Geophysical Survey at Kilkenny Castle, Kilkenny: Project Outline

Applicants: Cóilín Ó Drisceoil (Kilkenny Archaeology, Kilkenny Archaeological Project), Daniel Tietzche-Tyler, Earthsound Geophysics

KILKENNY ARCHAEOLOGY

KILKENNY ARCHAEOLOGICAL PROJECT

EARTHSOUND archaeological geophysics

Introduction

Kilkenny castle is an iconic site in south-east Ireland and the most visted tourist attraction in the county (Fenlon 2007) (Figure 1). When we look at the castle today following its post-medieval transformation into a rather benign and purely residential mansion, only a partial picture of its medieval scale and grandeur is presented. A soon to be published reconstruction (Tietzsch-Tyler forthcoming), derived from an analysis of the extant remains, contemporary documents, post-medieval maps, and seventeenth and nineteenth century drawings, suggests that Kilkenny castle was a formidable concentric fortress at the height of its medieval development (Figures 2, 3).

This reconstruction, if correct, would make Kilkenny castle the most formidable medieval castle in Ireland, easily comparable with the great castles of Dover, the Tower of London and Kenilworth in England, and predating by several decades the designer concentric castles of Caerphilly in Wales and Roscommon in Ireland. It surpassed in terms of military engineering the great royal castle of Dublin and the greater baronial castles of Trim, Dunamase and Carrickfergus. As such it probably accurately reflects the power wielded by its medieval lords, first William Marshal and his heirs up to 1391 and then the Butler earls of Ormond.

Proposed project

There are inconsistencies between the sources used in the Tietzche-Tyler reconstruction as well as problems with their reliability and accuracy. In particular Rocque's 1758 map of Kilkenny, which is utilised extensively, has been proved to be less than accurate elsewhere in the city (eg. Rothe House). Therefore it is proposed to carry out a ground penetrating radar (GPR) and resistance geophysical survey of the site. This would have two key aims:

- To 'ground-truth' the Tietzsch-Tyler reconstruction by providing an accurate ground plan of the buried wall-foundations of Kilkenny castle.
- To employ GPR to map the depth of archaeological deposits within the inner ward.

The following outputs will be delivered:

- The publication of a scholarly paper in the international journal of castle research *Château Gaillard* on the results of the survey and their implications for castle-studies.
- A public-information event will be undertaken during the course of the site-work to raise awareness at a local level of the importance of Kilkenny castle within international castle studies.

- A geophysical survey and interpretation report accompanied by a research-agenda for further work and project development.

Proposed Geophysical Survey Methodology

An area of 3.52 hectares will be surveyed in total. Survey within the inner ward will be undertaken using the GPR technique and the remainder by resistivity (Figure 4).

The detailed survey grid will be established to within an accuracy of +/-20cm and tied-in to the Ordnance Survey by DGPS. All fieldwork will be undertaken to the highest standard and to best international practice. Where conditions on site may impact on the overall quality of the fieldwork, this information will be passed on to the client. Due care and attention will be undertaken to abide by any legal constraints, access guidelines or general concerns highlighted during the course of this work

Resistance Survey

Electrical resistance survey will also be undertaken throughout the survey area, to investigate the location and determine the full extent of structural remains associated with the monument. The resistance survey will employ a Geoscan Research RM15 resistivity meter and single twin probe array, recording data at 1m sample intervals along 1m traverses, using a mobile probe separation of 0.5m and within a network of 20m^2 grids. A current range of 0.1 or 1.0mA will be used to determine the resolution of the resistance survey, soil and geological conditions permitting.

GPR

In view of the intentions for geophysical examination of the site we would like to also make the recommendation for GPR (Radar) survey at the keep interior, continuing the high sampling approach that has been applied to date. GPR survey is perhaps the most versatile of prospection techniques used in archaeology, and is likely to add significantly to the recent reconstruction by Tietzche-Tyler. The technique is typically used for building detection, but also for grave location, buried vault identification, and for informing on target / feature depth. Amplitude maps or ‘time slices’ from GPR survey over the buildings at the interior of the Castle could be generated given sufficient processing time, and a combined 3D composite of the data could also be plotted. This would add a new and significant dimension to the data set that we currently have, particularly since GPR survey, given the right conditions, is capable of providing much greater feature resolution than the techniques previously used.

It would be our intention to ultimately provide a data set that makes a substantial contribution to the results we already have, and to provide a basis from which further historical and archaeological research at the Castle might proceed. We would hope to achieve this through the following objectives:

Identifying the exact location, form and extent of the buildings highlighted in the reconstruction to gain significantly higher definition of these remains, and to locate any further, as yet unrecorded structures.

Investigating and mapping the extent of the inner ward and the structures therein.

To examine the extent of the possible ring-work ditch traversing the south-eastern corner of the Castle, and clarify its extent.

The equipment and software that we would intend to use for this survey would be as follows:

GSSI SIR 3000 Single Channel Radar Control System

400MHZ Antenna

RADAN & In-House Software

Data would be collected as a series of .DZT files using a rate of 220 scans/sec at 256 samples/scan in 16 bit format. This normal system configuration allows for an exceptionally high linear increment of data, and we would propose to add to this by increasing the number of traverses from every 1m to every 0.5m.

Bibliography

MURTAGH, B., 1993, 'The Kilkenny Castle Archaeological Project 1990-1993: Interim Report', Old *Kilkenny Review iv* (5), 1101-1117.

FENLON, J., 2007, *Kilkenny Castle*, Office of Public Works, Dublin.

TIETZSCH-TYLER, D., *forthcoming 2010*, 'William Marshal's Castle at Kilkenny in about 1395: A New Reconstruction' in C. O Drisceoil and J. Bradley (eds.) *William Marshal and the Medieval Lordship of Leinster*, Four Courts Press.

Figure 1: Aerial photograph of Kilkenny castle and its park

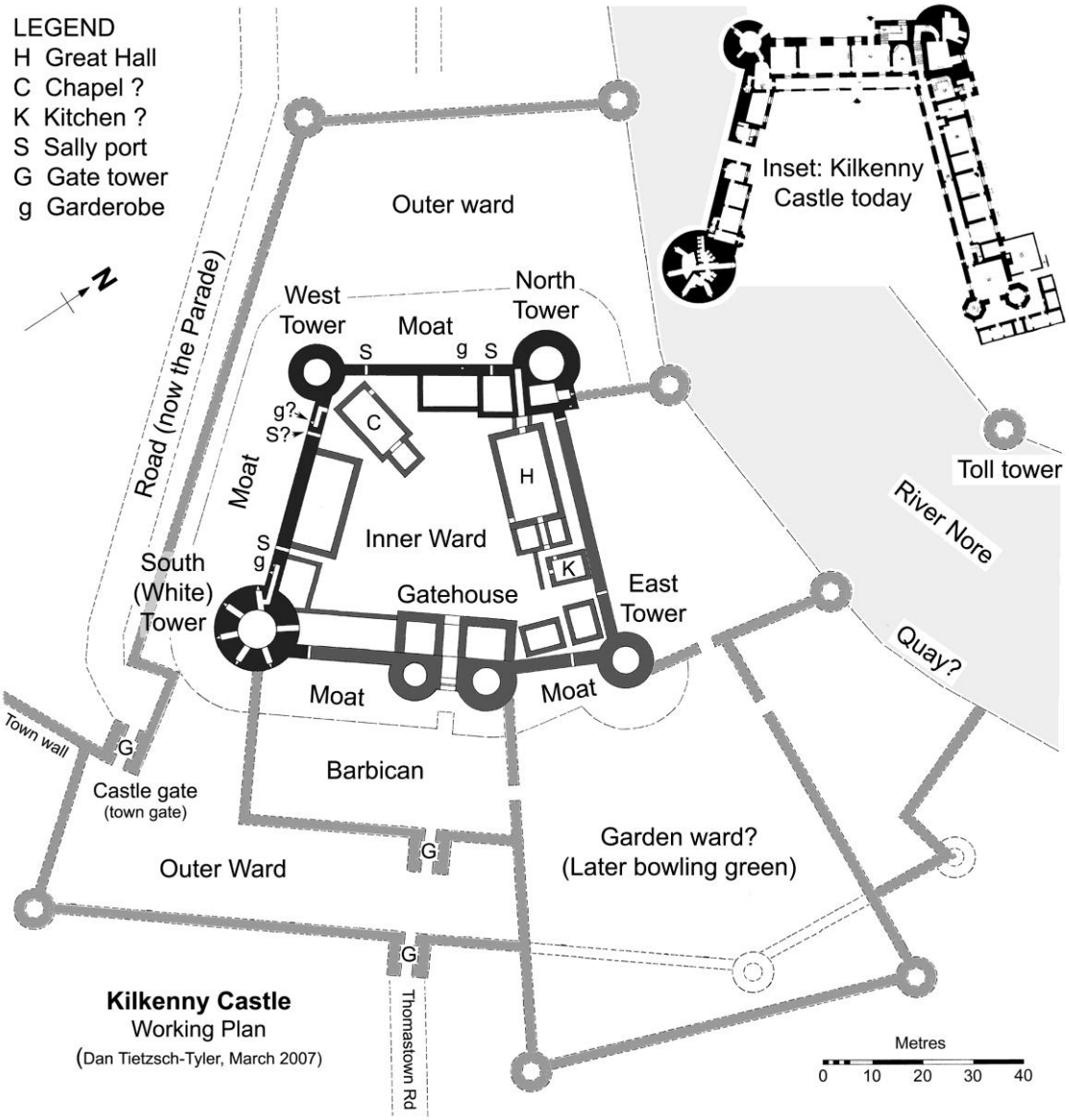

Figure 2: A working plan of the greater Kilkenny Castle compiled during the reconstruction project. Inset, top right, is a plan of Kilkenny Castle today at the same scale (Tietzche-Tyler forthcoming).

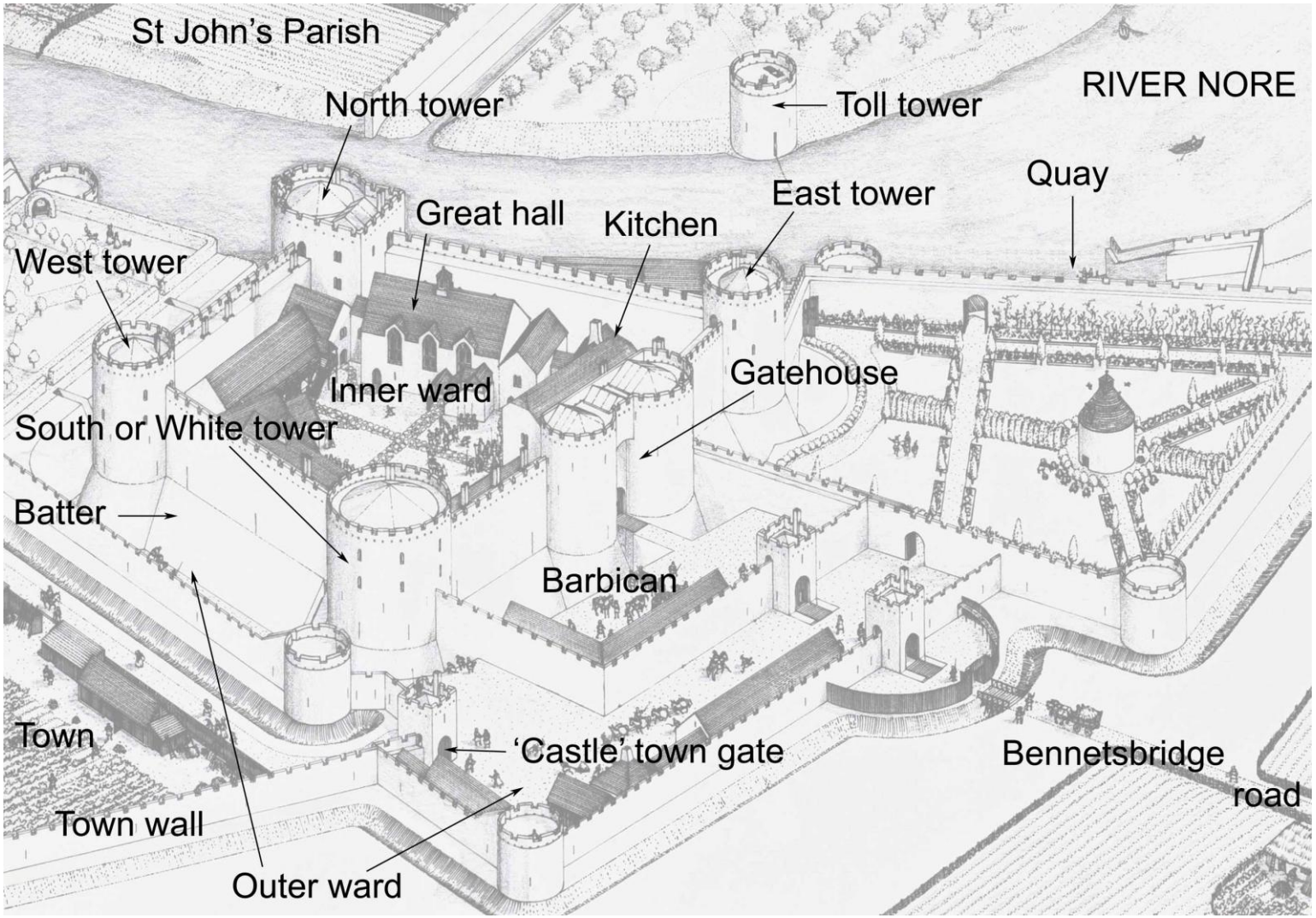

Figure 3: The reconstruction of Kilkenny Castle in Figure 1 with annotations identifying the main features of the castle.

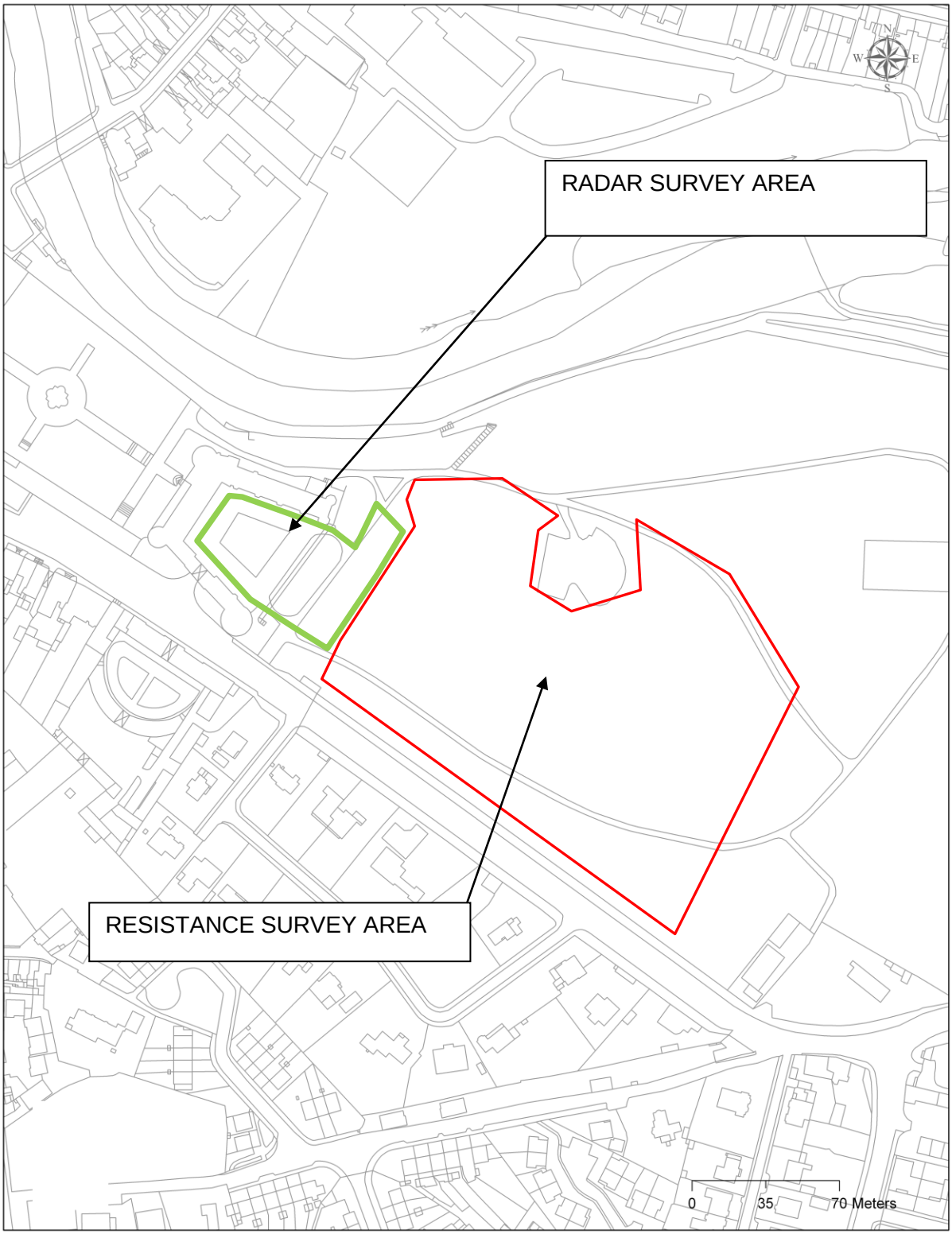

Figure 4: Map showing location of proposed areas of radar and resistance surveys