

HISTORIC BUILDING RECORD

SUBMARINE MINING ESTABLISHMENT PIER LANDGUARD FORT FELIXSTOWE (HER Ref. FEX 064)



General view of the pier remains, camera facing north

M. Sommers
©January 2009

Suffolk County Council Archaeological Service
Field Projects Team

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HER INFORMATION

Planning Application No.:	n/a
Grid Reference:	TM 2824 3192
Funded by:	Hutchison Ports (UK) Limited
OASIS ref.:	Suffolkc1-53350

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Summary: A photographic survey of the remains of the Submarine Mining Establishment Pier at Landguard Fort, Felixstowe, was undertaken in December 2008 prior to its likely burial during a proposed quayside realignment. A measured survey using a GPS system with sub-centimetre accuracy was also carried out. The results of both surveys are presented here. The Submarine Mining Establishment at Landguard Fort was founded during the 1870s to provide an additional defence for the Harwich Haven and it is believed that the pier dates from this period. The pier has been out of use since the beginning of the 20th century and at the time of the survey comprised a series of weathered upright timbers set in a concrete base and partially buried with shingle. Landguard Fort is recorded in the County HER under the reference FEX 064. The fort and its setting, including the pier, are a Scheduled Ancient Monument (SAM), no. 21407, and these works were undertaken as part of the SM consent for the proposed quayside works. The survey was undertaken by the Suffolk County Council Archaeological Service Field Team who were commissioned and funded by Hutchison Ports (UK) Limited.

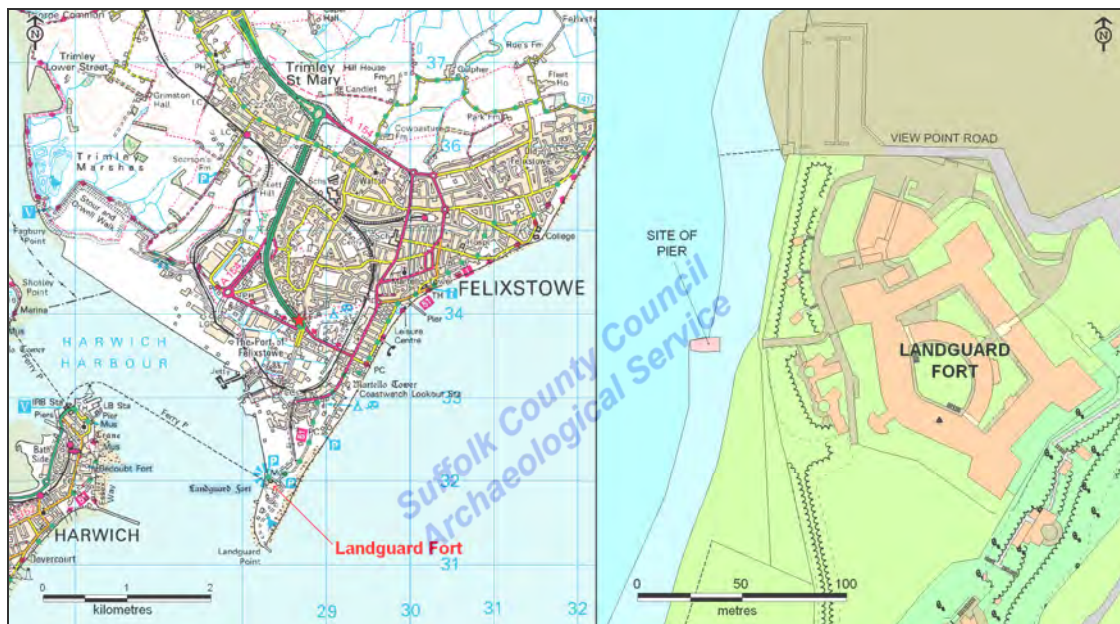


Figure 1: Location Plan

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1. Introduction

It has been proposed to realign the quayside adjacent Landguard Fort, Felixstowe, in order to improve facilities for visitors to the car park at the end of View Point Road and to create a berth for the Harwich-Felixstowe-Shotley ferry. These works will affect the inter-tidal area immediately to the west of the main fort area and will entail the construction of a length of quay wall approximately 35m to the west of existing concrete sea defences and the infilling of the area between the old and new structures. The site of a pier associated with the Submarine Mining Establishment at the fort lies within this area and its remains will be buried by the infilling. See Appendix 1 for a copy of the Definition Drawing (ref. F1000-288-A).

Landguard Fort and much of the surrounding area, including the pier remains, is a protected Scheduled Ancient Monument (no. 21407). Scheduled Monument consent has been granted to Hutchinson Ports (UK) Limited to carry out the proposed works of which Section 3b calls for a photographic survey of the pier remains be undertaken in conjunction with a 1:50 scale measured survey. To undertake both these surveys

the Field Projects Team of the Suffolk County Council Archaeological Service were commissioned and funded by Hutchinson Ports (UK) Limited.

The archive of the work is lodged with the Suffolk County Council Archaeological Service at its Bury St. Edmunds office under the existing Historic Environment Record reference for Landguard Fort site, FEX 064. A summary of this project has also been entered onto OASIS, the online archaeological database, under the reference suffolkc1-53350. The National Grid Reference for the centre of the fort is TM 2836 3191, the NGR for the pier remains is TM 2824 3192; see figure 1 above for a location plan.

2. Description

The remains of pier are located to the west of Landguard Fort on the foreshore within the intertidal zone, an area of loose shifting shingle. The remains comprise a series of weathered timber uprights of which at least some are set into a substantial concrete base. It lies at the western end of a brick lined cutting through which a tramway from the Submarine Mining Establishment located in the Ravelin Block on the north side of the fort (now housing Felixstowe Museum – see figure 2). The tramway originally continued onto the pier's wooden deck and was used to transport mines from the depot out to lighters or barges waiting at the end of the pier. The mines were then

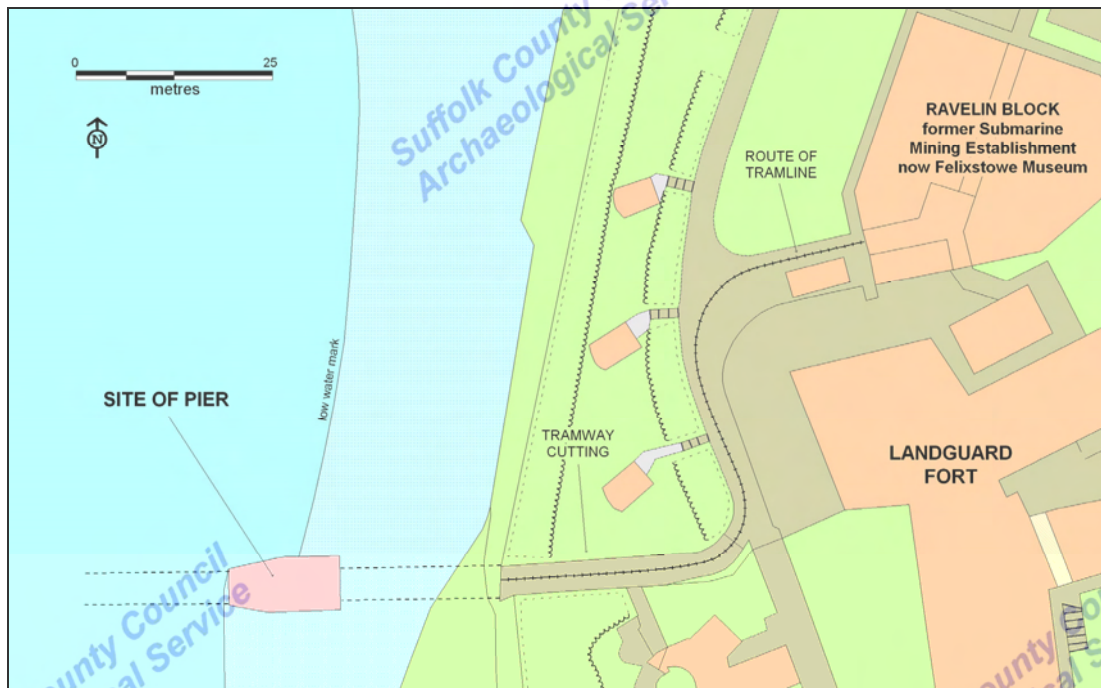


Figure 2: Modern OS mapping of Pier area

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taken out and laid across the entrance to the Harwich Haven to provide a further layer of defence. The mines were detonated by remote control when an enemy ship was observed to be in range. The Submarine Mining Establishment was in place at the fort and operational by the end of the 1870s (Kent 1988) and it is assumed this pier was part of the original installation.

The pier is marked on the 1st, 2nd and 3rd edition Ordnance Survey 1:2500 scale sheets (see figure 3 for an extract of the 2nd edition OS sheet). No detail is shown other than what is probably two flights of steps running down from east to west, one on either side of the pier about half-way down its length. Neither the fort nor any of the associated gun batteries are marked. These have been deliberately left off the maps for security reasons. This is also presumably why there are no details shown of features on the pier itself.

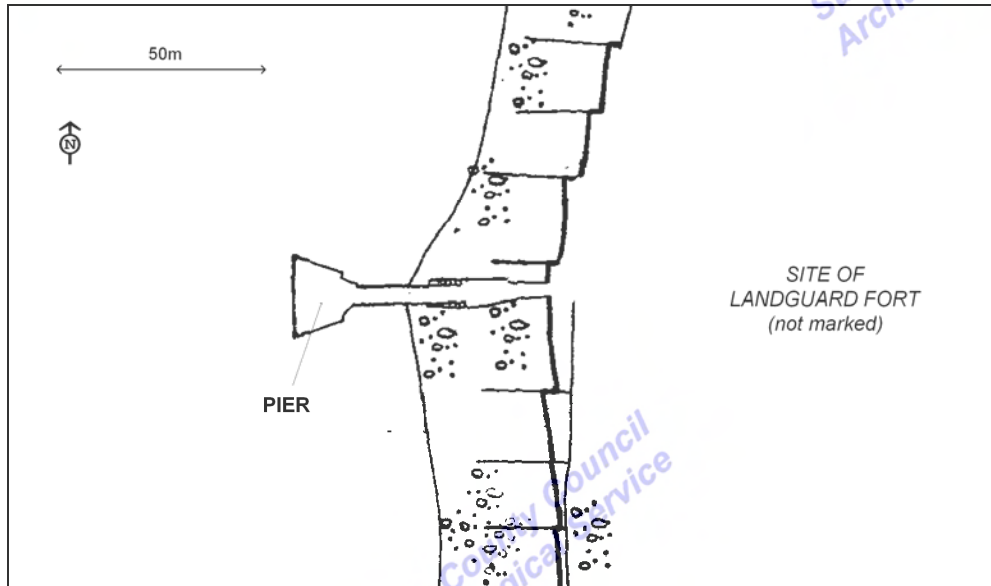


Figure 3: 2nd Edition Ordnance Survey 1:2500 scale sheet (rescaled extract)

3. Methodology

Measured Survey

The measured survey of the pier's remains was carried out using a 'Leica SmartRover RTK GPS 1200' connected to 'Leica SmartNet' data recorder giving sub 5cm accuracy (although 2-3cm in practice). The corner of each post was recorded as well as the outline of the concrete base and any features noted within the concrete base. The GPS system also recorded the elevation of each point. A transect running east to west along the pier remains was undertaken specifically to record elevations to enable the construction of a profile.

A copy of the original data has since been converted into MapInfo tables for manipulation and presentation in MapInfo Professional (version 8.5) software. In order to aid description and for photo identification purposes each timber upright (or site of) was allocated an ID number. These ranged between 1 and 18 and were marked initially on a sketch plan before later adding them to the GPS survey plan. The original data and the MapInfo tables will be held in the SCCAS archive (totalling 0.4MB of data).

Photographic Survey

The photographic survey was primarily carried out using a digital camera with a resolution of 10 megapixels. Numerous general views of the pier remains were taken as well as photographs of each face of each remaining timber upright. Extra

photographs to record any pertinent details were also taken. A number of monochrome photographs using a standard 35mm SLR camera were also taken. Each upright was numbered and a board indicating the timber's number was included in each photograph along with an appropriate scale (either a 2m ranging rod divided into 0.5m sections or a 30cm ruler).

4. Results

The site was visited on the 8th and 9th December 2008 to undertake both surveys. A large portion of the pier remains are visible most of the time although at high tide this is limited to the upper portions of the timber uprights. All of the pier's remains are visible and clear of water for a period of approximately 1 hour at low-tide. Ample opportunity to complete the survey was available over the two days of the survey (i.e. two periods of daylight low-tide).

The majority of the timber uprights were heavily weathered and had lost their most of their upper surfaces. Three timbers, numbers 2, 5 and 11, still retained a finished surface on the top of the post at an elevation of 2.64m OD. Evidence for jointing indicated that further timbers, which were presumably horizontal beams to support the deck, were fixed at this point and a possible height of the deck has been extrapolated and presented in the longitudinal section (figure 5)

Measured Survey

The results of the measured GPS survey of the pier remains have been processed and are presented below. Figure 4 consists of the surface plan whilst figure 5 comprises a West to East profile.

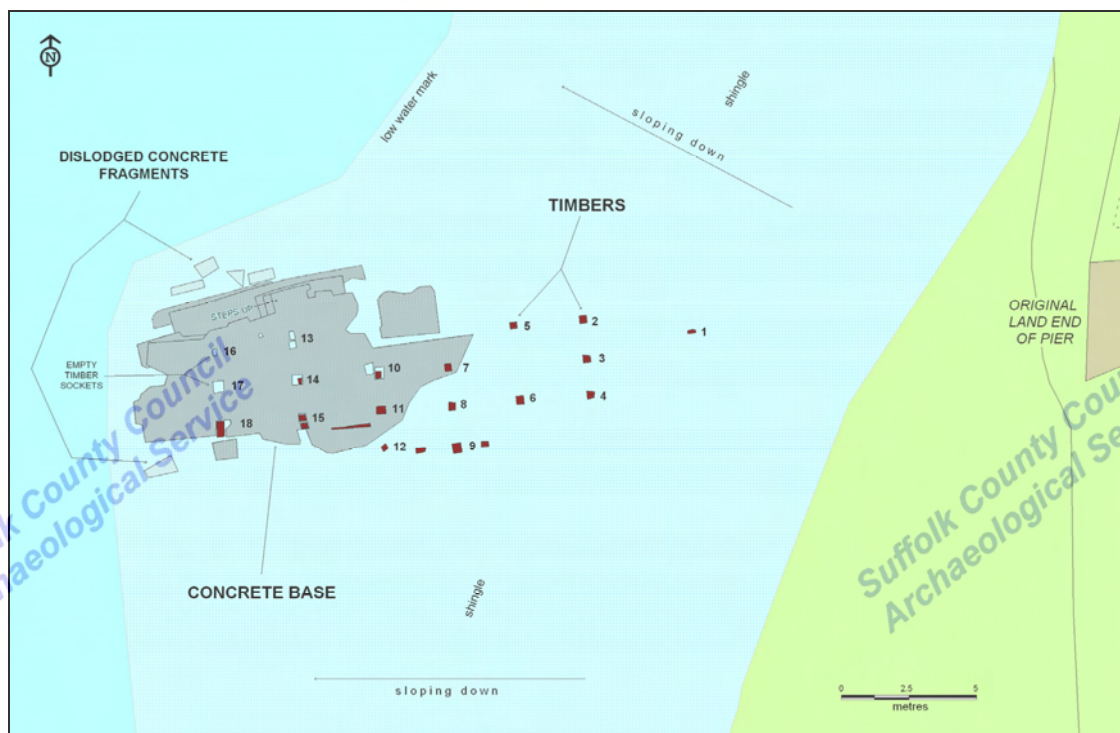


Figure 4: Results of the GPS Survey of the Pier Remains
(A larger scale version is available as Appendix 2)

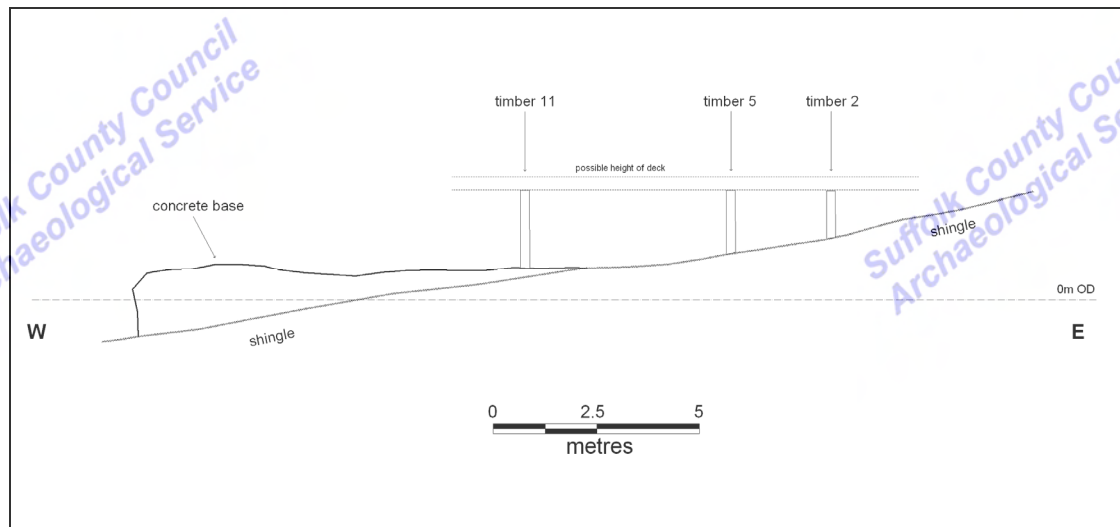


Figure 5: West – East Profile along the Pier Remains
(A larger scale version is available as Appendix 3)

Photographic Survey

A total of 88 digital photographs (totalling 190MB of data) were taken and will be held, unedited, in the SCCAS photo archive under the references GAK 01 to GAK 88. The photographic archive entries and copies of the photographs are reproduced below.

<u>Film Code</u>	<u>Frame No.</u>	<u>Description</u>
GAK	1	Landguard Fort, Submarine Mining Establishment Pier: view looking north
GAK	2	Landguard Fort, Submarine Mining Establishment Pier: view looking west
GAK	3	Landguard Fort, Submarine Mining Establishment Pier: north side of concrete base, looking south
GAK	4	Landguard Fort, Submarine Mining Establishment Pier: view, looking west
GAK	5	Landguard Fort, Submarine Mining Establishment Pier: view of distant pier, looking north
GAK	6	Landguard Fort, Submarine Mining Establishment Pier: view of distant pier, looking north
GAK	7	Landguard Fort, Submarine Mining Establishment Pier: view of foreshore in vicinity of pier, looking north
GAK	8	Landguard Fort, Submarine Mining Establishment Pier: view of pier looking north
GAK	9	Landguard Fort, Submarine Mining Establishment Pier: concrete base, looking northeast
GAK	10	Landguard Fort, Submarine Mining Establishment Pier: view of pier looking north
GAK	11	Landguard Fort, Submarine Mining Establishment Pier: view of north side of concrete base showing steps
GAK	12	Landguard Fort, Submarine Mining Establishment Pier: concrete base, looking south
GAK	13	Landguard Fort, Submarine Mining Establishment Pier: concrete base, looking south

<u>Film Code</u>	<u>Frame No.</u>	<u>Description</u>
GAK	14	Landguard Fort, Submarine Mining Establishment Pier: concrete base, looking west
GAK	15	Landguard Fort, Submarine Mining Establishment Pier: concrete base, looking west
GAK	16	Landguard Fort, Submarine Mining Establishment Pier: view of concrete base looking north
GAK	17	Landguard Fort, Submarine Mining Establishment Pier: concrete base, looking southwest
GAK	18	Landguard Fort, Submarine Mining Establishment Pier: view, looking northwest
GAK	19	Landguard Fort, Submarine Mining Establishment Pier: view along foreshore, looking north
GAK	20	Landguard Fort, Submarine Mining Establishment Pier: view along foreshore, looking north
GAK	21	Landguard Fort, Submarine Mining Establishment Pier: view along foreshore, looking north
GAK	22	Landguard Fort, Submarine Mining Establishment Pier: general view, surveying
GAK	23	Landguard Fort, Submarine Mining Establishment Pier: general view, surveying
GAK	24	Landguard Fort, Submarine Mining Establishment Pier: general view, surveying
GAK	25	Landguard Fort, Submarine Mining Establishment Pier: view along foreshore, looking north
GAK	26	Landguard Fort, Submarine Mining Establishment Pier: view of north side of concrete base showing steps
GAK	27	Landguard Fort, Submarine Mining Establishment Pier: view of north side of concrete base showing steps
GAK	28	Landguard Fort, Submarine Mining Establishment Pier: concrete base, looking northeast
GAK	29	Landguard Fort, Submarine Mining Establishment Pier: concrete base, looking west
GAK	30	Landguard Fort, Submarine Mining Establishment Pier: view of north side of concrete base showing steps, looking east
GAK	31	Landguard Fort, Submarine Mining Establishment Pier: view of north side of concrete base, looking south
GAK	32	Landguard Fort, Submarine Mining Establishment Pier: view, looking west
GAK	33	Landguard Fort, Submarine Mining Establishment Pier: south side of concrete base, looking north
GAK	34	Landguard Fort, Submarine Mining Establishment Pier: south side of concrete base, looking north
GAK	35	Landguard Fort, Submarine Mining Establishment Pier: view of north side of concrete base showing steps
GAK	36	Landguard Fort, Submarine Mining Establishment Pier: general view of pier and along foreshore, looking north
GAK	37	Landguard Fort, Submarine Mining Establishment Pier: general view of pier and along foreshore, looking north
GAK	38	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.1, east face
GAK	39	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.1, south face
GAK	40	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.1, west face

<u>Film Code</u>	<u>Frame No.</u>	<u>Description</u>
GAK	41	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.2, east face detail
GAK	42	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.2, east face
GAK	43	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.2 top, looking northwest
GAK	44	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.2, east face
GAK	45	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.2, north face
GAK	46	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.2, south face
GAK	47	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.2, west face detail
GAK	48	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.2, west face
GAK	49	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.3, east face
GAK	50	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.3, north face
GAK	51	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.3, south face
GAK	52	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.3, west face
GAK	53	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.4, east face
GAK	54	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.4, north face
GAK	55	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.4, south face
GAK	56	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.4, west face
GAK	57	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.5, top, looking northwest
GAK	58	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.5, east face
GAK	59	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.5, north face
GAK	60	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.5, south face
GAK	61	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.5, west face
GAK	62	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.6, east face
GAK	63	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.6, north face
GAK	64	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.6, south face
GAK	65	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.6, west face
GAK	66	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.7, south face
GAK	67	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.8, east face

<u>Film Code</u>	<u>Frame No.</u>	<u>Description</u>
GAK	68	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.8, north face
GAK	69	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.8, south face
GAK	70	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.8, west face
GAK	71	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.9, east face
GAK	72	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.9, north face
GAK	73	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.9, northwest face
GAK	74	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.9, south face
GAK	75	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.9, southeast face
GAK	76	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.9, west face
GAK	77	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.10, south face
GAK	78	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.11, east face detail
GAK	79	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.11, east face
GAK	80	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.11, north face
GAK	81	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.11, south face detail
GAK	82	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.11, south face
GAK	83	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.11, west face detail
GAK	84	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.11, west face
GAK	85	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.12, south face
GAK	86	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.12, southeast face
GAK	87	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.15, south face
GAK	88	Landguard Fort, Submarine Mining Establishment Pier: Timber Upright no.18, south face

Table 1: Photographic Archive Entries for the Submarine Mining Establishment Pier



GAK 01



GAK 02



GAK 03



GAK 04



GAK 05



GAK 06



GAK 07



GAK 08



GAK 09



GAK 10



GAK 11



GAK 12



GAK 13



GAK 14



GAK 15



GAK 16



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GAK 87



GAK 88

5. Discussion

The remains of the pier are fragmentary and heavily eroded and much has been buried by shingle which has been deliberately piled up on the foreshore in this area in order to help protect the sea wall defences that were becoming undermined by wave action. The author visited the site during November 2002 when the levels of the shingle on this beach were much lower. Many more timbers associated with the pier were visible as was a larger proportion of the concrete base. Numerous other features pertinent to the Scheduled Ancient Monument were also visible such as fragments of shaped stone, a large concrete 'dolphin' (a fixed structure to which a vessel may be moored), many other timbers (probably associated with breakwater type structures), and the stub of a second pier situated some 95m to the north of the surveyed remains (see Appendix 4 for a selection of photographs taken at that time and Appendix 5 for an extract of the 2nd edition OS map showing the second pier).

The timber uprights were formed from roughly squared baulks approximately 300mm (12 inches) square. Timbers 2, 3, 4, 5, 6, 8, 9 and 11 exhibited evidence of having had a block of timber affixed on either the northern and/or the southern sides with its top face at a height of approximately 1.8m OD. These were attached by large square headed bolts, the rusted remains of which were *in-situ*. The purpose of these is not obvious but a possible explanation is that they acted as stops for diagonal braces to butt against. A small number of uprights also had evidence of similar fixings on the east and west sides with top edges at a lower height of approximately 1.6m OD, again presumably for braces to butt against. Two of the timber uprights, 9 and 12, had associated diagonal braces situated on their eastern sides. Timber 12 was just a short stub whilst Timber 9 existed to near its full original height where it could be seen that a horizontal timber, running north-south, had been fixed against its eastern face but resting in a cut-out at the top of the diagonal brace. This was presumably the case with Timber 12. To the west of timber 11 a horizontal timber could be seen set into the concrete base. This may have been a horizontal member that spanned between timbers 15 and possible 11 (or a timber adjacent 11) which has later been encased in the concrete.

The concrete base of the mining pier continued further to the east but is now buried under the shingle. From the early OS maps it is clear that the pier originally continued further to the west. No evidence could be seen of this during the survey and it is likely that dredging of the entrance to the port has undermined and removed any remains that may have lain to the west. The concrete that does remain displays many large cracks and dislodged fragments lie on either side. On the southern side of the concrete base a set of three steps are visible leading down to a flat platform formed in the concrete. These are possible the lower steps of one of the flights of steps visible on the 2nd edition OS map (figure 3), with the upper steps having been originally formed from timber and since lost. The northern face of the concrete base is very irregular with no sign of any steps or platform suggesting that this side, which faces the open sea, has been heavily eroded resulting in it breaking up.

The concrete base was clearly added around the timbers after they had been erected although whether this was part of the original planned construction or was a later addition to protect against erosion and undermining of the timbers is not clear. It is

possible that the concrete base only existed in this particular zone to provide the platforms and base for the flights of steps indicated on the early OS map.

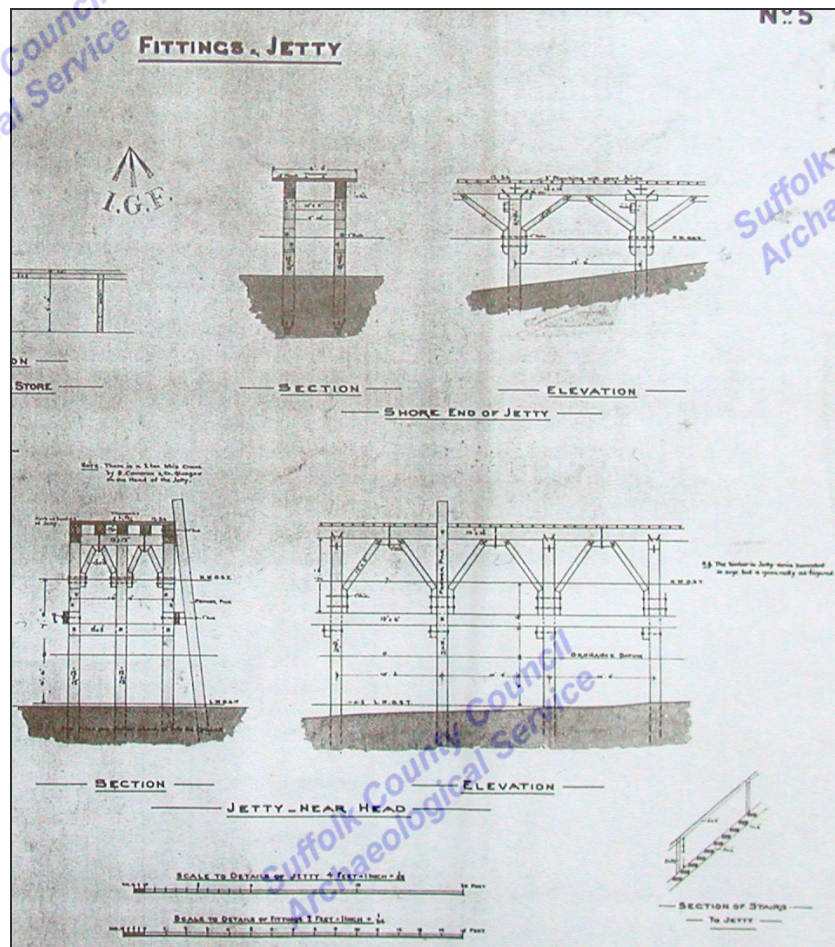


Figure 6: Extract of drawing titled 'Submarine Mining Establishment Fittings & Jetty' (PRO ref. and date not known by the author)

There are numerous plans of Landguard Fort and associated structures held in the Public Record Office (PRO) and it is likely that detailed plans of this pier survive, either as plans from its original construction, details of alterations or later record plans. A plan of the pier titled the 'Submarine Mining Establishment Fittings & Jetty' was given to the author along with other Felixstowe plans which probably originated from the PRO but unfortunately it came without any references or dates but is included above as it shows some interesting detail. It illustrates a pier constructed with diagonal braces butting against timber blocks affixed to the uprights as seen on the surviving remains. It also shows horizontal timbers running longitudinally along the pier at a lower level which is consistent with the timber encased in concrete west of Timber 11. What it does not show is the concrete base which could be seen as confirmation of its later addition.

6. References

Kent, P. (1988) *Fortifications of East Anglia*, London

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APPENDICES

- APPENDIX 1:** Drawing F1000-288-A: Ferry Berth Site – General Arrangement (an outline of the proposed works)
- APPENDIX 2:** Results of the GPS Survey of the Pier Remains (a larger scale version of Figure 4)
- APPENDIX 3:** West – East Profile Along the Pier Remains (a larger scale version of Figure 5)
- APPENDIX 4:** Selection of Photographs of the Pier Remains and Foreshore taken in November 2002
- APPENDIX 5:** 2nd Edition Ordnance Survey 1:2500 Scale Sheet (rescaled extract), Showing the second pier

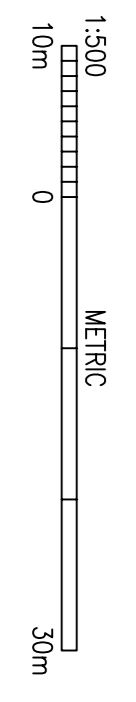
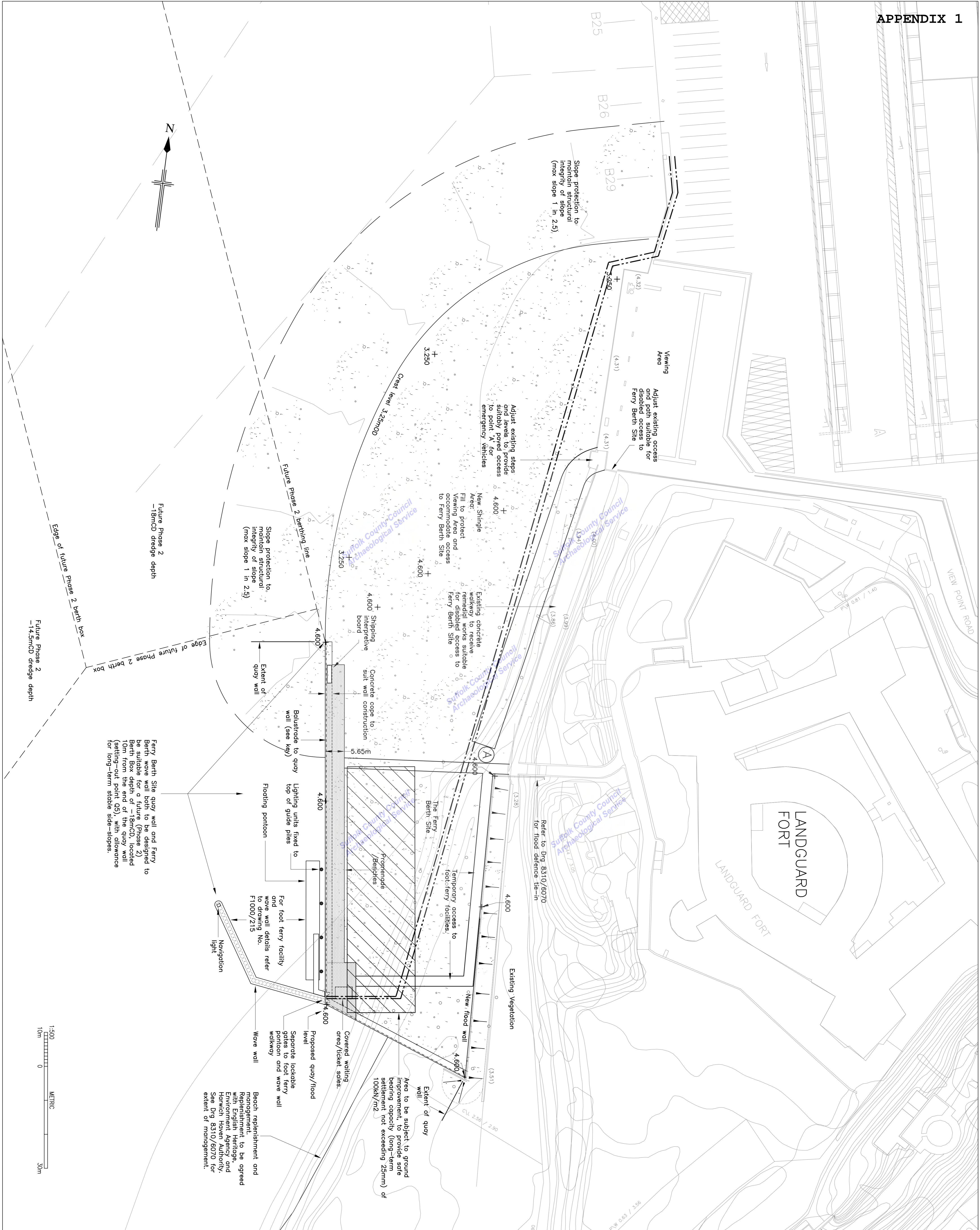
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NOTES.

- KEY:-
- Proposed sett work, 60mm thick, laid staggered bond pattern, Ref Sizes - 150x150, 100x150, 100x100mm.
- Balustrade to quay wall, 1.1m iron bollard and railing, Bollard: 990mm high above ground, 83mm diameter, Railing: 3No. 1500mm long x 40 x 10mm galvanised steel bars. Spacing to be agreed. Colour: Ref: 4007. Ref: SMP Metcico.
- New shingle material to Engineer's specification
- Proposed levels (rMAOD) 4,600
- Existing levels (rMAOD) (3,86)
- New 25mm Fresh Water Connection For Jet Washing Equipment
- New SMA Electrical Supply & Navigation Lights

DEFINITION DRAWING
TENDER ISSUE

A Area subject to ground improvement, added allowance for long term side slopes amended. 08.11.07

REV	DESCRIPTION
A	Area subject to ground improvement, added allowance for long term side slopes amended. 08.11.07

DO NOT SCALE

Port of Felixstowe
ENGINEERING DEPARTMENT
PORT OF FELIXSTOWE
THE DOCK
FELIXSTOWE IP11 3ST
TEL: 01394 604000
FAX: 01394 604449

A member of the HPH Group
A Hutchison Whampoa Company

PROJECT
FELIXSTOWE SOUTH
RECONFIGURATION

TITLE
FERRY BERTH SITE
GENERAL ARRANGEMENT
(PROVISIONAL ONLY)

SCALE	1:300 @ A1	CHECKED	
DATE	26.06.07	APPROVED	
DRN	REA	ASSSET No.	
STATUS		SHT	REV
DRAWING No.	F1000/288		A

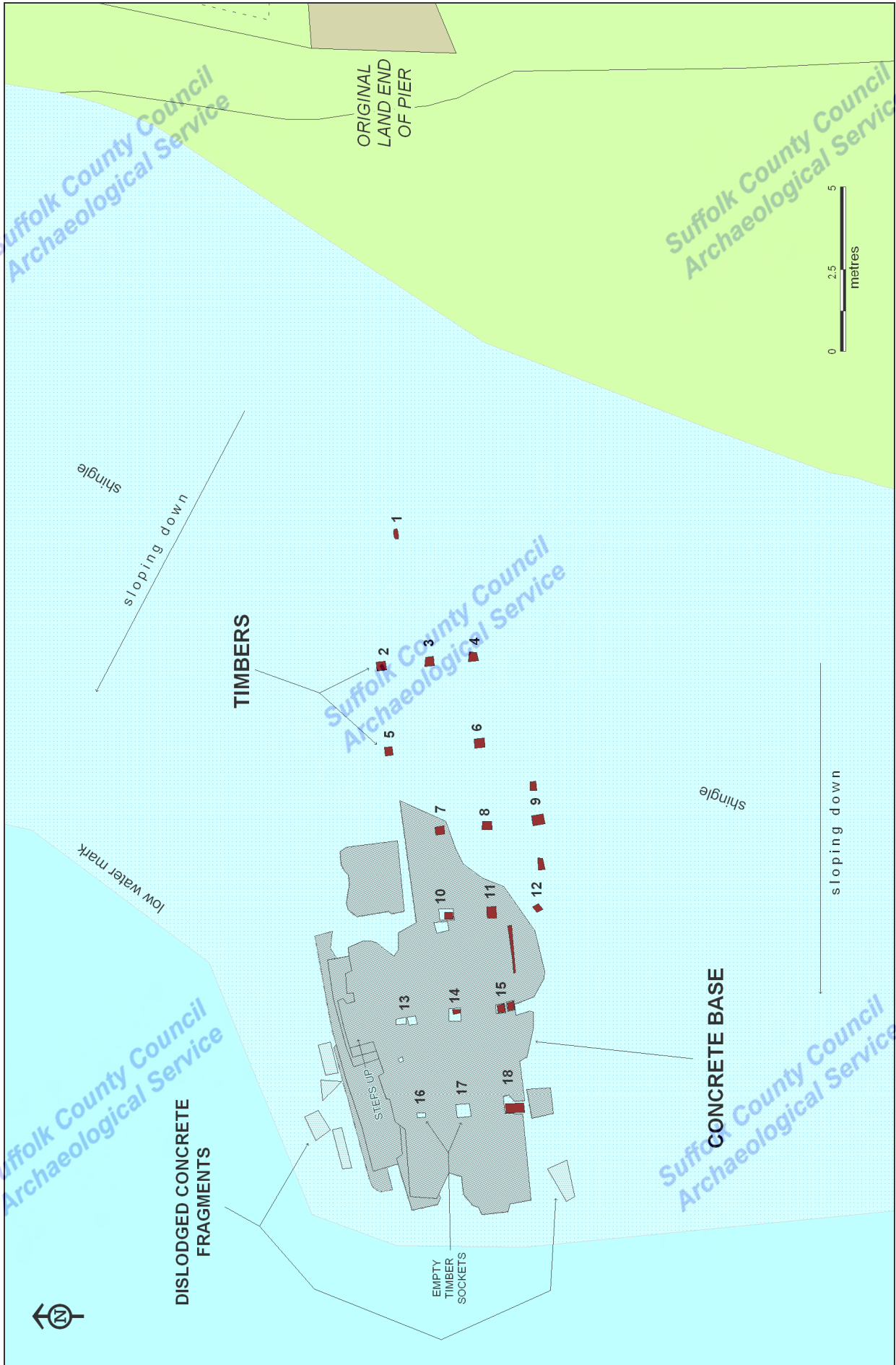
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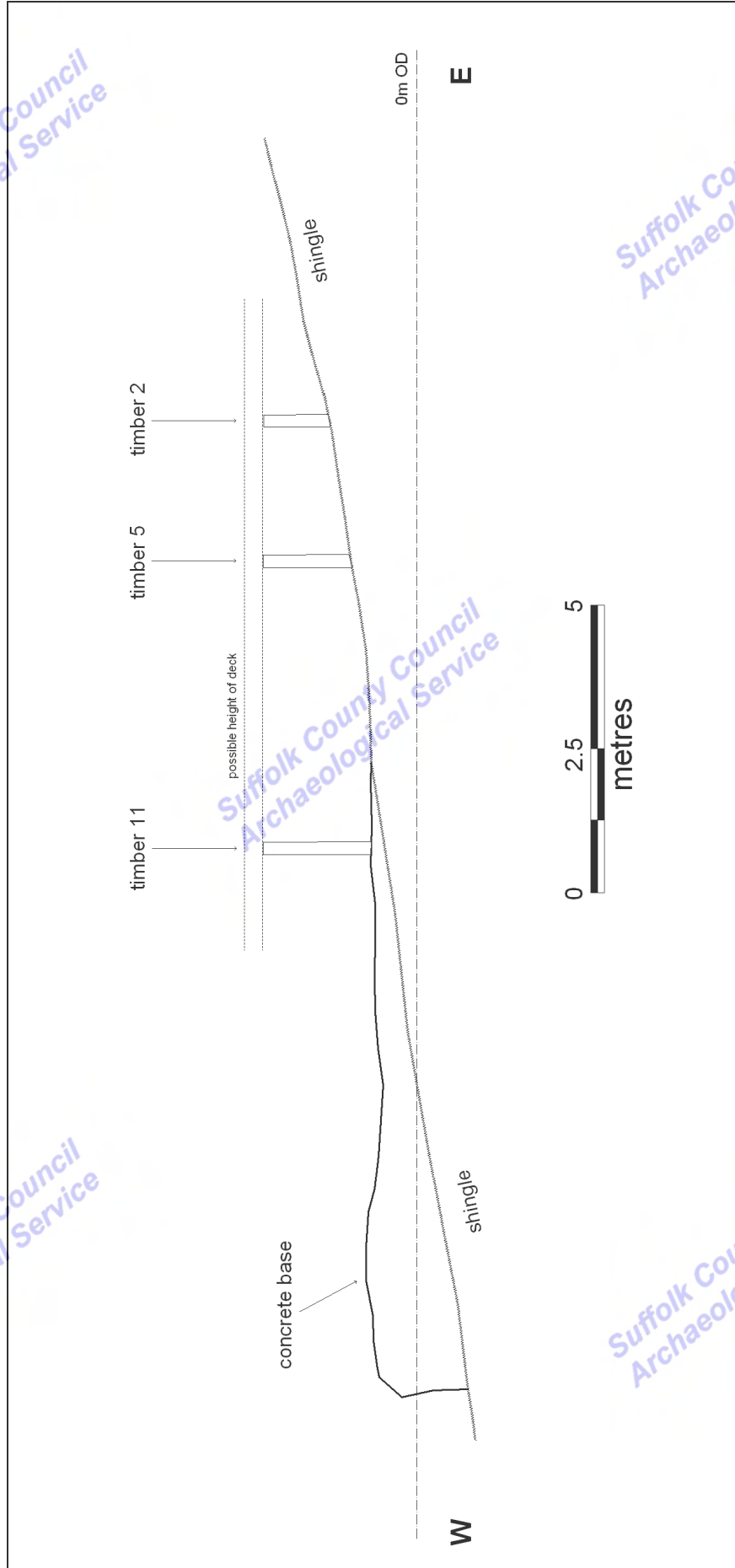
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APPENDIX 4



Concrete ?dolphin (view looking south)



Pier stub (view looking north)



Pier stub



Concrete ?dolphin (view looking north)



General view looking north along foreshore



Pier remains



Pier and other timber structure remains



Shaped stone blocks on foreshore



Shaped stone



Shaped stone



Shaped stone



Shaped stone



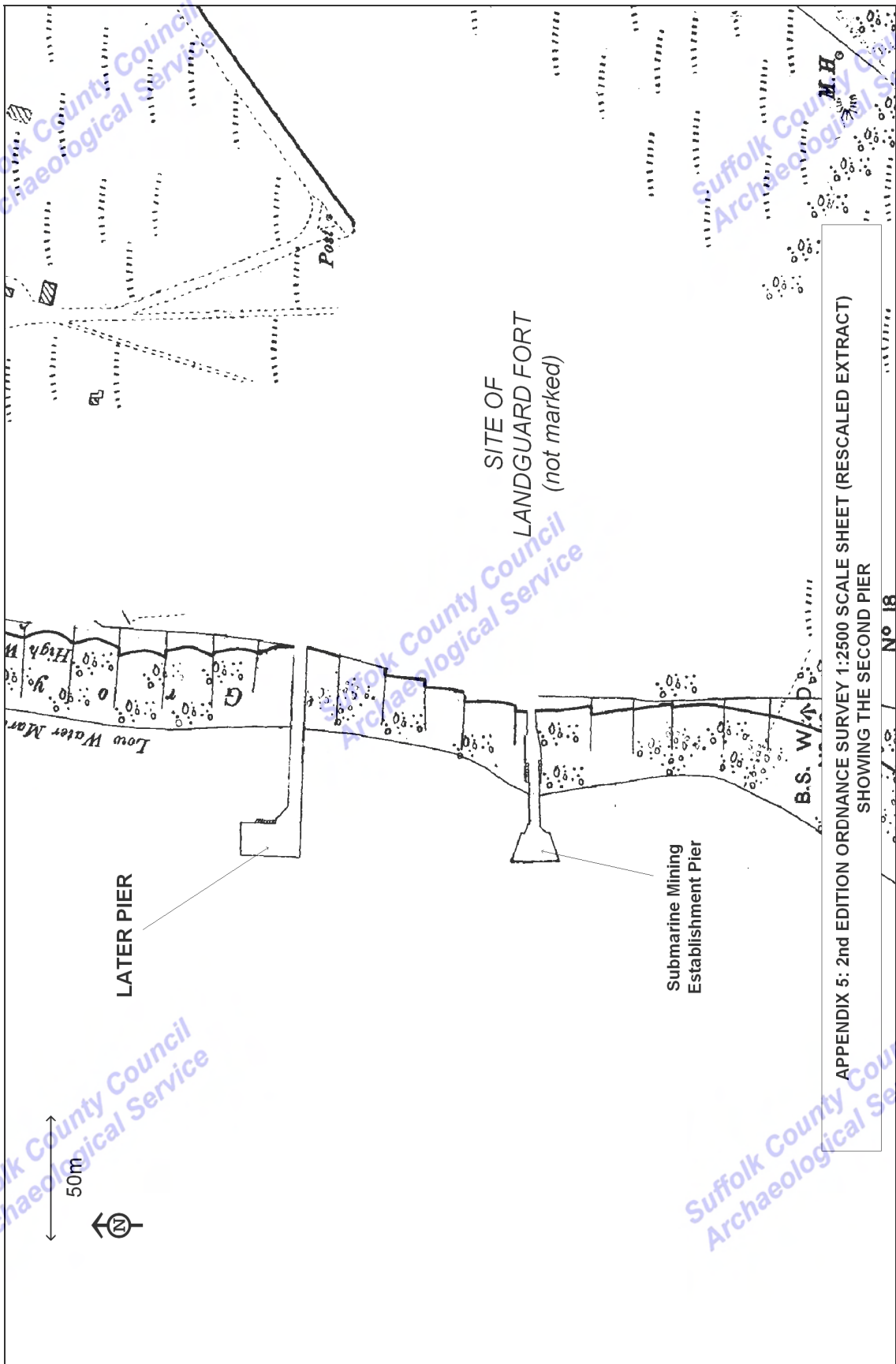
Shaped stone



Shaped stone

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APPENDIX 5: 2nd EDITION ORDNANCE SURVEY 1:2500 SCALE SHEET (RESCALED EXTRACT)
SHOWING THE SECOND PIER

No 18

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