Coalhouse Fort, East Tilbury, Essex
Feasibility and Options Study

PLACE SERVICES

Contents

Figure 1 Aerial Photo of Coalhouse Fort (Thurrock Council archive photo 0125)

Executive Summary

Coalhouse Fort is a late nineteenth-century Fort built on the recommendation of the Royal Commission on the Defence of the UK in 1860 ('The Palmerston Commission'). It is one of the finest examples of an armoured casemate Fort in England and is well documented historically. Coalhouse Fort is owned by Thurrock Council and has been closed to the public since 2020. The Site is designated as a Scheduled Monument and is included on Historic England's Heritage at Risk (HAR) Register. This Feasibility and Options Study has been funded by National Highways and aims to identify potential sustainable uses for the Site. Place Services were appointed by Thurrock Council to manage the study which includes:

Consideration of three individual projects targeting areas within the Site for future use.

A **Baseline Understanding** and overview of opportunities and constraints presented by the Site.

A **Feasibility Study** informed by the baseline understanding of the Site and its significance. Three specific project areas were identified within the Site for consideration and assessment. The Study comprises a number of relevant reports, including Structural Assessment, Design and Options Appraisal, Flood Assessments, Public Consultation and Stakeholder Engagement, Ecological Surveys, and a costings exercise.

A **Preliminary Ecological Assessment** (PEA) to identify any ecological sensitivities present within the Site, its surrounding area.

The three study areas have been presented in this study with corresponding options for their future use. The scope of the study also extended during the works to include applying for future funding to the National Heritage Fund and the establishment of a Coalhouse Fort Advisory Group to help Thurrock Council realise new uses at the Site.

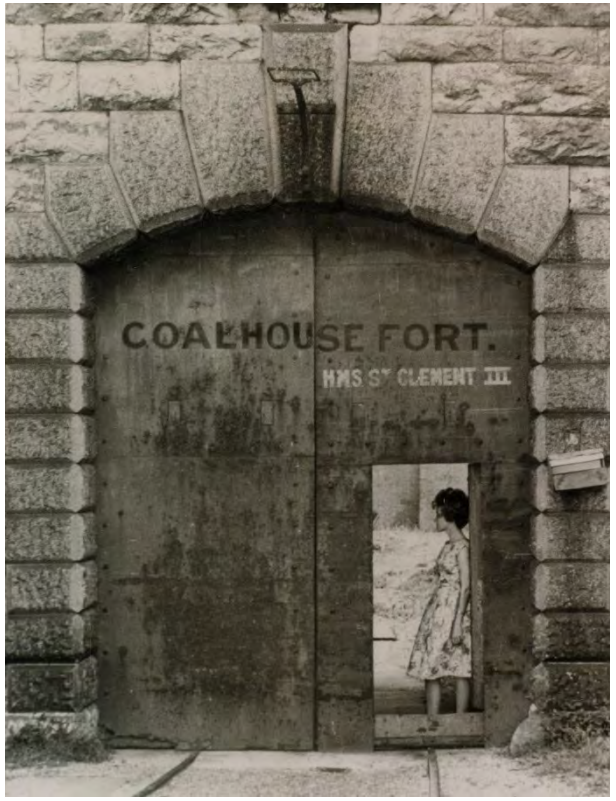


Figure 2 Photo of the main entrance to Coalhouse Fort during the 1960s (Thurrock Council, Archive Photo 0095)

Chapter 1: Introduction

1.1 Introduction

The study has been led by Place Services with inputs from a number of specialists, outlined in Section 1.4, to provide a holistic understanding of the Site and its potential to unlock a future which can sustain this nationally important heritage asset. Figure 4 identifies the three project areas within the Fort. These were selected, in collaboration with Historic England, based on viability for occupation with minimal financial investment.

Figure 3 Entrance to Coalhouse Fort through the Gatehouse

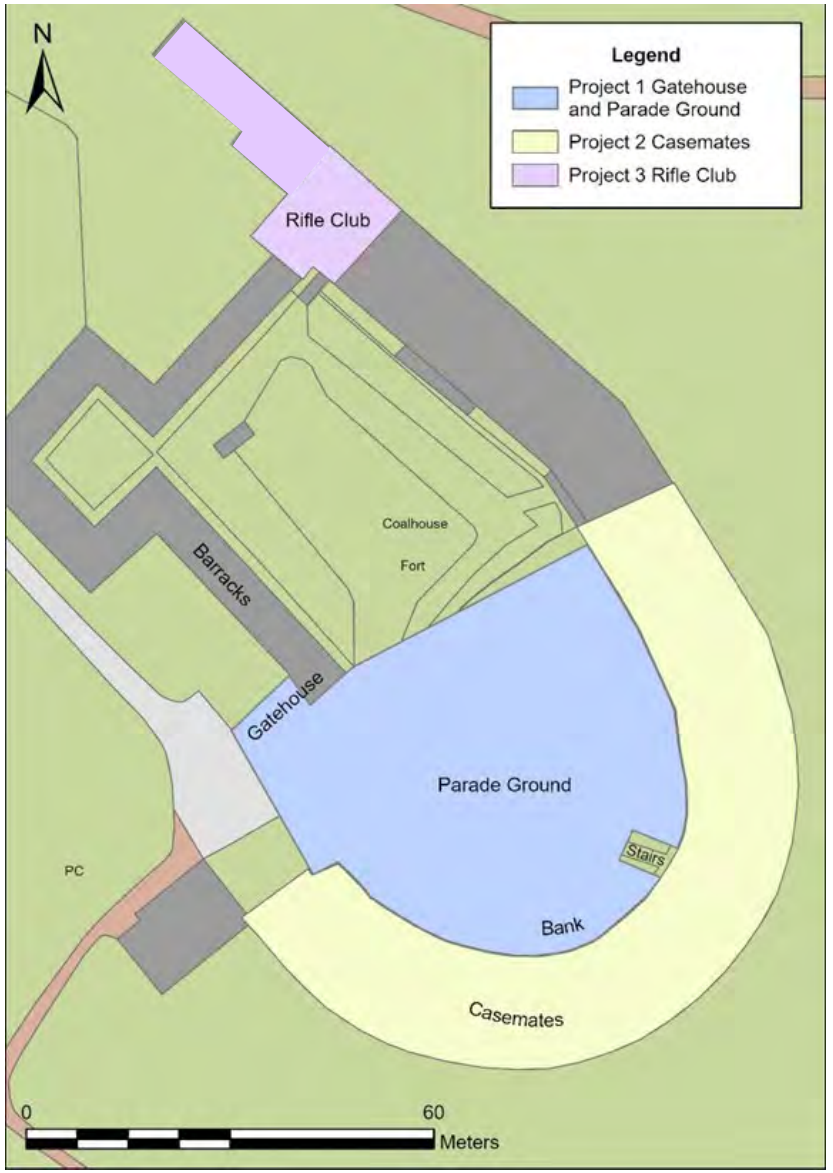


Figure 4 Project areas within the Fort

1.2 Study Area

The Site is a Scheduled Monument (SM) (listed as *Coalhouse Fort battery and artillery defences)*. It is centred on Ordnance Survey Grid Reference TQ 69069 76653.

The study area comprises three separate project areas (**Figure 4**) which are described in *Chapters 5, 6, and 7*. These are:

- Project 1: The Gatehouse and Parade Ground.
- Project 2: Casemates.
- Project 3: Former Rifle Club.[1]

The project areas were identified as opportune for the following reasons:

- They have existing access, with the opportunity to enhance accessibility;
- They build on recent investment and restoration / conservation works;
- They make a considerable positive contribution of the overall significance of the Scheduled Monument;
- Minimal intervention is required to introduce and/ or enhance service routes to these areas; and
- They possess the largest opportunity for future uses to be established.

[1] The shell stores and tunnels were also assessed as part of this project; however, they were found to be unsuitable for re-use at this time. Funds were instead relocated to undertake an assessment of the former rifle club.

1.3 Scope of the Study

The scope of this study has the following objectives:

- Explore opportunities for bringing the following areas of Coalhouse Fort into sustainable use:
    - The gatehouse and parade ground (Project 1);
    - A selection of casemates (Project 2); and
    - The shell stores and tunnels at magazine level, which was found to be unviable for future uses at this stage and so funds were relocated to explore the readmission of the rifle club to the Site (Project 3).
- Establish a suitable business model for the future management of the Site, and
- Ensure the Site can be publicly accessed and used for short- and medium-term consultation events, public engagement, and other activities.

The aim of the feasibility study was to ascertain uses for the project areas going forward and provide support in developing a strategic aim to facilitate its long-term use and its eventual removal (in the long-term future) from the HAR register. The Site has been the subject of several previous studies and has undergone programmes of conservation, including the Gatehouse which was repaired and refurbished in 2011. Individual Casemates have been used by several different organisations for storage, workshops and education, museums, and as a shooting range, but since the Covid-19 pandemic in 2020 all use of these areas have ceased with the rifle range being closed for safety reasons in 2022. The Site was closed to the public in 2020.

1.3.1 Evolution of Project Scope

The direction of the project was shaped by early findings from site visits and public consultations. These highlighted significant challenges surrounding the future uses of the Fort and revealed new opportunities to be followed up. The main changes to the scope of the study are as follows:

- At the outset of Project 3 (which was originally the magazine tunnels below the casemates), an alternative approach was identified that would yield a greater success for finding a future use for the Site, and so funds were redirected to accommodate this.
- The approval of funds to submit a Resilience Heritage Funding application played a crucial role in refining the project's objectives.

Project 3 commenced with an assessment of the tunnels to determine their suitability for use as archive storage. However, following an initial assessment by archaeologists, it was quickly concluded that this was not feasible due to the damp conditions and minimal facilities within the space. As a result, and in agreement with the Lower Thames Crossing, the allocated funds were redirected towards surveying the Rifle Club space located in the northeast section of the Site. This alternative approach aimed to identify a more viable location for future reuse of the Site. The space was more accessible and had more recently been used by the Rifle Club, who showed an interest in returning.

Early in the project, it also became evident that there was a significant opportunity to secure additional funding to support the long-term sustainability of the feasibility study. In response, CCN was commissioned to submit an application to the Heritage Fund for a resilient heritage grant. This funding aims to develop a long-term vision for the site, supported by the establishment of a Charitable Incorporated Organisation and further detailing of plans to support fundraising for capital works and permanent reopening. Additionally, it will enable volunteers to return to the Site to prevent further deterioration and support an advisory panel to maintain momentum and provide ongoing support for the future of Coalhouse Fort. Funds were therefore secured to undertake work required to make a submission.

Figure 3 View of the tunnels, taken during an early site visit

1.4 Authorship

This Study was managed by Place Services and included contributions from a number of specialists, which are outlined below together with their specific project roles. Outputs of individual specialists are included in this document as a suite of **Appendices A-I**.

- Tim Murphy, Place Services, Historic Environment Manager: Project Manager
- Sam Pace, Place Services, Senior Built Heritage Consultant: Project Co-Ordinator and Built Heritage Consultant
- Megan Breen, Place Services, Historic Environment Consultant: Project Support
- David Hills, Roger Mears Architects, AABC Architect: Project Conservation Architect
- Sophia Mirchandani, Cultural Consulting Network: Cultural and Business Consultant
- Marilyn Scott, Cultural Consulting Network: Cultural and Business Consultant
- Ed Morton, The Morton Partnership, Director, CARE Engineer: Project Engineer
- Alex McCall, The Morton Partnership, Engineer: Project Engineer
- Paul Coleman, Daniel Connal Partnership: Project Quantity Surveyor
- Ella Gibbs, Place Services, Senior Ecological Consultant: Project Ecologist
- Rafael Casimiro de Figueiredo, The Waterman Group: Flood Risk Assessment
- James Major, Zetica UXO: UXO Report
- Jon Coates, The Waterman Group, Ground Contamination Preliminary Risk Assessment
- Xander Smith, Colchester Archaeological Trust: Archaeological Contractor Monitoring and Recording
- Kevin Diver, Project Curator Thurrock Museum: Collections Audit

1.5 Gaps in Knowledge

Sources consulted in this appraisal are noted in the Bibliography of this document.

Many of the existing studies date from 2018-2019 when a previous feasibility study was undertaken.

The history of the Fort is well documented, and this appraisal includes a high-level overview drawn from this existing baseline. The Essex Historic Environment Record was also consulted.

Gaps in knowledge have largely arisen from the fact that there has been no previous effort to collate, and appropriately archive, all existing information on Coalhouse Fort. As such, some existing studies will likely have been missed.

It is likely that further surveys will be required as the projects at the Site are further developed. Examples include fire safety/risk assessments and access audits.

1.6 Stakeholders and Consultation

This project has included consultation with a number of stakeholders who are outlined below. Individual specialists' reports and relevant consultation feedback is recorded in **Appendix H**.

The following stakeholders have been consulted:

Thurrock Council (Project Commissioners & Owners of Coalhouse Fort):

- Kate Kozlova-Boran, Thurrock Council, Head of Service, Employability and Skills;
- Judy Flight, Thurrock Council, Head of Economic Department;
- Ewelina Sorbjan, Thurrock Council;
- Lisa Ricketts, Thurrock Council, Economic Development Manager;
- Ray Reeves, Thurrock Council, Park Ranger; and
- Cllr Valerie Morris-Cook.

National Highways (Project Funder):

- Dr Steve Sherlock, Heritage Advisor, Lower Thames Crossing
- Elaine King, Project Manager, Lower Thames Crossing
- Egbert Charlish-Jackson, PMO Manager, Lower Thames Crossing

Historic England:

- Luke Wormald, Head of East Region and Infrastructure Historic England
- Will Fletcher, Team Leader East Region, Historic England
- Adam Single, Inspector of Ancient Monuments, Historic England

Figure 4 Setting up for the Open Weekend, October 2024 (see Section 3.2 for further details)

Chapter 2: Baseline & Understanding

2.1 Location

Coalhouse Fort is located on the north bank of the River Thames in East Tilbury, Essex. The Site comprises the Victorian Coalhouse Fort at East Tilbury. It is accessed by Princess Margaret Road to the north, which travels through Linford and East Tilbury. The nearest train station to the Fort is located in Linford.

The Fort itself is an oval defensive structure, built in brick and concrete, comprising brick military buildings and structures surrounding an open parade ground . The structures include the Gatehouse, Casemates, Barracks, Gorge buildings, shell stores, tunnels, rifle range, and searchlight housing. These are discussed in greater detail within Chapter's 5, 6, and 7. Views from within the Fort are limited due to the enclosure created by these buildings.

The Gatehouse is located on the western side of the Fort and includes the only access to the interior of the Fort. The north Parade Ground (which is subject of this study) comprises the semi-circular open space enclosed by the Gatehouse and Casemates, at the southern end of the Fort. The generator house is located outside the Fort and has been converted into a café and visitor centre.

Figure 5 Location of Coalhouse Fort (in red) and the wider area. The Fort is situated on the River Thames, forming part of its defensive line.

The Fort is set within the wider public park, which contains tree planting, walkways, a café, picnic area and benches, and a range of features relating to the historic military use of the Site including the Control Tower, outer ditch, and radar tower. The surrounding park is low lying, due to its proximity to the river, which affords views out towards the River Thames. The Fort is visible from the park, although often nestled behind earth banks, planting, and brambles.

Figure 6 Map showing the Fort within its park

Figure 7 View of the Fort from the park

Figure 9 Interior of the Casemates

Figure 8 The Gatehouse from the Parade Ground

Figure 10 Coalhouse Fort from the air

2.2 Ownership, Management & Use

Ownership and responsibility for Coalhouse Fort passed to the Thurrock Urban District Council in 1960/61 from the War Office (which was dissolved in 1964 and absorbed into the Ministry of Defence). The Site was designated as a Scheduled Monument in 1962 and at this time Thurrock Urban District Council was confirmed as the legal owner of the Site. It has remained under the ownership of the Council (now Thurrock Council) since this time.

The Site is currently closed to the public for health and safety reasons. The Site currently has no dedicated full-time member of staff; security and maintenance are overseen by the part time ranger in the adjacent country park.

2.3 Planning Overview

An assessment of the planning constraints relating to the Fort are included within **Appendix B**.

Coalhouse Fort is a Scheduled Monument (List Entry ID 1013943)[2] and is included on Historic England's 'Heritage at Risk' Register.[3] Scheduled Monuments (SMs) are nationally important archaeological features protected by the Ancient Monuments and Archaeological Areas Act 1979. Scheduled Monument Consent (SMC) is required if work or alteration is to take place within the boundary of the area that has been scheduled. Large parts of Coalhouse Fort are either derelict or unused, resulting in its addition to the Historic England Heritage 'At Risk Register'. This assesses the overall condition as 'very bad' and categorises it as 'immediate risk of further rapid deterioration or loss of fabric; no solution agreed'.

Whilst the Site itself is not designated, in terms of natural environment designations, it is immediately adjacent to the Mucking Flats and Marshes Site of Special Scientific Interest (SSSI). SSSIs are protected by law to conserve their wildlife or geology.

The Site is also immediately adjacent to the Thames Estuary Ramsar Site. Ramsar Sites are internationally significant areas of wetland habitat.

Both the SSSI and Ramsar designations have implications on proposals for the future use of Coalhouse Fort.

2 https://historicengland.org.uk/listing/the-list/list-entry/1013943

3 https://historicengland.org.uk/listing/heritage-at-risk/search-register/list-entry/48239

Figure 11 Planning sensitivities map

2.4 Historical Overview

Coalhouse Fort demonstrates the historic strategic importance of Coalhouse Point and the changing approaches to defence over 400 years.

Following a Franco-Spanish attack on Tilbury and Gravesend in 1380, as part of the Hundred Years War, the people of East Tilbury requested to build fortifications to protect them. Permission was granted in 1402, although there are no further references to these fortifications and their location has not been traced.

A series of blockhouses were constructed along the coast, including a pair at East Tilbury and Higham in 1540, when fears of an invasion were heightened again due to King Henry VIII's break from the Catholic Church. These were disarmed in 1553, and East Tilbury was largely abandoned, though the tenant of the Manor of South Hall was responsible for maintaining it as part of the sea wall. It was already known as 'the olde blockhouse' by 1588 and its remains were visible from offshore on the river until the early eighteenth century.

A battery was built in 1799 during the French Revolutionary Wars and decommissioned in 1820 following the defeat of Napoleon. However, later threats of French invasions led to its conversion into a full Fort in 1855, armed with 18 cannons and enclosed by a pentagonal water-filled ditch. Though only recently completed, Coalhouse Fort was dismantled in 1861, as a result of recommendations by the Palmerston Commission, to be replaced with a new Fort in response to the improved range and accuracy of rifled guns. The Palmerston Commission, or the Royal Commission on the Defence of the United Kingdom, was a committee formed in 1859 championed by the Prime Minister Lord Palmerston to enquire into the ability of the United Kingdom to defend itself. This is where the Palmerston Forts get their name.

The Gorge buildings were also constructed to house the administrative and domestic quarters. They are notable for their iron veranda and Fox and Barrett fireproof construction; another example of this construction can be found at the Royal Albert Hall. The East Tilbury Battery, located to the north of Coalhouse Fort, was built in the late 1800s with a sloping earth front designed to blend into the landscape in views from the estuary. Coalhouse Fort was re-fortified in the early twentieth century and camouflaged by vegetation.

During World War One, Coalhouse Fort was used to control river traffic and halt any enemy shipping. A minefield of both mechanically and remotely operated mines was located between Coalhouse and Shornemead Fort (located across the River Thames in Gravesend), with a minefield control tower built to the north of Coalhouse Fort. In 1917 the soldiers stationed at Coalhouse Fort unveiled a memorial to their fallen comrades; however, this had not been granted permission by the War Office, who ordered its destruction by explosives.

At the beginning of World War Two, naval guns and anti-aircraft artillery were installed at Coalhouse Fort to be used as an emergency battery. Once the threat of invasion had receded, the Fort was used as a degaussing range, where submerged sensors in the adjacent area of the Thames would detect whether outbound ships had been demagnetised sufficiently enough to make them undetectable by German magnetic mines.

Following the war the Fort was briefly used for training Sea Cadets. After being decommissioned in 1949 the Fort had many uses, including as storage for the Bata Shoe Company (who had built substantial new developments in East Tilbury), emergency housing for ex-servicemen, and as a coal store during the Miners' Strike of 1959. The surrounding grounds were developed into a public park

and café following their acquisition by Thurrock Urban District Council but fell victim to vandalism in the 1970s.

The Coalhouse Fort Project, formed by volunteers in 1983, worked to restore the Fort and restore public access. Following an HLF project, the Generator House was refurbished and officially opened in 2016 as a café, information point and community interpretation space. Until the Covid-19 pandemic, Coalhouse Fort was open to visitors on regular open days and for special events. Individual casemates were used by several different organisations for storage, workshops and education, museums, and as a shooting range and the tunnels have a history of being used for magazine storage and defence. The Site has also been used as a filmset, notably for the film ‘Batman Begins’. Since 2020 the Fort has been unoccupied and with no public access.

Figure 12 Photo of Coalhouse Fort courtyard and parade ground at the main entrance area, Thurrock Council Coalhouse Fort archive, photo 0146

Figure 13 Photo of munitions - archaeological find, Thurrock Council Coalhouse Fort archive, photo 0104

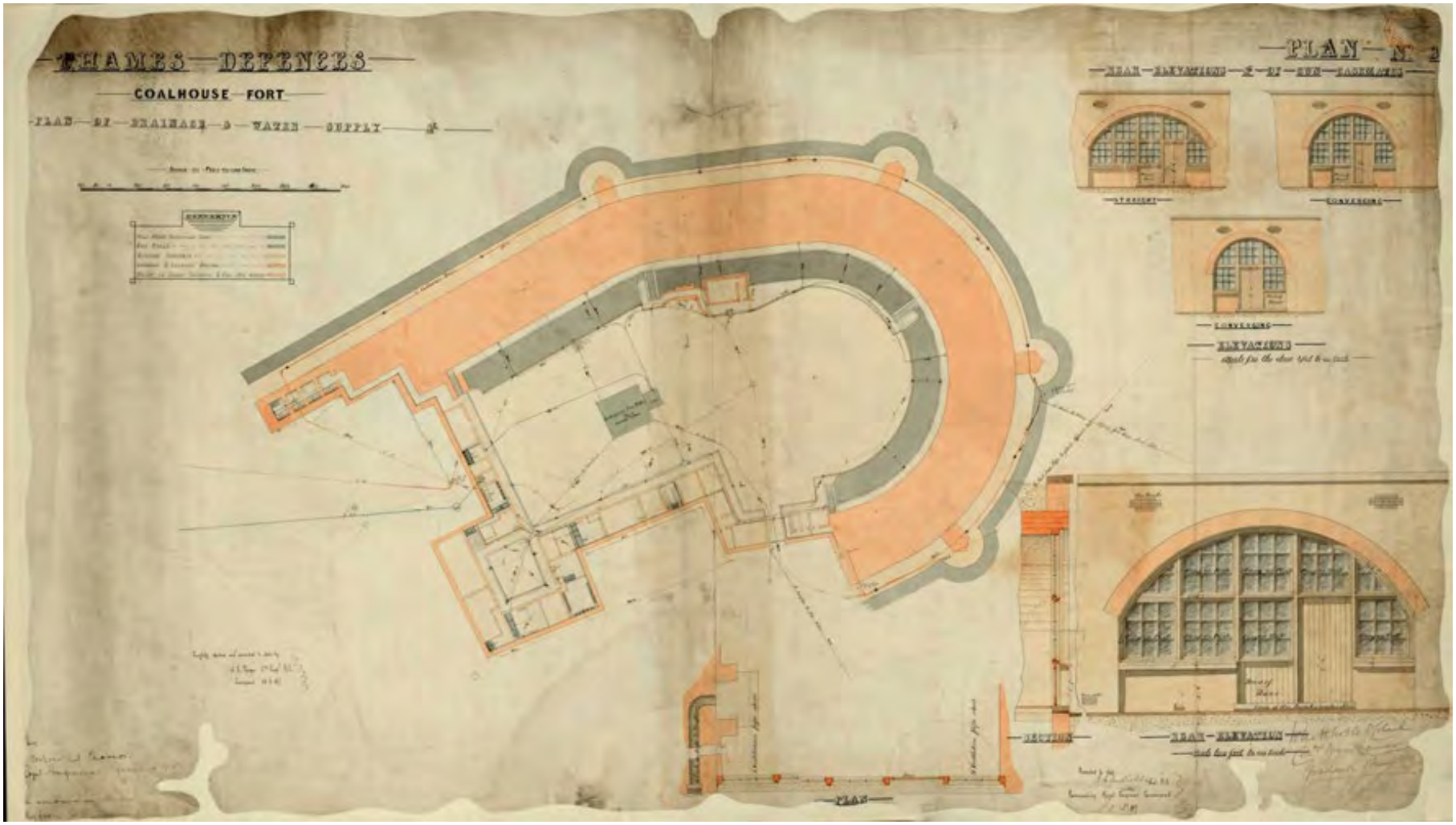


Figure 14 Drainage plan of the Fort dated 1875 (WO78-4369-2(3))

Figure 15 Image of Officers and Sergeants taken at the entrance to the Fort posted in 1914. The soldiers are the Royal Garrison Artillery. Image courtesy of Kevin Diver

2.5 Archaeological Overview

Due to its location adjacent to the Thames, the area of East Tilbury has attracted settlement since prehistory. Archaeological evidence found here has included Neolithic axes, Roman pottery, and Saxon coins, which suggests early settlers were taking advantage of the marshes for salt production. Historic Environment Records (HERs) within the Fort and Scheduled Monument are included in the table below, with a corresponding map overleaf (**Figure 17**). A full HER report is included in **Appendix C.**

Coalhouse Fort, and its environs, are considered to have high archaeological potential; the Henrician blockhouse to the south east of the Fort is well documented historically and has high archaeological potential. Archaeological deposits could survive well here due to waterlogged conditions.

HER Reference	Site
10300	The location of a modern concrete building, standing 50 yards to the NE of the minefield control tower, at the W end of the moat around Coalhouse Fort.
10299	Location of the two-storey Minefield Control Tower, which still stands 50 yards to the N of Coalhouse Fort.
10298	Site of a Tett Turret which once stood in the grass 30/40 yards from the entrance gateway into Coalhouse Fort (now destroyed).
10297	The location of Spigot Mortar Pedestals (2) - There are two spigot mortar pedestals in the grass near the NW wall of Coalhouse Fort.
1761	By 1903 part of the casemated front of Coalhouse Fort was earthed up in an effort to disguise the stark profile and 4 x Mk.7. Monuments Gun Emplacement, Pillbox, Coastal Battery, Battery, Searchlight Battery.
1760	Site of a series of fortifications dating back to the time of Henry VIII including Fort, Magazine, Moat, Barracks, Battery (see also 1756, 1757).
1756	Site of the post medieval Blockhouse. In 1539 Henry VIII ordered a blockhouse to be erected at East Tilbury.
14558	The Site of a spread of anti-glider ditches, which appear as earthworks on vertical aerial photography.

Figure 16 Pottery fragments found at Coalhouse Fort, Thurrock Council Coalhouse Fort archive photo 0068

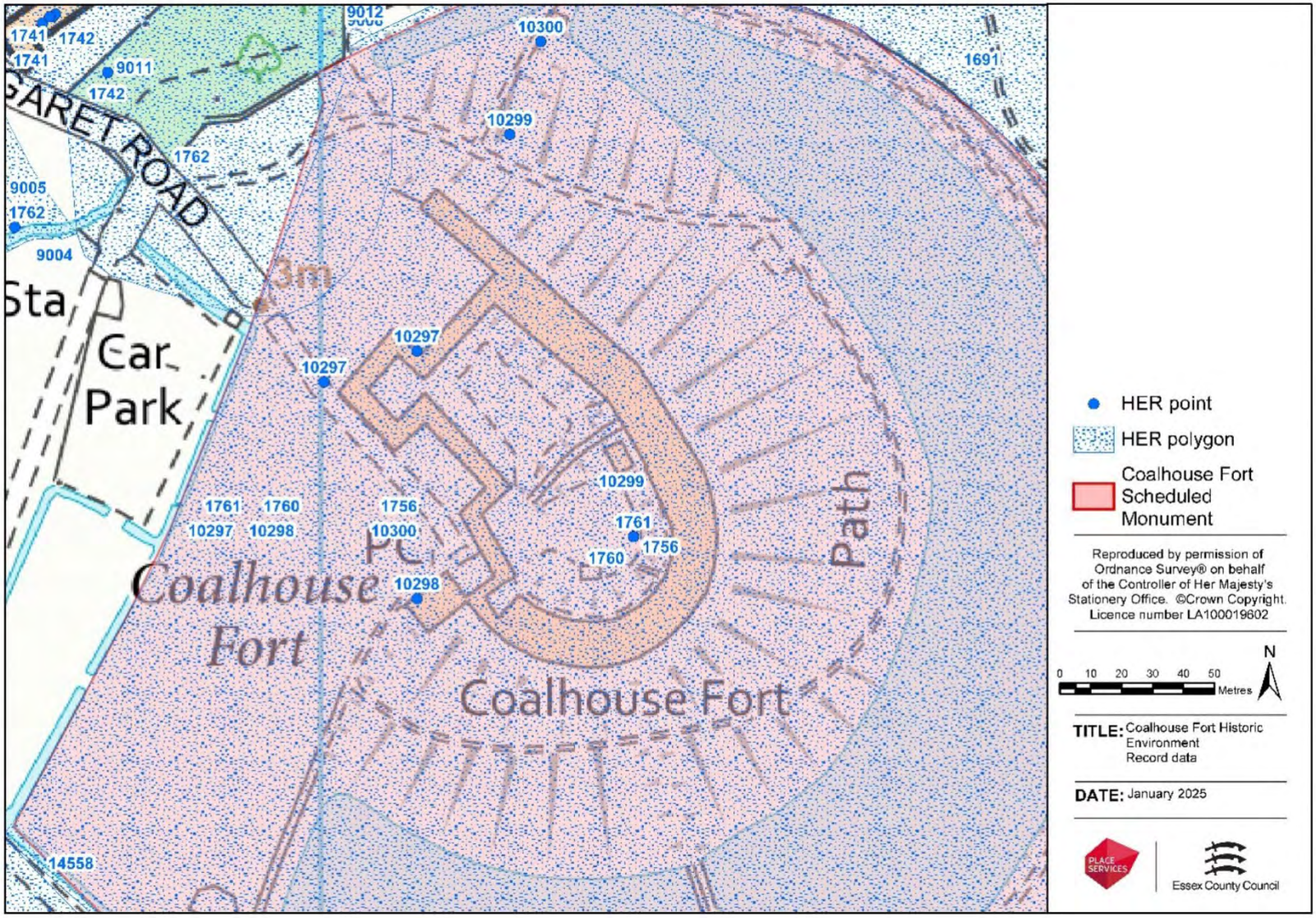


Figure 17 Map showing Historic Environment Record information

2.6 Statement of Significance

The intrinsic significance unique to each heritage asset can be defined as the sum of tangible and intangible values which make it important to society. The significance of an asset or place may reflect its age, rarity, aesthetic, architectural quality, or historic fabric, as well as intangible qualities such as associations with historic people or events.

To assess the heritage significance of Coalhouse Fort, this assessment has drawn guidance from Historic England[4] which recommends making assessments under the categories of: archaeological interest; architectural and artistic interest; and historic interest. These interests together contribute to the overall significance of a place or Site.

These attributes of significance are described as:

Archaeological interest

There will be archaeological interest in a heritage asset if it holds, or potentially holds, evidence of past human activity worthy of expert investigation at some point.

Architectural and artistic interest

These are interests in the design and general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skills, like sculpture.

Historic Interest

This is an interest in past lives and events (including pre-historic) which heritage assets can illustrate or be associated with. Heritage assets with historic interest not only provide a material record of our nation's history but can also provide meaning for communities derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity.

Setting also contributes to the significance of a heritage asset. The (National Planning Policy Framework) NPPF notes that setting is: *The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve*. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral. This assessment has consulted Historic England Guidance document, *The Setting of Heritage Assets*.[5]

[4] Historic England, 2019. *Statements of Heritage Significance: Analysing Significance in Heritage Assets - Historic England Advice Note 12.*

[5] Historic England, December 2017. *The Setting of Heritage Assets - Historic Environment Good Practice Advice in Planning Note 3 (Second Edition)*

Significance of Coalhouse Fort

In statutory terms, the significance of Coalhouse Fort has been recognised by its designation as a Scheduled Monument, reflecting its special interest as a structure of national importance forming part of England's historic coastal defence.

Although parts of the Fort have suffered from deterioration over time, its architectural and historical significance remains. The quality of its design and construction, particularly in its use of military engineering techniques and survival of military structures, is still legible in its form, layout, and defensive features.

Significance is also drawn from its historic interest; Coalhouse Fort is directly associated with key periods of military history which reflects its continued role in defending the Thames Estuary.

As an important surviving element of nineteenth-century military infrastructure, Coalhouse Fort demonstrates the changes to national defence during the Victorian era and beyond. Built as a response to the perceived threats of invasion, it stands as a reminder of Britain's historic naval power and artillery.

Architecturally, Coalhouse Fort is an outstanding example of a mid-nineteenth-century coastal defence structure, designed in accordance with the recommendations of the Royal Commission on the Defence of the United Kingdom (1859). It retains much of its historic fabric, including its masonry construction, casemated gun emplacements, and defensive moat. Of particular interest are the surviving elements of its later modifications, such as its mounting points for disappearing guns and the integration of searchlight emplacements, which reflect the evolution of military technology.

Although not exhaustive, specific elements of special interest are listed below. Identifying themes of significance is useful to understand at a high level what is important about a heritage asset:

Archaeological Interest

- Enhances understanding of nineteenth-century and early twentieth-century coastal defence strategies.
- Offers insight into the development of military engineering technologies.
- Highlights the role of Coalhouse Fort in the defence of the Thames estuary.

Architectural and Artistic Interest

- Exceptional example of Victorian military architecture.
- Robust and practical design, integrating defensive features of each phase.
- Unique casemated layout and surviving gun emplacements.
- High-quality masonry construction.

Historic Interest

- Association with the Royal Commission on the Defence of the United Kingdom (1859).
- Role in the defence of London via the Thames during key periods of national threat.
- Connection to advancements in artillery and coastal defence technology.
- Representative of Britain's strategic response to changing military threats in the Victorian era and World Wars.

2.6.1 Contribution of Setting to Significance

Historic England's *Setting of Heritage Assets* advice note on setting includes a: *"(non-exhaustive) check-list of potential attributes of a setting that may help to elucidate its contribution to significance'.* As the advice note states, *'only a limited selection of the attributes listed will be of a particular relevance to an asset."*

The Historic England advice note identifies the fact that heritage assets can include overlapping settings, as well as having a setting of their own. With regard to the non-exhaustive checklist included in Historic England's guidance, the following broad headings are considered to be relevant in terms of the contribution setting makes to the significance of the heritage asset:

The asset's physical surroundings:

- Topography;
- Other heritage assets;
- Definition, scale and 'grain' of surrounding streetscape, landscape and spaces;
- Orientations and aspect;
- Green space, trees and vegetation;
- Openness, enclosure and boundaries;
- Functional relationships; and
- History and degree of change over time.

Experience the asset:

- Surrounding landscape and townscape character;
- Views from towards, though, across and including the asset;
- Intentional intervisibility with other historic and natural features;
- Visual dominance, prominence or role as a focal point;
- Tranquillity, remoteness, 'wildness';
- Sense of enclosure, seclusion, intimacy or privacy;
- Land use;
- Cultural associations; and
- Traditions.

The historic and functional relationship between Coalhouse Fort and its surrounding landscape remains legible, particularly due to the topography of the area and proximity to the River Thames. The environs of the Site contribute to our understanding of Henry VIII's coastal fortifications, offering insight into early defensive strategy. This positioning in the landscape allows for an appreciation of its importance in coastal defensive history through time. It is also part of a wider defensive network of Forts, including Cliffe and Tilbury Forts, which make a positive contribution to our understanding of the Site. There is a car park to the west and a moat in a horseshoe shape wrapping around the north, east, and south side of the park. In the wider area the landscape comprises mainly grazing and arable farmland to the north and west, with the village of East Tilbury to the north-west. The River Thames is located to the east and south with its associated mudflats and tidal habitats.

The surrounding features of Coalhouse Fort contribute to its historical and strategic significance. The jetty and railway line highlight its historic logistical connections. The 1893 Quick-Fire battery, to the south of the Fort, is the only surviving example of its kind in the Thames basin and demonstrates the Fort's evolving role in artillery defence. Additionally, the rifle range, which is an unusual survival, enriches the known range of earthwork monuments and maintains a strong connection to the Fort's military use. The near-intact World War Two radar installations to the south of the Fort are among only three known examples in England, making this a rare remnant of a once-extensive defensive network. Together, these features contribute to the significance of Coalhouse Point and the continuous evolution of military defence over four centuries.

Views

Views to and from Coalhouse Fort make an important contribution to its significance, as they enhance our understanding of its strategic position on the Thames. The location of the Fort was chosen for its commanding views, which were essential for defence of the river. Today, these views contribute to the appreciation of this heritage asset and its presence and significance in the landscape.

Clear sightlines from the river, marshes, and surrounding areas highlight the Fort's role as a landmark. These views should be considered with regard to future changes, ensuring that any changes do not diminish its setting and ensure that visitors can appreciate views which contribute to significance.

Figure 18 Panoramic view of the Thames from the Fort

2.7 Baseline Studies

The following section includes an overview of the studies that have been commissioned as part of this Feasibility Assessment. These studies form the basis for assessing the viable future uses of the Site, by revealing its constraints and considerations. Ful reports for each study are included within the Appendices.

2.7.1 Structural Condition of the Site

A survey of the Site was undertaken by Ed Morton of The Morton Partnership, a CARE Engineer.

The Morton Partnership's comprehensive assessment of condition and associated recommendations for conservative 'necessary repair' is located in **Appendix J**. 'Necessary' repairs, for the purposes of this document, are limited to the consolidation and protection of vulnerable building fabric and those to enable independent (scaffold free) structural integrity. This consolidation, together with a maintenance plan, could preserve the structures for perpetuity. This scheme of repair, with additional works, would also form the basis for future uses of the Site. Below is a summary of their findings for each study area within the Site.

Summary of Condition: Parade Ground

The existing building is L shaped on plan, two storeys in height and has a flat roof. Walls external to the Fort are faced with large ragstone blocks, those within the Fort are faced with brickwork.

The west range, which the entrance coach way passes through, underwent refurbishment works some 15 years ago which saw the removal of the concrete part of the filler joist first-floor structure, with the beams remaining in-situ and the addition of timber joists over and additional steel beams between. Works to the roof structure were also undertaken including a new covering. Since these works, this section of the building has fared reasonably well, however staining to the first-floor ceiling shows that the roof water drainage system is still defective. Minor cracking to the walls both internally and externally is also present.

The north range has not previously been subject to refurbishment work and is in a very poor condition, particularly with regards to the first floor and roof structure. There is significant spalling to the concrete section of the filler joist floor and roof and in some areas complete section loss. There is also heavy corrosion to the embedded steels. In particular, there is also extensive cracking to the external wall which fronts the Parade Ground with diagonal fractures running up between the central set of windows and the loss of an engaged brick arch over one opening. To the east end of the wall there is severe disruption to the brickwork to the head of the iron canopy where corrosion jacking has caused a corner to become dislodged and is at risk of falling.

Summary of Condition: Casemates

Six Casemates were inspected as part of this survey which comprised those at the southern end of the Site working eastwards from the south west corner.

The Casemates are located at an upper raised level within the Fort and there is an earth bank between them and the parade ground. They are constructed from very thick masonry walls (the southern external wall is approximately 4 metres thick) and bricked vaulted roofs. Each chamber tapers in width being slightly wider at the external edge where they are connected via openings through dividing walls.

Generally, the condition of the face of the walls and vaulting is reasonable and as a whole, owing to their thickness, they likely have a large amount of redundant strength.

The primary condition issues relate to fractured masonry, both to the vaulting and to the southern external wall in the area of casemate 4, and also moisture penetration through the vaults and wall heads. This was found to be almost consistently present around openings in the southern external wall and also where there are fractures in the vaulting (particularly casemate 4) although it is also present in other isolated areas.

Summary of Condition: Former Rifle Club

The rifle range is situated to the north end of the Fort, its northern range is narrow but widens at the southern end. The typical roof construction comprises narrow beams with concrete cast between and a plaster finish. The walls are robust with thick brickwork.

To the long caponier range there is no major evidence of significant structural defects. Moving southwards there are areas of loss of the concrete infill between. The water is clearly getting through on a regular basis causing progressive loss and collapse of areas of concrete. There is clear and reasonably significant corrosion of the bottom of the beams with reasonable loss of section in places. This issue with both the deterioration of concrete and steel can be seen in many areas throughout the Fort and is likely caused the failure of the water proof covering to the roof and damage caused by the growth of vegetation.

2.7.2 Ecological Overview

A Preliminary Ecological Assessment (PEA) has been produced as part of this project (**Appendix D**) including a Preliminary Roost Assessment (PRA) for bats.

The Fort is located in close proximity to Mucking Flats and Marshes Site of Special Scientific Interest (SSSI), Thames Estuary & Marshes Ramsar Site and Special Protection Area (SPA), designated for their habitat compositions and/ or support of an important number of over-wintering wading birds. In addition, these sites comprise Priority habitats including mudflats, coastal saltmarsh and reedbeds. No Priority habitats, ecology-related statutory designated sites or non-statutory designated sites are located within the Fort itself.

It has been confirmed that bat roosts are present within the Fort and the majority of the Fort has some potential to support roosting bats, in particular during the hibernation period. In addition, some of the Casemates were found to support Barn Owls, including for nesting.

Figure 19 A Natterer's Bat found in the shell stores and tunnels

It is likely that a European Protected Species Mitigation Licence from Natural England will be required prior to commencement of any repair or restoration works in the Fort due to the presence of bat roosts. Any areas with active Barn Owl nests must not be disturbed during the nesting bird season or whilst any active nests are present. Nesting birds, other than Barn Owl, were also noted within the Fort and Parade Ground; these are statutorily protected from damage and destruction during the nesting bird season. This ecological advice provided in November 2024 is valid for 18 months.

The PRA for bats found the following:

Area	Summer	Hibernation
Gatehouse	Moderate potential in chimneys and wall cavities if present. No potential in previously converted sections and stairwell.	Moderate potential for low numbers of bats in chimneys and wall cavities if present. No potential in previously converted sections and stairwell.
Casemates	Moderate potential in casemates due to presence of chimneys and some crevice features throughout. Unlikely to be present where high Barn Owl activity is present.	Moderate potential for low numbers of bats in casemates due to presence of chimneys and some crevice features throughout. Unlikely to be present where high Barn Owl activity is present.
Shell Store & Tunnels	Moderate potential in these areas but only likely to be in small numbers. Confirmed use through droppings, most likely as a Night Roost.	Confirmed hibernation site for at least three species. Moderate potential for moderate numbers of bats.
Roof Structures	One confirmed roost in Searchlight Emplacement 2. Likely to only be low numbers of bats. Some other non-crevice features present but largely unsuitable and quite exposed.	Low potential for low numbers of hibernating bats in some of the crevices nut largely unsuitable and quite exposed.
Parade Ground	Mostly unsuitable structures but some potential within the Laboratory.	Mostly unsuitable structures but moderate potential for low number within the Laboratory.

Figure 20 Summary of Site ecology

2.7.3 Ground Contamination Overview

UXO Hazard Assessment

An Unexploded Ordnance (UXO) desk-based study and hazard assessment was undertaken by Zetica UXO as part of this project. The UXO report is reproduced in **Appendix E**. This identified no significant sources of unexploded ordnance.

Records indicate that one High Explosive (HE) bomb fell on the Site during World War Two and exploded. No further bombing and no other significant sources of UXO hazard have been identified on the Site.

Given this, it is considered that the Site has a low UXO hazard level, as shown in **Figure 21**.

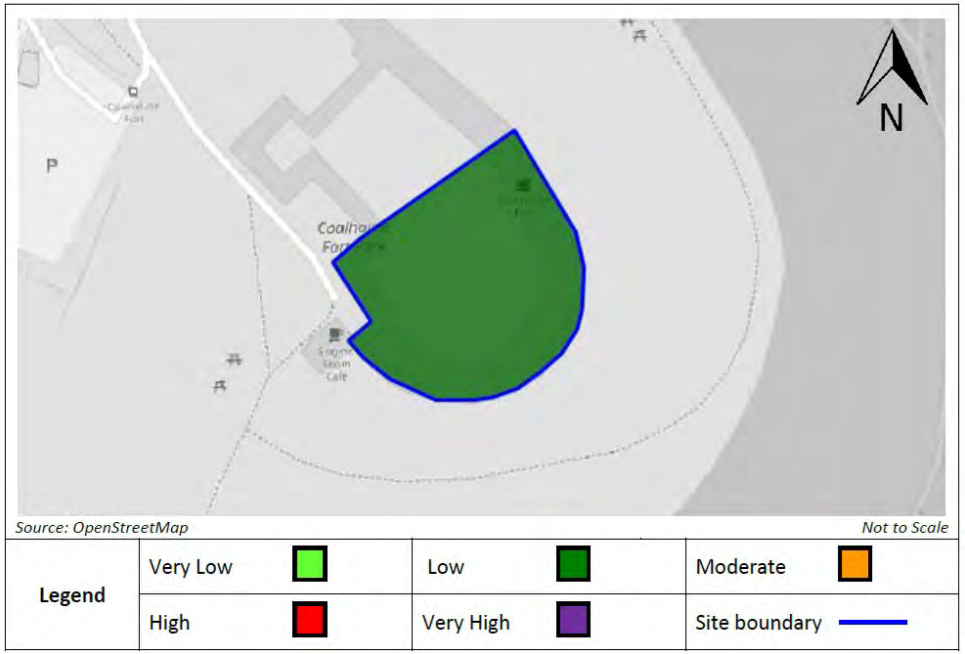


Figure 21 UXO hazard level of Coalhouse Fort

Ground Contamination

Waterman Infrastructure and Environment undertook a hand pitting investigation exercise in the north parade ground to assess levels of ground contamination. The full report is included within **Appendix E**.

Chemical analysis of shallow soils within the Parade Ground indicated the presence of elevated concentrations of PAHs (Polycyclic Aromatic Hydrocrabons) which may present a potentially unacceptable risk to human health should the Site be opened up for frequent public access without the implementation of appropriate mitigation measures. These mitigation measures are outlined in Sections 5.4 and 6.4 and the full report can be found in **Appendix E**. Given the proposed medium and long term uses, the overall risk rating for the Site is assessed to be at the Medium level.

The recommendations made within the full report included potential mitigation measures that should be considered to reduce potential risks to Low.

Dues to the Scheduled nature of the Site, the hand pitting exercise, including hand pit reinstatement, required Scheduled Monument Consent from Historic England. The eight test pits were monitored by Colchester Archaeological Trust (CAT) in accordance with an agreed Written Scheme of Investigation (WSI). Archaeological monitoring revealed modern layers and features including buried gravels from an earlier parade ground surface sealing buried topsoil, and a bedding layer for part of the demolished railway. The full Archaeological Monitoring report is included withing **Appendix F**.

Figure 22 Test pit 5, overseen by Colchester Archaeological Trust

2.7.4 Flood Risk Report

A Flood Risk assessment was prepared by Waterman Infrastructure and Environment as part of this project. The full report is included within **Appendix G**.

The scope of the assessment covered the Casemates, Gatehouse range and the southern half of the Parade Ground of Coalhouse Fort. It assessed the potential effects of tidal, fluvial, pluvial (surface water), groundwater and infrastructure failure sources of flooding upon the development, in line with national and local planning policy.

The findings of the report identified several key flood risks, including tidal, pluvial, and groundwater flooding. Basements were found to likely be heavily restricted owing to the tidal flood risk. The report also proposed mitigations for flood water management, including the incorporation of Sustainable Drainage Systems (SuDS) to manage surface water runoff, upgrades to the existing drainage infrastructure, and setting Finished Floor Levels (FFLs) at a minimum of 300mm above predicted flood depths for surface water flooding.

2.7.5 Collections Audit

A collections audit was undertaken by Kevin Diver, Project Curator at Thurrock Museum, to determine provenance, ownership, and relevance of the collections at the Site with a view to dispose of or relocate, the collection as appropriate, to facilitate new uses. The full report is included within **Appendix I**.

The inventory focussed on the collection of objects and artefacts within the Fort. Generally, objects are not fixed, although there are a few exceptions to this, such as the rooftop mounted World War Two Bofors AA gun, the early twentieth-century Quick Firing gun base (also rooftop mounted) and the Victorian detention cell doors. These fixed items are part of the Scheduled Monument designation. To discern the provenance of items within the audit, a variety of documents have been found in the archives of Thurrock Museum which have helped to inform this report.

Figure 23 Coalhouse Point Radar Tower mounting wheel for transmitter/reflector. Recovered from the foreshore close to Radar Tower by Coalhouse Fort Project volunteers in 1984. Part of Thurrock Museum collection.

Chapter 3: Consultation and Feasibility

3.1 Overview

Cultural Consulting Network (CCN) were instructed to undertake a feasibility study to explore new uses for the Gatehouse, Parade Ground and Casemates. The team aimed to develop short- to medium-term plans to secure support and funding for the Fort's future conservation, re-opening, and operations. This included consideration of future governance and management.

CCN's methodology included:

- A review of past reports to understand local context, previous constraints and opportunities, and lessons learnt;
- Consultation to establish interest in the Fort, current key constraints and opportunities, potential for future use, and potential funding streams and partnerships;
- Comparator research for examples of other business models for similar building typologies, lessons learnt, and good practice;
- Liaison with subject specialist experts and key stakeholders to understand on-the-ground constraints and opportunities of the Fort;
- Consideration of critical success factors common to long-term major development projects for historic sites, and
- Development of short- to medium-term plans to lay the foundations for the longer-term development of the Fort.

This research sought to establish if emerging plans were:

- Technically feasible and acceptable in both heritage and ecological terms;
- Of potential benefit to the Fort;

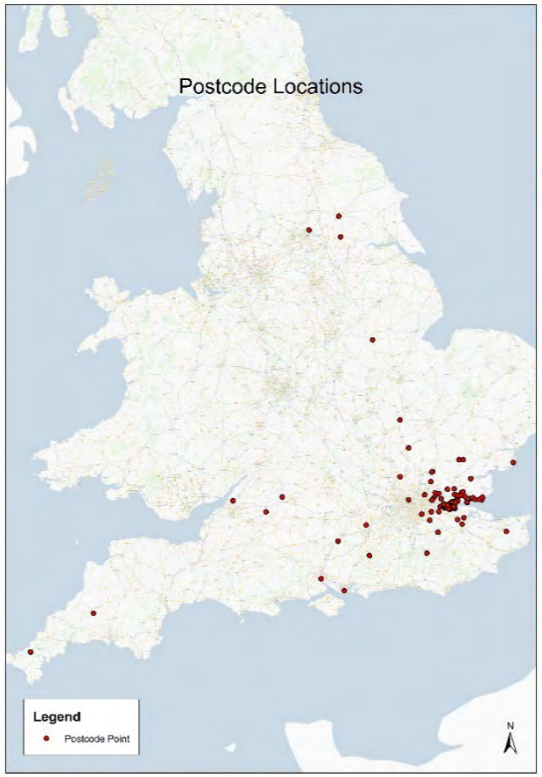


Figure 24 Location of visitors to the Fort, collated through the visitor survey

- Of potential benefit to the local community and visitors;
- Economically viable;
- Having potential to secure funding and to establish a viable business model, and
- Deliverable, in terms of governance, management and future operations.

3.2 Consultation Undertaken

3.2.1 Visitor Survey

To support the consultation exercise, an on-line survey of visitors to Coalhouse Fort Park was conducted from 5th September until the 31st October 2024. This captured information about who visited the park, where they travelled from, their modes of travel, their motivations for visiting, visit type (i.e. solo, as a family, or in groups) and demographic data. It also tested interest in the Fort itself, potential new uses, and future activities. Understanding the current potential local use of the park and support for the Fort helped to inform future plans.

The on-line survey received 279 responses. 85% had visited Coalhouse Fort in the past, and 96% stated that they would visit Coalhouse Fort if it was open again, indicating a strong interest in the Fort despite its closure. The majority of survey respondents were local and are regular users of the surrounding country park. When asked if they thought that Coalhouse Fort was an important local building, 99% agreed that it was very important or important.

Survey respondents were asked if they would be interested in a variety of activities. Open Days, exhibitions, guided tours, building or craft heritage activities, music events, and theatre events were all popular.

Following an invitation at the end of the on-line survey, 141 participants left additional comments. These comments evidenced a passionate and engaged community around Coalhouse Fort, with many ideas for its future. The Fort is seen as a vital piece of local history, with many people eager to see it maintained and reopened to the public. Some key points taken from the feedback include:

- **Historical importance**: Many respondents emphasised the Fort's significance in local and national history and the need to preserve it for future generations.
- **Community use**: There is a strong desire for the Fort to serve as a venue for community events, craft fairs, music events, and educational activities. Suggestions included hosting local markets, historical re-enactments, and workshops.
- **Visitor amenities**: Improving amenities including food and beverage options, car parking, and accessibility (particularly for mobility scooters) were highlighted.
- **Volunteer involvement**: Many expressed a willingness to volunteer and help maintain and conserve the Fort, indicating strong community support for this.
- **Caution against residential development**: There is clear opposition to converting the Fort into residential accommodation, which stems from concerns about maintaining public access and the impact on local wildlife and green spaces.
- **Potential for collaboration**: Some respondents referenced successful examples of other Forts being managed by volunteer groups, suggesting a similar approach could be beneficial for Coalhouse Fort.
- **Need for investment**: While there is enthusiasm, many people recognized that significant investment and a clear strategic and management plan is essential for the Fort's future.

Overall, the feedback reflects a community deeply invested in both preserving Coalhouse Fort and enhancing its role as a local landmark, and community and educational resource.

3.2.2 One to One Interviews

Between late-August and early-November, over 35 targeted interviews were undertaken to understand views on Coalhouse Fort, as well as potential business and development opportunities.[6] Consultees included:

- Councillors and officers of Thurrock Council;
- Local community and amenity groups, and social enterprise organisations;
- Specialist interest groups;
- Heritage societies and groups including those specifically focused on Coalhouse Fort;
- Local arts and creative industries organisations and artists;
- Historic England;
- Historic Fort groups and comparable historic Forts and sites;
- Officers at Place Services and Essex County Council, and
- The Landmark Trust.

Interviews were based on a broad standard set of questions to enable a range of views to be captured, with consensus and differences noted. The conversations were not time limited but typically lasted 30 minutes. Questions included:

- Have you visited Coalhouse Fort in the past? Or been involved in Coalhouse Fort?
- What do you think are the key issues and opportunities associated with Coalhouse Fort?
- What are your views on its future use and place within East Tilbury and the local area more widely?
- What uses do you think the Gatehouse and Casemates could be put to? What is local need and demand?
- What would need to be put in place to enable the Fort and/ or those spaces to be brought back into use? (Physical, financial, governance, access etc)
- What degree of public access do you think would be welcome?
- Do you see any potential for local partnerships to support its use and programming?
- Do you have any thoughts on how restoration work could be funded?

Follow up interviews were held with individuals where a potential viable use was identified, to explore business development opportunities including space hire, film location potential, volunteering, events programming, and activities.

The following potential was identified:

- Community use including courses and skills development;
- Health and wellbeing activities linked to the natural heritage and history;
- Educational potential (primary, secondary and further education);
- Artist studios and craft workshops including related markets and programming;
- Events and programming to generate income;
- Film location hire; and
- Volunteering to support maintenance and operations.

[6] This number excludes conversations held with a range of individuals during the Open Weekend.

3.2.3 Public Consultation Open Weekend

An open weekend was held on Saturday 12th and Sunday 13th October between 11.30am-4.00pm. The Open Weekend was widely publicised and attracted around 1000 people.

The aims of the Open Weekend were:

- To reignite interest in the Fort amongst the local community;
- To raise awareness of the Feasibility Study, its aims and current scope;
- To make contact with local groups, businesses and individuals who may have an interest in the future use of the Fort;
- To make contact with past supporters and volunteers and to learn from them about past operations, maintenance, and activities;
- To test ideas for the viable future of the Fort and invite new ideas
- To generate interest in the history and ecology of the Fort through planned low-level engagement activities in order to demonstrate local interest to any potential future funders for restoration work.

Many of the emerging issues and themes were mirrored on-line on the Coalhouse Fort Futures Facebook group (c. 2000 members) which saw high activity in the form of comments, images, and videos from those attending the Open Weekend. The key themes were:

- Appreciation of the Fort
- Disappointment at the existing state of disrepair;
- Strong local interest in the future of the Fort;
- A wealth of knowledge within the community;
- Resentment and anger over the previous and current management of Coalhouse Fort;
- Disappointment about the lack of access for local people and groups, and
- Disappointment about the absence of any plans for the future of the Fort.

3.3 Viable Uses Identified

The majority of consultees expressed the view that the most sustainable future of the Fort lay in a mixed-use development and business model, recognising that the previous volunteer run 'visitor attraction' model, with activities focused on Fort and military history, would not generate sufficient income or funding support to conserve and maintain the Site.

Based on consultation results and comparator research, the following viable uses were identified:

- Development of artist studios/ workshops and business units, with related communal space and facilities;
- Development of spaces for educational purposes including
    - Historic and built environment CPD (Continuing Professional Development)
    - General courses including: supported volunteering; hire by business education providers; and partnership working with local education providers;
- Workshops and supported skills development related the historic environment/ built heritage
- Heritage interpretation and related programming (tours, talks) to support regular ticketed open days with themed activities supported by volunteers;

- Hosting volunteer cohorts to maintain the Site;
- Arts and community programmes based on the Fort's heritage and ecology in partnership with other relevant providers;
- Health and wellbeing activities working with community led support teams, with potential for related funding for bespoke programmes;
- Christmas markets, Halloween events, paranormal activity events, music events, and pop-ups (subject to appropriate consents), and
- Film location hire (which may be marketed, promoted and managed by Essex Film Office).

Given that residential and /or holiday lets have been developed at other Forts, this could be an area for further research and development as part of future feasibility work. Although not included within the scope of this feasibility study, contact was also made with The Landmark Trust to test their interest in developing parts of the Fort as holiday lets. The Landmark Trust confirmed that this was not currently of interest to their organisation as they typically only redevelop entire sites over which they have overall control and influence. However, this could be a consideration in the future for other areas of the Fort.

A significant number of interviewees spoke of the need for a clear strategic vision for the Fort, and sound governance and management of the Site. Many questioned whether the local authority was the best organisation to lead any future development project, querying whether the Fort had ever been, or would ever be, a good use of limited Council resources. Consultees (including Councillors) stated that, in the long-term, a charitable independent organisation (CIO), free of local authority planning processes and with access to wider funding opportunities, would be essential for the successful delivery of any future uses.

3.3.1 Additional outputs

At the midway point of the feasibility study, CCN identified that it would be beneficial to allow volunteers back to the Site in some capacity. In order to facilitate this, Place Services compiled a Volunteer Preventative Maintenance Plan, which clearly outlines specific maintenance tasks that can be undertaken by volunteers having due regard to the ecological and heritage sensitivities of the Site. This will facilitate future volunteering as soon as they can be brought back on Site. See full details for future funding application plans within **Appendix H**.

3.4 Outcomes and outputs

Following the identification of potential uses for Project Areas 1 and 2, the key issues facing any future development plans, and the Fort's longer-term sustainability, the following actions were prioritised and undertaken between November 2024 and March 2025:

- Meet with Thurrock Council to discuss emerging findings and to obtain approval for the establishment of an Advisory Group as well as the preparation of and submission of funding applications to facilitate works beyond the end of this stage of work.
- Request that Thurrock Council nominate a project contact for the proposed Advisory Group and project lead for the proposed Heritage Fund grant application for the next phase of work (see below and full details in **Appendix H**).
- Establishment of an Advisory Group with a diverse range of relevant skills and experience. This group will provide

support and maintain momentum after this project with a view to:

1. Continuing work on a long term strategy for Coalhouse Fort;
2. Ensuring local people and key stakeholders are kept informed of progress and consulted where appropriate;
3. Providing expert input into developing plans and the establishment of a CIO including identifying potential partners and funding opportunities.

- Attending meetings with Historic England to discuss findings and recommendations and to present outline proposals for the future use of the Gatehouse, Casemates and Parade Ground, including the need for a long term strategic plan for the conservation, funding and sustainable reuse of the Fort.
- Meet with the National Lottery Heritage Fund to discuss proposals to reanimate Coalhouse Fort, reopen the Fort for volunteering and pilot activities, and develop longer-term strategic and fundraising plans for saving the Fort such as the establishment of a CIO.
- Submit a Heritage Grant application to facilitate and implement the next phase of works from June 2025 onwards.
- Submission of a grant application to Historic England for £10Kmatch-funding application following further discussions with Historic England.

3.5 Summary conclusions and next steps

The above research and consultation clearly identified interest in, and opportunities for, the re-opening, conservation, and development of Coalhouse Fort. To give the Fort the best chance of success, the foundations of a long-term development project will need to be established to ensure that work continues in a planned and coherent way after March 2025. It should be noted that most large-scale heritage conservation and development projects take between 8-10 years to secure major capital and revenue funding to implement significant work.

In order to build on this feasibility study, it is recommended that Thurrock Council submit a Heritage Fund Heritage Grant application (up to £250K), and a Historic England grant application up to (£10K) to: secure capacity and specialist expertise to progress the next stage of strategic planning and governance work; identify future funding opportunities; and to facilitate a short-term programme of volunteering and activities at the Fort. The Heritage Fund Heritage Grant application, ‘Reanimating Coalhouse Fort’, will be submitted by March 2025 with a decision anticipated in May 2025. The grant application for the next stage of work includes funding for:

- Establish a CIO to provide independent strategic leadership, and to leverage partnership and funding opportunities independent of Thurrock Council. This will be established with a view to the CIO eventually taking control of the future development, management, and operation of the Fort.
- Contract legal services to advise on the future relationship between the CIO and Thurrock Council and to draw up heads of terms.
- Contract a design team (including AABC Architect and CARE Engineer) with specialist built and historic

environment services to provide technical expertise to direct site investigation work needed to detail and cost phase one capital works and to inform the longer-term strategic plans. Liaising with Historic England to obtain the necessary consents including for access and maintenance work in the short term.

- Establish the CIO to:
    - develop the business case
    - develop future business model
    - establish partnerships and
    - develop a fundraising plan,

  This will support the strategic long-term vision for the Site, and the future sustainability plans including phase one works to the Gatehouse, Casemates and Parade Ground.

- Commission an Access Audit, a fire safety audit, and other specialist site investigations to better understand how to conserve the Site and associated costs.
- Undertake ecology surveys and obtaining consents for restoring volunteer access, pilot activities, and further consultation events.
- Employ a Community Engagement Officer to support community activities and further consultation, and to recruit and manage maintenance volunteers to undertake to undertake planned preventive maintenance works.

In support of the above, Thurrock Council is recommended to develop a communication plan to ensure the local community, and all interested parties are informed of the results of this feasibility study as well as any future stages of work where appropriate

Chapter 4: Proposals

4.1 Introduction

This section explores the proposals for future viable uses of Coalhouse Fort. As well as discussing holistic proposals, the three project areas have also been presented with corresponding options for their future use. The project areas are shown in **Figure 26**.

4.1.1 Repair and Development Philosophy

Approach

Works will need to be undertaken at Coalhouse Fort to provide sustainable new uses. The approach to the future repair and development of the Coalhouse Fort can be considered under the broad headings of 'Preservation', 'Conservation' and 'Restoration'. All of the identified viable uses, with the exception of 'Curated Decay', discussed below, fall under one or more of these approaches. The Site in general is discussed below as well as the specific Project Areas (Gatehouse, Casemates and Parade Ground).

Preservation

This can be considered as 'preventative conservation' once an asset is at an acceptable baseline condition, or as the activity/ process of keeping something valued intact and free from damage or decay through appropriate maintenance. The legal interpretation

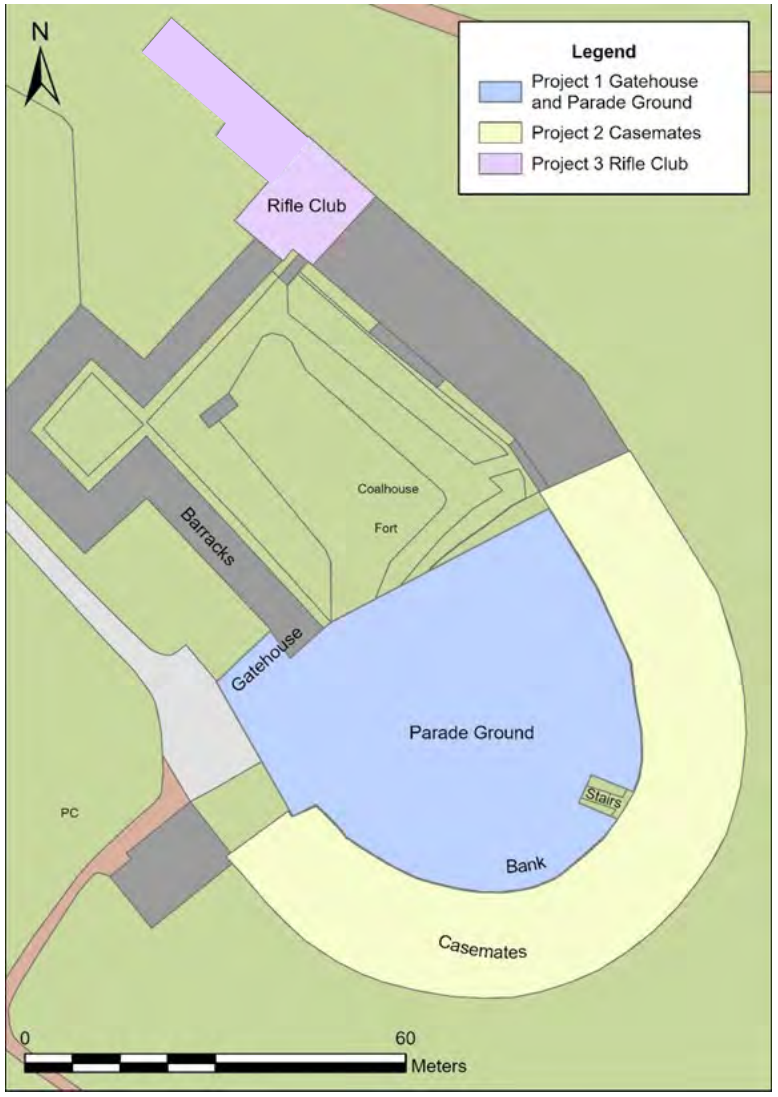


Figure 25 Project areas within the Fort

is simply to keep something 'safe from harm'.[7] Coalhouse Fort is generally in a 'very bad' condition as described in its assessment information as part of its inclusion on the 'Heritage at Risk Register'. It is a 'Priority A' at risk site which means it is considered to be at 'immediate risk of further rapid deterioration or loss of fabric [with] no solution agreed.'[8] An approach of preservation here would include appropriate repair of the structures, stabilising them to minimise further deterioration and making the Site safe for access. Future mitigation would take the form of planned maintenance and, if needed, reactive repairs.

This approach does not typically include any development and would maintain the remains of the Fort in-situ with an aim of minimising further deterioration. This approach is considered the minimum necessary which should be undertaken at the Site (as a scheduled monument) and would take the form of a consolidated ruin which is structurally sound (i.e., free from temporary support).

This approach may be relevant to some specific structures at Coalhouse Fort, and some areas temporarily in the short-medium term, where minimal works can halt deterioration. However, preservation is likely to be considered an unviable approach given it will take significant investment without an end use.

Preservation is not considered appropriate for the Casemates, Gatehouse or Parade Ground (the Project Areas) which will all require some level of change and intervention to facilitate future sustainable uses.

Conservation

Historic England Guidance, *Conservation Principles*, defines conservation as:

> *"The process of managing change to a significant place in its setting in ways that will best sustain its heritage values, while recognising opportunities to reveal or reinforce those values for present and future generations"*.[9]

This approach is likely to be most relevant to Coalhouse Fort and its future sustainable use.

Any future use of the Site is very likely to include intervention by way of alteration or the rebuilding of the structure(s). As with most interventions to historic buildings, the success will ultimately be found in the detail and how various elements are installed or articulated. This may include the way in which the buildings are altered and repaired, the aesthetic of new interventions, and new upgrade items.

Changes have been noted in the outline designs by Roger Mears Architects, discussed in Chapter 5.3 and 5.4 of this report. This illustrates the interventions that would be required to secure a sustainable use of the Gatehouse, Parade Ground, and Casemates.

[7] The legal interpretation established in South Lakeland DC v Secretary of State for the Environment and Rowbotham [1991]

[8] https://historicengland.org.uk/advice/heritage-at-risk/search-register/list-entry/48239

[9] https://historicengland.org.uk/images-books/publications/conservation-principles-sustainable-management-historic-environment/conservationprinciplespoliciesandguidanceapril08web/

Restoration

Historic England's Guidance, *Conservation Principles*, defines restoration as:

"To return a place to a known earlier state, on the basis of compelling evidence, without conjecture".[10]

Should places be restored, it is important that they are done so faithfully and informed by a good understanding of past form. Incorrect restorations, and those that manifest in a collection of elements which never co-existed, are adverse in their result and detract from the experience of the significance of a heritage asset.

Assessment of existing built fabric and documentary material, pertaining to the historic form of the Fort, suggests a reconstruction is theoretically possible although complex as there are many phases and historic configurations of the Site. However, in terms of viability this is unlikely to be a realistic expectation; the Fort will never be used for its designed purpose and a full reconstruction would not likely support a new use.

Whilst a philosophy of restoration may be adopted to some extent for the most significant elements of the Fort, it is likely this will need to be combined with elements of 'conservation' to ensure the development is both viable and usable.

There is also a challenge that restoration of elements of the Fort (such as the specific roof construction) would adversely affect the viability of a future scheme.

In terms of the Gatehouse and Casemates, restoration will not be a viable approach.

Further research into the parade ground may inform potential of a reinstatement of features or surfaces that are compatible with a viable scheme.

Do Nothing

Legislation and planning policy requirements mean a 'do-nothing' scenario is not an option.

Curated Decay

One approach which does not fall under preservation, conservation, or restoration is 'curated decay'. This is a circumstance where the ultimate loss of the heritage asset (or part of) is accepted, and it is left to deteriorate with no maintenance or intervention. The only reason works would be typically undertaken would be as a result of a safety issue and works would involve incrementally dismantling the unsafe structure rather than repairing it. In this scenario the loss of the building/ building element would need to be accepted, the local planning authority and Historic England would need to be in agreement and consents would need to be granted for works which would otherwise be unacceptable.

Curated Decay is typically considered a last resort approach when all other options have been fully exhausted, or when heritage assets are at a point of unavoidable loss where investment into their preservation/ conservation is folly. A good example would be a heritage asset adjacent to a cliff or land edge over the sea, where it

[10] https://historicengland.org.uk/images-books/publications/conservation-principles-sustainable-management-historic-environment/conservationprinciplespoliciesandguidanceapril08web/

is predictable that total loss would occur in the short term. An example is the recent loss of the lighthouse at Orford Ness, Suffolk.

Curated decay is (currently) not considered an acceptable approach at Coalhouse Fort as there is still potential for a strategic long-term plan which could incrementally deliver the Site.

There are however two elements of ‘curated decay’ which should be considered now and in the future:

- The Site is in an overall very poor state of repair. As such, there will be regular instances of deterioration and dilapidation that need to be addressed at the scheduled monument. This will require consistent financial investment (in some cases significant investment) and to a feature/ structure which contributes nothing/ very little to the sustainable use of the Site. Whilst it may not be possible that curated decay is a current option, it should at least be considered where best to place funds at the Site and in a manner which does not detract from realising the strategic and long-term objective.

- Should there not be intervention in the short term, it is likely that an assessment will be required to identify areas that could be saved and areas to be curated as a deteriorating ruin. This will be a consideration if the Site passes beyond any viable use.

Curated decay is not relevant to the Casemates and Gatehouse. However, there are elements such as dilapidated searchlight emplacements, which require attention and investment. Whilst these features contribute to the significance of the scheduled monuments, their preservation should not divert funds from achieving the goals in ‘usable areas’ of the Site. This approach would, in the short term, possibly save elements but will likely and ultimately result in the Fort’s complete decline.

Figure 26 The Barracks are an example of part of the Site which is currently unusable, due to its current condition

4.2 Site wide considerations

Although the proposals of this study are designed to be implemented independently or holistically as required, there are specific considerations which must be considered on a site-wide basis. This may be due to the fact that access is required throughout more than one project areas, or that the proposals may have the potential to affect, impact, or benefit multiple areas.

4.2.1 Access

The approach to access has considered how proposals may be implemented on a phased basis, allowing for small areas of the Site to be opened up and accessed as soon as possible while ensuring that this does not prohibit the implementation of future phases of development and regeneration. As such, while realising Project 2 does not depend on the completion of Project 1 it does require the access proposals to be undertaken (shown in Figure 64 Access plan)

4.2.2 Services

Similarly, the new services required to facilitate the use of the casemates will be intrinsically linked to those proposed for Project 1 although it is not dependent on Project 1 being fully implemented or completed.

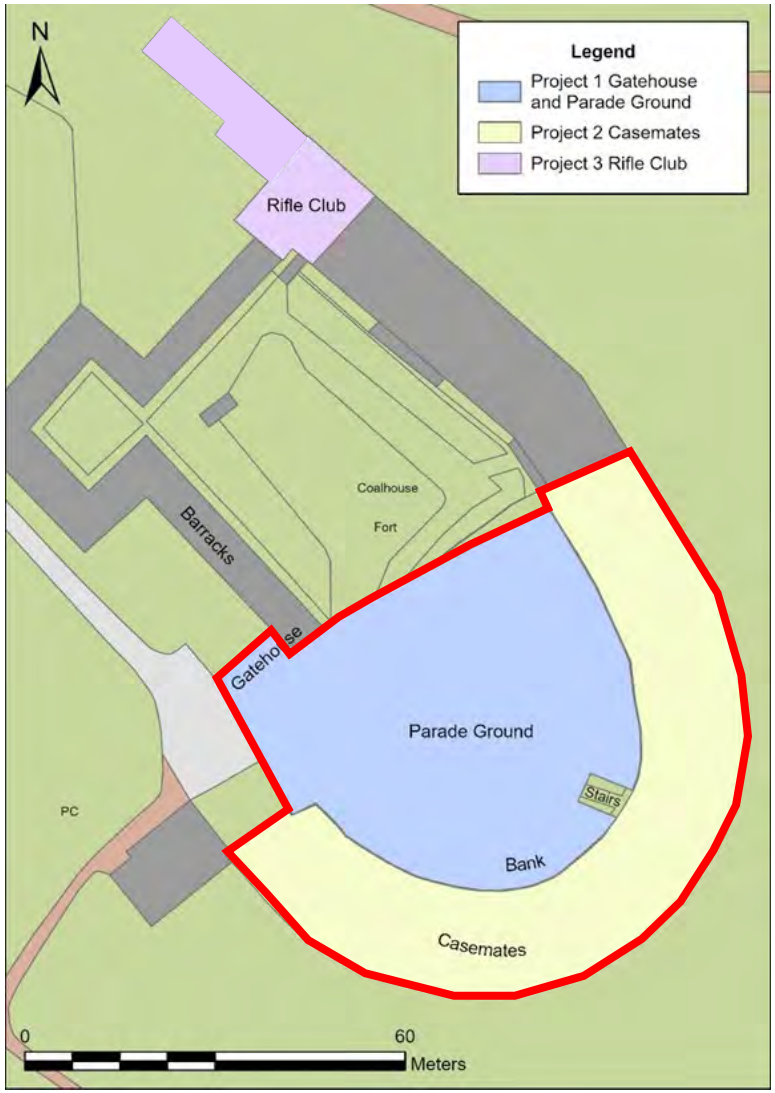


Figure 27 Project areas discussed within section 5.2 (outlined in red)

4.2.3 Renewable Energy

Climate change is one of the most important and challenging issues of our time. Indeed, there is a large amount of national legislation, guidance, and policy which supports the transition to a low carbon future. Renewable energy creation should play an important part in delivering a new use for the Site. It is therefore acknowledged that public benefits may arise from such developments.

However, public benefits may include heritage benefits such as sustaining or enhancing the significance of a heritage asset and the contribution of its setting. Furthermore, Paragraph 8 of the NPPF makes clear that an environmental objective of achieving sustainable development also includes contributing to protecting and enhancing the built and historic environment, and paragraph 212 of the NPPF states that when considering the impact of a proposed development on the significance of a designated heritage asset, “great weight” should be given to the asset’s conservation.

Consequently, whilst sustainability and energy efficiency are legitimate issues, for designated heritage assets, historic buildings, and buildings which form part of the setting of heritage assets, a balance must be achieved between generating its own energy and avoiding damage both to the significance of the building and its fabric, and the visual impact of the renewable installation on the character and appearance of the historic building or site, including its setting.

There are three typical sources of renewable energy which may be employed: solar, wind, and heat pumps. These are considered below in more detail.

Wind

On a national and industrial level, wind power has the potential to provide large amounts of green energy. However, on a smaller scale, it is difficult to utilise and capitalise on these gains as the amount of energy generated is relative to the size and speed of the wind. This is because the scale of the wind turbine that is required and the physics of the span relative to the amount of energy gained. Essentially the bigger the turbine, the better the gains. As such, small scale turbines have minimal gains.

There also needs to be considerations regarding proximity of nearby buildings, trees and landscape, ecology, as well as the visual impact. It is recommended that wind turbines are not attached to a traditional building, due to the minimal gains and the potential impact to the structure of the building. Larger wind turbines are required to be positioned away from buildings and not in a location that has an adverse impact on the setting of heritage assets. There should be a consideration to the nearby designated sites and the impact that this could have on the wading birds (collision risk etc.)

Wind turbines within the Fort and the setting of the Fort will undoubtedly have an adverse visual impact, detracting from the openness of the undeveloped parkland around the Site which provides a tangible reference to the historic use of the wider site and makes a positive contribution to the significance of the heritage asset. This, along with the presence of mature trees within the setting of the Fort, means it is unlikely that wind turbines will be appropriate for the Site.

Heat Pumps

The process of heat pumps is complex, however fundamentally they extract heat/ energy from the 'source' location, which is converted and upgraded for central heating. The source can be ground, air or water, though ground and air are more common as they are generally more accessible. Water source heat pumps require a water source that does not freeze during the winter months.

Air source heat pumps extract heat through a fan. They can be installed outside the building, with services connected through the wall which can have an adverse visual impact and may, in some cases, result in the loss of historic fabric.

Ground source heat pumps extract heat via pipes inserted into the ground and connected to a building. Burial of the pipes is either through a closed loop system, that requires trenches, or open loop systems, requiring boreholes. Large drilling machinery is required for the installation, and this can be disruptive to subsurface archaeology.

A water source heat pumps extract heat energy from a body of water, like a lake or river, using a circulating fluid that absorbs the heat, which is then transferred through a compressor to raise its temperature, and finally delivered to a building through a heat exchanger to provide heating and hot water; essentially, it uses electricity to move heat from the water source to a building instead of generating heat directly like a traditional boiler.

Aside from the direct impacts on the heritage asset, in order to get the best performance from heat pumps, the building should be well-insulated and relatively airtight. Consequently, heat pumps are only likely to be viable as part of specific uses and in areas that have been fully repaired and refurbished and may also need to be installed in combination with a fabric retrofit. It is unlikely, in consideration of the options taken forward, that heat pumps will be viable. Should certain areas be repaired, refurbished and very well insulated in the future, the correct environmental conditions may be achieved so that this method could be used.

Solar

Solar energy is a renewable source converted through panels. Photovoltaic (PV) Solar Panels converts sunlight energy into electricity, whereas Solar Thermals uses solar to heat water.

When choosing a location, in regard of heritage assets, for a proposed solar array it is considered best practice to appraise each option sequentially and generally in the following order of preference:

- Ground-mounted
- To the roof of any ancillary / outbuilding
- To the roof of a later / modern extension
- To the rear/least prominent roof slope of the heritage assets

There is potential for a solar array to the roof of the Gatehouse providing they are sited sympathetically and appropriately (i.e. shielded from view behind the parapet. This area has been selected as it is considered to have the least impact on the heritage asset (if undertaken appropriately) and is in close proximity to the proposed service runs. There may be other sites in the wider environs, but this would require additional service runs in terms of length. The installation of a solar array to the Gatehouse roof will require Scheduled Monument Consent.

4.2.4 Ecology Mitigation

In terms of protected and Priority species, further surveys are required to inform which species utilise the Fort and to what extent. It has been confirmed that bat roosts are present within the Fort and the majority of the Fort has some potential to support roosting bats, in particular during the hibernation period. In addition, some of the Casemates were found to accommodate Barn Owl including for nesting.

Figure 28 Barn Owl in flight throughout the Casemates

It is likely that a European Protected Species Mitigation Licence from Natural England will be required prior to commencement of any repair or restoration works, due to the presence of bat roosts. In addition, any areas with active Barn Owl nests will not be able to be disturbed during the nesting season, given the robust protection provided to Schedule 1 species. Nesting birds other than Barn Owl were also noted within the Fort; these are protected from damage and destruction during the nesting bird season. Precautionary measures have been provided in this report. This section, and the full report in Appendix D, also provides recommendations for a wildlife sensitive lighting design to minimise impacts upon roosting, foraging and commuting bats, and other nocturnal wildlife.

Designated Sites

The Site is located to the south and west of the Thames Estuary & Marshes SPA and Ramsar Site and the Mucking Flats & Marshes SSSI. Because the Thames Estuary & Marshes is protected by the Conservation of Habitats and Species Regulations 2017 Thurrock Council must carry out an assessment under the Habitats Regulations (HRA) to test if the proposals could significantly harm the designated features of Thames Estuary & Marshes SPA and Ramsar Site. If it is found that there is likely to be a significant effect on the Site, then an Appropriate Assessment will need to be carried out; at this stage, Natural England will need to be consulted for advice. This will reveal the effects of the proposal in more detail and identify ways to avoid or minimise any effects.

Habitats

Impacts to the existing grassland should be minimised where possible, for example through the use of track mats and the use of fencing to limit the area of grassland to be impacted. Post-development, the grassland habitat should be managed to maximise its biodiversity value. Impacts to the adjacent trees and those within the Parade Ground can be avoided through installation of Heras fencing to protect their RPA. An Arboricultural consultant should be contacted to determine the best management regime for the trees within the Fort. Some of the trees within the parade ground had potential to support roosting bats and so their management should be informed by an ecologist and arboricultural consultant.

Bats

As the proposed interventions will affect the Casemates, Gatehouse and Parade Ground, further ecological surveys will be required as

detailed in the Preliminary Ecological Appraisal (Section 4.59-4.60 and **Appendix D**) and will include:

- Bat hibernation surveys;
- Bat emergence surveys (which can also be used to collect information on how Barn Owl use the Site);
- Bat activity surveys (if proposals include external lighting); and
- Bat swarming surveys.

A mitigation licence from Natural England will be required to undertake any works that impact a bat roost. The recommended further surveys will inform the licence application which will in turn detail the specific mitigation requirements for the proposed works. Mitigation could include sensitive timings of work and the provision of compensatory roosting features.

During construction of the proposed development, it is recommended that no night work is undertaken, to avoid adverse impacts to bats from artificial lighting.

A bat-sensitive lighting strategy for operational use should be created and consulted during the lighting design process. If a bat sensitive-lighting strategy cannot be adhered to then bat activity surveys will be required to understand the impacts of the proposed lighting.

Enhancements at the Site could include increasing the crevice-roosting opportunities for bats within the tunnels and incorporating integrated roosting features for bats within the fabric of the building where Historic England allows.

Birds

Similarly to bats, the Ranger has sometimes found birds trapped in Casemates where the only potential access point is via the chimneys (including a pigeon and Little Owl in B/22). Bird nesting material could sometimes be seen within the chimneys from inside the Casemates, and Barn Owl pellets and/or whitewash was sometimes located immediately below them (including in B/20). It can therefore be assumed that they are accessible to birds including Barn Owl. Casemate numbers B/22 and B/20 are casemates located to the north of those within the Project Area, however they are adjacent, and some casemates within the Project Area have potential for access.

It is recommended that any vegetation that needs to be removed or impacted by the proposed development is undertaken outside the main nesting season (generally March to August, inclusive). It may also be necessary to shorten the available window to avoid disturbing actively nesting Barn Owl which may nest outside of the main nesting season.

If Casemates where Barn Owl have previously nested or could nest are being affected by proposals, then it is recommended that an area of the Fort is set aside to accommodate future nesting opportunities by this species. The area should offer dry, sheltered nesting opportunities. It is recommended that a nesting platform/box is installed in a suitable area at the earliest convenience to give the Barn Owl time to find and take up residence in this area, potentially moving them out of the Casemates that are being impacted by the proposals. The area designated for Barn Owl should not be at risk from future development proposals unless it is to benefit the Barn Owl (e.g. structural repairs etc.).

Enhancements could include the installation of a Kestrel box at the Site to offer nesting opportunities for this species. In addition, bird

boxes could be installed on retained trees or nesting features could be incorporated into the fabric of the building where Historic England allow. This could include Swallow and House Martin cups installed in suitable locations.

In addition, because the Site is in close proximity to Thames Estuary & Marshes Special Protection Area (SPA) and Ramsar Site, it is recommended that a Habitats Regulation Assessment should be undertaken to determine if any proposed works have the potential to impact upon the wading bird species that utilise the nearby designated sites overwinter.

Figure 29 View south from the north of the site, showing grass, foliage, and buildings where there will be ecological sensitivities to consider in any proposals.

4.3 Project 1, Parade Ground and Gatehouse

4.3.1 Introduction

This chapter pertains to findings relating specifically to the Parade Ground and Gatehouse (Project Area 1). The chapter incorporates an overview of findings from consultants involved in undertaking this multi-disciplinary feasibility study, and covers ecology, ground contamination, structural condition, and architectural design interventions. Full reports from each discipline, including their full findings and recommendations, can be found in the appendices of this report.

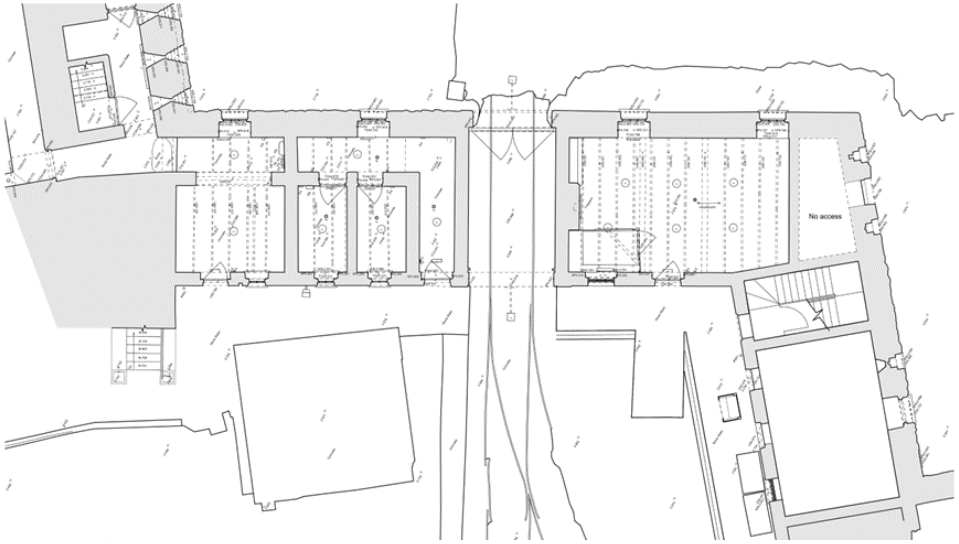


Figure 30 Floorplan of the Gatehouse

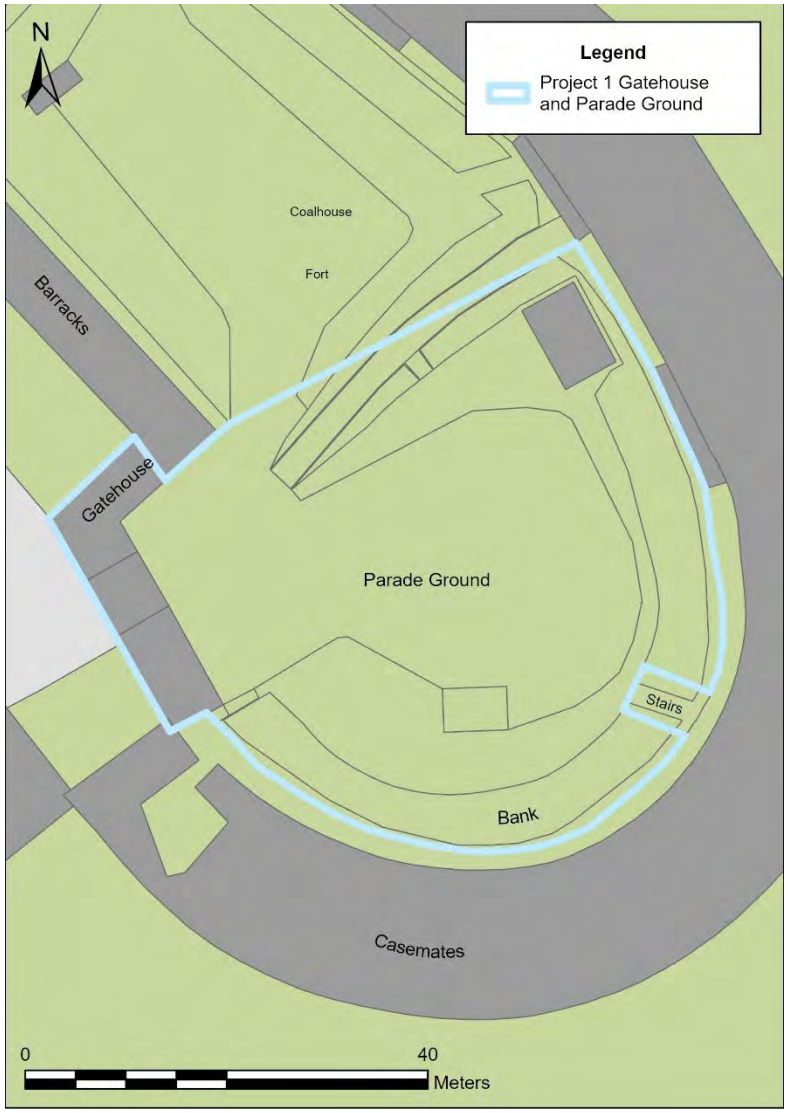


Figure 31 Location of Project Area 1

The Gatehouse is a large nineteenth century two storey L-shaped range, constructed in yellow brick and concrete. It is accessed by the external tarmacadam path to the west. A gate with the words ‘Coalhouse Fort’ painted on timber riveted double-leaf doors marks the entrance. The gateway leads into the southern Parade Ground, a large semi-circular area of open space surrounded by the Fort buildings.

It has been repaired and converted into use as a museum/ exhibition space and storerooms. The first floor contains historic objects to recreate the character of the barracks such as iron framed barrack beds and stretchers. It also contains a desk and chair with Victorian/ Edwardian items including a bedwarmer, bottles, ink well and crockery. The upper floors are also used to store interpretation panels on the heritage and ecology of the Site. The ground floors are being used for further storage.

The Parade Ground is surfaced mostly with gravel and overgrowth. There is some vegetation, particularly covering the banks leading up to the Casemates. Currently, a number of objects populate the Parade Ground ranging from historic artifacts and modern military props.[11]

Figure 32 Upper floors of the Gatehouse

Figure 33 View of the Gatehouse from across the Parade Ground

Figure 34 Access to the upper floors of the Gatehouse

[11] See Collections Audit within the Appendices for further details.

4.3.2 Design and Intervention Options

Introduction

The Gatehouse is located on the western side of the Fort, marking the pedestrian entrance. It extends to the north and south of the entrance gate.

The upper floors of the Gatehouse were repaired and refurbished in 2011. The majority of the ground floor spaces remained untouched, and issues remained regarding access.

Building areas within scope

The building elements within scope are identified as:

- The range forming the entranceway into the Site (including the access stair), henceforth referred to as the West Range.
- The adjoining range, henceforth referred to as the North Range

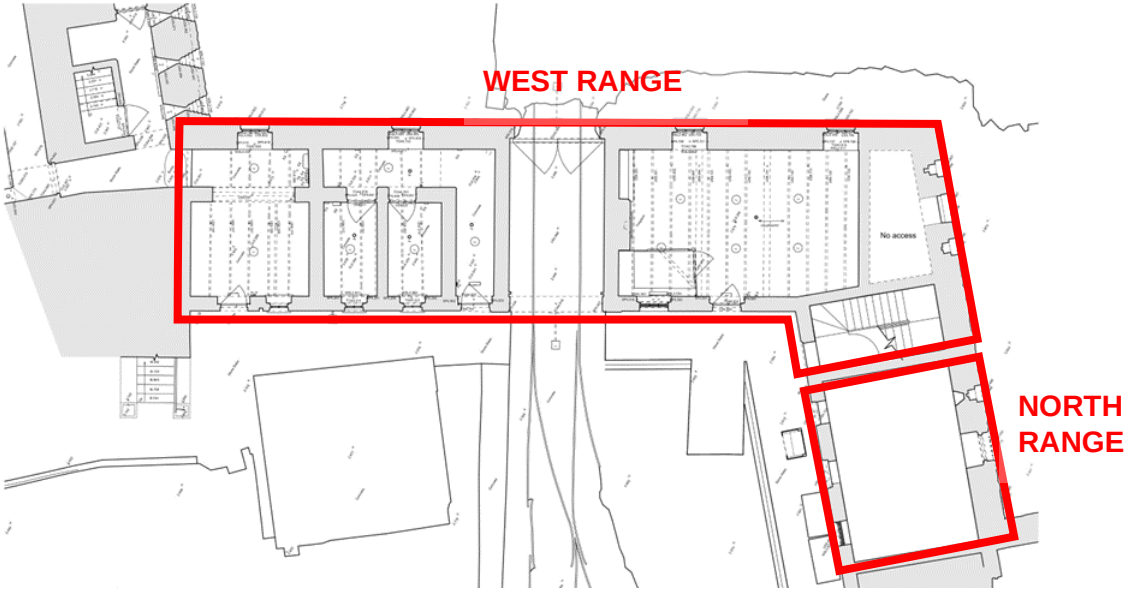


Figure 35 Diagram of the ranges

Existing building

The existing building spaces and features are as follows:

Ground Floor

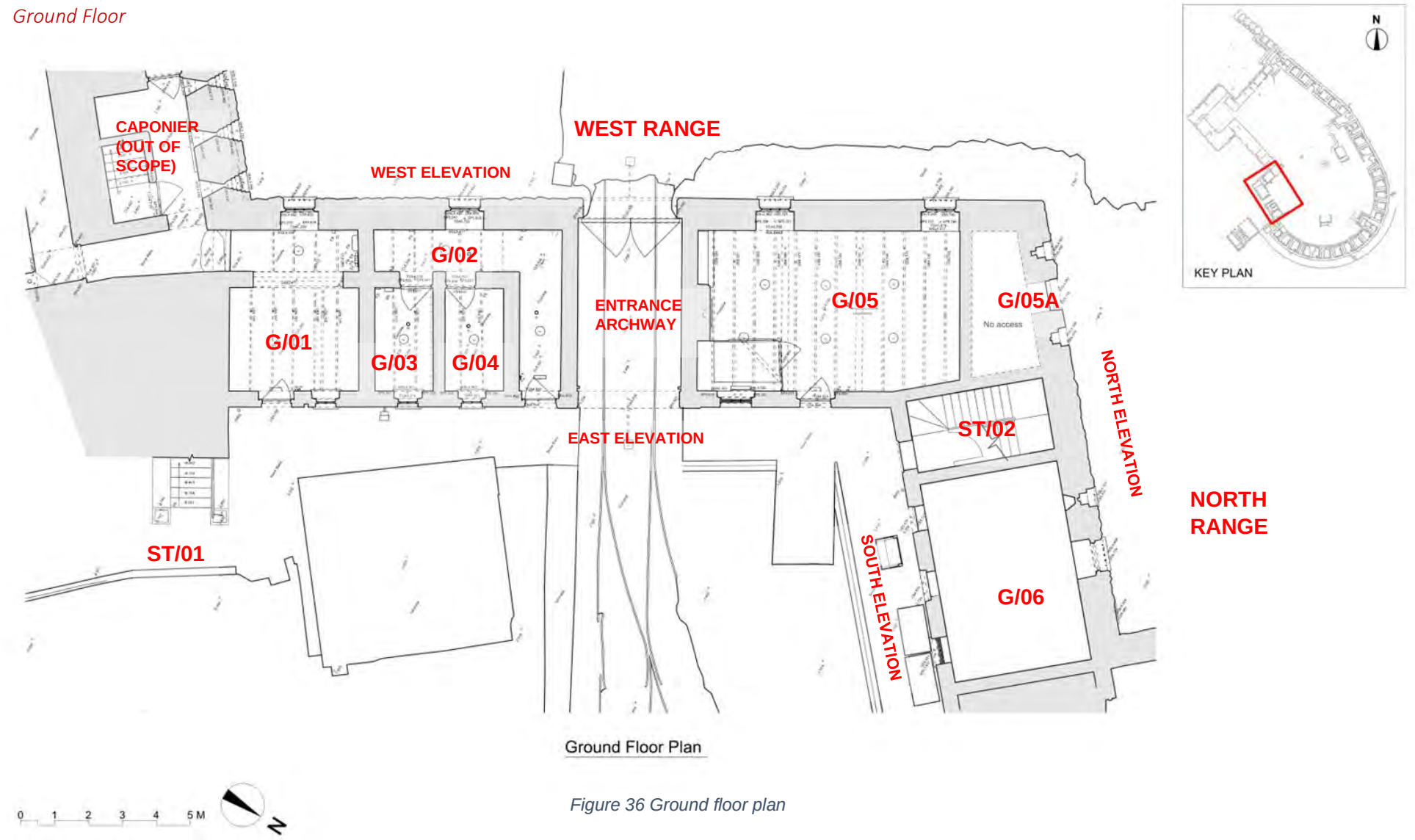


Figure 36 Ground floor plan

ROOM NO:	G/01
HISTORIC USE:	Store / access to tunnels?
CURRENT USE:	None (store for maintenance equipment)
WALLS:	Brick (painted)
FLOOR:	Concrete screed
CEILING:	Exposed steel beams / concrete slab (painted; potentially plaster finish onto concrete)
FIXTURES / FITTINGS:	Window to west wall – timber sliding sash Door to east wall – timber ledged / braced
CONDITION / COMMENTS:	Fair; evidence of damp ingress generally – algae growth to south wall (adjacent to earth bank – acts as a retaining wall); deteriorating finishes generally; rust to 1st floor beams

Figure 37 Room Number G/01

ROOM NO:	G/02, 03, 04
HISTORIC USE:	Detention cells & access corridor
CURRENT USE:	None (store for equipment)
WALLS:	Brick (painted)
FLOOR:	Concrete screed
CEILING:	Exposed steel beams / concrete slab (painted; potentially plaster finish onto concrete)
FIXTURES / FITTINGS:	Window to west wall – timber sliding sash Windows x 2 to east wall – timber sliding sashes with internal steel bars Door to east wall – timber ledged / braced Doors to cells x 2 – timber panelled Steel pendant lights x 3
CONDITION / COMMENTS:	Fair; evidence of damp ingress generally esp, walls at low level & some algae growth; deteriorating finishes generally; rust to 1st floor beams Some potential for interpretation – law & order within the Fort when operational

Figure 38 Room Number G/02

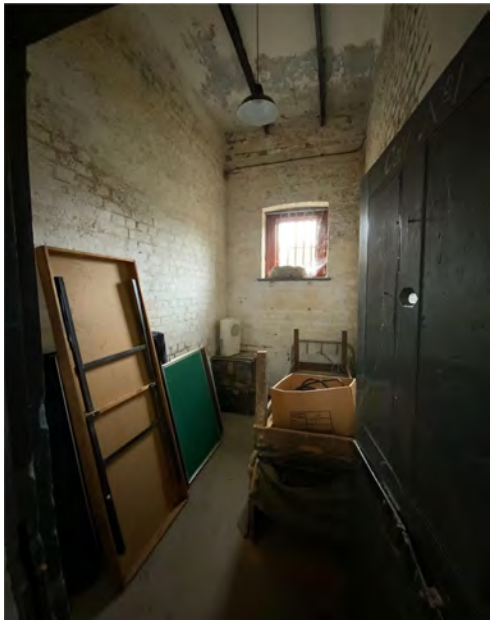


Figure 39 Room Number G/03

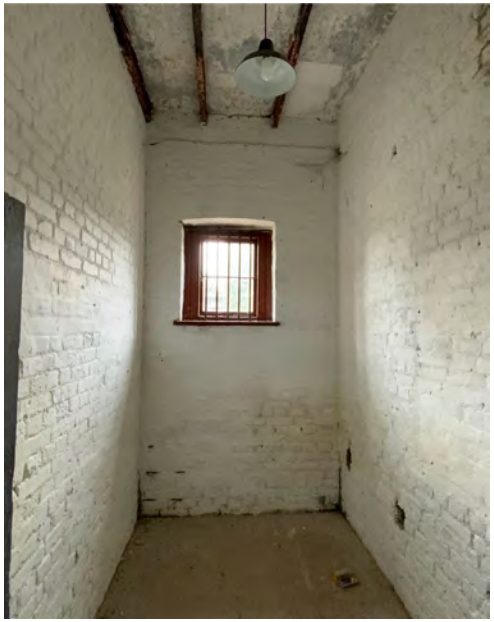


Figure 40 Room Number G/04

ROOM NO:	G/05
HISTORIC USE:	Dormitory?
CURRENT USE:	None (store for equipment; former museum shop)
WALLS:	Brick (painted)
FLOOR:	Timber boards (appear modern; presume over concrete screed?)
CEILING:	Exposed steel beams / concrete slab (painted; potentially plaster finish onto concrete)
FIXTURES / FITTINGS:	Windows x 2 to west wall – timber sliding sash Window x 1 to east wall – timber sliding sashes Door to east wall – timber ledged / braced Timber enclosure with door to south east corner c. 1940 Steel pendant lights x 2
CONDITION / COMMENTS:	Good; minor evidence of damp ingress generally esp, walls at low level; finishes generally good condition

Figure 41 View north into room Number G/05

Figure 42 View south into room Number G/05

ROOM NO:	G/05A
HISTORIC USE:	No access; TBC
CURRENT USE:	No access; TBC
WALLS:	No access; TBC
FLOOR:	No access; TBC
CEILING:	No access; TBC
FIXTURES / FITTINGS:	No access; TBC
CONDITION / COMMENTS:	No access; TBC

ROOM NO:	G/06
HISTORIC USE:	TBC; Dormitory / bath house?
CURRENT USE:	None (derelict)
WALLS:	Brick (painted)
FLOOR:	Suspended timber (missing)
CEILING:	Exposed steel beams / concrete slab / lath & plaster ceiling spanning between beams (largely missing)
FIXTURES / FITTINGS:	Openings x 3 (gun slots?) to north wall at mid-height to wall – blocked Window x 1 to south wall – timber sliding sashes Doors x 2 to south wall– timber ledged / braced Hot water cylinder to SE corner
CONDITION / COMMENTS:	Very poor; space is derelict with loss of floor / ceiling / elements of 1st floor over; finishes very poor good condition

Figure 43 View into room G/06 (1)

Figure 44 View into room Number G/06 (2)

Figure 45 View into room G/06 (3)

ROOM NO:	ST/01, 02
HISTORIC USE:	Staircase
CURRENT USE:	Staircase
WALLS:	Brick (painted)
FLOOR:	York stone steps / landings
CEILING:	Exposed steel beams / concrete slab (painted; potentially plaster finish onto concrete or lath & plaster ceiling spanning between beams)
FIXTURES / FITTINGS:	Opening x 1 (gun slot?) to north wall at mid-height to wall – blocked Window x 1 to south wall 1st floor – timber sliding sashes Door to south wall G floor – timber ledged / braced Door opening to east wall 1st floor – door missing Timber enclosure with door under upper flight c. 1940; potential access to room G/05A Modern bulkhead lights to wall
CONDITION / COMMENTS:	Fair; minor evidence of damp ingress generally esp, walls at low level; finishes generally poor condition Condition of finishes could be left as part of interpretation (strategy adopted at previous refurbishment c 2010) Stair handrail height & gaps between balusters do not conform to building regulations

First Floor

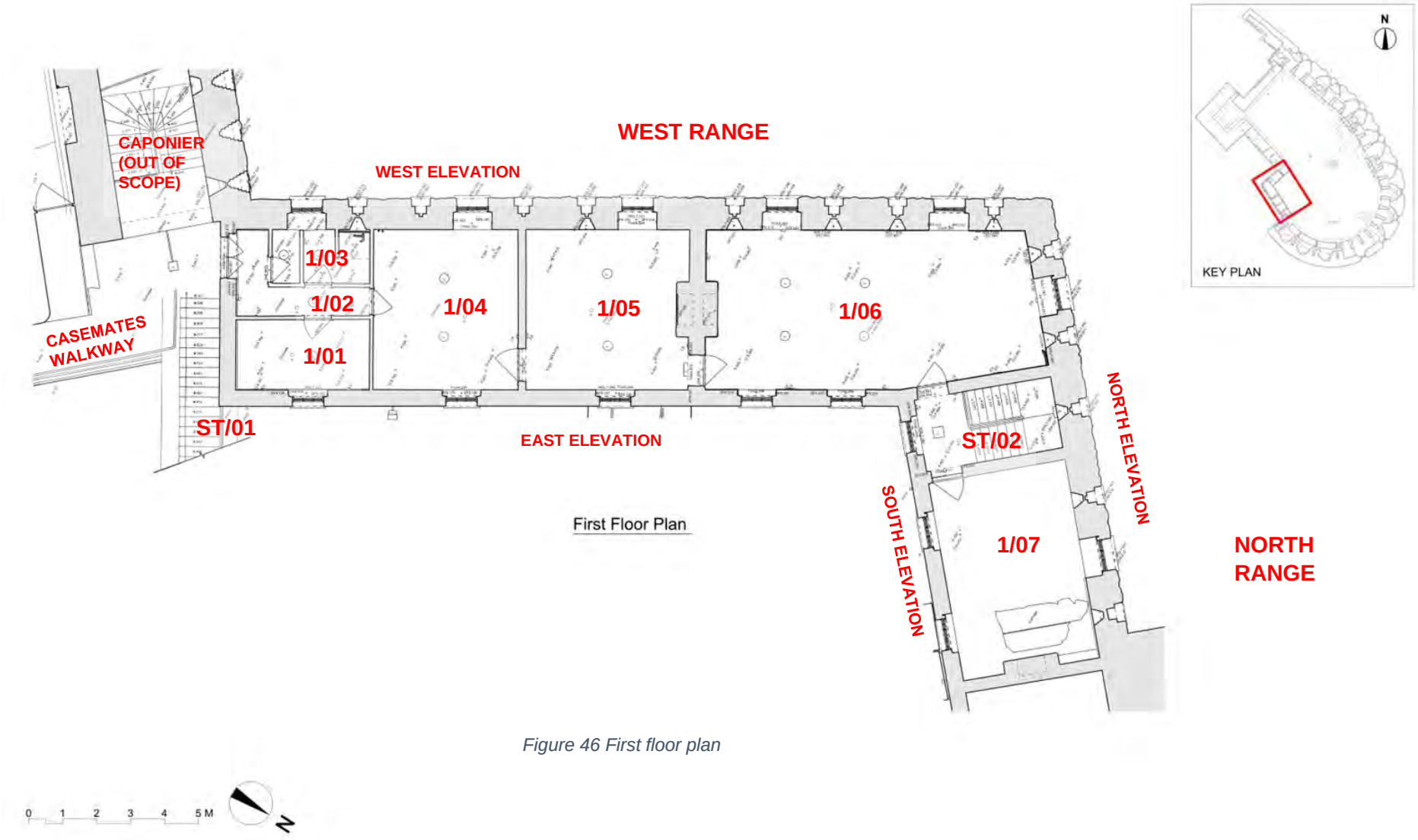


Figure 46 First floor plan

ROOM NO:	1/01
HISTORIC USE:	Dormitory? C19; space partitioned off with fletton bricks c 1940 forming stores / ablutions?
CURRENT USE:	None (store for equipment)
WALLS:	Brick (painted); C19 stock bricks south & east walls North & west walls = c 1940 fletton bricks
FLOOR:	Concrete screed
CEILING:	Plaster (painted; potentially plaster finish onto concrete or lath & plaster ceiling spanning between steel beams (not visible))
FIXTURES / FITTINGS:	Window x 1 to east wall – timber sliding sashes Door to west wall – timber panelled 1940s style steel pendant light x 1
CONDITION / COMMENTS:	Fair; evidence of damp ingress generally at ceiling level to perimeter (roof leaks) ; finishes generally poor condition Condition of finishes could be left as part of interpretation (strategy adopted at previous refurbishment c 2010)

Figure 47 Room Number 1/01

ROOM NO:	1/02 (CORRIDOR) 1/03 (STORES)
HISTORIC USE:	Dormitory? C19; space partitioned off with fletton bricks c 1940 forming stores / ablutions?
CURRENT USE:	None (store for equipment)
WALLS:	Brick (painted); C19 stock bricks south & west walls North, south & east walls = c 1940 fletton bricks
FLOOR:	Concrete screed
CEILING:	Plaster (painted; potentially plaster finish onto concrete or lath & plaster ceiling spanning between steel beams (not visible))
FIXTURES / FITTINGS:	Window x 1 to west wall – timber sliding sashes Opening (gun slot?) to west wall at mid-height Doors to east & south walls (internal) – timber panelled Double doors to south wall (external) – timber ledged & braced 1940s style steel pendant lights x 3 Water tank (north space)
CONDITION / COMMENTS:	Fair; evidence of damp ingress generally at ceiling level to perimeter (roof leaks); finishes generally poor condition Condition of finishes could be left as part of interpretation (strategy adopted at previous refurbishment c 2010)

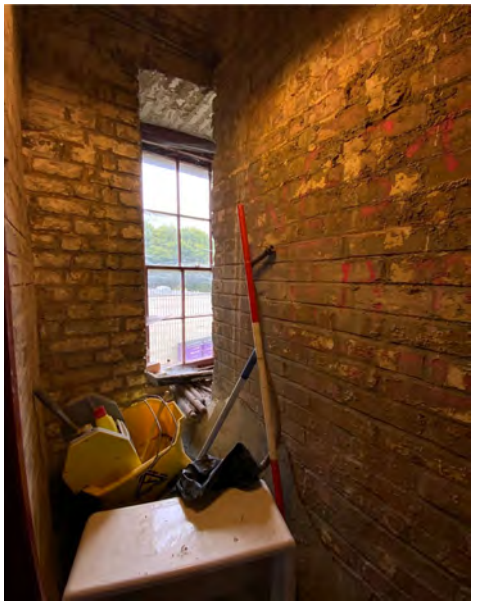


Figure 48 Room Number 1/03

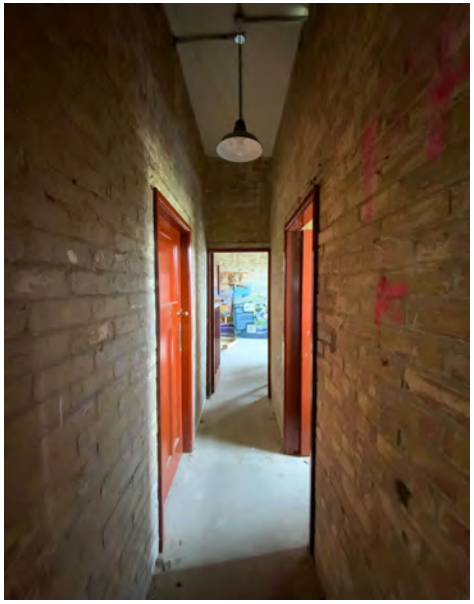


Figure 49 Room Number 1/02

ROOM NO:	1/04
HISTORIC USE:	Dormitory? C19; space partitioned off with fletton bricks at south end c 1940 forming stores / ablutions?
CURRENT USE:	Classroom
WALLS:	Brick (painted); C19 stock bricks north, west & east walls • North wall likely inserted C19 / e C20 = Flemish bond instead of original English bond & has brick on edge course @ head & blocks former gun slot to west wall South wall = c 1940 fletton bricks
FLOOR:	Concrete screed
CEILING:	Plaster (painted; potentially plaster finish onto concrete or lath & plaster ceiling spanning between steel beams (not visible))
FIXTURES / FITTINGS:	Window x 1 to west wall – timber sliding sashes with steel shutters Window x 1 to east wall – timber sliding sashes Door to north & south walls – timber panelled 1940s style steel pendant light x 2
CONDITION / COMMENTS:	Fair; evidence of damp ingress generally at ceiling level to perimeter (roof leaks) ; finishes generally poor condition Condition of finishes could be left as part of interpretation (strategy adopted at previous refurbishment c 2010)

Figure 50 Room Number 1/04

ROOM NO:	1/05
HISTORIC USE:	Dormitory? C19; space partitioned off with stock bricks at south end c 1900? forming two rooms
CURRENT USE:	Classroom
WALLS:	Brick (painted); C19 stock bricks north, south, west & east walls • south wall likely inserted C19 / e C20 = Flemish bond instead of original English bond & has brick on edge course @ head & blocks former gun slot to west wall
FLOOR:	Timber suspended (presume over concrete slab) • step up 116 mm to 1/04
CEILING:	Plaster (painted; potentially plaster finish onto concrete or lath & plaster ceiling spanning between steel beams (not visible))
FIXTURES / FITTINGS:	Window x 1 to west wall – timber sliding sashes with steel shutters Opening (gun slot?) to west wall at mid-height Window x 1 to east wall – timber sliding sashes Door to north wall – timber panelled 1940s style steel pendant light x 2 Chimney breast to north wall – no fire surround
CONDITION / COMMENTS:	Fair; evidence of damp ingress generally at ceiling level to perimeter (roof leaks) ; finishes generally poor condition Condition of finishes could be left as part of interpretation (strategy adopted at previous refurbishment c 2010)

Figure 51 Room Number 1/05

ROOM NO:	1/06
HISTORIC USE:	Dormitory? C19
CURRENT USE:	Classroom
WALLS:	Brick (painted); C19 stock bricks north, south, west & east walls
FLOOR:	Timber suspended (presume over concrete slab) • flush threshold to 1/05
CEILING:	Plaster (painted; potentially plaster finish onto concrete or lath & plaster ceiling spanning between steel beams (not visible))
FIXTURES / FITTINGS:	Window x 2 to west wall – timber sliding sashes with steel shutters Opening x 4 (gun slot?) to west wall at mid-height Window x 1 to north wall – timber sliding sashes with steel shutter Opening x 2 (gun slot?) to north wall at mid-height Window x 2 to east wall – timber sliding sashes Door to east wall – timber panelled 1940s style steel pendant light x 4 Chimney breast to south wall – no fire surround
CONDITION / COMMENTS:	Fair; evidence of damp ingress generally at ceiling level to perimeter (roof leaks); finishes generally poor condition Condition of finishes could be left as part of interpretation (strategy adopted at previous refurbishment c 2010)

Figure 52 View south into room number 1/06

Figure 53 View north into room number 1/06

ROOM NO:	1/07
HISTORIC USE:	TBC; Dormitory
CURRENT USE:	None (derelict)
WALLS:	Brick (painted)
FLOOR:	Suspended timber / concrete on steel beams (missing)
CEILING:	Exposed steel beams / concrete slab / lath & plaster ceiling spanning between beams (largely missing)
FIXTURES / FITTINGS:	Window x 1 to north wall – timber sliding sashes with steel shutter Openings x 2 (gun slots?) to north wall at mid-height to wall – blocked Window x 2 to south wall – timber sliding sashes Doors to west wall (stair) – timber panelled (poor condition) Chimney breast to east wall – no fire surround
CONDITION / COMMENTS:	Very poor; space is derelict with loss of floor / ceiling / elements of roof over; finishes very poor good condition

Figure 54 Room Number 1/07

Figure 55 Stairs Number ST/02

Roof

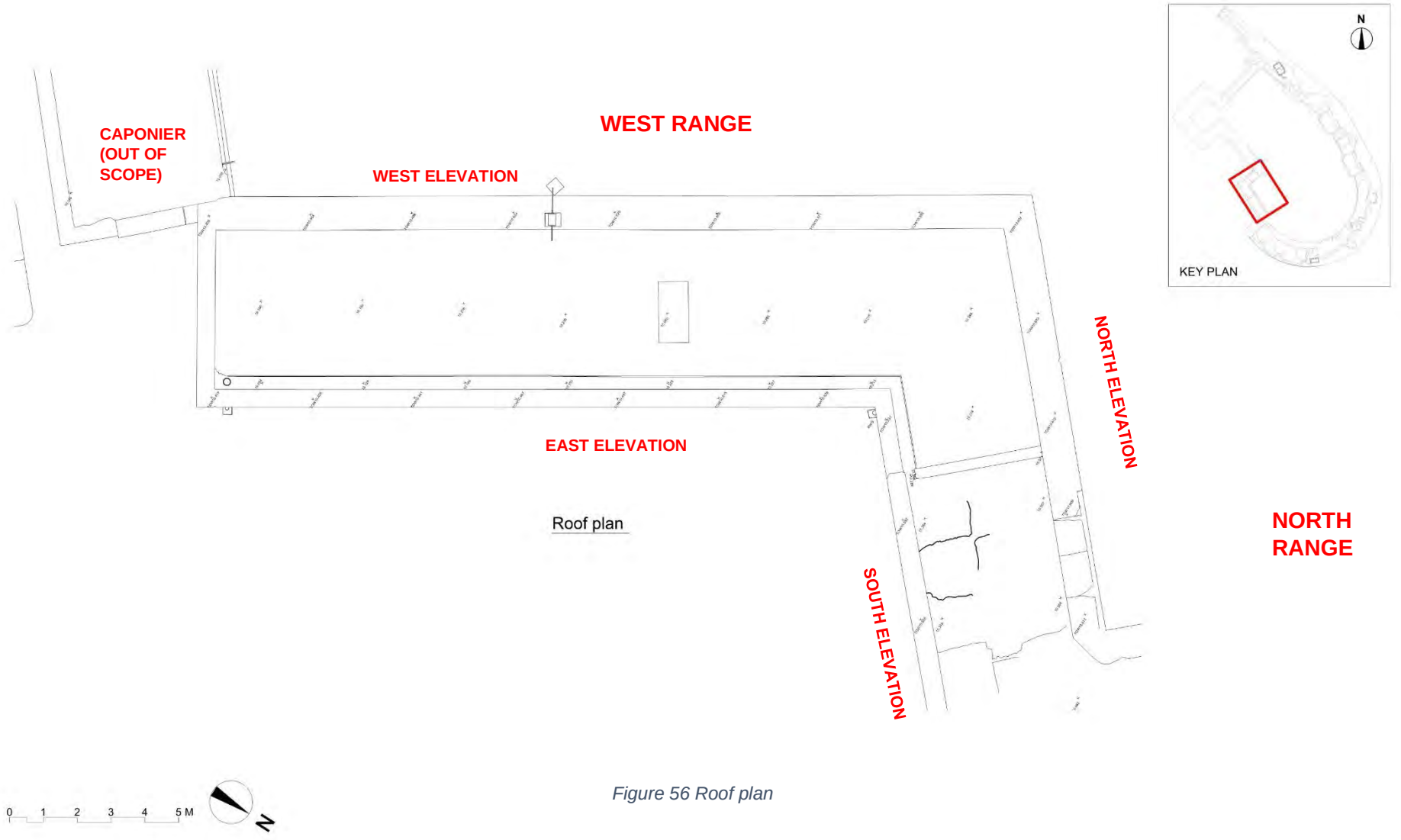


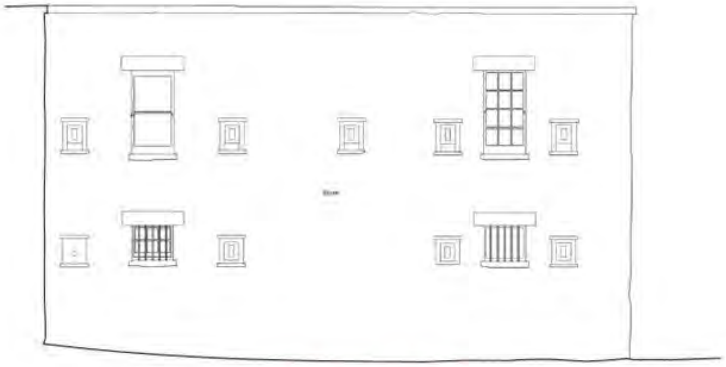
Figure 56 Roof plan

ROOM NO:	ROOFS – WEST RANGE & NORTH RANGE
HISTORIC USE:	Roofs
CURRENT USE:	Roofs
WALLS:	Perimeter parapet stock brick walls with York stone copings
DECK:	Concrete slab (lime) supported on steel joists; asphalt coverings with lead flashing to parapet upstands; gulley to east side with falls west to east
CEILING:	N/A
FIXTURES / FITTINGS:	Modern gulley outlets
CONDITION / COMMENTS:	Fair; evidence of damp ingress internally at ceiling level to perimeter indicating roof leaks at junction with upstands North range roof = very poor condition with considerable cracking & vegetation growth

Figure 57 Roof – North Range

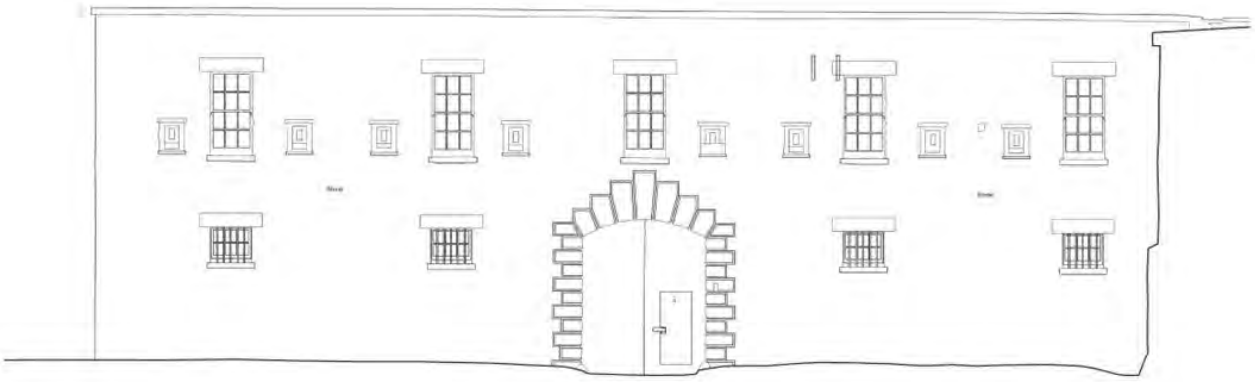
Figure 58 Roof – West Range

Elevations



NORTH ELEVATION

External Elevation 13



External Elevation 14

WEST ELEVATION

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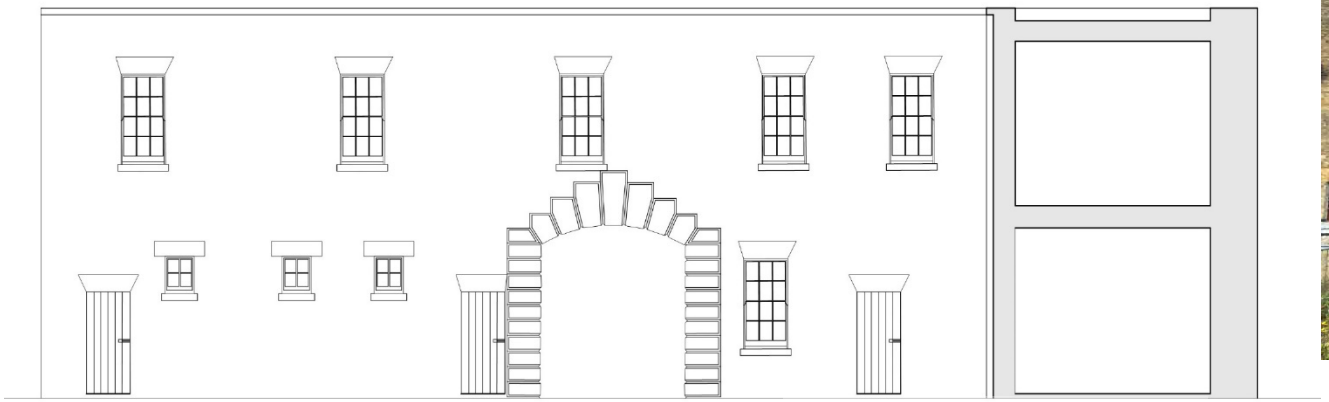
Figure 59 External elevations of gatehouse

SOUTH ELEVATION

Section 9

Figure 60 View of the internal south elevation



EAST ELEVATION

Section 13

Figure 61 View of the internal east elevation

ELEMENT NO:	WEST RANGE, WEST ELEVATION
HISTORIC USE:	Elevation
CURRENT USE:	Elevation
WALLS:	Stock brick walls in English bond with flat gauged arches; York stone cills & copings Stone surround to entrance archway
FLOORS:	N/A
CEILING:	N/A
FIXTURES / FITTINGS:	Timber sliding sash windows Timber doors – ledged & braced Modern floodlighting Cast iron rainwater pipes
CONDITION / COMMENTS:	Fair; some repointing / brick replacement required

ELEMENT NO:	NORTH RANGE, SOUTH ELEVATION
HISTORIC USE:	Elevation
CURRENT USE:	Elevation
WALLS:	Stock brick walls in English bond with flat gauged arches; York stone cills & copings
FLOORS:	N/A
CEILING:	N/A
FIXTURES / FITTINGS:	Timber sliding sash windows Timber doors – ledged & braced Modern floodlighting Cast iron rainwater pipes
CONDITION / COMMENTS:	Poor; repointing / brick replacement required; cracking above 1st floor windows & loss of voussoirs

Brief for conservation and adaptation

This brief was formed at the inception of the project, in consultation with stakeholders identified in Section 1.6.

Use

- Maintain and enhance the existing education & community use with improved access and facilities.
- Consider potential interpretation of spaces.

Building fabric

- Refurbish / repair / rebuild north range.
- Repairs to west range as required.

Access

- Vertical access
    - Provide lift access to the 1st floor rooms & casemates walkway.
    - Upgrade the existing stair to meet Building Regulations requirements, with balustrading to landings minimum 1100 mm high & with openings less than 100 mm width.
- Horizontal access
    - Provide horizontal access throughout 1st floor rooms and onto the Casemates Walkway, with level thresholds & door widths to meet minimum 750 mm Building Regulations requirements.

Facilities

- Services provision
    - Power (existing?)
    - Data
    - Water
    - Drainage
- Provision of WC facilities
    - To support education / community use
    - WC facilities to be shared with the Casemates due to the lack of opportunities to provide drainage to this part of the Site.

4.3.3 Proposals

Summary of Proposals

Ground floor

1. New services into Site extended from existing adjacent to café
2. New forecourt with resin-bonded gravel surfacing & existing train tracks retained / re-laid
3. New platform lift
4. Former cells as interpretation spaces
5. New WCs for Casemates tenants / volunteers / selected site use
6. Existing stair refurbished with baluster infills & handrail raised at top landing
7. No interventions to North Range; funds diverted for use elsewhere on Site
8. External services riser

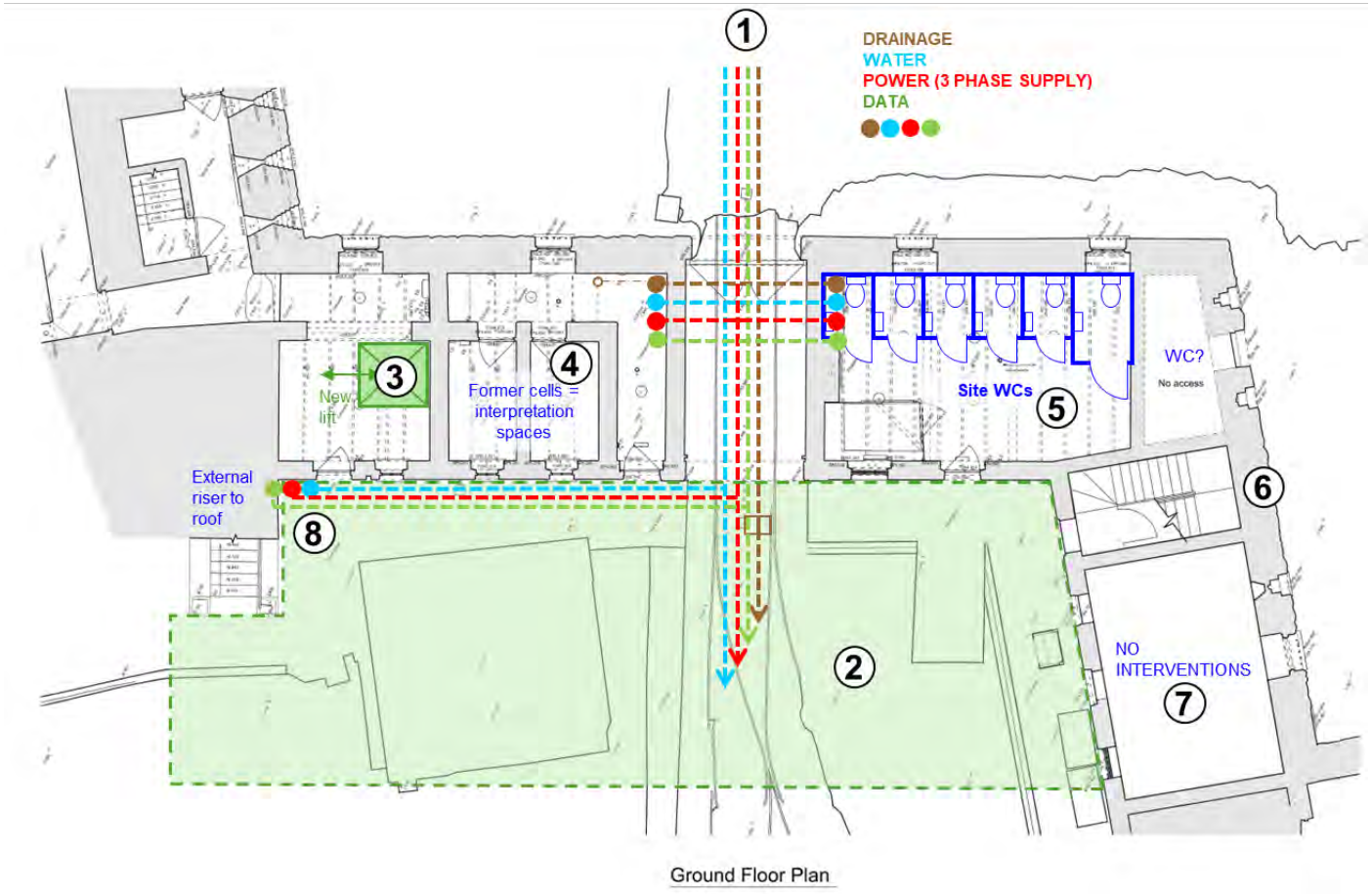


Figure 62 All proposals for the ground floor

First floor

9. New opening to 1940s Fletton brick wall
10. New ramp to existing step to provide level access
11. New ramp to existing step to provide level access
12. Removal of 1940s Fletton brick walls
13. WCs for educational use
14. New sinks to classrooms

Roof

15. External services route over roof to Casemates (see separate section)

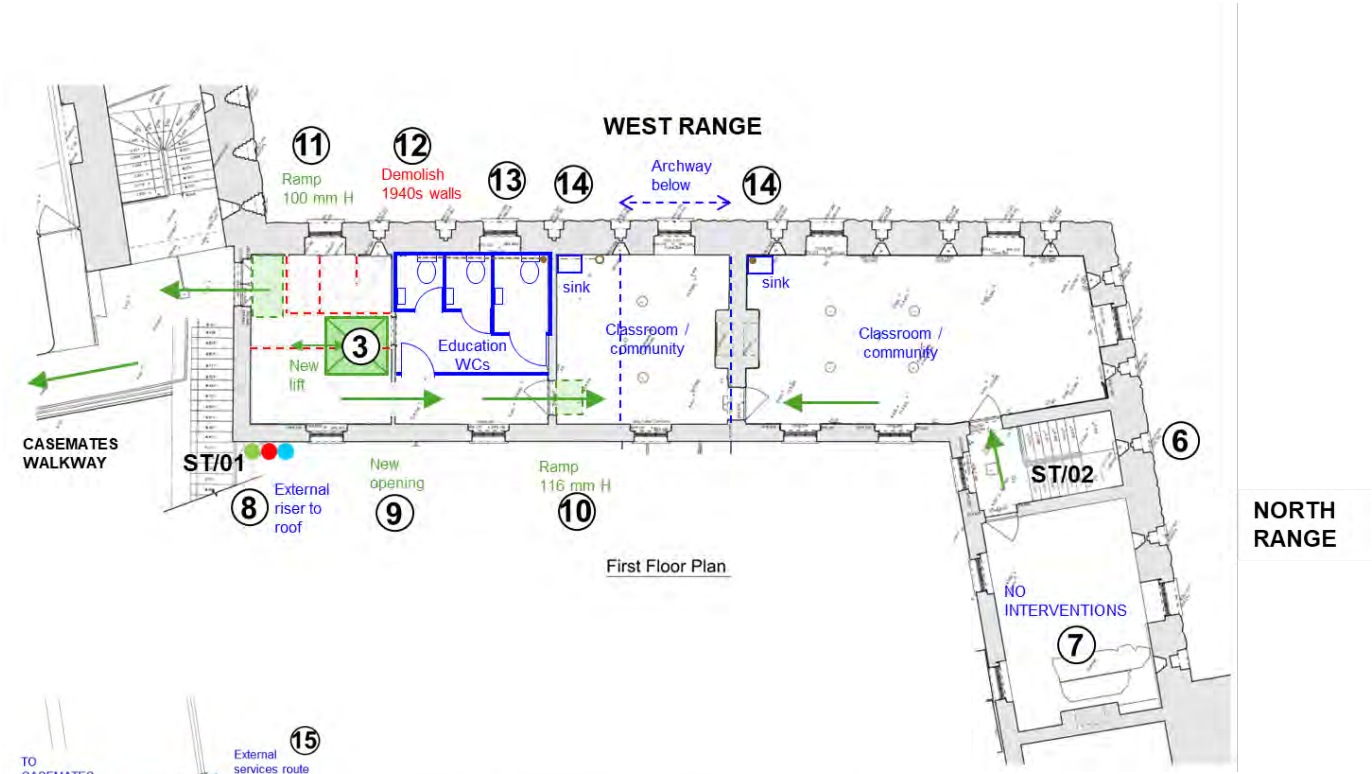


Figure 63 All proposals for the first floor

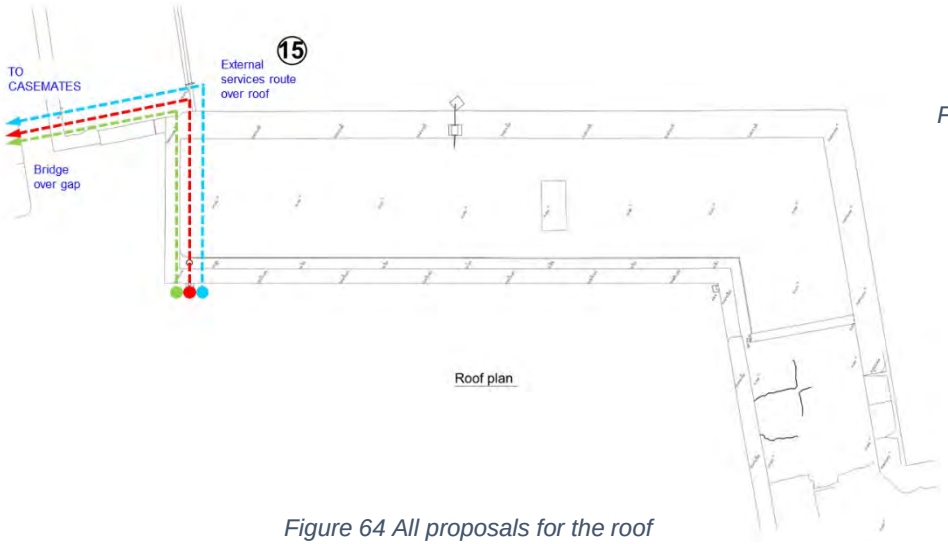


Figure 64 All proposals for the roof

Access

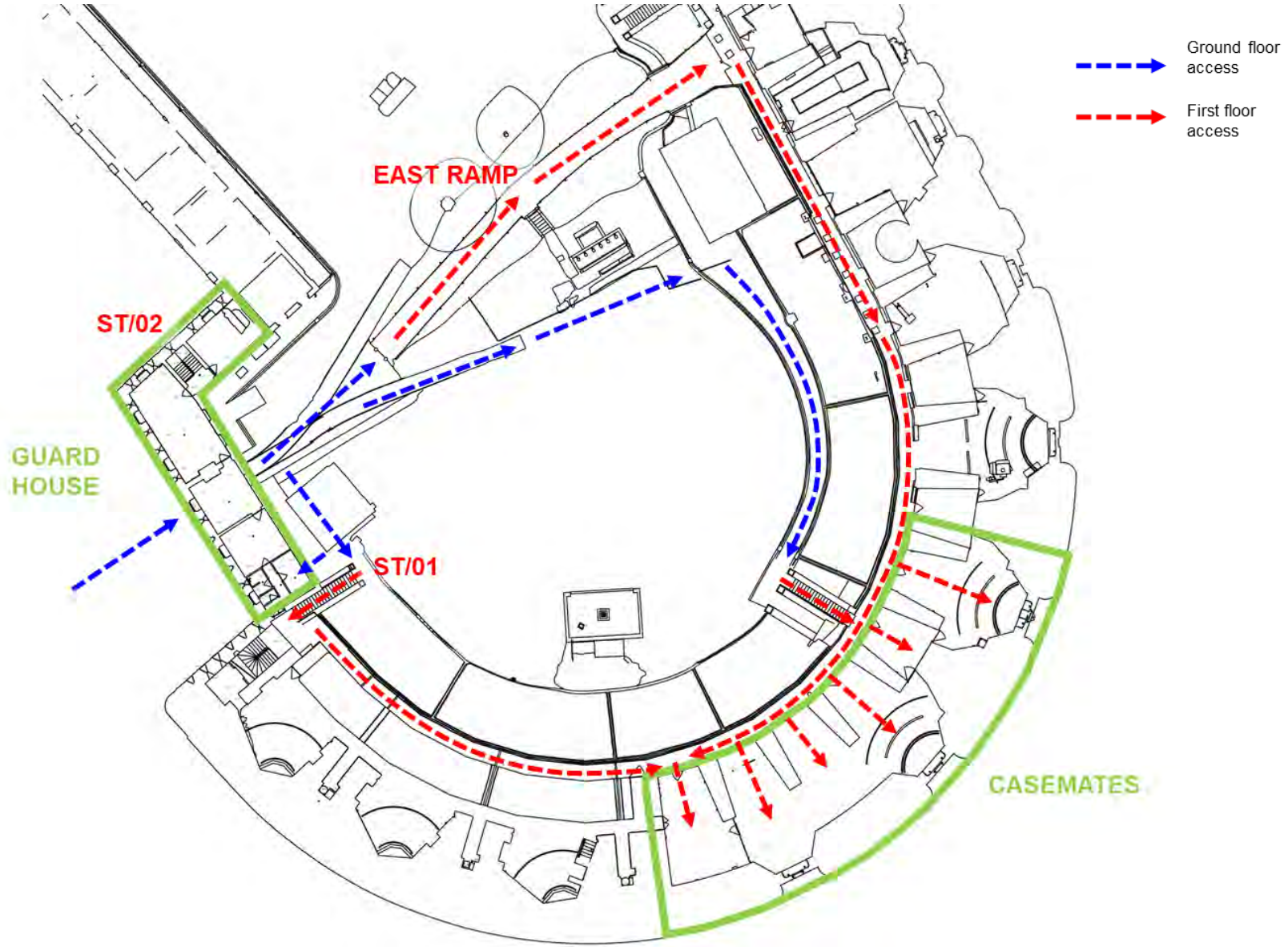


Figure 65 Access plan

Accessibility around the Site generally is poor:

- Surfaces are uneven, making access by mobility-impaired persons difficult; in particular there is no clear area of hardstanding directly inside the Site, with multiple obstructions presented by old footings, low brick walls, etc. Areas of hardstanding that do exist have multiple joints, cracks and holes between surfaces, and vegetation growing through

- The Guardhouse is only accessible via stairs ST/01, which are external, and ST02 which do not conform to Building Regulations Approved Document Part M, with winders and large rises to steps. There is no lift provision. Ramped access is available but follows a torturous route, using the east ramp to the Casemates walkway at 1st floor level following this around the southern part of the Site to enter the Guardhouse at the southern end, a journey of 165 metres.

- The Casemates have no lift access, with the external walkway only accessible via the use of stair ST/01, ST/02 (passing through the Guardhouse 1st floor), ST/03 (another external stair accessed via the Parade Ground) or the east ramp. Provision of a lift in the Guardhouse should have the capacity to simultaneously provide access to the Casemates, avoiding the need for a separate lift which will be costly and, due to the arrangement of the Site, would probably need to be located externally, presenting maintenance issues.

As the project progressed, site visits and consultations with Historic England also led to a revision of the proposed location for lift access. These discussions focused on balancing the impact on the Site's historic fabric with the benefits of improved accessibility. The significance of the affected structures was carefully considered, ensuring that any alterations would be minimal and in line with heritage preservation guidelines. Ultimately, relocating the lift access within the design to the Guard House provided a solution that opened up more of the Site while reducing the need for invasive works, making it a more sustainable and sensitive approach to enhancing accessibility.

Vertical access - lift

To provide full access to all Project Areas 1 and 2 it is necessary to provide a lift. The proposed lift provision therefore needs to satisfy the following requirements:

- Be easily accessible from external areas via the entrance archway.
- Provide access to the Guardhouse 1st floor and the Casemates walkway.
- Have minimal impact on the building fabric.

Potential lift locations:

Figure 66 Areas identified where a lift could be installed

Figure 67 Direction of travel through identified areas for lift installation

- Area 1 – North Range
  - Advantages:
    - Spaces to be rebuilt with new floors allowing lift provision to be built-in; reducing impact on historic fabric
    - Potential for dedicated lift / circulation area
  - Disadvantages
    - Remote from Casemates Walkway necessitating travel through classroom / community spaces to gain access
    - North Range rebuilt; considerable effort & expenditure to provide a space that is mostly taken up by circulation; space has limited use otherwise and is remote from existing classroom / community spaces and is also remote from services provision, requiring increased expenditure

- Area 2 – West Range – north end
  - Advantages:
    - Closer to Casemates Walkway
  - Disadvantages
    - Compromises key spaces G/01 & classroom / community space 1/06
    - Remote from Casemates Walkway necessitating travel through classroom / community spaces to gain access
    - Requires forming aperture through floor = loss of historic fabric

- Area 3 – West Range – centre
  - Advantages:
    - Closer to Casemates Walkway
  - Disadvantages
    - Archway located below; lift will encroach on entrance to Site & required removal of historic fabric
    - Compromises key classroom / community space 1/05
    - Remote from Casemates Walkway necessitating travel through classroom / community spaces to gain access

- Area 4 – West Range – centre (south end)
  - Advantages:
    - Closer to Casemates Walkway
    - Provides access to adjacent classroom / community spaces without compromising use
  - Disadvantages
    - Cells located below; difficult to accommodate lift & requires removal of historic fabric
    - Compromises key G/04 classroom / community space
    - Requires forming aperture through floor = loss of historic fabric

- Area 5 – West Range – south end
    - Advantages:
        - Closest to Casemates Walkway
        - Provides access to adjacent classroom / community spaces without compromising use
        - Ground floor = underused space with limited potential for community use, etc
        - First floor = previously altered space (1940s partitions); less historically significant fabric; storage only – not key visitor space
    - Disadvantages
        - Requires forming aperture through floor = loss of historic fabric

For the above reasons it has been determined that **Area 5** is the optimum location for the lift.

Figure 68 Area 1 for proposed lift

Lift Location

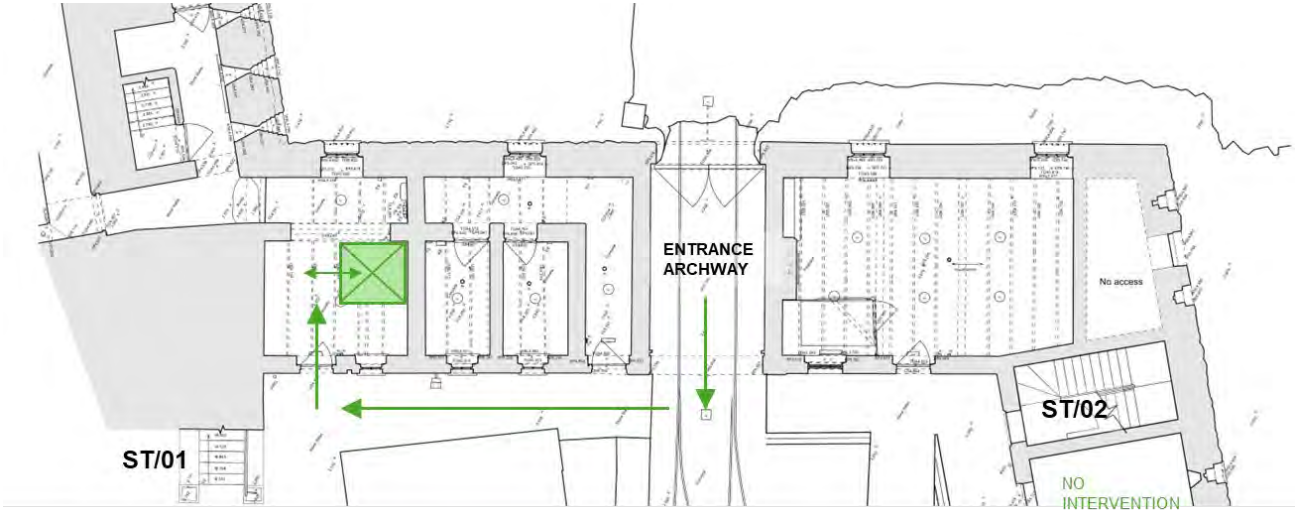


Figure 69 Optimum lift location (ground floor)

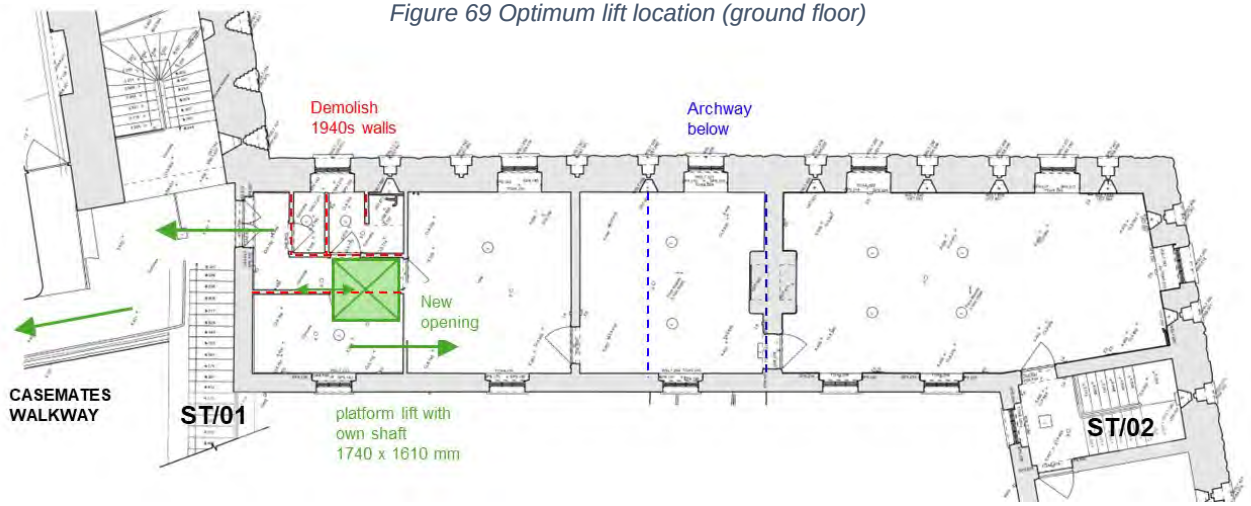


Figure 70 Optimum lift location (first floor)

Within area 5 it is considered that the optimum location is to the north-west corner of the main space on the ground floor. This maintains a generous amount of space around the lift from the existing entrance door, maintaining a 1.5 m2 space in front of the lift, as well as keeping the existing window clear of obstructions, admitting natural light. This also maintains access to the passageway to the rear that provides access to the tunnels.

At first floor level this location allows the lift to be placed away from the east elevation, maintaining views out and natural light admittance, as well as continuing the existing access route adjacent to the east wall. The later 1940s partitions are proposed to be removed, creating a generous lobby area which gives easy access to the Casemates Walkway. The 1940s brick partitions are considered to be of lower significance compared to the original nineteenth century fabric. The main dividing wall is also retained with a new doorway inserted; the existing entrance within the wall is too narrow to meet the Building Regulations Part M access minimum width of 750 mm and would need to be adjusted in any event. The opening will be infilled with fletton brick salvaged from the demolished partitions.

The proposed lift is to be a platform-type, supplied with its own lift shaft. This will minimise any impact on the existing fabric, with no requirement for a pit of overrun, and requiring only an aperture to be formed within the first-floor slab. This can be achieved relatively easily by trimming the existing steel joists with new steelwork.

Locating the lift within the proposed location removes the need for rebuilding of the north range, which requires considerable expenditure on a new ground floor, first floor, roof, doors and windows (see script on costings). Savings made here can be diverted into the new lift works and other improvements.

ST/01 – external stair to Casemates Walkway

This is an original stair with granite treads. The stair is in reasonable condition, of an acceptable width and pitch. It is of high significance; therefore interventions are proposed to be minimal, relating to clearing of vegetation and repointing of joints between treads and junctions with the adjacent brick walls in lime mortar. To improve access, it is proposed to fit a new continuous handrail to the south wall so that there is a handrail to both sides. The handrail will be in painted steel to match the original section of balustrading to the foot of the stair.

ST/02 – internal stair to West Range

This is an original stair with York Stone treads and wrought iron balustrading and handrail. The stair is not ideal from a Building Regulations perspective, with winders to the foot of the stair and relatively high risers, however it is of high heritage significance so opportunities for alterations are limited. It is considered that the stair will be acceptable given the proposed lift provision.

The balustrading at the top landing is 930 mm high, below the regulation 1100 mm, and the gaps between the balusters are c 210 mm, in excess of the required 100 mm. This presents a risk from falling. Consequently, it is proposed to raise the height and provide infill panels to the balustrade. These are to be achieved using bespoke clamps that will bolt-on to the existing and fix into the adjacent wall, making them entirety reversible.

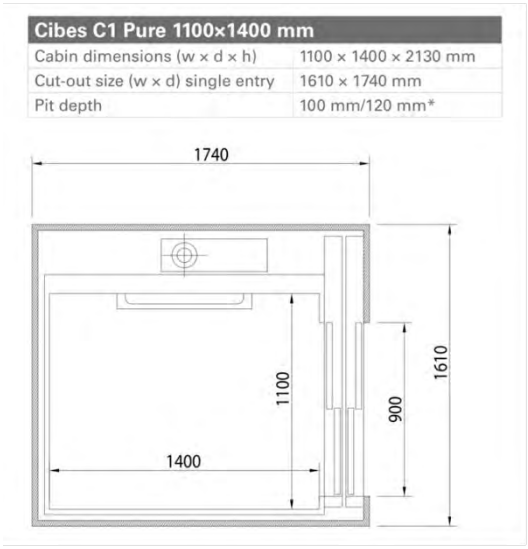


Figure 71 Lift type

Figure 72 Vegetation on ST/01 will be cleared

Figure 73 ST/01 a continuous handrail provided to the south side of the stair in addition to the existing, improving accessibility

Figure 74 ST/02 The existing balustrading will be raised in height at the top landing level with infill panels to conform to regulations, these will be bespoke made & clamp on to the existing, enabling full reversibility.

Horizontal access – ground floor

Horizontal access begins at the entrance archway to the Site. The area through the archway and immediately inside the Site presents a number of impediments to free movement, with uneven surfacing, old footings and vegetation presenting trip hazards and restricting the area generally.

It is proposed to provide an enlarged open area immediately adjacent to the Guardhouse. This will provide easy and safe access into the Site for all visitors, an orientation space on entry, a space for equipment to be unloaded for events. Initial proposals are for this area to be surfaced with resin-bonded gravel, providing a visually comparable but more user-friendly version of the loose gravel to the adjacent Parade Ground.

The new forecourt will enable level access to all entrances to ground floor spaces within the Guardhouse.

Existing features within the hardstanding are to be researched to determine their historical significance. Important features can be retained potentially via a demarcation of materials within the surfacing, e.g granite setts or bricks.

Areas of York stone paving will be lifted and re-laid in their original locations. The train tracks that run through the entrance archway into the Site are to be preserved either in-situ or lifted and re-laid in their original locations.

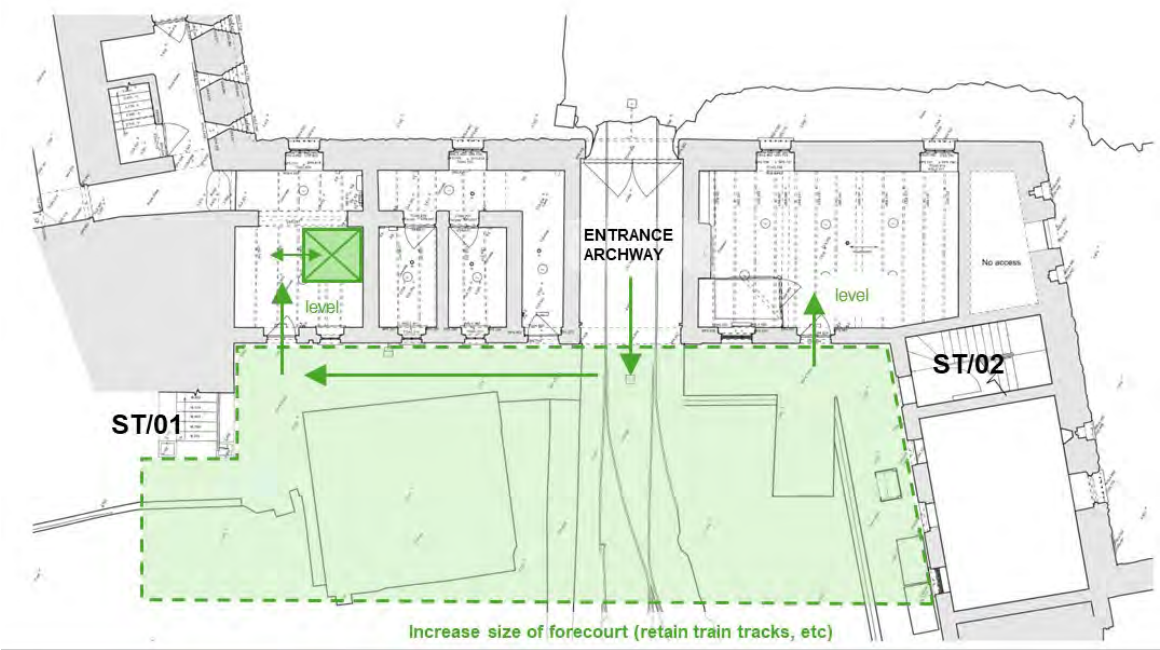


Figure 75 Ground floor access plan

Figure 76 Example surfacing treatment (1)

Figure 77 view north east of parade ground from ST/01

Figure 78 view west of entrance archway

Figure 79 Example surfacing treatment (2)

Horizontal access – first floor

To provide full access throughout the first-floor rooms it is necessary for all doors to have flush thresholds and a minimum width of 750 mm to conform to Building Regulations Approved Document Part M. The existing door openings are as follows:

Door 1

- Clear opening width = 850 mm; complies
- Threshold = level access; complies

Door 2

- Clear opening width = 860 mm; complies
- Threshold = level access; complies

Door 3

- Clear opening width = 910 mm; complies
- Threshold = 116 mm step; a ramp will be provided with a maximum gradient of 1:12 = 1.4 m length; this can be accommodated within room 1/05

Door 4

- Clear opening width = this is a new door opening so will be 900 mm minimum
- Threshold = level access can be achieved

Door 5

- Clear opening width = 1220 mm; complies
- Threshold = 100 mm step; a ramp will be provided with a maximum gradient of 1:12 = 1.4 m length; this can be accommodated within room 1/02.

The removal of the 1940s partitions within this area will remove the existing narrow corridor (800 mm wide) and create a generous lobby area that will be fully accessible to all.

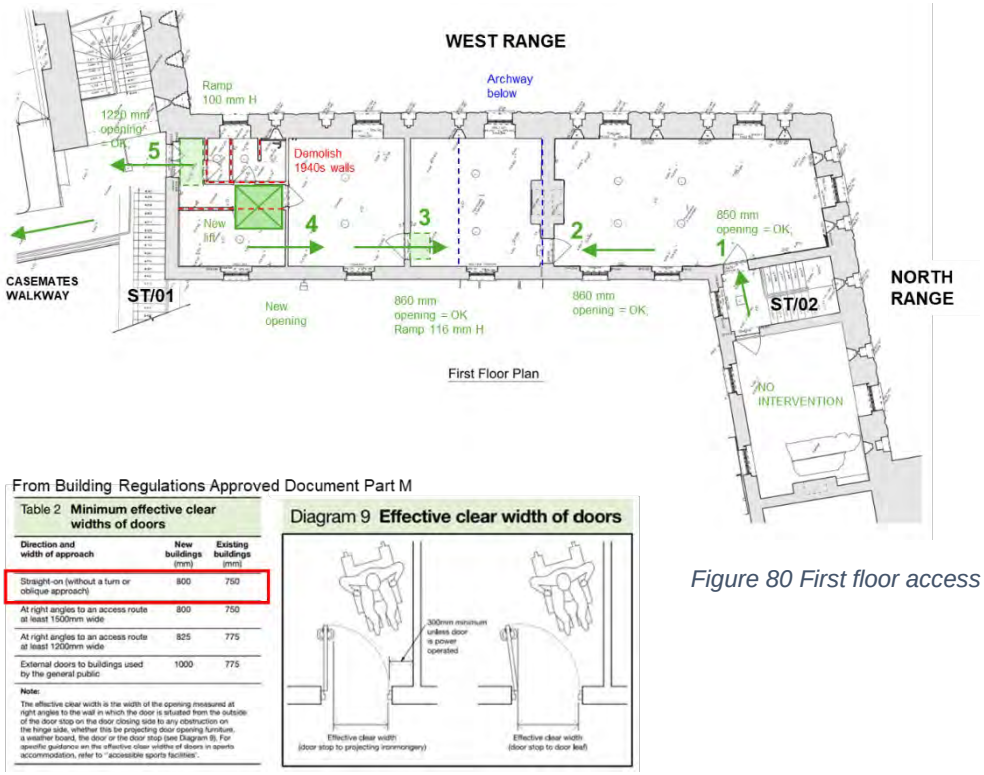


Figure 80 First floor access

Figure 81 Door 1

Figure 82 Door 2

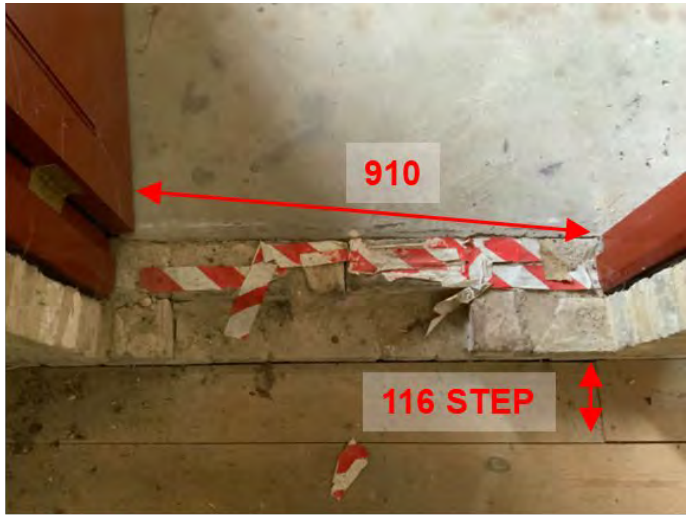


Figure 83 Door 3

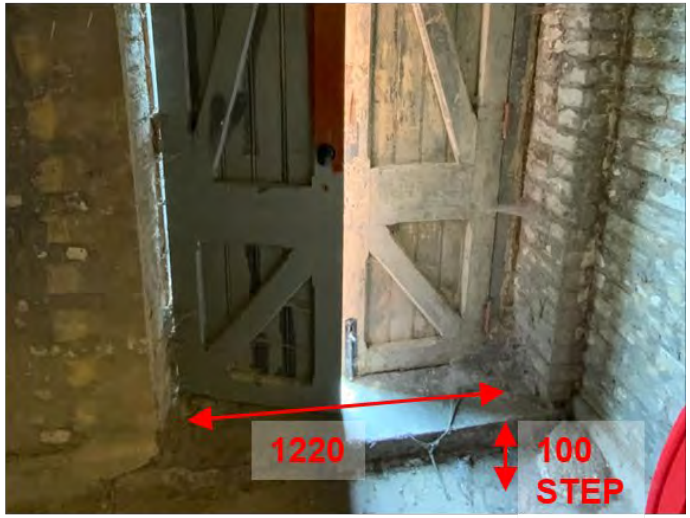


Figure 84 Door 5

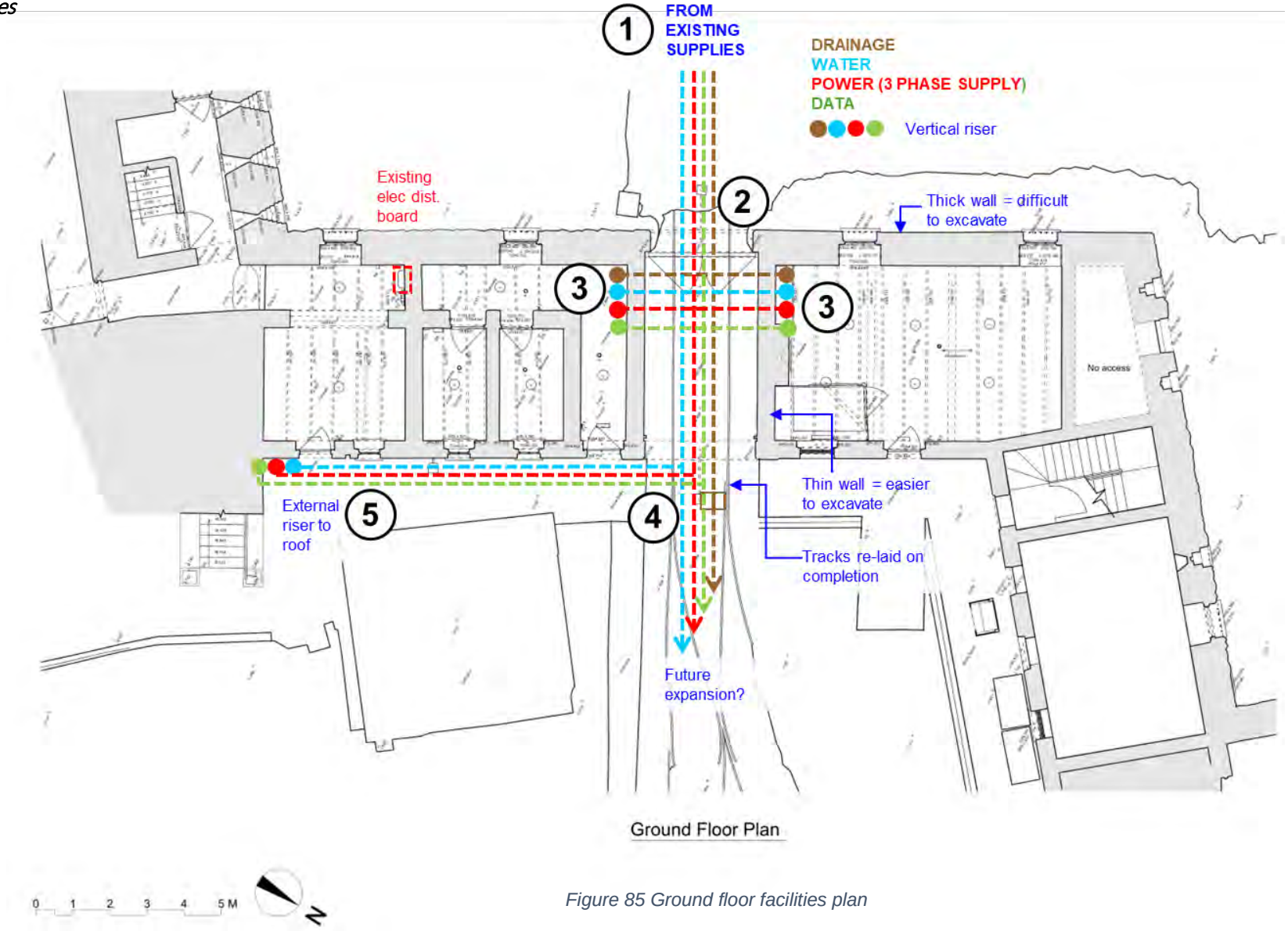


Figure 85 Ground floor facilities plan

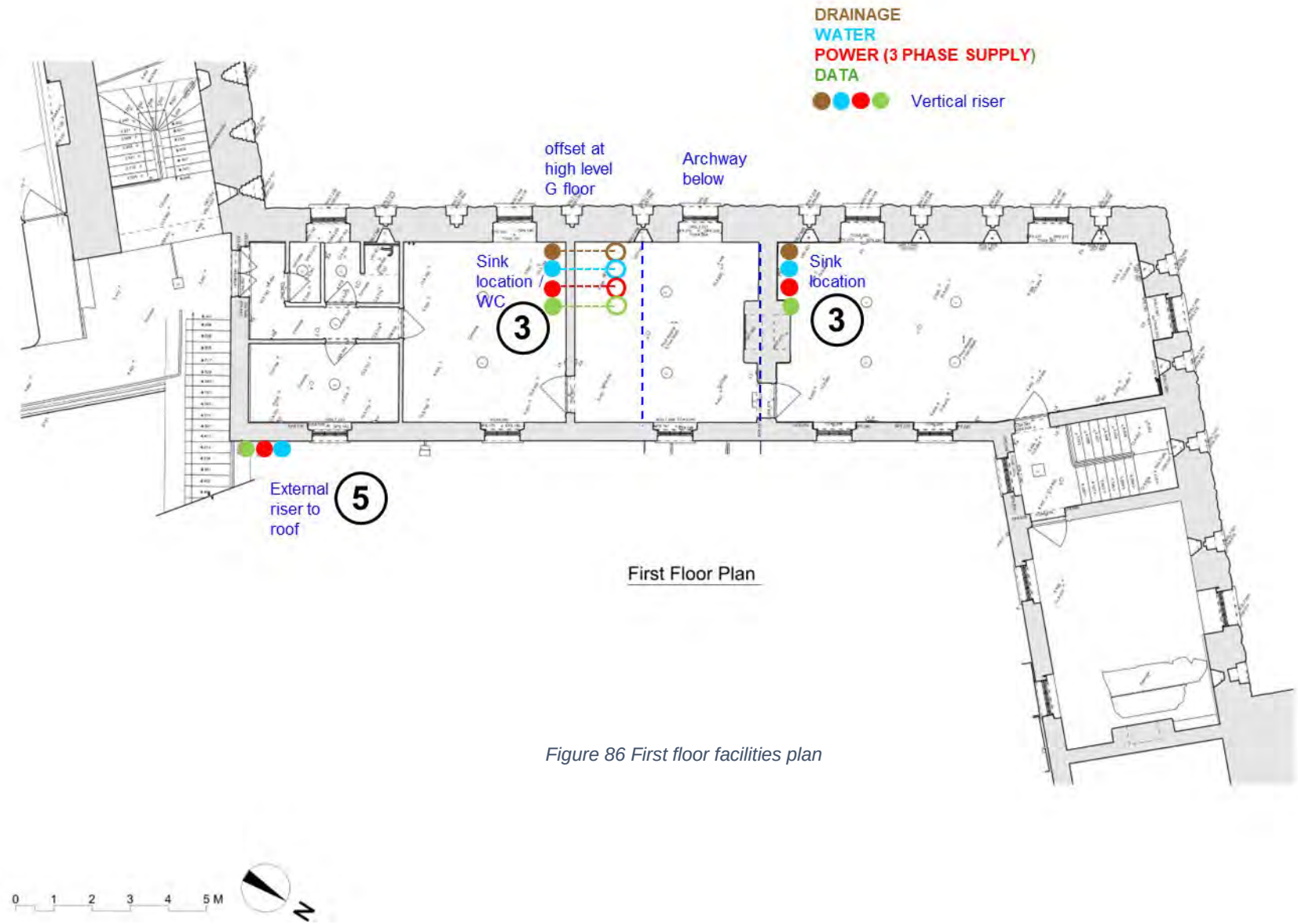


Figure 86 First floor facilities plan

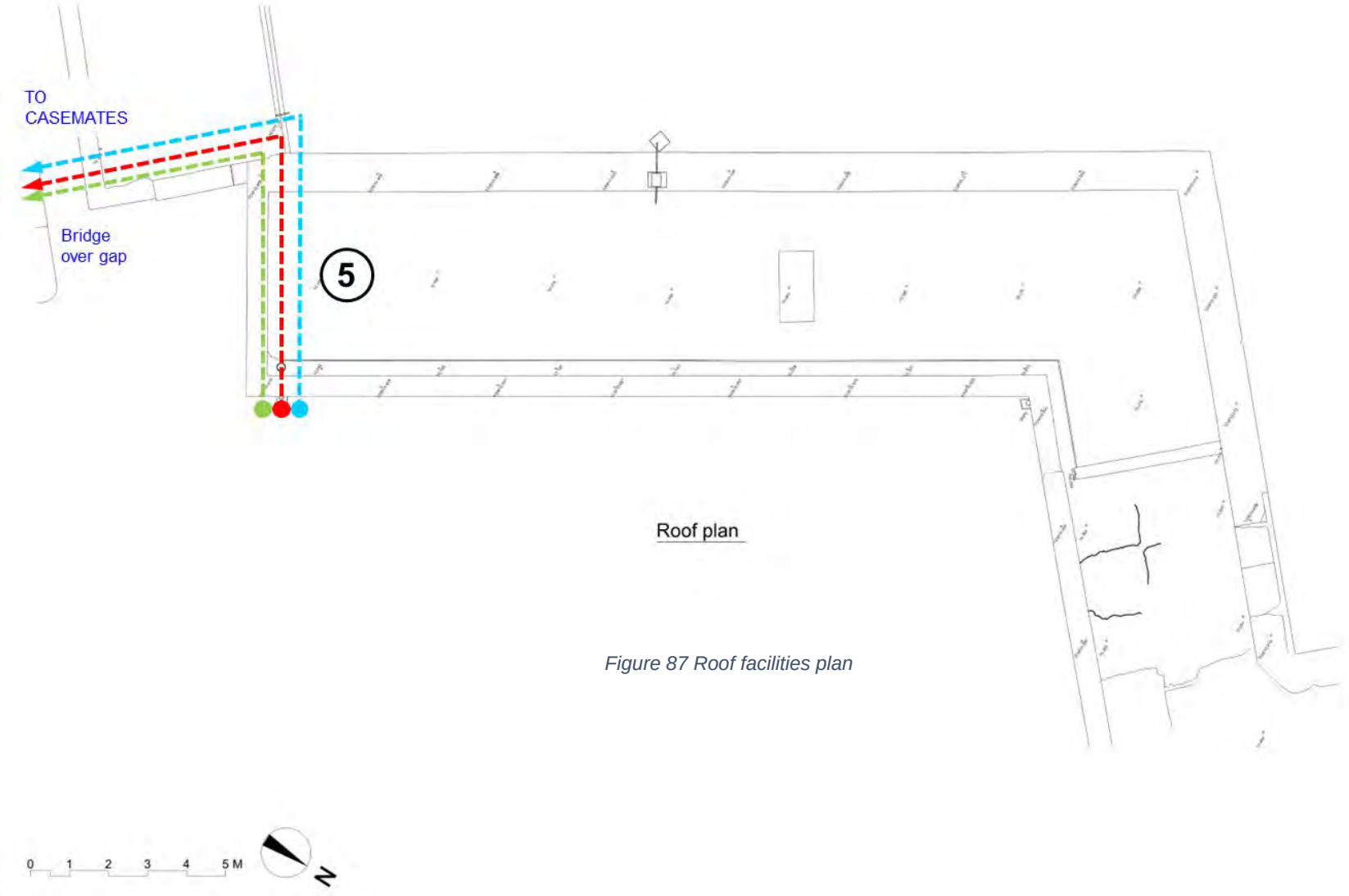


Figure 87 Roof facilities plan

Services provision

The following have been identified as a requirement for the Site:

- Power (3-phase)
- Data
- Water
- Drainage

Existing provision

The extent of existing services on the Site and the intake locations is unclear; power is present to the Gatehouse and to some of the Casemates, however this is unlikely to be a 3-phase supply. Provision of data services, water and drainage is thought to be non-existent.

Consequently, at this initial stage it has been decided to proceed on the assumption that new services are required in their entirety. This can be updated as further information becomes available.

Services strategy

The initial services strategy is as follows:

1 Extend existing services

Existing services provision are located adjacent to the café. It is proposed to extend these into the Site via new excavations.

2 Entry to Site via entrance archway

Services are proposed to enter the Site via the main entrance through the archway. This avoids excavations through the foundations of the external walls, which will be problematic due to the thickness of the walls, and cause damage to historic fabric.

Taking the main service route though the archway also simplifies future expansion, with the capacity to branch off around the Site.

The existing railway tracks will be maintained in-situ with the services routed underneath or lifted and re-laid in the original locations on completion.

3 Provision to Gatehouse north and south sides.

Within the archway services branch off to serve the north and south spaces. Excavations here will be easier as a result of the thinner walls. Once inside, services are provided to the ground floor spaces, with riser locations up to first floor.

Services can be offset at high level ground floor to the required location for facilities on the first floor, in particular drainage and water.

Distribution of power, lighting and data can be via surface-mounted conduits as existing. It may be possible to re-use existing socket and lighting locations.

4 Future provision

Once inside the Site, the services can be terminated in new inspection chambers ready for future expansion.

5 Casemates services

Services are routed underground to the south-east corner of the Guardhouse. From here a vertical riser runs up the outside of the building and across the roofs to the Casemates to the south (see *Casemates* section).

The placing of the services externally minimises impact on the historic fabric by removing the need to form apertures through floors

and walls. Functionally and aesthetically it takes its cue from the tradition on the Site throughout its history of adaptation and 'organic' growth on a need-to-have basis, with a series of 'bolt-ons' and additions.

By adopting this strategy, surface mounted services will not look out of place, and will be easily accessible, extendable and adaptable. Importantly, they will also be fully reversible.

Provision of WC facilities

There are currently no WC facilities within the Site; the existing arrangement is to use those adjacent to the café. This is unsuitable for the educational / community uses, raising safeguarding issues. Dedicated WC facilities are therefore required.

In addition, WCs are required to serve the proposed tenants within the Casemates. Due to the remoteness of these areas and the difficulty of providing drainage to them, it is proposed to locate the WCs within the Guardhouse.

These WCs could also be used for volunteers and smaller events on the Site, with temporary WCs brought in for larger events.

Given the variety of uses and safeguarding concerns it is considered that 2 no. WC facilities are required on the Site:

1. To support the existing education / community use
2. To support the Casemates tenants, volunteers and selected Site activities

WCs for education/ community use

Due to proximity for ease of use and safeguarding issues these are best placed on the first floor. Room 1/05 is close to the lift and of limited use for educational purposes due to the small footprint, and is less significant than say 1/06 or 1/07, being the result of later subdivision. Services provision is also readily available by offsetting pipework at high level on the ground floor.

The proposed layout shows a disabled WC with 2 no. unisex cubicles incorporating sinks, although other configurations would be possible according to requirements.

Using the same principle, it is also possible to provide sinks to the classrooms to improve the range of educational activities.

WCs for Casemates tenants, volunteers and selected Site activities

Room G/01 is occupied by the new lift, leaving no space for WCs. The cells in G/03 & G/04 could be converted for WC use but the provision would be limited, and these spaces are better suited for interpretation spaces as part of the Site's educational offer.

Room G/05 is well-suited for WC facilities, relatively large and in close proximity to the proposed service routes.

The proposed layout shows a disabled WC with 5 no. unisex cubicles incorporating sinks, although other configurations would be possible according to requirements, including showers if desirable. The adjacent space with no access could potentially be utilised for WCs by forming an opening through the wall.

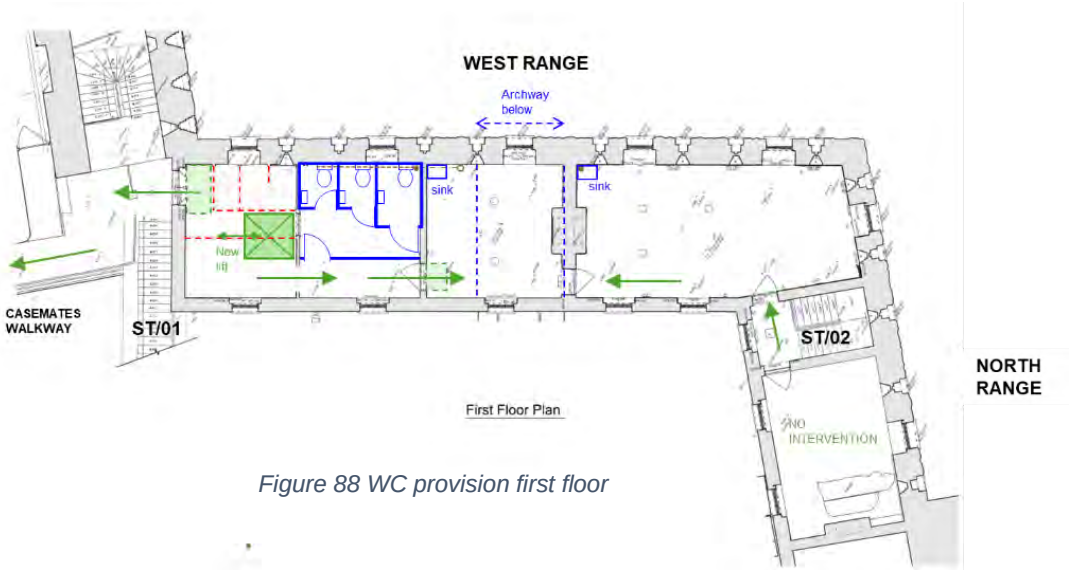


Figure 88 WC provision first floor

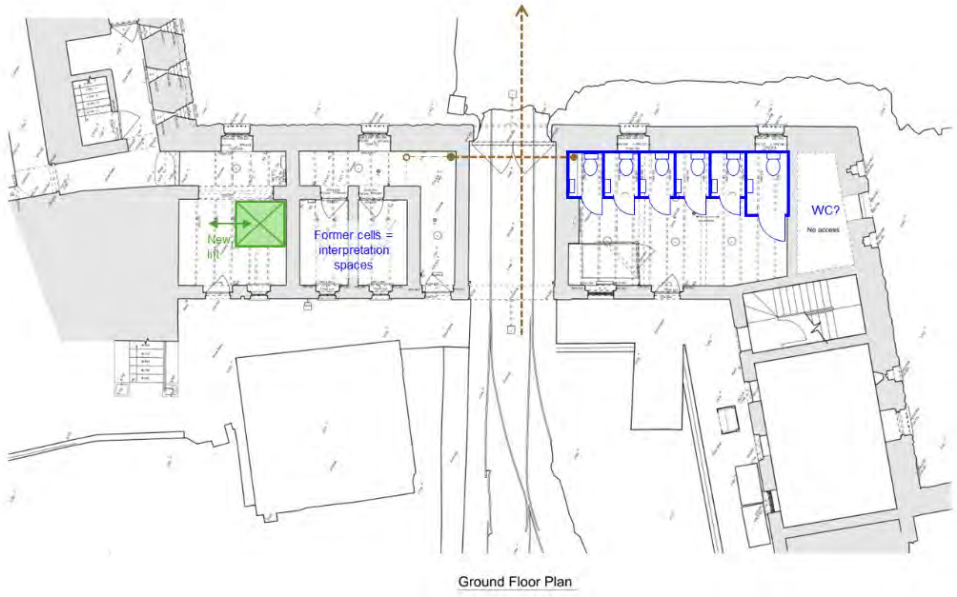


Figure 89 WC provision ground floor

4.3.4 Minimum structural works required for delivery of architectural intervention

The schedule of 'necessary works' required to provide a baseline from which the delivery of architectural intervention can take place are outlined in **Appendix C**. These are considered the minimum which should be undertaken to the structure.

The minimum works recommended include;

- Clearing of block rainwater goods and enhancement of the general system where necessary, and
- Replacement of the first floor and roof structure to the northern leg and repairs to the external wall front the parade ground to include cracking stitching, rebuilding of brick arched opening head, and rebuilding of dislodged brickwork to east end.

The schedule of 'necessary works' has been costed by Daniel Connal Partnership. This cost report is available in **Appendix K**.

4.3.5 Ground Contamination mitigation for proposals

Chemical analysis of shallow soils within the Parade Ground indicated the presence of elevated concentrations of PAHs which may present a potentially unacceptable risk to human health should the Site be opened up for frequent public access without the implementation of appropriate mitigation measures.

Given the proposed medium- and long term- uses the overall risk rating for the Site is assessed to be at the Medium level (see Section 2.7.3 and **Appendix E**). The following actions are recommended to address the potentially unacceptable risks identified:

- Potential contaminant linkages between elevated PAHs in shallow soils and human health can be mitigated by removal of the contaminant source or introducing a physical barrier to break the potential contaminant linkages. This could include one or more of the following:
    - Stripping of impacted soils and disposal at an appropriately licensed waste facility, followed by importing suitable for use soils for the Parade Ground placed to thickness appropriate for vegetation rooting depths
    - Placement of an imported suitable for use soil capping layer over the existing Site soils (required thickness of capping at least 300mm);
    - Placement of a geotextile membrane over existing soils to provide a physical barrier, followed by placement of imported suitable for use soils to a thickness appropriate for vegetation rooting depths, or decorate gravels as required;
    - Placement of ground protection mats to provide a physical barrier to underlying soils.
- Details of mitigation measures to be included in the Site's Operation and Maintenance (O&M) manual and ongoing maintenance and management of the soft landscaping to ensure mitigation measures remain in place.
- Standard dust mitigation measures should be employed during construction works, including dampening down of exposed soils and covering of stockpiles;
- Soils containing asbestos should be managed in accordance with the Control of Asbestos Regulations (CAR) 2012;
- Construction and maintenance workers should be asbestos awareness trained, use personal protective equipment

(PPE) suitable for the contaminants present in the ground, and employ good hygiene measures;
- Entry to excavations should be avoided where possible. If entry cannot be avoided, a risk assessment should be undertaken with PPE/RPE used where appropriate in line with the Confined Space Entry Regulations 1997;
- Fuels and chemicals stored on-site and/or brought to Site as part of construction works should be stored and managed in accordance with Control of Substances Hazardous to Health (COSHH) Regulations 2002. Works should employ spill kits and devise emergency spill response procedures;
- Potential risks to new drinking water supply pipes from contamination can be mitigated by selecting an appropriate barrier pipe.

4.3.6 Heritage impact assessment for proposals

The acceptability of any proposal for the parade ground and/or gatehouse will be assessed on the basis of impacts on significance; any harm should be minimised and will require clear and convincing justification.

This assessment provides a high-level indication of the interventions to the parade ground and gatehouse which may be acceptable subject to clear and convincing justification. As such, only a high-level assessment of harm to significance is possible; it is not possible to undertake a specific assessment of heritage impact. With the exception of the loss of the World War Two first floor partition wall in the Gatehouse (shown on Figure 69), it is considered that the above interventions, if approached sensitively, could be achieved without having an adverse impact upon the significance of the parade ground and gatehouse. The loss of the World War Two partition walls would result in low levels of less than substantial harm. However, this is necessary to secure optimum viable use of the gatehouse and the public/heritage benefits of resolving the heritage asset's vacancy, preventing future deterioration. Securing an 'optimum viable use' would weigh favourably in the balance in Paragraph 215 of the NPPF.

The acceptability, in terms of heritage legislation and policy, of the above interventions will ultimately be realised beyond the scope of this document and in the detailed design. Elements that should be considered as part of the detailed design are:

- Appropriate repair specification and methodology, referring to the report by The Morton Partnership.
- Use of appropriate materials and high-quality new materials where appropriate.
- Use of appropriate fixtures and fittings: where these may differ from original, ensure they are technically and aesthetically appropriate.
- The articulation and scale of new interventions is appropriate.
- If temporary structures are installed, these should be fully reversible with no impact on significant features.
- Appropriate landscaping scheme and new surface treatments using appropriate materials.

4.4 Project 2, Casemates

4.4.1 Introduction

This chapter pertains to findings that specifically relate to the Casemates (Project area 2). The chapter incorporates an overview of findings from consultants involved in undertaking this multi-disciplinary feasibility study, and covers ecology, ground contamination, structural condition, and architectural design interventions. Full reports from each discipline, including their full findings and recommendations, can be found in the appendices of this report.

The Victorian Casemates are located to the south of the Site. They are accessed by a curved walkway accessed from both the east and the west of the semicircular buildings.

The casemates comprise twelve vaulted rooms facing the river to the south and east. These are protected by thick granite walls and cast iron surrounded gun ports, designed to protect gunners from stone splinters caused by enemy fire. The structure is built with thick granite slabs to withstand heavy shelling.

Each casemate is of a differing dimension, with some stretching the full width of the building (such as B10, 12, 14 and 16 within the study area) and others much shorter. This can be seen in Figure 25 and 24, where Figure 24 shows a window to the rear of the casemate, which would overlook and defend the Thames. Some are enclosed with timber windows at their northern entrance and others are open. Each is a chamber, constructed with granite walls, brick arched ceilings and concrete floors. They are functional military structures, evident in their existing form and character.

The casemates became redundant in 1949, and have since been used ad hoc, and mostly for storage. They are in varying states of repair and condition.

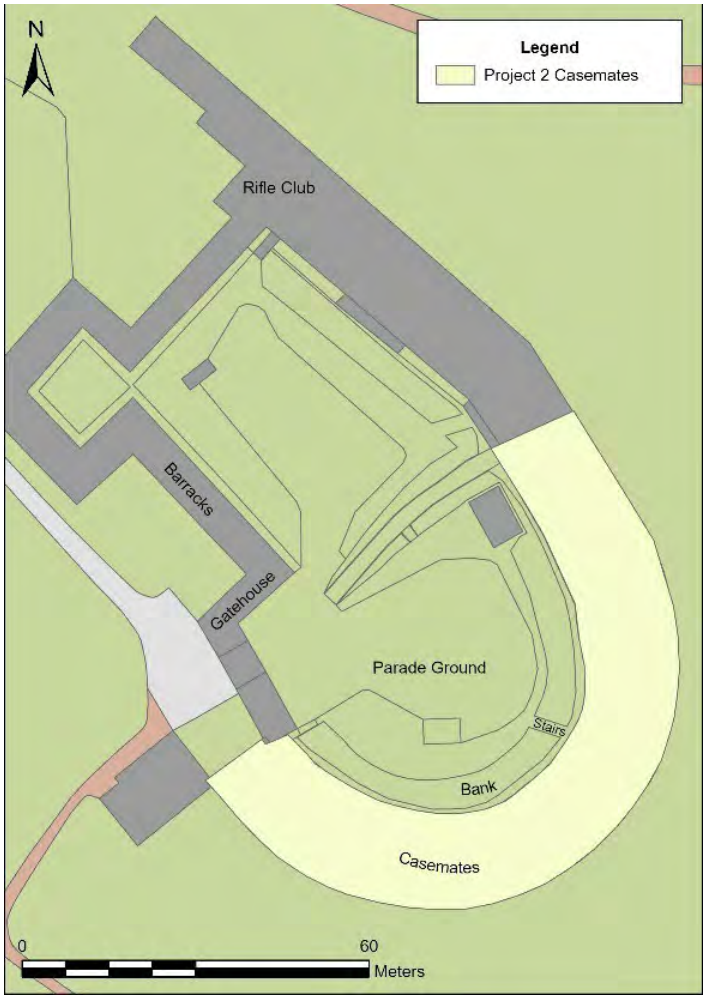


Figure 90 Casemates study area

Figure 91 View of the Casemates

Figure 92 Interior of Casemate B09

Figure 93 Interior of Casemate B15

4.4.2 Design and Intervention Options

Introduction

The Casemates are located to the south-east side of the Fort, originally containing fourteen of the seventeen guns in the Fort. The guns were rifled, muzzle-loaders and were protected from enemy fire behind thick wrought iron gun ports. The gunners received instructions via voice pipes entering the Casemates from a rooftop command post.

The main Casemates with gun ports were originally open to the centre of the Fort due to the smoke emitted by the guns. Intermediate Casemates (without gun ports) contained living quarters with fireplaces for the gunners use during an emergency. Ammunition was stored in vaulted chambers (magazines) directly below the Casemates and raised up to the guns on lifts.

This feasibility study considers the next phase of development of the Site, looking at access, future uses and interventions required to facilitate these, alongside required maintenance and repairs.

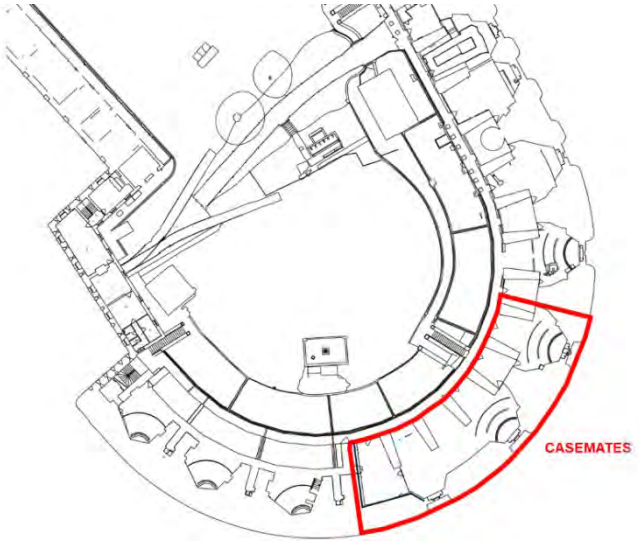


Figure 94 Building areas within the scope

Building areas within scope

The building elements within scope are identified as 6 no. Casemates to the south side of the Site. These have been numbered units 1 to 6 in a counter-clockwise direction from the westernmost unit, The intention is that the numbering continues as more casemates become available in the future.

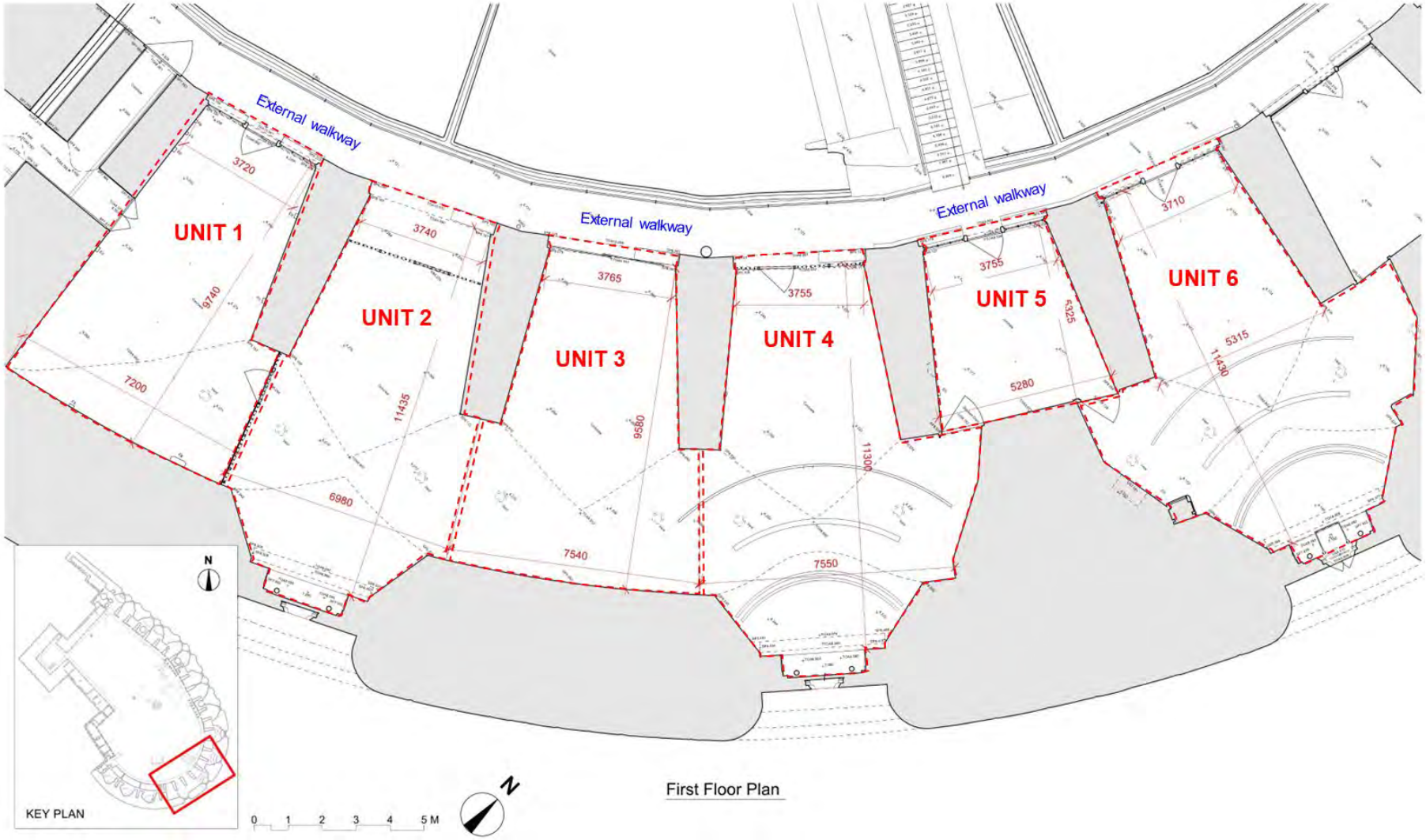


Figure 95 Detailed plan of the building areas within the scope

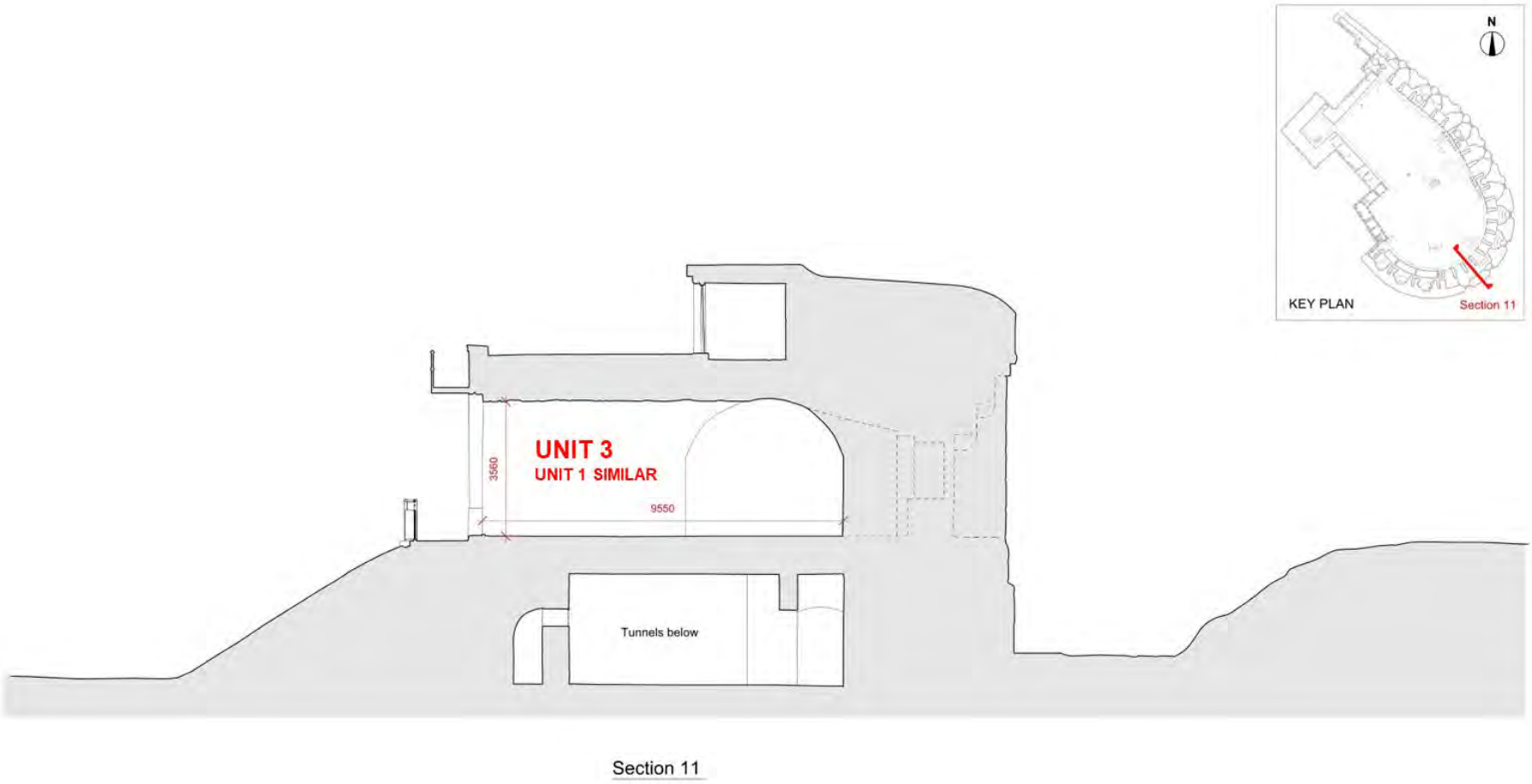


Figure 96 Section of Unit 3

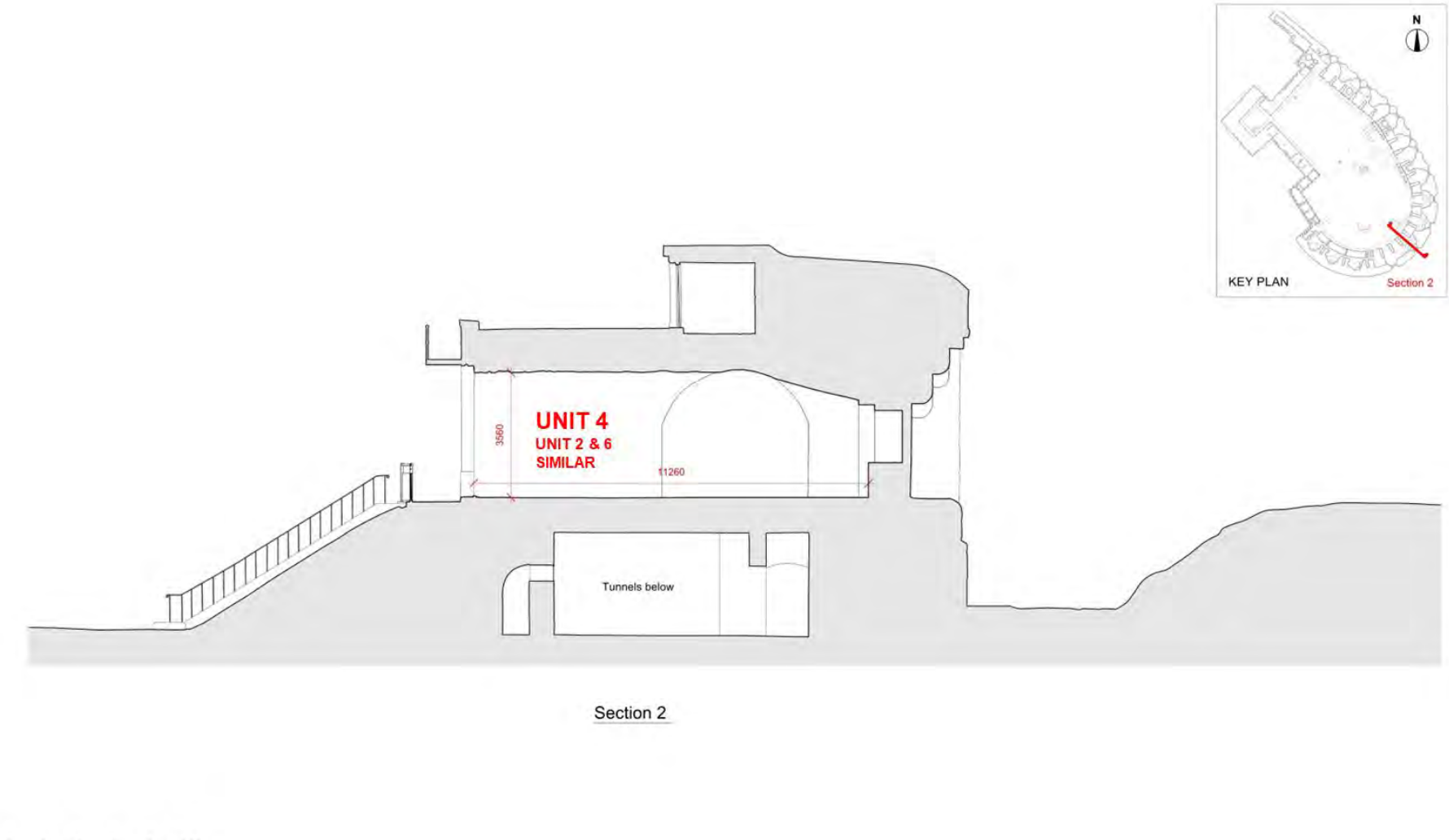


Figure 97 Section of Unit 4

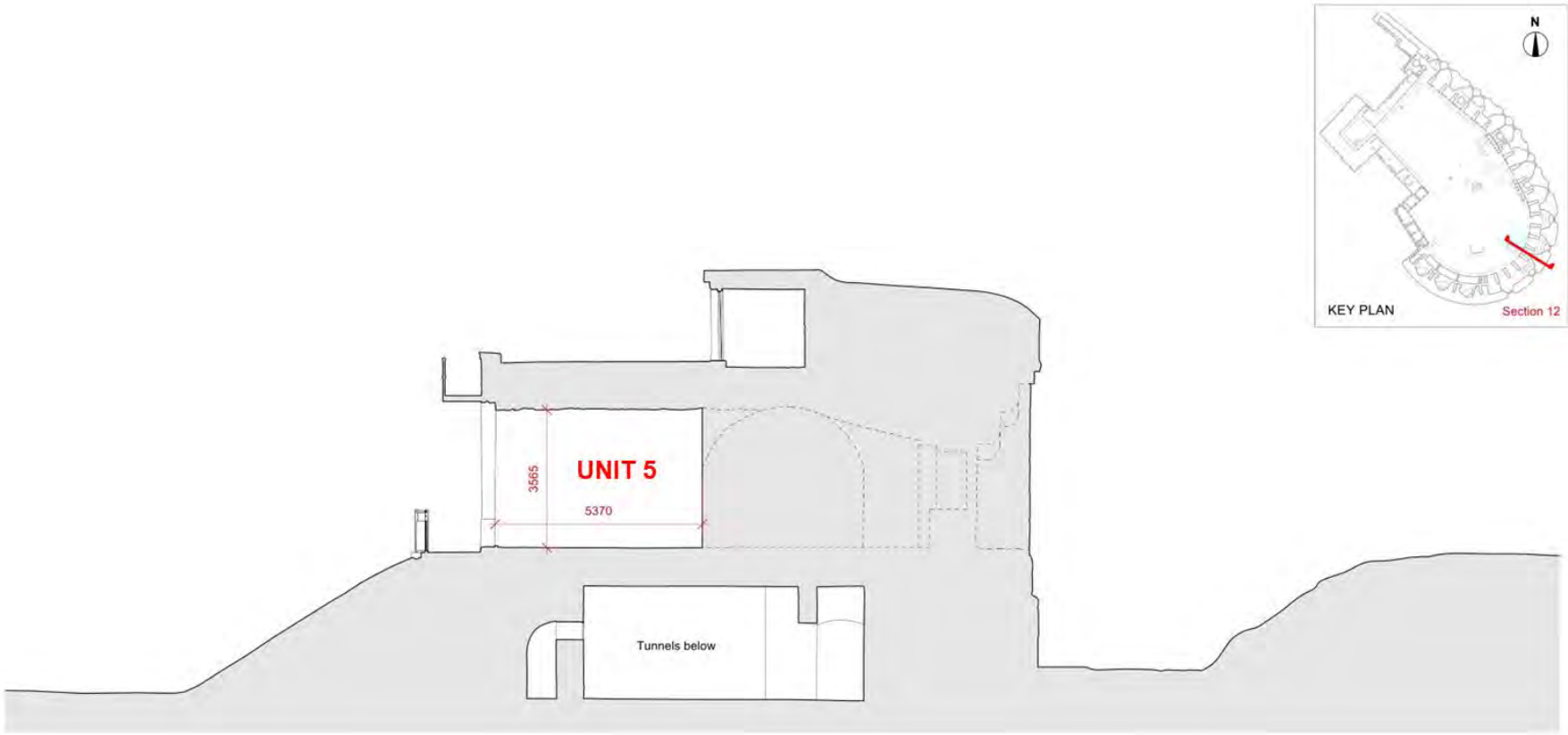


Figure 98 Section of Unit 5

Existing building

The existing building spaces and features are as follows:

UNIT NO:	**01**
HISTORIC USE:	Casemate (living quarters)
CURRENT USE:	None (store for equipment)
WALLS / CEILING:	Exposed brick vaulting (painted) Stone facing to south wall to 2.5 m height approx. Modern partition infill to south-east opening
FLOOR:	Concrete screed (painted)
FIXTURES / FITTINGS:	Fireplace to east wall Door to west wall – timber ledged / braced Glazed timber screen c1940? to north entrance archway Modern strip lighting with surface-mounted cabling
CONDITION / COMMENTS:	Fair; evidence of damp ingress generally; deteriorating finishes throughout

Figure 99 Exterior of Unit Number 1

Figure 100 Interior Unit Number 1

ROOM NO:	02
HISTORIC USE:	Casemate (gun emplacement)
CURRENT USE:	None (store for equipment)
WALLS / CEILING:	Exposed brick vaulting (painted) Stone facing to south wall to 2.5 m height approx.
FLOOR:	Concrete screed; remains of gun emplacement to floor
FIXTURES / FITTINGS:	Modern steel gate and infill screen to north entrance archway Modern strip lighting with surface-mounted cabling Iron gun port to south wall (opening bricked-up)
CONDITION / COMMENTS:	Poor; evidence of damp ingress generally; washing out of mortar joints and deteriorating finishes and staining to brickwork throughout

Figure 101 Interior of Room Number 2

Figure 102 Exterior of Room Number 2

ROOM NO:	03
HISTORIC USE:	Casemate (linking space between gun emplacements – no gun port)
CURRENT USE:	None (store for equipment)
WALLS / CEILING:	Exposed brick vaulting (painted) Stone facing to south wall to 2.5 m height approx. Modern partition infill to south-east opening
FLOOR:	Concrete screed
FIXTURES / FITTINGS:	Modern steel gate and infill screen to north entrance archway Modern strip lighting with surface-mounted cabling
CONDITION / COMMENTS:	Poor; evidence of damp ingress generally; washing out of mortar joints and deteriorating finishes and staining to brickwork throughout

Figure 103 Interior of Room Number 3

Figure 104 Exterior of Room Number 3

ROOM NO:	04
HISTORIC USE:	Casemate (gun emplacement)
CURRENT USE:	None (store for equipment)
WALLS / CEILING:	Exposed brick vaulting (painted) Stone facing to south wall to 2.5 m height approx. Modern partition infill to south east arched opening (south west = open to unit 3)
FLOOR:	Concrete screed; remains of gun emplacement to floor
FIXTURES / FITTINGS:	Modern steel gate and infill screen to north entrance archway Modern strip lighting with surface-mounted cabling Iron gun port to south wall (opening bricked-up)
CONDITION / COMMENTS:	Poor; evidence of damp ingress generally; washing out of mortar joints and deteriorating finishes and staining to brickwork throughout; cracking to apex of brick vaulting and algae growth around gun port and centre of plan; rust / corrosion to gun port

Figure 105 Exterior of Room Number 4

Figure 106 Interior of Room Number 4

ROOM NO:	05
HISTORIC USE:	Casemate (living quarters)
CURRENT USE:	None (store for equipment)
WALLS / CEILING:	Exposed brick vaulting (painted)
FLOOR:	Concrete screed (painted)
FIXTURES / FITTINGS:	Fireplace to west wall Doors & screens to openings to south wall – timber ledged / braced Glazed timber screen c 1940? to north entrance archway Modern strip lighting with surface-mounted cabling
CONDITION / COMMENTS:	Poor; evidence of damp ingress generally; washing out of mortar joints and deteriorating finishes and staining and algae growth to brickwork throughout

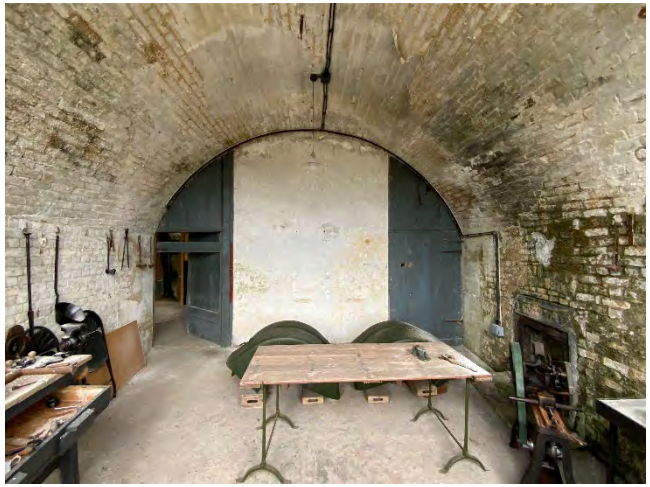


Figure 107 Interior of Room Number 5

Figure 108 Exterior of Room Number 5

ROOM NO:	06
HISTORIC USE:	Casemate (gun emplacement)
CURRENT USE:	None (store for equipment)
WALLS / CEILING:	Exposed brick vaulting (painted) Stone facing to south wall to 2.5 m height approx. Plastered finishes to east & west walls (presumed over brickwork)
FLOOR:	Concrete screed; remains of gun emplacement to floor
FIXTURES / FITTINGS:	Glazed timber screen c 1940? to north entrance archway Modern strip lighting with surface-mounted cabling Iron gun port to south wall (opening bricked-up) Recesses to south-east & south-west corner (former fireplace?) Timber shaft for former shell lift to south-east & south-west corner
CONDITION / COMMENTS:	Poor; evidence of damp ingress generally; washing out of mortar joints and deteriorating finishes and staining to brickwork throughout; cracking to apex of brick vaulting and extreme algae growth around gun port and centre of plan; rust / corrosion to gun port

Figure 109 Interior of Room 6 (looking west)

Figure 110 Interior of Room 6 (looking east)

Figure 111 Exterior of Room 6

Figure 112 Room Number 6 (1) looking south towards the gun port

Figure 113 Room Number 6 (2) view of the former shell lift

Figure 114 Room Number 6 (3) showing details of possible former fireplace

Figure 115 Room Number 6 (4) view north towards the entrance of the casemate

Figure 116 Room Number 6 (5) view of gun emplacement

ROOM NO:	ROOFS – UNITS 1 - 6
HISTORIC USE:	Roofs
CURRENT USE:	Roofs
WALLS:	North side – perimeter parapet upstand stock brick walls with rendered copings (appears cementitious)
DECK:	Brick vault with rendered surface (appears cementitious) overlaid with asphalt; bituminous felt repairs over cracking
CEILING:	N/A
FIXTURES / FITTINGS:	Modern clay chimney flues set within north parapet upstand
CONDITION / COMMENTS:	Fair / poor; evidence of cracking to asphalt causing damp ingress internally; repairs to cracks with bituminous felt Form of roof with various structures projecting above surface makes waterproofing difficult; curved profile of south edge with no drip results in water running over the wall surface below causing water ingress particularly around gun ports. Previous attempts to waterproof the structures have largely failed.

Figure 117 Roof units 1 - 6

Figure 118 View north east across the roof

Figure 119 View west across the roof

Use

- Convert spaces for commercial use – office / co-working / artists' studios / workshops

Building fabric

- Repairs as required
- Upgrade interiors to habitable spaces

Access

- Vertical access
    - Provide lift access to the Casemates Walkway
    - Upgrade the existing stairs to meet Building Regulations requirements, with balustrading to edges minimum 1100 mm high & with spacing between balusters less than 100 mm width.
- Horizontal access
    - Provide horizontal access throughout with level thresholds & door widths to meet minimum 750 mm Building Regulations requirements.

Facilities

- Services provision
    - Power (existing?)
    - Data
    - Water
    - Drainage
- Provision of WC facilities
    - To support education / community use
    - WC facilities to be located within the Gatehouse due to the lack of opportunities to provide drainage to the Casemates area of the Site

4.4.3 Proposals

Access

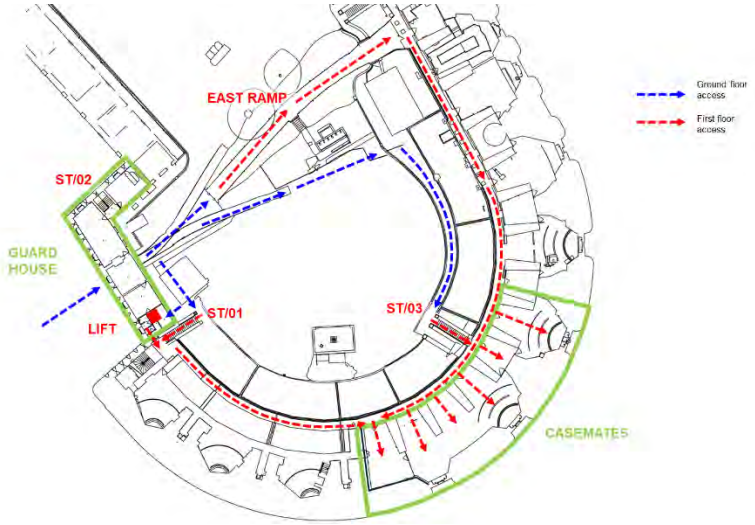


Figure 120 Site Access Plan

See also the report on the Guardhouse for further details on access. Accessibility around the Site generally is poor:

- Surfaces are uneven, making access difficult, particularly by mobility-impaired persons. Areas of hardstanding and paving that do exist have multiple joints, cracks and holes between surfaces, and vegetation growing through
- The Casemates are only accessible via stairs ST/01, which are external, and ST02 which do not conform to Building Regulations Approved Document Part M, with winders and large rises to steps. There is no lift provision, Ramped access is available but follows a torturous route, using the east ramp to the Casemates walkway at 1st floor level following this around the southern part of the Site to enter the Guardhouse at the southern end, a journey of 165 metres.
- The Casemates have no lift access, with the external walkway only accessible via the use of external stair ST/01, ST/02 (passing through the Guardhouse 1st floor) and ST/03 (another external stair accessed via the Parade Ground) or the east ramp. Provision of a lift in the Guardhouse will have the capacity to simultaneously provide access to the Casemates, avoiding the need for a separate lift which will be costly and, due to the arrangement of the Site, would probably need to be located externally, presenting maintenance issues.

Vertical access - lift

It is proposed to provide a new lift within the Guardhouse which will simultaneously provide full access to the external walkway at first floor level and on to the Casemates.

Refer to the section of the report on the Gatehouse for details of the proposed lift.

Vertical Access – stairs and ramp

ST/01 – external stair to Casemates Walkway (accessed adjacent to Guardhouse)

This is an original stair with granite treads. The stair is in reasonable condition, of an acceptable width and pitch. It is of high significance; therefore, interventions are proposed to be minimal, relating to clearing of vegetation and repointing of joints between treads and junctions with the adjacent brick walls in lime mortar. To improve access, it is proposed to fit a new continuous handrail to the south wall so that there is a handrail to both sides. The handrail will be in painted steel to match the original section of balustrading to the foot of the stair.

ST/03 – external stair to Casemates Walkway (accessed via Parade Ground)

This is an original stair with granite treads. The stair is in reasonable condition, of an acceptable width and pitch. It is of high significance; therefore, interventions are proposed to be minimal, relating to clearing of vegetation and repointing of joints between treads and junctions with the adjacent upstand walls in lime mortar. To improve access, it is proposed to fit a new continuous handrail to the south wall so that there is a handrail to both sides. The handrail will be in painted steel to match the original section of balustrading to the foot of the stair.

The balustrading at the top landing (part of the Casemates Walkway) is modern and meets regulations with 1100 mm height and the gaps between the balusters less than 100 mm. It may be necessary to review the height of the balustrading locally to maintain the 1100 mm height following raising of sections of the Casemates Walkway to provide flush thresholds into the Casemates (see below).

There is a drop of approximately 3 metres at its highest to the west of the stair. The surviving section of iron balustrading to the west of the stair is below the required 1100 mm height and has gaps between balusters in excess of the required 100 mm. This may present a risk from falling. The requirements for the balustrading will be determined with Building Control, but it may be necessary to raise the height and provide infill panels to the balustrade. If required, these will be achieved using bespoke clamps that will bolt-on to the existing and fix into the adjacent wall, making them entirety reversible.

The proposed new handrail to the west side will meet regulations. These is no requirement for balustrade infills here as there is no drop to the other side.

Figure 121 ST/03 vegetation will be cleared, and a continuous handrail provided to the east side of the stair in addition to the existing, improving accessibility. The existing balustrade may need to be raised and infilled between balusters, dependent on building regulations

Figure 122 ST/01 vegetation will be cleared, and a continuous handrail provided to the south side of the stair in addition to the existing, improving accessibility

East Ramp

The east ramp rises from approximately the centre of the Site and rises to the east to provide access to the Casemates Walkway at first floor level.

It currently has concrete surfacing in poor condition and rudimentary edge protection. To conform to Building Regulations Part M the East Ramp will require repairs to the surfacing, with the gradient checking and potentially making less steep, together with the provision of intermediate landings and new handrails and up stands to both sides.

Figure 123 The East Ramp provides access to the Casemates Walkway at the upper level

Figure 124 The East Ramp will require repairs to the surfacing and the gradient checking and potentially flattened, together with the provision of intermediate landings and new handrails to both sides to conform to Building Regulations Part M

Horizontal access – Parade ground

The Parade Ground has existing concrete paths leading from the main entrance to the Site around the perimeter, leading to staircase ST/03.

It has concrete surfacing, probably dating from the 1940s. This is in poor condition, presenting a number of impediments to free movement, with uneven surfacing, and vegetation presenting trip hazards. The surfacing will require repairs in concrete to match the existing.

Figure 125 The Parade Ground has existing concrete paths around the perimeter leading to ST/03

Figure 126 The Parade Ground path will require repairs to the concrete surfacing

Horizontal access – Casemates Walkway

The Casemates Walkway runs externally around the southern part of the Site providing access to the Casemates. It is paved, with a mix of earlier York stone flags and later concrete. The paving is generally in reasonable condition, although there is a considerable amount of vegetation growing through the joints.

The edge to the bank adjacent to the Parade Ground has modern galvanised steel balustrading in good condition and to a height and with spacing that conform to Building Regulations Part K.

It is proposed to retain the existing paving, removing the vegetation and lifting and re-laying flags where necessary. In order to provide level access to the Casemates with flush thresholds it will be necessary to raise the surface of the paving locally around the entrances (see Fitout below). As a result, it may be necessary to raise the height of the balustrading locally to maintain the 1100 mm height; this is to be determined with Building Control.

Figure 128 View south from the opposite side of the Site towards casemates

Figure 127 Access routes to casemates

Figure 129 View south from the top of ST/01 towards casemates

Facilities

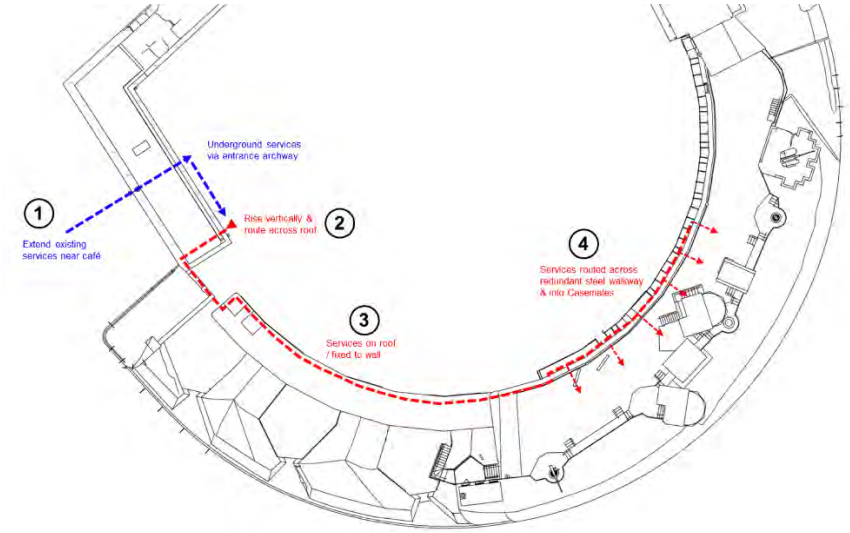


Figure 130 Services

Services provision

The following have been identified as a requirement for the Site:

- Power (3-phase)
- Data
- Water
- Drainage

Existing provision

The extent of existing services on the Site and the intake locations is unclear; power is present to some of the Casemates; however, this is unlikely to be a 3-phase supply. Provision of data services, water and drainage is thought to be non-existent.

Consequently, at this initial stage it has been decided to proceed on the assumption that new services are required in their entirety. This can be updated as further information becomes available.

Services strategy

See also the report on the Guardhouse for further details on services provision. The initial services strategy is as follows:

1 Extend existing services into Site via entrance archway

Services are proposed to be extended from the existing services provision adjacent to the café enter the Site via the main entrance archway.

2 Casemates services across Guardhouse & Caponier roof

Services are routed underground to the south-east corner of the Guardhouse. From here a vertical riser runs up the outside of the building and across the roof of the Guardhouse and the adjacent Caponier to on the Casemates to the south.

3 Casemates services across roof / wall

Services are routed across the outer edge of the roof or fixed to the wall at high level using brackets based on the historical walkway brackets (see below).

4 Services across via redundant steel walkway & into Casemates

Using the redundant steel walkway fixed to the wall at high level, the services are routed to the entrances of the Casemates, entering each via the entrance screens.

The placing of the services externally minimises impact on the historic fabric by removing the need to form apertures through floors and walls. Functionally and aesthetically, it takes its cue from the tradition on the Site throughout its history of adaptation and 'organic' growth on a need-to-have basis, with a series of 'bolt-ons' and additions. It also makes use of redundant historic features such as the steel walkway running above the Casemates entrances, probably dating from World War One or World War Two.

By adopting this strategy, surface mounted services will not look out of place, and will be easily accessible, extendable and adaptable. Importantly, they will also be fully reversible.

Provision of WC facilities

There are currently no WC facilities within the Site; the existing arrangement is to use those adjacent to the café.

WCs are required to serve the future tenants within the Casemates. Due to the remoteness of these areas and the difficulty of providing drainage to them, it is proposed to locate the WCs within the Guardhouse.

Refer to the Guardhouse report for further details on WCs.

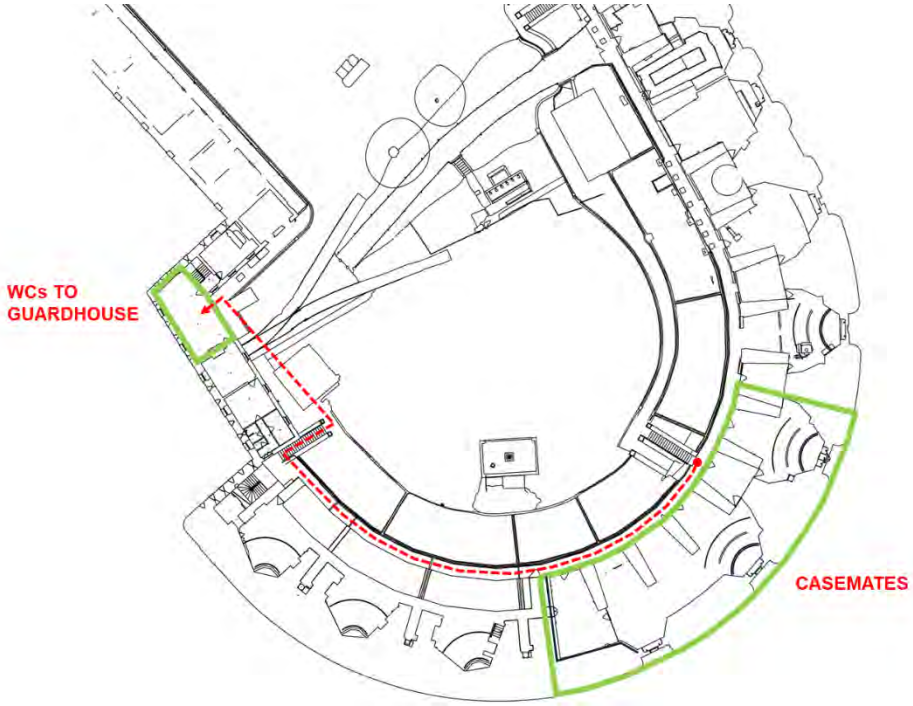


Figure 132 Location of WC facilities

Proposed Services Fitout

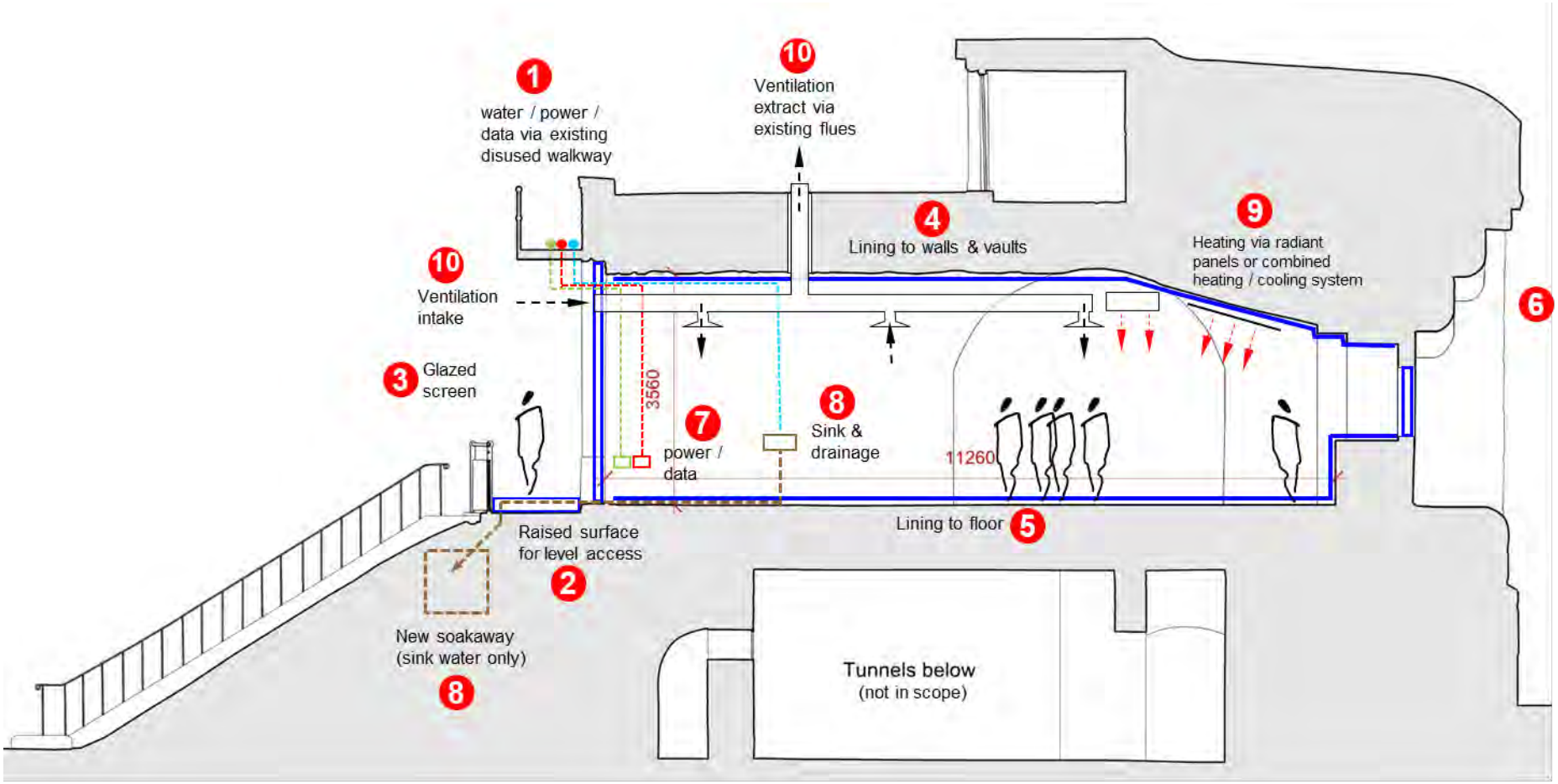


Figure 133 Proposed fit out for services

It is proposed to possibly provide commercial space for rent within the Casemates. This should be flexible, suitable for use as offices, co-working spaces or artists' studios and workshops.

Initial research has indicated that whilst there are similar spaces available for rent in former industrial spaces in the locale, the facilities offered are generally to a low standard. In order to differentiate the spaces at Coalhouse Fort it will be necessary to provide more salubrious surroundings with an emphasis on amenity and quality, with a high standard of fitout.

Accordingly, a 'kit of parts' approach has been adopted for the Casemates. This responds to the overall character and needs of the spaces whilst having the flexibility to be varied on an individual basis. The intention is that the kit can be deployed as required, with the level of intervention determined by the tenants and responding to their own individual circumstances and that of the spaces. Although this study has focussed on six of the Casemates, the approach could easily be rolled out across the remaining units quickly, easily and inexpensively in future, without the need for extensive, time consuming and costly redesign.

The various elements of the 'kit of parts' are as follows:

1. Services

These are provided via the existing disused external walkway running above the entrances of each of the Casemates. The entry point into the spaces is via the entrance screens, either by carefully removing a section of glazing in the existing glazed screens or via purpose-made entry points within new screens (see opposite).

Figure 134 Services are provided via the existing disused external walkway running above the entrances of each of the Casemates. The entry point into the spaces is via the entrance screens, either by carefully removing a section of glazing in the existing glazed screens or via purpose-made entry points within new screens

Figure 135 Level access is to be provided at the entrances to the units by raising the surfacing locally around the doorways to produce flush thresholds. This will be achieved by overlaying the existing paving with new steel platforms with ramps, allowing the existing York stone paving to remain undisturbed. This has previously been introduced in some areas.

2. Level access

Is to be provided at the entrances to the units by raising the surfacing locally around the doorways to produce flush thresholds. This will be achieved by overlaying the existing paving with new steel platforms with ramps, allowing the existing York stone paving to remain undisturbed and also enabling the incorporation of drainage services underneath from the proposed sinks and the internal lining to the Casemates (see above).

3. Glazed entrance screens

The existing timber entrance screens are to be conserved, with timber repairs carried out alongside redecoration. Modern steel gates and screens are to be removed and replaced with new glazed screens. Initial thoughts on the form of these is that aluminium frames would be preferable to timber, maximising the admittance of natural light and providing a 'streamlined' aesthetic with minimal frames that responds to the requirements of the brief for an emphasis on amenity and quality. Minimal frame sizes will also reduce the visible impact of the screens, particularly if painted black or dark grey, maintaining the original aesthetic of the Casemates which originally had no infill within the openings to allow smoke from the guns to escape. Consequently, the Casemates would originally have appeared as dark 'voids' within the wall, as is currently the case with the units with steel bar infills.

4. Lining to walls and vaults

The Casemates are generally in poor condition internally, with water ingress, cracking to the brick structures and extensive areas of algal growth. Finishes generally are poor, with flaking and peeling paint which in conjunction with the washing-out of mortar joints means

Figure 136 Example of aluminum glazed screen to a vaulted space, with minimal sightlines to the framing and maximising admittance of daylight to produce a streamlined aesthetic with good amenity. The Casemates arches were originally open, which would be perpetuated by the use of minimal framing and larger expanses of glass.

that there is a constant process of 'shedding' of materials into the spaces below.

The cause of the issues is water leaking though the roof structures. Whilst this can be improved through remedial measures, due to inevitable structural movement, the form of the roof with multiple protruding elements and water runoff onto the external walls below, it can never be fully eliminated.

Consequently, there is a need to provide some form of lining within the structures to make them fit for habitation and provide them with a sustainable future. This has already been introduced to the Casemate formerly used as a café, although this was largely unsuccessful due to the use of incorrect non-waterproof materials.

Figure 137 Example of existing lining to vaults; the peeling finishes, staining and 'rippled' surface are as a result of the use of incorrect non-waterproof materials.

Methods typically used to waterproof railway arches have been considered for application in the Casemates. These have 2 basic options:

1. Proprietary corrugated plastic lining with plastic fixing battens.
2. Corrugated galvanised steel sheet with steel, plastic or timber fitting battens.

Plastic lining

This is available as a proprietary railway arch lining system specifically manufactured for the purpose by a company called Rockwell, so is economical and established. The system comprises high-impact plastic lining sheets which are flexible enough to adapt to each arch and will cold curve to match most vaulted ceilings.

Lining sheets are fixed to composite plastic battens which are fixed directly to the arch brickwork. The nature of the installation allows the system to remain completely demountable to allow arch structures to be easily inspected. The cavity formed between the brickwork and the lining can be ventilated, either via natural ventilation using the existing vent flues (presumably provided to evacuate smoke from the guns) or via connection to the mechanical extract, if provided (see below).

Battens and sheets are completely water and rodent proof plus offer good chemical resistance. Battens are extremely robust yet flexible enough to follow uneven brickwork. Fixings are manufactured from 304 series stainless steel to provide system durability.

The corrugated lining ensures any water that has permeated the arch brickwork is directed around the arch into floor level drainage channels, discharging onto the bank outside via pipes underneath the raised sections of the Casemates Walkway.

The system has a lifespan in excess of 25 years and has been used in numerous locations, offering an economical solution to transform

railway arches from dark and damp environments into pleasant work, storage, retail or leisure space.

Openings between units will be infilled with separating walls formed of moisture resistant cement board incorporating security mesh.

Advantages: The system is a well-established product specifically designed for the purpose and is likely to be robust as well as economical. It provides a clean, crisp and modern ‘streamlined’ aesthetic that is white in colour so will brighten up the spaces and maximise light levels, providing an attractive, dust and damp free, modern-looking environment that satisfies the brief to provide surroundings with an emphasis on amenity and quality, with a high standard of fitout.

The plastic material will be stable and will not corrode or require any form of decoration in future and is easily cleaned and maintained. The lightweight nature of the plastic means that it is easily removed to inspect the brickwork behind.

Disadvantages: Within the context of the historic building the plastic sheet may appear overly-modern, having a bland and overly-slick appearance and diluting the historic character of the spaces.

Figure 138 Ventilation of lining could utilise the existing flues originally provided for purging of smoke within the Casemates from firing the guns

Figure 139 Examples of lining to brick railway arches using corrugated plastic sheet lining

Figure 140 (Above) Examples of lining to brick railway arches using corrugated plastic sheet lining (London Bridge Station)

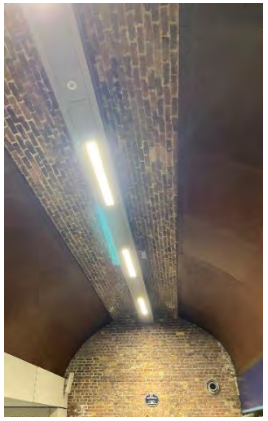


Figure 141 (Left) Examples of lining to brick railway arches using composite board; a similar approach may require the use of a waterproof membrane due to the inability to overlap the sheets. It may be possible to adopt an approach of installing lining only where required, however this risks ongoing maintenance issues with future leaks that may not currently be evident, and the damp issues at Coalhouse affect the full surface of the vaults (London Bridge Station)

Corrugated galvanised steel sheet

This is similar to the plastic lining, but with galvanised steel sheets rather than plastic. This is not part of a proprietary system but can be achieved using standard corrugated galvanised steel sheet fixed to the arches on steel or timber battens; it may be possible to use the same plastic battens as the plastic lining.

Advantages: This is primarily aesthetic; corrugated metal has been widely used in industrial and military applications since Henry Robinson Palmer patented corrugated iron in 1829. Consequently, it is in-keeping with the character and appearance of the historic building.

Disadvantages: Not using a proprietary system means that the lining will have to be specially designed for the spaces and is probably more difficult to install, with the result that it will be more expensive than the plastic alternative.

Longevity may also be an issue; there is the potential for the metal sheets to rust, particularly if exposed to corrosive salts contained in water-runoff from the brickwork behind. Fixing holes will be particularly susceptible since the galvanised surface will be broken. The galvanised finish will also be darker in appearance that the white plastic, particularly when the galvanised surface inevitably oxidises to a duller, dark grey. Painting will require the use of specific acid-etch primers which are costly and will introduce an ongoing maintenance issue.

The industrial aesthetic produced by the steel sheet may also deter some potential tenants in search of a more modern, streamlined appearance.

Figure 142 Examples of lining to brick railway arches using corrugated galvanised steel sheet. It may be possible to adopt an approach of installing lining only where required, however this risks ongoing maintenance issues with future leaks that may not currently be evident, and the damp issues at Coalhouse affect the full surface of the vaults

Incorporation of insulation

Lining the vaults presents the opportunity to introduce insulation, improving the thermal performance of the spaces and improving the sustainability credentials.

To avoid water ingress to the insulation, which will compromise the thermal performance, it will be necessary to introduce a waterproof tanking between the insulation and the brickwork. This is best achieved using a platon membrane over the brick surface, capturing any water and directing it to drainage channels similar to those that would be provided with the plastic or corrugated metal lining only. The cavity between the membrane and the brickwork could be ventilated using the existing vent flues or via connection to the mechanical extract, if provided (see below).

Tanking and insulating the vaults is likely to add considerable expense to the project. To determine whether this is viable a study should be carried out at the next stage to establish:

- the actual benefits of insulation the internal environment and running costs
  - *versus*
- the capital cost of taking and insulation
  - *versus*
- The impact of lining and insulation on the building fabric, i.e. will it result in deterioration of the brickwork or mortar.

Figure 143 Tanking of vaulted brick structures

Figure 144 Platon membrane

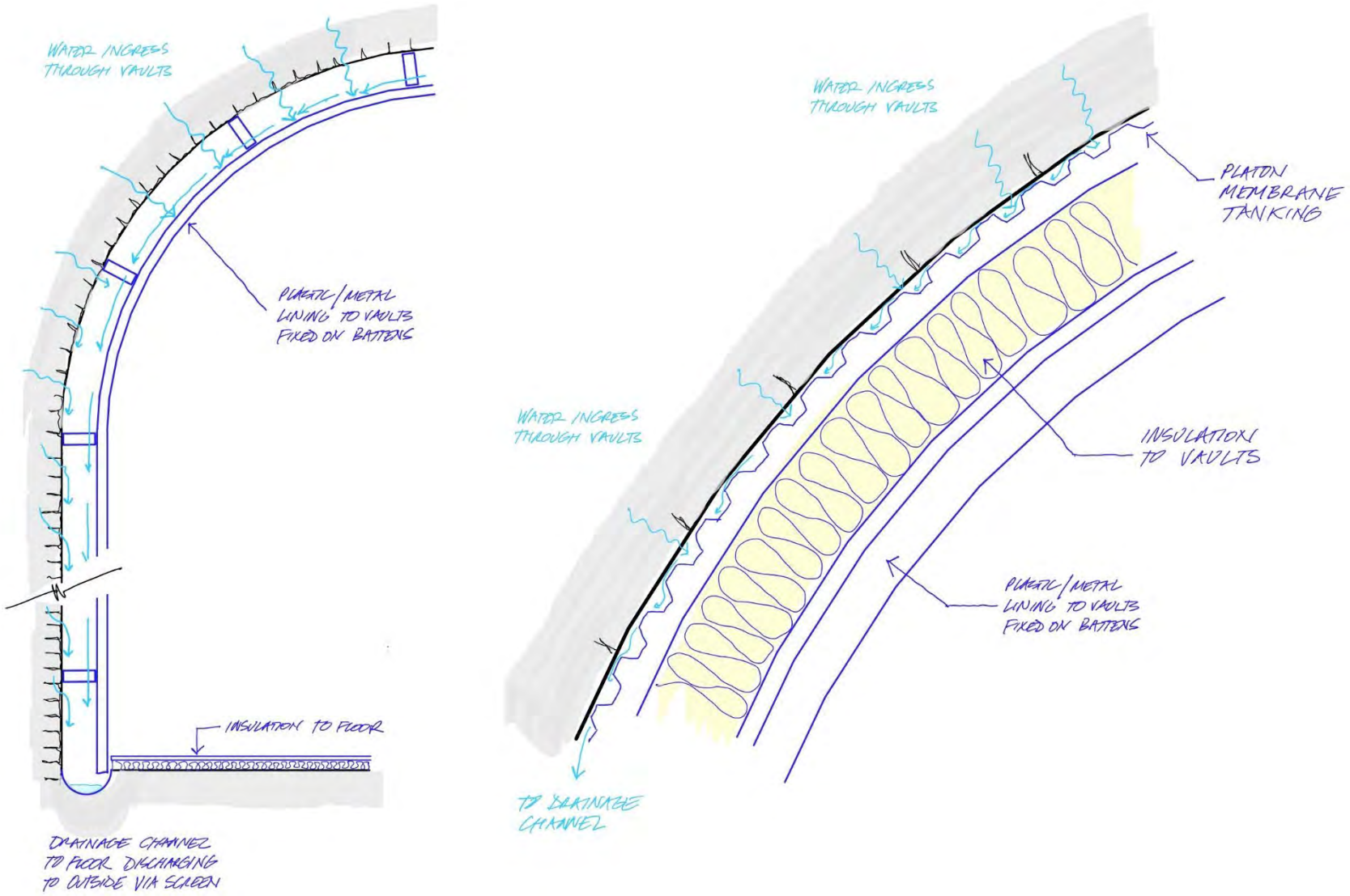


Figure 145 (Left) Indicative Section Through Vault Showing Lining (Right) Detail Showing Waterproofing / Insulation / Lining

5. Insulated raised floor

The existing floor is to be retained in situ overlaid with a damp-proof platon membrane with rigid insulation and ply tongue and groove flooring on timber battens.

6. Windows to existing gun ports

Where present (3 of the 6 units), the gun -ports are to be fitted with windows to admit natural light and provide external views across the river. Crittal-style steel-framed double glazed windows will suit the character of the Fort, separated from the existing wrought-iron surrounds to prevent bi-metallic corrosion.

7. Power, data and lighting

Services entry into the spaces is to be via the glazed screens (see above) and terminated adjacent to the entrance. From this point, services are to be distributed around the spaces by the incoming tenants via trunking and conduits surface mounted to the new lining.

8. Water & drainage supplies

Water pipework is to be brought into the spaces via the entrance screen and terminate at a butler-style sink mounted on independent framework. Hot water is to be supplied via localised electrical water heaters.

Drainage is to be provided via pipework within the floor void, passing through the entrance screen at low level and underneath the raised walkway. From here is proposed to be connected to soakaways within the external earth bank. These are to be located to avoid exacerbating any damp ingress within the underground tunnels below. Since the drainage serves sinks only – WCs are located within the Guardhouse- the amount of water is expected to be minimal.

9. Heating

The units will be occupied intermittently. Traditional radiators will be expensive to run due to the massive masonry structures which will absorb the heat, further exacerbated by the damp ingress.

Consequently, a quick-response solution is proposed, such as wall or ceiling mounted radiant panels. It may also be possible to introduce combined heating / cooling and ventilation units.

10. Ventilation

It may be possible to naturally ventilate the spaces using ventilation grilles within the entrance screens and the existing flues within the vaults. Alternatively, surface-mounted ductwork could be mounted at high level, with intake air via louvres in the glazed screens and extract air via the existing flues.

Figure 146 Ventilation of spaces could utilise the existing flues originally provided for fireplaces and purging of smoke within the Casemates from firing the guns

Figure 147 Exterior existing flues

4.4.4 Summary of minimum structural works required for delivery of architectural intervention

The schedule of ‘necessary works’ required to provide a baseline from which the delivery of architectural intervention can take place are outlined in **Appendix J**. These are considered the minimum which should be undertaken to the structure.

There is a complex arrangement of level changes and secondary structures present above the casemates at roof level, some of which have water resistant coverings, and some which do not. Due to this arrangement, it is unlikely that moisture penetration can be completely prevented, however it can be mitigated by unblocking existing gulleys and improvement works to the existing drainage system and roof coverings.

The schedule of ‘necessary works’ has been costed by Daniel Connal Partenrship. This cost report is available in **Appendix K**.

4.4.5 Ground contamination mitigation

Whilst the use of the Casemates is not wholly dependent on the regular public use of the Parage Ground, ground floor access to the casemates will partially cut across small sections of the south Parade Ground. As such, many of the recommended ground contamination mitigation measures outlined in Section 6.1.3 and Appendix E are relevant and required to facilitate the implementation of Project 2.

4.4.6 Heritage Impact Assessment for Proposals

The acceptability of any proposal for the casemates will be assessed on the basis of impacts on significance; any harm should be minimised and will require clear and convincing justification.

This assessment provides a high-level indication of the interventions to the casemates which may be acceptable subject to clear and convincing justification. As such, only a high-level assessment of harm to significance is possible; it is not possible to undertake a specific assessment of heritage impact. It is considered that the above interventions, if approached sensitively, could be achieved without having an adverse impact upon the significance of the structures. The interventions proposed as part of the ‘fitout’ of the casemates will also be largely reversible. The proposals will, therefore, help to secure optimum viable use of the casemates and the public/heritage benefits of resolving the heritage asset’s vacancy, preventing future deterioration. Securing an ‘optimum viable use’ would weigh favourably in the balance in Paragraph 215 of the NPPF.

The acceptability, in terms of heritage legislation and policy, of the above interventions will ultimately be realised beyond the scope of this document and in the detailed design. Elements that should be considered as part of the detailed design are:

- Appropriate repair specification and methodology, referring to the report by The Morton Partnership.
- Use of appropriate and high-quality materials where appropriate.

- Use of appropriate fixtures and fittings: where these may differ from original, ensure they are technically and aesthetically appropriate.
- The articulation and scale of new interventions is appropriate.

Figure 148 Internal view of the casemate

4.5 Project 3: Former Rifle Club

4.5.1 Introduction

Project 3 originally intended to explore potential future uses for the magazines and tunnels under the southern portion (Casemates 1-6) of the Fort. This was to include a structural survey and a high-level assessment of potential use for storage of archaeological archives. It was realised early in the project that the environmental conditions in the tunnels were not suitable for archival storage. The presence of bats here also presented a significant constraint to any uses in the short term. A decision was made not to progress further with the assessment of the tunnels.

The funds for the structural survey of the tunnels were reallocated to the area of the former rifle club. The rifle club had vacated this area of the Site due to the condition of the building. The costed survey was undertaken to provide an indication of the investment needed by the Rifle Club to address the condition issues and reoccupy this part of the Site.

The former rifle club is located to the northeastern end of the Fort in the caponier.

A structural survey of this area is located in **Appendix J.** The costs for repair of this area are outlined in **Appendix K**.

This area was only subject to a condition survey to test if this area can be viably used in the short term, and specifically if the repair of the caponier was financially viable to the stakeholders at the rifle club.

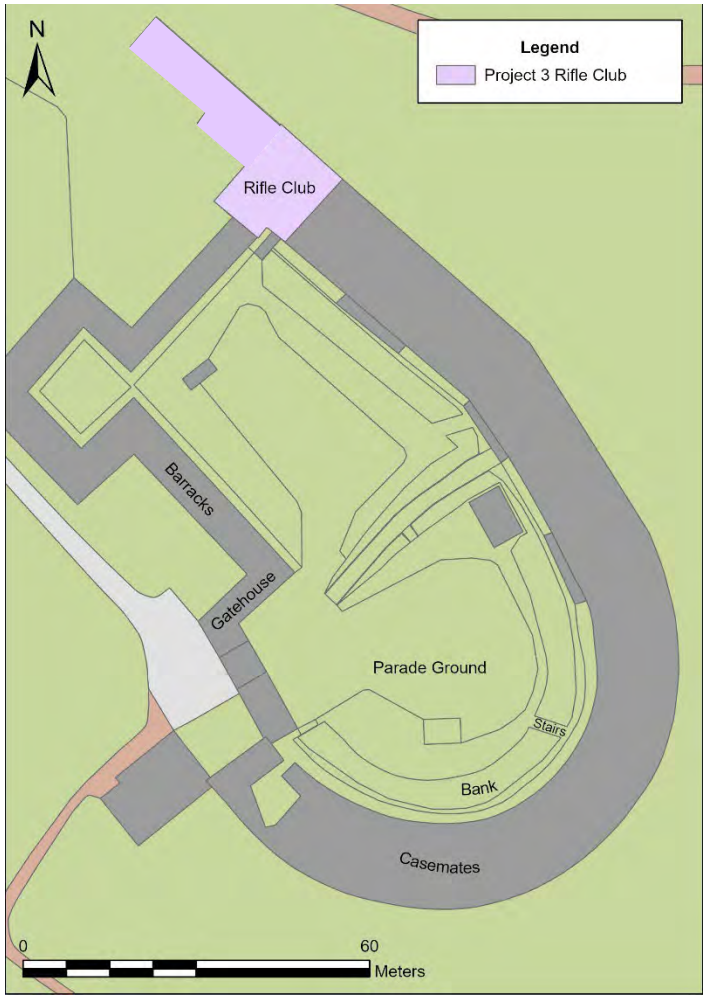


Figure 149 Location of Project Area 3

4.5.2 Summary of minimum works required for delivery of any future architectural intervention

The schedule of ‘necessary works’ required to provide a baseline from which the delivery of architectural intervention can take place are outlined in **Appendix J**. These are considered the minimum which should be undertaken to the structure.

The minimum works recommended include;

- Clear all vegetation at roof level and unblock all rain water channels and gulleys
- Remove and replace any friable concrete between the filler joist roof beams
- Provide new grillage of support beams beneath existing embedded beams
- Provide new water proof covering to top side of roof

The schedule of ‘necessary works’ has been costed. This cost report is available in **Appendix K**.

Figure 150 Narrower north end of roof

Chapter 5: Overview and Conclusions

This study has been led by Place Services, with input from a number of specialists, to provide a holistic understanding of Coalhouse Fort. The study has referenced its immediate environs and its potential to unlock a sustainable future that can safeguard this nationally important heritage asset.

The Site was divided into 3 Project Areas, as outlined in Section 1.2, to focus on the parts of the Site with the largest opportunity for future uses to be established at this point in time. The areas are: The Gatehouse and Parade Ground, Casemates and the Former Rifle Club.

Chapters 1 and 2 provide baseline information about the Site, particularly regarding heritage significance and natural environment considerations, as well as an overview of surveys undertaken.

Consultation was undertaken with key stakeholders and the community, outlined in Section 1.6 and 3.2. Research and consultation identified that there is considerable local interest in the Fort and its survival. In general, there was support for the Fort being developed with a mixed-use offer with some spaces rented out to generate regular income. Sections 2.7.1, 5.3.4, 5.4.4 and 5.5.2 summarise the structural engineer's report undertaken by The Morton Partnership, which outlines a schedule of necessary works required for the designs to be realised.

The study concluded that, in terms of philosophy, an approach of 'preservation' and 'conservation' is most suitable, with some elements of the Fort consolidated and others conserved and altered appropriately to facilitate new uses.

Chapters 5 and 6 explore different approaches to the Site and the types of interventions (outlined in work by Roger Mears Architects) that would need to be considered in the future. The project architects, and consultation with Historic England, confirmed that the gatehouse and casemates could be sensitively conserved and developed as attractive and functional spaces. Detailed design and intervention options are included in Sections 5.3.2 and 5.4.2.

The study has determined that 'curated decay' is not an acceptable option. Based on the information reviewed, there is currently no basis or justification for the loss of the heritage asset, particularly with regard to the requirements of both legislation and planning policy. However, there is a need for a practical approach in the allocation of future funds. It is foreseeable that there will be constant elements of the fort that require repair. Areas which do not contribute to viably resolving a sustainable future, for the Site, should possibly be left for the short-medium term. Otherwise, funding will not be directed to appropriate locations to progress a strategy for the whole Site. This is outlined in Chapter 4.

Some key constraints for the Site are access and utilities, and options for these have been outlined and applied to different uses. Renewable energy has also been highlighted for future consideration.

The study suggests that there could be viable and sustainable new uses for the scheduled monument. However, it has been evidenced that there is little potential to fund the works or financially sustain the use, unless intermediary funds are secured to bridge the gap between the end of this project and the start of remedial works. Securing funding for future works will be paramount to the Site's success. Part of the funding was allocated to submitting an application to the Heritage Fund to help progress this strategic work.

As part of Projects 1 and 2, which focus on design and architectural interventions, Option 2 for the gatehouse has been identified as the preferred approach. Additionally, a toolkit for the casemates has been provided for future interventions and conservation of Forts. For Project 3, it was concluded that the tunnels would not be taken further as part of this study as they are not viable for use in the short term. The budget for this element was diverted to the Rifle Range in north capioner and a costed structural survey to consider if this can be repaired and used. The survey has suggested further use of this area will be challenging without significant financial investment.

Across all areas, there is potential for a programme of events and activities, which could be piloted through further funding. This would provide an opportunity to test the Site's viability for public engagement and generate interest from potential stakeholders and investors.

This assessment has provided a baseline for further consideration of the Site; however, several fundamental matters remain outstanding. The next steps beyond this assessment should focus on:

- Completing the minimum structural works,
- Securing further funding,
- Conducting additional surveys,
- Establishing a CIO or other governance structure,
- Implementing ecological mitigation measures,
- Facilitating the return of volunteers,
- Developing a drainage strategy, and
- Conducting archaeological investigations on the parade ground.

In order to support the management of such activities going forward, and to advise on and take forward future plans being developed for the Fort, an advisory panel has been established. The advisory panel is made up of 12 volunteers who applied for inclusion on the panel through a competitive process. Successful applicants were selected to bring together experts from arts, culture, heritage, environmental, building, project management, community and business backgrounds. Some potential future stakeholders have been consulted as part of this assessment. Discussions need to take place between the Council (as owners), the advisory panel, and interested stakeholders to maintain project momentum. These discussions will also help refine the opportunities and sensitivities of the Site, as well as improve the understanding of available funding mechanisms.

Additionally, the potential for enabling development within the wider Site, including the Barracks, should be explored to ensure a holistic approach to achieving a sustainable and viable solution for the Site as a whole. This assessment has found that there are likely opportunities for the reuse of the Fort. Each option presents different levels of impact on the historic and natural environment, as well as varying challenges regarding access, utilities, and funding. What has been resolved is that Coalhouse Fort is a nationally important heritage asset, and based on current information, its loss is not considered acceptable in terms of policy and legislation.

This study has resolved that areas of the fort can likely be adapted for new, and possibly sustainable, future uses. The realisation of this will ultimately be dependent on the procurement of funds to undertake physical works and the appropriate stakeholders to deliver the uses. It is recommended that Thurrock Council continue collaborating with key stakeholders, the new advisory panel, and Historic England to explore the findings of this assessment.

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