

FEDERAL HERITAGE BUILDINGS REVIEW OFFICE

BUILDING REPORT 90-50

TITLE: Signal Hill Gun Emplacement (Building 578)
and Associated Buildings 546, 547
Canadian Forces Base Esquimalt
British Columbia

SOURCE: Ian Doull, Architectural History Branch

INTRODUCTION

The Signal Hill gun emplacement (building 578), gun crew shelter (building 546) and fire command post (building 547) were constructed between ca. 1903 and 1905, and constituted the principal installations in the Victoria-Esquimalt coastal defence artillery system between 1912 and 1938. The emplacement incorporates concrete-encased, brick-lined magazines, and was considered to represent the most technologically advanced British gun emplacement type of the turn-of-the-century period.

A FHBRO study will be completed later in 1990 in which all eligible buildings at the Signal Hill site will be examined.¹ The CFB Esquimalt base development engineer has requested that these three structures be examined separately, due to the planning of a new facility which may potentially encroach upon the site. The following report has been prepared in response to this urgent request.

HISTORICAL ASSOCIATIONS

Thematic

The Signal Hill gun emplacement and its associated structures illustrate the theme of coastal defence, by both British and Canadian artillery forces. The buildings together comprised the key installation, and the last constructed, of the Victoria-Esquamalt coastal artillery system developed jointly between Canada and Britain (Figure 1). Fully operational in 1912, the system operated in modified form until 1956, when coastal defence artillery was declared to be obsolete. In 1958 the entire Victoria-Esquamalt system, including Signal Hill, was declared to be of national historic significance by the Historic Sites and Monuments Board of Canada.² Fort Rodd Hill, transferred from the Department of National Defence to the National Historic Sites Division (now Canadian Parks Service), was subsequently opened to the public as a national historic site where the coastal defence theme is interpreted.

The need for coastal defence in the Victoria area resulted from the presence of the Royal Navy shore establishment at Esquamalt - deemed vital to the security of Vancouver Island - which was itself vulnerable to attack by hostile warships. The first temporary artillery batteries were installed in the area in 1878, and for the next 15 years intermittent but intensive high-level negotiations were conducted between the Canadian and British governments before agreement was reached in 1893 for a joint Anglo-Canadian coastal defence scheme.³ Beginning in 1894 the British Royal Engineers constructed concrete and masonry fortresses and emplacements armed with modern coastal artillery ordnance at Fort Macaulay, Fort Rodd Hill, Belmont, Duntze Head, and Black Rock, supported by searchlights and submarine minefields (Figure 1).⁴

The Signal Hill battery (Figures 2-6) was the last and most powerful of the installations to be built, and the only one designed to hold 9.2-inch counter-bombardment guns. Controversy over the nature of the armament led to the delay in construction of the emplacement, which began in ca. 1903.⁵ The guns, although delivered, had yet to be installed when the British garrison withdrew in 1906. The associated buildings 546 and 547 were constructed concurrently with the emplacement. The former was designed to provide shelter and storage space for the gun crews (Figures 7,8). It now contains radio monitoring equipment. Building 547 was used as the "fire command post" from which the tactical commander of the entire coastal defence system controlled operations (Figures 9-12). With the aid of telephone and flag communciations with other lookout posts, the commander identified potential targets and assigned a particular battery within the system to open fire.⁶ The building now contains radio transmitting equipment.

In 1912 mounting of the Signal Hill guns was completed,⁷ except for the installation of the rangefinder system which was performed in 1914. In the early weeks of World War I, widely publicized German cruiser activity in the eastern Pacific created panic in coastal British Columbia.⁸ Although never actually challenged, the Signal Hill battery was the sole component in the artillery system capable of warding off an attempt by an enemy cruiser to bombard the Dockyard or the adjacent provincial capital.⁹

Signal Hill served throughout World War I as the principal defencework for the Esquimalt Dockyard and adjacent coastline. The system continued to be manned during peacetime and remained almost unaltered until 1938. War

preparations were begun in that year, which included the construction of some new batteries and the remodelling of existing ones. The 9.2-inch Signal Hill guns were removed to Albert Head, four miles southwest of Signal Hill, where they could better command the approaches to the harbour.¹⁰ During the war the Signal Hill batteryworks housed a fortress engineers' base for maintenance work.¹¹ The three structures provided office and storage space. Several wartime temporary buildings were constructed near the summit of Signal Hill, all of which have been demolished.

In summary, the Signal Hill battery was the principal defencework on the west coast from 1912 until the eve of World War II. It played a vital role in protecting the only British (and Canadian) naval base in the eastern Pacific. It also provided reassurance to area residents during World War I.¹²

Person/Event

No persons or events of historical significance are associated with these buildings.

Local Development

These three structures were the only buildings to be constructed on the upper levels of Signal Hill prior to World War II. The submarine mining establishment and army ordnance corps depot were built several years earlier on the northern fringes of the hill, near the Constance Cove shoreline. They operated from ca. 1899 to 1906, when the British forces withdrew; the buildings subsequently housed other uses under Canadian control. The property was purchased by Canada on behalf of the British War Office in 1894, in accordance with the 1893 joint agreement.¹³ Construction of the battery

and buildings was begun in 1903, but work on the battery - complete except for the mounting of the guns - was stopped in 1905. Installation was finally performed in 1912.

Due to the power of the guns, precautions were necessary to prevent concussion damage to the immediate community. In 1904 St. Paul's Church, the naval and garrison church, was moved from its position at the southern base of Signal Hill several hundred yards to the east to prevent damage from shellfire passing directly overhead.¹⁴

ARCHITECTURE

Building 578 - Signal Hill Gun Emplacement

Aesthetic Design

The Signal Hill gun emplacement is a huge, reinforced concrete engineering structure approximately 250 feet in length (Figures 13, 14). It is considerably obscured by virtue of it having been built into the brow of the hilltop and partially buried with backfill (Figures 3, 4). It is therefore difficult to describe or to photograph the exterior. In basic terms the emplacement consists of a central, sunken magazine and shell storage area (Figures 6, 13, 14), flanked by two huge raised gun support bases, all encased in thick concrete. The two wooden structures visible in photographs (Figures 2-5) were added subsequent to the removal of the guns in 1938, possibly to protect the mounting bases from the elements.¹⁵ They may also have functioned as observation posts. The wooden covers represent the only alterations to the structure, and constitute small additions to the original fabric. The impression created is one of a

massively fortified structure, starkly simple in design, planned to support powerful weaponry and able to withstand attack.¹⁶ Indeed, the guns mounted at Signal Hill weighed 28 tons each, and were capable of firing a 380-pound projectile to 14,000 yards.¹⁷

Functional Design

In a functional sense, the emplacement design represents the zenith of British coastal artillery development prior to World War I, and the culmination of intensive technological advances begun with the revolution in rifled artillery and in warship design which began in the mid 1800s. The large-scale use of steel and reinforced concrete for emplacements and supports reflects new construction technology - particularly in the use of concrete - which was developed by about 1900. By contrast, the Fort Rodd Hill emplacements, built less than 10 years earlier, represented an earlier generation of technology, both in gun and in emplacement design. The Signal Hill emplacement was designed to support heavier guns capable of firing up to three rounds per minute.¹⁸ This comparatively rapid firing rate was achieved by allowing speedy delivery of ammunition from the magazines to the loading areas immediately surrounding the gun-mounting pedestals. The magazines - brick-lined, underground, and heavily encased in concrete - were situated beneath and between the gun mounts. Elevators carried shells and charges to the loading floors, where they were fed into the hydraulically assisted loading equipment. The loading area was protected by massive concrete shields facing the sea, and by heavy steel plates tightly fitted around the mountings.¹⁹

The magazine area consists of a double magazine, divided by a central access corridor and flanked by shell stores at each

end (Figure 15). A long corridor, accessible from the outside and illuminated by windows, extends longitudinally across the magazines between the shell stores. The magazine interiors were illuminated by lanterns placed in wall apertures filled with thick glass to prevent accidental ignition.²⁰ A lamp room was situated under the exterior stairs where the lanterns were maintained.

The gun emplacements were standardized designs which were widely used internationally by the British for primary armament, with suitable modifications, for almost 50 years.²¹ Only three were ever constructed in Canada: at Signal Hill, and at McNab's Island and Sandwich Point at Halifax - the former a single-gun emplacement. The Halifax structures have been largely demolished. Signal Hill, although abandoned in appearance, is remarkably intact. Most of the components, including door and window fittings, ammunition elevators, and steel staircases and platforms, are still in place. Thus the emplacement is the only complete remaining example in Canada of a heavy coastal artillery installation from the period in which "concrete fortifications and modern artillery design came of age."²²

Craftsmanship and Materials

The Signal Hill gun emplacement was built to precise materials specifications. The concrete for the parapets was mixed with stone-free sand. The aprons were to be coloured to blend with the terrain (Figure 16), and special techniques were specified to allow the apron concrete to dry slowly, over a period of several months.²³ Precise instructions were given for the composition of concrete for all other component areas.²⁴ The magazines were lined with brick.

Good workmanship was evidently employed in the execution of the specifications. Although exposed to the elements for almost a century and abandoned since ca. 1945, there is only minor evidence of superficial deterioration of the concrete (Figure 6). The interiors of the magazines also remain in good condition. The general abandoned and dilapidated appearance is largely due to the progressive encroachment of ground cover which has occurred over the last several decades, and the accumulation of general debris.

Designer

The gun emplacement was a standardized design developed by the British Royal Engineers. Instructions for installation were supplied from England by the office of inspector-general of fortifications, RE.²⁵

Building 546 - Gun Crew Shelter and Stores, ca. 1903-1905

ARCHITECTURE

Aesthetic Design

Building 546 is a simple, one-storey end-gabled structure, with slightly irregularly spaced fenestration on the main (north) elevation (Figures 7, 8). The flat arched openings on the main elevation feature brick voussoirs. The existing gabled roof may have been built up over an original sloping roof, as illustrated in construction drawings, of which the original steel framing remains.

Functional Design

The original floorplan consisted of two rooms of slightly unequal size, each with an exterior door and with no inter-

connection (Figure 17). This has been altered into three interconnected rooms, in addition to a small washroom and office (Figure 18). One of the former entrance doors has been converted to a window (Figure 8).

Craftsmanship and Materials

Building 546 exhibits simple but competent craftsmanship, and appears to be in good condition. It features masonry construction on a concrete base. An unusual feature is the steel "I"-beam roof framing,²⁶ perhaps designed to withstand flying debris during an attack.

Designer

The building was designed by the Royal Engineers.

Building 547 - Former Fire Command Post, ca. 1903-1905

ARCHITECTURE

Aesthetic Design

Building 547 is a small "L"-shaped, bunker-like building with a flat roof (Figures 9-12). It was designed solely for utilitarian purposes and possesses no distinguishing features. The main (west) elevation features a door and flanking windows; other windows are situated at the rear. The building displays a slightly projecting concrete cornice on the main elevation.

Functional Design

The interior of building 547 is divided into two rooms (Figure 19).

Craftsmanship and Materials

Little workmanship was involved in the construction of this concrete building, but the structure appears to remain in good condition.

Design

Building 547 was designed by the Royal Engineers.

ENVIRONMENT

Building 578

Site

Building 578 is magnificently sited on the southern brow of Signal Hill, with an unrestricted view southward across the Juan de Fuca Straits and the entrance to Esquimalt Harbour (Figures 2, 3). It is probable that, with the exception of the wooden shelters, no changes have been made to the immediate site over time, although undergrowth has covered the backfill on all sides. The structure is isolated a short distance south of the gravel access road at the point where it widens to form a gravel-covered parking area (Figure 20). The only site feature of note is building 546, situated at the northeastern base of the emplacement. Wartime temporaries which were constructed some distance northward have all been removed.

Setting

The emplacement dominates the secluded, partially wooded summit area of Signal Hill, and rises abruptly from the ground in the vicinity of the parking area. It easily dwarfs the adjacent building 546.

Landmark

Designed to be inconspicuous from sea level, the emplacement is not easily visible from the lower Signal Hill and Dockyard areas. It is known nationally to military historians and others who have interest in the development of coastal defence artillery,²⁷ and was the principal installation of a system which has been declared of national historic significance. It was further identified as possessing primary historical significance in an historical survey of CFB Esquimalt buildings prepared in 1982.²⁸

Building 546

ENVIRONMENT

Site

Building 546 stands on a small cleared plateau facing the parking area to the north (Figure 20), with its rear (southern) elevation standing within inches of the gun emplacement (Figure 5). The site boundaries are somewhat indistinct, but few changes have probably occurred.

Setting

Building 546 is the only brick structure of the three buildings at the summit area, and contrasts with the emplacement by virtue of its materials. It is the first building encountered as one ascends to the summit along the roadway (Figure 20).

Landmark

Building 546 is visible only from the parking area at the top of Signal Hill. It was identified in the 1982 survey as possessing secondary heritage value.²⁹

Building 547

ENVIRONMENT

Site

This structure is set into the outcropping at the absolute summit of Signal Hill (Figure 11). Loose rock has been backfilled around the sides (Figure 12), and a small area has been cleared facing the front door (Figure 10). The site has undergone no obvious changes. It is isolated and self-contained, and is reached by a steep flight of stairs from the parking lot (Figure 9).

Setting

The structure appears to have been designed to blend with the terrain as much as possible. Its concrete construction identifies it as a structure associated with the emplacement.

Landmark

Although the location of 547 affords a superb view of the surrounding coastline, the building is visible only from certain areas near the summit of Signal Hill. It enjoys some symbolic recognition as the former fire command post of the coastal artillery system, and was identified in the 1982 survey as possessing secondary historic value.³⁰

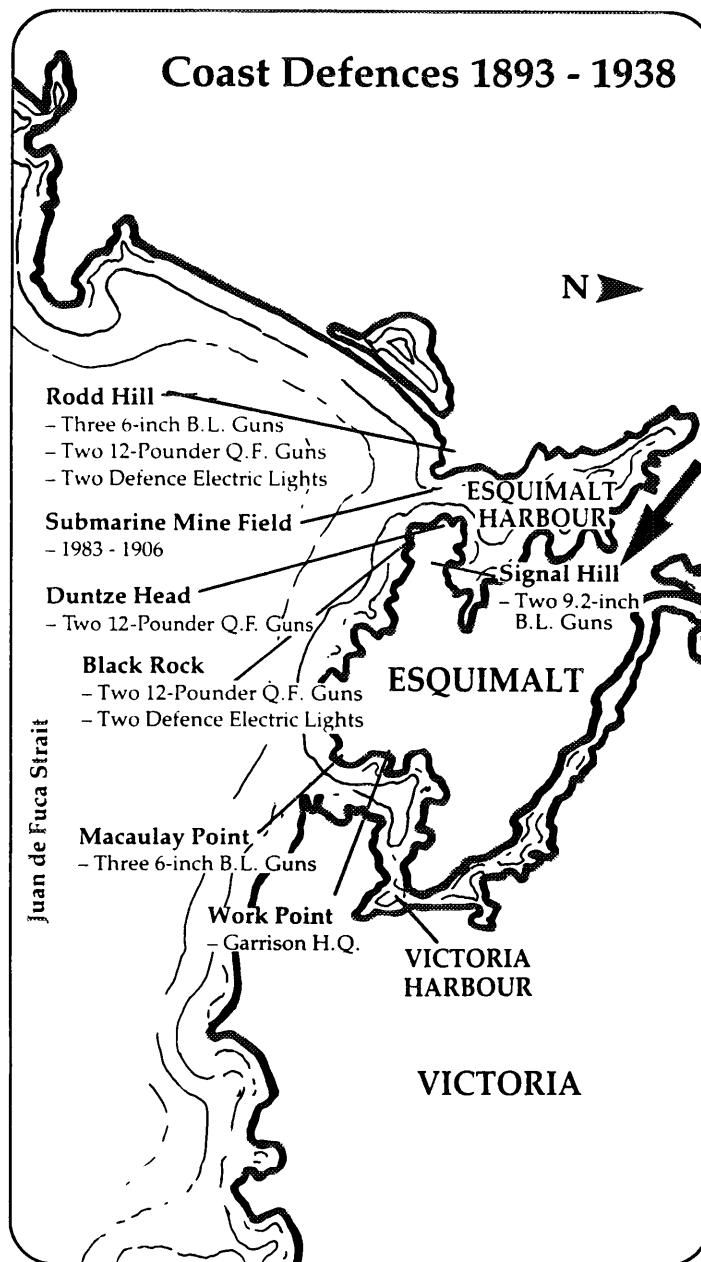
Endnotes

- 1 See FHBRO Report 89-203, forthcoming autumn 1990.
- 2 Historic Sites and Monuments Board of Canada. "Minutes," November 1958, p. 52.
- 3 For detailed discussion see: Ronald Lovatt, A History of the Defence of Victoria and Esquimalt, 1846-1893, Manuscript Report Series No. 426 (Ottawa: Parks Canada, 1980), Chapters 3-5; Peter Guy Silverman, "A History of the Militia and Defence of British Columbia, 1871-1914" (M.A. thesis, University of British Columbia, 1956), pp. 76-120.

- 4 F.D.H. Nelson and N.E. Oliver, CFB Esquimalt Military Heritage (Victoria: Insight Consultants, 1982), pp. 1-6.
- 5 Roger Sarty, "Silent Sentry: A Military and Political History of Canadian Coastal Defence" (Ph.D. diss., University of Toronto, 1982), p. 72. The assistance of Dr. Sarty in supplying information for use in this report is gratefully acknowledged.
- 6 "Note on Signal Hill Battery, Esquimalt," prepared by R. Sarty, Directorate of History, Department of National Defence, 7 May 1990; Roger Sarty, in conversation with the author, 8 May 1990.
- 7 Ronald Lovatt, A History of the Defence of Victoria and Esquimalt 1906-1918, Microfiche Report Series No. 194 (Ottawa: Parks Canada, 1985), p. 28.
- 8 Gilbert N. Tucker, The Naval Service of Canada, Its Official History, Volume 1: Origins and Early Years (Ottawa: King's Printer, 1952), pp. 267-74, 280-81.
- 9 "Note on Signal Hill Battery, Esquimalt."
- 10 CFB Esquimalt Military Heritage, pp. 5-6; "Silent Sentry: A Military and Political History of Canadian Coastal Defence," p. 214.
- 11 "Note on Signal Hill Battery, Esquimalt."
- 12 "Note on Signal Hill Battery, Esquimalt."
- 13 Ronald Lovatt, A History of the Defence of Victoria and Esquimalt: Royal Marine Artillery Period, 1893-1899, Microfiche Report Series No. 88 (Ottawa: Parks Canada, 1982), p. 44.
- 14 Ronald Lovatt, A History of the Defence of Victoria and Esquimalt: Royal Garrison Artillery Period, 1899-1906, Microfiche Report Series No. 89 (Ottawa: Parks Canada, 1983), p. 22.
- 15 S.M. Ross, base development engineer, CFB Esquimalt, in conversation with the author, 4 May 1989.
- 16 Roger Sarty, Coast Artillery 1815-1914 (Bloomfield, Ontario: Museum Restoration Service, 1988), p. 35.
- 17 Coast Artillery, 1815-1914, p. 35.

- 18 "Note on Signal Hill Battery, Esquimalt;" Roger Sarty, in conversation with the author, 8 May 1990.
- 19 "Note on Signal Hill Battery, Esquimalt."
- 20 S.M. Ross, in conversation with the author, 4 May 1990.
- 21 Coast Artillery, 1815-1914, p. 35.
- 22 "Note on Signal Hill Battery, Esquimalt."
- 23 CFB Esquimalt Military Heritage, p. 92.
- 24 Notations on original plans, copies courtesy CFB Esquimalt.
- 25 Original plans, copies courtesy CFB Esquimalt.
- 26 Building Survey Report, CFB Esquimalt, Vol. 1: Dockyard, Signal Hill (Vancouver: Stevenson & Kellogg Ltd., 1974), p. 682.
- 27 Roger Sarty (Ottawa), 8 May 1990; Donald Grant (Ottawa), 18 May 1990; Stan Richards (Vancouver), 28 May 1990, in conversation with the author.
- 28 CFB Esquimalt Military Heritage, pp. 92-95.
- 29 CFB Esquimalt Military Heritage, pp. 92-95.
- 30 CFB Esquimalt Military Heritage, pp. 92-95.

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT

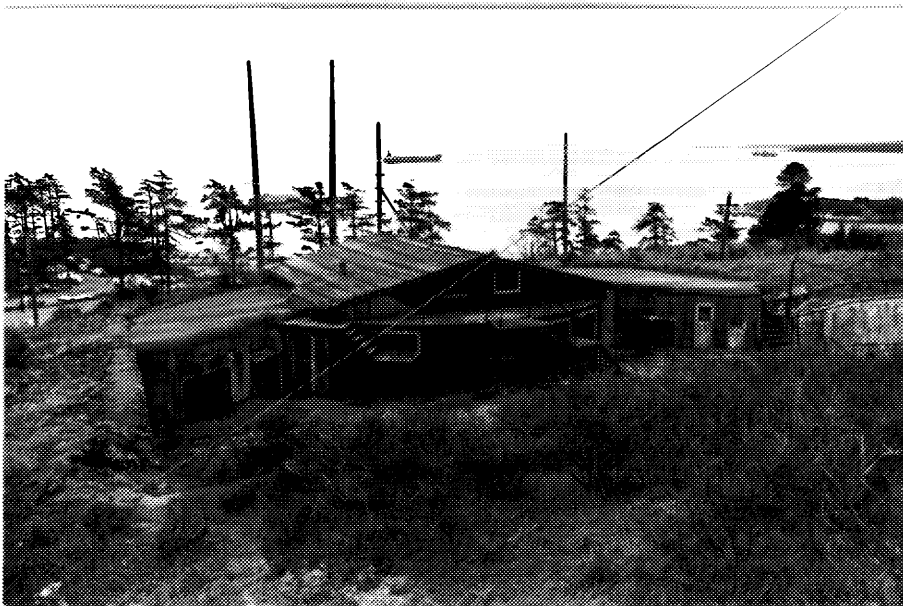


1 Victoria-Esquimalt coastal defence system, 1893-1938. (Courtesy Fort Rodd Hill NHS, CPS.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT

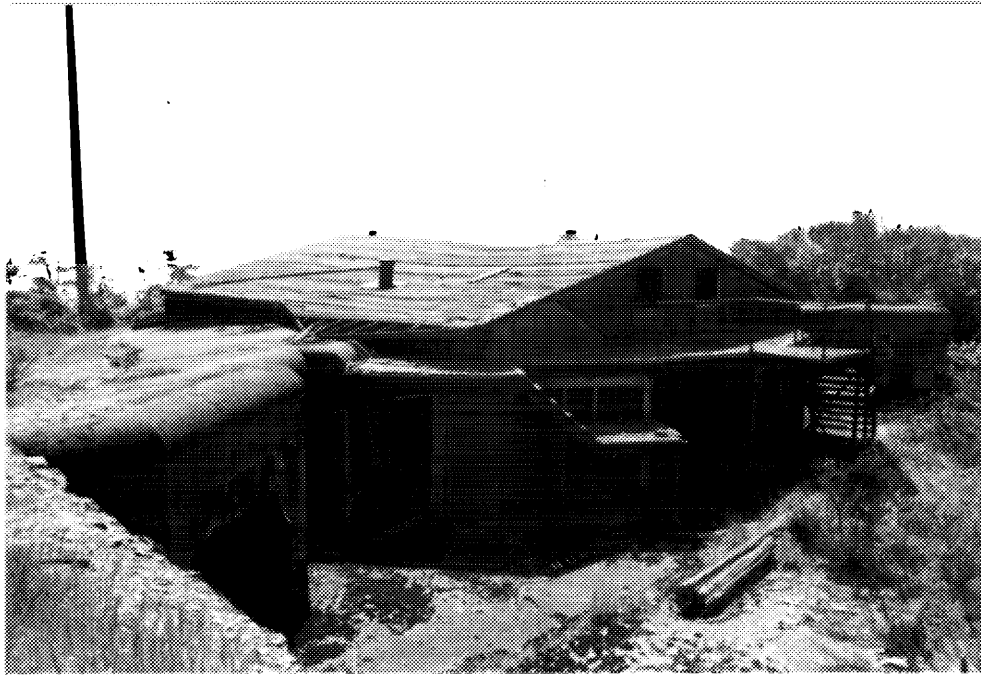


- 2 Signal Hill gun emplacement (building no. 578), showing central magazine, flanking gun mounting positions with 1938 wooden shelters, and original stairs and railing fittings. (CIHB, Parks, 1974.)



- 3 Signal Hill gun emplacement, eastern gun position and Esquimalt Harbour entrance. (CIHB, Parks 1974.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT



4 Signal Hill emplacement, eastern gun position, wooden shelter constructed 1938. (Ian Doull, AHB, Parks, 1989.)



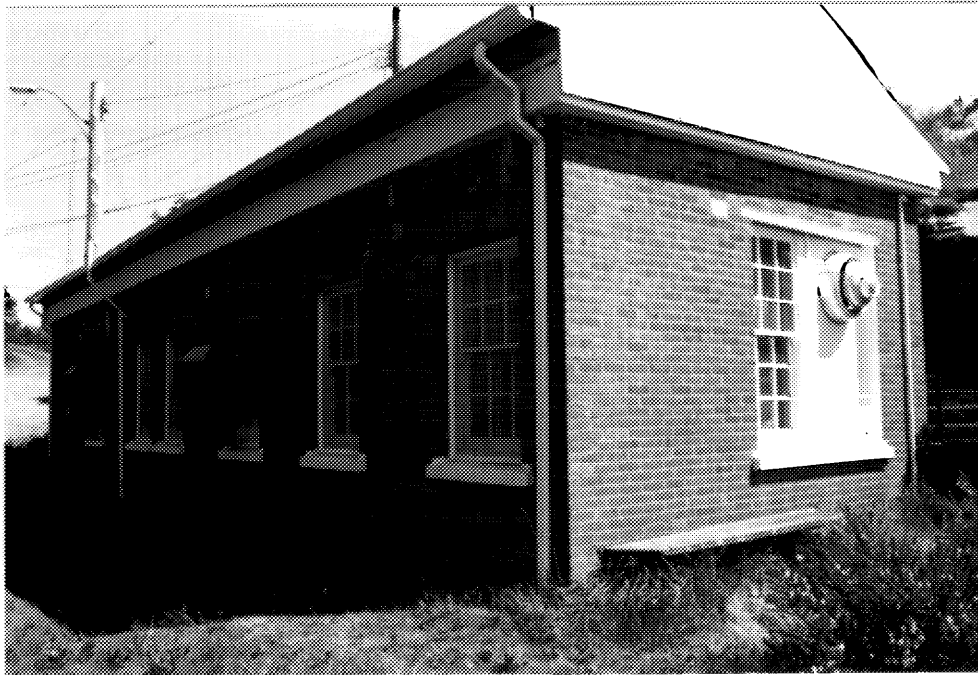
5 Signal Hill emplacement, western gun position and building 546. (Ian Doull, AHB, Parks, 1989.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT



6 Signal Hill emplacement,
view across magazine
area toward western gun
position. (CIHB, Parks,
1974.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT



7 Signal Hill, former shelter and stores building no. 546, main (north) and side (west) elevations. (Ian Doull, AHB, Parks, 1989.)



8 Signal Hill building no. 546, main and side (east) elevations. (Ian Doull, AHB, Parks, 1989.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT

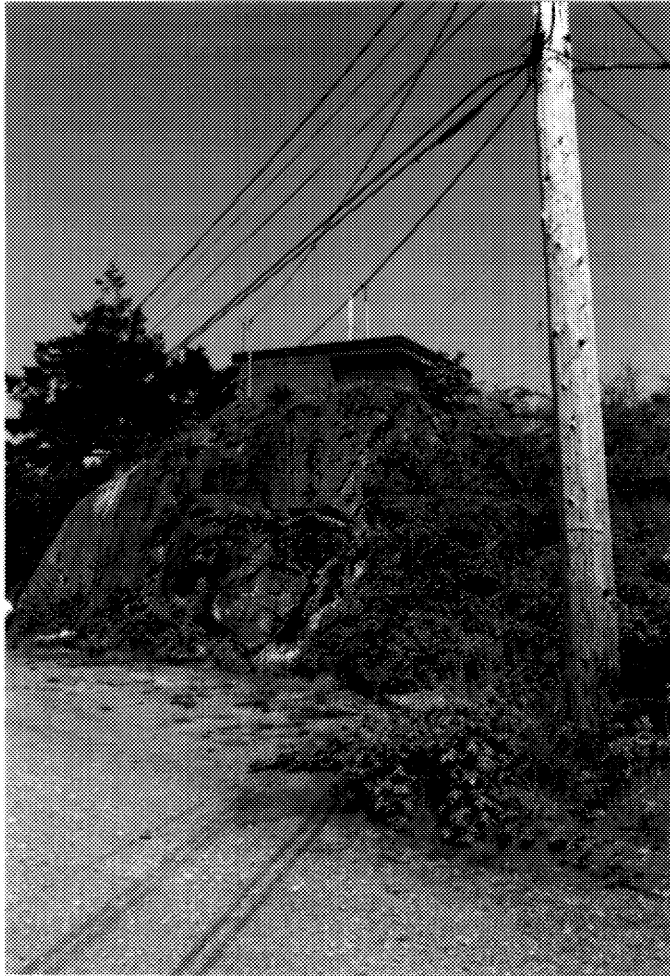


9 Signal Hill, former fire command post, building no. 547, main (north) elevation. (Ian Doull, AHB, Parks, 1989.)



10 Building 547, main elevation. (Ian Doull, AHB, Parks, 1989.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT



11 Signal Hill, building
547, located at summit.
(Ian Doull, AHB, Parks,
1989.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT



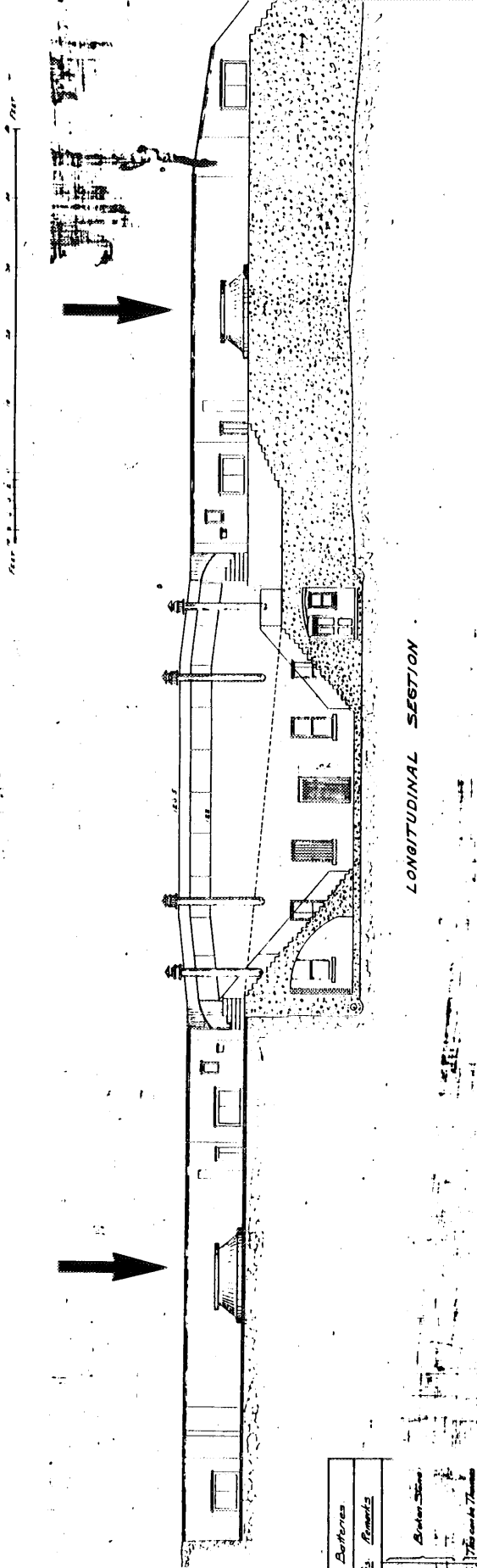
12 Signal Hill, building
no. 547, site detail.
(Ian Doull, AHB, Parks,
1989.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT

THE 9.2 B.L. GUNS (MARK X) BATTERY.

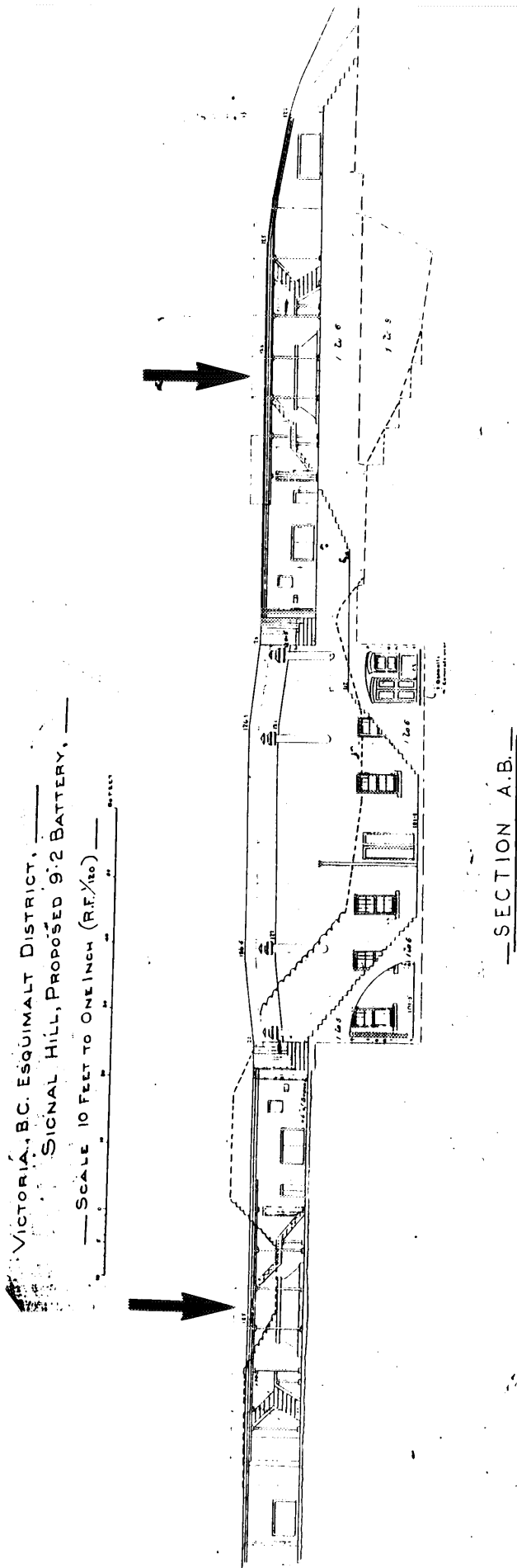
SIGNAL HILL. ESQUIMALT DISTRICT. VICTORIA. B.C.

SCALE: 1/8" = 1' (VERT. 1/4" = 10')



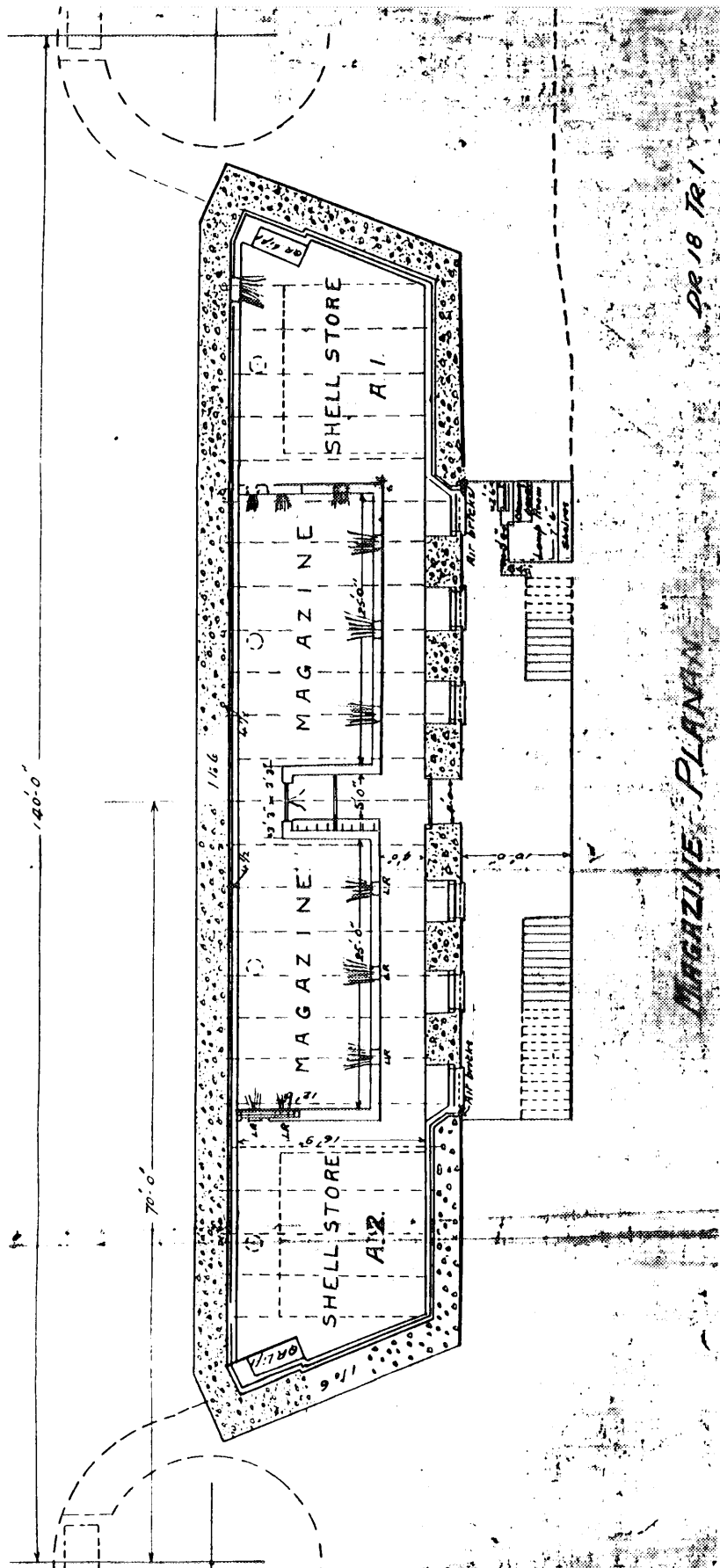
13 Signal Hill emplacement, sectioned elevation drawing by Royal Engineers. Arrows indicate gun mounting bases, now covered by wooden shelters. (Courtesy CFB Esquimalt.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT



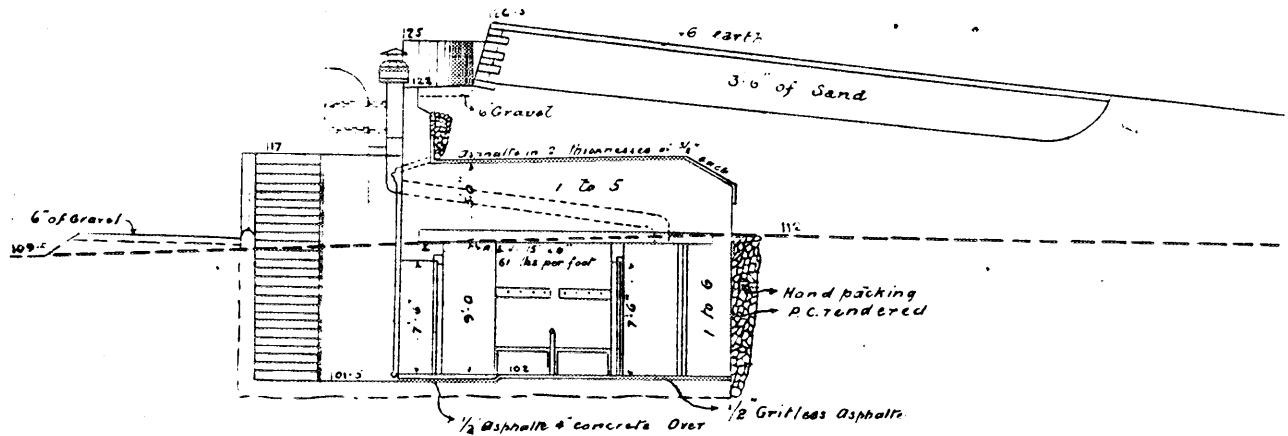
14 Signal Hill emplacement, interior longitudinal drawing by Royal Engineers. Arrows indicate gun mounting bases, now covered by wooden shelters. (Courtesy CFB Esquimalt.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT



15 Signal Hill emplacement,
magazine plan, drawing
by Royal Engineers.
(Courtesy CFB
Esquimalt.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT



SECTION E.F.

Drainage and foundations to be considered locally. If sand for Parapet cannot be obtained locally report is to be made to the War Office sand to be free from stones.

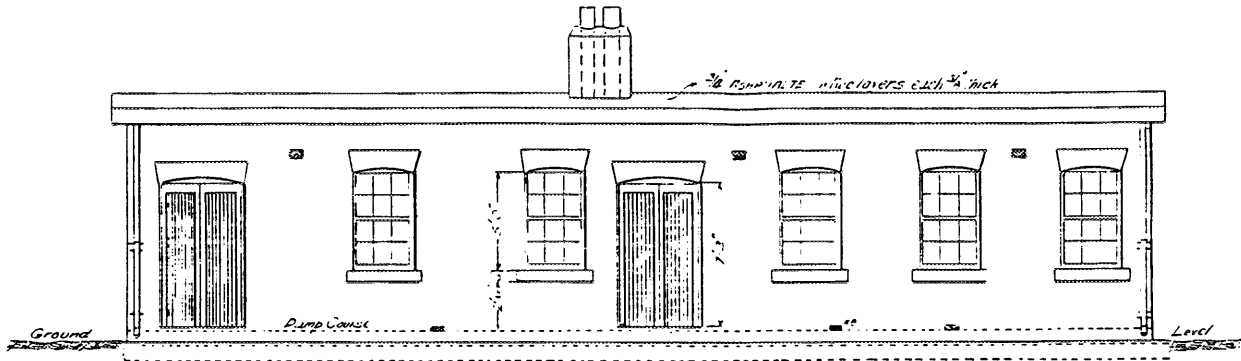
Aprons of Emplacements are to be coloured to assimilate with the natural surroundings.

In order to prevent the desiccation of Concrete by the direct or indirect action of the sun concrete surfaces should on completion be kept covered with a layer of earth, or sand kept in a damp state. This covering should not be removed for a period of from three to six months, according to circumstances.

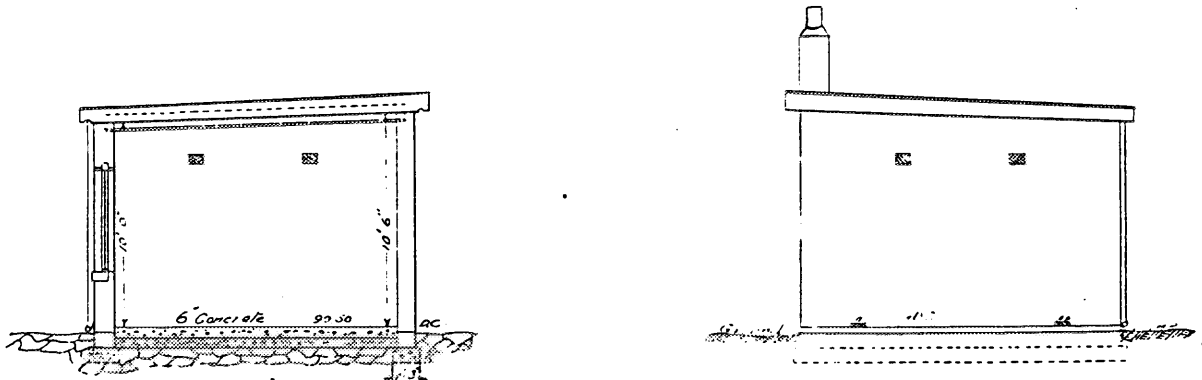
Air space should have "Warrington" cavity bond irons built in at 3 feet intervals horizontally and every 4th course vertically.

16 Signal Hill emplacement, section drawing and construction specifications, prepared by Royal Engineers. (Courtesy CFB Esquimalt.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT



NORTH ELEVATION

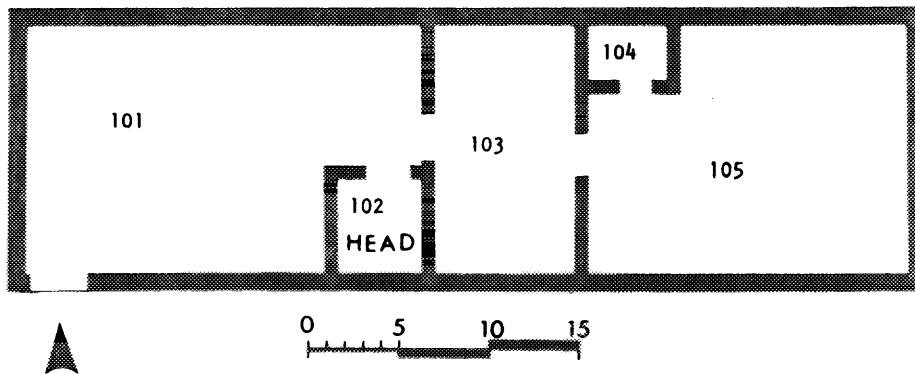


Bars or hooks should be provided for
slinging hammocks, also any internal
fittings considered necessary

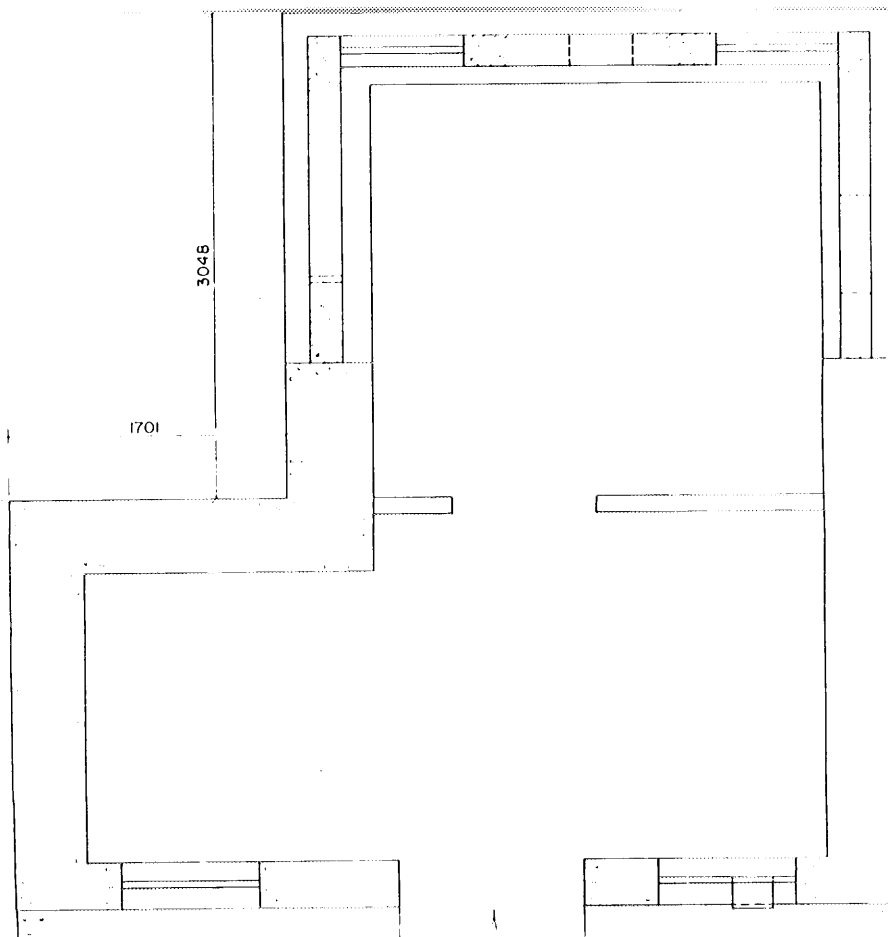


17 Signal Hill, building 546, elevation and plan, drawn by Royal Engineers. (Courtesy CFB Esquimalt.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT

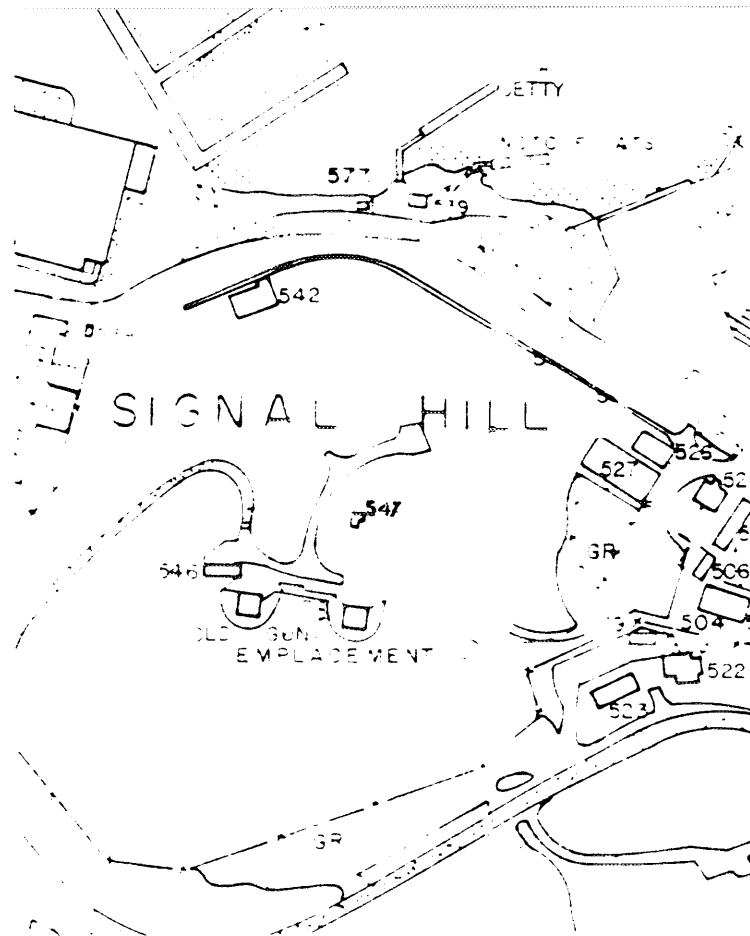


18 Signal Hill, building no. 546, current plan.
(Stevenson Kellogg Report, Vol. 1, p. 683.)



19 Signal Hill building no. 547, current plan.
(Courtesy CFB Esquimalt.)

ARTILLERY STRUCTURES, SIGNAL HILL, CFB ESQUIMALT



20 CFB Esquimalt, Signal Hill, detail of site plan.
(Courtesy CFB Esquimalt.)