Reimaging the Black Friary:
Recent Approaches to Seeing Beyond Modern Activities at the Dominican Friary, Trim, Co Meath, Republic of Ireland

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Problem: Geophysically surveying a site with severe modern disturbance

Solution: Taking a small-scale (high-resolution), multi-method approach

Introduction

Archaeological and forensic investigations often include non-invasive searches for buried remains. Geophysical survey, however, is hindered by modern rubbish, ferrous objects, clay soils, and waterlogged areas. This study was a multi-method (ground-penetrating radar, electromagnetic induction, and magnetic), multi-phase survey of unexcavated areas of the Black Friary (see Shine et al. 2016; Green 2015, 2016). Post-medieval quarrying of the site produced a thick (*c.* 40-60 cm) rubble layer which is overlain by ferrous contamination from modern dumping.

Figure 1: Site location

The Black Friary (see O'Carroll 2014)

- Founded in 1263 by Geoffrey de Geneville
- Demolished and quarried after the 16th century dissolution of monastic houses
- Situated within 1km of the River Boyne and Trim Castle (outside the northern medieval boundary of Trim town)
- Presently lies within c. 2.5ha of pastoral/community land under excavation by the Irish Archaeology Field School (IAFS)
- Remains of the friary are visible on the surfaces as exposed stonework and grassy hummocks
- Superficial deposits across the site are largely silty clay, sandy clay, and clayey silt

Previous Surveys

Kennedy (1989) — **Proton magnetometry | Resistivity | Topographic survey**
- Outlined the friary buildings and areas of interest

Niall Lynch (2010) — **Topographic survey**
- Further delineated areas of interest

Ian Elliot – IGAS Ltd. (2010) — **Gradiometry | Resistivity**
- Gradiometry hindered by ferrous contamination
- Resistivity confirmed Kennedy's interpretation

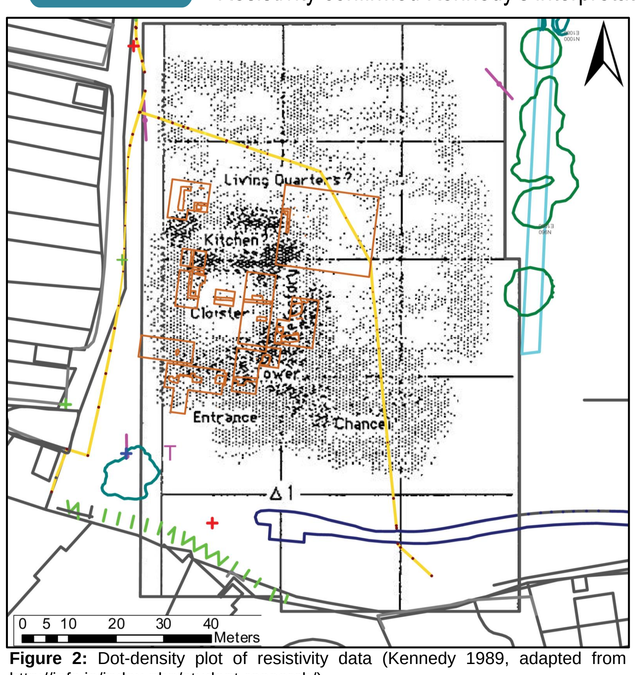

Figure 2: Dot-density plot of resistivity data (Kennedy 1989, adapted from http://iafs.ie/index.php/student-research/).

Methods

GPR — **MALÅ RAMAC X3M**
- Shielded 250 MHz, 500MHz, & 800MHz central frequency antennas
- Orthogonal survey
- Traverse Intervals: 0.10m, 0.20m, 0.25m, 0.5m, 1m
- Sampling Interval: 0.02m

Single Gradiometer — **Geoscan Research FM256**
- Traverse Interval: 0.5m
- Sampling Interval: 0.125m

EMI — **Geonics EM38B**
- 1m intercoil spacing
- 14.7KHz frequency
- Traverse Interval: 1m
- Sampling Interval: 0.5m

Dual Gradiometer — **Bartington Grad601**
- Traverse Interval: 1m
- Sampling Interval: 0.125m

Results

The multi-method, higher resolution surveys delineated (Fig. 3):
- Possible town wall remains and/or the foundation trench (See Shine *et al*. 2016)
- Possible burials within the cemetery boundary
- A well or similar access to groundwater and a possible associated paleochannel/stream
- Modern disturbances

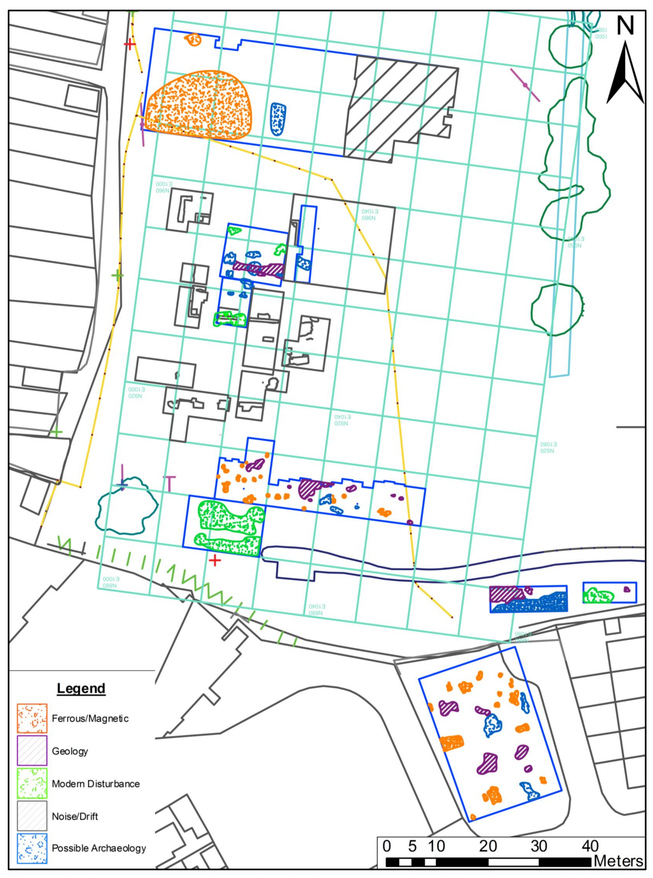

Figure 3: Interpretation of geophysical survey results. (Map data provided by IAFS)

A distinct decline in data quality directly correlated to traverse spacing (demonstrated in Figs. 4-5). In the case of this site and forensic investigations it is essential to acquire high resolution data. This research suggests a 0.10m traverse interval and 0.02m sampling interval achieves ideal resolution (particularly for burials).

GPR proved most successful in terms of feature detection, depth of investigation, and data quality.

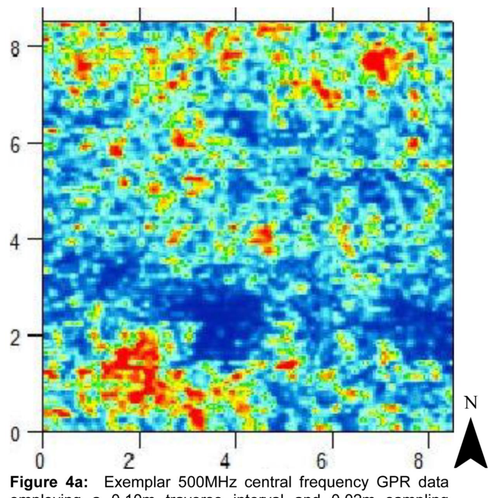

Figure 4a: Exemplar 500MHz central frequency GPR data employing a 0.10m traverse interval and 0.02m sampling interval. Below are examples of this data employing coarser traverse intervals

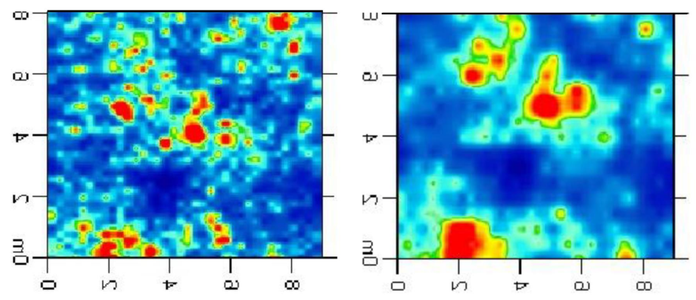

Figure 4b: Exemplar 500MHz central frequency GPR data employing a 0.20m traverse interval and 0.02m sampling interval.

Figure 4c: Exemplar 500MHz central frequency GPR data employing a 0.50m traverse interval and 0.02m sampling interval.

Survey Phases

2015 Establishing optimum parameters for high resolution data acquisition

2016 Locating the cemetery boundary and individual graves within

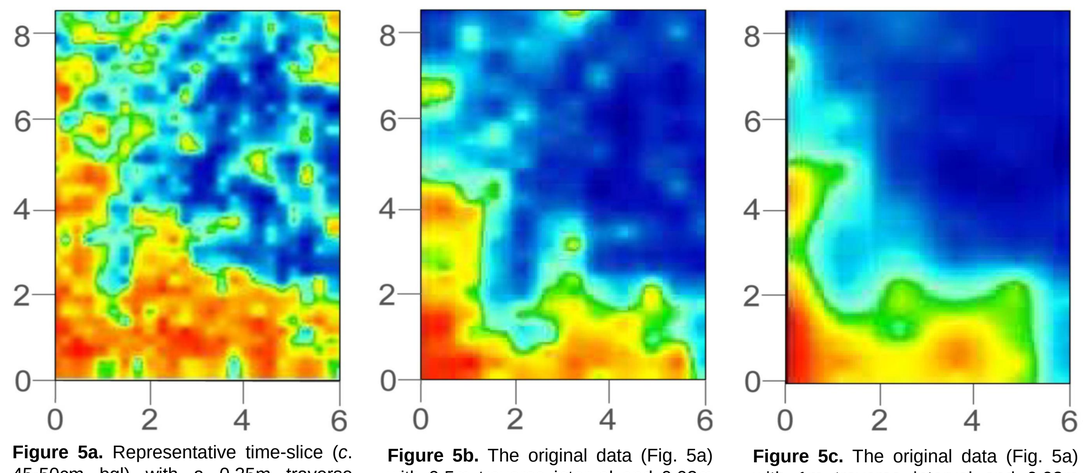

Figure 5a. Representative time-slice (*c.* 45-50cm bgl) with a 0.25m traverse interval and 0.02m sampling interval

Figure 5b. The original data (Fig. 5a) with 0.5m traverse interval and 0.02m sampling interval

Figure 5c. The original data (Fig. 5a) with 1m traverse interval and 0.02m sampling interval

Conclusion

Survey parameters, topsoil debris, and investigation depth rendered previous surveys unable to detect small, low contrast features. By employing a higher-resolution, multi-method approach, the recent surveys informed on optimum survey parameters for locating targets of archaeological or forensic relevance in high attenuation matrices, magnetic contamination, and/or rubble. **A 0.1m traverse interval and minimum 2m square grid maximise the potential to locate human interments during the pre-excavation stage of investigations in these environments.** However, the additional time required to conduct landscape surveys with these parameters must be considered. If conducting an initial landscape survey adhering to the parameters set forth in David *et al*. (2008), **subsequent survey of areas of interest utilizing traverse intervals at least 25% the size of the target object (e.g. 0.25m for adult human interments) are suitable to isolate apposite anomalies.**

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