Learning legacy

Lessons learned from the London 2012 Games construction project

The archaeological challenge

Prior to the development of the Olympic Park, and the building of its sporting venues and infrastructure, a comprehensive programme of archaeological evaluation and excavation was undertaken. In total, 122 archaeological evaluation trenches were opened, targeted where possible on land that would be directly impacted on by the development. Archaeological remains found at eight of these locations were of such significance that they were subject to a further phase of mitigation excavation. However, the practicalities of undertaking these investigations posed major challenges to the archaeologists digging and interpreting the sites.

Reaching the archaeology

Over much of the Park the old land surfaces were covered by a great depth of modern overburden, in many places up to five metres thick. This had to be removed carefully to reveal the archaeological deposits and create safe working conditions for the archaeologists.

Mechanical excavators, fitted with flat ditching buckets that cause minimal disturbance to archaeological deposits, were used to open the trenches and remove the modern material. This work was supervised by archaeologists to prevent damage to the underlying layers.

Because of their depth, many trenches were dug with their sides stepped, or battered into slopes, so they would not collapse from the weight of the surrounding ground; some were even piled for additional support. This meant that very large quantities of soil had to be removed to expose even small areas at the bottom of the trenches, but it allowed the archaeologists to reach the deposits most deeply buried within the stratigraphic sequences.

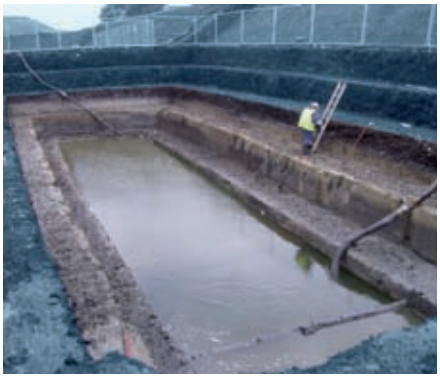
In one of the largest mitigation excavations – near Temple Mills – up to nine metres of post-1850 dumped soil and rubbish needed to be removed before the archaeological features were encountered. To expose a large working area, a sheet-piled cofferdam supported by braces was inserted. In such a deep excavation, the health and safety of the archaeologists was paramount. Gas detectors monitored the air quality at the base of the trench, and pumps removed excess water. Access into the trench was via two scaffold towers.

Safety issues and solutions

Many safety challenges were encountered during the excavations, including:

- ground stability in deep excavations;
- the presence of modern services, made ground, and chemical contamination; and
- groundwater and flooding.

The Lower Lea Valley had over a century and a half of industrial development – in many cases with dirty and dangerous industries that were moved away to the outskirts of the capital – and the ground conditions were often chemically contaminated. As well as numerous practical safety issues, in many cases the planned locations of the trenches had to be revised.



Water was a huge problem to the archaeologists; here you can see an excavator recording the archaeological deposits whilst trench is being pumped*

A deep stepped trench which allowed archaeologists to safely record deposits*

Archaeologists had to wear full protective clothing during excavation*

Archaeologist were required to wear extensive personal protection equipment (PPE), including disposable suits or overalls, gloves, rubber boots, protective glasses and facemasks. These, although necessary, made excavation slow and difficult.

Water, from both above and below, was a persistent problem during the excavations. Pumps were used to remove it from the trenches, but this often slowed the work. Care had to be taken to make sure the water tables were not exposed to the heavy contaminants encountered on many sites. Several trenches contained large volumes of perched water and groundwater within the soil sequences; these trenches could only be excavated to the top of the alluvial layers, since the hydraulic pressure of the groundwater made deeper excavation impossible.

Finally, frequent wet weather, which quickly flooded the deep trenches, compounded the difficult excavation conditions. The recognition, identification, careful excavation and accurate recording of archaeological features can be severely hindered by bad weather.

Collecting and interpreting the evidence

Once the trenches were opened, all investigation of archaeological features and deposits was done by hand, including cleaning all the trench faces for further examination and recording. A full written and drawn record was made of all the archaeological deposits, and all excavations were located by surveyors, and plotted on the Ordnance Survey grid.

Even in those trenches where there were few, if any, archaeological features present, there were still peat deposits, buried soils and layers of alluvium which required investigation by geoarchaeological and palaeoenvironmental specialists. Their work has thrown important light on the development of the Lea Valley landscape, and has allowed the reconstruction of the past environments which, over time, have been impacted on, and affected by, human activity.

Archaeologists can date such features and deposits by finding associated artefacts (man-made objects) or ecofacts (environmental remains). This is often pottery, worked flint, or some evidence of human use of the landscape. An extensive suite of dates was gained by using radiocarbon dating, a method using the naturally occurring Carbon-14 (^{14}C) to determine the age of organic material. A variety of materials from the Park excavations were chosen for radiocarbon dating, including human and animal bone, wood, seeds and charcoal, as well as layers of peat or the organic components of alluvial sediments.

There are many potential problems with such dating. For example, in very waterlogged conditions bone may prove unsuitable for dating, this was a setback at one site where four inhumation burials were excavated – none were accompanied by grave goods that could help provide a date. Without dating, the burials could potentially belong to the phases of Bronze Age, Iron Age, or Romano-British activity recorded on that site.

Other difficulties with radiocarbon dating may be the presence of both intrusive and redeposited materials. Intrusive materials may be small pieces of plant material moved through a soil profile by earth worms, burrowing animals, or other biological activity. Redeposited material could consist of organic matter, like an old peat deposit eroded from a river bank then transported downstream and deposited within a later archaeological feature.

Understanding the unique legacy

There were many challenges:

- reaching the archaeology;
- working under difficult conditions;
- excavating, recording and recovering the evidence; and
- interpreting the mass of data.

But the archaeological works are throwing important new light on the development and use of the lower Lea Valley from over 500,000 years ago to the present day, and helping us to understand the unique legacy of the valley and its inhabitants.

One of the burials from the prehistoric settlement that was radiocarbon dated*

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