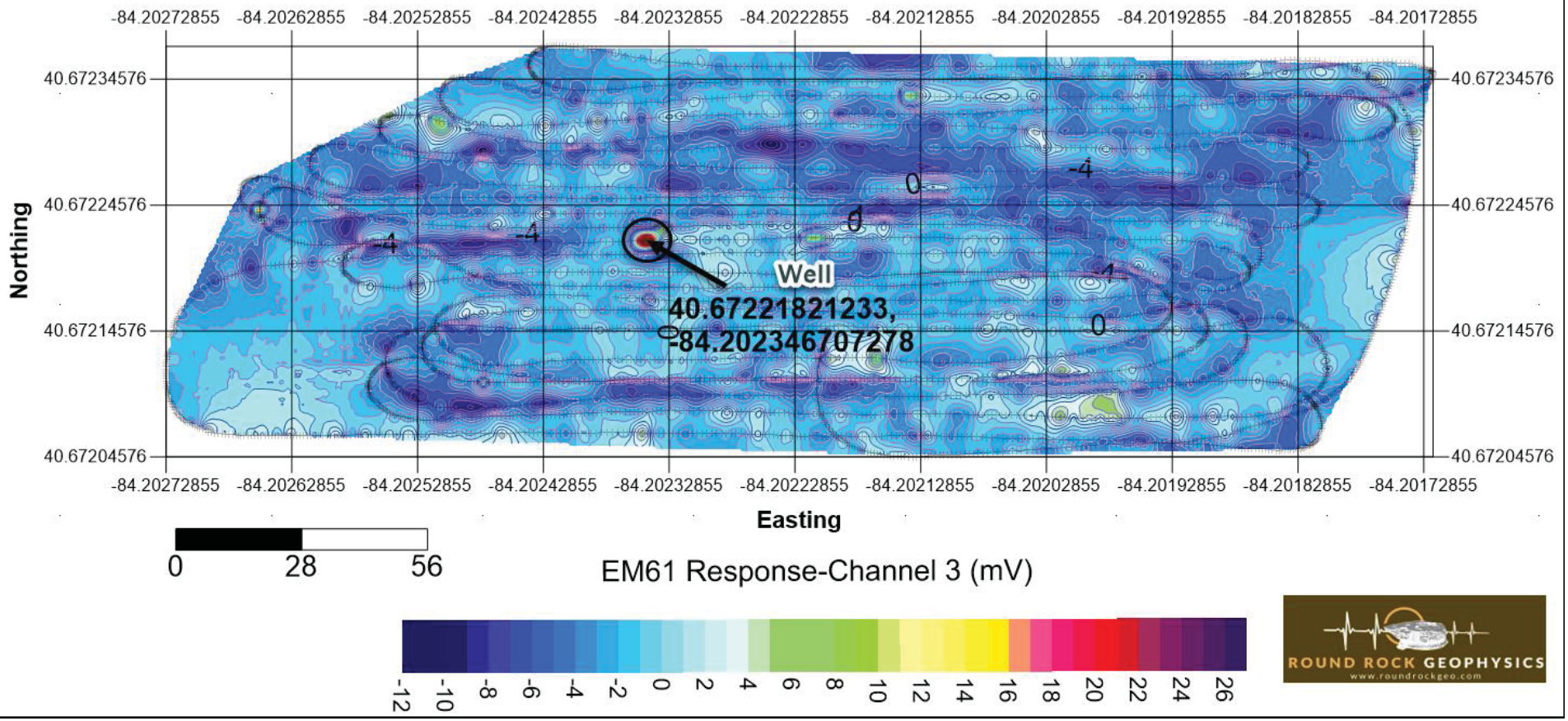

ROUND ROCK GEOPHYSICS
www.roundrockgeo.com


Well 68-Channel 3
-84.2342
-84.2341
-84.234
-84.2339
-84.2338
40.6797
40.6796
40.6795
40.6794
40.6793
40.6792
Northing
Easting
Well
40.679489967954,
-84.234174678808
EM61 Response-Channel 3 (mV)
220
211
202
193
184
175
166
157
148
139
130
121
112
103
94
85
76
67
58
49
40
31
22
13
4
-5
-14
-23
-32
-41
-50
0
28
56
ROUND ROCK GEOPHYSICS


Well 69-Channel 3
-84.215 -84.2149 -84.2148 -84.2147 -84.2146 -84.2145 -84.2144 -84.2143
40.6713
40.6712
40.6711
40.671
40.6709
40.6708
40.6707
40.6706
40.6705
40.6704
Northing
40.671299457109
-84.214498284383
Well
Easting
0 28 56
EM61 Response-Channe 3 (mV)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

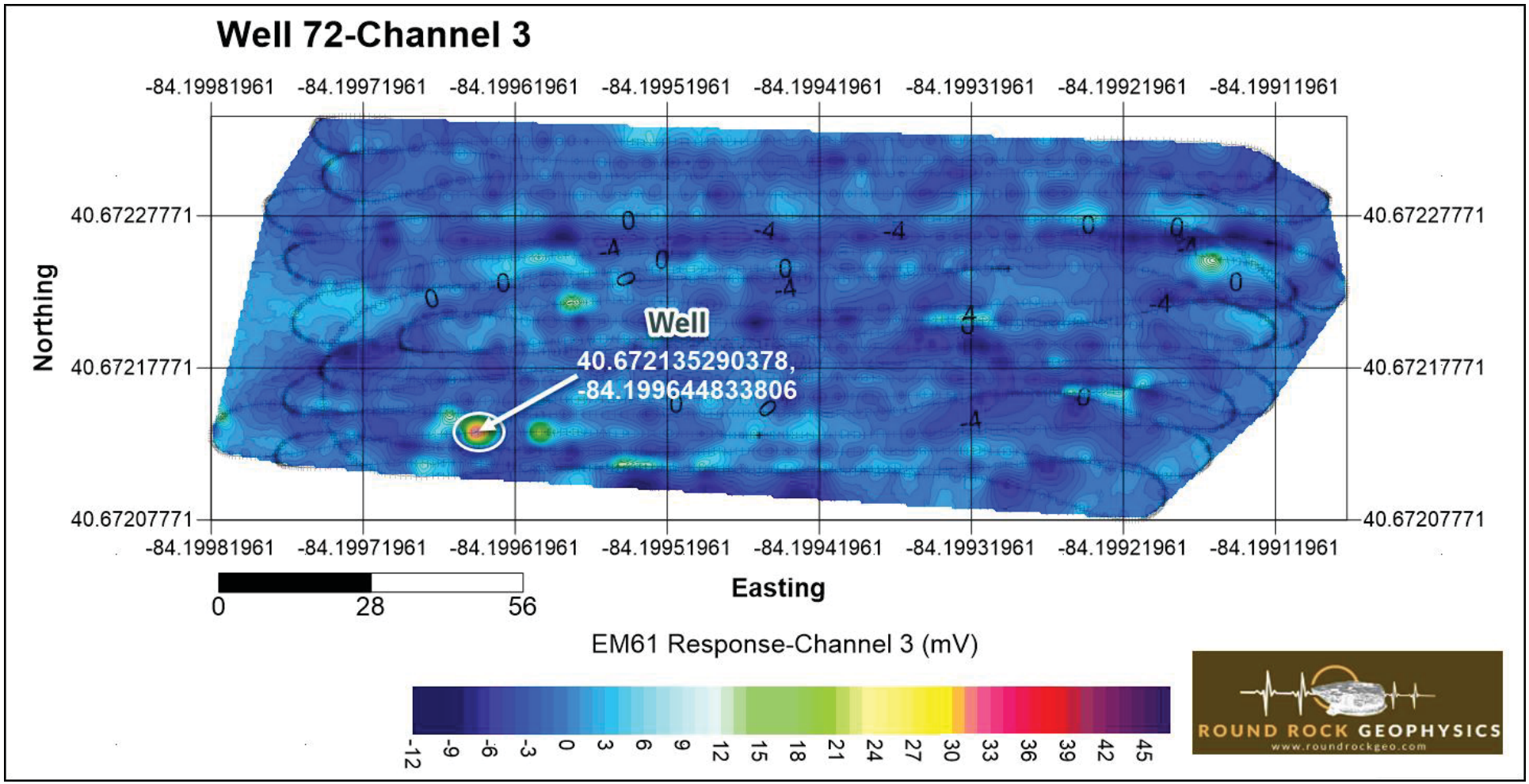

Well 70-Channel 3
-84.2165
-84.2164
-84.2163
-84.2162
-84.2161
40.6702
40.6701
40.67
40.6699
40.6698
40.6697
40.6696
40.6695
40.6694
40.6693
40.6692
Northing
Well
40.6693920754
-84.216328181002
Easting
0
28
56
EM61 Response-Channe 3 (mV)
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

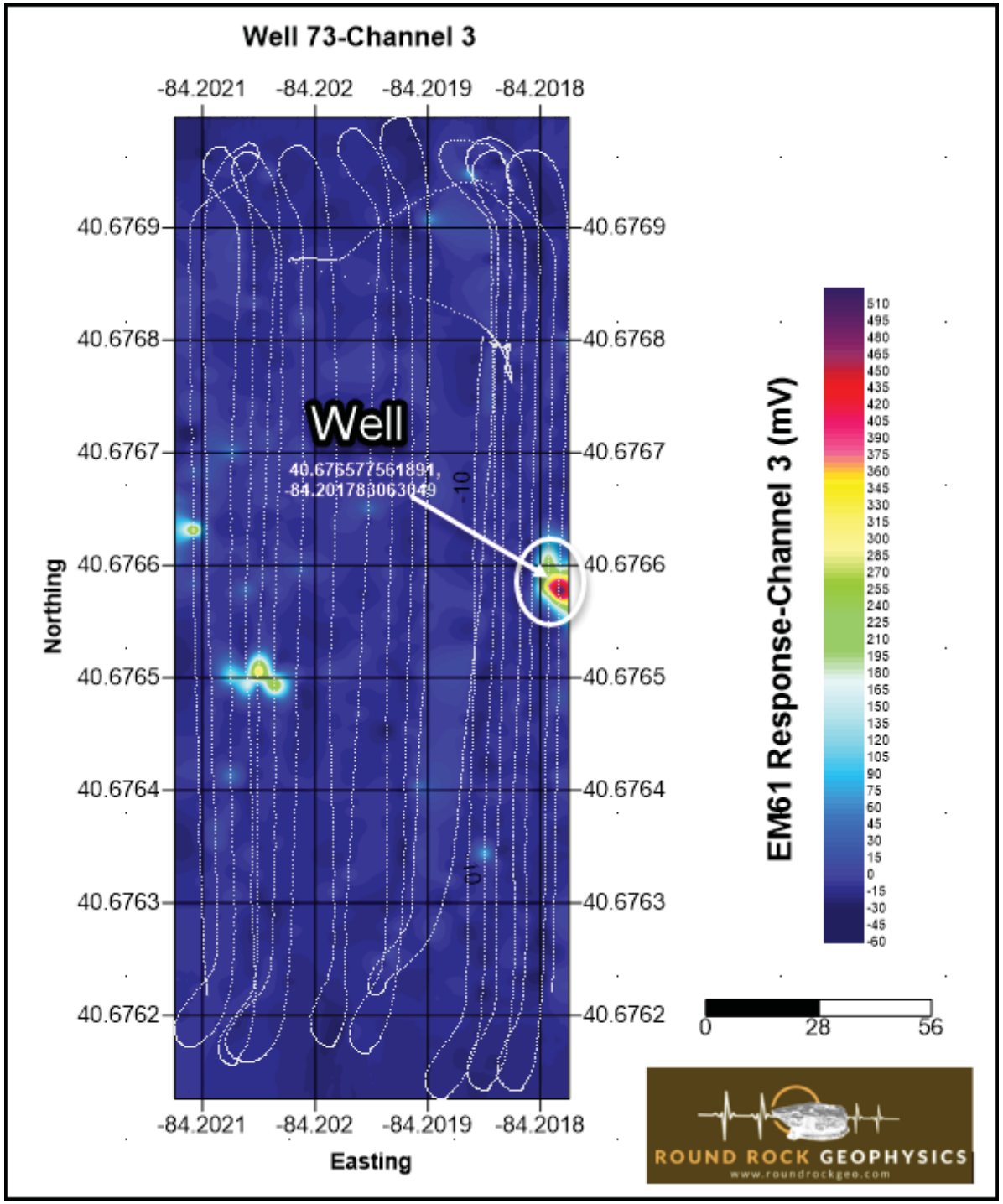
# Well 71-Channel 3



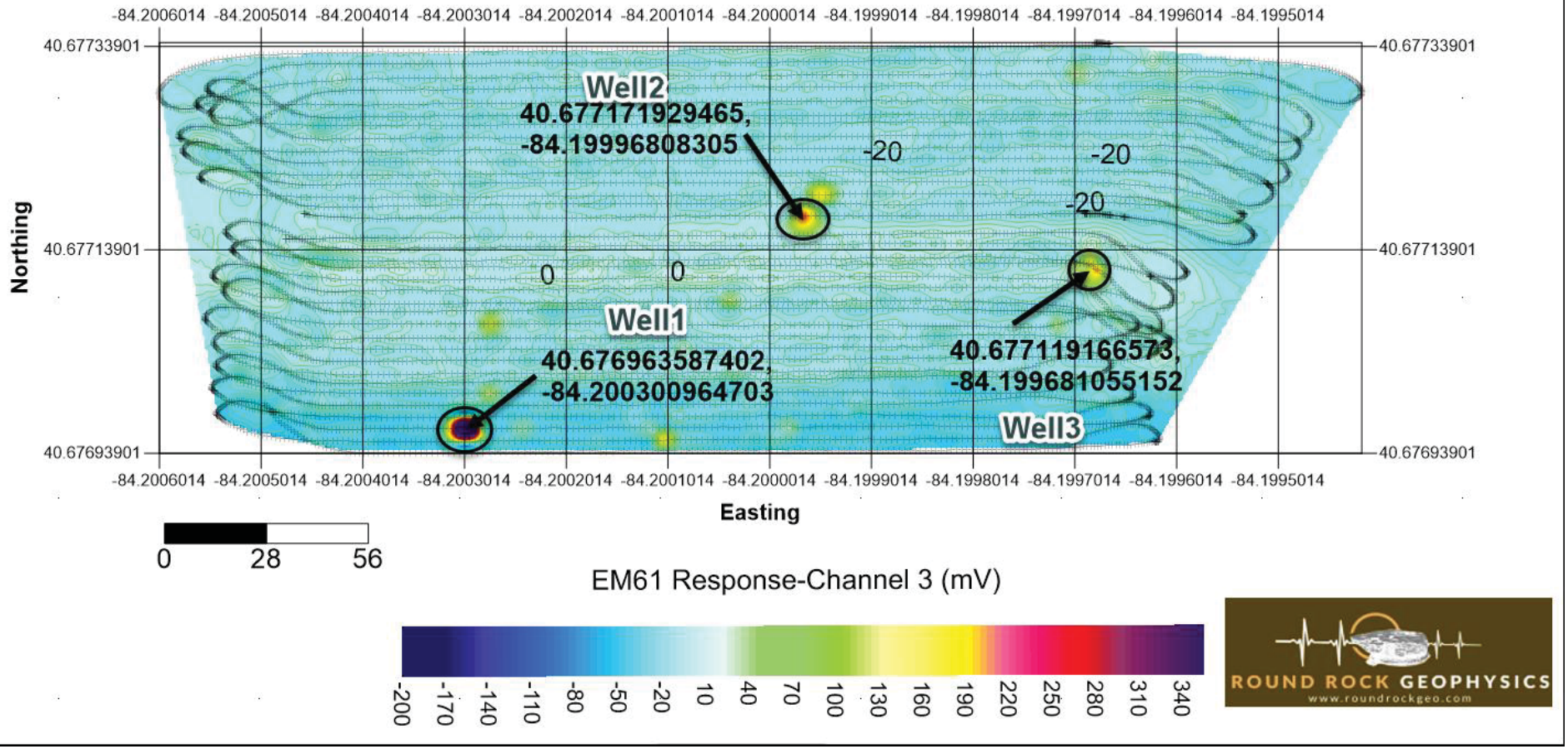

0 28 56

ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

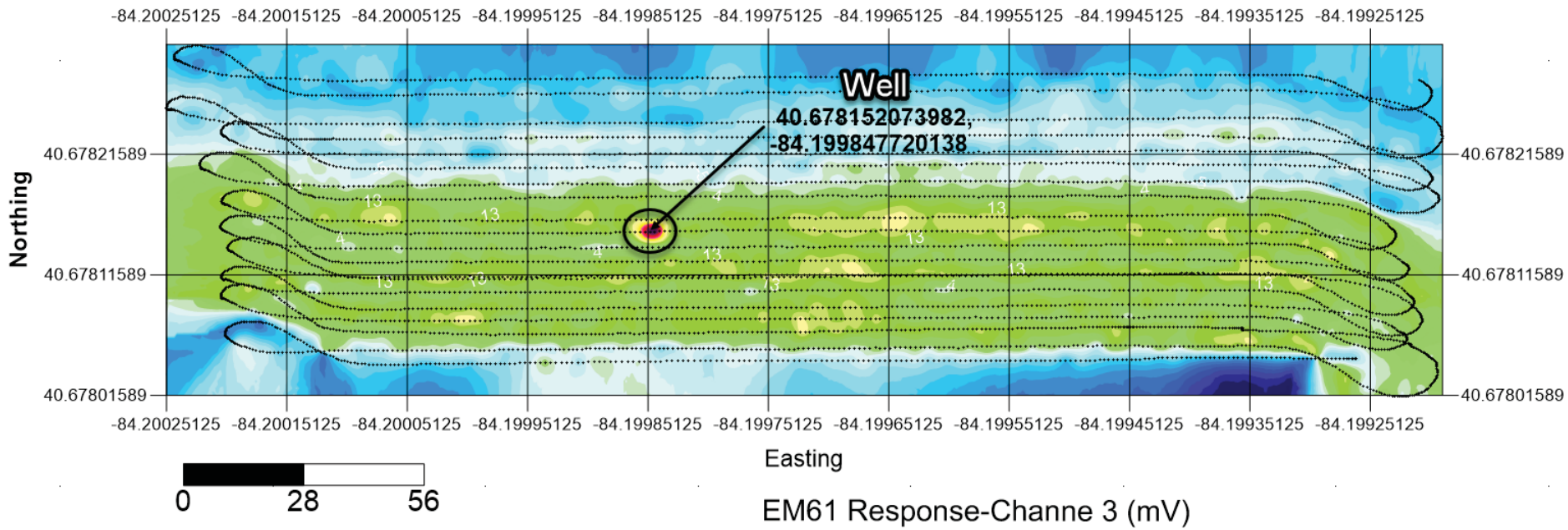

Well 72-Channel 3
-84.19981961
-84.19971961
-84.19961961
-84.19951961
-84.19941961
-84.19931961
-84.19921961
-84.19911961
40.67227771
40.67217771
40.67207771
Northing
Easting
Well
40.672135290378,
-84.199644833806
0
28
56
EM61 Response-Channel 3 (mV)
-12
-9
-6
-3
0
3
6
9
12
15
18
21
24
27
30
33
36
39
42
45
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com


Well 73-Channel 3
-84.2021
-84.202
-84.2019
-84.2018
40.6769
40.6768
40.6767
40.6766
40.6765
40.6764
40.6763
40.6762
Northing
Easting
Well
40.67657561891,
-84.201783063049
-10
0
EM61 Response-Channel 3 (mV)
510
495
480
465
450
435
420
405
390
375
360
345
330
315
300
285
270
255
240
225
210
195
180
165
150
135
120
105
90
75
60
45
30
15
0
-15
-30
-45
-60
0
28
56
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

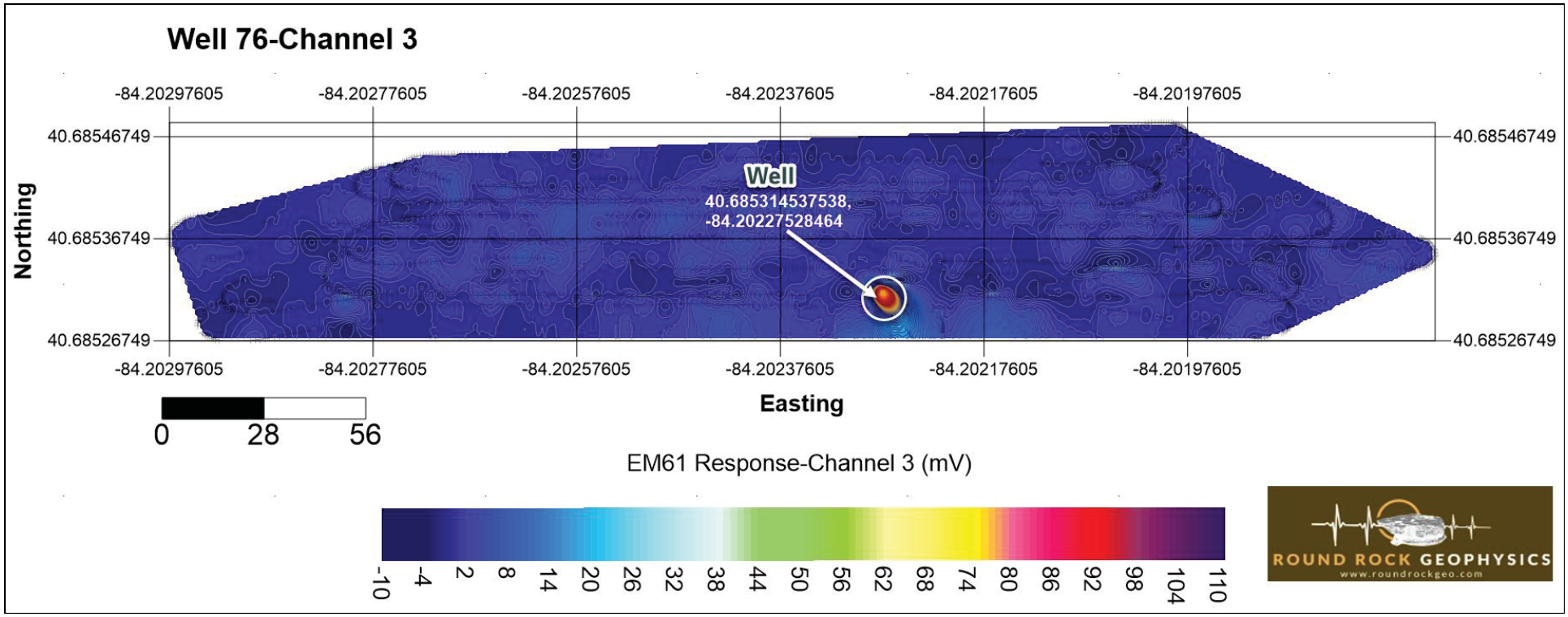
# Well 74-Channel 3

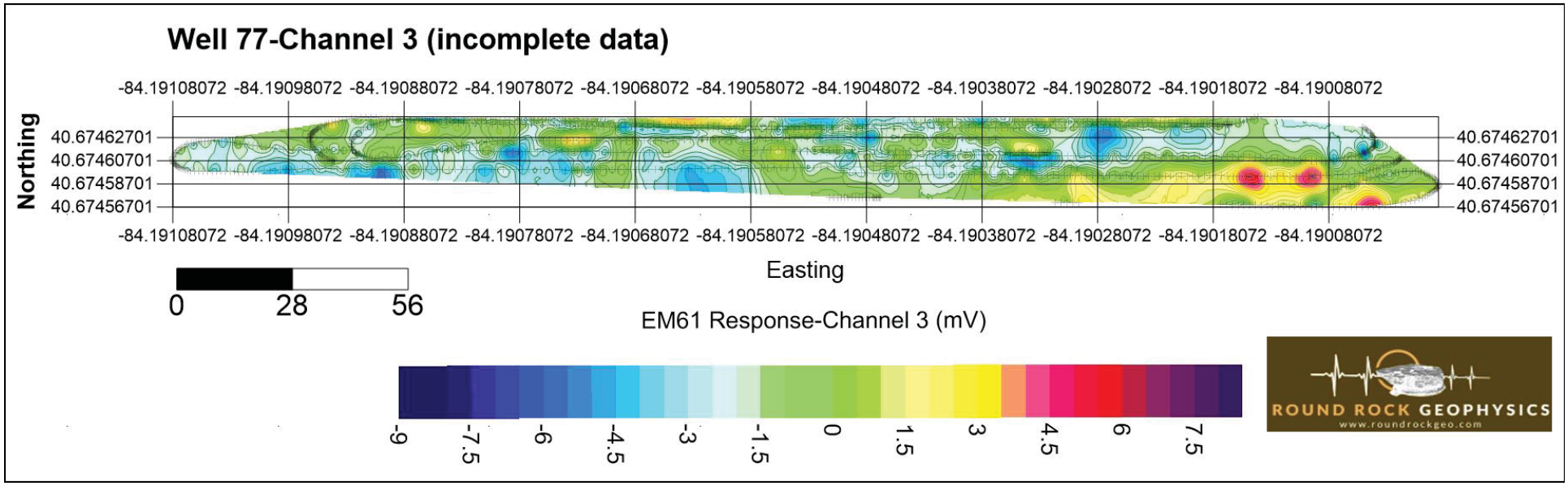


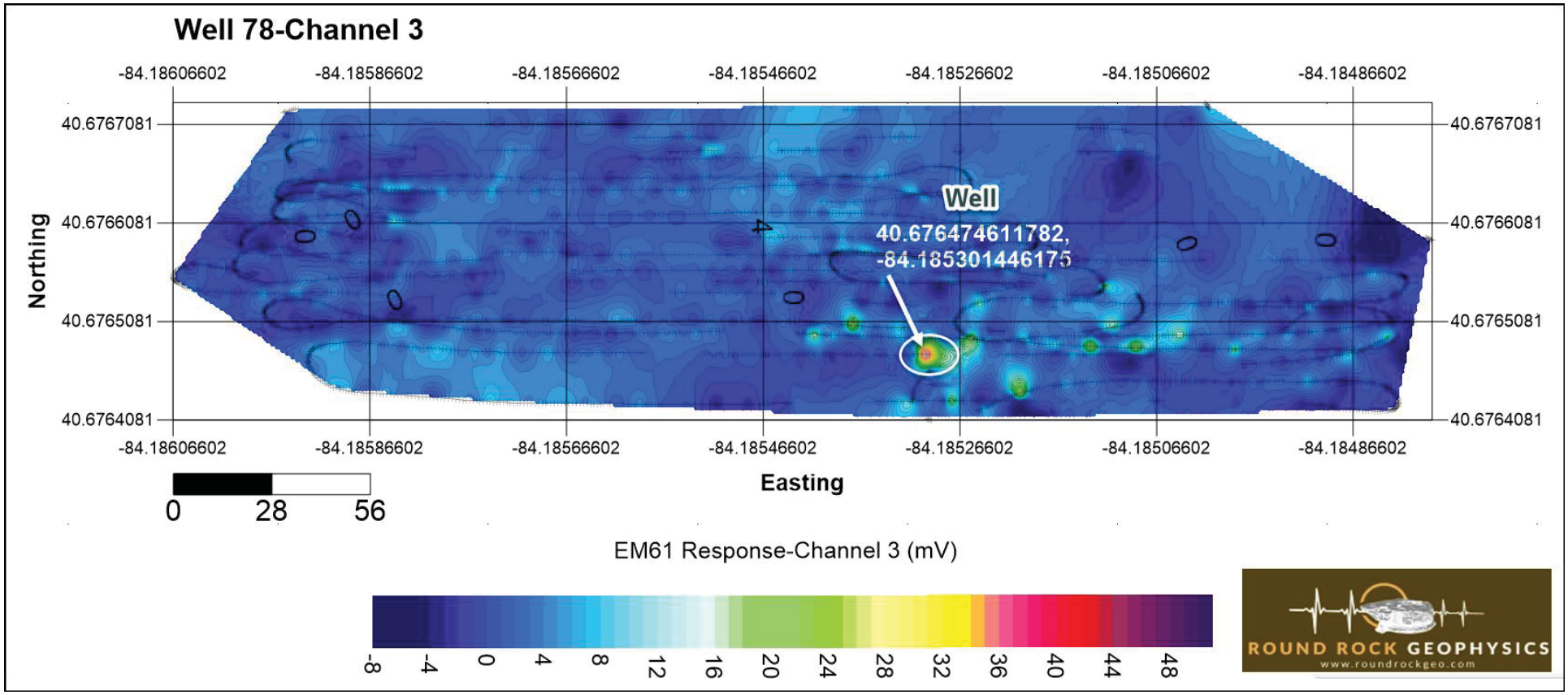
# Well 75-Channel 3

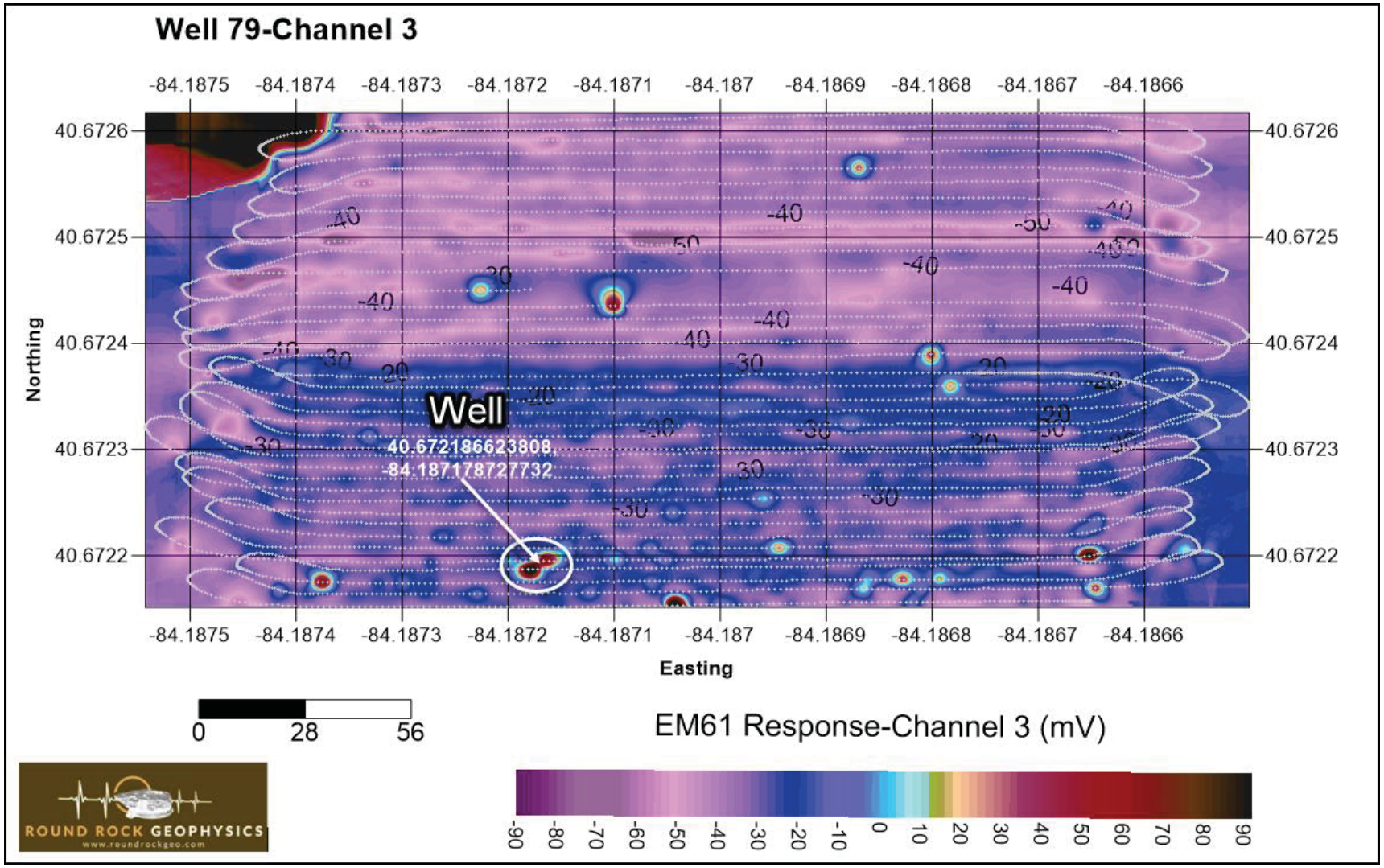


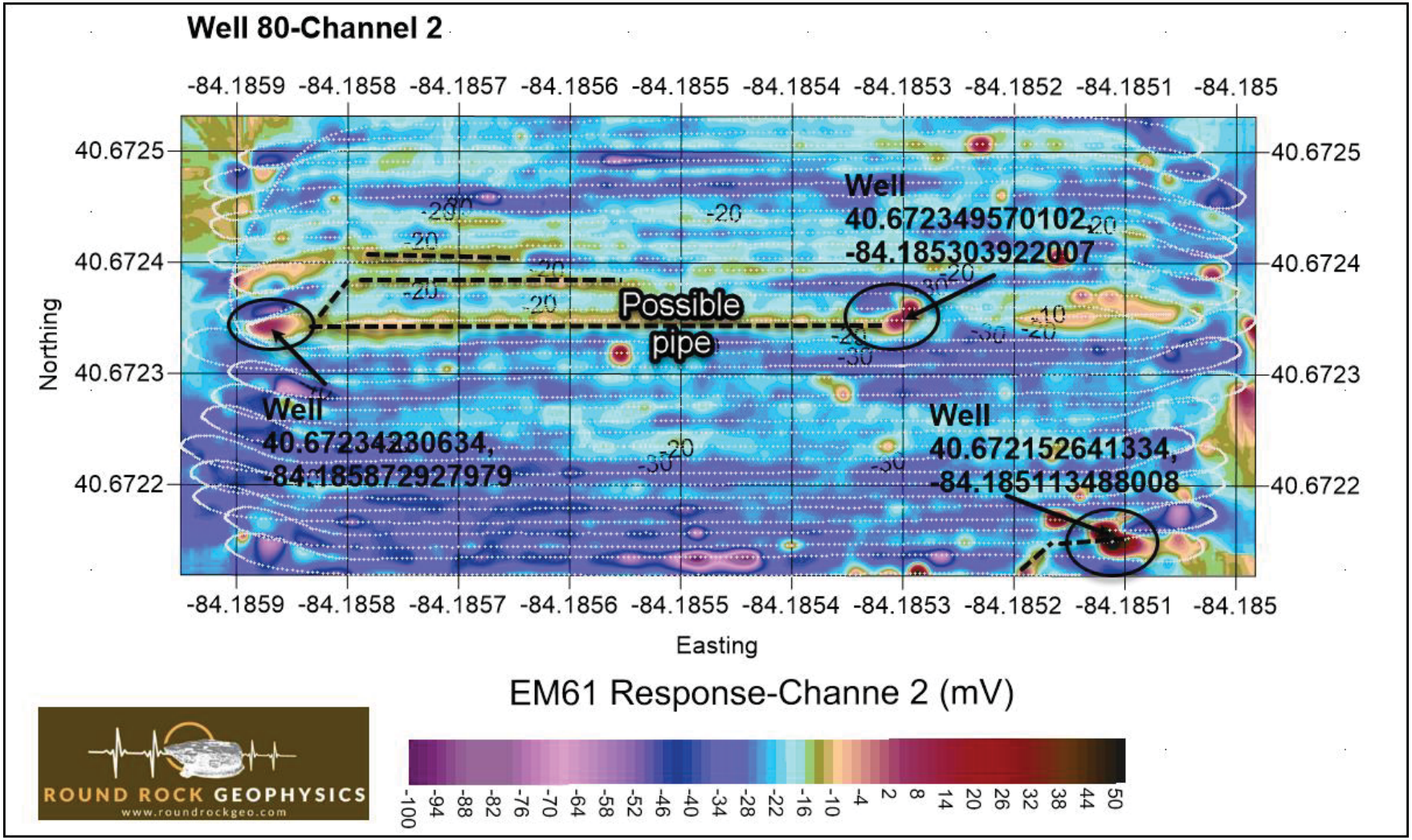

ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

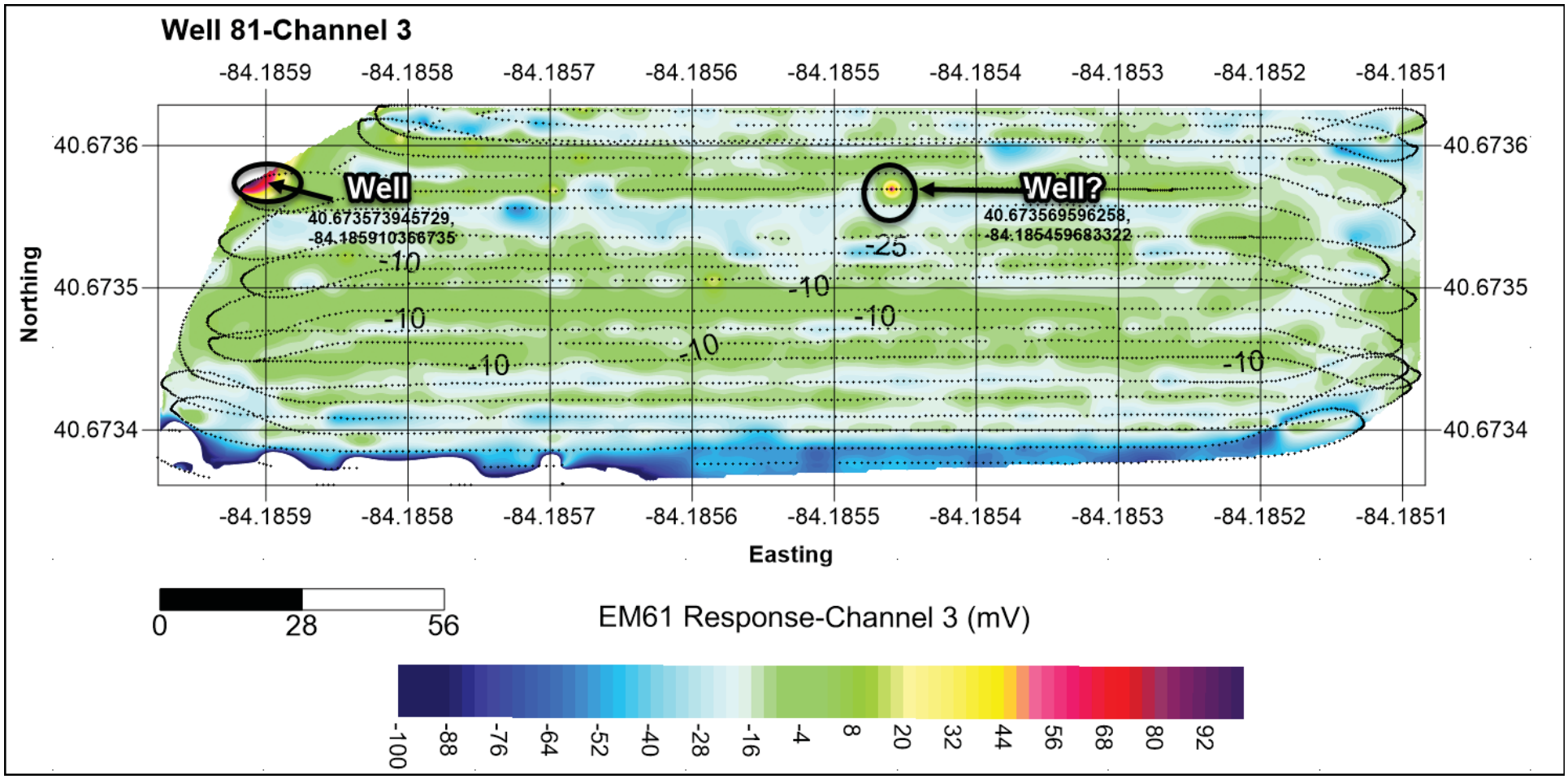

Well 76-Channel 3
-84.20297605
-84.20277605
-84.20257605
-84.20237605
-84.20217605
-84.20197605
40.68546749
40.68536749
40.68526749
Northing
Easting
Well
40.685314537538,
-84.20227528464
0
28
56
EM61 Response-Channel 3 (mV)
-10
-4
2
8
14
20
26
32
38
44
50
56
62
68
74
80
86
92
98
104
110
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

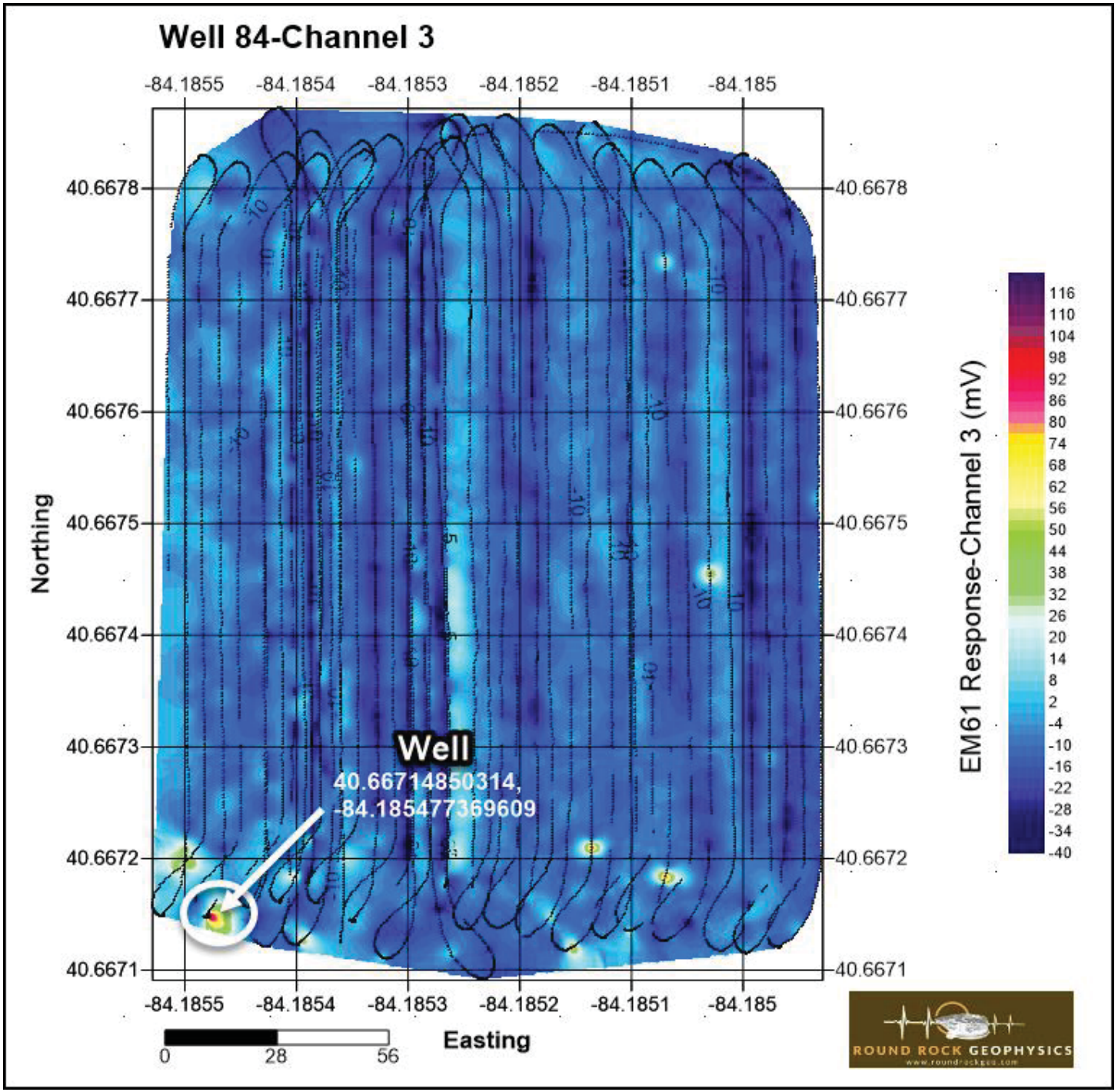

Well 77-Channel 3 (incomplete data)
-84.19108072 -84.19098072 -84.19088072 -84.19078072 -84.19068072 -84.19058072 -84.19048072 -84.19038072 -84.19028072 -84.19018072 -84.19008072
Northing
40.67462701
40.67460701
40.67458701
40.67456701
Easting
0
28
56
EM61 Response-Channel 3 (mV)
-9
-7.5
-6
-4.5
-3
-1.5
0
1.5
3
4.5
6
7.5
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

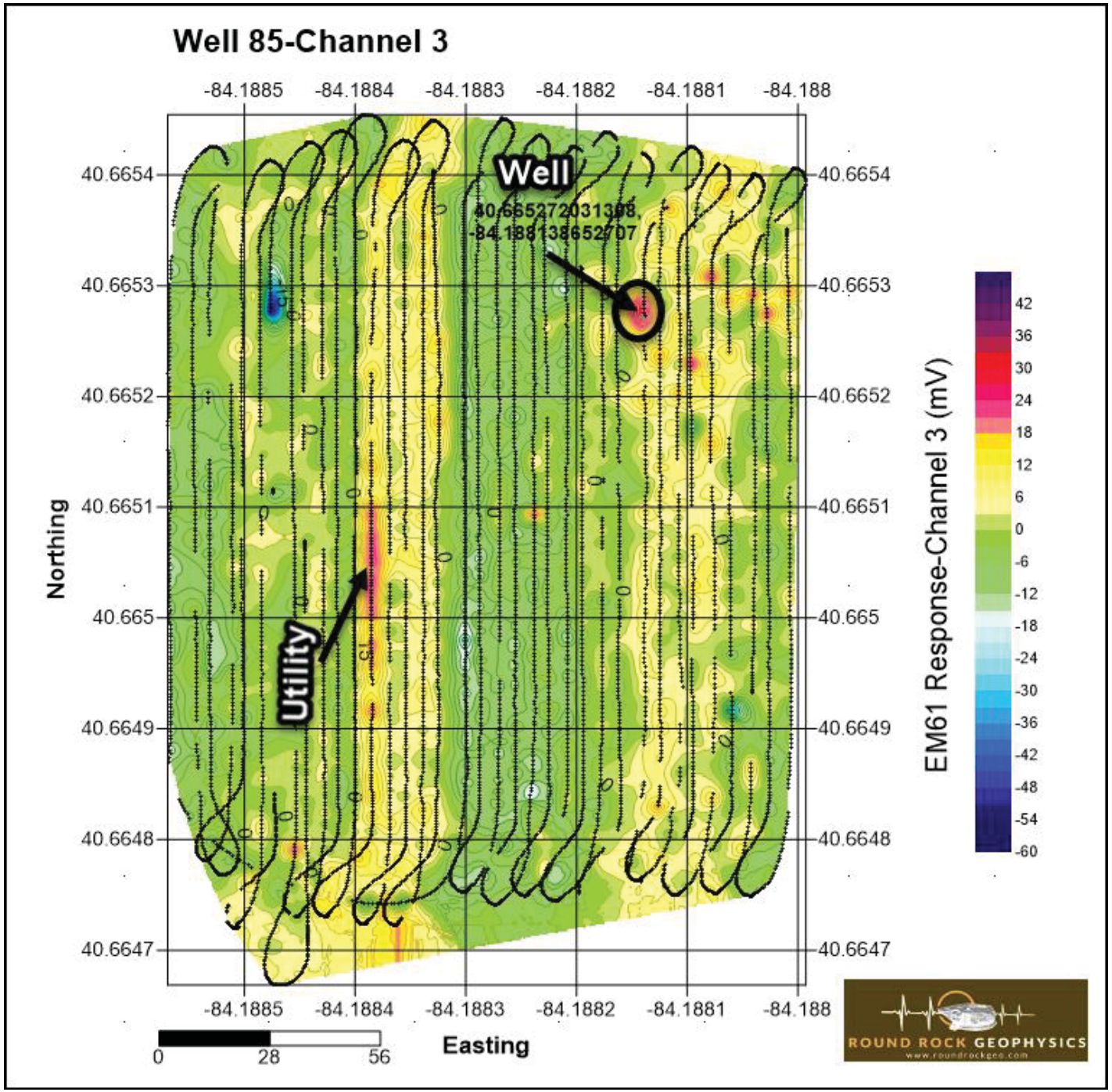

Well 78-Channel 3
-84.18606602
-84.18586602
-84.18566602
-84.18546602
-84.18526602
-84.18506602
-84.18486602
40.6767081
40.6766081
40.6765081
40.6764081
Northing
Easting
Well
40.676474611782,
-84.185301446175
0
28
56
EM61 Response-Channel 3 (mV)
-8
-4
0
4
8
12
16
20
24
28
32
36
40
44
48
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

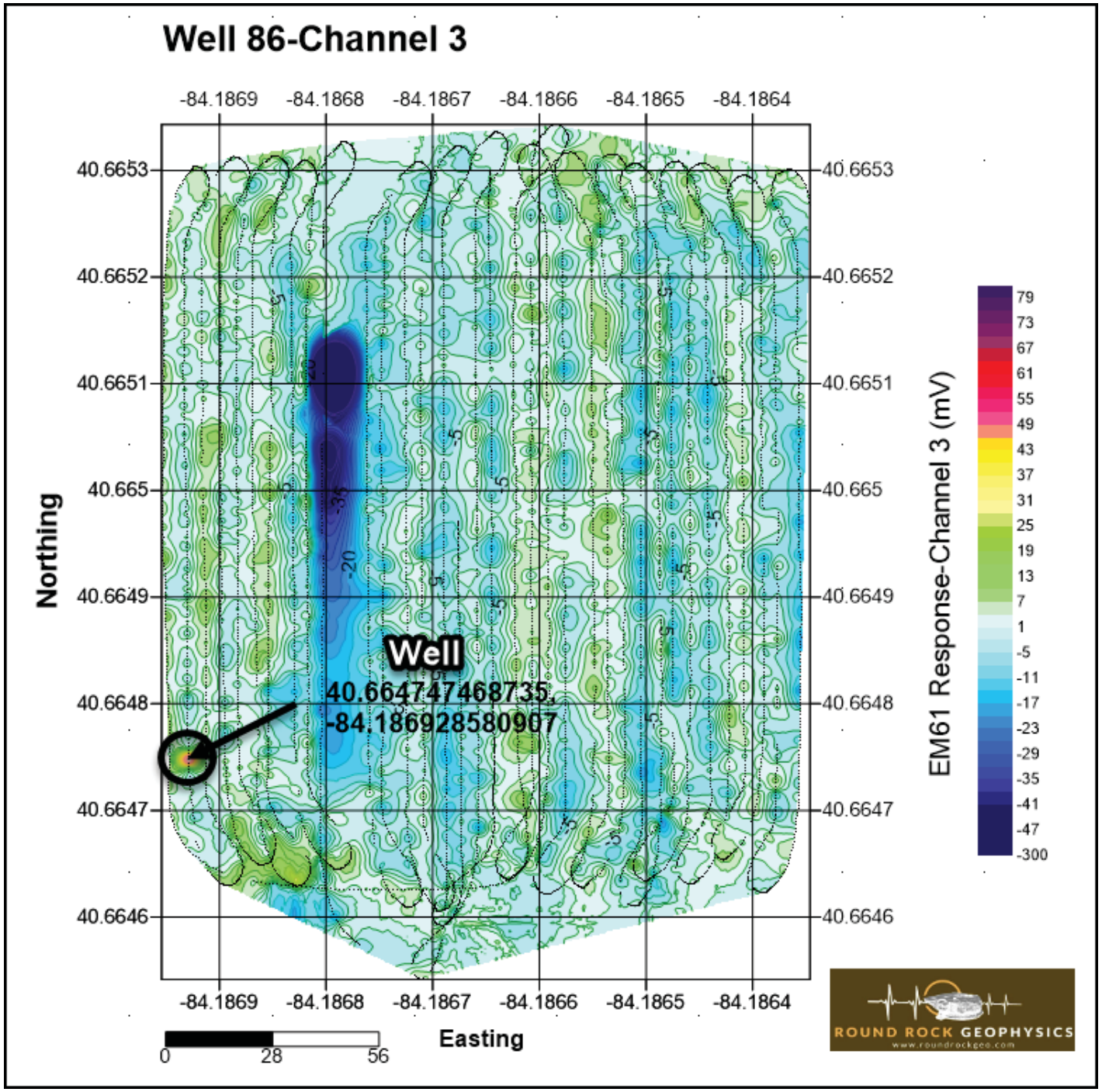

Well 79-Channel 3
-84.1875
-84.1874
-84.1873
-84.1872
-84.1871
-84.187
-84.1869
-84.1868
-84.1867
-84.1866
40.6726
40.6725
40.6724
40.6723
40.6722
Northing
Easting
Well
40.672186623808,
-84.187178727732
0
28
56
EM61 Response-Channel 3 (mV)
-90
-80
-70
-60
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80
90
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

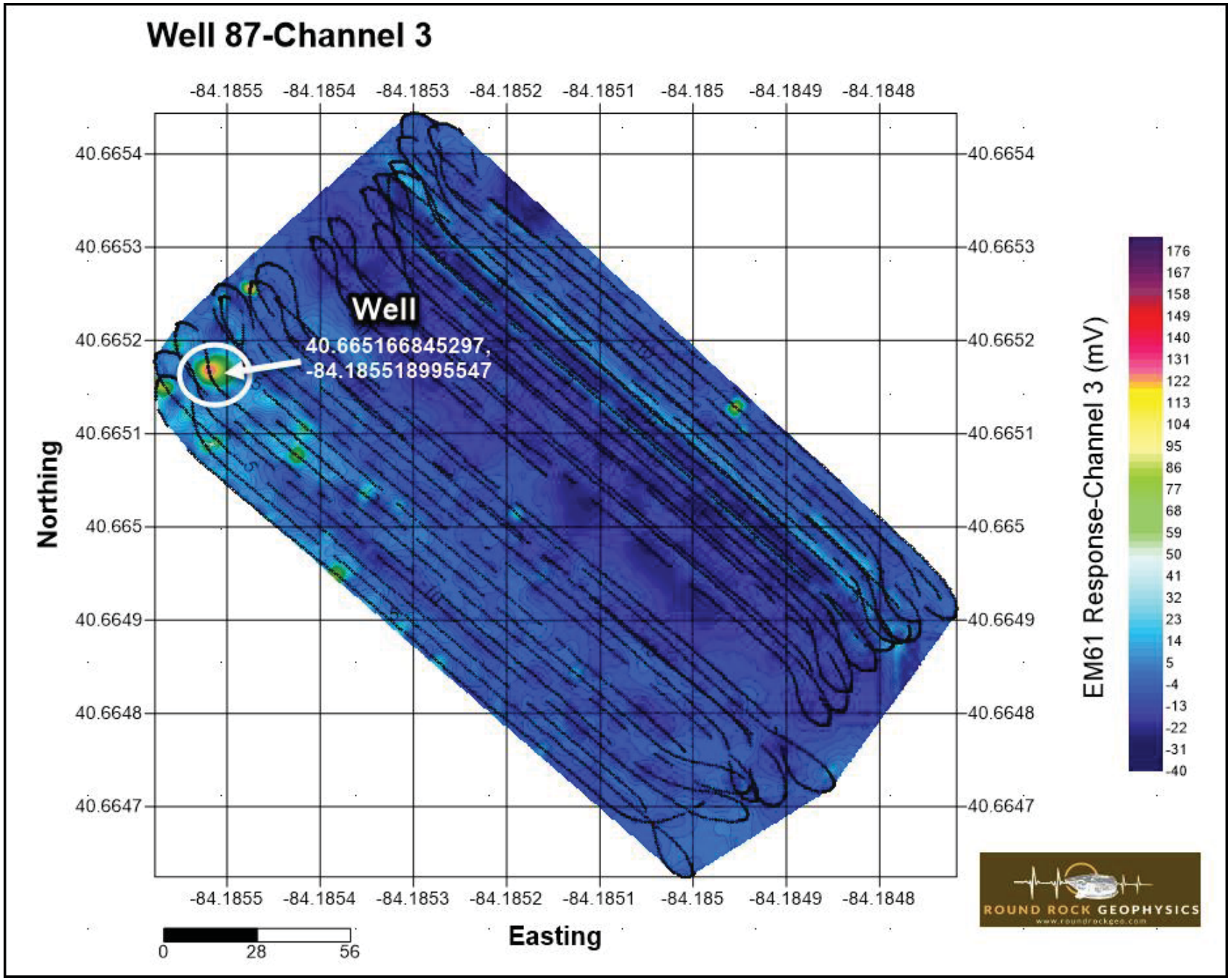

Well 80-Channel 2
-84.1859 -84.1858 -84.1857 -84.1856 -84.1855 -84.1854 -84.1853 -84.1852 -84.1851 -84.185
40.6725
40.6724
40.6723
40.6722
Northing
Easting
Well
40.672349570102,
-84.185303922007
Possible
pipe
Well
40.67234230634,
-84.185872927979
Well
40.672152641334,
-84.185113488008
EM61 Response-Channe 2 (mV)
-100 -94 -88 -82 -76 -70 -64 -58 -52 -46 -40 -34 -28 -22 -16 -10 -4 2 8 14 20 26 32 38 44 50
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

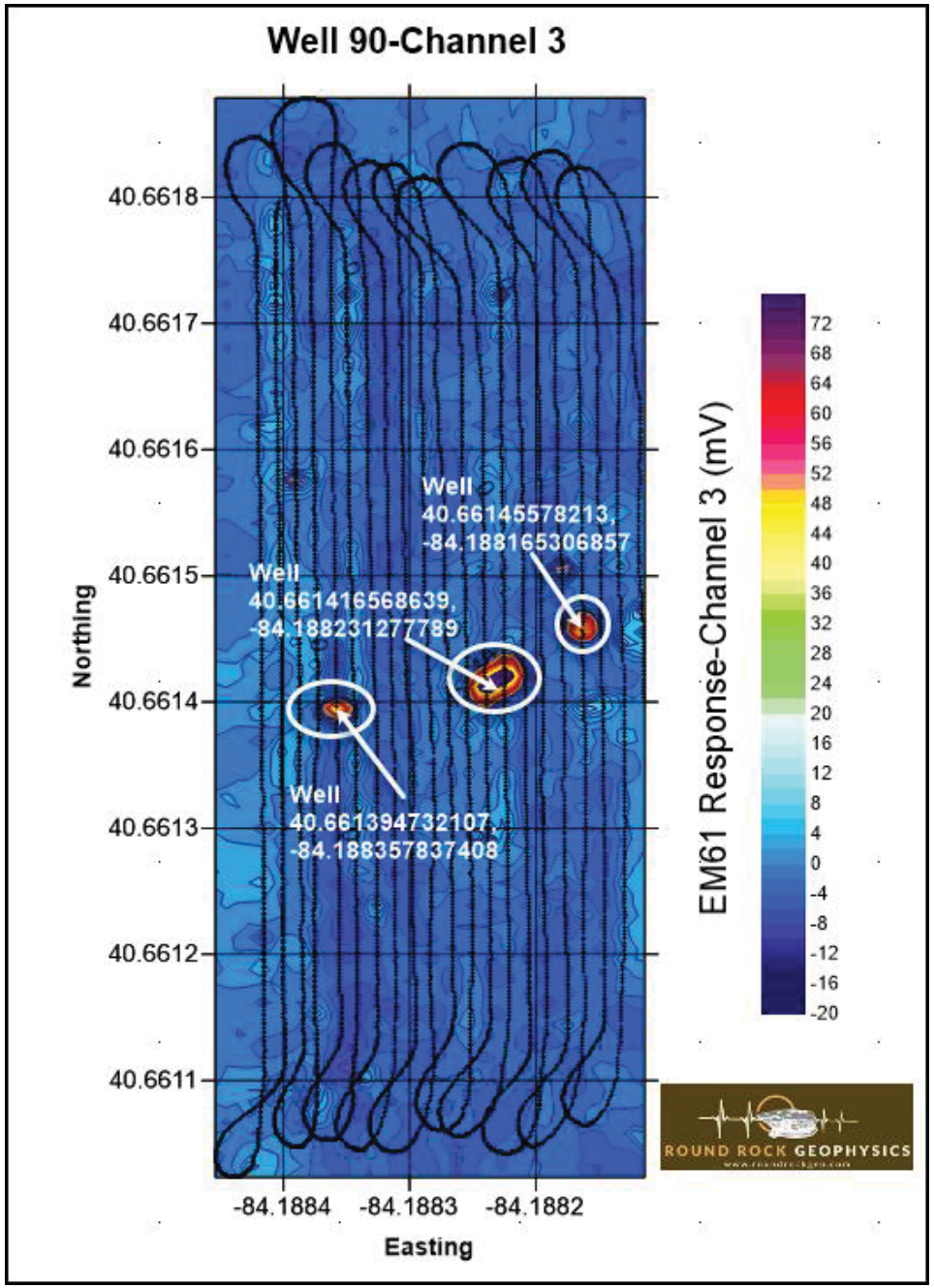

Well 81-Channel 3
-84.1859
-84.1858
-84.1857
-84.1856
-84.1855
-84.1854
-84.1853
-84.1852
-84.1851
40.6736
40.6735
40.6734
Northing
Easting
Well
40.673573945729,
-84.185910366735
Well?
40.673569596258,
-84.185459683322
-10
-25
0
28
56
EM61 Response-Channel 3 (mV)
-100
-88
-76
-64
-52
-40
-28
-16
-4
8
20
32
44
56
68
80
92

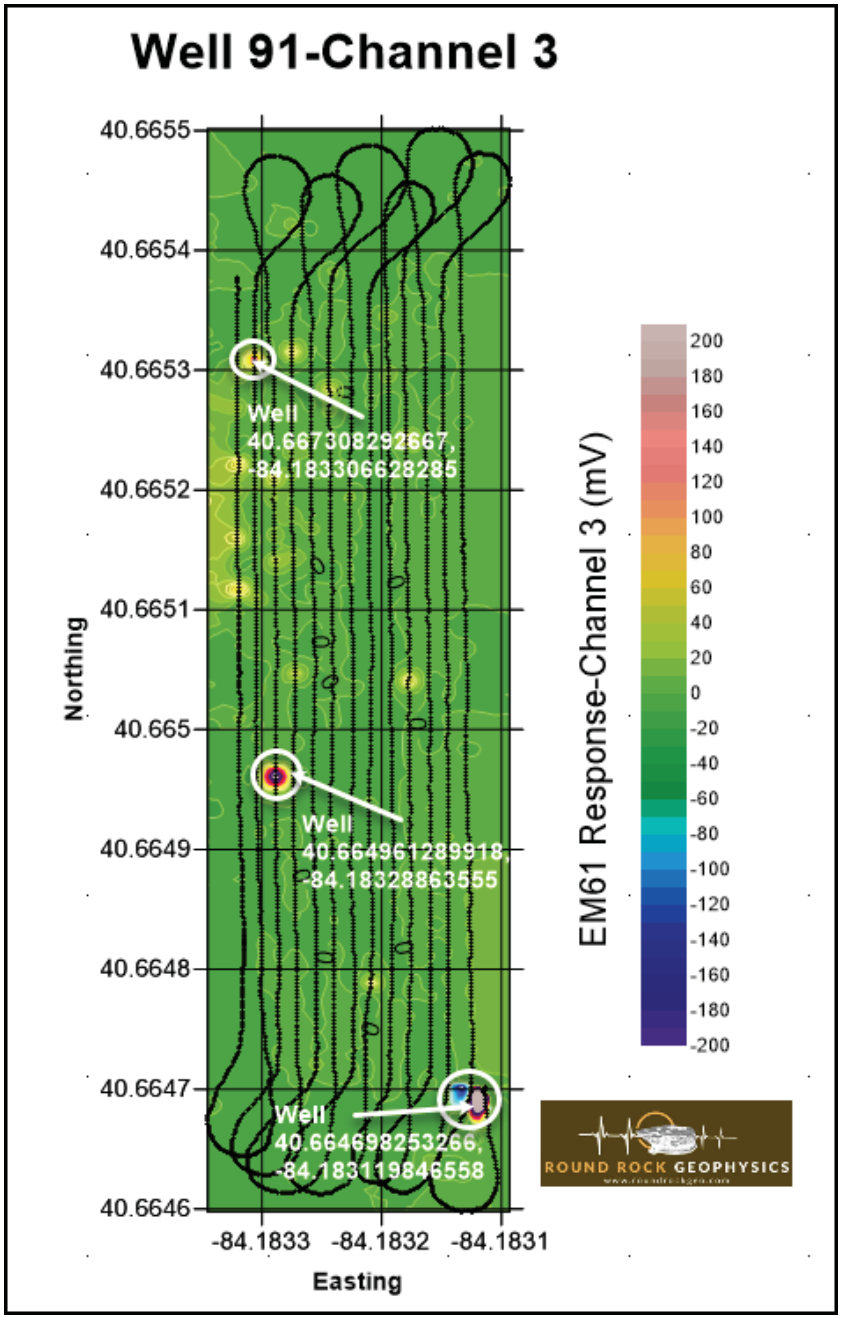

Well 84-Channel 3
-84.1855
-84.1854
-84.1853
-84.1852
-84.1851
-84.185
40.6678
40.6677
40.6676
40.6675
40.6674
40.6673
40.6672
40.6671
Northing
Easting
Well
40.66714850314,
-84.185477369609
0
28
56
EM61 Response-Channel 3 (mV)
116
110
104
98
92
86
80
74
68
62
56
50
44
38
32
26
20
14
8
2
-4
-10
-16
-22
-28
-34
-40
ROUND ROCK GEOPHYSICS


Well 85-Channel 3
-84.1885
-84.1884
-84.1883
-84.1882
-84.1881
-84.188
40.6654
40.6653
40.6652
40.6651
40.665
40.6649
40.6648
40.6647
Northing
Easting
Well
40.665272031308,
-84.188138652707
Utility
0
28
56
EM61 Response-Channel 3 (mV)
42
36
30
24
18
12
6
0
-6
-12
-18
-24
-30
-36
-42
-48
-54
-60
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

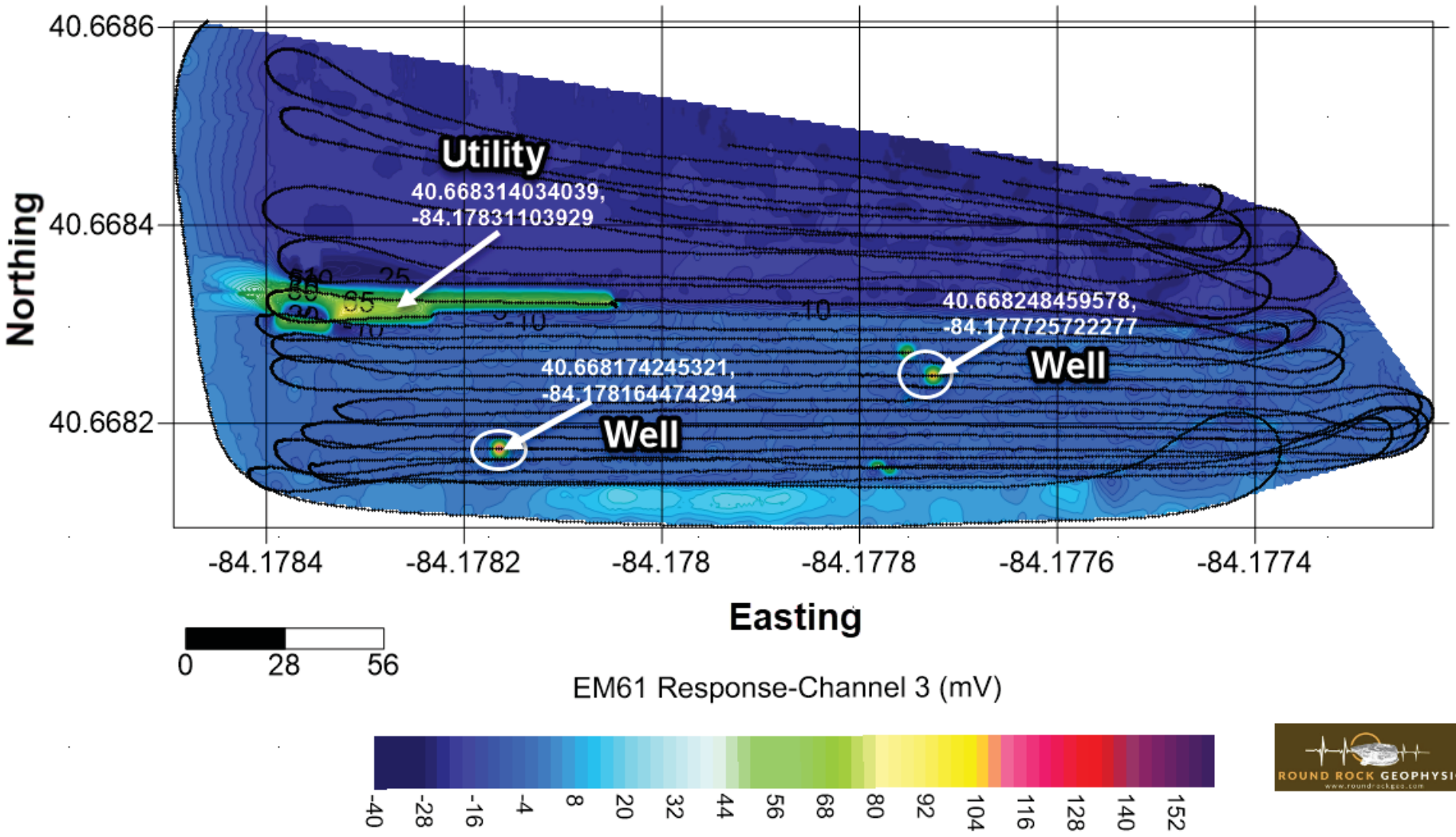

Well 86-Channel 3
-84.1869
-84.1868
-84.1867
-84.1866
-84.1865
-84.1864
40.6653
40.6652
40.6651
40.665
40.6649
40.6648
40.6647
40.6646
Northing
Easting
Well
40.664747468735,
-84.186928580907
EM61 Response-Channel 3 (mV)
79
73
67
61
55
49
43
37
31
25
19
13
7
1
-5
-11
-17
-23
-29
-35
-41
-47
-300
0
28
56
ROUND ROCK GEOPHYSICS

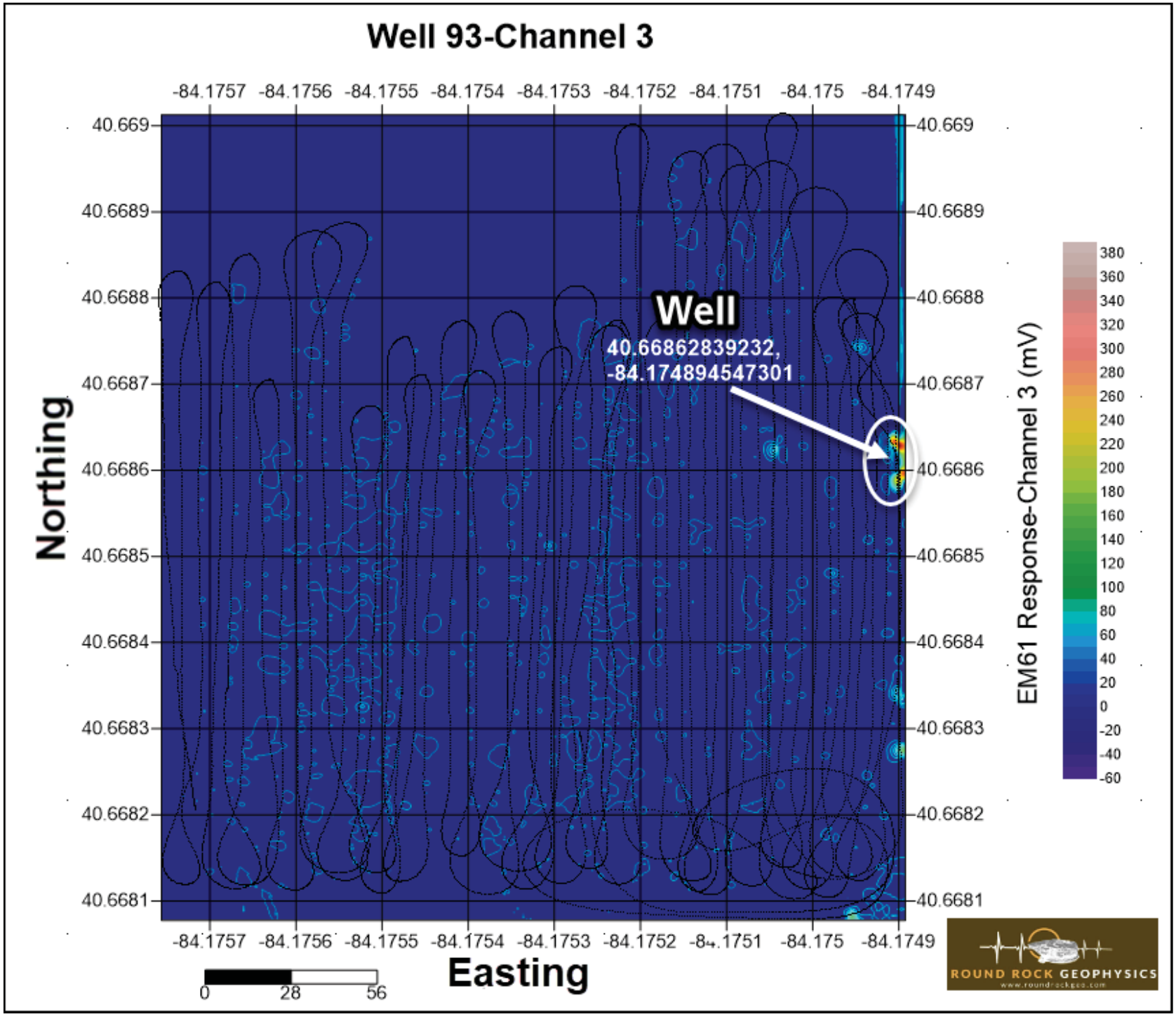

Well 87-Channel 3
-84.1855
-84.1854
-84.1853
-84.1852
-84.1851
-84.185
-84.1849
-84.1848
40.6654
40.6653
40.6652
40.6651
40.665
40.6649
40.6648
40.6647
Northing
Easting
Well
40.665166845297,
-84.185518995547
EM61 Response-Channel 3 (mV)
176
167
158
149
140
131
122
113
104
95
86
77
68
59
50
41
32
23
14
5
-4
-13
-22
-31
-40
0
28
56
ROUND ROCK GEOPHYSICS

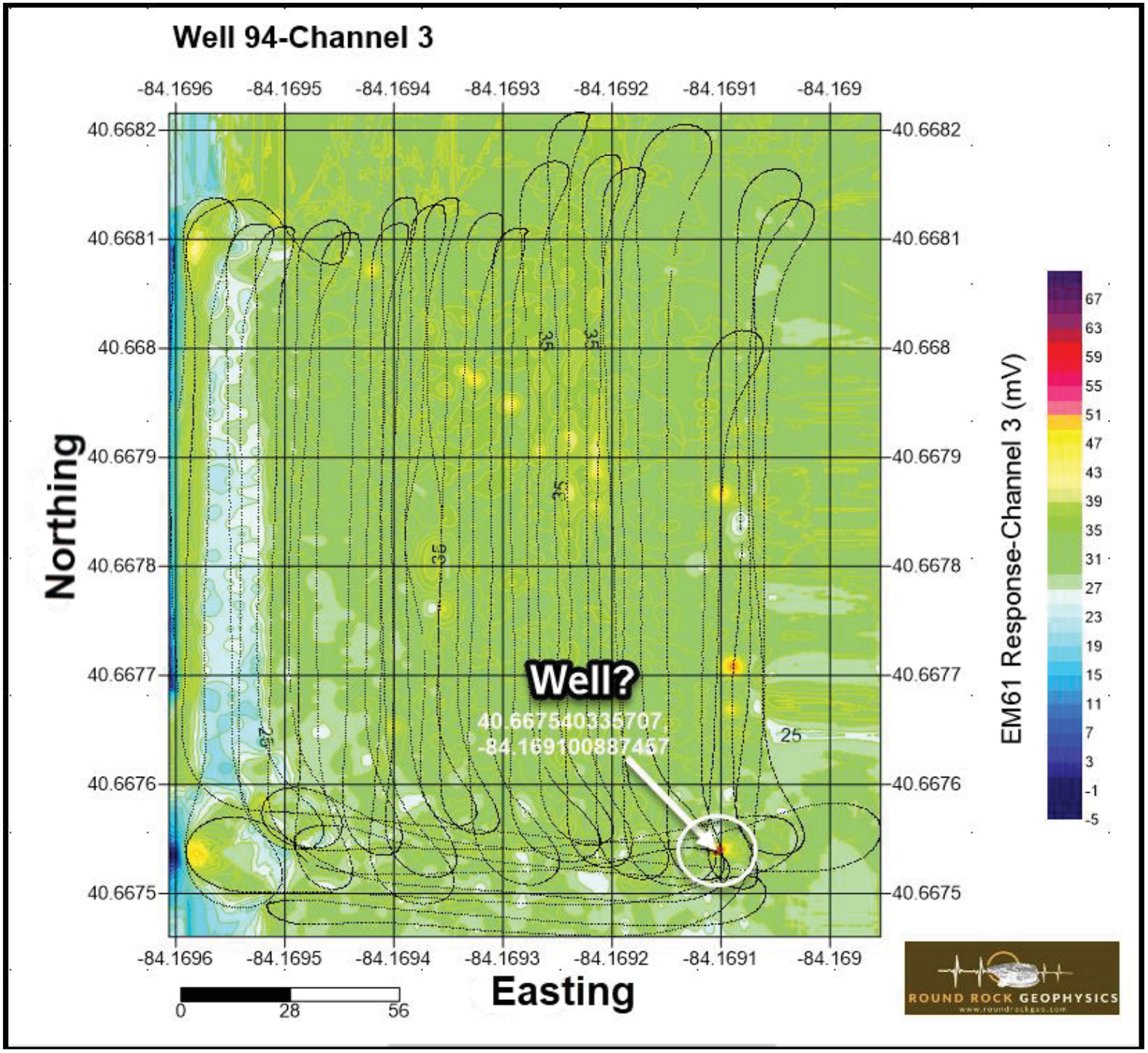

Well 90-Channel 3
40.6618
40.6617
40.6616
40.6615
40.6614
40.6613
40.6612
40.6611
Northing
-84.1884
-84.1883
-84.1882
Easting
Well
40.66145578213,
-84.188165306857
Well
40.661416568639,
-84.188231277789
Well
40.661394732107,
-84.188357837408
EM61 Response-Channel 3 (mV)
72
68
64
60
56
52
48
44
40
36
32
28
24
20
16
12
8
4
0
-4
-8
-12
-16
-20
ROUND ROCK GEOPHYSICS

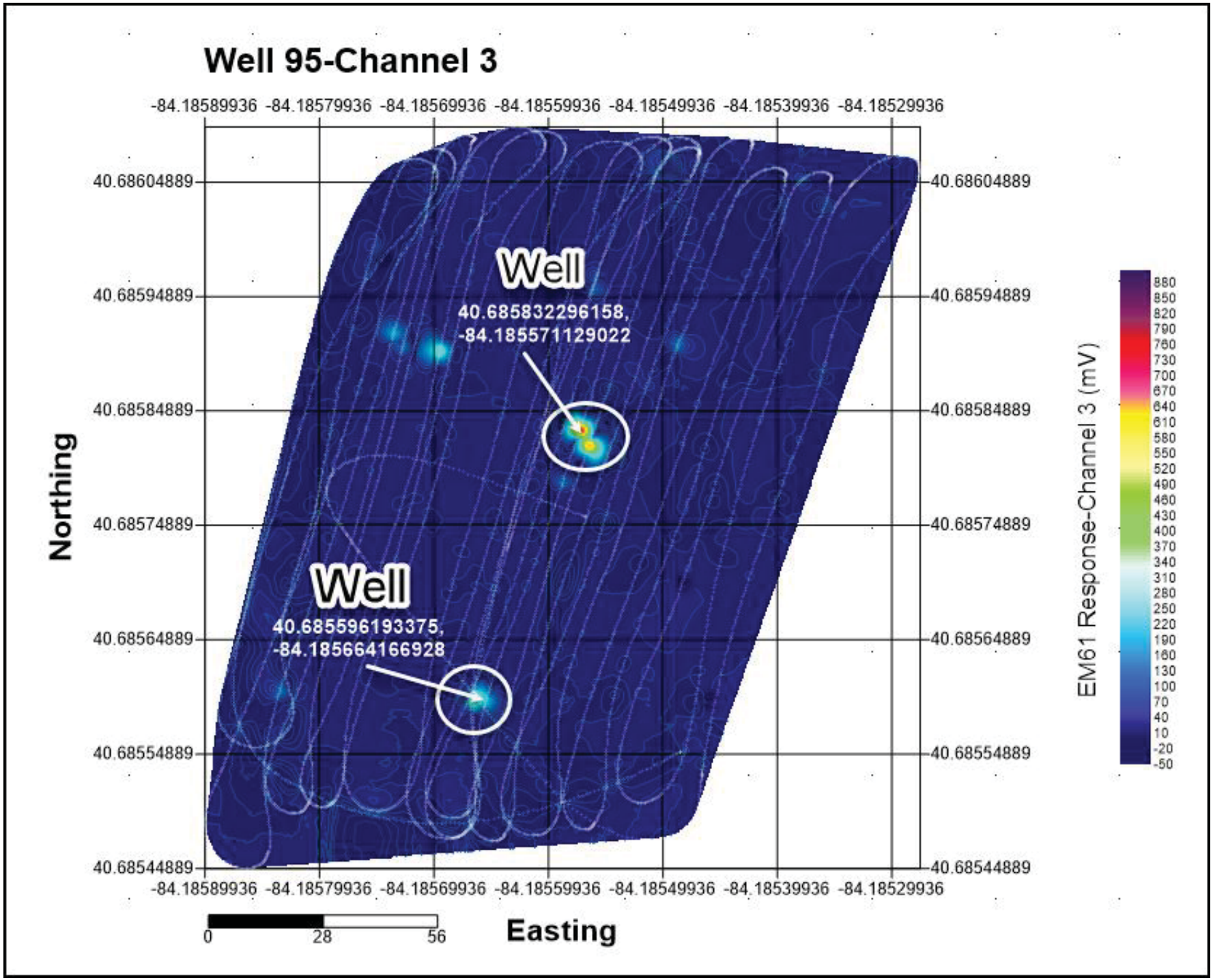

Well 91-Channel 3
40.6655
40.6654
40.6653
40.6652
40.6651
40.665
40.6649
40.6648
40.6647
40.6646
Northing
-84.1833
-84.1832
-84.1831
Easting
Well
40.667308292667,
-84.183306628285
Well
40.664961289918,
-84.18328863555
Well
40.664698253266,
-84.183119846558
EM61 Response-Channel 3 (mV)
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
ROUND ROCK GEOPHYSICS

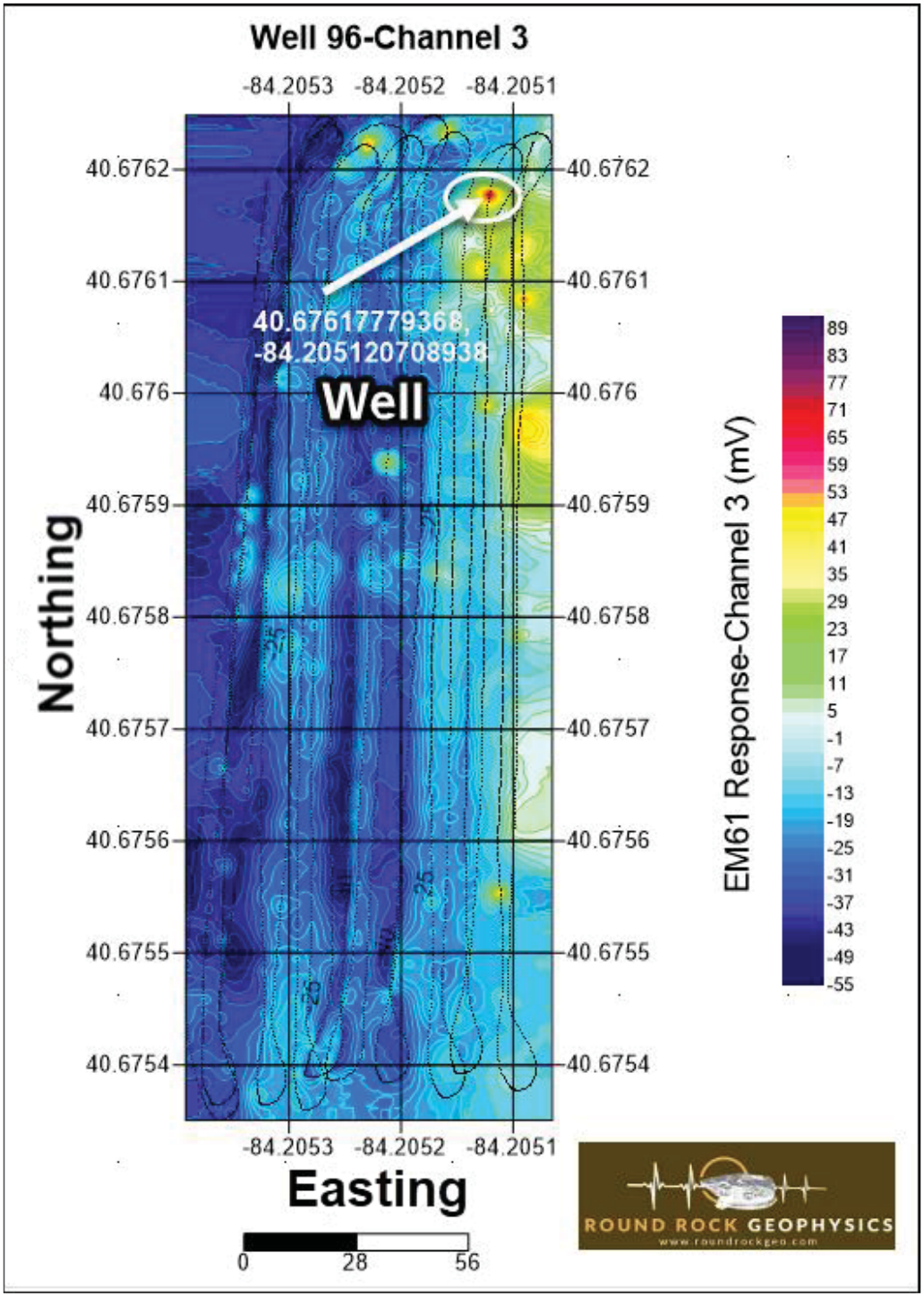
# Well 92-Channel 3

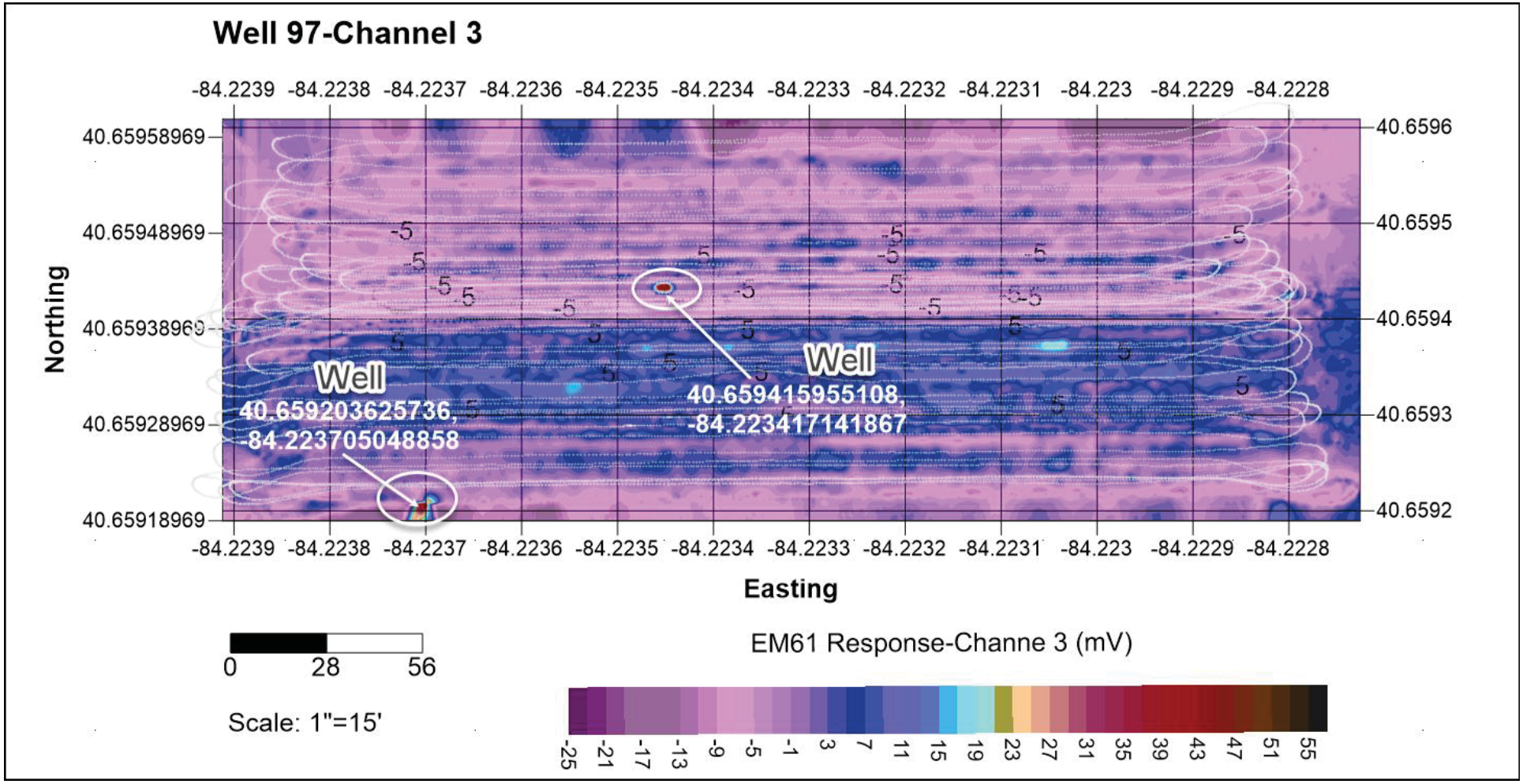


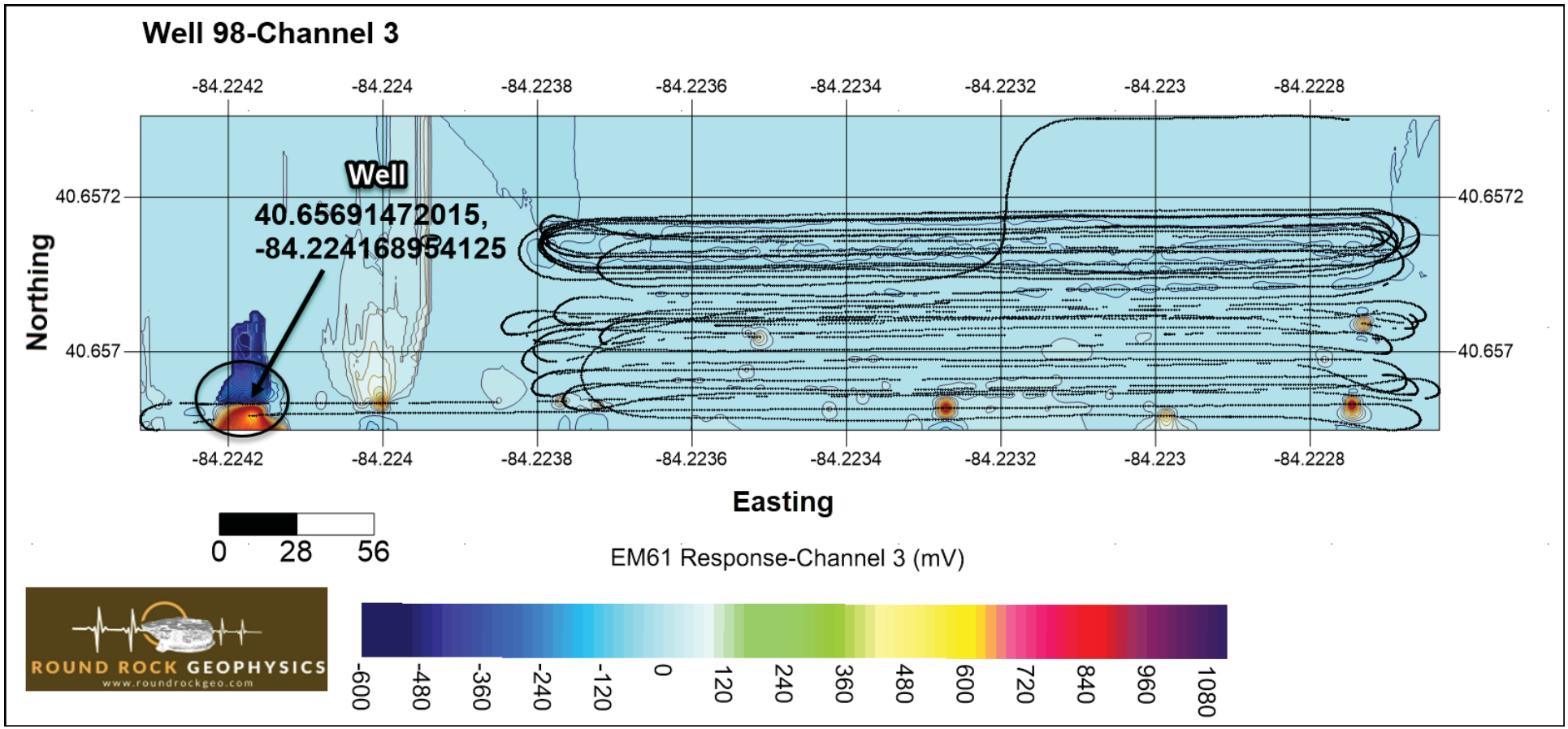

Well 93-Channel 3
-84.1757
-84.1756
-84.1755
-84.1754
-84.1753
-84.1752
-84.1751
-84.175
-84.1749
40.669
40.6689
40.6688
40.6687
40.6686
40.6685
40.6684
40.6683
40.6682
40.6681
Northing
Easting
Well
40.66862839232,
-84.174894547301
EM61 Response-Channel 3 (mV)
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
0
28
56
ROUND ROCK GEOPHYSICS

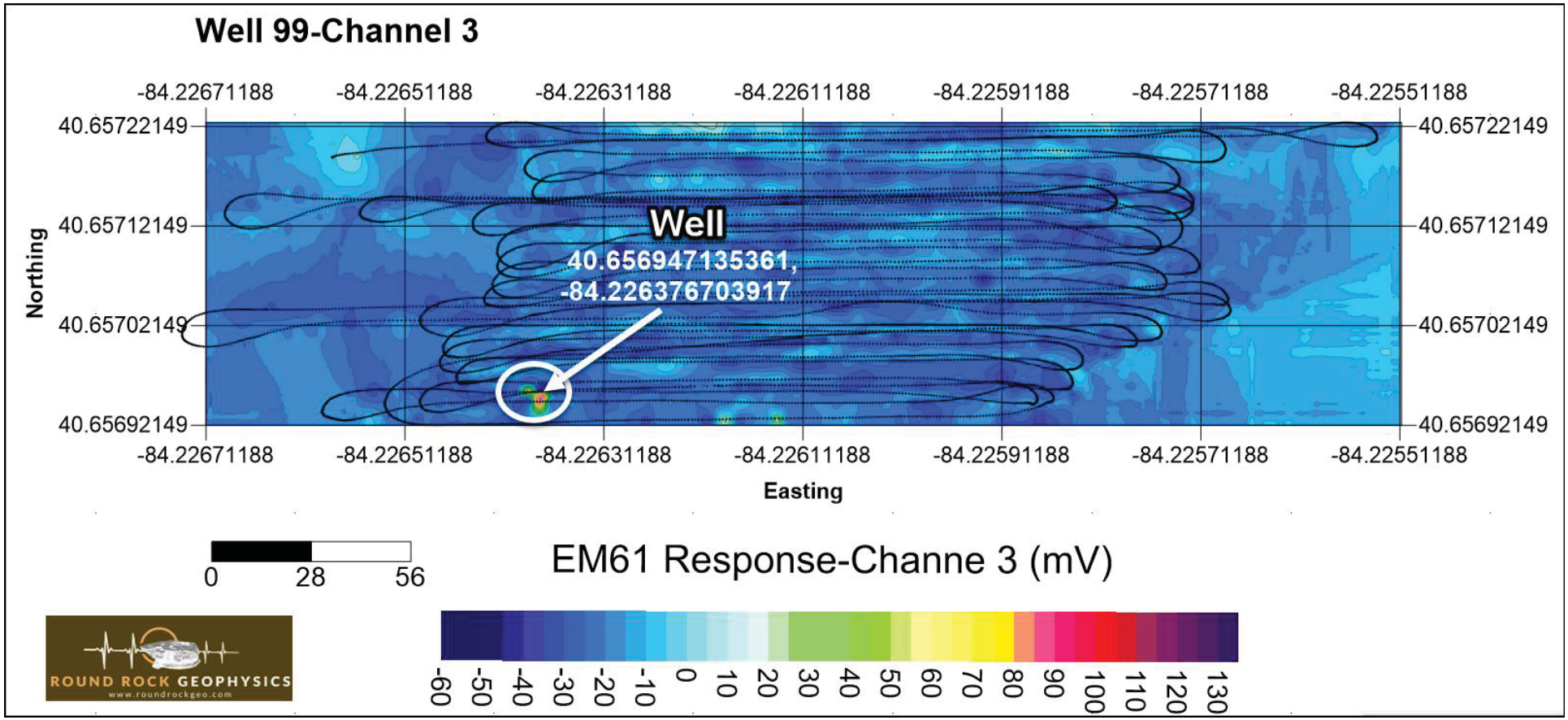

Well 94-Channel 3
-84.1696
-84.1695
-84.1694
-84.1693
-84.1692
-84.1691
-84.169
40.6682
40.6681
40.668
40.6679
40.6678
40.6677
40.6676
40.6675
Northing
Easting
Well?
40.667540335707,
-84.169100887457
25
35
EM61 Response-Channel 3 (mV)
67
63
59
55
51
47
43
39
35
31
27
23
19
15
11
7
3
-1
-5
0
28
56
ROUND ROCK GEOPHYSICS

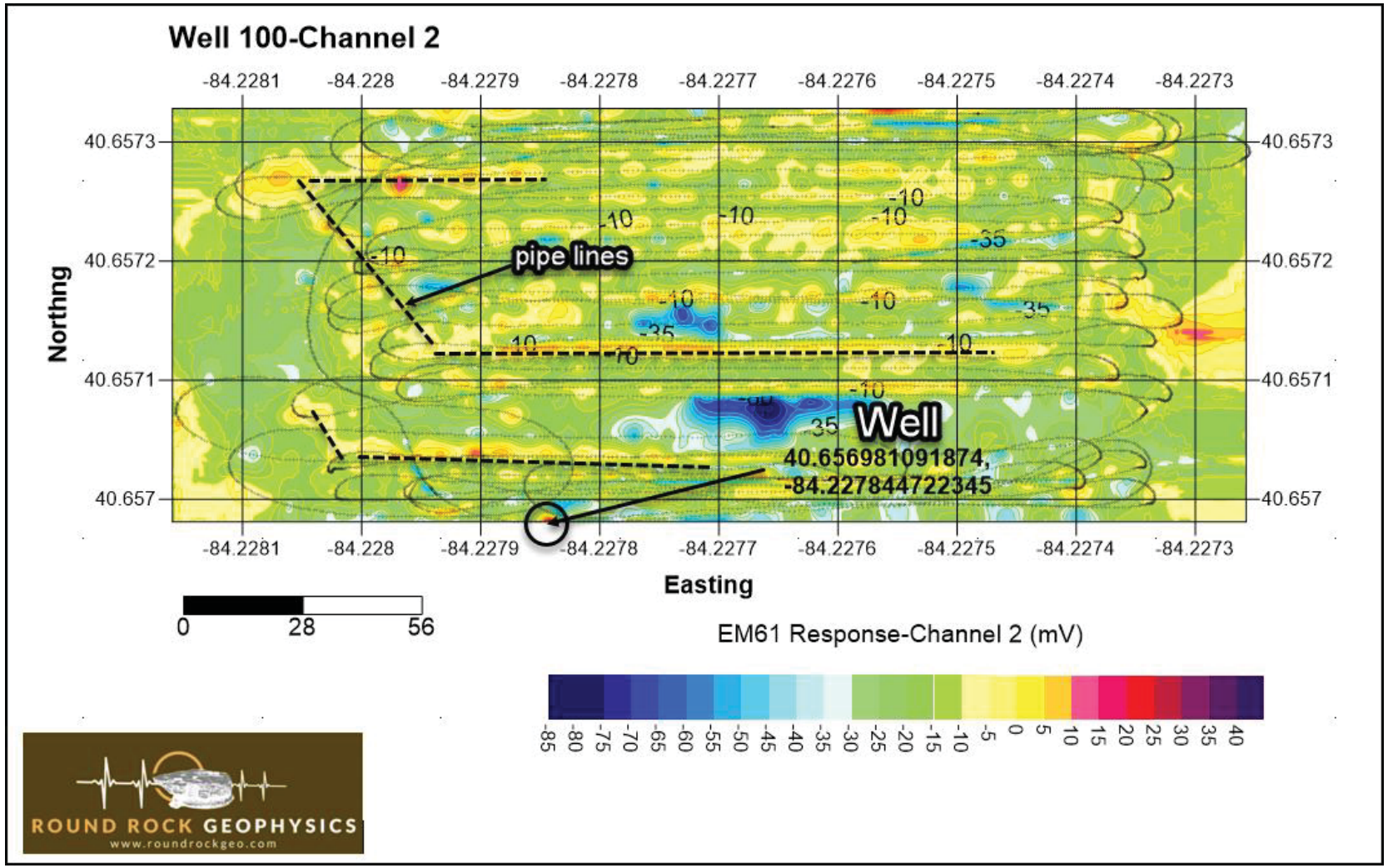

Well 95-Channel 3
-84.18589936
-84.18579936
-84.18569936
-84.18559936
-84.18549936
-84.18539936
-84.18529936
40.68604889
40.68594889
40.68584889
40.68574889
40.68564889
40.68554889
40.68544889
Northing
Easting
Well
40.685832296158,
-84.185571129022
Well
40.685596193375,
-84.185664166928
0
28
56
EM61 Response-Channel 3 (mV)
880
850
820
790
760
730
700
670
640
610
580
550
520
490
460
430
400
370
340
310
280
250
220
190
160
130
100
70
40
10
-20
-50

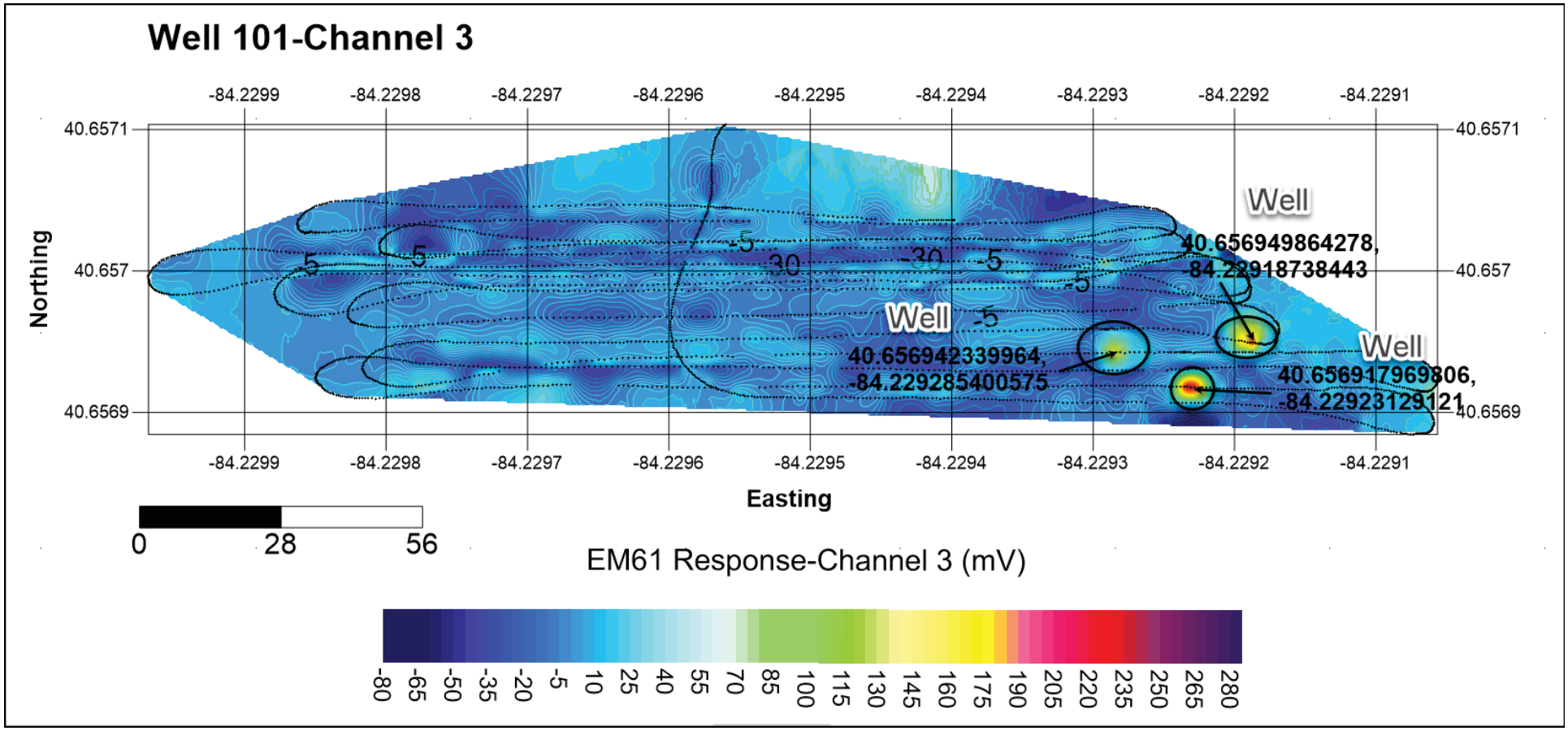

Well 96-Channel 3
-84.2053
-84.2052
-84.2051
40.6762
40.6761
40.676
40.6759
40.6758
40.6757
40.6756
40.6755
40.6754
40.67617779368,
-84.205120708938
Well
Northing
Easting
EM61 Response-Channel 3 (mV)
89
83
77
71
65
59
53
47
41
35
29
23
17
11
5
-1
-7
-13
-19
-25
-31
-37
-43
-49
-55
0
28
56
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

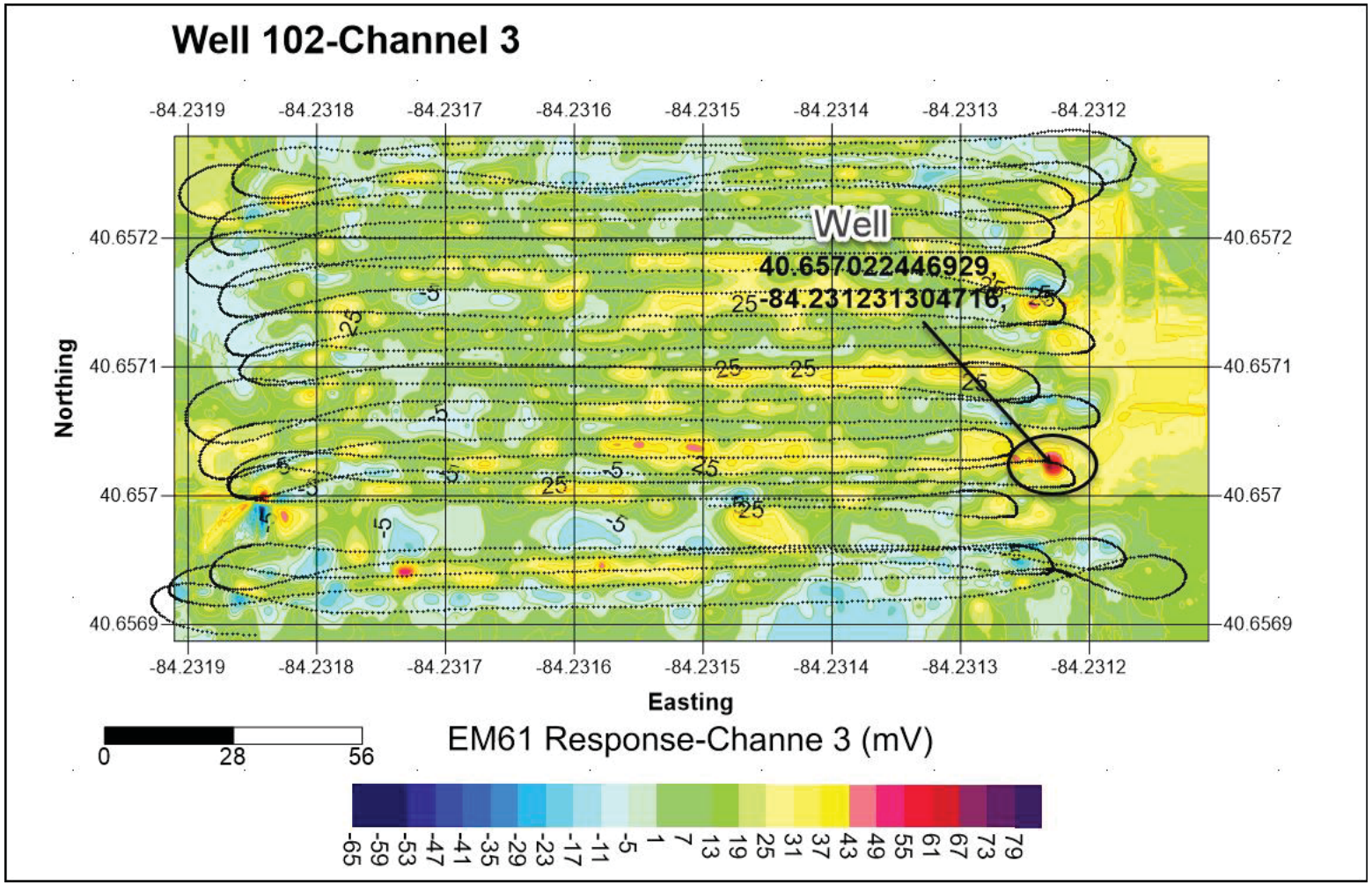

Well 97-Channel 3
-84.2239 -84.2238 -84.2237 -84.2236 -84.2235 -84.2234 -84.2233 -84.2232 -84.2231 -84.223 -84.2229 -84.2228
40.65958969
40.65948969
40.65938969
40.65928969
40.65918969
40.6596
40.6595
40.6594
40.6593
40.6592
Northing
Easting
Well
40.659203625736,
-84.223705048858
Well
40.659415955108,
-84.223417141867
0 28 56
Scale: 1"=15'
EM61 Response-Channe 3 (mV)
-25 -21 -17 -13 -9 -5 -1 3 7 11 15 19 23 27 31 35 39 43 47 51 55

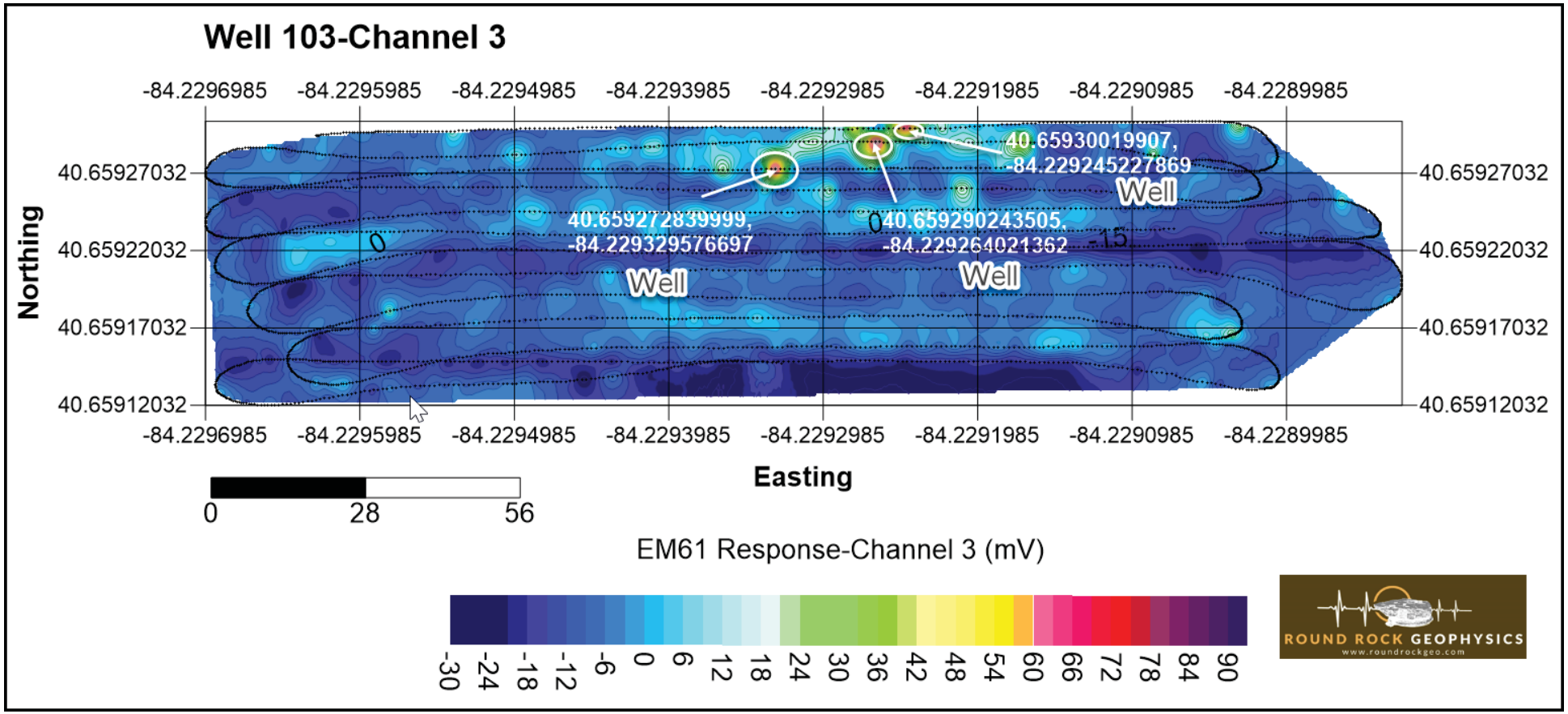

Well 98-Channel 3
-84.2242
-84.224
-84.2238
-84.2236
-84.2234
-84.2232
-84.223
-84.2228
Well
40.65691472015,
-84.22416895 4125
40.6572
40.657
Northing
Easting
0
28
56
EM61 Response-Channel 3 (mV)
-600
-480
-360
-240
-120
0
120
240
360
480
600
720
840
960
1080
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

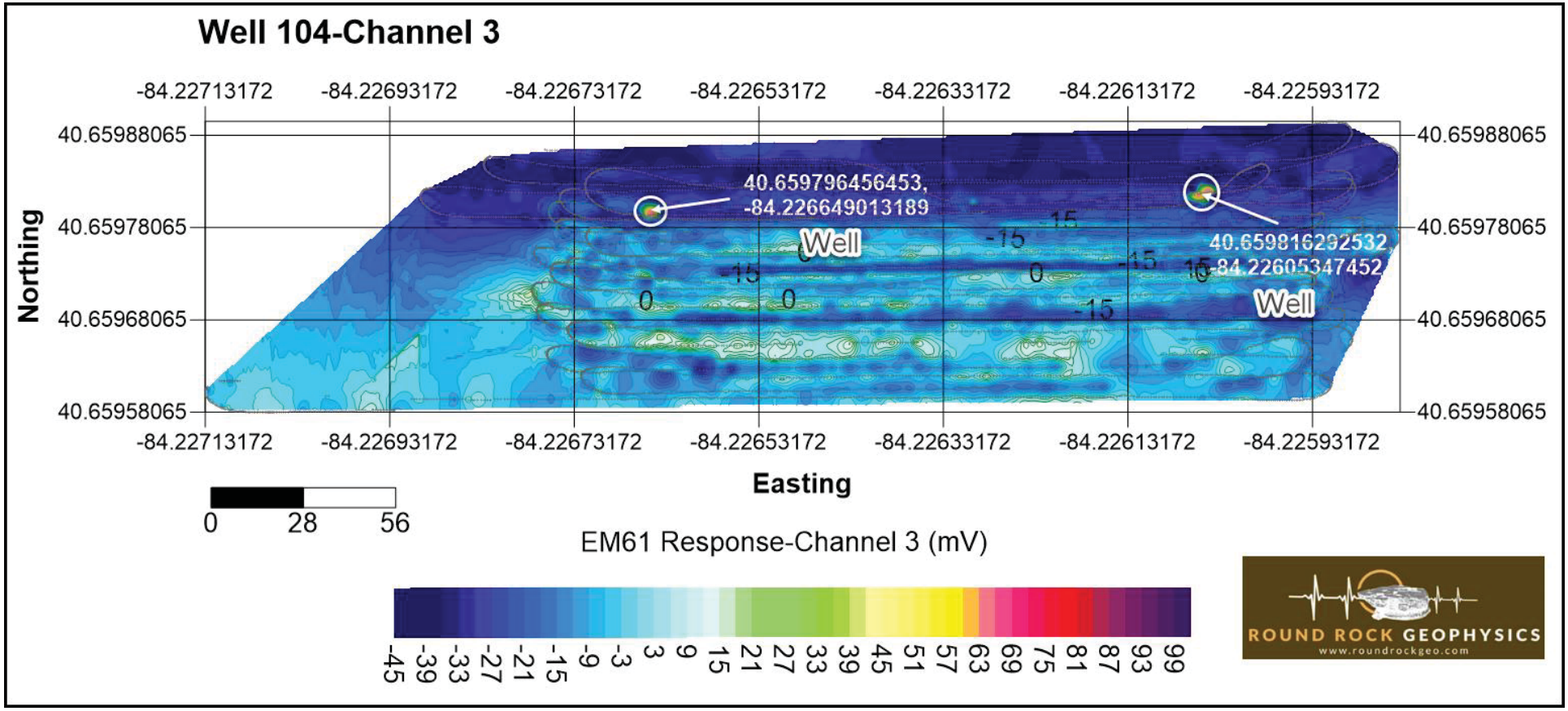

Well 99-Channel 3
-84.22671188
-84.22651188
-84.22631188
-84.22611188
-84.22591188
-84.22571188
-84.22551188
40.65722149
40.65712149
40.65702149
40.65692149
Northing
Easting
Well
40.656947135361,
-84.226376703917
0
28
56
EM61 Response-Channe 3 (mV)
-60
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

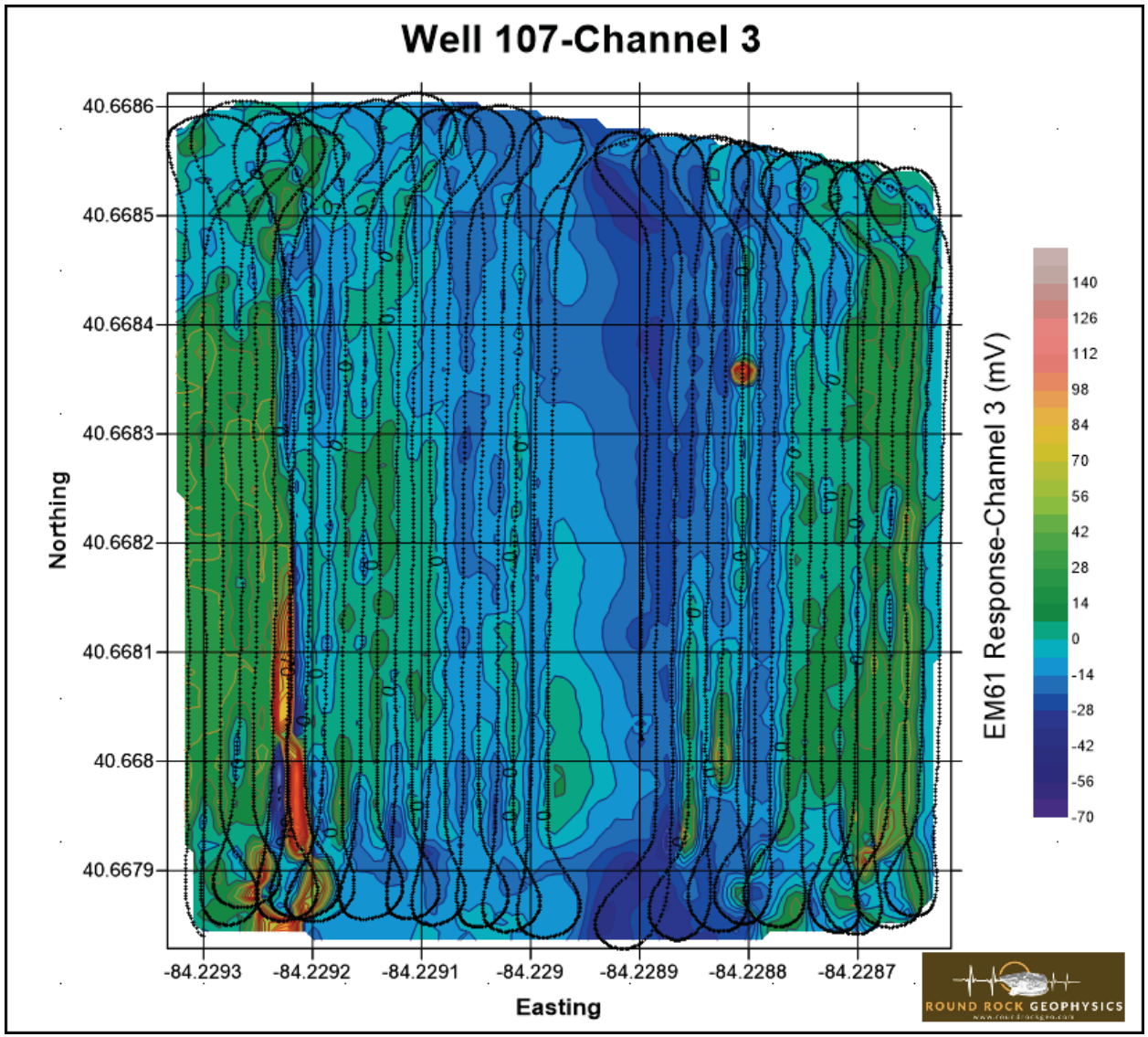

Well 100-Channel 2
-84.2281
-84.228
-84.2279
-84.2278
-84.2277
-84.2276
-84.2275
-84.2274
-84.2273
40.6573
40.6572
40.6571
40.657
Northng
Easting
pipe lines
Well
40.656981091874,
-84.227844722345
-10
-35
35
0
28
56
EM61 Response-Channel 2 (mV)
-85
-80
-75
-70
-65
-60
-55
-50
-45
-40
-35
-30
-25
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com


Well 101-Channel 3
-84.2299
-84.2298
-84.2297
-84.2296
-84.2295
-84.2294
-84.2293
-84.2292
-84.2291
40.6571
40.657
40.6569
Northing
Easting
Well
40.656949864278,
-84.22918738443
Well
40.656942339964,
-84.229285400575
Well
40.656917969806,
-84.22923129121
5
-5
30
-30
0
28
56
EM61 Response-Channel 3 (mV)
-80
-65
-50
-35
-20
-5
10
25
40
55
70
85
100
115
130
145
160
175
190
205
220
235
250
265
280

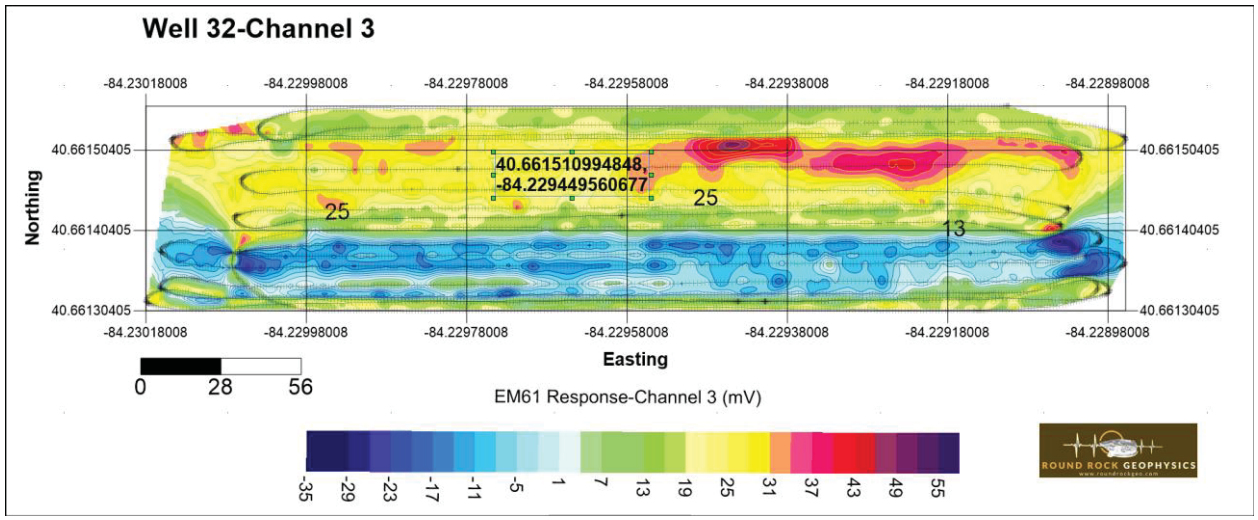

Well 102-Channel 3
Well
40.657022446929,
-84.231231304716,
Northing
Easting
-84.2319
-84.2318
-84.2317
-84.2316
-84.2315
-84.2314
-84.2313
-84.2312
40.6572
40.6571
40.657
40.6569
0
28
56
EM61 Response-Channe 3 (mV)
-65 -59 -53 -47 -41 -35 -29 -23 -17 -11 -5 1 7 13 19 25 31 37 43 49 55 61 67 73 79

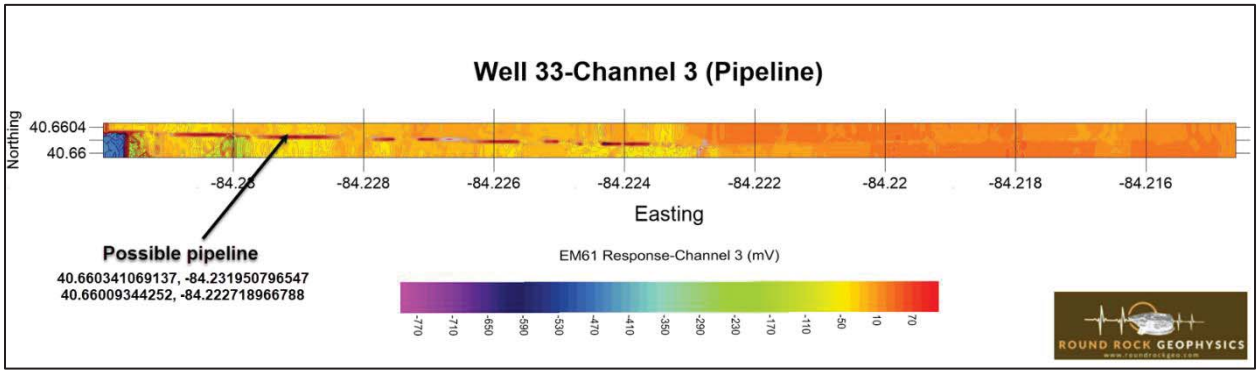

Well 103-Channel 3
-84.2296985
-84.2295985
-84.2294985
-84.2293985
-84.2292985
-84.2291985
-84.2290985
-84.2289985
40.65927032
40.65922032
40.65917032
40.65912032
Northing
Easting
40.65930019907,
-84.229245227869
Well
40.659272839999,
-84.229329576697
Well
40.659290243505,
-84.229264021362
Well
0
-15
0
28
56
EM61 Response-Channel 3 (mV)
-30
-24
-18
-12
-6
0
6
12
18
24
30
36
42
48
54
60
66
72
78
84
90
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

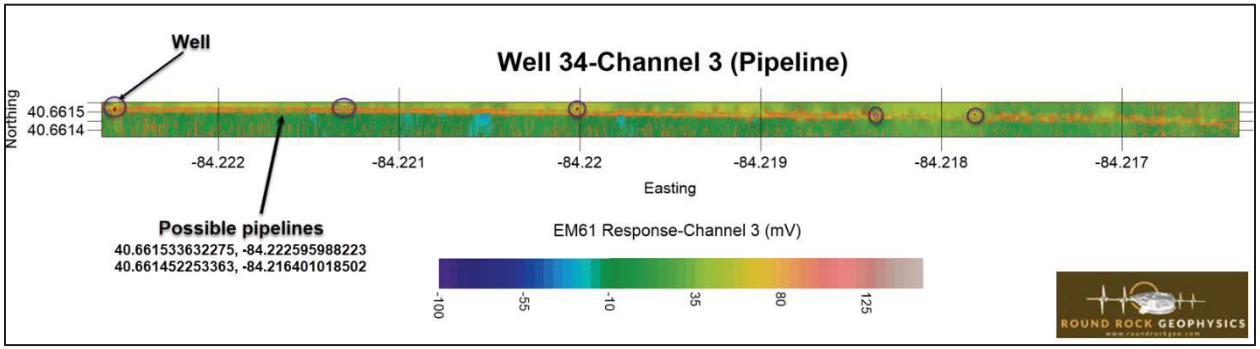

Well 104-Channel 3
-84.22713172
-84.22693172
-84.22673172
-84.22653172
-84.22633172
-84.22613172
-84.22593172
40.65988065
40.65978065
40.65968065
40.65958065
Northing
Easting
40.659796456453,
-84.226649013189
Well
40.659816292532,
-84.22605347452
Well
0
28
56
EM61 Response-Channel 3 (mV)
-45 -39 -33 -27 -21 -15 -9 -3 3 9 15 21 27 33 39 45 51 57 63 69 75 81 87 93 99
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

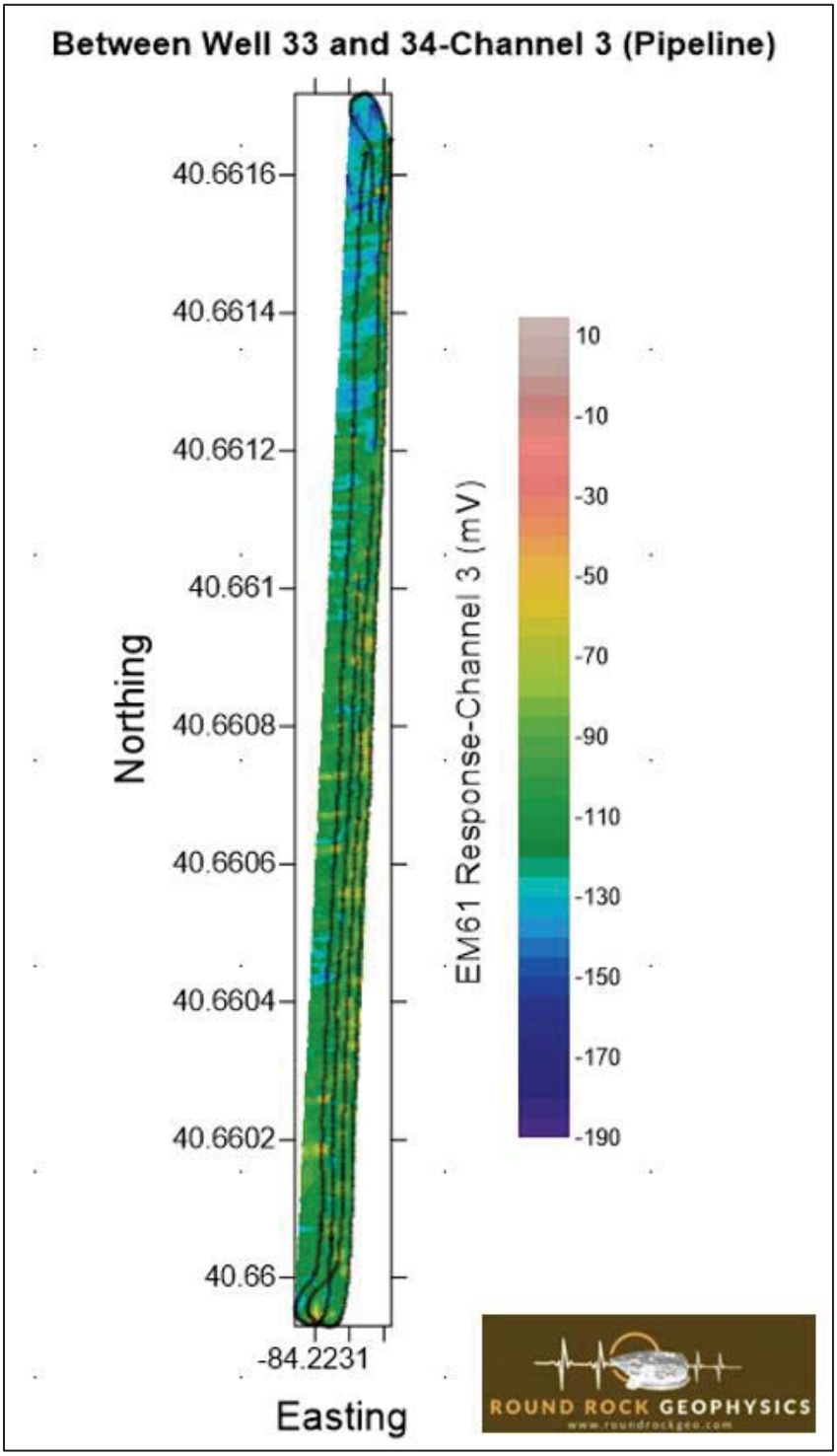

Well 107-Channel 3
40.6686
40.6685
40.6684
40.6683
40.6682
40.6681
40.668
40.6679
Northing
-84.2293
-84.2292
-84.2291
-84.229
-84.2289
-84.2288
-84.2287
Easting
EM61 Response-Channel 3 (mV)
140
126
112
98
84
70
56
42
28
14
0
-14
-28
-42
-56
-70
ROUND ROCK GEOPHYSICS

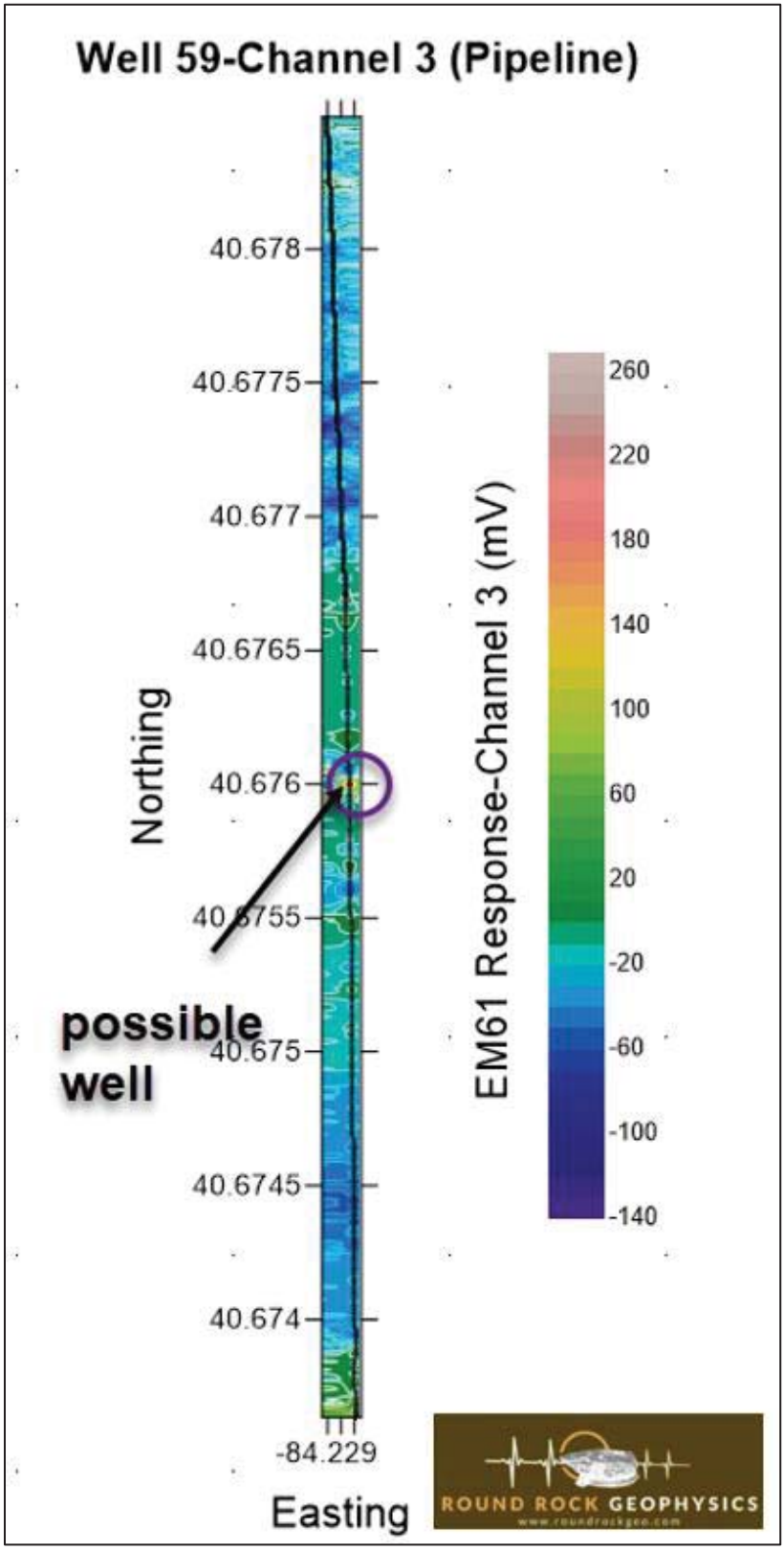
## Horizontal Anomalies

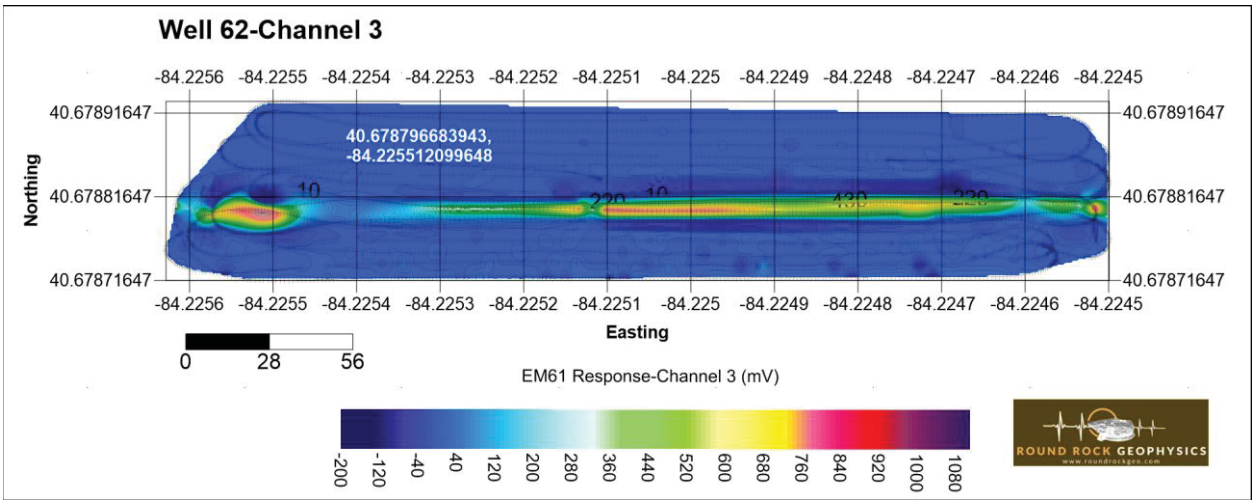


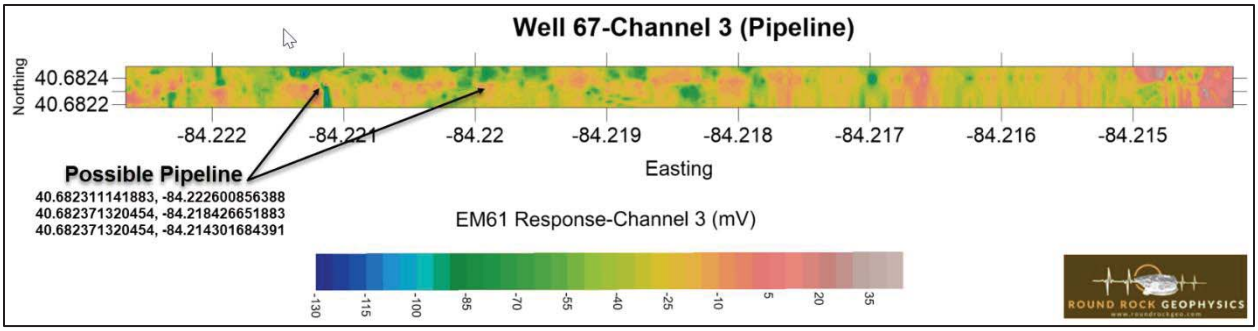



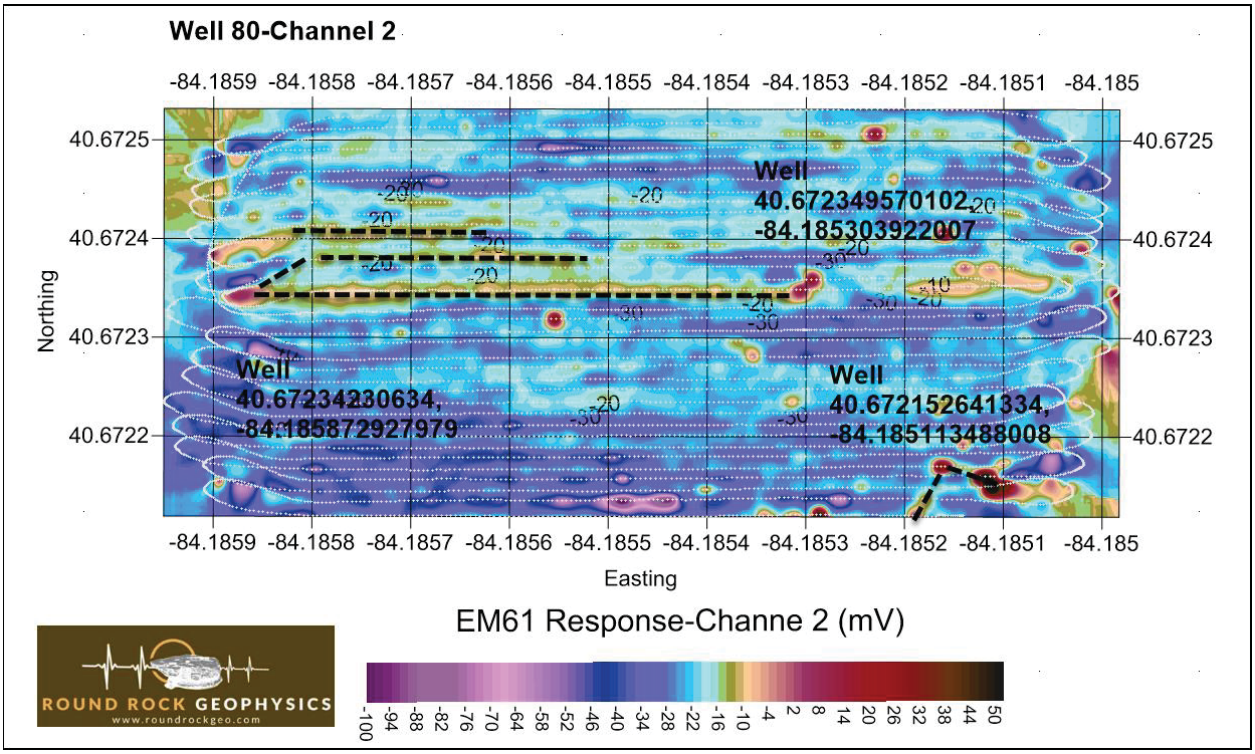

Well 34-Channel 3 (Pipeline)
Well
Northing
40.6615
40.6614
-84.222
-84.221
-84.22
-84.219
-84.218
-84.217
Easting
Possible pipelines
40.661533632275, -84.222595988223
40.661452253363, -84.216401018502
EM61 Response-Channel 3 (mV)
-100
-55
-10
35
80
125
ROUND ROCK GEOPHYSICS

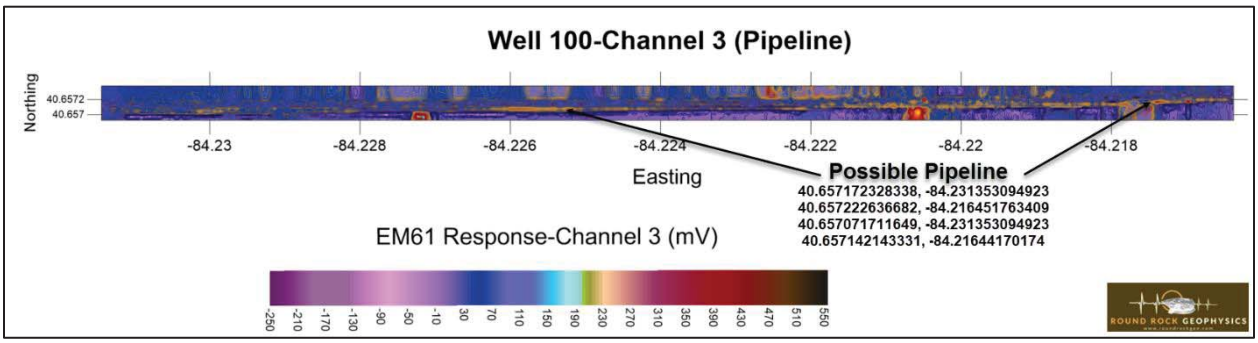

Between Well 33 and 34-Channel 3 (Pipeline)
40.6616
40.6614
40.6612
40.661
40.6608
40.6606
40.6604
40.6602
40.66
Northing
-84.2231
Easting
EM61 Response-Channel 3 (mV)
10
-10
-30
-50
-70
-90
-110
-130
-150
-170
-190
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com

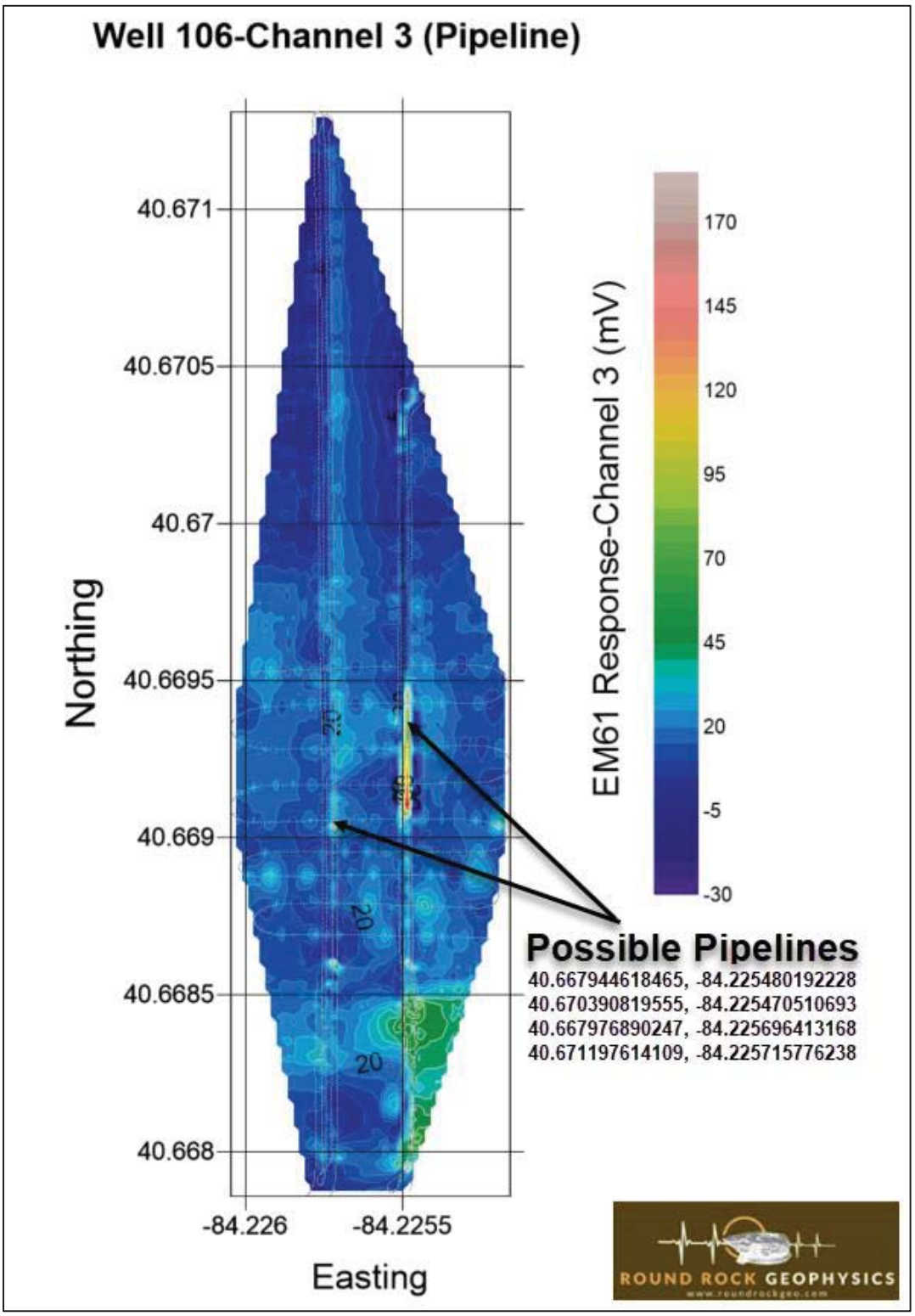

Well 59-Channel 3 (Pipeline)
40.678
40.6775
40.677
40.6765
40.676
40.6755
40.675
40.6745
40.674
Northing
possible well
-84.229
Easting
EM61 Response-Channel 3 (mV)
260
220
180
140
100
60
20
-20
-60
-100
-140
ROUND ROCK GEOPHYSICS


Well 62-Channel 3
-84.2256 -84.2255 -84.2254 -84.2253 -84.2252 -84.2251 -84.225 -84.2249 -84.2248 -84.2247 -84.2246 -84.2245
40.67891647
40.67881647
40.67871647
Northing
40.678796683943,
-84.225512099648
10
220
10
430
220
Easting
0 28 56
EM61 Response-Channel 3 (mV)
-200 -120 -40 40 120 200 280 360 440 520 600 680 760 840 920 1000 1080
ROUND ROCK GEOPHYSICS


Well 67-Channel 3 (Pipeline)
Northing
40.6824
40.6822
-84.222 -84.221 -84.22 -84.219 -84.218 -84.217 -84.216 -84.215
Easting
Possible Pipeline
40.682311141883, -84.222600856388
40.682371320454, -84.218426651883
40.682371320454, -84.214301684391
EM61 Response-Channel 3 (mV)
-130 -115 -100 -85 -70 -55 -40 -25 -10 5 20 35
ROUND ROCK GEOPHYSICS


Well 80-Channel 2
-84.1859 -84.1858 -84.1857 -84.1856 -84.1855 -84.1854 -84.1853 -84.1852 -84.1851 -84.185
40.6725
40.6724
40.6723
40.6722
Northing
Well
40.672349570102,
-84.185303922007
Well
40.672342230634,
-84.185872927979
Well
40.672152641334,
-84.185113488008
Easting
EM61 Response-Channe 2 (mV)
-100 -94 -88 -82 -76 -70 -64 -58 -52 -46 -40 -34 -28 -22 -16 -10 -4 2 8 14 20 26 32 38 44 50
ROUND ROCK GEOPHYSICS
www.roundrockgeo.com


Well 100-Channel 3 (Pipeline)
Northing
40.6572
40.657
-84.23
-84.228
-84.226
-84.224
-84.222
-84.22
-84.218
Easting
Possible Pipeline
40.657172328338, -84.231353094923
40.657222636682, -84.216451763409
40.657071711649, -84.231353094923
40.657142143331, -84.21644170174
EM61 Response-Channel 3 (mV)
-250
-210
-170
-130
-90
-50
-10
30
70
110
150
190
230
270
310
350
390
430
470
510
550
ROUND ROCK GEOPHYSICS


Well 106-Channel 3 (Pipeline)
40.671
40.6705
40.67
40.6695
40.669
40.6685
40.668
Northing
-84.226
-84.2255
Easting
EM61 Response-Channel 3 (mV)
170
145
120
95
70
45
20
-5
-30
Possible Pipelines
40.667944618465, -84.225480192228
40.670390819555, -84.225470510693
40.667976890247, -84.225696413168
40.671197614109, -84.225715776238
ROUND ROCK GEOPHYSICS

**This foregoing document was electronically filed with the Public Utilities**

**Commission of Ohio Docketing Information System on**

**9/27/2021 5:20:29 PM**

**in**

**Case No(s). 20-1605-EL-BGN**

Summary: Response to Ninth Data Request from Staff of the Ohio Power Siting Board electronically filed by Christine M.T. Pirik on behalf of Birch Solar 1, LLC