



Archaeology & Visualisation Overview & Demonstrator

November 2005



Synopsis

The purpose of this report is to outline and illustrate the possibilities of using Virtual Environments to complement the archaeological activities taking place at and around the Greengates site, and to give a broad indication of the many possibilities of development.

The long-term vision is to provide a virtual model of the immediate surrounding physical environment of Greengates across several different eras, based on currently available records and the results of the archaeological investigation conducted by Greater Manchester Archaeology Unit (GMAU) and the University of Manchester Archaeology Unit (UMAU). Users would also be able to freely move around a 3D model and interrogate objects / buildings to explore their uses.

1. Introduction

This document outlines how techniques such as virtual reality and visualization can be used to present content and understanding offering a unique interactive experience in 3D which would widen community access and usability. The project could be enhanced with content such as still images and associated text to provide access to and understanding of the development of both the live archaeological investigation and the historical understanding developed from the investigation and historical records.

The following are descriptions of some of the ways in which a VE model and interactive visualization could be developed.

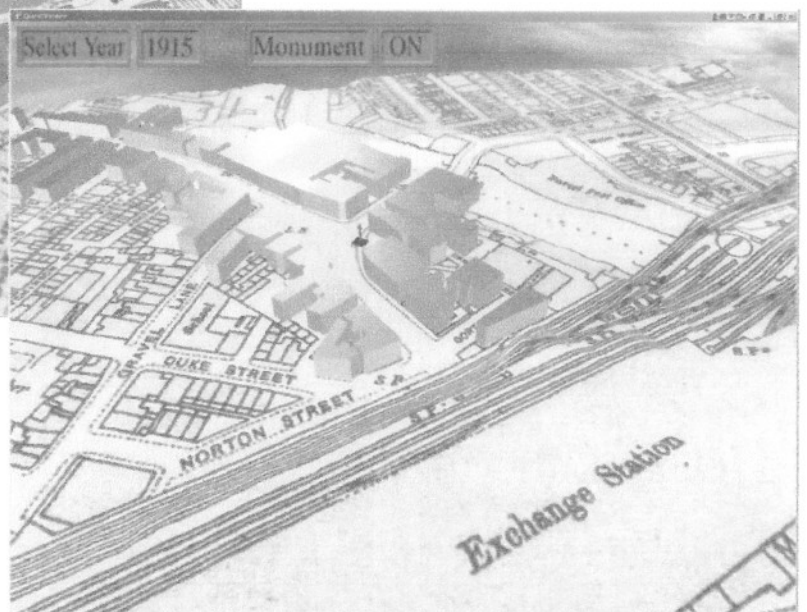
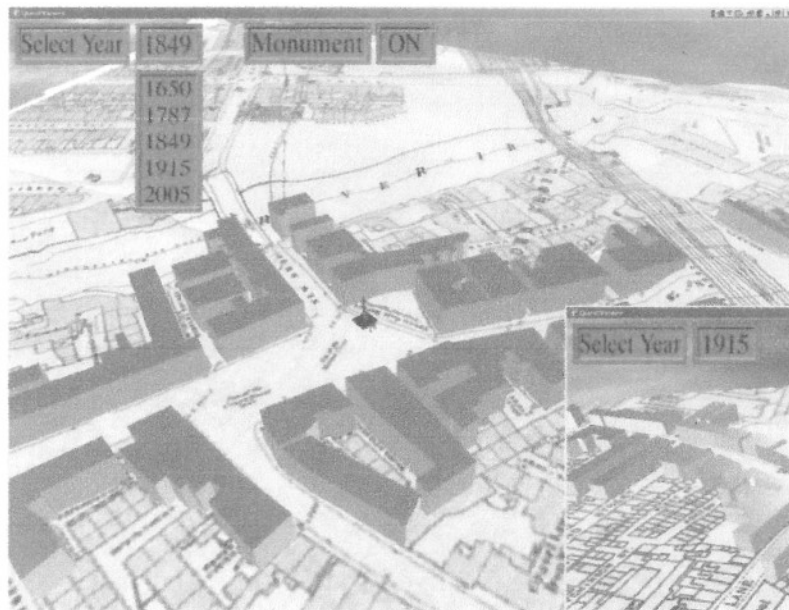
2. Approach & Possibilities

One approach would be to create a modern day terrain model as a base for the visualization, and to overlay maps onto the terrain for a selection of key 'times' from the history of the area as suggested by available maps and periods of specific archeological interest. Currently we have access to the following time period maps:

- 1650
- 1787
- 1849
- 1915
- 2005

3D block models of the building from each of these time periods could be built and overlaid onto the terrain model and various maps. The images below show the mock up of the 3D worlds, which includes the terrain data, with a map from each era and the block models overlaid:





The Collier Street baths and the Bull public house have been modeled and inserted onto the laser scanned terrain data along with infill for the modern period. This look is not indicative of a final project. The image from our model of Chester below gives a better indication of the quality that can be achieved using photography for texturing buildings.



We have also incorporated a model of the Cross for indicative purposes, however once we have data (estimated dimensions and materials) and some images for texturing purposes we will be able to refine this and create the surrounding square based on the maps we already have, and additional information gathered in the desktop research study. It is possible to switch this on/off in each of the time periods.



For a better understanding of the ways in which information can be incorporated, please visit www.virtualchester.org. In the Virtual Chester model, users can navigate around the model, click onto buildings to find additional information and to view archive images, and also to view panoramic 360 photographs (also known as QTVRs – Quick Time Virtual Reality).



The next stage is to look at the ways in which the archaeology can be built into the world. Some of these could include:

- providing access to the archaeological investigation via webcams via a live video stream or time lapse footage from the stored frames
- creating 3D models of finds and related objects
- incorporating simple images and information regarding finds and their interpretations for various locations
- integrating into the user experience photographic QTVR style media of real archeology where appropriate and possible
- populating the buildings with 3D objects – creating internals, showing various time periods, furnishings, and the context for the artifacts found
- populating the 3D models and potentially the web interface with some virtual characters based on:
 - hypothetical inhabitants and people (where no specific population data is available)
 - real inhabitants (where specific population data is available, ie mostly from 1801 onwards, although some data may be available from the 1770s)

Users would be able to interact with characters to discover information about them, their lives, their families and their work.

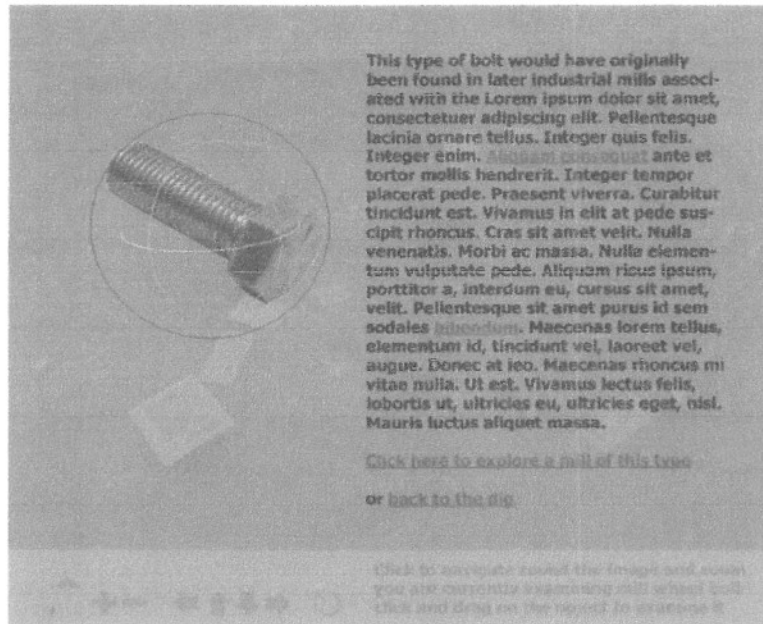
- publish relevant content developed by the community, encouraging the contribution of content to the site from local individuals and groups regarding material relevant to the history of the sites. This could be simply accomplished through the use of a php discussion board.

The following images show various mock ups of these possibilities. The first is an image of a dig photograph with a highlighted item that can be panned and tilted. The zoomed item, looks rusty, has a selection halo, max style orbits indicating that the object can be rotated.



Click to navigate round the image and zoom
you are currently examining mill wheel bolt
click and drag on the object to examine it

The image below shows that having clicked on the link, the user can view a 3D model of the artefact and find out more about it. The options can then be to investigate further, or return to the dig, or in fact to see an image of the building/location of the find.



The following mockup demonstrates a virtual exhibition space linked by the nut from the dig site. The machinery will function and the user will have control of their position in the environment. Walking outside would find the user in the appropriate era street.



3. The Way Forward

As illustrated above, there are various ways in which 3D models and computer visualization could be used to provide information on the historical context and capture the archaeological process and material associated with the Greengates site, in an intuitive and interactive way.

In order to provide some indicative costs, some parameters need to be agreed, such as:

- defining the geographic area to be included and drawing up the boundaries,
- selecting appropriate time periods
- agreeing the level of detail to be included, eg simple block models versus fully textured
- the target number of artifacts to be modeled and 2D images to incorporate
- additional information to be included, such as census data
- whether characters are to be incorporated, back stories and mode of interaction
- level of interactivity.

It should however, also be noted that any approach selected will allow for a phased approach and incremental development, with scope for continuous improvement.

Suggested Phase 1:

Element	Content	Estimated Cost	Development Potential
Geographic Area: Greengate Bounded by Trinity Way, River, Railway, & Blackfriars	Maps Terrain	£20,000	Extend area to include contiguous areas, or other key locations (eg Ordsall Hall)
Block Model - 4 Time Periods To be agreed	Each period - colour coded Buildings fading in/out		Texture all buildings either in a specific time period or throughout
Textured Buildings: <ul style="list-style-type: none"> ▪ Collier St Baths ▪ The Bull ▪ The Cross ▪ Stocks ▪ Exchange ▪ Market 	Supported by additional 2D images – old photographs, maps (say 10 per building) (Narrative to be supplied by SCC or partners)		Create internals where useful
Archaeological artifacts 10 x simple 3D models (eg utensils, furniture)	Additional 2D imagery and text incorporated, where provided		Increase the number of artifacts, add in models and images of equipment, utensils, furniture etc not found on site, but likely to have been used during the time period.
Interaction	Free Navigation Tour Mouse-over hot spots	-	Voice over Other sound recordings

All models could be developed to run either over the internet, or with larger scale display systems for example installed at a key heritage location for a more immersive experience.