



Energy Recovery Facility, Cleveland Iron and Steel Works

Written Scheme of Investigation – Archaeological Evaluation and Strip, Map & Record

Revised Scheme (for work before March 2021 see Version 2)

Client: South Tees Development Corporation

Local Planning Authority: Redcar & Cleveland Borough Council

Planning Reference: R/2019/0767/OOM

NGR: NZ 5438 2123

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1.0 Introduction

1.1 South Tees Development Corporation (STDC) has been granted outline planning permission (R/2019/0767/OOM) for the development of an Energy Recovery Facility (ERF) at the Grangetown Prairie Land of the former Cleveland Iron & Steel Works, Redcar & Cleveland (NGR NZ54382123, see Figure 1). The permission is subject to a condition (number 7) which requires a programme of archaeological work to be undertaken in advance of remediation:

No phase of development shall take place until a written scheme of investigation (WSI) for archaeological work within that phase has been submitted to and approved in writing by the local planning authority. The WSI shall as a minimum make provision for:

(i) Before remediation or development commences, archaeological evaluation of borehole and trenching data

(ii) Before remediation or development commences, initial archaeological survey (drawn and photographed) of the whole application site, with particular emphasis on the remains the subject of preservation in situ

(iii) Where practical and before remediation or construction works takes place on site an archaeological strip, map and sample of remains of high significance suggested by the borehole/trenching data, or observed during the initial survey

(iv) An archaeological watching brief of all ground disturbance during the remediation works and during construction ground works in areas identified as archaeologically sensitive

(v) Protection during development, followed by consolidation and preservation of high value remains left in situ

(vi) a general programme of works and monitoring arrangements, including reasonable notification to the local planning authority of commencement of works

(vii) details of staff involvement in carrying out the work (including specialists), and their qualifications and responsibilities

(viii) the timetable for completing post-excavation assessment.

(a) Provision for the analysis, archiving and publication of the results of the archaeological surveys and excavations shall be secured to the satisfaction of the local planning authority by the developer before the development is brought into use.

(b) The development shall not without the prior written approval of the local planning authority be carried out otherwise than in accordance with the approved WSI, and the consolidation and preservation of on-site remains as provided for in the WSI (or as otherwise agreed at any time in writing by the local planning authority) shall be secured by the developer and/or landowner on an on-going basis.

REASON: The site contains remains of significant archaeological interest, some of which merit preservation in situ.

REASON FOR PRE-COMMENCEMENT: A pre-commencement condition is required to ensure that no remains are disturbed or otherwise compromised by site excavation of other ground works.

1.2 This Written Scheme of Investigation (WSI) has been prepared by Prospect Archaeology Ltd and details the staffing, methodology and timetable of the programme of works for investigation and recording works. It complies with the Chartered Institute for Archaeologists' (CIfA) *Standard and guidance for archaeological field evaluation* (CIfA 2014), *Standard and guidance for the archaeological investigation and recording of standing buildings or structures* (CIfA 2014), *Standard and guidance for archaeological excavation* (CIfA 2014) and *Standard and guidance for an archaeological watching brief* (CIfA 2014) in their updated (2020) versions.

2.0 Site Location and Description

2.1 The site is located to the east of John Boyle Road and west of Tees Dock Road, in an area formerly occupied by the Cleveland Iron & Steel Works (centred on NGR NZ 5438 2123). The proposed development site occupies an area of c. 10ha south of the Middlesbrough to Redcar main railway line. It forms part of the larger Grangetown Prairie site. The built elements of the former steelworks have been largely cleared from the Site and it is currently a mixture of rubble, hard-standing and other rough ground.

3.0 Previous Archaeological Work

3.1 The site has been the subject of two desk-based assessments (Prospect Archaeology 2020 and Tees Archaeology 2019). These both document the long and complex history of use of the Site for iron and steel production but came to differing conclusions on the potential for survival and significance of any remains of the 19th century works. Archaeological monitoring (watching brief) of site investigation test pits has been undertaken by NAA and a site visit and walkover survey have been undertaken by both NAA and Pre-Construct Archaeology. These have identified the presence of three surviving blast furnace bases (NAA 2020a; PCA 2020). One is believed to be of 20th century date and the other two of possibly 19th century date. It is clear from comparison with the earlier Tees Archaeology report that material has been removed from the site since November 2019. The NAA watching brief report concludes that arched brick structural remains to the north of the later Cleveland Iron Works furnaces may be furnace flues of the 1850s Eston Iron Works (NAA 2020b). It is believed, further reduction in the ground surface in this area has also impacted on archaeological survival.

3.2 Under the scope of works provided in the first version of this Written Scheme of Investigation (November 2020), a programme of cleaning and recording has been undertaken in the area of the blast furnaces and adjacent land. It has become clear from this work that there is no archaeological survival to the east of a rail track, east of the blast furnaces, and limited survival of archaeological remains to the west, south and north. The eastern area of the Eston Iron Works has been remediated although the area of the western end of that structure does survive. No other areas of the site are expected to contain significant archaeological remains.

4.0 Scope of Works

4.1 An area of specific archaeological interest has been identified by the Tees Archaeology report and refined by Pre-Construct's ongoing work (2021). The programme of works detailed in this document will focus primarily on that part of the site of greatest archaeological interest (see Figure 2). The area to the east now has negligible archaeological potential and the areas to the south and west, considered to be of low archaeological potential have, following evaluation, been confirmed as such. Selected features will be cleaned and photographically recorded as appropriate. The area to the northwest, formerly occupied by the western end of the Eston Iron Works, will be subject to further evaluation by trial-trenching and subsequent investigation and recording if considered appropriate bearing in mind the results of the evaluation.

5.0 Aims and Objectives

5.1 The purpose of the excavation and recording exercise is to establish the state of preservation of the Eston Iron Works and to provide a full record of this and the remains of the Cleveland Iron and Steel Works blast furnaces and associated surviving structures where they survive.

5.2 The following specific research themes and recommendations contained in the North-East Regional Research Framework (Petts & Gerrard 2006) will be considered in the excavation and analysis of the site:

- MOi - Industry
- ID9 - Recovery of metalworking material & full analysis
- ID11 – Developing a type series of slag and other metallurgical residues

6.0 General Instructions

Health and Safety

6.1 The archaeologists on site will operate with due regard for Health and Safety regulations. Where archaeological work is carried out at the same time as the work of other contractors, regard should also be taken of any reasonable additional constraints that these contractors may impose. This work will require the preparation of a Risk Assessment in accordance with the Health and Safety at Work Regulations. The archaeological contractors will comply with any and all health and safety procedures in place for the overall site and complete inductions, training and tool-box talks as necessary.

7.0 Method

Evaluation

7.1 One trench measuring 20m in length and 4m wide will be dug in the location estimated to be across the mapped and surviving section of the Eston Iron Works to determine the absence or presence of surviving archaeological remains of this structure.

7.2 Where archaeological deposits are encountered within the trenches, they will be cleaned, mapped, and excavated sufficiently to establish whether they can be related to the 1850s Iron Works. Built

structures such as walls will be examined and sampled to a degree whereby, as far as is practicable given general site conditions, their extent, form, date, function and relationship to other features and deposits can be established.

- 7.3 An archaeologist shall be present on site at all times during the evaluation and shall direct the trenching. The archaeologist should view the area as it is being dug and any trench sections after excavation has been completed. Where archaeology is judged to be present, the excavated area should be rapidly cleaned and the need for further work assessed. The archaeologist must promptly inform the consultant of the progress with the evaluation so that the consultant is able to agree with the local planning authority whether additional archaeological investigation / recording, or none, is required in the area, before proceeding with further ground disturbance.
- 7.4 All features/deposits of archaeological interest should be accurately located on a site plan and recorded by photographs, scale drawings and written descriptions sufficient to permit the preparation of a report. Section drawings (at a minimum scale of 1:20) must include heights O.D. Plans (at a minimum scale of 1:50) must include O.D. spot heights for all principal strata and any features. Where initial assessment is that remains of archaeological interest are present, a larger area will be stripped down to the appropriate level to allow full cleaning and recording of all surviving remains of the 1850s iron works. Methodologies will follow those outlined below.

Unexpected Discoveries

- 7.5 If significant archaeological features or deposits are uncovered which could not reasonably have been expected, the scope of the WSI will be reviewed to determine the most appropriate recording and sampling strategy for those remains. Should this be required, the locations and extent of additional archaeological investigation will be agreed by all parties on site.

Excavation and Recording

- 7.6 Within the Recording and Excavation area (Figure 2) surviving upstanding structures and surface features such as walls, roadways, railway tracks, chimney bases, stanchions and the blast furnace bases will be identified and recorded in the first instance. The judicious use of a mechanical excavator under direct, close archaeological supervision, combined with hand cleaning / excavation, may be employed to better reveal the extent of partially buried or obscured features and structures. A survey of the features and structures identified will be prepared and issued to Prospect Archaeology and NEAR prior to a site monitoring visit.
- 7.7 From this survey the footprint and phasing of production buildings will be plotted and used to inform strip and record excavation. Particular attention should be paid to dating the blast furnace bases through identification of materials and methods of construction used. All structural remains, including buildings, railways, pipes and ducts, surrounding the blast furnaces should be investigated, cleaned and recorded with a view to understanding their relationships to the blast furnaces.

- 7.8 Archaeological recording will be carried out by means of unique numeric based context records and will be written, drawn and photographic (and any other appropriate means). All archaeological exposures (layers, cuts, fills, structures) will be recorded using pro forma recording sheets. Harris Matrix stratification diagrams will be used to record stratigraphic relationships and these records will be compiled and fully checked during the course of the recording work.
- 7.9 The area of investigation will be located by appropriate means to ensure its accurate location relative to the Ordnance Survey National Grid.
- 7.10 A drawn record will be maintained, comprising a site plan showing the locations of the areas of excavation within the Site, feature plans elevations and section drawings as appropriate. These will be produced at appropriate scales, normally 1:100, 1:50, 1:20 and/or 1:10, as the complexity of the drawing requires. Detailed plans will be made of key features and section or elevation drawings provided of cut features and upstanding structures as appropriate. All drawings will be referenced to the overall site plan. OD spot heights for all principal strata should be included on plans.
- 7.11 A photographic record of the project and of each feature / structure / deposit will be made and photographs illustrating the relationships between groups of features and general progress will also be taken. Archival record shots will be b/w film and colour digital shots will be used to supplement the record but will not form part of the formal archive; procedures will follow the guidance offered in The Historic England (2015) 'Digital Image Capture and File Storage: Guidelines for Best Practice' document (<https://historicengland.org.uk/images-books/publications/digital-image-capture-and-file-storage/>). All photographs will be in sharp focus with an appropriate depth of field. All photographs will be adequately exposed in good natural light or, where necessary, will be sufficiently well lit by artificial means. All photographs will be taken with DSLR camera of no less than 10 megapixels resolution. For maximum quality the preferred option is that the RAW (camera-specific) setting is used. RAW images will be converted to TIFF before they are deposited with Kirkleatham Museum,
- 7.12 All context, drawing and photographic registers will be cross-referenced.
- 7.13 Finds will be bagged and labelled according to their context of origin. All finds will be treated in accordance with the recommendations contained in First Aid for Finds (Watkinson & Neale 1998, 3rd edition). Advice will be taken on any finds requiring immediate specialist treatment.
- 7.14 Blast Furnace No 5, which lies to the south of the main group of furnaces and dates to the 1930s, should be recorded by detailed photographic means only, due to health & safety considerations.
- 7.15 Following completion of the excavation and recording, any demolition of the blast furnace bases will proceed under archaeological supervision. Archaeological monitoring should focus on recording materials, structural elements and relationships with other features, where revealed. As the cores of the furnaces are expected to be solid metal, it is unlikely there will be any meaningful

opportunity for archaeological cleaning and recording, although such actions should be pursued wherever possible.

Digital Rectified Photography

7.16 As an adjunct to hand drawn elevations and plans the recording of significant and complex built structures and stone and brick surfaces may be carried out using digital rectified photography to provide orthophotographic images.

7.17 Photographs must be taken at a resolution adequate to allow the creation of images at these scales. The collection and archiving of digital photographs used to create orthophotographs must follow and comply with Historic England's guidance contained in "Measured and Drawn: Techniques and practice for the metric survey of historic buildings (2nd edition)", English Heritage 2009" and Photogrammetric Applications for Cultural Heritage, Guidance for Good Practice, Historic England 2017.

7.18 In general photographs must be taken parallel or near parallel to the subject's main surface, sufficient photographs must be taken from additional viewpoints to capture any changes in level or concealed areas; photographs must have sufficient overlap (60%-80%) to ensure good interpolation by the software used; targets or scales must be used and the resulting image must be checked against the subject/archaeological features before their destruction. Orthophotographs or copies should be annotated with relevant context numbers (and feature boundaries when not obvious) and be cross referenced in the descriptive and interpretive text in the site report.

7.19 Video footage of the structures, particularly during their demolition, may be a useful adjunct to the detailed photographic record. This should comprise short (e.g. 15 second) clips of the structures from different viewpoints at different stages in their recording and demolition.

Soil Sampling

7.20 The recording work is targeting late 19th and 20th century industrial structures, therefore environmental soil sampling is unlikely to be required. Soil samples will only be taken from deposits that can be securely dated and/or placed in the Site's stratigraphic sequence. Samples will be collected in accordance with a strategy which recognises the aims and objectives of the project and provision will be made for on-site advice from a relevant specialist. The strategy will take note of the industrial nature of the site and as part of the strategy, sampling will be undertaken of industrial residues for examination, in accordance with the advice and the guidance offered in Historic England guidance documents: English Heritage 2011, Historic England 2015 and Historic England 2018a. Samples for environmental purposes will be no less than 40 litres (where possible). If samples are required from discrete features that are not proposed for 100% excavation, they will be taken from the unexcavated 50%. Sampling of stake-holes or small features will require the excavation of 100% of the feature.

Human Remains

- 7.21 Should human remains be encountered they must initially be left in situ, covered and protected. The consultant, curator and coroner should be informed immediately. Removal of human remains will only take place in accordance with a Ministry of Justice licence (which may be required under the 1857 Burials Act) and in accordance with the guidance referenced in Historic England 2018b and the guidance issued by the Advisory Panel on the Archaeology of Burials in England.

Treasure

- 7.22 The possibility of encountering items of treasure, as defined in the Treasure Act (1996) as amended, is noted and provision will be made for informing the necessary authorities, and providing appropriate security measures, should the need arise.

8.0 Monitoring

- 8.1 NEAR will be informed of the proposed start date and will be kept informed of progress throughout the field and post-excavation work. A member of Prospect Archaeology staff will monitor the excavation and post-excavation work on behalf of the client. Site monitoring visits will be coordinated by Prospect Archaeology.

9.0 Post-excavation processing

- 9.1 Finds and records will be returned to the contracted unit for processing. Records will be checked and entered into a computerised database. All finds will be treated in accordance with current HE best practice, including 'Investigative Conservation'. Finds will be cleaned (where appropriate) and marked and boxed for transfer to the relevant specialists according to accepted principles and in line with appropriate period/ material guidelines. Environmental samples will be washed and assessed by an environmental archaeologist.
- 9.2 Where material suitable for scientific dating is recovered, sufficient dating will be undertaken to meet the aims of the project.
- 9.3 For all categories of material recovered, including finds, palaeo-environmental, industrial and other specialist samples, an assessment by an appropriately experienced specialist will be undertaken.
- 9.4 Environmental samples will be processed and sorted, and any artefacts recovered provided to the appropriate specialist(s) to be considered alongside the hand-recovered material. Basic stratigraphic information will be supplied to the project specialists.
- 9.5 Where assessment has identified the need for further analysis and no further mitigation work has been secured within 12 months of the completion of the evaluation reporting (or as agreed with the local planning authority as advised by NEAR), this will be completed drawing upon the contingency allowed, representing 10% of post-excavation costs.
- 9.6 All ferrous objects and a selection of non-ferrous objects (including all coins) will be x-radiographed in accordance with the guidance offered in Historic England 2006.

10.0 Reporting

- 10.1 The post-excavation report will be produced within 4 weeks of the completion of the initial recording fieldwork and provided digitally (pdf format) to Prospect Archaeology for distribution. The report will be prepared in accordance with the Chartered Institute for Archaeologists' guidelines.
- 10.2 Prospect Archaeology will distribute copies of the report to appropriate organisations and individuals. The whole document should be provided as a complete text and image file in pdf format. Prospect Archaeology shall ensure that a full digital copy of the report (on CD or otherwise) is supplied to the Redcar & Cleveland HER within three months of being completed.
- 10.3 The report will contain the following sections:
- A non-technical summary of the findings
 - Description of the methodology employed and explanation of any agreed variations to the brief and justification for any analyses not undertaken
 - Aims and objectives, including specific research objectives
 - A stratigraphic descriptive account of the results from each area / structure investigated
 - Discussion of the results and their significance in relation to local, regional and national sites, as appropriate
 - Specialist discussion of finds or structures of particular technical or industrial interest
 - Conclusions
 - A catalogue and brief post-excavation analysis of each category of artefacts recovered during excavation, including the potential for further analysis
 - An index to the project archive, including details of its location
 - Illustrations and plates as appropriate. Illustrations to be included are: a detailed location map, a detailed site plan showing all trenches, all trench plans and sections and detailed plans and sections of features, select artefact images; an overall site plan showing all (phased) archaeological features will also be included.
 - References and bibliography of all sources used; and
 - An appendix containing a list and summary descriptions of all contexts recorded.
- 10.4 Prospect Archaeology will require regular updating on the results of the investigations and evaluation, with no less than weekly progress reports to be submitted. This is to allow rapid decisions on the need for further / extended recording work in different parts of the Site.

11.0 Publication

- 11.1 Formal publication is expected to take place following a mitigation phase of fieldwork; should such work not take place within a reasonable timeframe, e.g. 12 months from completion of evaluation reporting (or as agreed with the local planning authority as advised by NEAR), then the need for and scope of a formal publication of the results will be discussed and agreed with Prospect Archaeology, the client and the local planning authority as advised by NEAR.

12.0 Health and Safety

- 12.1 All Site work will be carried out in accordance with the relevant current Health and Safety legislation. A copy of the Health and Safety Document is available on request and a Risk Assessment will be prepared prior to commencement of work on Site.

13.0 Insurance

- 13.1 PA and its sub-contractors are fully covered by Employers and Public Liability and Professional Indemnity insurances, copies of which are available for inspection on request.

14.0 Archiving

- 14.1 The Site archive will be prepared in accordance with the UKIC's document *Guidelines for the Preparation of Excavation Archives for Long Term Storage* and the ClfA's *Standard and Guidance for the creation, compilation, transfer and deposition of archaeological archives 2014*.
- 14.2 Ultimately the ordered and checked archive, along with artefacts, ecofacts and relevant documents will be combined with the final site archive and deposited with the Kirkleatham Museum. The museum will be contacted prior to the commencement of fieldwork. Thereafter the museum will be involved in discussions with regard to selection and retention of archive material prior to archive deposition, through completion and submission of appropriate forms. This excludes finds that are subject to the Treasure Act 1996 (and later amendments), the deposition of which will be determined separately. A budget to cover the museum's deposition charge will be allowed for in the project costs to the client. The Museum will be contacted for an accession number by the contractor at the appropriate time. On completion, confirmation of deposition will be supplied to NEAR.
- 14.3 An electronic copy of the archive will be deposited with ADS

15.0 Programme & Staffing

- 15.1 Fieldwork will be undertaken by a team from Pre-Construct Archaeology, under the supervision of Scott Vance. A full list of specialists to be used will be provided prior to fieldwork commencing, for discussion and agreement with Prospect Archaeology and the local planning authority as advised by NEAR. Other specialists found to be necessary during the life of the project will be discussed and agreed on a case-by-case basis.
- 15.2 The archaeologist(s) appointed to carry out the work specified will by commencing work be deemed to be working according to the requirements of this WSI, unless the archaeologist(s) in question first agree a variation of this WSI with the local planning authority as advised by NEAR.

16.0 References

Historic England (2006) *Guidelines on the X-radiography of archaeological metalwork*

English Heritage 2011 (second edition) *Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation*. Centre for Archaeology Guidelines

Historic England, 2015 *Archaeometallurgy Guidelines for Best Practice*

Historic England, 2018a *Science for Historic Industries Guidelines for the Investigation of 17th- to 19th-century Industries*

Historic England, 2018b *The Role of the Human Osteologist in an Archaeological Fieldwork Project*

NAA 2020a *Archaeological Monitoring of Ground Investigations Tees Valley Energy Recovery Facility (TVERF), Redcar, Teesside*

NAA 2020b *Archaeological Walkover Survey Tees Valley Energy Recovery Facility (TVERF), Redcar, Teesside*

17.0 Figures



Figure 1: Site Location

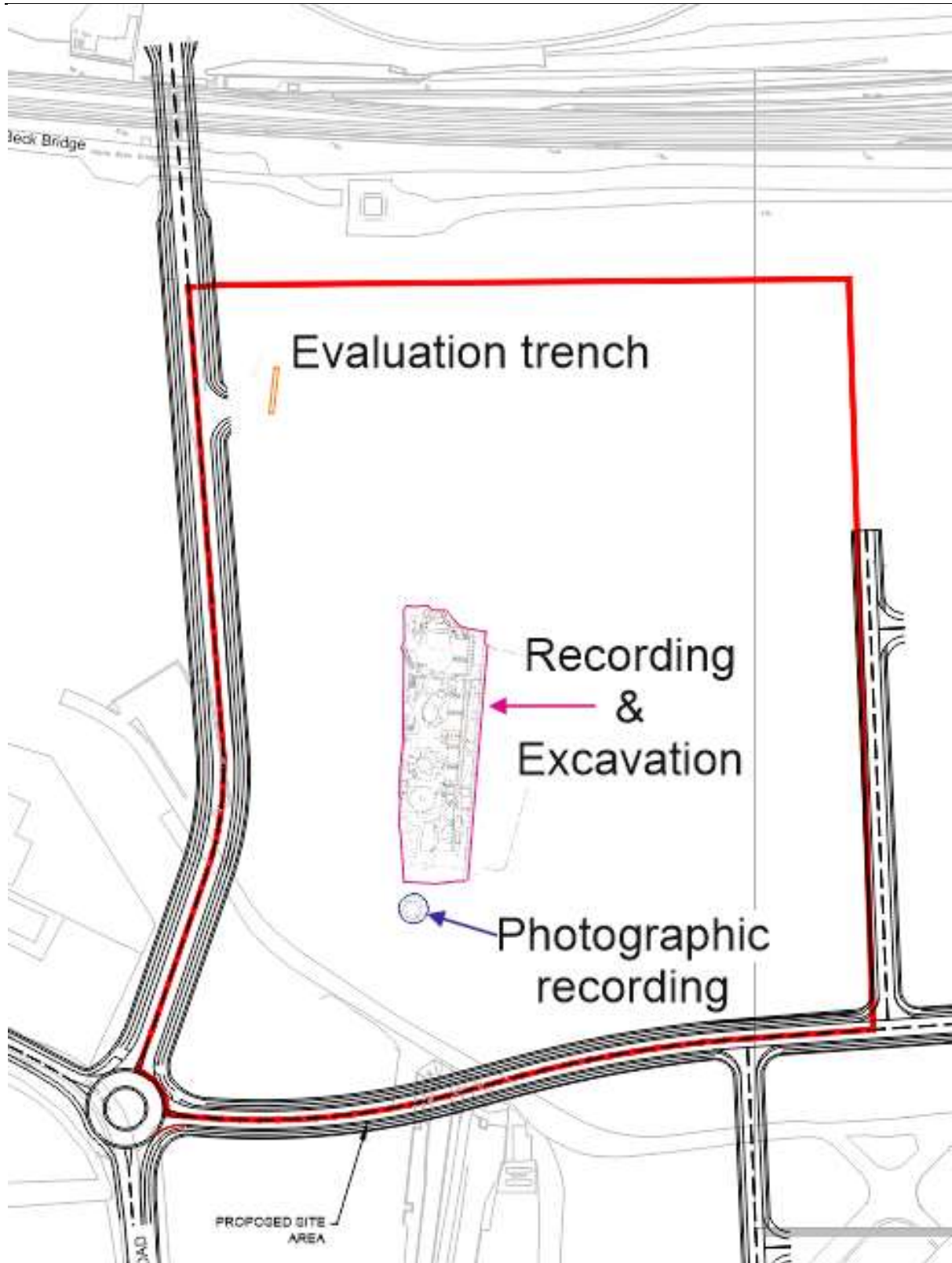


Figure 2: Intervention areas