Appendix B

Groundsure report

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Order Details

Date: 30/03/2020

Your ref: 267701-20

Our Ref: GS-6721979

Client: Ove Arup & Partners International Ltd

Site Details

Location: 369651 074211

Area: 2.12 ha

Authority: Dorset Council

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	**1.1**	**Historical industrial land uses**	6	1	14	19	-
16	**1.2**	**Historical tanks**	1	5	4	12	-
17	**1.3**	**Historical energy features**	1	1	0	0	-
18	1.4	Historical petrol stations	0	0	0	0	-
18	1.5	Historical garages	0	0	0	0	-
18	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
19	**2.1**	**Historical industrial land uses**	6	1	20	25	-
21	**2.2**	**Historical tanks**	1	5	6	17	-
23	**2.3**	**Historical energy features**	1	1	0	0	-
23	2.4	Historical petrol stations	0	0	0	0	-
23	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
24	3.1	Active or recent landfill	0	0	0	0	-
24	3.2	Historical landfill (BGS records)	0	0	0	0	-
25	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
25	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
25	3.5	Historical waste sites	0	0	0	0	-
25	**3.6**	**Licensed waste sites**	0	0	2	0	-
26	**3.7**	**Waste exemptions**	0	0	0	3	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
27	**4.1**	**Recent industrial land uses**	3	1	6	-	-
28	4.2	Current or recent petrol stations	0	0	0	0	-
28	4.3	Electricity cables	0	0	0	0	-
28	4.4	Gas pipelines	0	0	0	0	-
29	4.5	Sites determined as Contaminated Land	0	0	0	0	-

29	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	3	-
29	4.7	Regulated explosive sites	0	0	0	0	-
29	4.8	Hazardous substance storage/usage	0	0	0	3	-
30	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
30	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
30	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
31	4.12	Radioactive Substance Authorisations	0	0	0	0	-
31	4.13	Licensed Discharges to controlled waters	0	1	2	6	-
32	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
32	4.15	Pollutant release to public sewer	0	0	0	0	-
33	4.16	List 1 Dangerous Substances	0	0	0	0	-
33	4.17	List 2 Dangerous Substances	0	0	0	0	-
33	4.18	Pollution Incidents (EA/NRW)	0	0	2	3	-
34	4.19	Pollution inventory substances	0	0	0	0	-
34	4.20	Pollution inventory waste transfers	0	0	0	0	-
34	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
35	5.1	Superficial aquifer	Identified (within 500m)				
37	5.2	Bedrock aquifer	Identified (within 500m)				
39	5.3	Groundwater vulnerability	Identified (within 50m)				
40	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
40	5.5	Groundwater vulnerability- local information	None (within 0m)				
41	5.6	Groundwater abstractions	0	0	0	0	0
41	5.7	Surface water abstractions	0	0	0	0	0
41	5.8	Potable abstractions	0	0	0	0	0
41	5.9	Source Protection Zones	0	0	0	0	-
42	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
43	6.1	Water Network (OS MasterMap)	0	0	2	-	-

44	6.2	Surface water features	0	0	0	-	-
44	**6.3**	**WFD Surface water body catchments**	1	-	-	-	-
44	**6.4**	**WFD Surface water bodies**	1	1	0	-	-
45	**6.5**	**WFD Groundwater bodies**	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
46	**7.1**	**Risk of Flooding from Rivers and Sea (RoFRaS)**	High (within 50m)				
47	7.2	Historical Flood Events	0	0	0	-	-
47	7.3	Flood Defences	0	0	0	-	-
47	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
47	7.5	Flood Storage Areas	0	0	0	-	-
48	**7.6**	**Flood Zone 2**	Identified (within 50m)				
49	**7.7**	**Flood Zone 3**	Identified (within 50m)				
Page	Section	Surface water flooding					
50	**8.1**	**Surface water flooding**	1 in 30 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding					
52	**9.1**	**Groundwater flooding**	Low (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
53	**10.1**	**Sites of Special Scientific Interest (SSSI)**	1	0	0	0	7
54	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
54	**10.3**	**Special Areas of Conservation (SAC)**	0	1	0	0	4
55	10.4	Special Protection Areas (SPA)	0	0	0	0	0
55	10.5	National Nature Reserves (NNR)	0	0	0	0	0
56	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
56	10.7	Designated Ancient Woodland	0	0	0	0	0
56	10.8	Biosphere Reserves	0	0	0	0	0
56	10.9	Forest Parks	0	0	0	0	0
57	**10.10**	**Marine Conservation Zones**	0	0	0	0	1
57	10.11	Green Belt	0	0	0	0	0
57	10.12	Proposed Ramsar sites	0	0	0	0	0

57	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
58	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
58	10.15	Nitrate Sensitive Areas	0	0	0	0	0
58	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
59	**10.17**	**SSSI Impact Risk Zones**	4	-	-	-	-
61	**10.18**	**SSSI Units**	1	0	0	1	22
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
71	11.1	World Heritage Sites	0	0	0	-	-
72	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
72	11.3	National Parks	0	0	0	-	-
72	**11.4**	**Listed Buildings**	0	1	2	-	-
73	11.5	Conservation Areas	0	0	0	-	-
73	**11.6**	**Scheduled Ancient Monuments**	0	0	1	-	-
73	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
74	**12.1**	**Agricultural Land Classification**	Non Agricultural (within 250m)				
75	12.2	Open Access Land	0	0	0	-	-
75	12.3	Tree Felling Licences	0	0	0	-	-
75	12.4	Environmental Stewardship Schemes	0	0	0	-	-
75	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
76	**13.1**	**Priority Habitat Inventory**	4	2	10	-	-
77	**13.2**	**Habitat Networks**	3	1	2	-	-
78	13.3	Open Mosaic Habitat	0	0	0	-	-
78	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
79	**14.1**	**10k Availability**	Identified (within 500m)				
80	**14.2**	**Artificial and made ground (10k)**	1	0	0	1	-
81	**14.3**	**Superficial geology (10k)**	0	1	0	2	-

82	14.4	Landslip (10k)	1	0	0	1	-
83	14.5	Bedrock geology (10k)	1	0	0	5	-
84	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
85	15.1	50k Availability	Identified (within 500m)				
86	15.2	Artificial and made ground (50k)	1	0	0	1	-
87	15.3	Artificial ground permeability (50k)	1	0	-	-	-
88	15.4	Superficial geology (50k)	0	1	0	0	-
89	15.5	Superficial permeability (50k)	Identified (within 50m)				
89	15.6	Landslip (50k)	1	0	0	0	-
89	15.7	Landslip permeability (50k)	Identified (within 50m)				
90	15.8	Bedrock geology (50k)	1	0	0	4	-
91	15.9	Bedrock permeability (50k)	Identified (within 50m)				
91	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
92	16.1	BGS Boreholes	2	7	29	-	-
Page	Section	Natural ground subsidence					
95	17.1	Shrink swell clays	Low (within 50m)				
97	17.2	Running sands	Moderate (within 50m)				
99	17.3	Compressible deposits	Moderate (within 50m)				
101	17.4	Collapsible deposits	Very low (within 50m)				
102	17.5	Landslides	High (within 50m)				
104	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
106	18.1	Natural cavities	0	0	0	0	-
107	18.2	BritPits	0	0	0	0	-
107	18.3	Surface ground workings	1	0	18	-	-
108	18.4	Underground workings	0	0	0	0	0
108	18.5	Historical Mineral Planning Areas	0	0	0	0	-

108	18.6	Non-coal mining	0	0	0	0	0
108	18.7	Mining cavities	0	0	0	0	0
109	18.8	JPB mining areas	None (within 0m)				
109	18.9	Coal mining	None (within 0m)				
109	18.10	Brine areas	None (within 0m)				
109	18.11	Gypsum areas	None (within 0m)				
109	18.12	Tin mining	None (within 0m)				
110	18.13	Clay mining	None (within 0m)				

Page	Section	Radon	
111	**19.1**	**Radon**	Less than 1% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
112	**20.1**	**BGS Estimated Background Soil Chemistry**	2	1	-	-	-
112	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
112	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
113	21.1	Underground railways (London)	0	0	0	-	-
113	21.2	Underground railways (Non-London)	0	0	0	-	-
114	21.3	Railway tunnels	0	0	0	-	-
114	**21.4**	**Historical railway and tunnel features**	4	0	2	-	-
114	21.5	Royal Mail tunnels	0	0	0	-	-
115	**21.6**	**Historical railways**	0	2	0	-	-
115	21.7	Railways	0	0	0	-	-
115	21.8	Crossrail 1	0	0	0	0	-
115	21.9	Crossrail 2	0	0	0	0	-
116	21.10	HS2	0	0	0	0	-

Recent aerial photograph

Capture Date: 18/06/2017

Site Area: 2.12ha

Recent site history - 2014 aerial photograph

Capture Date: 03/05/2014

Site Area: 2.12ha

Recent site history - 2009 aerial photograph

Capture Date: 27/09/2009

Site Area: 2.12ha

Recent site history - 2005 aerial photograph

Capture Date: 27/10/2005

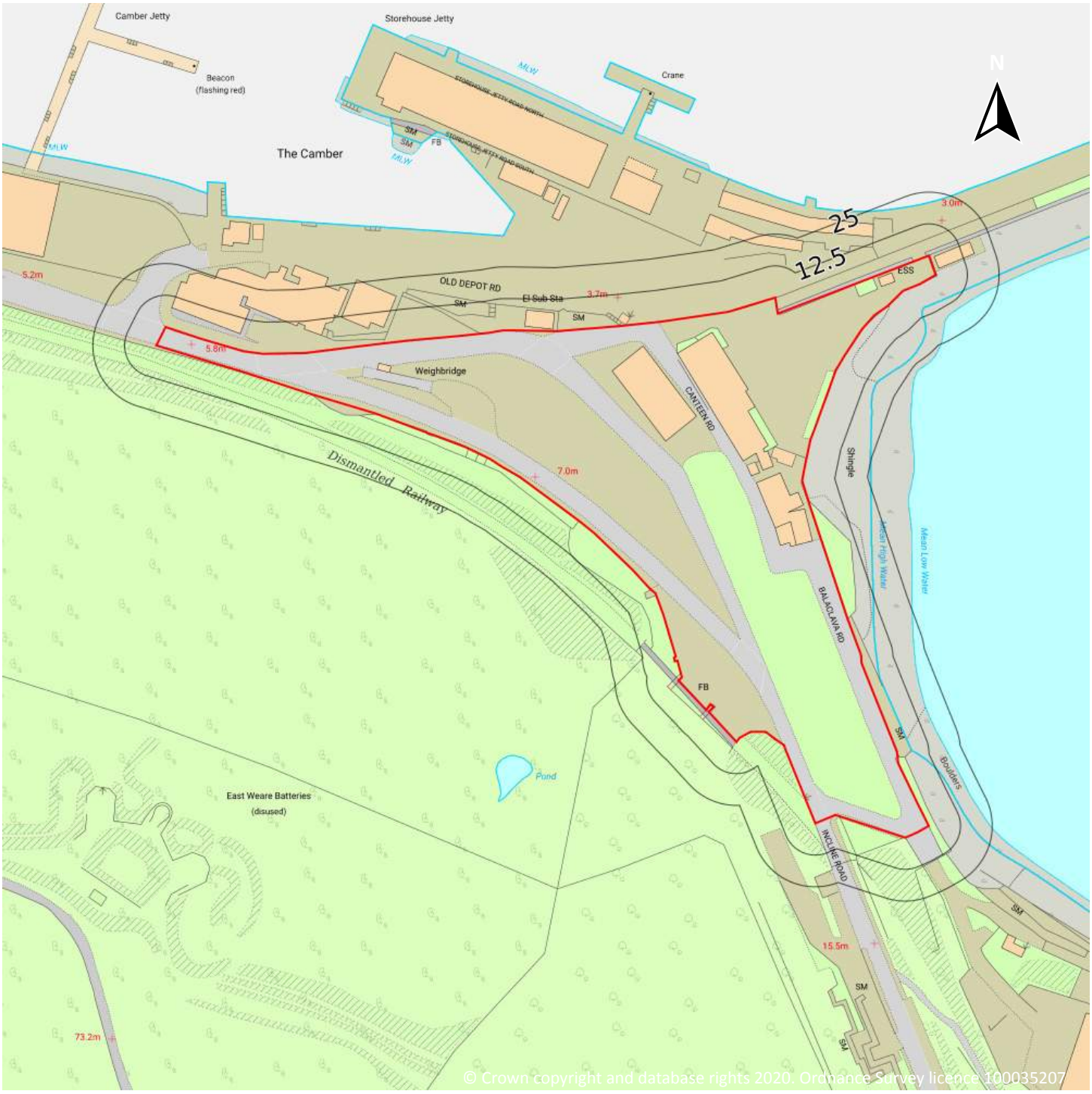
Site Area: 2.12ha

Recent site history - 1999 aerial photograph

Capture Date: 27/07/1999

Site Area: 2.12ha

OS MasterMap site plan



Site Area: 2.12ha

1 Past land use

Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

1.1 Historical industrial land uses

Records within 500m	40

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
1	**On site**	**Dock Yard**	**1963**	**1281214**

ID	Location	Land use	Dates present	Group ID
2	**On site**	**Railway Sidings**	**1963**	**1285670**
3	**On site**	**Railway Sidings**	**1901**	**1287864**
4	**On site**	**Boat House**	**1901**	**1279959**
A	**On site**	**Hospital**	**1901**	**1273628**
A	**On site**	**Unspecified Depot**	**1901**	**1280300**
5	34m W	Railway Building	1901	1277092
6	56m SW	Unspecified Ground Workings	1963	1274257
D	89m SE	Coastguard Station	1901	1277529
E	113m SW	Unspecified Heap	1927 - 1938	1283968
D	115m SE	Unspecified Pit	1976	1273420
D	115m SE	Unspecified Ground Workings	1963	1274256
E	115m SW	Unspecified Pit	1963	1273419
7	137m NW	Railway Buildings	1901	1276911
F	153m SW	Unspecified Ground Workings	1901 - 1938	1289026
F	154m SW	Unspecified Ground Workings	1963	1283511
8	167m S	Unspecified Heaps	1976	1278500
G	190m SW	Unspecified Tank	1963 - 1976	1286074
H	213m SW	Disused Batteries	1976	1275073
H	245m SW	Cuttings	1976	1275265
10	246m SW	Unspecified Pit	1901 - 1938	1281699
J	253m SW	Cemetery	1963 - 1976	1286160
11	262m S	Unspecified Tank	1963	1275597
12	285m SW	Unspecified Ground Workings	1927 - 1938	1282872
J	286m SW	Cemetery	1901	1280570
J	290m SW	Cemetery	1927 - 1938	1287756
K	312m S	Unspecified Tanks	1963	1276584
L	320m N	Dock Yard	1976	1286926
M	408m NW	Engine House	1901	1278353

ID	Location	Land use	Dates present	Group ID
N	409m S	Unspecified Tank	1963 - 1976	1287279
M	431m NW	Railway Building	1901	1277094
14	432m SW	Unspecified Heap	1976	1279670
O	437m W	Railway Building	1901	1277093
P	442m S	Unspecified Ground Workings	1963	1274255
15	452m W	Unspecified Ground Workings	1901	1274249
O	454m W	Railway Sidings	1938	1281474
O	454m W	Railway Sidings	1927	1283130
16	465m SW	Unspecified Heap	1963 - 1976	1284681
O	483m W	Railway Building	1927 - 1938	1285235
P	488m S	Unspecified Ground Workings	1963	1274254

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**22**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
B	**On site**	**Gas Works**	**1864**	**195110**
B	15m SW	Unspecified Tank	1864	195025
B	17m SW	Gasometer	1864	195141
C	21m S	Tanks	1960	195334
C	26m S	Tanks	1960	195333
B	44m S	Unspecified Tank	1903	195026
G	188m SW	Unspecified Tank	1973 - 1996	196000

ID	Location	Land use	Dates present	Group ID
9	232m S	Unspecified Tank	1903	195027
I	244m SE	Unspecified Tank	1973	195028
I	244m SE	Unspecified Tank	1959	195029
K	314m S	Unspecified Tank	1994 - 1996	196688
K	316m S	Unspecified Tank	1973	195787
L	350m N	Unspecified Tank	1973	195022
L	355m N	Unspecified Tank	1973	195021
K	371m S	Unspecified Tank	1973 - 1996	195494
N	410m S	Unspecified Tank	1994 - 1996	195553
N	412m S	Unspecified Tank	1973	196539
13	413m N	Unspecified Tank	1973	195023
O	424m W	Unspecified Tank	1929	195020
P	474m S	Unspecified Tank	1864	195031
O	481m W	Tanks	1994 - 1996	196069
O	496m W	Tanks	1973	195167

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	**2**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
B	**On site**	**Gas Works**	**1864**	**114220**
B	17m SW	Gasometer	1864	114264

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped

Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

2.1 Historical industrial land uses

Records within 500m	52

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
1	**On site**	**Boat House**	**1901**	**1279959**
2	**On site**	**Railway Sidings**	**1963**	**1285670**
3	**On site**	**Dock Yard**	**1963**	**1281214**

ID	Location	Land Use	Date	Group ID
4	**On site**	**Railway Sidings**	**1901**	**1287864**
A	**On site**	**Hospital**	**1901**	**1273628**
A	**On site**	**Unspecified Depot**	**1901**	**1280300**
5	34m W	Railway Building	1901	1277092
6	56m SW	Unspecified Ground Workings	1963	1274257
D	89m SE	Coastguard Station	1901	1277529
E	113m SW	Unspecified Heap	1938	1283968
E	113m SW	Unspecified Heap	1927	1283968
D	115m SE	Unspecified Ground Workings	1963	1274256
D	115m SE	Unspecified Pit	1976	1273420
E	115m SW	Unspecified Pit	1963	1273419
7	137m NW	Railway Buildings	1901	1276911
F	153m SW	Unspecified Ground Workings	1938	1289026
F	153m SW	Unspecified Ground Workings	1927	1289026
F	153m SW	Unspecified Ground Workings	1901	1289026
F	154m SW	Unspecified Ground Workings	1963	1283511
8	167m S	Unspecified Heaps	1976	1278500
G	190m SW	Unspecified Tank	1963	1286074
G	190m SW	Unspecified Tank	1976	1286074
H	213m SW	Disused Batteries	1976	1275073
H	245m SW	Cuttings	1976	1275265
J	246m SW	Unspecified Pit	1938	1281699
J	246m SW	Unspecified Pit	1927	1281699
J	246m SW	Unspecified Pit	1901	1281699
K	253m SW	Cemetery	1963	1286160
K	253m SW	Cemetery	1976	1286160
10	262m S	Unspecified Tank	1963	1275597
L	285m SW	Unspecified Ground Workings	1938	1282872

ID	Location	Land Use	Date	Group ID
L	285m SW	Unspecified Ground Workings	1927	1282872
K	286m SW	Cemetery	1901	1280570
K	290m SW	Cemetery	1938	1287756
K	290m SW	Cemetery	1927	1287756
M	312m S	Unspecified Tanks	1963	1276584
N	320m N	Dock Yard	1976	1286926
O	408m NW	Engine House	1901	1278353
P	409m S	Unspecified Tank	1963	1287279
P	409m S	Unspecified Tank	1976	1287279
O	431m NW	Railway Building	1901	1277094
12	432m SW	Unspecified Heap	1976	1279670
Q	437m W	Railway Building	1901	1277093
R	442m S	Unspecified Ground Workings	1963	1274255
13	452m W	Unspecified Ground Workings	1901	1274249
Q	454m W	Railway Sidings	1938	1281474
Q	454m W	Railway Sidings	1927	1283130
S	465m SW	Unspecified Heap	1963	1284681
S	465m SW	Unspecified Heap	1976	1284681
Q	483m W	Railway Building	1938	1285235
Q	483m W	Railway Building	1927	1285235
R	488m S	Unspecified Ground Workings	1963	1274254

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**29**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
B	**On site**	**Gas Works**	**1864**	**195110**
B	15m SW	Unspecified Tank	1864	195025
B	17m SW	Gasometer	1864	195141
C	21m S	Tanks	1960	195334
C	26m S	Tanks	1960	195333
B	44m S	Unspecified Tank	1903	195026
G	188m SW	Unspecified Tank	1996	196000
G	188m SW	Unspecified Tank	1994	196000
G	189m SW	Unspecified Tank	1973	196000
9	232m S	Unspecified Tank	1903	195027
I	244m SE	Unspecified Tank	1973	195028
I	244m SE	Unspecified Tank	1959	195029
M	314m S	Unspecified Tank	1996	196688
M	314m S	Unspecified Tank	1994	196688
M	316m S	Unspecified Tank	1973	195787
N	350m N	Unspecified Tank	1973	195022
N	355m N	Unspecified Tank	1973	195021
M	371m S	Unspecified Tank	1996	195494
M	371m S	Unspecified Tank	1994	195494
M	372m S	Unspecified Tank	1973	195494
P	410m S	Unspecified Tank	1996	195553
P	410m S	Unspecified Tank	1994	195553
P	412m S	Unspecified Tank	1973	196539
11	413m N	Unspecified Tank	1973	195023
Q	424m W	Unspecified Tank	1929	195020
R	474m S	Unspecified Tank	1864	195031
Q	481m W	Tanks	1996	196069
Q	481m W	Tanks	1994	196069

ID	Location	Land Use	Date	Group ID
Q	496m W	Tanks	1973	195167

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	2

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
B	**On site**	**Gas Works**	**1864**	**114220**
B	17m SW	Gasometer	1864	114264

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill

Site Outline

Search buffers in metres (m)

Licensed waste sites

Waste exemptions

3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	2

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

Features are displayed on the Waste and landfill map on **page 24**

ID	Location	Details		
A	228m S	Site Name: Paisley Plant Hire Limited Site Address: Incline Road, Portland Port, Castletown, Portland, Dorset, DT5 1PP Correspondence Address: -	Type of Site: 75kte HCI Waste TS + asbestos Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PAI009 EPR reference: EA/EPR/GP3591LR/A001 Operator: Paisley Plant Hire Limited Waste Management licence No: 101534 Annual Tonnage: 74999	Issue Date: 04/08/2010 Effective Date: - Modified:: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued

ID	Location	Details		
A	228m S	Site Name: Paisley Plant Hire Ltd Site Address: Portland Port, Castletown, Portland, Dorset, DT5 1PP Correspondence Address: -	Type of Site: 75kte HCI Waste TS + asbestos Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PAI009 EPR reference: EA/EPR/GP3591LR/A001 Operator: Paisley Plant Hire Ltd Waste Management licence No: 101534 Annual Tonnage: 74999	Issue Date: 04/08/2010 Effective Date: - Modified:: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	**3**

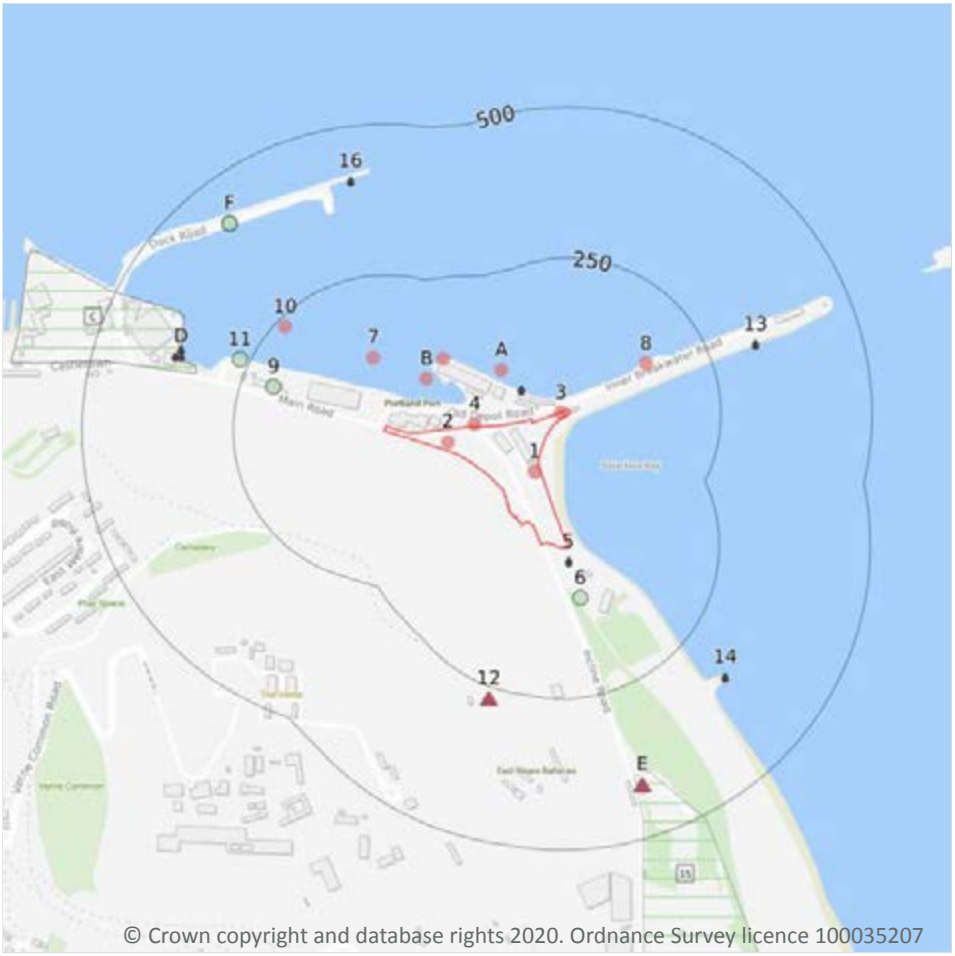
Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 24**

ID	Location	Site	Reference	Category	Sub-Category	Description
B	492m W	PORTLAND PORT BUSINESS CENTRE, CASTLETOWN, PORTLAND, DT5 1PP	WEX078668	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	492m W	PORTLAND PORT BUSINESS CENTRE CASTLETOWN PORTLAND DT5 1PP	WEX005945	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	498m W	Portland Port PORTLAND Dorset DT5 1PP	EPR/CE5587CY /A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in a secure place

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



Site Outline

Search buffers in metres (m)

Recent industrial land uses

Control of Major Accident Hazards

Hazardous substance storage/usage

Licensed Discharges to controlled waters

Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m	10

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Company	Address	Activity	Category
1	On site	Portland Shellfish Ltd	Building 233, Portland Port Business Centre, Castletown, Portland, Dorset, DT5 1PA	Fish, Meat and Poultry Products	Foodstuffs
2	On site	Paisley Plants	Building 228, Portland Port Business Centre, Castletown, Portland, Dorset, DT5 1PA	Construction and Tool Hire	Hire Services
3	On site	Electricity Sub Station	Dorset, DT5	Electrical Features	Infrastructure and Facilities

ID	Location	Company	Address	Activity	Category
4	5m N	Electricity Sub Station	Dorset, DT5	Electrical Features	Infrastructure and Facilities
B	87m N	Landing Stage	Dorset, DT5	Moorings and Unloading Facilities	Water
A	90m N	Crane	Dorset, DT5	Travelling Cranes and Gantries	Industrial Features
7	116m N	Camber Jetty	Dorset, DT5	Moorings and Unloading Facilities	Water
B	117m N	Storehouse Jetty	Dorset, DT5	Moorings and Unloading Facilities	Water
8	149m NE	Crane	Dorset, DT5	Travelling Cranes and Gantries	Industrial Features
10	235m NW	Loading Jetty	Dorset, DT5	Moorings and Unloading Facilities	Water

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	**0**

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	**0**

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	**0**

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	3

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Company	Address	Operational status	Tier
C	325m W	Portland Port Limited	Portland Port Limited, Portland Port, Castledown, Portland, Dorset, DT5 1PP	Historical NIHHS Site	-
C	326m W	Portland Port Ltd	Portland Port Ltd, Castletown, Portland, DT5 1PP	Historical NIHHS Site	-
15	396m S	Portland Bunkers UK Limited	Portland Bunkers UK Limited, East Weare Batteries, Portland Port, The Old Guardhouse, Incline Road, Portland, Dorset, DT5 1PH	Current COMAH Site	COMAH Upper Tier Operator

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	3

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Details	
12	269m S	Application reference number: 03/00141/HAZ Application status: Historical Consent Application date: 28/02/2003 Address: East Weare Batteries Off, Incline Road, Portland, Dorset, DT5 1EG	Details: Storage of fuels, diesel in underground storage tanks Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
E	413m S	Application reference number: No Details Application status: Approved Application date: No Details Address: Portland Bunkers UK Limited, Off Incline Road, Portland Port, Castletown, Portland, Dorset, England, DT5 1PH	Details: No Details Enforcement: No Details Date of enforcement: No Details Comment: No Details
E	413m S	Application reference number: No Details Application status: Approved Application date: No Details Address: Portland Port Limited/ Mere Tank Farm, Portland Port, Portland, Dorset, England, DT5 1PH	Details: No Details Enforcement: No Details Date of enforcement: No Details Comment: No Details

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	**0**

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	**0**

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	**0**

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	9

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Address	Details	
5	25m S	HM NAVAL BASE, OSPREY QUAY, PORTLAND, DORSET	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - NOT WATER COMPANY Permit Number: 043062 Permit Version: 1 Receiving Water: ENGLISH CHANNEL	Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 113 & SCHED 12) Issue date: 29/12/1995 Effective Date: 29/12/1995 Revocation Date: -
A	51m N	NATIVE MARINE CENTRE LIMITED, PORTLAND PORT, CASTLE TOWN, PORTLAND, DT5 1PP	Effluent Type: AGRICULTURE - FISH FARMING - NOT WATER COMPANY Permit Number: EPRWP3928XN Permit Version: 2 Receiving Water: PORTLAND HARBOUR	Status: NEW ISSUED UNDER EPR 2010 Issue date: 01/11/2012 Effective Date: 22/10/2013 Revocation Date: -
A	51m N	NATIVE MARINE CENTRE LIMITED, PORTLAND PORT, CASTLE TOWN, PORTLAND, DT5 1PP	Effluent Type: AGRICULTURE - FISH FARMING - NOT WATER COMPANY Permit Number: EPRWP3928XN Permit Version: 1 Receiving Water: PORTLAND HARBOUR	Status: NEW ISSUED UNDER EPR 2010 Issue date: 01/11/2012 Effective Date: 01/11/2012 Revocation Date: 21/10/2013
13	327m E	FUEL OIL DEPOT, RNAS, PORTLAND, DORSET	Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - WATER COMPANY (WTW) Permit Number: 043086 Permit Version: 1 Receiving Water: CHESIL BEACH	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 05/03/1996 Effective Date: 01/03/1996 Revocation Date: 31/07/2008
14	339m SE	HM PRISON, THE VERNE, SEWER STORM OVERFLOW, PORTLAND, DORSET	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - NOT WATER COMPANY Permit Number: 042843 Permit Version: 1 Receiving Water: BALACLAVA BAY	Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 113 & SCHED 12) Issue date: 08/11/1995 Effective Date: 02/11/1995 Revocation Date: -

ID	Location	Address	Details	
D	357m W	HM NAVAL BASE, OSPREY QUAY, PORTLAND, DORSET	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - NOT WATER COMPANY Permit Number: 043081 Permit Version: 1 Receiving Water: PORTLAND HARBOUR	Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 113 & SCHED 12) Issue date: 20/12/1995 Effective Date: 15/12/1995 Revocation Date: -
D	361m W	HM NAVAL BASE, OSPREY QUAY, PORTLAND, DORSET	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: 043071 Permit Version: 1 Receiving Water: COASTAL WATER	Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 113 & SCHED 12) Issue date: 15/03/1996 Effective Date: 12/03/1996 Revocation Date: -
D	367m W	HM NAVAL BASE, OSPREY QUAY, PORTLAND, DORSET	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: 043070 Permit Version: 1 Receiving Water: COASTAL WATER	Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 113 & SCHED 12) Issue date: 15/03/1996 Effective Date: 12/03/1996 Revocation Date: -
16	409m N	HM NAVAL BASE, OSPREY QUAY, PORTLAND, DORSET	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: 043075 Permit Version: 1 Receiving Water: PORTLAND HARBOUR	Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 113 & SCHED 12) Issue date: 05/03/1996 Effective Date: 21/02/1996 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	**0**

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	**0**

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	5

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Details	
6	88m S	Incident Date: 08/10/2001 Incident Identification: 35455 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
9	196m W	Incident Date: 03/10/2001 Incident Identification: 34351 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
11	266m NW	Incident Date: 04/04/2014 Incident Identification: 1224569 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 2 (Significant) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
F	424m NW	Incident Date: 11/05/2001 Incident Identification: 5260 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

ID	Location	Details	
F	424m NW	Incident Date: 11/05/2001 Incident Identification: 5260 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	**0**

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	**0**

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.21 Pollution inventory radioactive waste

Records within 500m	**0**

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer

Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	2

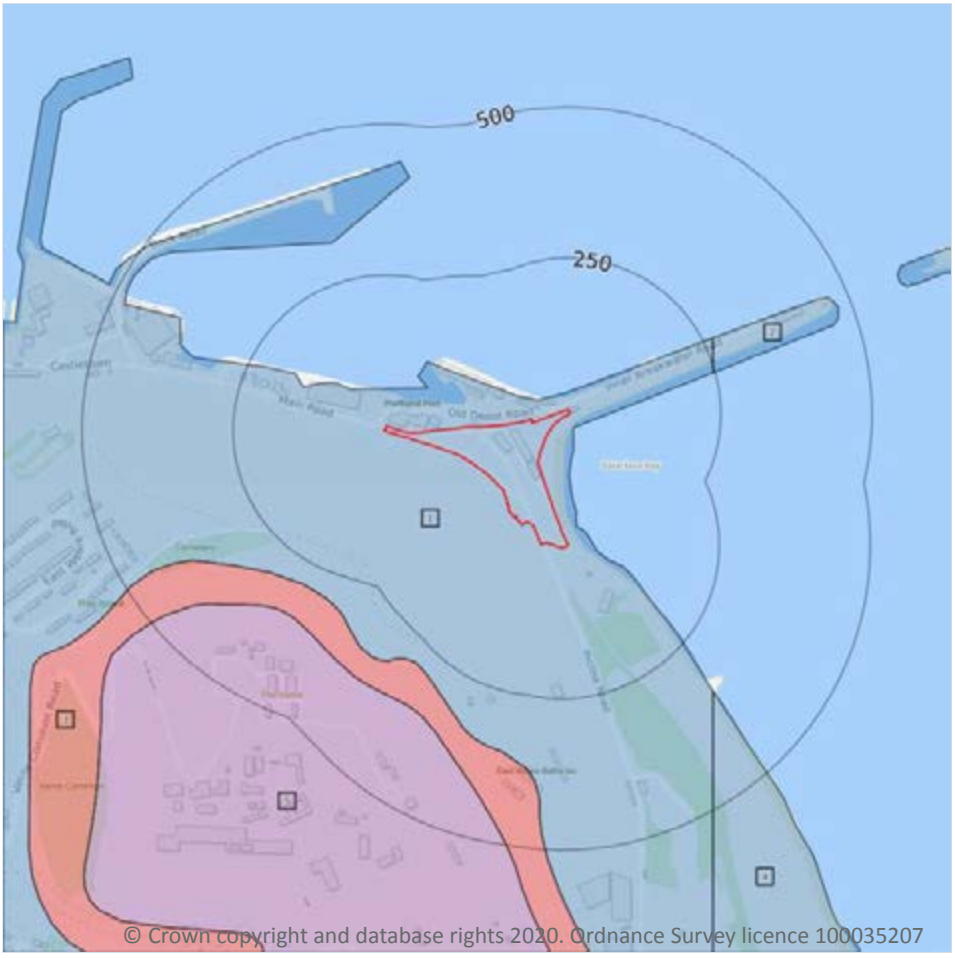
Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 35**

ID	Location	Designation	Description
1	10m E	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	341m SE	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	**5**

Aquifer status of groundwater held within bedrock geology.

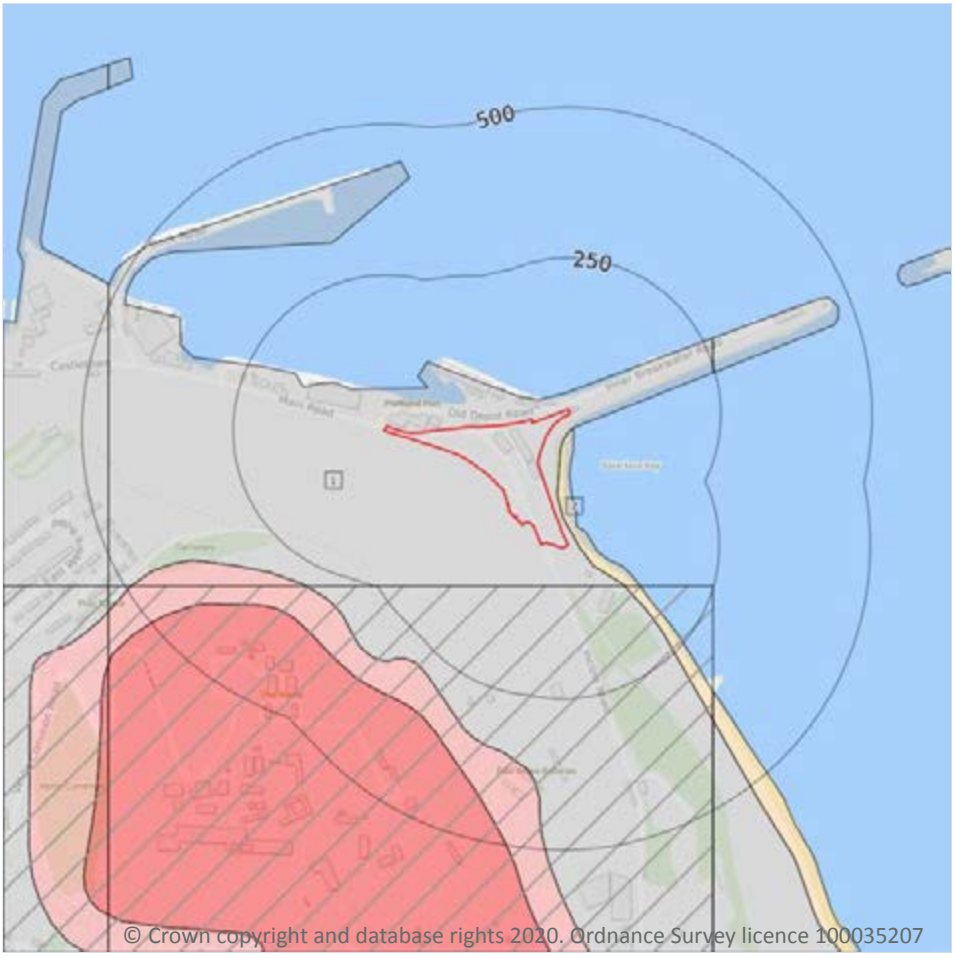
Features are displayed on the Bedrock aquifer map on **page 37**

ID	Location	Designation	Description
1	**On site**	**Unproductive**	**These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow**
2	247m E	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

ID	Location	Designation	Description
3	285m SW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	341m SE	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
5	342m SW	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability
- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability
- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information
- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	2

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 39**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	**On site**	**Summary Classification: Unproductive aquifer (may have productive aquifer beneath) Combined classification: Unproductive Bedrock Aquifer, No Superficial Aquifer**	**Leaching class: High Infiltration value: >70% Dilution value: <300mm/year**	**Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data**	**Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures**
2	9m E	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Unproductive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: High Aquifer type: Secondary Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	**0**

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site	**0**

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones

5.6 Groundwater abstractions

Records within 2000m	0

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	0

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology

Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	**2**

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 43**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	75m SW	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
B	85m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**0**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	**1**

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 43**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	**On site**	**Coastal Catchment**	**Not part of a river WB catchment**	**2**	**West Dorset Rivers**	**Dorset**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	**2**

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 43**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
1	**On site**	**Coastal**	**Dorset / Hampshire**	**GB620705550000**	**Moderate**	**Good**	**Moderate**	**2016**
2	42m N	Coastal	Portland Harbour	GB680805270000	Moderate	Good	Moderate	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	**1**

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 43**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	**On site**	**West Dorset Stream Groundwater Body**	**GB40802G802700**	**Good**	**Good**	**Good**	**2015**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

Site Outline

Search buffers in metres (m)

Environment Agency river and coastal flooding:

- High
- Medium
- Low
- Very Low
- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Flood Defences

7.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m	14

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance).

Features are displayed on the River and coastal flooding map on **page 46**

Distance	RoFRaS flood risk
On site	**Low**
0 - 50m	High

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

Site Outline

Search buffers in metres (m)

Flood zone 2

Flood zone 3

7.6 Flood Zone 2

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

Features are displayed on the River and coastal flooding map on **page 46**

Location	Type
On site	**Zone 2 - (Fluvial /Tidal Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 46**

Location	Type
16m N	Zone 3 - (Fluvial Models)

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding

Site Outline

Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 30 year, 0.1m - 0.3m**
Highest risk within 50m	**1 in 30 year, 0.1m - 0.3m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 50**

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.1m and 0.3m
1 in 250 year	Between 0.1m and 0.3m
1 in 100 year	Between 0.1m and 0.3m
1 in 30 year	Between 0.1m and 0.3m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding

Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

9.1 Groundwater flooding

Highest risk on site	**Negligible**
Highest risk within 50m	**Low**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 52**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations

Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SSSI)

Special Areas of Conservation (SAC)

Marine Conservation Zones

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	8

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 53**

ID	Location	Name	Data source
1	**On site**	**Isle of Portland**	**Natural England**

ID	Location	Name	Data source
A	643m S	Nicodemus Heights	Natural England
2	798m S	Nicodemus Heights	Natural England
3	929m SW	Isle of Portland	Natural England
5	1324m SW	Chesil & The Fleet	Natural England
8	1419m SW	Isle of Portland	Natural England
-	1502m SW	Isle of Portland	Natural England
-	1747m S	Isle of Portland	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	**0**

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	**5**

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

Features are displayed on the Environmental designations map on **page 53**

ID	Location	Name	Features of interest	Habitat description	Data source
A	12m W	Isle of Portland to Studland Cliffs	Annual vegetation of drift lines; Coastal shingle vegetation outside the reach of waves; Vegetated sea cliffs; Dry grasslands and scrublands on chalk or limestone; Great crested newt; Early gentian.	Shingle, Sea cliffs, Islets; Dry grassland, Steppes; Heath, Scrub, Maquis and Garrigue, Phygrana	Natural England

ID	Location	Name	Features of interest	Habitat description	Data source
4	1037m SW	Isle of Portland to Studland Cliffs	Annual vegetation of drift lines; Coastal shingle vegetation outside the reach of waves; Vegetated sea cliffs; Dry grasslands and scrublands on chalk or limestone; Great crested newt; Early gentian.	Shingle, Sea cliffs, Islets; Dry grassland, Steppes; Heath, Scrub, Maquis and Garrigue, Phygrana	Natural England
6	1324m SW	Chesil & The Fleet	Subtidal sandbanks; Intertidal mudflats and sandflats; Lagoons; Annual vegetation of drift lines; Coastal shingle vegetation outside the reach of waves; Vegetated sea cliffs; Glasswort and other annuals colonising mud and sand; Atlantic salt meadows; Mediterranean saltmarsh scrub.	Shingle, Sea cliffs, Islets; Salt marshes, Salt pastures, Salt steppes; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Marine areas, Sea inlets	Natural England
9	1419m SW	Isle of Portland to Studland Cliffs	Annual vegetation of drift lines; Coastal shingle vegetation outside the reach of waves; Vegetated sea cliffs; Dry grasslands and scrublands on chalk or limestone; Great crested newt; Early gentian.	Shingle, Sea cliffs, Islets; Dry grassland, Steppes; Heath, Scrub, Maquis and Garrigue, Phygrana	Natural England
10	1452m SW	Studland to Portland	Reefs.	Marine areas, Sea inlets	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	**0**

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	**0**

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	0

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	1

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

Features are displayed on the Environmental designations map on **page 53**

ID	Location	Name	Status
7	1414m SW	Chesil Beach and Stennis Ledges	Designated

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

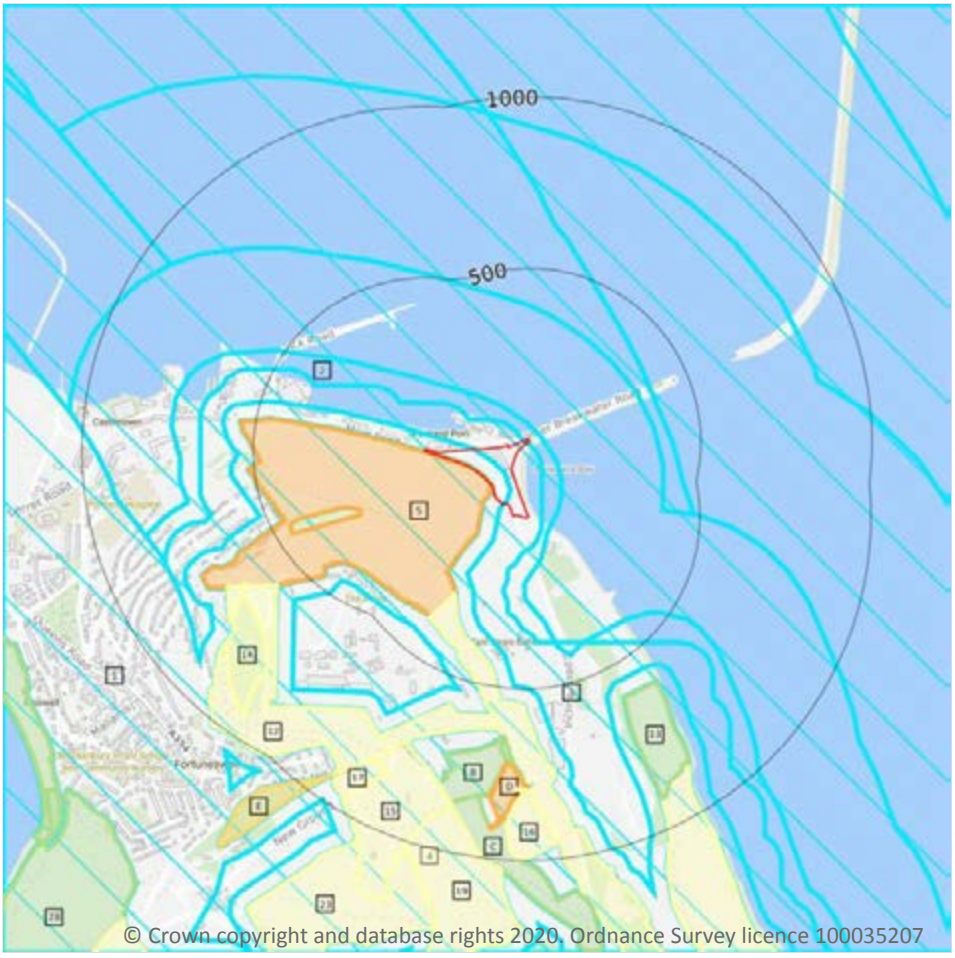
10.16 Nitrate Vulnerable Zones

Records within 2000m	0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	4

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 59**

ID	Location	Type of developments requiring consultation
1	**On site**	**All applications - All Planning Applications - Except Householder Applications.**

ID	Location	Type of developments requiring consultation
2	**On site**	**All applications - All Planning Applications (Except Householder) Outside Or Extending Outside Existing Settlements/urban Areas Affecting Greenspace, Farmland, Semi Natural Habitats Or Landscape Features Such As Trees, Hedges, Streams, Rural Buildings/structures.** **Infrastructure - Pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals.** **Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines.** **Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction.** **Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha.** **Residential - Residential development of 10 units or more.** **Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units.** **Air pollution - Any development that could cause AIR POLLUTION or DUST either in its construction or operation (incl: industrial/commercial processes, livestock & poultry units, slurry lagoons/manure stores).** **Combustion - All general combustion processes. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.** **Waste - Mechanical and biological waste treatment, inert landfill, non-hazardous landfill, hazardous landfill, household civic amenity recycling facilities construction, demolition and excavation waste, other waste management.** **Composting - Any composting proposal. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management.** **Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is > 1,000m² or any development needing its own water supply .**

ID	Location	Type of developments requiring consultation
3	**On site**	**All applications - All Planning Applications (Except Householder) Outside Or Extending Outside Existing Settlements/urban Areas Affecting Greenspace, Farmland, Semi Natural Habitats Or Landscape Features Such As Trees, Hedges, Streams, Rural Buildings/structures. Infrastructure - Pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals. Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines. Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction. Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha. Residential - Residential development of 10 units or more. Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units. Air pollution - Any development that could cause AIR POLLUTION or DUST either in its construction or operation (incl: industrial/commercial processes, livestock & poultry units, slurry lagoons/manure stores). Combustion - All general combustion processes. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion. Waste - Mechanical and biological waste treatment, inert landfill, non-hazardous landfill, hazardous landfill, household civic amenity recycling facilities construction, demolition and excavation waste, other waste management. Composting - Any composting proposal. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management. Discharges - Any discharge of water or liquid waste that is discharged to ground (ie to seep away) or to surface water, such as a beck or stream (NB this does not include discharges to mains sewer which are unlikely to pose a risk at this location). Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is > 1,000m² or any development needing its own water supply .**
4	**On site**	**All applications - All Planning Applications.**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	**24**

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

Features are displayed on the SSSI Impact Zones and Units map on **page 59**

ID:	5
Location:	On site
SSSI name:	Isle of Portland
Unit name:	Verne Common
Broad habitat:	Supralittoral Rock
Condition:	Unfavourable - Declining

Reportable features:

Feature name	Feature condition	Date of assessment
H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia), (note that this includes the priority feature important orchid rich sites)	Unfavourable - Declining	01/11/2011

ID: 7
Location: 286m SW
SSSI name: Isle of Portland
Unit name: East Weares
Broad habitat: Broadleaved, Mixed And Yew Woodland - Lowland
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
EC - Jurassic - Cretaceous Reptilia	Unfavourable - Recovering	21/11/2011
EC - Mesozoic Palaeobotany	Unfavourable - Recovering	21/11/2011
H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts	Unfavourable - Recovering	21/11/2011
H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia), (note that this includes the priority feature important orchid rich sites)	Unfavourable - Recovering	21/11/2011

ID: 12
Location: 581m S
SSSI name: Isle of Portland
Unit name: The Verne
Broad habitat: Calcareous Grassland - Lowland
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia), (note that this includes the priority feature important orchid rich sites)	Unfavourable - Recovering	01/09/2011
S1654 Early gentian, Gentianella anglica	Unfavourable - Recovering	01/09/2011

ID: 13
Location: 599m SE
SSSI name: Isle of Portland
Unit name: King's Pier Hollow
Broad habitat: Supralittoral Rock
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Scrub	Favourable	19/10/2012

ID: C
Location: 643m S
SSSI name: Nicodemus Heights
Unit name: Heights East
Broad habitat: Calcareous Grassland - Lowland
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia), (note that this includes the priority feature important orchid rich sites)	Favourable	02/03/2010
S1654 Early gentian, Gentianella anglica	Favourable	02/03/2010

ID: B
Location: 647m S
SSSI name: Nicodemus Heights
Unit name: The Compound
Broad habitat: Calcareous Grassland - Lowland
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia), (note that this includes the priority feature important orchid rich sites)	Favourable	08/06/2010
S1654 Early gentian, Gentianella anglica	Favourable	08/06/2010

ID: 14
Location: 667m SW
SSSI name: Isle of Portland
Unit name: Verne Field
Broad habitat: Calcareous Grassland - Lowland
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia), (note that this includes the priority feature important orchid rich sites)	Unfavourable - Recovering	13/09/2011
S1654 Early gentian, Gentianella anglica	Unfavourable - Recovering	13/09/2011

ID: D
Location: 717m S
SSSI name: Nicodemus Heights
Unit name: Nicodemus Fields
Broad habitat: Calcareous Grassland - Lowland
Condition: Unfavourable - Declining
Reportable features:

Feature name	Feature condition	Date of assessment
Lowland calcareous grassland (CG3-5)	Unfavourable - Declining	19/02/2010

ID: 15
Location: 728m SW
SSSI name: Isle of Portland
Unit name: Redoubt
Broad habitat: Calcareous Grassland - Lowland
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia), (note that this includes the priority feature important orchid rich sites)	Unfavourable - Recovering	01/09/2011
S1654 Early gentian, Gentianella anglica	Unfavourable - Recovering	01/09/2011

ID: 16
Location: 796m S
SSSI name: Isle of Portland
Unit name: Nicodemus Knob
Broad habitat: Calcareous Grassland - Lowland
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
EA - Portlandian - Berriasian	Favourable	01/11/2011
EC - Mesozoic Palaeobotany	Favourable	01/11/2011
Lowland calcareous grassland (CG3-5)	Unfavourable - Recovering	01/11/2011

ID: D
Location: 798m S
SSSI name: Isle of Portland
Unit name: East Weares
Broad habitat: Broadleaved, Mixed And Yew Woodland - Lowland
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
EC - Jurassic - Cretaceous Reptilia	Unfavourable - Recovering	21/11/2011
EC - Mesozoic Palaeobotany	Unfavourable - Recovering	21/11/2011
H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts	Unfavourable - Recovering	21/11/2011
H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia), (note that this includes the priority feature important orchid rich sites)	Unfavourable - Recovering	21/11/2011

ID: 17
Location: 819m SW
SSSI name: Isle of Portland
Unit name: Redoubt Field
Broad habitat: Broadleaved, Mixed And Yew Woodland - Lowland
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Lowland calcareous grassland (CG3-5)	Unfavourable - Recovering	26/09/2013

ID: 19
Location: 862m S
SSSI name: Isle of Portland
Unit name: Admiralty Quarry
Broad habitat: Inland Rock
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
EA - Mesozoic Palaeobotany	Unfavourable - Recovering	26/09/2013
Lowland calcareous grassland (CG2)	Unfavourable - Recovering	26/09/2013

ID: E
Location: 929m SW
SSSI name: Isle of Portland
Unit name: Verne Yeats
Broad habitat: Broadleaved, Mixed And Yew Woodland - Lowland
Condition: Unfavourable - No change
Reportable features:

Feature name	Feature condition	Date of assessment
Lowland calcareous grassland (CG1)	Unfavourable - No change	07/03/2013
Lowland calcareous grassland (CG2)	Unfavourable - No change	07/03/2013
Lowland calcareous grassland (CG3-5)	Unfavourable - No change	07/03/2013

ID: 23
Location: 1028m S
SSSI name: Isle of Portland
Unit name: Kingbarrow Quarries
Broad habitat: Inland Rock
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
EA - Portlandian - Berriasian	Favourable	18/08/2011
EC - Jurassic - Cretaceous Reptilia	Favourable	18/08/2011
EC - Mesozoic Palaeobotany	Favourable	18/08/2011

Feature name	Feature condition	Date of assessment
H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia), (note that this includes the priority feature important orchid rich sites)	Unfavourable - Recovering	18/08/2011
S1654 Early gentian, Gentianella anglica	Unfavourable - Recovering	18/08/2011

ID: 26
Location: 1324m SW
SSSI name: Chesil & The Fleet
Unit name: Chesil Cove
Broad habitat: Littoral Rock
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Aggregations of breeding birds - Ringed plover, Charadrius hiaticula	-	-
Assemblages of breeding birds - Lowland open waters and their margins	-	-
Coastal vegetated shingle (SD1-3)	Favourable	17/09/2012
H1210 Annual vegetation of drift lines	Favourable	17/09/2012
H1220 Perennial vegetation of stony banks	Favourable	17/09/2012
H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Favourable	17/09/2012
H1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	Favourable	17/09/2012
IA - Coastal Geomorphology	Favourable	17/09/2012
Invert. assemblage F111 bare sand & chalk	Favourable	17/09/2012
Nationally scarce plant - Suaeda vera, Shrubby Sea-blite	-	-
Population of RDB cricket - Pseudomogoplistes squamiger, Scaly Cricket	-	-
SM4-28 - Saltmarsh	-	-
Vascular plant assemblage	-	-

ID: 28
Location: 1419m SW
SSSI name: Isle of Portland
Unit name: West Weare
Broad habitat: Supralittoral Rock
Condition: Favourable

Reportable features:

Feature name	Feature condition	Date of assessment
EA - Portlandian - Berriasian	Not Recorded	01/01/1900
EC - Jurassic - Cretaceous Reptilia	Not Recorded	01/01/1900
H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia), (note that this includes the priority feature important orchid rich sites)	Not Recorded	01/01/1900

ID: -
Location: 1502m SW
SSSI name: Isle of Portland
Unit name: Inmosthay Ravine
Broad habitat: Inland Rock
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Lowland calcareous grassland (CG3-5)	Unfavourable - Recovering	07/03/2013

ID: -
Location: 1577m SW
SSSI name: Isle of Portland
Unit name: Inmosthay Quarries
Broad habitat: Inland Rock
Condition: Unfavourable - No change
Reportable features:

Feature name	Feature condition	Date of assessment
Lowland calcareous grassland (CG3-5)	Unfavourable - No change	07/03/2013

ID: 32
Location: 1625m SW
SSSI name: Isle of Portland
Unit name: Tout Quarries
Broad habitat: Inland Rock
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Lichen assemblage	Unfavourable - Recovering	07/03/2013
Lowland calcareous grassland (CG1)	Unfavourable - Recovering	07/03/2013
Lowland calcareous grassland (CG2)	Unfavourable - Recovering	07/03/2013
Lowland calcareous grassland (CG3-5)	Unfavourable - Recovering	07/03/2013

ID: -
Location: 1752m S
SSSI name: Isle of Portland
Unit name: Broadcroft Quarry North
Broad habitat: Inland Rock
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
EA - Jurassic - Cretaceous Reptilia	Favourable	26/09/2013
Lowland calcareous grassland (CG2)	Favourable	26/09/2013

ID: -
Location: 1770m S
SSSI name: Isle of Portland
Unit name: Inmosthay Quarries South
Broad habitat: Inland Rock
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Lowland calcareous grassland (CG1)	Unfavourable - Recovering	07/03/2013
Lowland calcareous grassland (CG3-5)	Unfavourable - Recovering	07/03/2013
Scrub	Unfavourable - Recovering	07/03/2013

ID: -
Location: 1818m SW
SSSI name: Isle of Portland
Unit name: Fancy Beach
Broad habitat: Inland Rock
Condition: Unfavourable - Declining

Reportable features:

Feature name	Feature condition	Date of assessment
Lowland calcareous grassland (CG3-5)	Unfavourable - Declining	07/03/2013

ID: -
Location: 1892m S
SSSI name: Isle of Portland
Unit name: Broadcroft Quarries
Broad habitat: Inland Rock
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Lowland calcareous grassland (CG3-5)	Unfavourable - Recovering	15/03/2012
Populations of nationally scarce butterfly species - Plebejus argus, Silver-studded Blue	Unfavourable - Recovering	15/03/2012

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

Site Outline

Search buffers in metres (m)

Listed buildings

Conservation areas

Conservation areas - no data

National Parks

Areas of Outstanding Natural Beauty

Registered parks and gardens

Scheduled Monuments

World Heritage Sites

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	3

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 71**

ID	Location	Name	Grade	Reference Number	Listed date
1	20m N	Dockyard Offices, Portland, Dorset, Dorset, DT5	II	1203099	17/05/1993
A	199m S	East Weare Batteries At Sy 694 741, Portland, Dorset, Dorset, DT5	II	1281863	17/05/1993
2	207m S	Battery Approximately 160M NE Of East Weare Camp, Portland, Dorset, Dorset, DT5	II	1447946	26/02/2018

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	1

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

Features are displayed on the Visual and cultural designations map on **page 71**

ID	Location	Ancient monument name	Reference number
A	135m S	Battery 200yds (180m) E of the Naval cemetery	1002412

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

12 Agricultural designations

Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 74**

ID	Location	Classification	Description
1	**On site**	**Non Agricultural**	-

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment.

This data is sourced from Natural England.

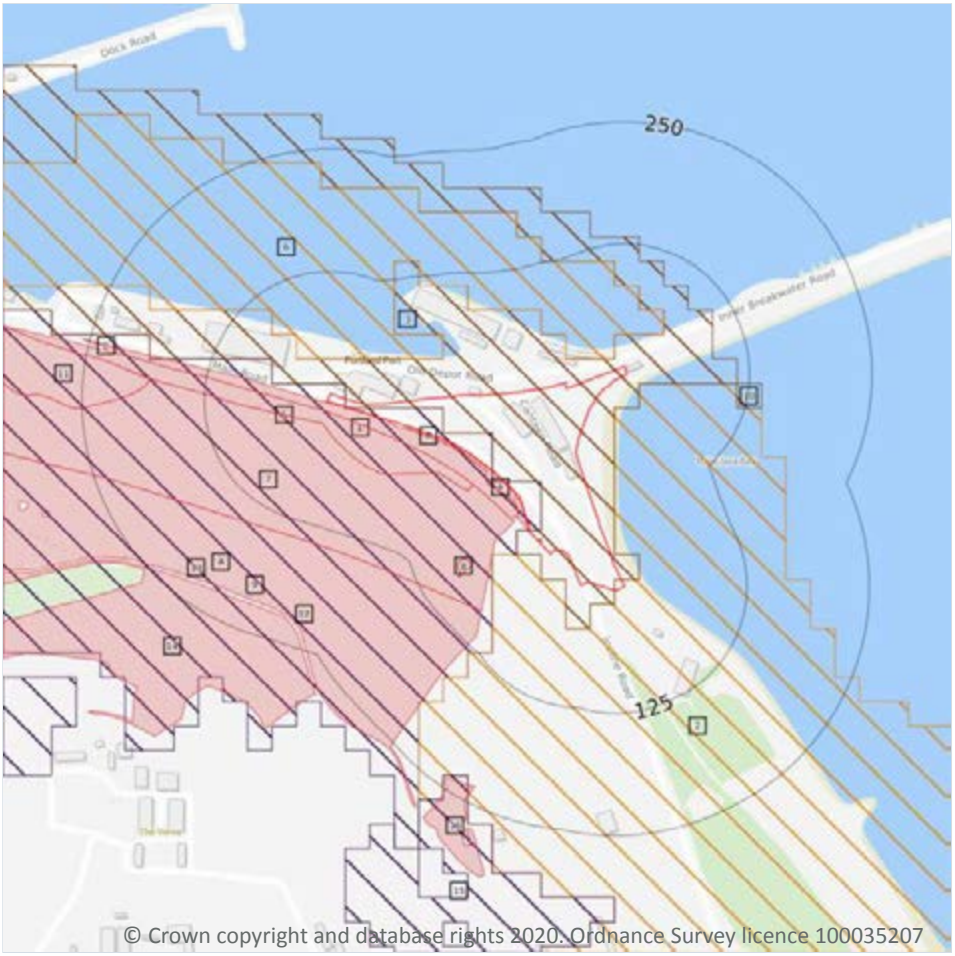
12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks
Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	**16**

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 76**

ID	Location	Main Habitat	Other habitats
1	**On site**	**Maritime cliff and slope**	**Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)**
4	**On site**	**Maritime cliff and slope**	**Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)**

ID	Location	Main Habitat	Other habitats
B	**On site**	**Maritime cliff and slope**	**Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)**
B	**On site**	**No main habitat but additional habitats present**	**Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)**
5	10m S	Maritime cliff and slope	Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)
7	12m W	Maritime cliff and slope	Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)
8	67m SW	Maritime cliff and slope	Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)
9	91m SW	Maritime cliff and slope	Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)
11	181m W	Maritime cliff and slope	Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)
A	194m SW	Maritime cliff and slope	Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)
12	212m S	Maritime cliff and slope	Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)
13	214m SW	Maritime cliff and slope	Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)
C	221m W	Maritime cliff and slope	Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)
14	221m S	Maritime cliff and slope	Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)
16	233m SW	Lowland calcareous grassland	Main habitat: LCGRA (INV > 50%)
C	245m W	Maritime cliff and slope	Main habitat: MCSLP (INV > 50%); Additional: LCGRA (ENSIS L2); UCGRA (ENSIS L2)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	**6**

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

Features are displayed on the Habitat designations map on **page 76**

ID	Location	Type	Habitat
2	**On site**	**Network Enhancement Zone 1**	**Not specified**
3	**On site**	**Network Enhancement Zone 2**	**Not specified**
A	**On site**	**Primary Habitat**	**Maritime cliff and slope**
6	11m N	Network Enhancement Zone 1	Not specified
10	113m E	Network Enhancement Zone 2	Not specified
15	226m SW	Primary Habitat	Lowland calcareous grassland

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

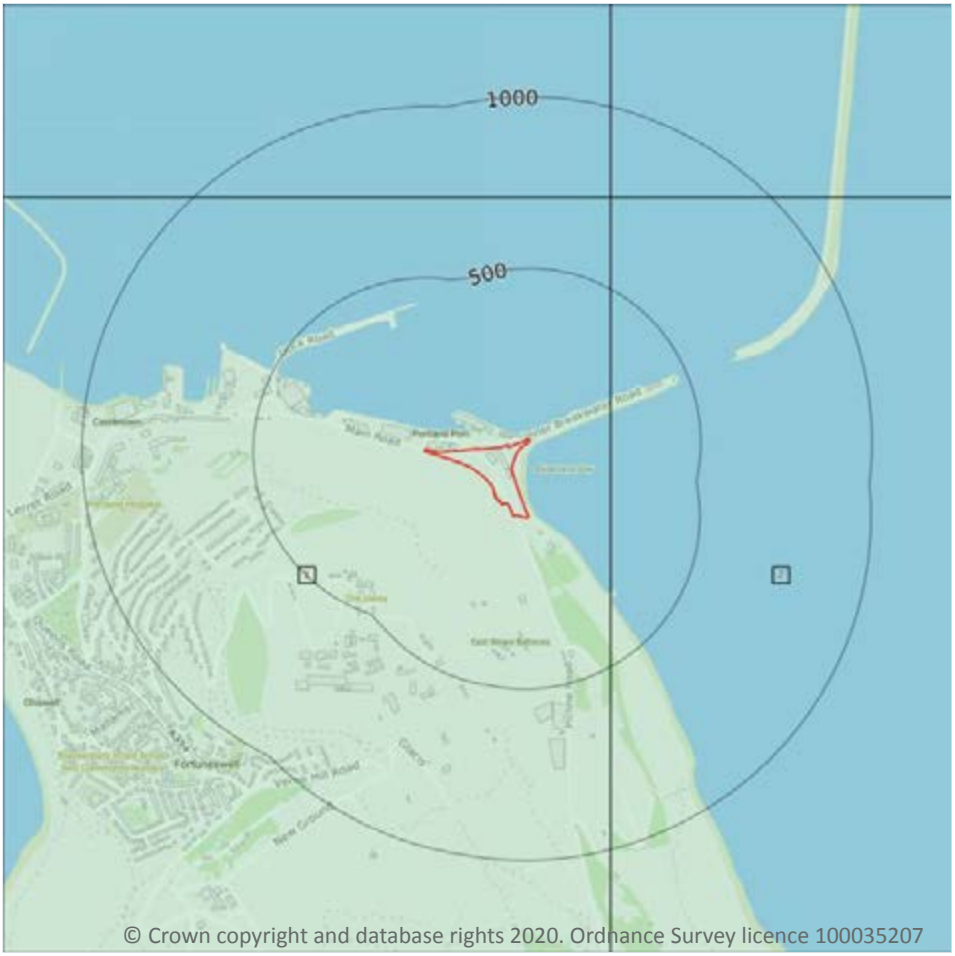
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

Full coverage

Partial coverage

No coverage

14.1 10k Availability

Records within 500m	2

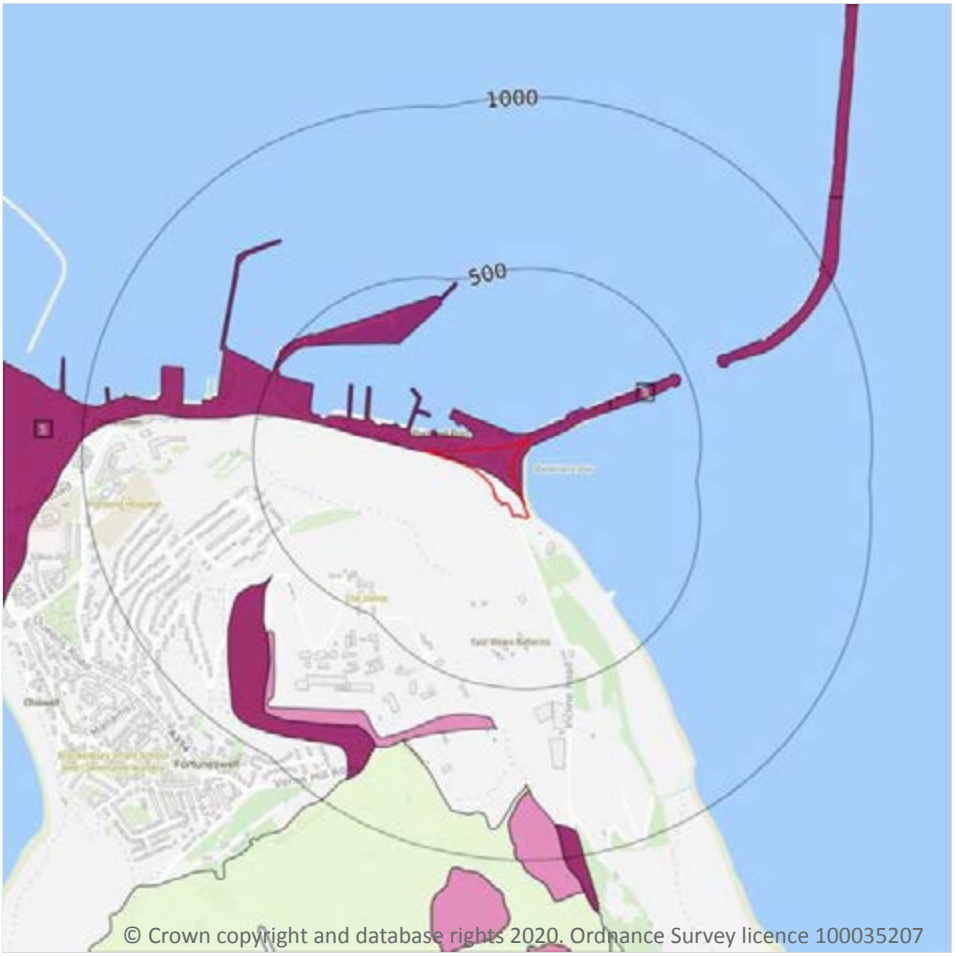
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 79**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**SY67SE**
2	237m E	Full	Full	Full	Full	SY77SW

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m	2

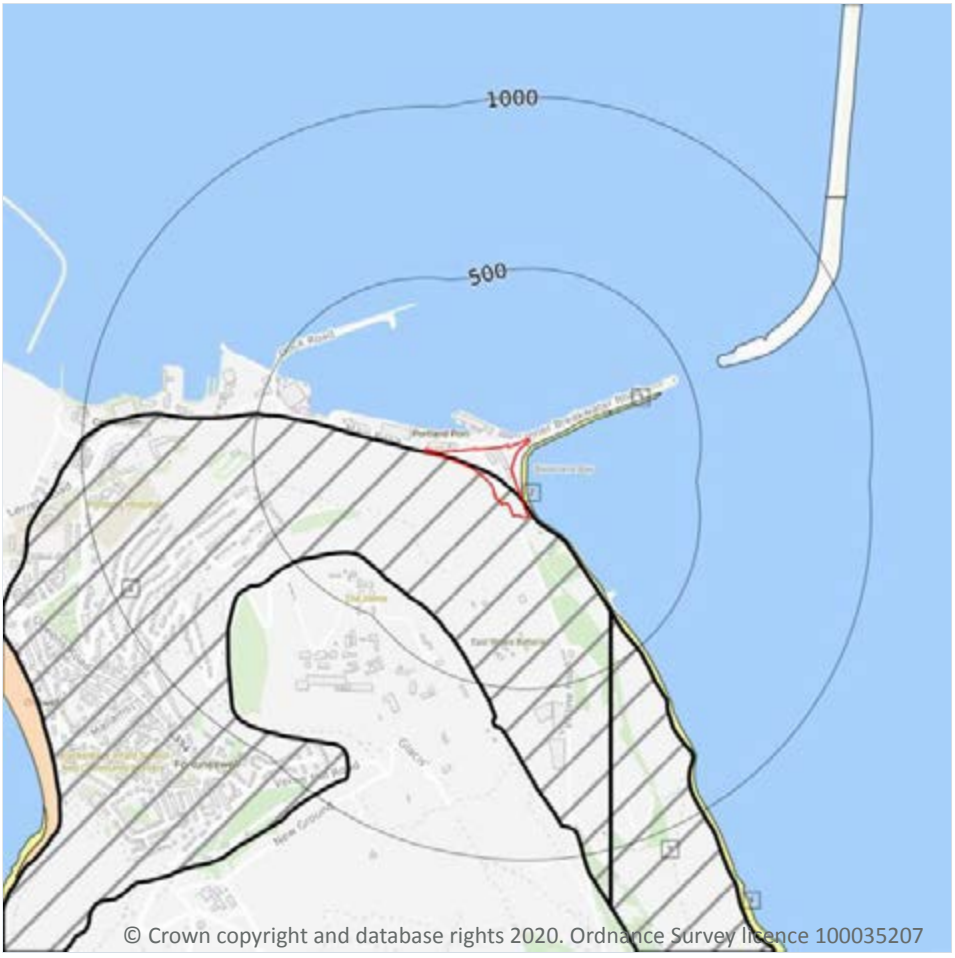
Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 80**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**MGR-ARTDP**	**Made Ground (Undivided)**	**Artificial Deposit**
2	254m E	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m **3**

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 81**

ID	Location	LEX Code	Description	Rock description
2	3m E	TFD-XCZS	Tidal Flat Deposits - Clay, Silt And Sand	Clay, Silt And Sand
3	250m E	TFD-XCZS	Tidal Flat Deposits - Clay, Silt And Sand	Clay, Silt And Sand
4	357m SE	TFD-XCZS	Tidal Flat Deposits - Clay, Silt And Sand	Clay, Silt And Sand

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m	2

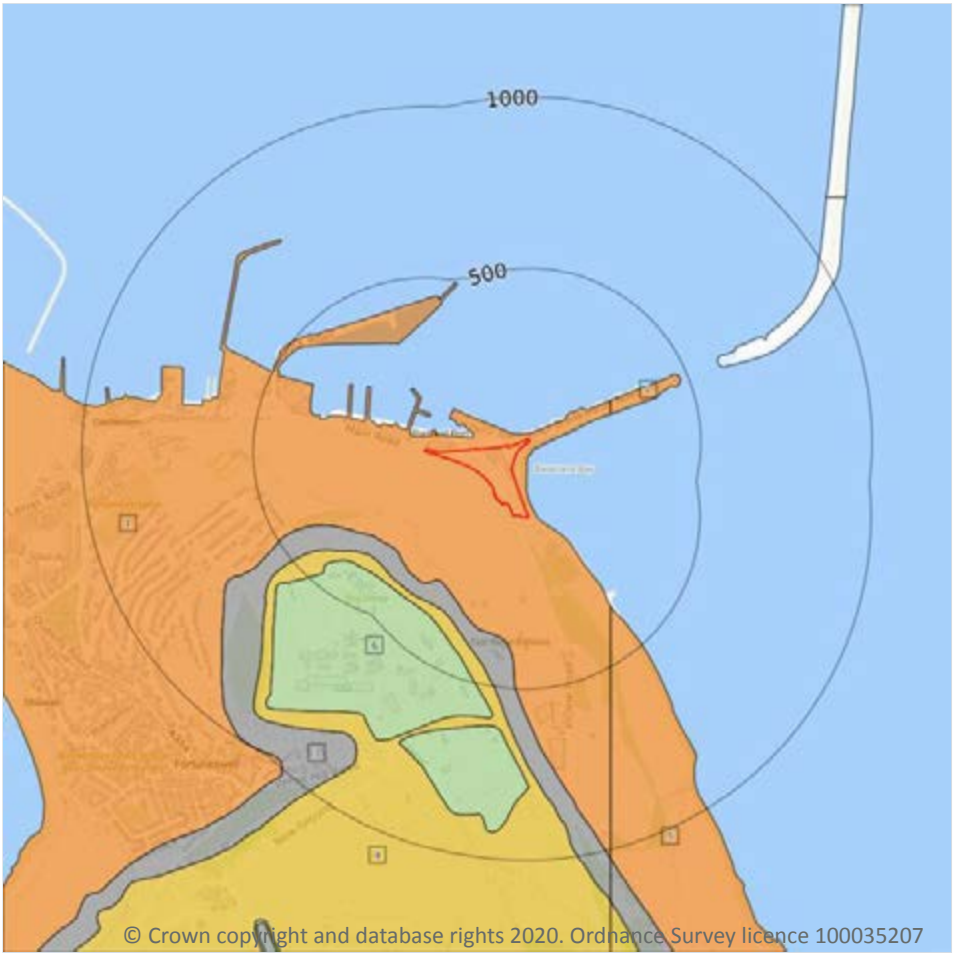
Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 81**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**SLIP-UKNOWN**	**Landslide Deposits**	**Unknown/unclassified Entry**
5	367m SE	SLIP-UKNOWN	Landslide Deposits	Unknown/unclassified Entry

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m **6**

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 83**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**KC-MDST**	**Kimmeridge Clay Formation - Mudstone**	**Kimmeridgian Age**
2	250m E	KC-MDST	Kimmeridge Clay Formation - Mudstone	Kimmeridgian Age
3	284m SW	POSA-STMD	Portland Sand Formation - Sandstone And Mudstone	Tithonian Age
4	343m SW	POCH-LMST	Portland Cherty Member - Limestone	Tithonian Age

ID	Location	LEX Code	Description	Rock age
5	357m SE	KC-MDST	Kimmeridge Clay Formation - Mudstone	Kimmeridgian Age
6	380m SW	POFR-LMST	Portland Freestone Member - Limestone	Tithonian Age

This data is sourced from the British Geological Survey.

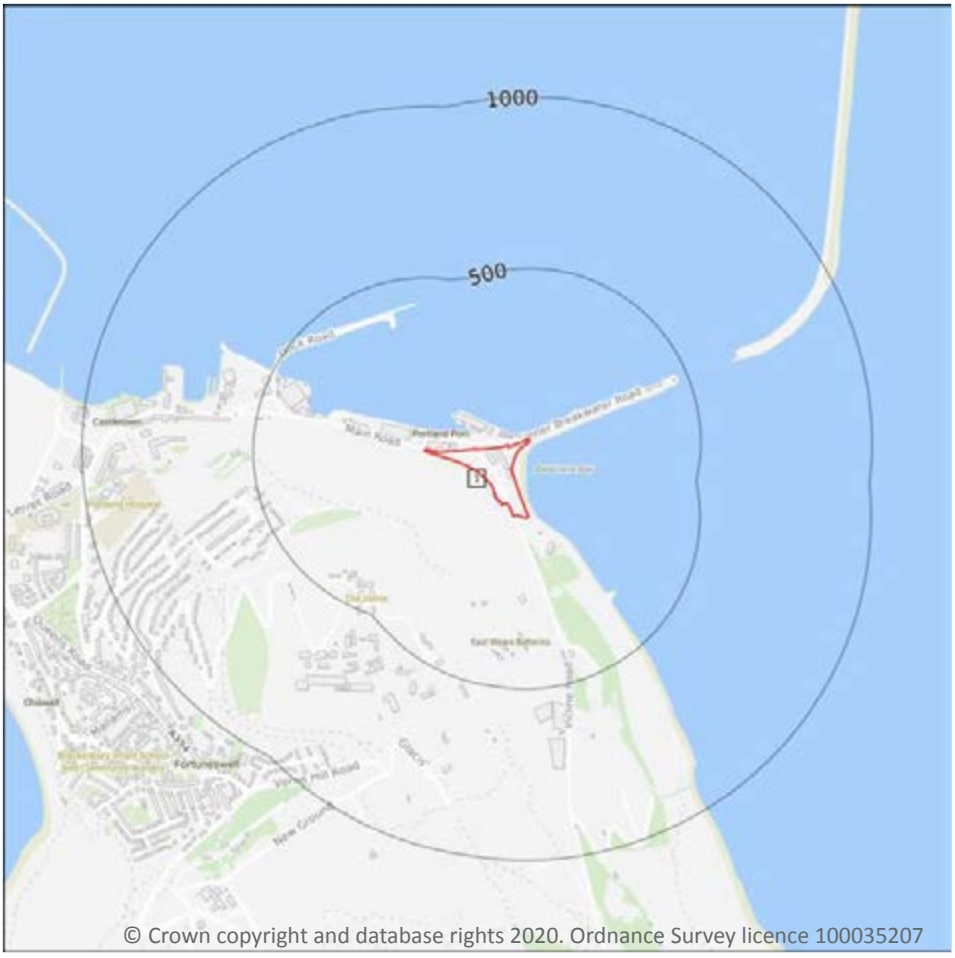
14.6 Bedrock faults and other linear features (10k)

Records within 500m	**0**

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

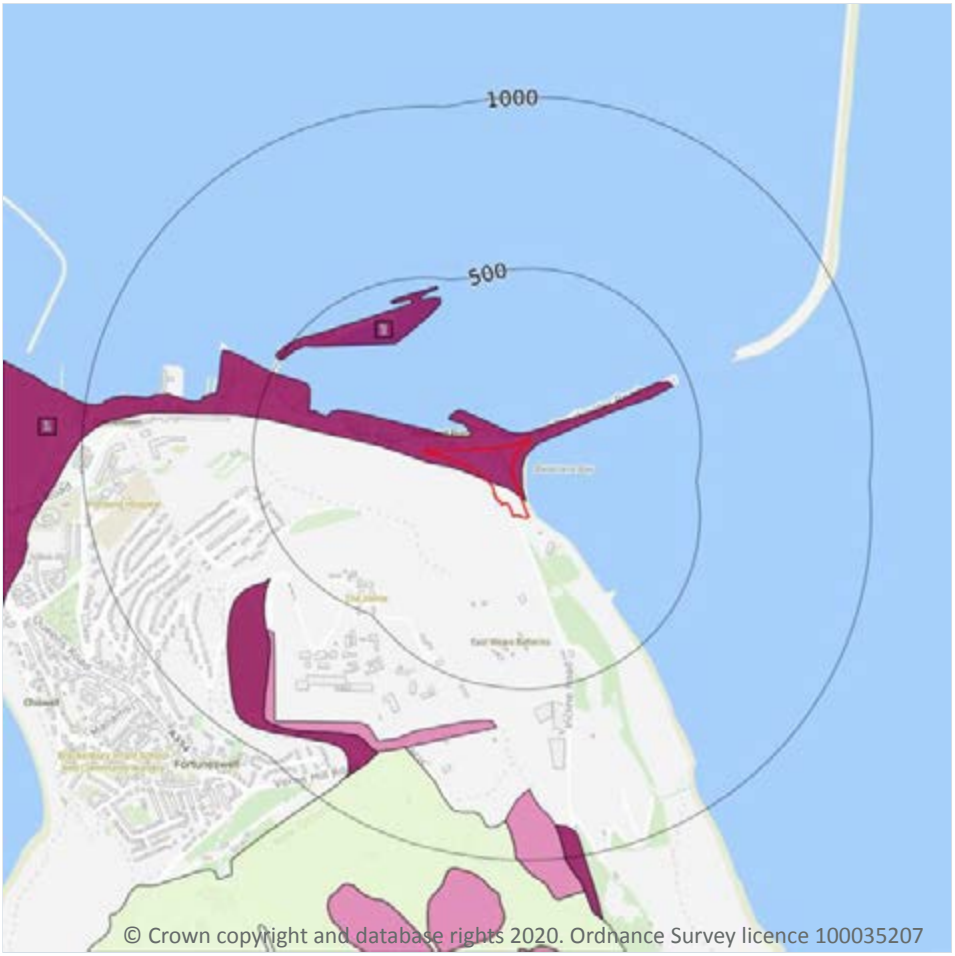
An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 85**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW342e_343_swanage_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

15.2 Artificial and made ground (50k)

Records within 500m	2

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 86**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**MGR-ARTDP**	**MADE GROUND (UNDIVIDED)**	**ARTIFICIAL DEPOSIT**
2	320m N	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

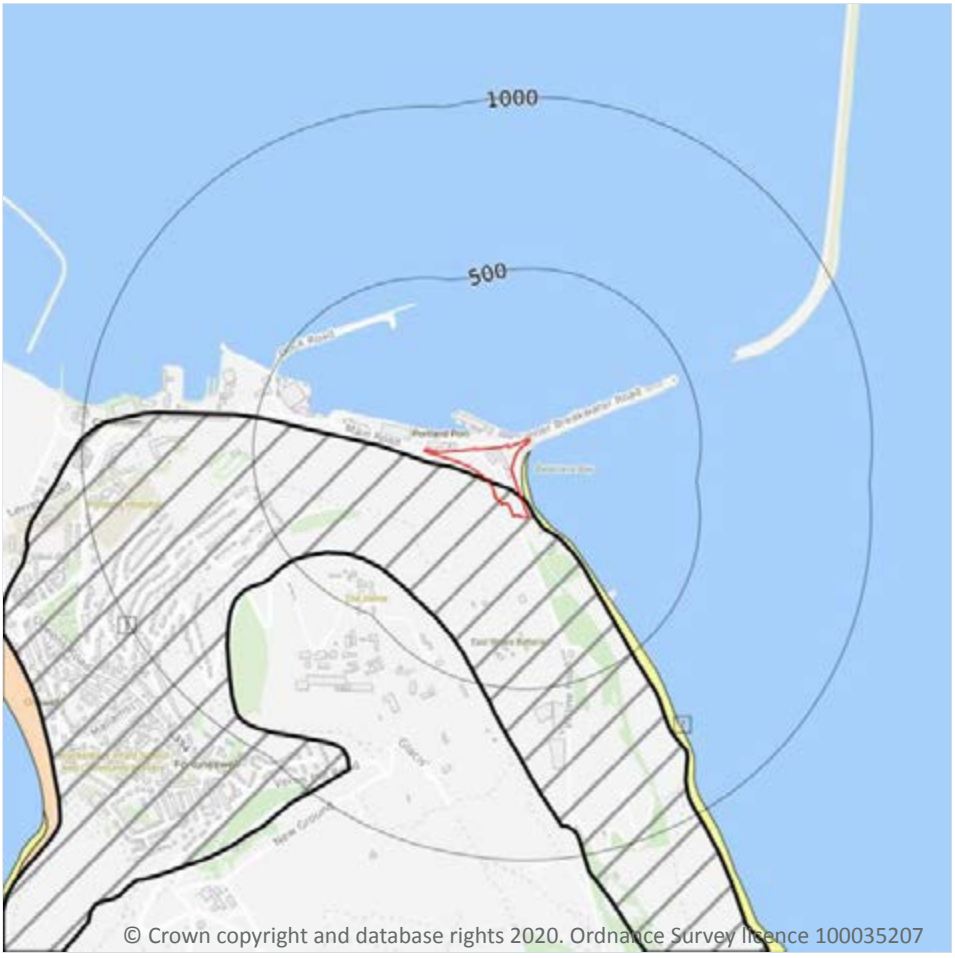
Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**Very High**	**Low**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m	1

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 88**

ID	Location	LEX Code	Description	Rock description
2	10m E	TFD-XCZS	TIDAL FLAT DEPOSITS	CLAY, SILT AND SAND

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
10m SE	Intergranular	Moderate	Very Low

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	1

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 88**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**SLIP-UKNOWN**	**LANDSLIDE DEPOSITS**	**UNKNOWN/UNCLASSIFIED ENTRY**

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

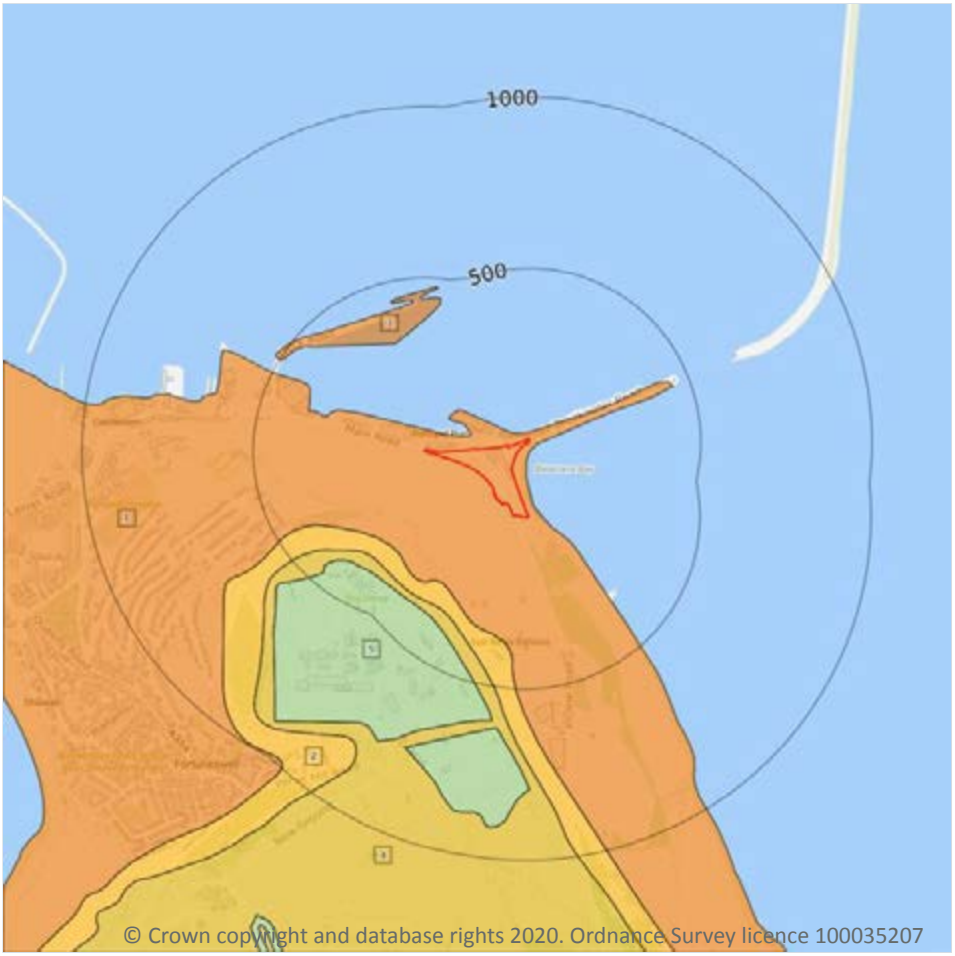
Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

Flow type	Maximum permeability	Minimum permeability
Mixed	Very High	Low

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	5

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 90**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**KC-MDST**	**KIMMERIDGE CLAY FORMATION - MUDSTONE**	**KIMMERIDGIAN**
2	285m SW	POSA-SDST	PORTLAND SAND FORMATION - SANDSTONE	TITHONIAN
3	320m N	KC-MDST	KIMMERIDGE CLAY FORMATION - MUDSTONE	KIMMERIDGIAN
4	342m SW	POCH-LMST	PORTLAND CHERT MEMBER - LIMESTONE	TITHONIAN

ID	Location	LEX Code	Description	Rock age
5	381m SW	POFR-LMST	PORTLAND FREESTONE MEMBER - LIMESTONE	TITHONIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	**1**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Low**	**Very Low**

This data is sourced from the British Geological Survey.

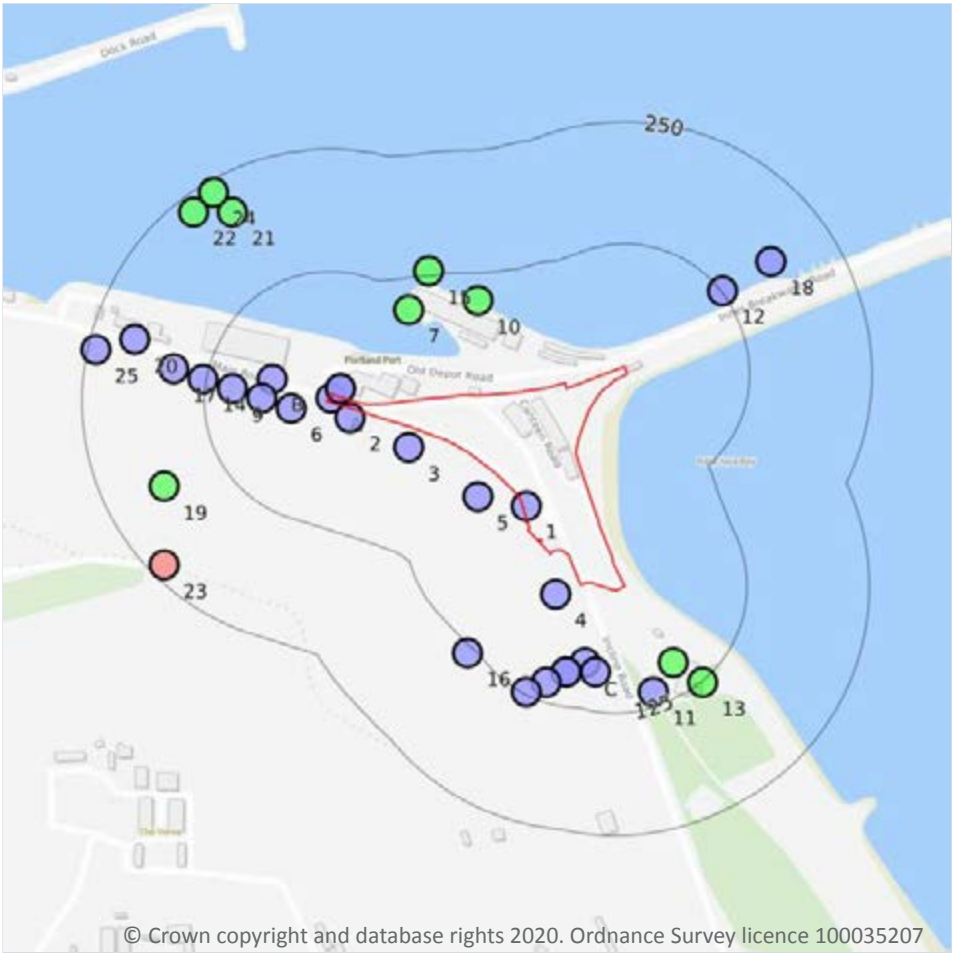
15.10 Bedrock faults and other linear features (50k)

Records within 500m	**0**

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



Site Outline

Search buffers in metres (m)

Confidential

0 - 10m

10 - 30m

30m+

Unknown

16.1 BGS Boreholes

Records within 250m	38

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

Features are displayed on the Boreholes map on **page 92**

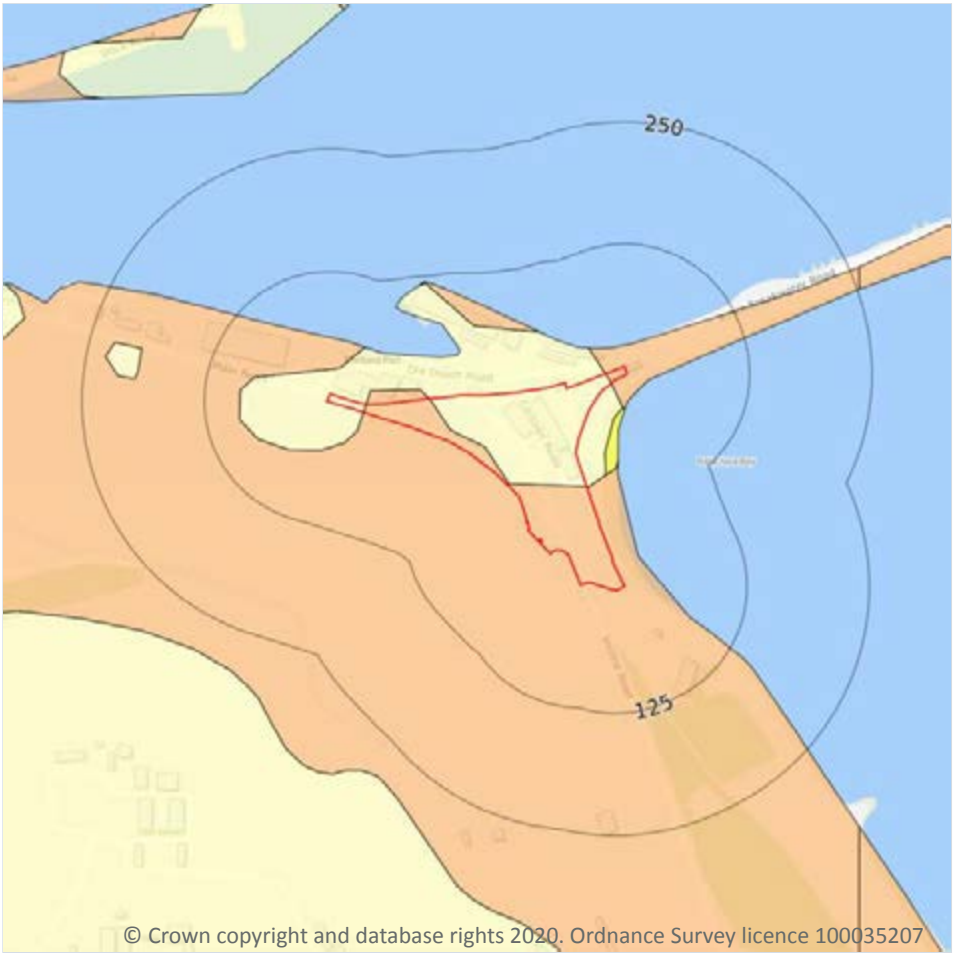
ID	Location	Grid reference	Name	Length	Confidential	Web link
1	**On site**	**369660 74150**	**PORTLAND GRAVITY SEWER BH9**	**5.5**	**N**	**439963**
A	**On site**	**369460 74260**	**PORTLAND GRAVITY SEWER TP8**	**1.0**	**N**	**439962**
A	9m N	369470 74270	HMNB PORTLAND BH3	7.5	N	439877

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	9m N	369470 74270	HMNB PORTLAND PORT HQ BH1,2,TP1,2,3,4	9.6	N	439868
2	10m S	369480 74240	STABILITY CLIFF ABOVE NAVAL BASE BH65A	9.29	N	439844
3	20m S	369540 74210	STABILITY CLIFF ABOVE NAVAL BASE BH62A	4.41	N	439843
4	27m W	369690 74060	PORTLAND GRAVITY SEWER BH10	8.5	N	439964
5	30m SW	369610 74160	STABILITY CLIFF ABOVE NAVAL BASE BH59A	9.14	N	439842
6	37m W	369420 74250	STABILITY CLIFF ABOVE NAVAL BASE BH67A	8.53	N	439845
B	61m W	369400 74280	PORTLAND GRAVITY SEWER BH8	5.5	N	439961
B	66m W	369390 74260	STABILITY CLIFF ABOVE NAVAL BASE BH68A	9.44	N	439846
C	79m S	369720 73990	PORTLAND ASSESSMENT POLICE QTRS BH6	7.62	N	439835
C	86m S	369730 73980	PORTLAND ASSESSMENT POLICE QTRS BH5	7.62	N	439834
C	90m S	369700 73980	POLICE QTRS BH3	8.38	N	439840
C	90m S	369700 73980	POLICE QTRS BH2	5.79	N	439839
C	90m S	369700 73980	POLICE QTRS BH1	7.01	N	439838
C	90m S	369700 73980	POLICE QTRS BH4	5.79	N	439841
7	92m N	369540 74350	PORTLAND HMS OSPREY BH10	15.1	N	439878
8	93m SE	369810 73990	PORTLAND RN BASE A	17.8	N	439776
9	97m W	369360 74270	STABILITY CLIFF ABOVE NAVAL BASE BH69A	6.85	N	439847
10	97m N	369610 74360	PORTLAND HMS OSPREY BH12	15.1	N	439880
C	105m S	369680 73970	PORTLAND ASSESSMENT POLICE QTRS BH8	7.62	N	439836
11	111m S	369790 73960	PORTLAND GRAVITY SEWER BH13	6.0	N	439965
C	122m SW	369660 73960	PORTLAND ASSESSMENT POLICE QTRS BH9	6.4	N	439837
12	126m NE	369860 74370	PORTLAND PORT WEYMOUTH 1	5.0	N	17333246
13	126m SE	369840 73970	PORTLAND RN BASE B	16.0	N	439777
14	128m W	369330 74280	STABILITY CLIFF ABOVE NAVAL BASE BH70A	6.24	N	439848
15	130m N	369560 74390	PORTLAND HMS OSPREY BH11	12.5	N	439879
16	132m SW	369600 74000	PORTLAND HARBOUR (2 REPORTS)	-2.0	N	439725
17	159m W	369300 74290	STABILITY CLIFF ABOVE NAVAL BASE BH71A	9.44	N	439849
18	184m NE	369910 74400	PORTLAND PORT WEYMOUTH 2	7.7	N	17333247

ID	Location	Grid reference	Name	Length	Confidential	Web link
19	188m SW	369290 74170	STABILITY CLIFF ABOVE NAVAL BASE BH71B	18.28	N	439850
20	206m W	369260 74320	PORTLAND GRAVITY SEWER TP7A&7C	2.0	N	439960
21	211m NW	369360 74450	PORTLAND RMAS BERTHING BH4	25.0	N	439859
22	232m NW	369320 74450	PORTLAND RMAS BERTHING BH1	25.0	N	439856
23	236m SW	369290 74090	STABILITY CLIFF ABOVE NAVAL BASE BH71C	30.48	N	439851
24	238m NW	369340 74470	PORTLAND RMAS BERTHING BH3	25.0	N	439858
25	242m W	369220 74310	STABILITY CLIFF ABOVE NAVAL BASE BH74A	3.5	N	439852

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	3

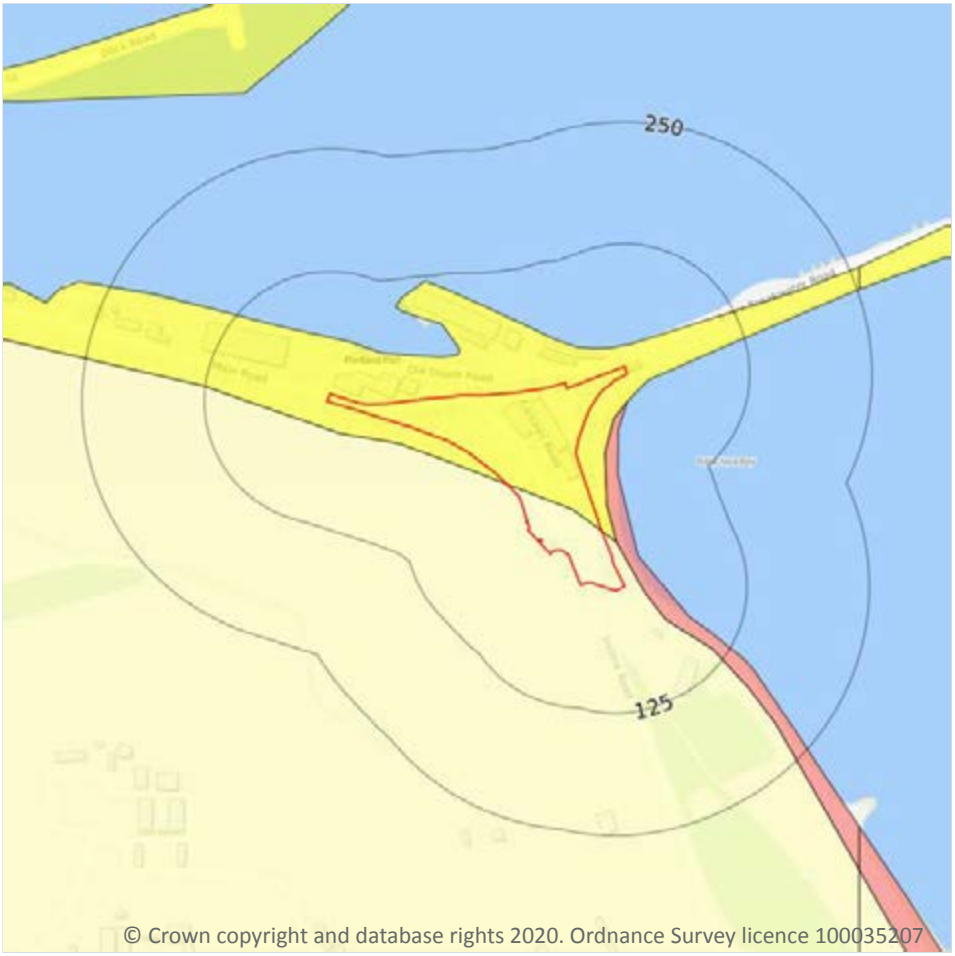
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 95**

Location	Hazard rating	Details
On site	**Negligible**	**Ground conditions predominantly non-plastic.**
On site	**Low**	**Ground conditions predominantly medium plasticity.**
22m E	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	3

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

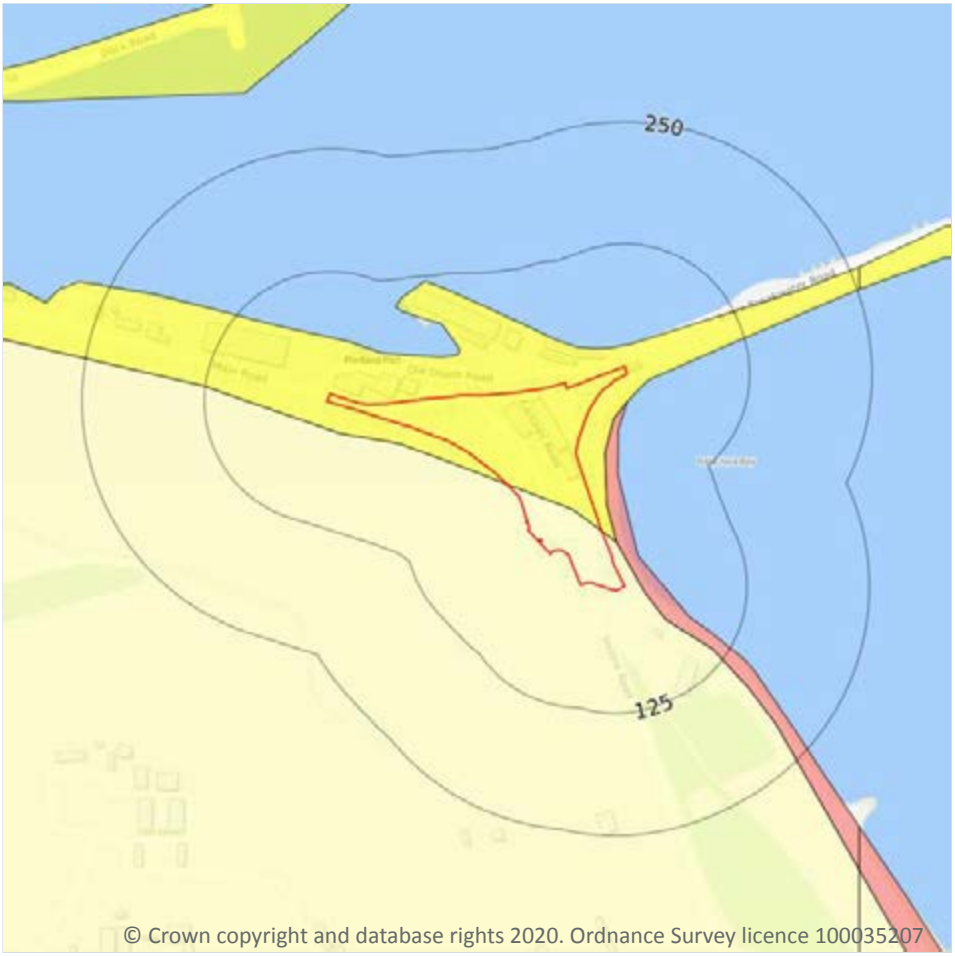
Features are displayed on the Natural ground subsidence - Running sands map on **page 97**

Location	Hazard rating	Details
On site	**Negligible**	**Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**
10m E	Moderate	Running sand conditions are probably present. Constraints may apply to land uses involving excavation or the addition or removal of water.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	3

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

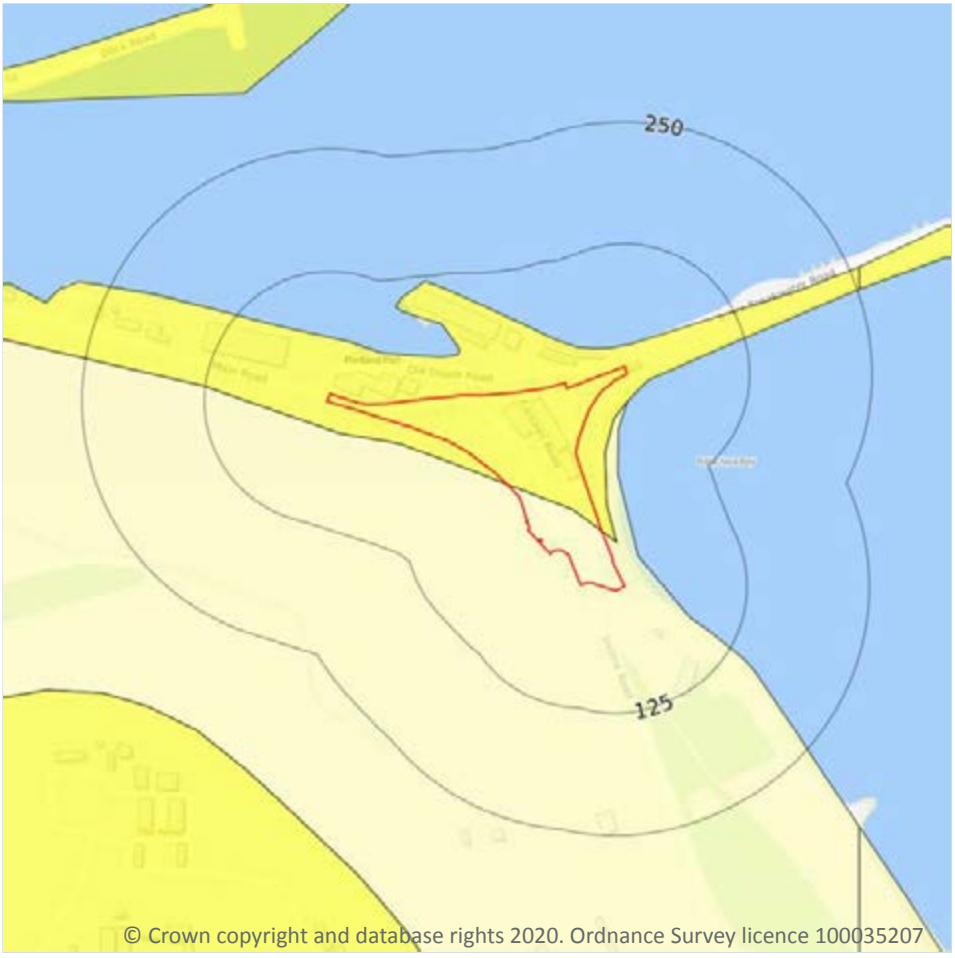
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 99**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
On site	**Very low**	**Compressibility and uneven settlement problems are not likely to be significant on the site for most land uses.**

Location	Hazard rating	Details
10m E	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	2

The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 101**

Location	Hazard rating	Details
On site	**Negligible**	**Deposits with potential to collapse when loaded and saturated are believed not to be present.**
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides

Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	5

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 102**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

Location	Hazard rating	Details
On site	**Moderate**	**Slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site.**
On site	**High**	**Slope instability problems almost certainly present and may be active. Significant constraint on land use.**
10m E	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.
26m SE	Moderate	Slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks

Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

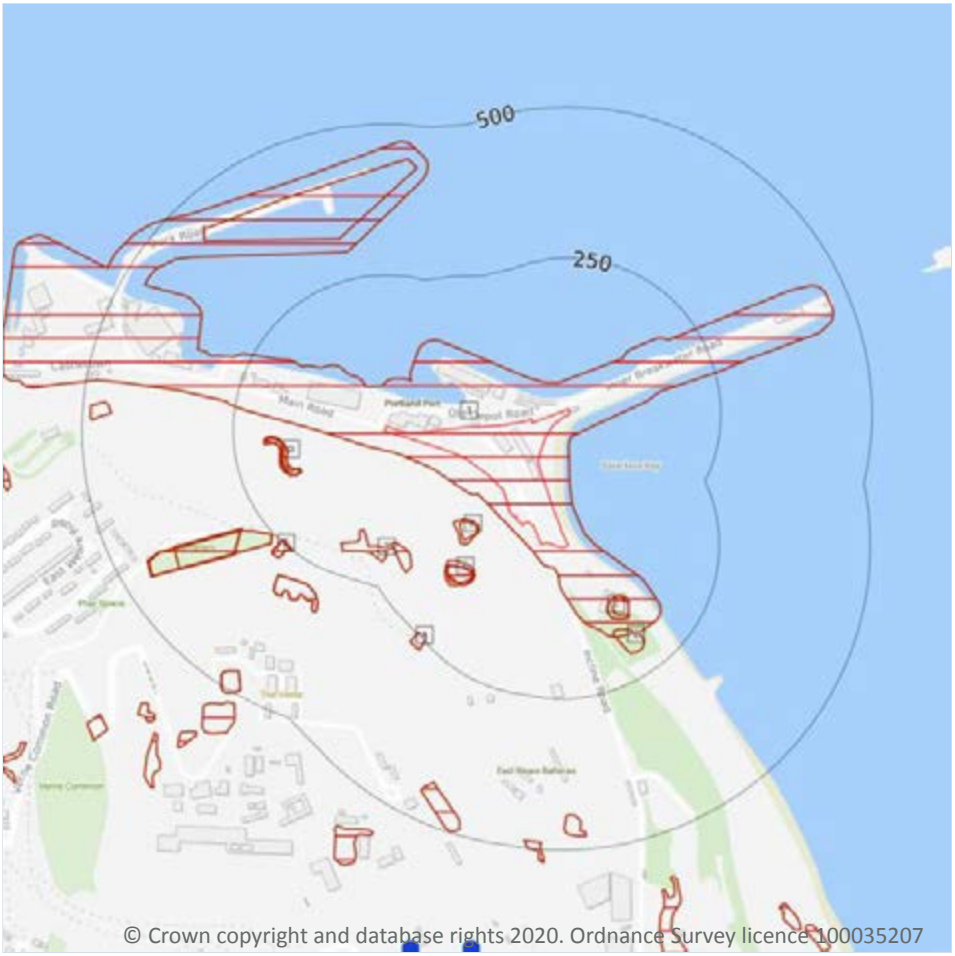
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 104**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline

Search buffers in metres (m)

Natural cavities (Area)

Natural cavities (Point)

BritPits

Surface ground workings

Underground workings

Historical Mineral Planning Areas

Mining Cavities

Non Coal Mining

Sporadic underground mining of restricted extent possible

Localised small scale underground mining possible

Small scale mining possible

Underground mining known or likely within or in close proximity

Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Peter Brett Associates (PBA).

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	19

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 106**

ID	Location	Land Use	Year of mapping	Mapping scale
1	**On site**	**Dock Yard**	**1963**	**1:10560**
A	56m SW	Unspecified Ground Workings	1963	1:10560
A	59m SW	Disused Reservoir	1901	1:10560
B	109m SW	Disused Reservoir	1901	1:10560
B	113m SW	Unspecified Heap	1938	1:10560
B	113m SW	Unspecified Heap	1927	1:10560
B	115m SW	Unspecified Pit	1963	1:10560
C	115m SE	Unspecified Ground Workings	1963	1:10560
C	115m SE	Unspecified Pit	1976	1:10000
D	153m SW	Unspecified Ground Workings	1938	1:10560
D	153m SW	Unspecified Ground Workings	1927	1:10560
D	153m SW	Unspecified Ground Workings	1901	1:10560
D	154m SW	Unspecified Ground Workings	1963	1:10560
2	161m SE	Old Reservoir	1901	1:10560
3	167m S	Unspecified Heaps	1976	1:10000
4	245m SW	Cuttings	1976	1:10000
E	246m SW	Unspecified Pit	1938	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
E	246m SW	Unspecified Pit	1927	1:10560
E	246m SW	Unspecified Pit	1901	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Peter Brett Associates (PBA).

18.8 JPB mining areas

Records on site	0

Areas which could be affected by former coal mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Mining Searches UK.

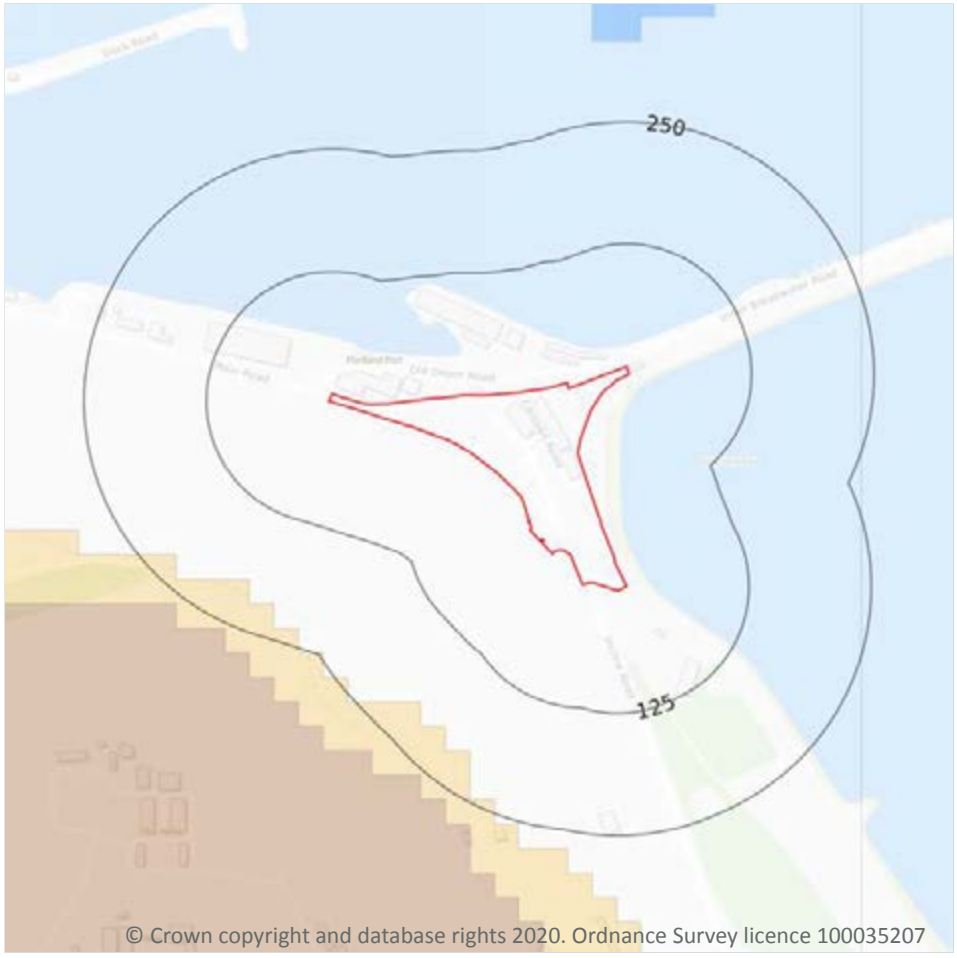
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



Site Outline

Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 111**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None****

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	3

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
10m SE	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

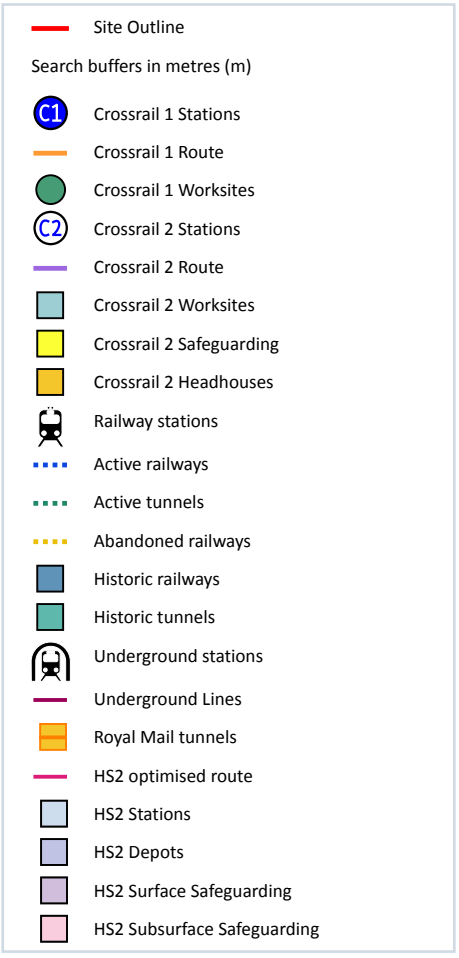
20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects



21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	6

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 113**

Location	Land Use	Year of mapping	Mapping scale
On site	**Railway Sidings**	**1864**	**2500**
On site	**Railway Sidings**	**1903**	**2500**
On site	**Railway Sidings**	**1901**	**10560**
On site	**Railway Sidings**	**1963**	**10560**
68m S	Railway Sidings	1959	2500
247m W	Railway Sidings	1960	2500

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	2

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

Features are displayed on the Railway infrastructure and projects map on **page 113**

Location	Description
6m SW	Razed
6m SW	Abandoned

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

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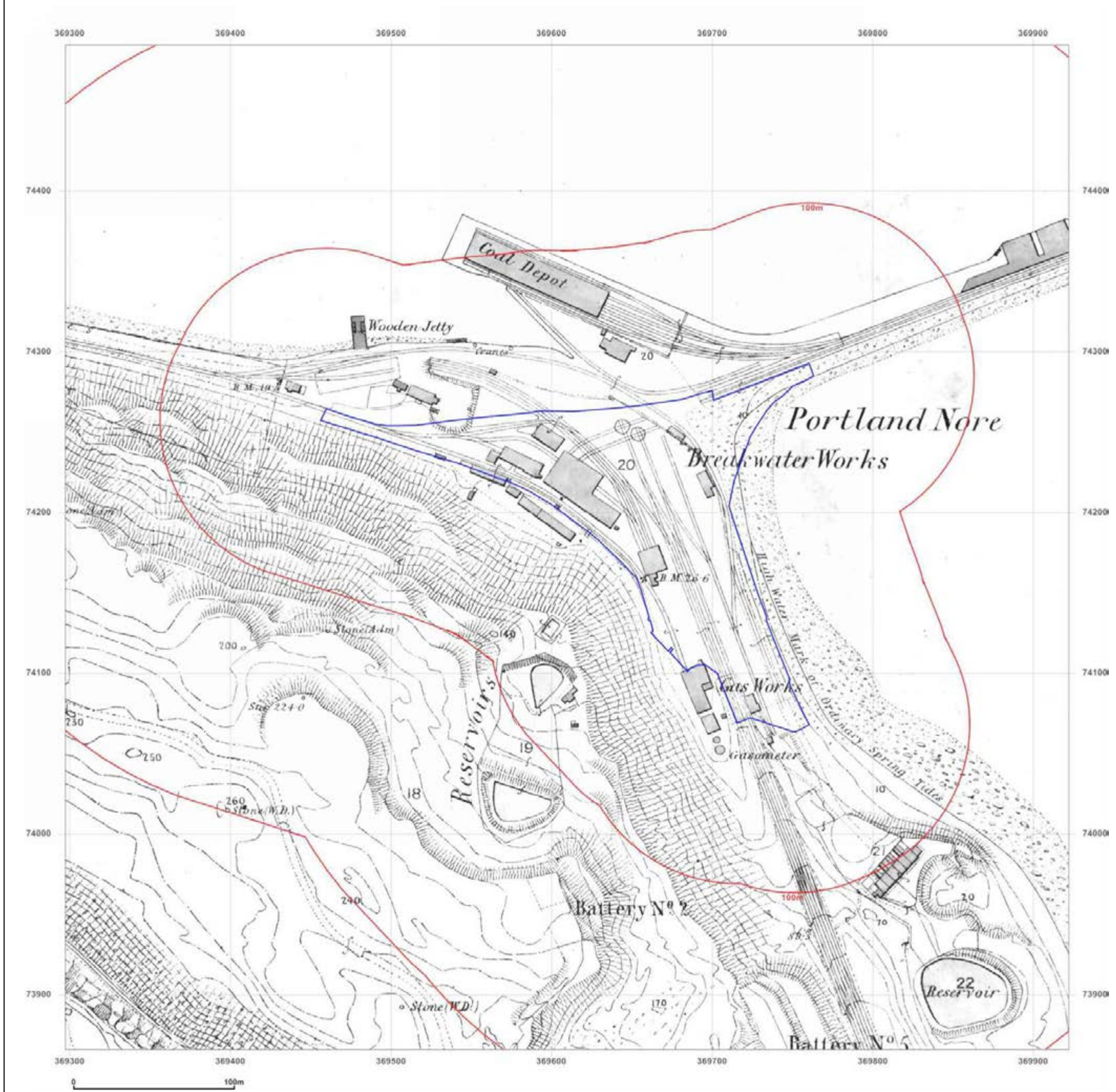

Groundsure INSIGHTS

Site Details:

STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: County Series

Map date: **1864**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1864
Edition N/A
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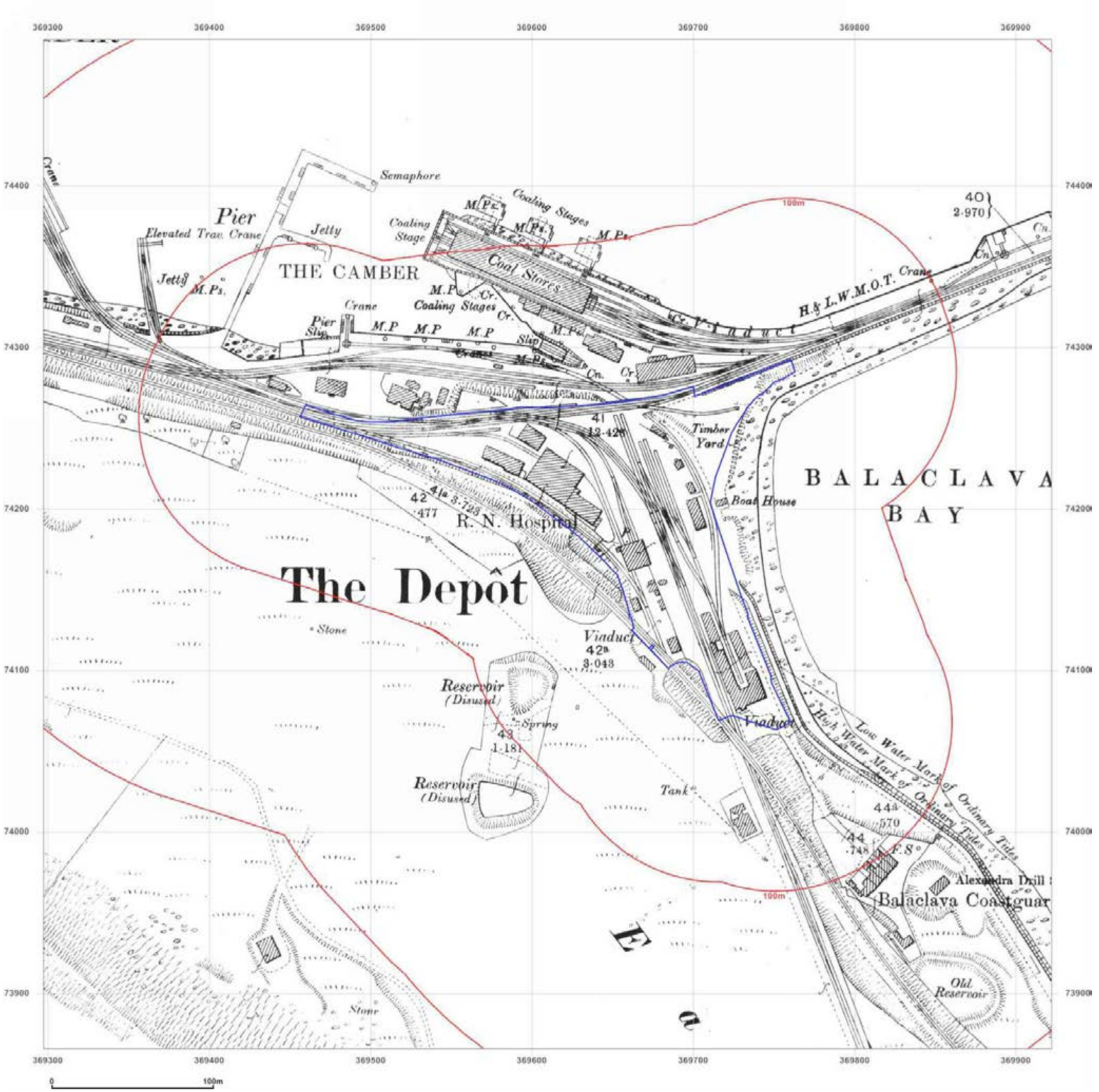

Groundsure INSIGHTS

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Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: County Series

Map date: **1903**

Scale: 1:2,500

Printed at: 1:2,500

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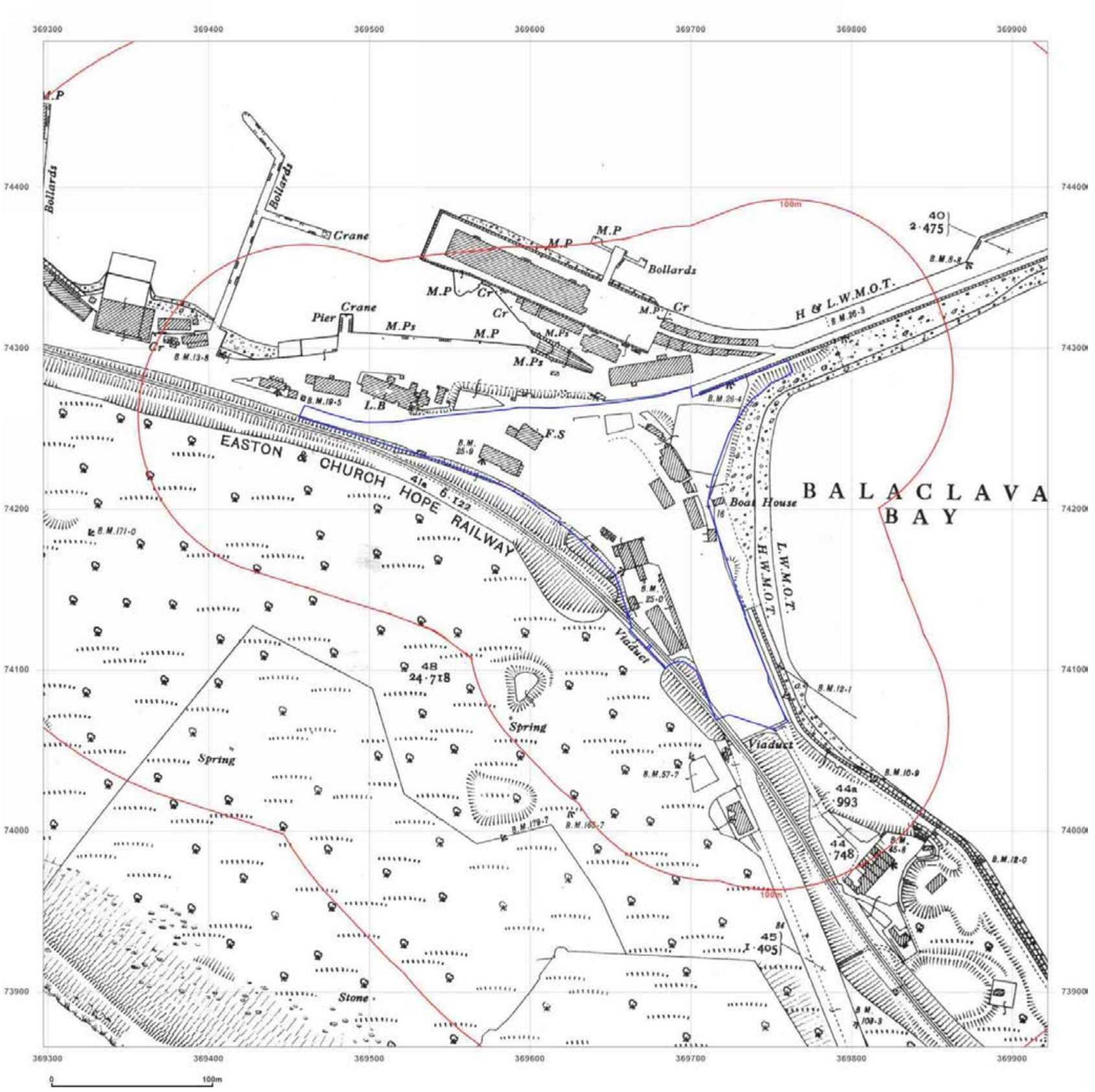

Groundsure INSIGHTS

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STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: County Series
Map date: **1929**
Scale: 1:2,500
Printed at: 1:2,500

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Revised 1929
Edition N/A
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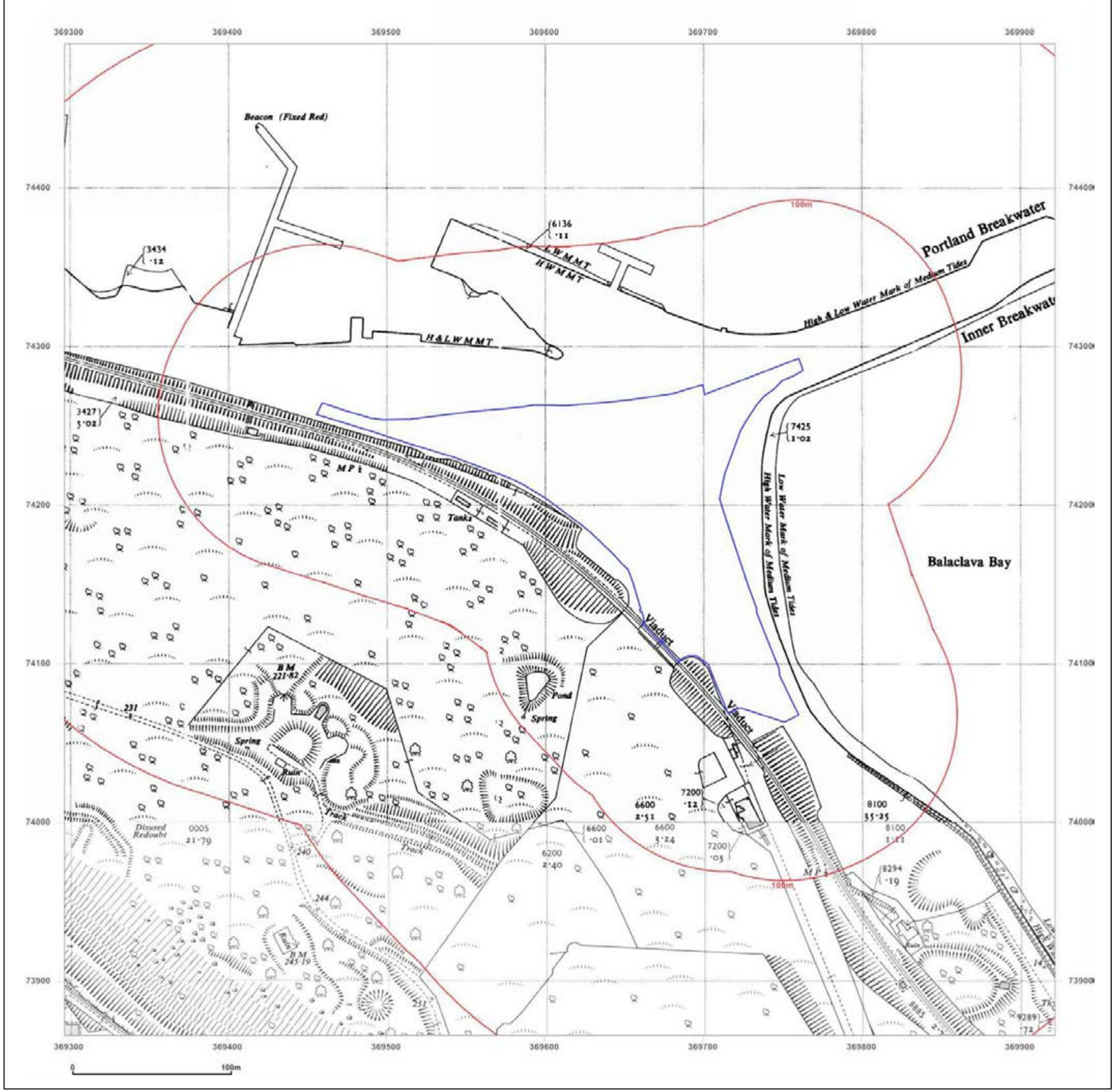

Groundsure INSIGHTS

Site Details:

STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: National Grid

Map date: **1959-1960**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed N/A
Revised N/A
Edition N/A
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Levelled N/A

Surveyed 1959
Revised 1959
Edition N/A
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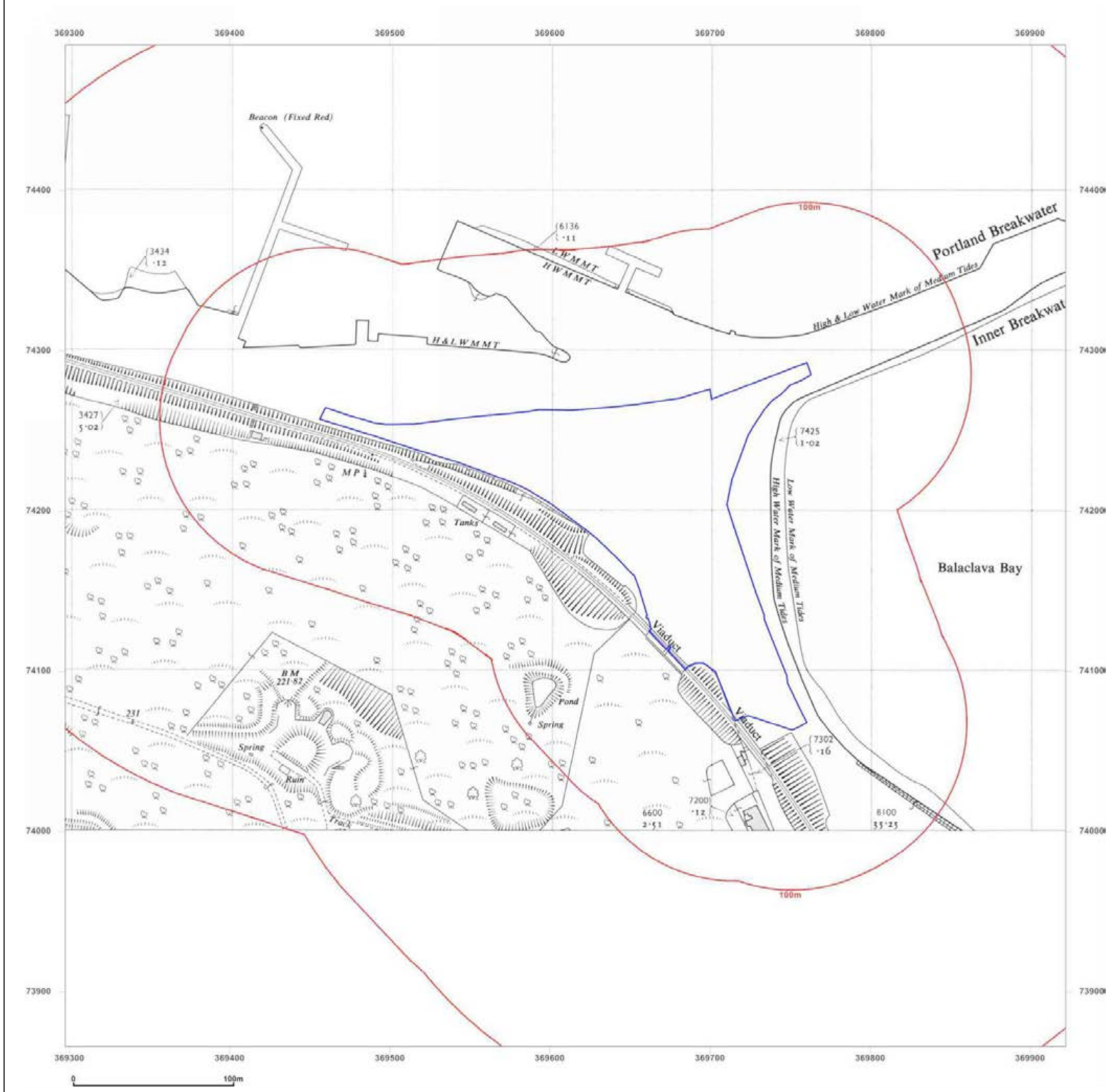

Groundsure INSIGHTS

Site Details:

STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: National Grid

Map date: **1960**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1960
Revised 1960
Edition N/A
Copyright 1960
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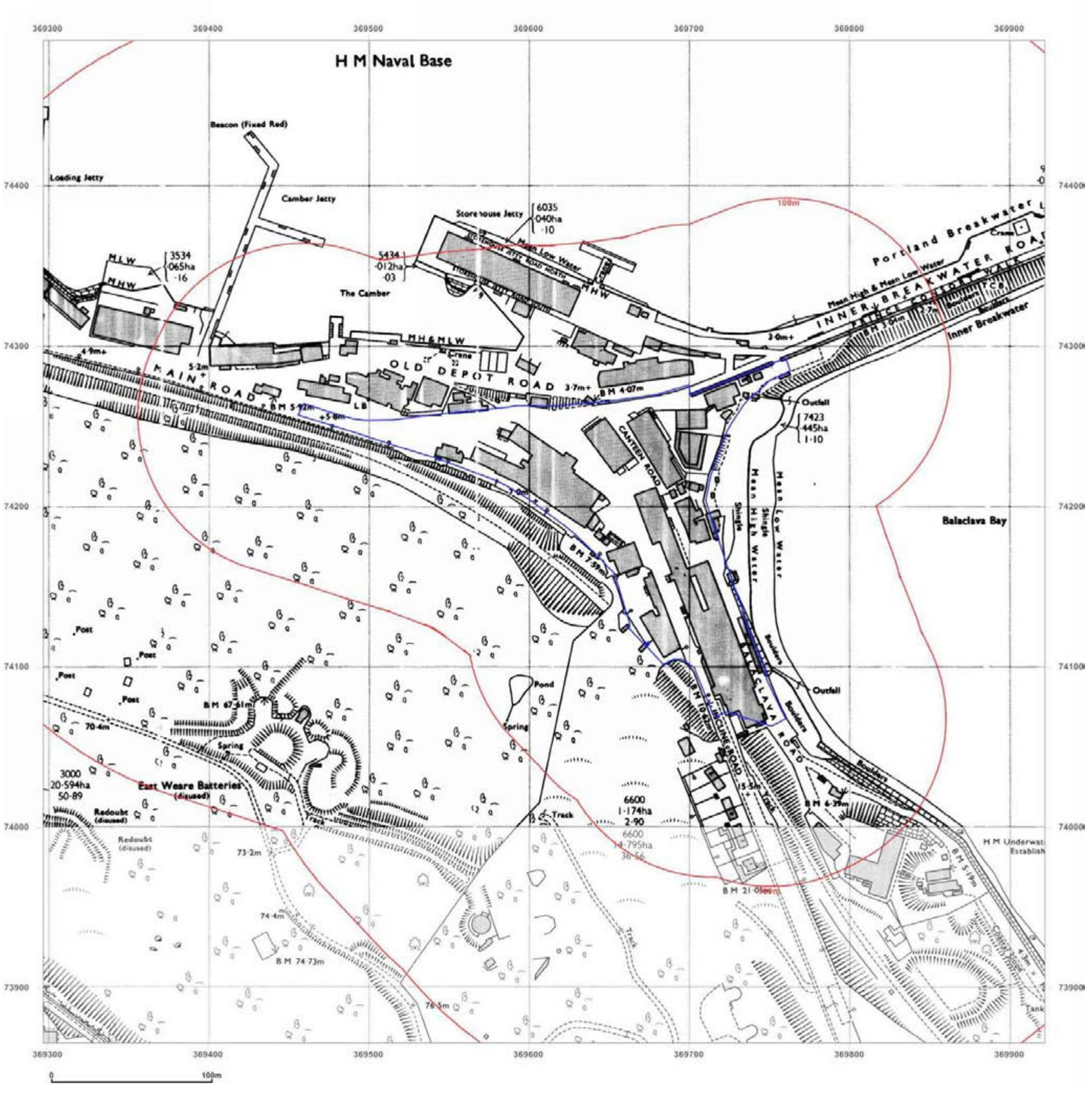

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STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: National Grid

Map date: **1973**

Scale: 1:2,500

Printed at: 1:2,500

N W E S

Surveyed N/A
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Revised 1973
Edition N/A
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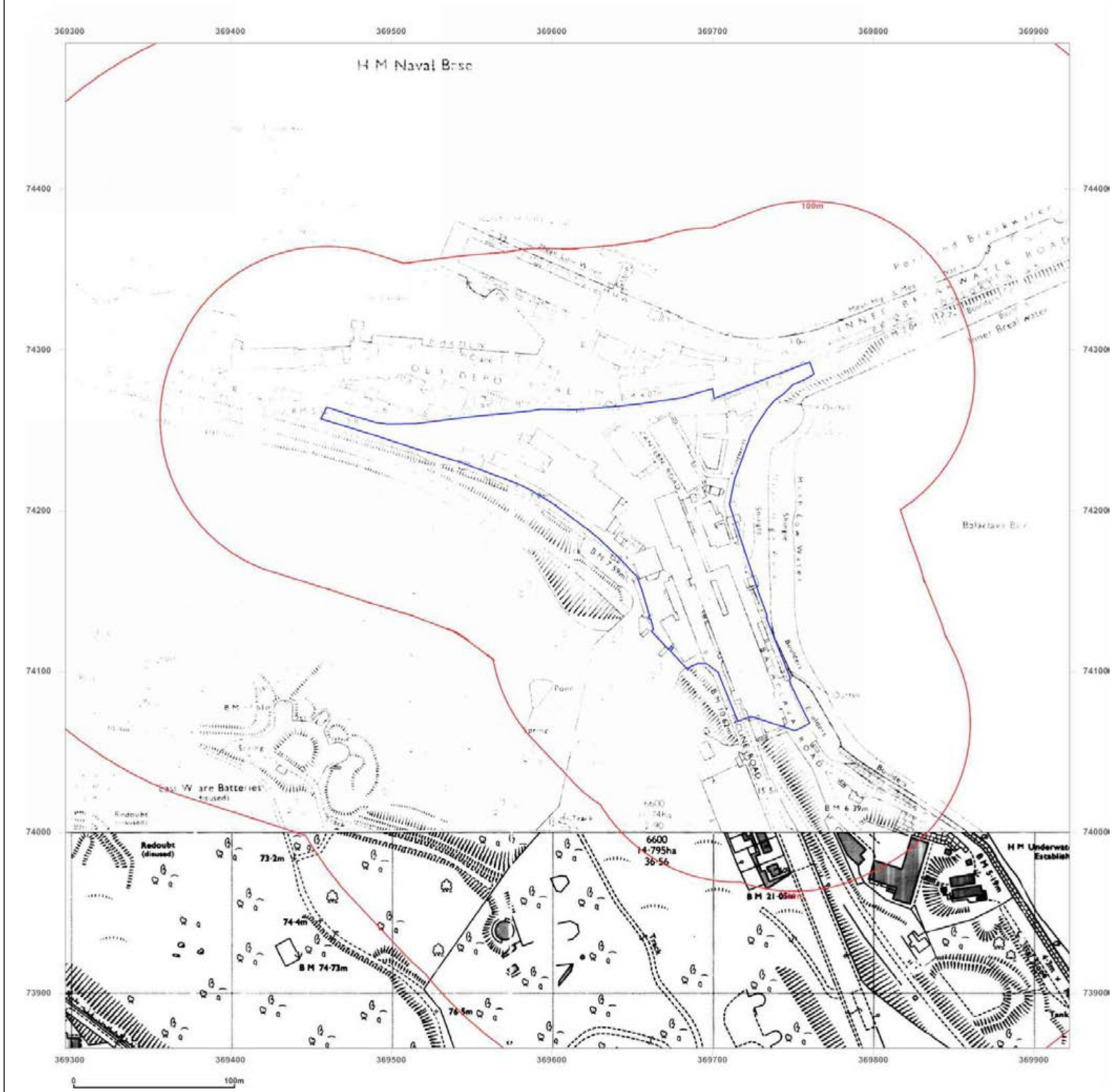

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Site Details:

STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: National Grid

Map date: **1974-1976**

Scale: 1:2,500

Printed at: 1:2,500

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Revised N/A
Edition N/A
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Edition N/A
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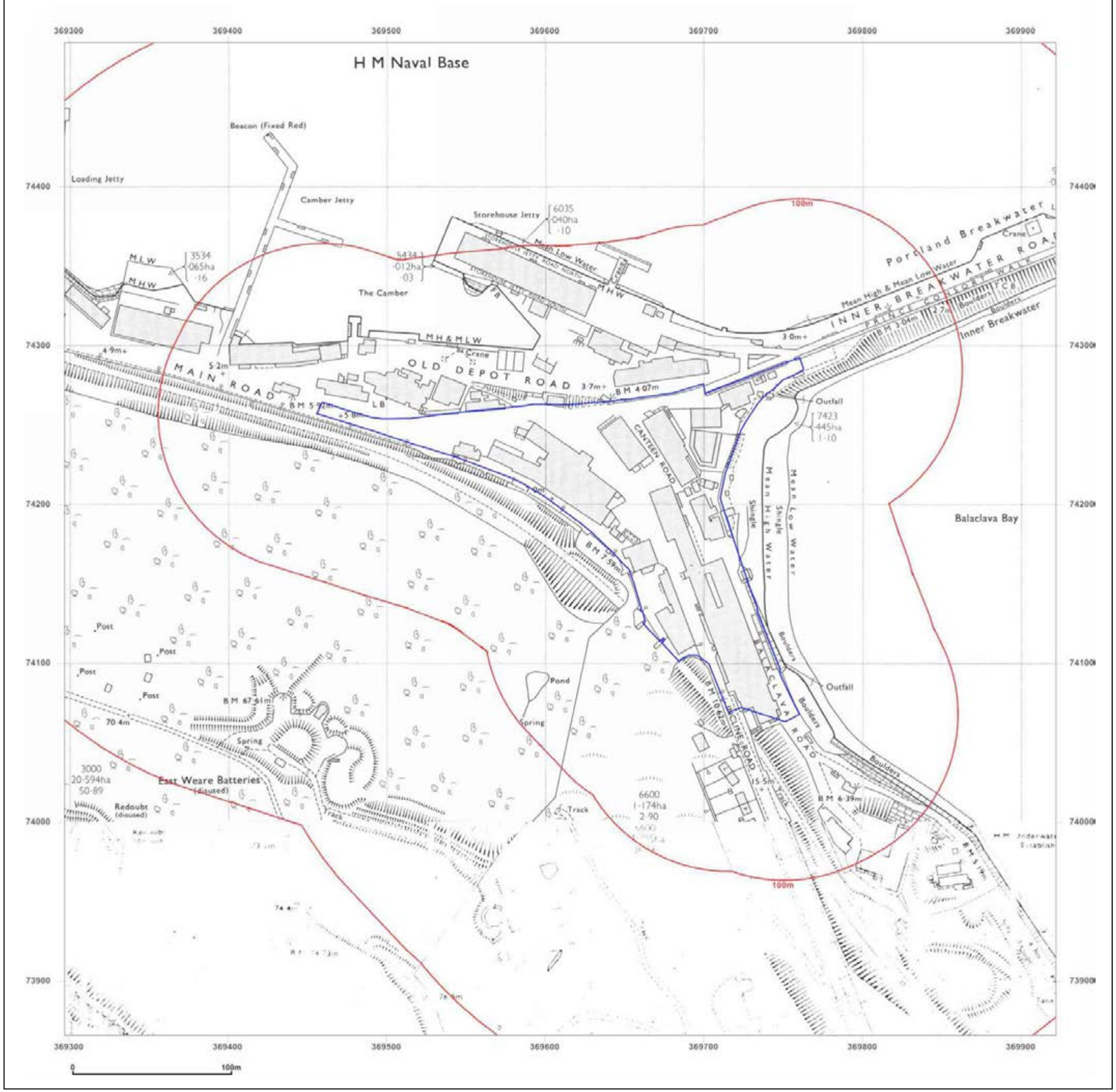

Groundsure INSIGHTS

Site Details:

STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: National Grid

Map date: **1973-1976**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1973
Edition N/A
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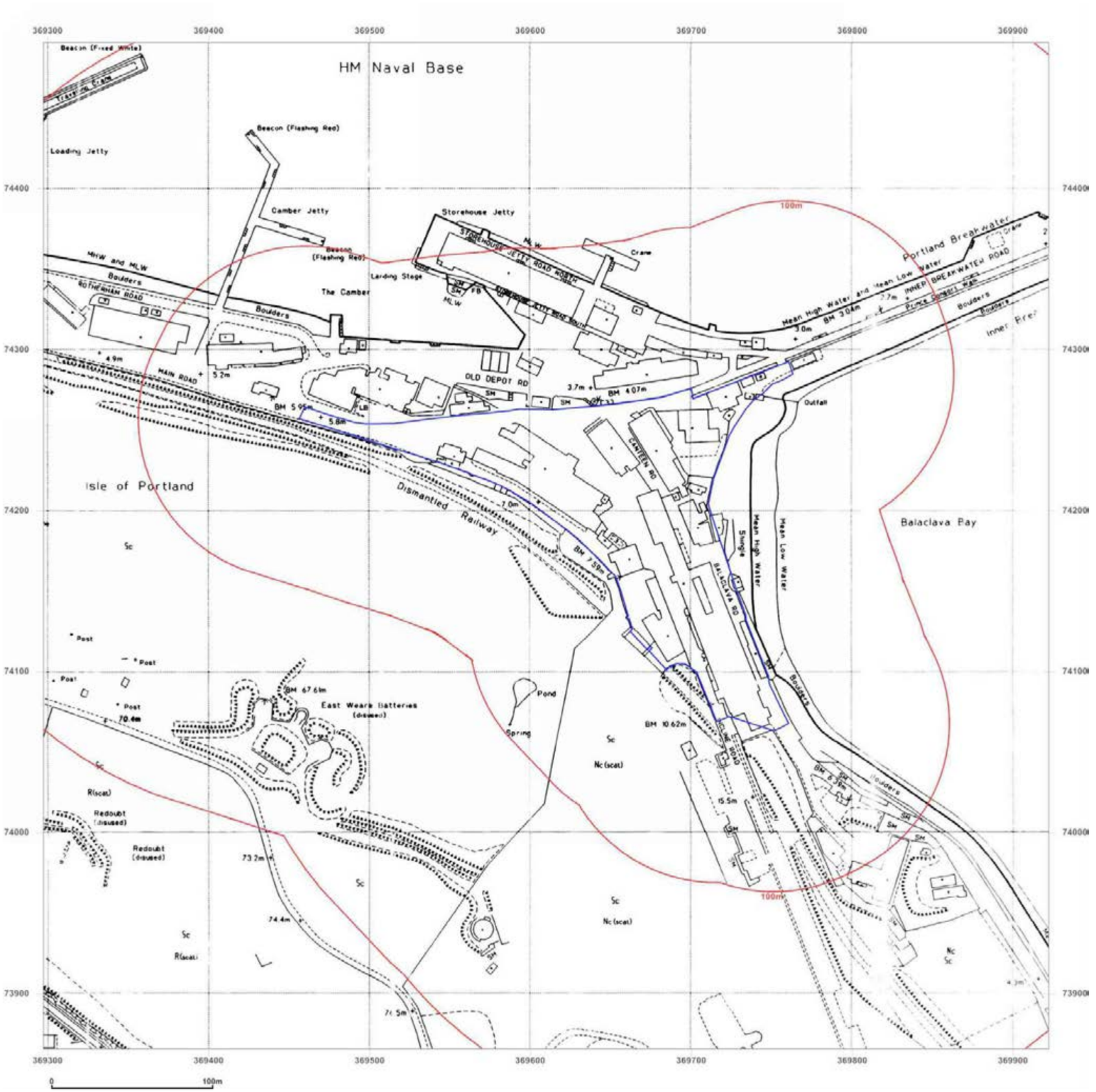

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Site Details:

STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: National Grid

Map date: **1994**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1994
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Edition N/A
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Surveyed 1994
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Edition N/A
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Groundsure INSIGHTS

Site Details:

STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: LandLine
Map date: **2003**
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Printed at: 1:1,250

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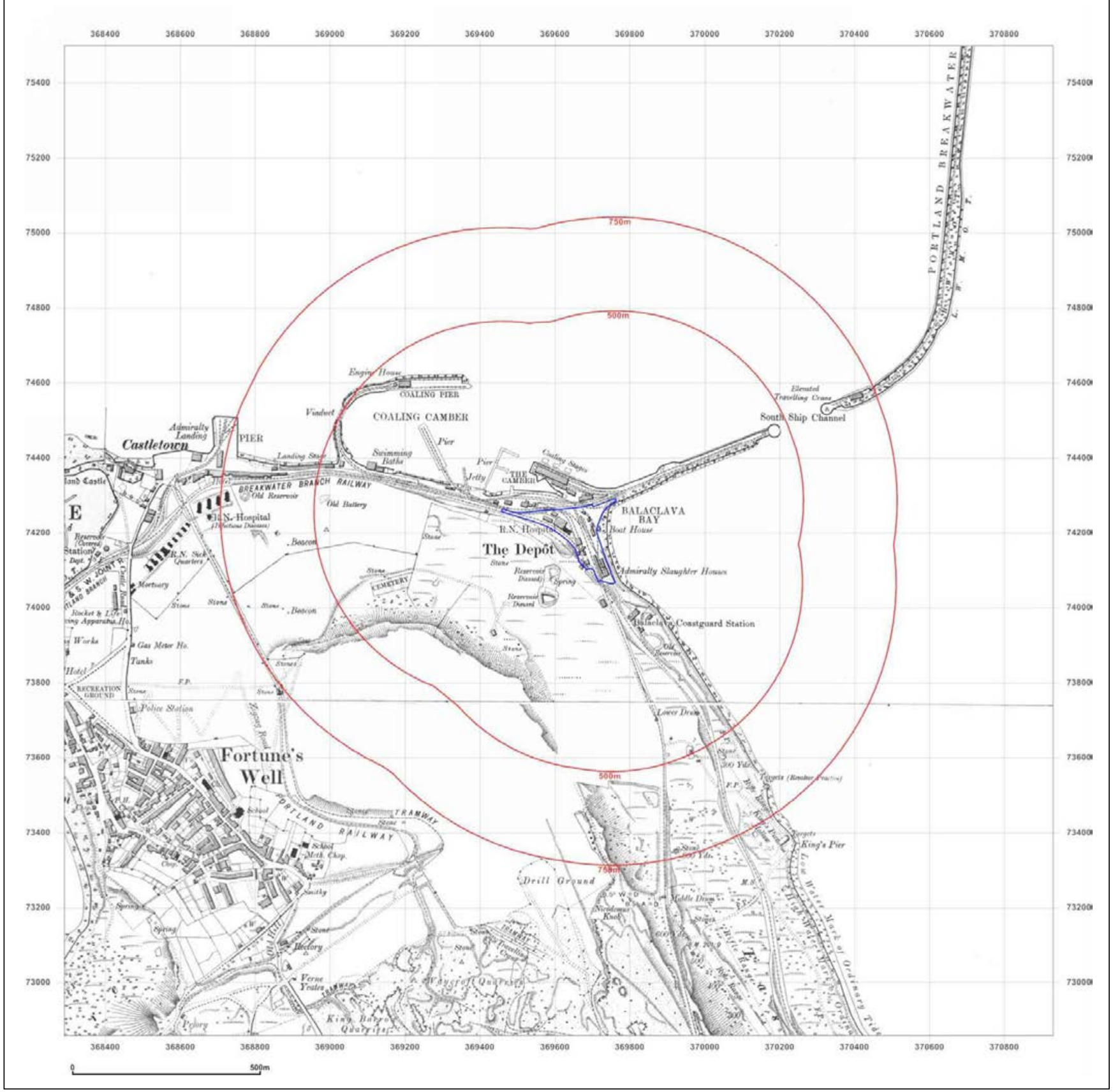

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STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: County Series

Map date: **1901**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1895
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1862
Revised 1901
Edition N/A
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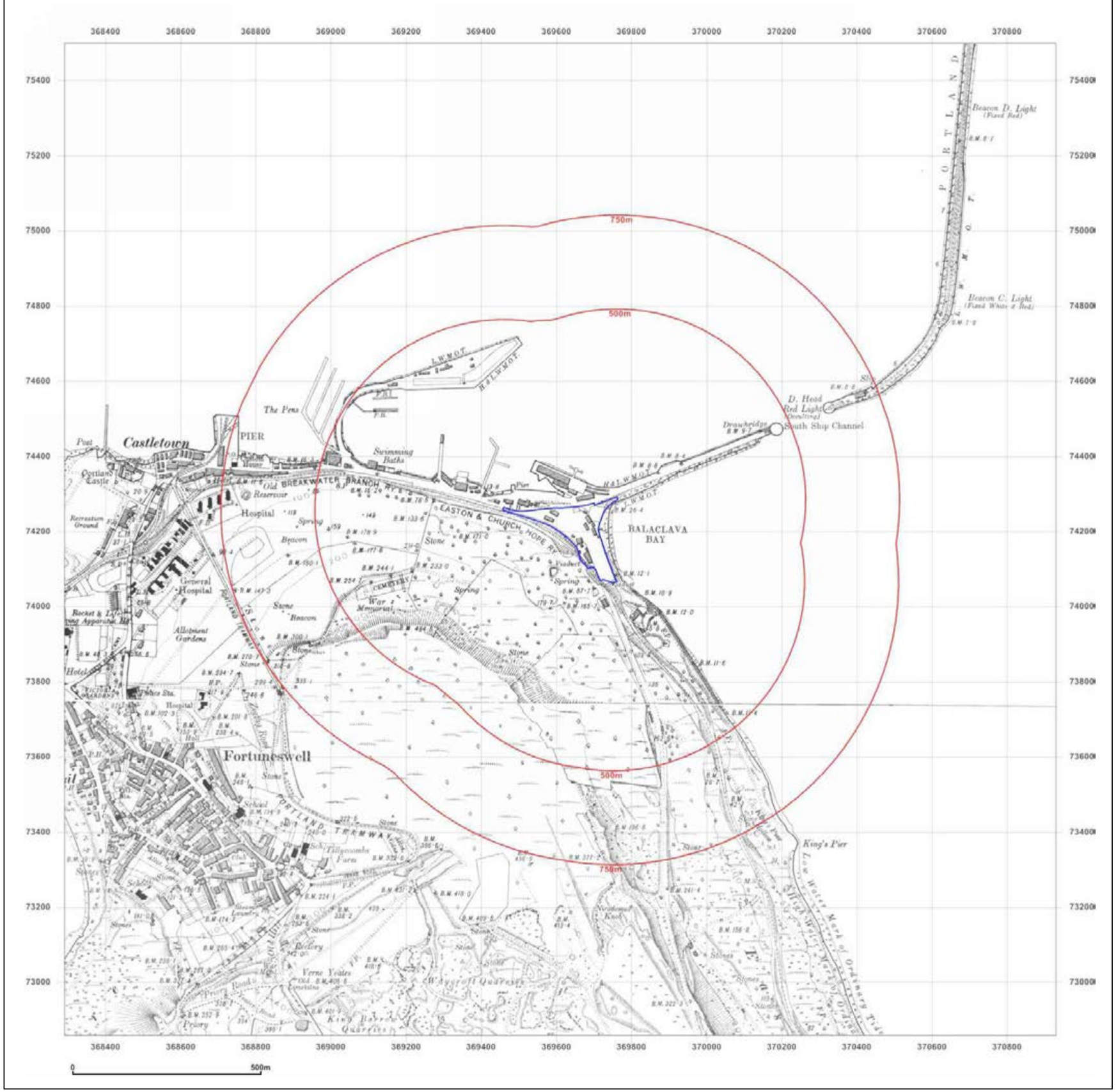

Groundsure INSIGHTS

Site Details:

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Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: County Series

Map date: **1927**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1862
Revised 1927
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1862
Revised 1927
Edition N/A
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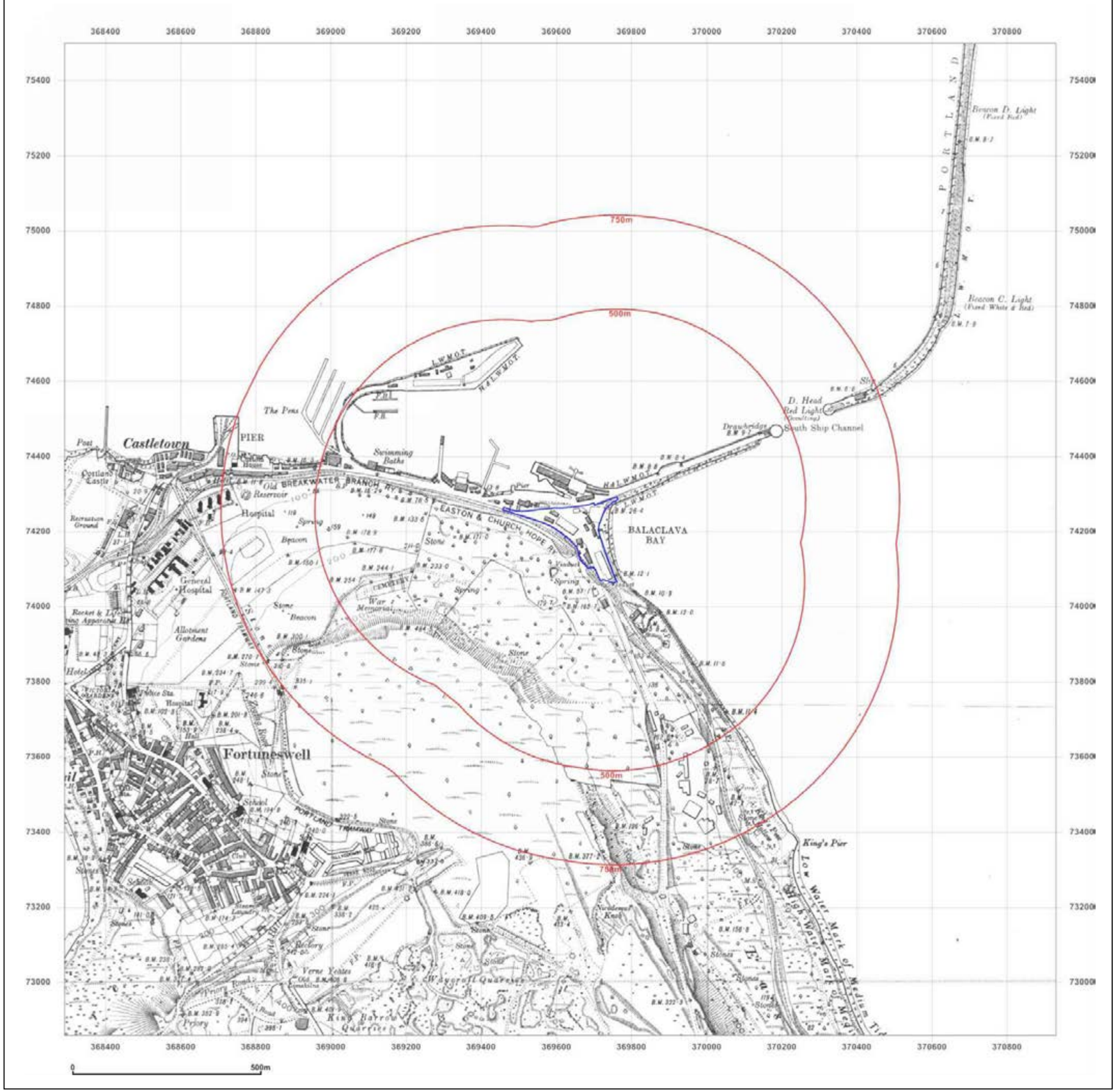

Groundsure INSIGHTS

Site Details:

STREET RECORD, BALACLAVA ROAD, PORTLAND, DT5 1PA

Client Ref: 267701-20
Report Ref: GS-6721978
Grid Ref: 369609, 74178

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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Revised 1938
Edition N/A
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Levelled N/A

Surveyed 1862
Revised 1938
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Appendix C

Site photographs

Photograph 1: View across site looking to east

Photograph 2: Northeast corner of site

Photograph 3: View across site looking to the north

Photograph 4: Electricity substation adjacent to northern site boundary

Photograph 5: Weighbridge , northwest corner of site

Photograph 6: Above ground pipeline along eastern site boundary

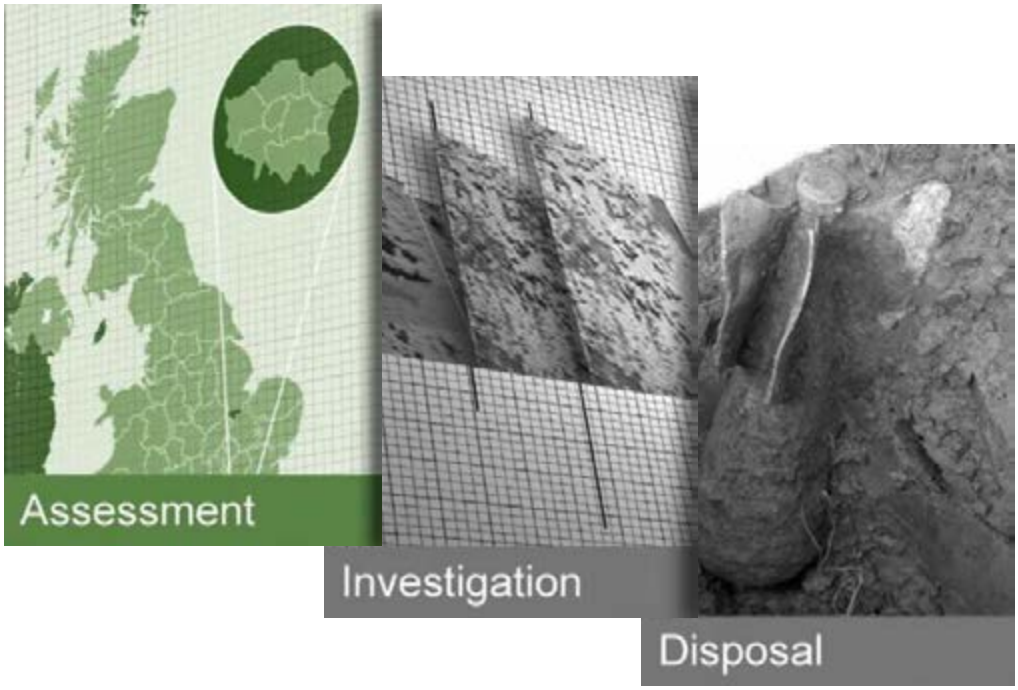
Photograph 7: Looking south west towards cliffs

Photograph 8: Retaining structure along northern site boundary

Photograph 9: Retaining structure along northern site boundary

Appendix D

Zetica (2020) UXO Desk Study & Risk Assessment



Portland Port - UXO Desk Study & Risk Assessment

Drafted by Clark Friend
Checked by Sven Leman
Authorised by Stefan Lang

Document Title	**UXO Desk Study & Risk Assessment**
Document Ref.	**P9692-20-R1**
Revision	**A**
Project Location	**Portland Port**
Client	**Powerful Portland Ltd**
Date	**26th May 2020**

UXO DESK STUDY & RISK ASSESSMENT

EXECUTIVE SUMMARY

Key findings: Potential hazard from Unexploded Bombs (UXB) on the Site.

Key actions: Explosive Ordnance Clearance (EOC) engineer supervision is required for excavations and deep UXB detection is required to clear borehole or pile locations.

UXO Hazard Assessment

Records have been found indicating that 7No. High Explosive (HE) bombs fell on the Site during World War Two (WWII), 2No. of which were recorded as UXB and removed. At least 14No. further HE bombs fell in close proximity.

Given the high localised density of bombing in the vicinity of the Site, it is considered possible that a UXB could have fallen unnoticed on the Site.

It is considered that the Site has a moderate UXO hazard level, as shown in the following Figure, reproduced as Figure 9 in the main report.

The UXO hazard zone plan of the Site is also given in the accompanying P9692-20-R1-MAP01-A.

Figure UXO hazard zone plan of the Site

Source: OpenStreetMap *Not to Scale*

Legend					
	Very Low		Low		Moderate	
	High		Very High		Site boundary	

Note that the UXO hazard will have been mitigated within the depth and extents of any post-WWII intrusive works.

The main findings of the report are summarised below.

- By 1900 the Site was encompassed by Portland Naval Base. Facilities located on the Site were primarily devoted to supplying and maintaining ships berthed in Portland Harbour.

- By 1910 records indicate that a torpedo workshop was located on the Site. This had closed by 1918.
- No records of bombing on the Site during World War One (WWI) have been found.
- During WWII His Majesty's (HM) Naval Base Portland, encompassing the Site, was a major strategic target. At this time, the Site comprised part of an Admiralty Underwater Weapons Establishment (AUWE), engaged in the anti-submarine defence of Portland Harbour.
- Records have been found indicating that 7No. HE bombs fell on the Site and 14No. further HE bombs fell within approximately 0.2km of the Site. 2No. HE bombs on the Site were recorded as UXBs.
- Estimated average maximum bomb penetration depths on the Site range from 2.5m to 6.0m depending on the weight of the bomb.
- Post-WWII the AUWE on the Site continued to operate until its closure in 1995.

Data Confidence Level

The findings of this report were based on good corroborative evidence of the military activity and bombing on the Site.

Proposed Works

It is understood that works on the Site are associated with the construction of an Energy Recovery Facility (ERF).

For the purpose of this risk assessment, it is assumed that works on the Site may include intrusive ground investigations, excavations and piling.

Risk Assessment

The Table below, reproduced as Table 4 in the main report, provides a UXO risk assessment for the proposed works on the Site.

Further details on the methodology for the risk assessment are provided in Section 7.2 of the main report.

Table UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Shallow Excavations	3	2	6	3	5	15	**Moderate**
	Deep Excavations	3	2	6	3	5	15	**Moderate**
	Boreholes/Piling	2	3	6	3	4	12	**Moderate**
Other UXO	Shallow Excavations	2	1	2	1	4	4	**Low**
	Deep Excavations	1	1	1	1	4	4	**Low**
	Boreholes/Piling	1	1	1	1	3	3	**Low**

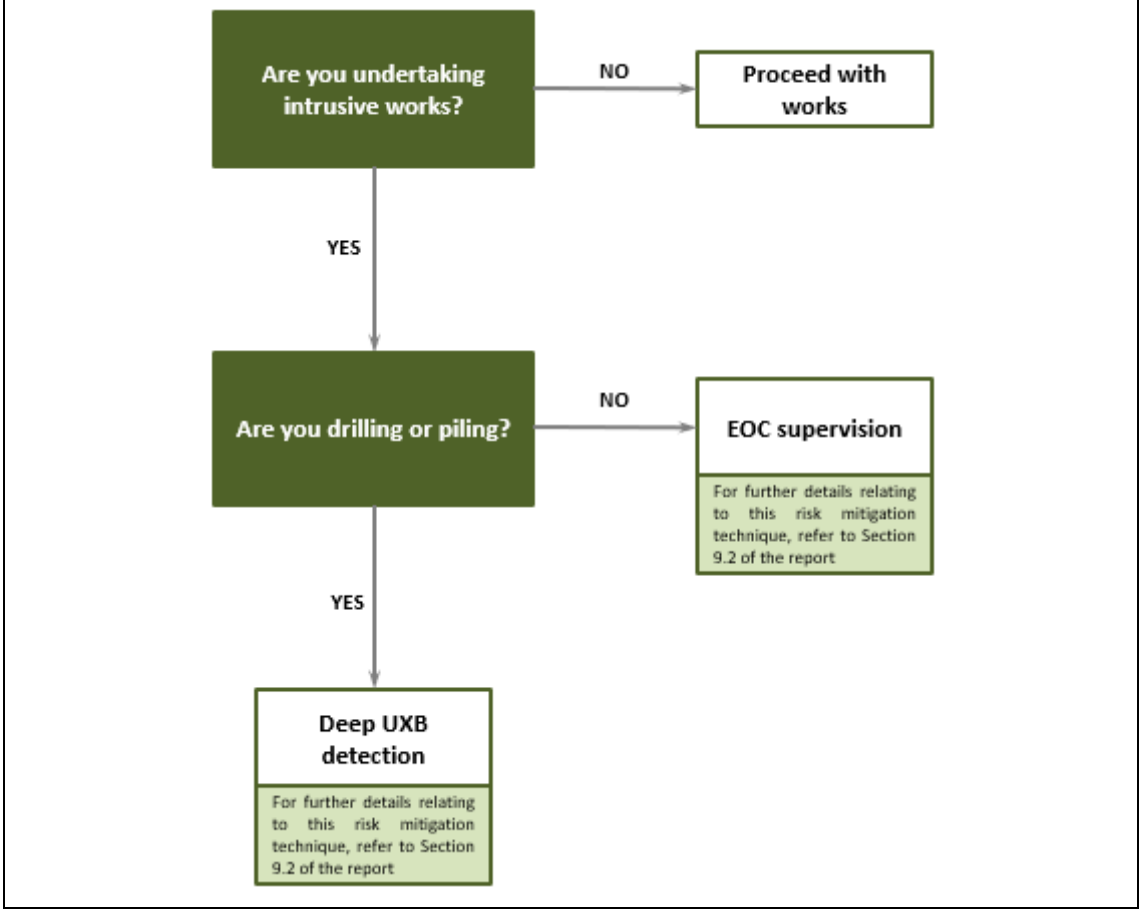
PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)

Shallow Excavations defined as <1.0m below ground level (bgl.)

Risk Mitigation Plan

The Figure below, reproduced as Figure 10 in the main report, provides a risk mitigation plan to ensure that the UXO risk for the proposed works is reduced to As Low As Reasonably Practicable (ALARP).

Figure	Recommended risk mitigation plan for the Site



Further details on the recommended risk mitigation techniques are given in Section 9.2 of this report.

The Table below, reproduced as Table 5 in the main report, summarises the UXO risk for proposed works on the Site and recommended techniques to mitigate the risk.

Table	Summary of UXO risk and mitigation recommendations

Proposed Works	UXO Risk	Recommended Mitigation
Excavations		**EOC Engineer Supervision** – to ensure safety and minimise delays, Explosive Ordnance Clearance (EOC) Engineer supervision is recommended.
Boreholes/Piling		**Deep UXB detection –** to clear borehole and pile locations of potential UXB, an intrusive magnetometer survey should be undertaken until either the maximum bomb penetration or maximum drilling/piling depth is reached.

In summary, it is recommended that all excavations are supervised by an EOC engineer.

As part of borehole or pile construction, we recommend that deep UXB detection is undertaken to ensure the safety of those working in the area.

What Do I Do Next?

If you wish to proceed with UXO risk mitigation, Zetica would be happy to assist. Just contact us via phone (01993 886682) or email (uxo@zetica.com) and we can provide a proposal with options and prices.

If you have requirements for additional surveys, Zetica can provide a range of options to combine UXO clearance with the detection of other buried hazards (e.g. archaeology, utilities, etc.).

If proposed works on the Site change, or additional works are planned, contact Zetica for a re-assessment of the UXO risk and the risk mitigation requirements. In particular, caution is advised if works extend onto the beach adjacent to the eastern boundary of the Site.

CONTENTS

Figures, Plates, Tables & Drawings

Accompanying GIS Data

P9692-20-R1-MAP01-A (UXO Desk Study)

ABBREVIATIONS

AA	Anti-Aircraft
ALARP	As Low As Reasonably Practicable
ARP	Air Raid Precaution
AT	Anti-Tank
AUWE	Admiralty Underwater Weapons Establishment
AXO	Abandoned Explosive Ordnance
BD	Bomb Disposal
BDO	Bomb Disposal Officer
BDU	Bomb Disposal Unit
CHEL	Chain Home Extra Low
CMD	Conventional Munitions Disposal
DAB	Delayed Action Bomb
DCLG	Department of Communities and Local Government
EO	Explosive Ordnance
EOC	Explosive Ordnance Clearance
EOR	Explosive Ordnance Reconnaissance
ERF	Energy Recovery Facility
ERW	Explosive Remnants of War
ESA	Explosive Substances and Articles
FFE	Free From Explosives
HAA	Heavy Anti-Aircraft
HE	High Explosive
HMUDE	HM Underwater Detection Establishment
HSE	Health and Safety Executive
IB	Incendiary Bomb
IED	Improvised Explosive Device
IEDD	Improvised Explosive Device Disposal
JSEODOC	Joint Services EOD Operations Centre
LAA	Light Anti-Aircraft
MGB	Motor Gun Boats
ML	Motor Launches
MTB	Motor Torpedo Boats
MoD	Ministry of Defence
OB	Oil Bomb
PM	Parachute Mine
PUCA	Pick Up and Carry Away
QF	Quick-Firing
RAF	Royal Air Force
RBM	Rifled Breech-Loading
RFC	Royal Flying Corps
RML	Rifled Muzzle-Loading
RNAS	Royal Naval Air Station
TEP	Time Expired Pyrotechnics
UXAA	Unexploded Anti-Aircraft
UXB	Unexploded Bomb
UXIB	Unexploded Incendiary Bomb
UXO	Unexploded Ordnance
WWI	World War One
WWII	World War Two

UXO DESK STUDY & RISK ASSESSMENT

Please read: Zetica has colour coded each paragraph. Paragraphs with black text on a white background are paragraphs that provide site-specific information or information specifically researched as part of this project.

Boxed paragraphs in a dark green text with a green background are paragraphs providing general information and, where appropriate, links to online resources giving further detail. These are all available at www.zeticauxo.com. If you cannot gain access to these resources, Zetica can forward them on request.

1 INTRODUCTION

1.1 Project Outline

Zetica Ltd was commissioned by Powerful Point Ltd to carry out an Unexploded Ordnance (UXO) Desk Study and Risk Assessment for an area of approximately 2.4 hectares (ha) at the junction of Inner Breakwater Road, Main Road and Incline Road, Portland, Weymouth, Dorset (the 'Site').

The aim of this report is to gain a fair and representative view of the UXO hazard for the Site and its immediate surrounding area in accordance with the Construction Industry Research and Information Association (CIRIA) C681 'Unexploded Ordnance (UXO), a Guide for the Construction Industry'.

Where appropriate, this hazard assessment includes:

- Likelihood of ordnance being present.
- Type of ordnance (size, filling, fuze mechanisms).
- Quantity of ordnance.
- Potential for live ordnance.
- Probable location.
- Ordnance condition.

It should be noted that some military activity providing a source of UXO hazard may not be recorded and therefore there cannot be any guarantee that all UXO hazards affecting the Site have been identified in this report.

1.2 Sources of Information

Zetica Ltd researched the military history of the Site and its surrounding area using a range of information sources. The main sources of information are detailed in the following sections and referenced at the end of this report.

1.2.1 Zetica Ltd Defence Related Site Records

Zetica Ltd's in-house records were consulted, including reference books and archived materials from past work in the region. Relevant documents have been cited within the bibliography of this report.

1.2.2 Zetica Ltd Bombing Density Records and Maps

Reference has been made to the Zetica Ltd bomb risk maps located on Zetica's website (http://zeticauxo.com/downloads-and-resources/risk-maps/)

1.2.3 Ministry of Defence and Government Records

Government departments and units within the Ministry of Defence (MoD) were approached for information of past and present military activity in the area. These included the Department of Communities and Local Government (DCLG) records of abandoned bombs.

1.2.4 Other Historical Records, Maps and Drawings

Numerous reference documents including historical maps, aerial photographs and drawings have been consulted from sources such as the National Archives, the US National Archives & Records Administration (NARA), the Imperial War Museum (IWM), Historic England and the Defence of Britain Project.

The British Geological Survey (BGS) was consulted for borehole information.

1.2.5 Local Authority Records

Information has been obtained from Dorset Council.

1.2.6 Local Record Offices and Libraries

Information was obtained from Dorset History Centre.

1.2.7 Local Historical and Other Groups

Local history groups and archaeological societies were consulted, including the Dorset Historic Environment Record (HER).

1.3 Data Confidence Level

In general, there is a good level of confidence in the researched information sources used for this report. Exceptions to this are specifically detailed in the text of the report.

Note that some WWII Air Raid Precaution (ARP) records for Portland Urban District (UD) do not give detailed locations of where bombs fell, often only stating that 'bombs fell on Portland'. Other evidence (including bomb census maps, bomb damage maps and newspaper reports) have been used to gain a corroborative assessment of the potential UXO hazard on the Site.

It should also be noted that it has not been possible to obtain detailed historical aerial photography for the Site, as the Historic England archive is shut due to the Covid-19 outbreak. Readily available aerial photography has been used where possible.

2 THE SITE

2.1 Site Location

The Site is centred on Ordnance Survey National Grid Reference (OSNGR) SY 696742. It is located at the junction of Inner Breakwater Road, Main Road and Incline Road, approximately 5.0km south-southeast of central Weymouth.

The Site comprises hard standing representing the foundations of former buildings and carriageways.

Figure 1 is a Site location map and Plate 1 is a recent aerial photograph of the Site.

Figure 1	Site location map

Source: © Crown Copyright 2020. Reproduced by permission of Ordnance Survey *Not to Scale*

Legend	Site boundary

Plate 1	Recent aerial photograph of the Site

Source: Google Earth *Not to Scale*

Legend	Site boundary

3 MILITARY ACTIVITY

The following sections outline the recorded military activity in the vicinity of the Site. The potential UXO hazard from WWI and WWII bombing is detailed in Section 4.

Each sub-section provides hyperlinks to further information on potential sources of UXO hazard. These are also available at www.zeticauxo.com. If you cannot gain access to these resources, Zetica can forward them on request.

3.1 His Majesty's Naval Base Portland

The Site has comprised part of the Portland Naval Base since before the mid-19th century, when the most significant expansion and developments to the Base occurred. The base was officially named His Majesty's (HM) Naval Base Portland in 1923 and operated until its closure in 1995.

Major expansions at Portland took place immediately prior to both World Wars and at the start of the Cold War. The facilities at the Base have grown as ships became larger and their operation more complex.

Further information about developments relative to the Site are provided below.

3.1.1 Portland Harbour

Major development of the harbour and shore-side facilities, encompassing the Site, commenced in the mid-19th century with the construction of the Inner Breakwater, adjacent to the north-eastern part of the Site.

Further breakwaters were eventually constructed by 1902 to provide a deep-water, sheltered anchorage that could accommodate a large number of military and civilian vessels.

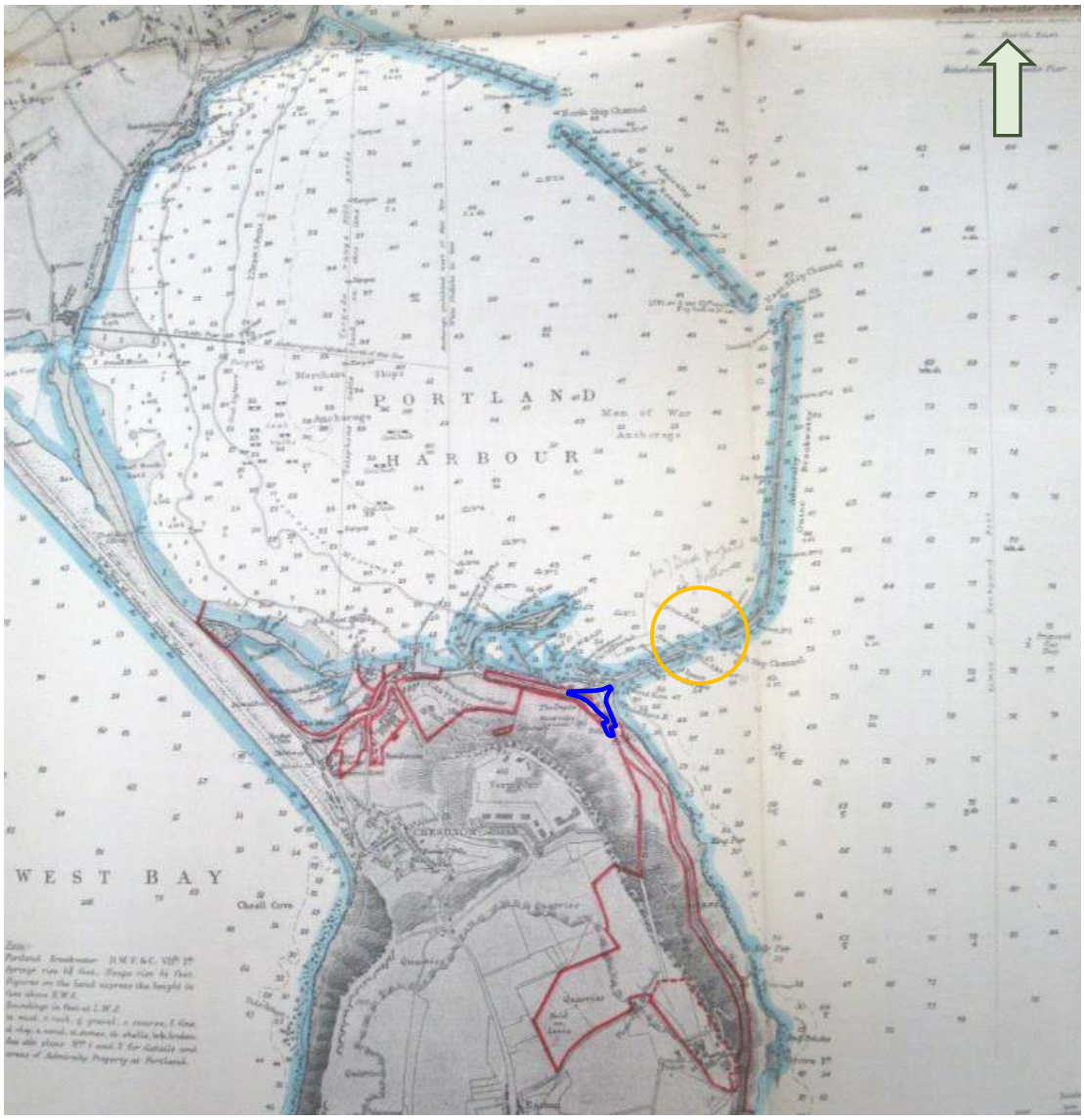
On the southern side of this anchorage there was an internal harbour based around The Camber, located adjacent to the northern boundary of the Site.

This was initially concerned with revictualling and later with coaling operations.

Figure 2 is a plan of Portland Harbour and land owned by the Admiralty, dating from 1910. Land owned by the Admiralty is highlighted in red.

The Southern Ship Channel, approximately 0.5km east-northeast of the Site, has also been highlighted.

Figure 2	Plan of Portland Harbour, 1910



Source: National Archives

Legend	Site boundary	Southern Ship Channel

The Depot

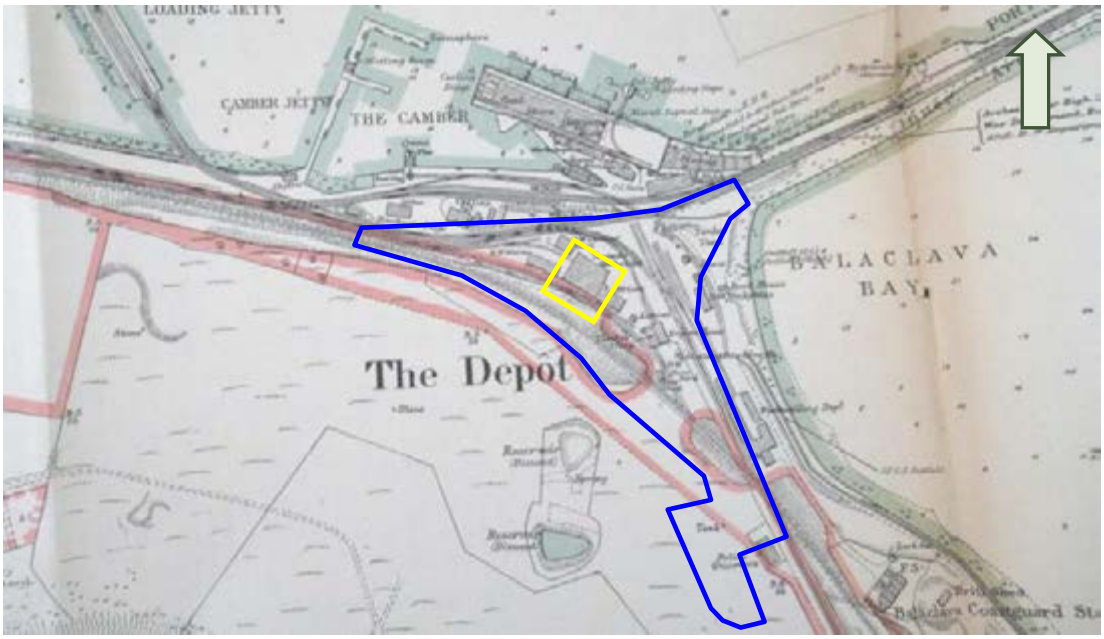
The Depot was the name given to an area encompassing the Site, based around The Camber, a coaling and repair facility.

Figure 3 is an extract of a plan of Portland Harbour, dating from 1910, showing the facilities on the Site.

These can be seen to include an extensive railway system which was used to supply ammunition to the gun emplacement at the end of the Inner Arm of Portland Breakwater (see Section 3.2.1), together with numerous workshops, offices and stores.

A Torpedo Workshop has also been identified on the Site. Destroyer and torpedo boat pens were located on the west side of The Camber, within approximately 0.1km north of the Site. It is likely that torpedoes ready for service were supplied from these workshops.

Figure 3	Plan of The Depot, 1910



Source: National Archives

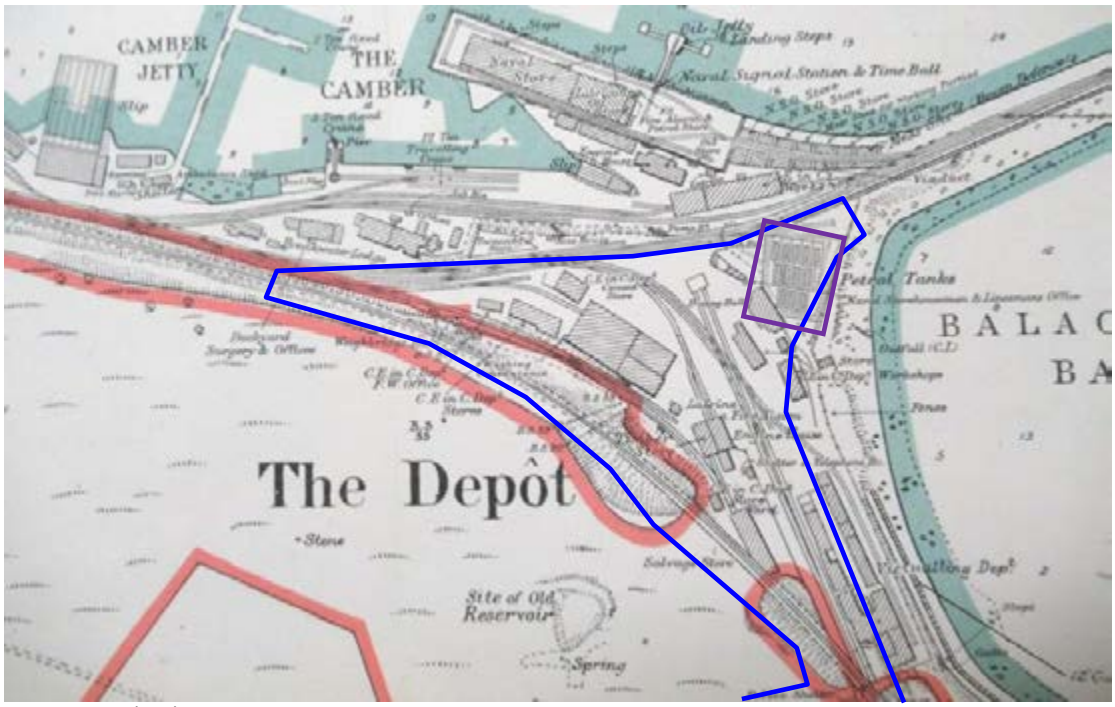
Legend	Site boundary	Torpedo Workshops

Records indicate that by 1918 the torpedo workshop on the Site had closed and the building redeveloped as a naval hospital.

Significant changes had been made by 1921, as shown in Figure 4, a revised plan of The Depot, where an area of fuel tanks and small additions to some of the buildings had been constructed.

This shows that the hospital had closed, and several offices had been established on the western part of the Site.

Figure 4	Plan of The Depot, 1921



Source: National Archives

Legend	Site boundary	Fuel Stores

HM Underwater Detection Establishment

During the Interwar period the area of The Depot was radically changed and it became dedicated to the detection of submarines and the coordination of the defence of Portland Harbour.

Initially this was part of the newly created HM Underwater Detection Establishment (HMUDE) that was established at Portland Harbour with its HQ and operational facilities located in Balaclava Bay, on the Site.

During WWII the facilities on the Site became the Admiralty Underwater Weapons Establishment (AUWE) and were responsible for the development of equipment for hunting submarines, including underwater sound detection.

Extensive trials were carried out in Portland Harbour co-ordinating the detection of an underwater target which was then attacked using the 'Hedgehog', a form of spigot mortar that projected a number of depth charges in a 3D pattern.

Detection and practise attack trials were carried out throughout WWII using both British and American submarines operating out of the Portland Base.

After WWII the electronic aspects of detection became more important and new developments were continually being tested. The facilities are shown in Plate 2, a photograph dating from the 1990s.

Plate 2	Oblique aerial photograph of the AUWE on the Site, 1990s

Source: Portland History

Legend	Site boundary

The facility was closed in 1995 and eventually disposed of.

Potential UXO Hazard

By 1910 a torpedo workshop was located on the Site, until its closure by 1918. During WWII several naval research facilities were located on the Site, dedicated to the detection of German submarines.

Naval facilities on the Site closed in 1995. Most of the buildings located on the Site have since been demolished.

No other significant sources of UXO hazard associated with HM Naval Base Portland have been identified on the Site.

HM Naval Base Portland is not considered to provide a source of UXO hazard to the Site.

3.2 Defences

For further information on military defences, and the potential UXO hazards associated with them, follow the links below:

- Anti-Aircraft Guns
- Anti-Invasion Defences
- Barrage Balloons
- Bombing Decoys

- Home Guard
- Mined Locations
- Mortar & Gun Emplacements
- Pillboxes

The Site comprised a part of significant military defence establishment during WWI and WWII and remained a restricted area until decommissioning in 1995. Several associated defences were established in the vicinity of the Site.

The nearest are described below.

3.1.1 Inner Pier (Breakwater) Defences

After its construction in the mid-19th century, the Inner Pier (Breakwater) was equipped with a small fort at the northeast end, approximately 0.5km east-northeast of the Site, to protect the Southern Ship Canal.

By 1902 the Inner Breakwater emplacement had 2No. 12-pdr Quick-Firing (QF) guns and a .303" Maxim gun emplacement that operated as part of the WWI anti-torpedo defences. Munitions were supplied to the magazines via a railway line that ran along the top of the breakwater.

In November 1914, His Majesty's Ship (HMS) Hood was towed into the Southern Ship Channel (see Figure 2), approximately 0.5km east-northeast of the Site, and scuttled to block access. At this time, the Inner Breakwater defences were removed.

During WWII, records indicate that a 40mm LAA gun was mounted on the Inner Pier Breakwater.

These defences were removed by 1956.

The Inner Pier (Breakwater) Defences are not considered to provide a source of UXO hazard to the Site.

3.1.2 HMS Attack

Records indicate that during WWII buildings adjacent to the southern boundary of the Site were associated with a Coastal Force called HMS Attack.

These buildings appear to have been administrative and were concerned with the maintenance and repair of Motor Torpedo Boats (MTB), Motor Gun Boats (MGB) and Motor Launches (ML) based in Portland.

This unit was decommissioned in 1945.

HMS attack is not considered to provide a source of UXO hazard to the Site.

3.1.3 Portland Naval Communications HQ

During WWII an underground communications and control HQ was established in tunnels off Main Road, south of The Camber (SY 694743), within approximately 0.2km west of the Site. Construction began immediately after heavy raids in July 1940 and was complete by early-1941.

The facility continued to operate throughout the remainder of WWII.

The facility was completely remodelled in 1952 to act as a nuclear bunker and control centre. This complex was cleared and abandoned during the 1960s.

Portland Naval Communications HQ is not considered to provide a source of UXO hazard to the Site.

3.1.4 The Verne Citadel

The Verne Citadel was constructed approximately 0.5km southwest of the Site between 1857 and 1881 as part of the defences for Portland Harbour and the approaches to Weymouth.

It was initially armed with 2No. 12.5-inch (") rifled muzzle-loading (RML) guns, 1No. 10" RML and 5No. 7" RML guns, together with 13No. 40-pdr rifled breech-loading (RBL) guns, 18No. 8" and 1No. 32-pdr gun organised in 4No. batteries. They were manned by troops accommodated in the associated barracks.

By 1902 the batteries were disarmed as the guns were obsolete.

During WWI, Verne Citadel commanded and coordinated the several coastal batteries defending the surrounding coastline and was used for accommodation by troops in transit. A hospital area was also constructed to cater for returned wounded soldiers.

During WWII, the Fort was again used for troop accommodation and was also the location of a Chain Home Extra Low (CHEL) radar station.

Plate 3 is a Luftwaffe target photograph of the Verne Citadel, dated the 1st July 1940.

The individual barrack blocks within the fort are highlighted. This also shows 1No. Heavy Anti-Aircraft (HAA) battery (Target A) and several Light AA (LAA) emplacements

Plate 3	Luftwaffe target photograph of The Verne Citadel (Fort Verne), 1st July 1940

Source: NARA *Not to Scale*

Legend	Site boundary	HAA battery	LAA emplacements

Post-WWII the site has been used as a prison until around 2017 when it was used as an immigration detention centre. Since 2018 it has again reverted to use as a prison.

It is considered that The Verne Citadel does not provide any direct UXO hazard to the Site.

3.1.5 East Weare Battery

Immediately below and to the east of The Verne Citadel was East Weare Battery, approximately 0.2km south-southwest of the Site. This was constructed simultaneously with The Citadel as part of the coastal defences of Portland Harbour, and became operational in 1869.

The battery was intended for 27No. guns, but no records have been found to confirm that the maximum armament was ever fitted. By 1900 records indicate that the battery was armed with 2No. 9.2"and 3No. 6" guns that were present throughout WWI.

From 1936 and during WWII it was armed with 2No. modernised 9.2" guns that were decommissioned and removed in 1956.

East Weare Battery is not considered to provide a source of UXO hazard to the Site.

3.1.6 Anti-Aircraft Guns

Records indicate that during WWI there were at least 2No. Anti-Aircraft (AA) gun batteries within 10km of the Site. The nearest was located at The Verne Citadel (SY 691737), approximately 0.6km southwest of the Site. This was armed with 1No. 6-pounder (-pdr) Hotchkiss gun and 1No. 1-pdr gun.

During WWII records indicate that there were at least 10No. HAA batteries within 10km of the Site. The nearest was Battery 4 located at East Weare (SY 698736), approximately 0.4km south-southeast of the Site.

Records indicate that at least 7No. mobile LAA batteries were operational in the vicinity of the Site (see Plate 3 above). These comprised mostly 40mm Bofors guns and Lewis machine guns.

During attacks these HAA and LAA defences would have been augmented by the guns of any of the ships at anchor in the harbour together with specially armed warships on station, for example the anti-aircraft ship HMS Foylebank. This had 8No. 4" AA guns, 2No. quadruple 2-pdr pom-pom guns and an unspecified number of 0.5" machine guns.

Potential UXO Hazard

Given the number of HAA gun batteries in the surrounding area during WWII, the potential for a UXAA shell to have fallen on the Site unnoticed, whilst unlikely (due to the majority hard standing and buildings present), cannot be totally discounted.

3.1.7 Mined Locations

At the beginning of WWII HM Naval Base Portland Port was identified as a vulnerable position and several minefields were established in the vicinity of the Site. The nearest is described below.

Minefield No. 59 Old Depot Road/Balaclava Road

Records indicate that the beach at Balaclava Bay, adjacent to the eastern boundary of the Site, was heavily mined and designated Minefield No. 59.

Minefield No. 59 comprised 61No. Anti-Tank (AT) mines. Additionally, an offshore anti-boat landing barrier comprised of large boulders was established within approximately 0.1km east of the Site as part of this defensive establishment.

Potential UXO Hazard

Records indicate that Minefield No. 59 was cleared at the end of WWII.

It is understood that land-based minefields were typically cleared using the original layout plans. It is known that mines were moved from their original position by tidal currents, accidental detonations and by bombs falling during air raids.

Given this, the possibility that some mines were missed during clearance operations of the beach, adjacent to the Site, cannot be discounted.

Mined locations are not considered to provide a source of UXO hazard to the Site.

3.3 Military Airfields

For further information on military airfields, and the potential UXO hazards associated with them, follow the links below:

- Military Airfields

No records of any military airfields on the Site have been found.

3.3.1 RNAS/RAF Serapta and HMS Osprey

The nearest recorded military air base during WWI was Royal Naval Air Station (RNAS) Serapta (SY 684744), approximately 1.1km west of the Site.

This was established in September 1916 and officially opened in 1917 as Serapta. The establishment operated amphibious seaplanes from slipways at the harbour which carried out anti-submarine patrols along the English Channel.

Records indicate that 1No. seaplane hangar associated with RNAS Serapta was located within the Coaling Camber, approximately 0.2km west-northwest of the Site.

The station was taken over by the Royal Air Force (RAF) in 1918 and the facilities were enlarged and modernised.

At the beginning of WWII RAF Serapta was re-established as HMS Osprey. After the first German air attacks in June and July 1940 HMS Osprey was transferred to Campbeltown, leaving the seaplane facilities at Portland under care and maintenance status throughout the war.

Buildings associated with HMS Attack (see Section 3.1.3), located adjacent to the southern boundary of the Site, were briefly used for accommodation and storage of troops and equipment associated with HMS Osprey at this time.

Following WWII, HMS Osprey reopened in Portland and operated rotary-wing (helicopter) aircraft in conjunction with submarines. A number of Sikorsky R-4Bs briefly underwent trials at Portland. The success of these trials led to the establishment in 1959 of a new facility called RNAS Portland, approximately 1.3km west-northwest of the Site.

RNAS Osprey was closed on the 31st March 1999.

Military airfields are not considered to provide a source of UXO hazard to the Site.

3.4 Aircraft Crashes

For further information on military aircraft crashes, and the potential UXO hazards associated with them, follow the links below:

- Aircraft Crashes

No records of any aircraft crashes on the Site have been found. The nearest are described below.

9th July 1940

1No. Junkers Ju87 (serial number unknown) bomber aircraft crashed off Portland, in the vicinity of the Site.

11th July 1940

1No. Messerschmitt Bf110C (serial number unknown) fighter-bomber aircraft crashed into the cliffs of The Verne, approximately 0.3km southwest of the Site.

Aircraft crashes are not considered to provide a source of UXO hazard to the Site.

3.5 Firing Ranges and Military Training Areas

For further information on firing ranges and military training areas, and the potential UXO hazards associated with them, follow the links below:

- Artillery Ranges
- Bombing Ranges
- Military Training Areas
- Small Arms Ranges

Records of firing ranges and military training areas in the vicinity of Site have been found. The nearest is described below (details of offshore ranges are provided in Section 5.1).

3.4.2 Small Arms Ranges

In the early 1900s, a series of rifle ranges were established on the eastern side of the Verne Citadel, located between approximately 0.4km south-southeast and 1.5km south-southeast of the Site.

These ranges comprised a number of galleries with firing points out to 800yds.

The ranges appear to have had a target servicing shed and store together with an ammunition house located approximately 0.8km south-southeast of the Site.

In the 1980s these ranges were decommissioned and closed.

Small arms ranges are not considered to provide a source of UXO hazard to the Site.

3.6 Explosives Factories, Munitions Depots and Disposal Areas

For further information on explosives factories, munitions depots and disposal areas, and the potential UXO hazards associated with them, follow the links below:

- Explosives Factories
- Munitions Depots
- Munitions Disposal Areas

Other than those discussed above, no records of any explosives factories, munitions depots or munitions disposal areas on or in close proximity to the Site have been found.

3.7 Other Military Establishments

No other military establishments have been identified on or in close proximity to the Site.

4 BOMBING

4.1 WWI Bombing

For further information on WWI bombing in the UK, and the potential UXO hazard associated with it, see Appendix 2.1. Alternatively, use the following link.

- WWI Bombing

No records have been found indicating that the Site was bombed during WWI.

4.2 WWII Bombing

For further information on WWII bombing in the UK, and the potential UXO hazard associated with it, see Appendix 2.2. Alternatively, use the following link.

- WWII Bombing

Records indicate that the Site was bombed during WWII. Further details on bombing in the vicinity of the Site are given in the following sections.

4.2.1 Bombing in Dorset and Portland

From 1939 Dorset and the South West Coast were subjected to reconnaissance flights by the Luftwaffe which was building up a photographic record of potential targets.

From the onset of WWII, magnetic mines were laid by the Luftwaffe along the coast and in estuaries. This mine laying became increasingly frequent and took a heavy toll on both naval and civilian vessels from November 1939 in both the Portland and Weymouth regions.

Bombing and mining raids began in late 1939 and continued until the end of WWII. Some areas of Dorset were heavily bombed in WWII, especially in 1940. Bombing densities generally increased around Weymouth and Portland, and north-eastwards towards Poole and Bournemouth. The raids continued through the early months of 1941 becoming less frequent, although often more intense.

Heavier bombs including Parachute Mines (PMs) and Oil Bombs (OBs) were now used and incendiary raids caused fire damage across the region. From July 1941 the bombing campaign entered a period of relative inactivity. Raids still took place but tended to be relatively minor in severity.

Bournemouth, Poole Harbour, Weymouth and particularly Portland Harbour were specifically targeted by the Luftwaffe. In addition, other establishments in the region such as the Royal Navy Cordite Factory (RNCF) Holton Heath, Whiteheads Torpedo Works and communications establishments such as RAF Ringstead were targets in their own right.

At least 48No. air raids are recorded in the Portland and Weymouth region during WWII. More than 532No. HE bombs fell on the Isle Portland alone.

4.2.2 Strategic Targets

During WWII, HM Naval Base Portland, encompassing the Site, was a significant strategic target and included a naval base, navy barracks, munitions stores and research facilities.

Plate 4 is a Luftwaffe reconnaissance photograph of HM Naval Base Portland, dated the 3rd July 1942.

Several targets are identified, as summarised in Table 1. Bomb damage was highlighted by white circles

Plate 4	Luftwaffe target photograph of HM Naval Base Portland, 3rd July 1942

Source: NARA *Not to Scale*

Legend	Site boundary

Table 1	Luftwaffe targets in the vicinity of the Site

Target No.	Target
GB 10 181	Armed Forces
GB 12 2	Portland Harbour and docks
GB 16 7	Fortifications
GB 21 39	Fuel Depot
GB 22 10	Gas and Electricity Works
GB 76 14	Torpedo Works
Flak	HAA

4.2.3 Bombing Densities and Incidents

Table 2 gives details of the overall bombing statistics recorded for the Local Authority Districts of the Site and surrounding districts. These were categorised as Rural Districts (RD), Urban Districts (UD), Municipal or Metropolitan Boroughs (MB) and County Boroughs (CB). WWII bomb density levels are defined below:

<5 bombs per 405ha is a Very Low regional bombing density.

5-15 bombs per 405ha is Low.

15-50 bombs per 405ha is Moderate.

50-250 bombs per 405ha is High.

>250 bombs per 405ha is Very High.

Table 2 Bombing statistics

Area	Bombs Recorded				
	High Explosive	Parachute Mines	Other	Total	Bombs per 405ha (1000 acres)
Portland UD	**364**	**1**	**5**	**370**	**127.4**
Weymouth & Melcombe Regis MB	412	2	10	424	60.4
Dorchester RD	593	7	9	609	4.7

Note that Table 2 excludes the figures for Incendiary Bombs (IBs). Discrepancies between this list and other records, such as bomb clearance records, demonstrate that this data is likely to under-represent actual bombing.

Details of the nearest recorded bombing incidents to the Site are given in the following section. Appendix 5 provides further details of recorded bombing incidents in the immediate vicinity of the Site.

4th July 1940

26No. Junkers Ju87 dive bombers attacked Portland Dockyard. The main objective was to sink HMS Foylebank, an anti-aircraft guard ship that was anchored in the outer harbour, together with other defences.

2No. HE bombs fell on the McAlpine base, Old Depot Road, approximately 0.2km west of the Site.

11th August 1940

Approximately 50No. Junkers Ju88 and Dornier Do17 bomber aircraft attacked Portland, particularly the Mere Fuel Oil Depot and ships at anchor nearby. 32No. HE bombs were recorded as falling on Admiralty lands with many more in the sea. The nearest recorded incidents are described below.

3No. HE bombs fell on the Captain A/S offices, HMUDE, Balaclava Bay, on the Site.

1No. HE bomb fell on the Foreman of Works offices, HMUDE, Balaclava Bay, on the Site.

2No. HE bombs fell on the cliffs on Incline Road, south of Captain A/S offices, HMUDE, Balaclava Bay, approximately 20m south of the Site.

2No. HE bombs fell on the beach outside Captain A/S offices, HMUDE, Balaclava Bay, approximately 50m east of the Site.

4No. HE bombs fell along the cliffs south of Main Road, approximately 0.2km west of the Site.

14th August 1940

1No. HE fell in the inner harbour immediately north of the Anti-Submarine Jetty, approximately 0.3km northwest of the Site.

15th September 1940

25No. Heinkel He111 bomber aircraft dropped approximately 70No. HE bombs, 4No. OBs and numerous other IBs on Portland. The nearest recorded incidents are described below.

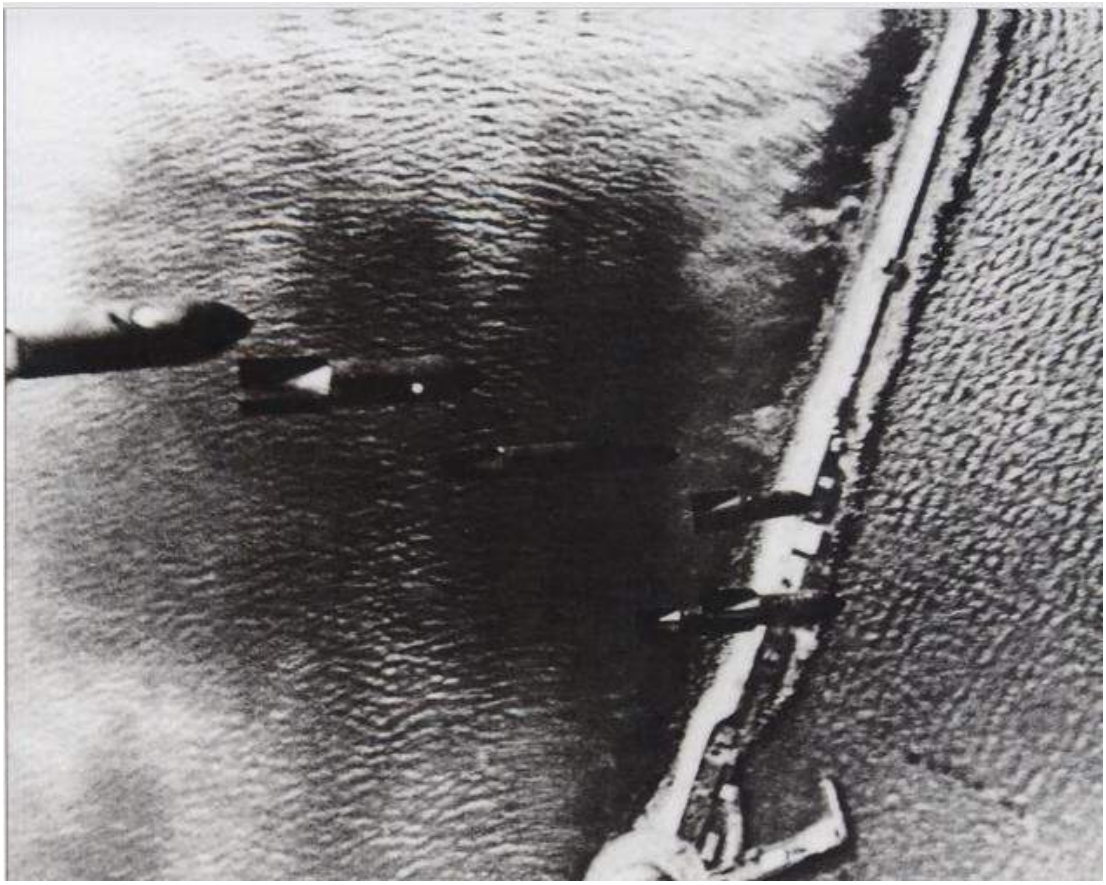
2No. HE bombs fell on the centre of the AUWE, on the Site. 1No. of these was reported as a UXB.

1No. HE bomb fell on the south side of the AUWE, on the Site. It was reported as a UXB.

About 30No. HE bombs were reported as falling in Balaclava Bay, within approximately 0.5km of the Site. Several of these were reported as UXB.

Plate 5 is an aerial photograph, dated the 15th September 1940. It shows HE bombs falling along the Inner Breakwater, within approximately 0.5km east-northeast of the Site.

Plate 5	German aerial photograph showing bombing of Portland, 15th September 1940



Source: John Ward

5th October 1940

1No. HE bomb fell on open land near HMS Osprey, within approximately 0.2km southeast of the Site.

9th October 1940

1No. HE bomb fell on the McAlpine depot west of HMS Osprey, approximately 0.1km south-southwest of the Site.

1No. HE bomb fell on the grounds of HMS Osprey, approximately 0.3km south-southeast of the Site.

23rd-24th March 1942

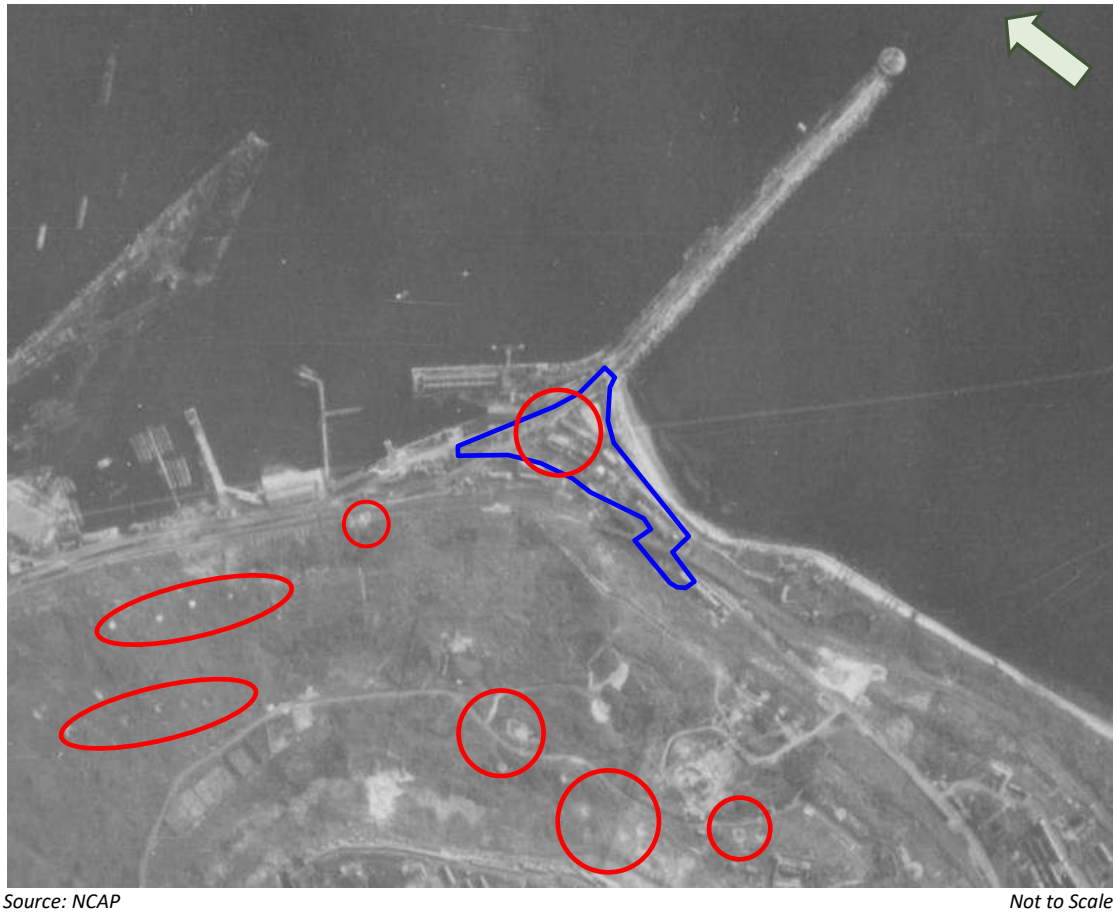
1No. 250kg HE bomb fell on the quayside at The Camber, on the northern boundary of the Site.

24th-25th March 1942

4No. HE bombs fell in the Inner Harbour west of The Camber, approximately 0.3km northwest of the Site.

Plate 6 is an aerial photograph dated the 27th June 1943, after the main bombing raids had taken place. Bomb damage and cratering has been identified on and in the vicinity of the Site.

Plate 6	Aerial photograph, 27th June 1943



Source: NCAP *Not to Scale*

Legend	Site boundary	Bomb damage

It should be noted that during WWII, many UXB were mapped and subsequently removed as and when conditions and demands on Bomb Disposal teams allowed. Their removal was not always accurately recorded and sometimes records were later destroyed. In practice, most UXB were probably removed and only a much smaller number were actually registered as officially abandoned bombs.

Figure 5 is a map showing the approximate location of recorded bomb impacts in the immediate vicinity of the Site.

The map has been compiled from a number of different sources, including air raid incident reports, historical aerial photographs and bomb census maps.

The bomb map is also given in the accompanying P9692-20-R1-MAP01-A.

Figure 5	Compiled bomb impact map for the vicinity of the Site

Source: OpenStreetMap *Not to Scale*

Legend	Site boundary	HE bomb	UXB

Potential UXO Hazard

Records have been found indicating that 7No. HE bombs fell on the Site, 2No. of which were recoreded as UXBs and later removed. At least 14No. further HE bombs fell within 0.2km of the Site.

Given the high localised bombing density and the intesnity of the raids, it is considered possible that a UXB fell on the Site unnoticed.

WWII bombing is considered to provude a possible source of UXO hazard to the Site.

4.2.4 Geology and Bomb Penetration Depths

It is important to consider the geological materials present at the time that a bomb was dropped in order to establish its maximum penetration depth.

British Geological Survey (BGS) 1:50,000 Sheet 341/342 West Fleet & Weymouth (Solid & Drift) and BGS borehole records from nearby investigations.

The geology of the foreshore and beach area of the Site during WWII is understood to have consisted of Made Ground over remnants of landslide lobes of disturbed Kimmeridge Clay overlying undisturbed Kimmeridge Clay.

Table 3 provides an estimate of average maximum bomb penetration depths for the area of the Site assuming WWII ground conditions of 2m of Made Ground, modelled as gravel, over 5m of soft to firm clay overlying more than 20m of very stiff to hard clay.

Table 3	Estimated average maximum bomb penetration depths	
Estimated average bomb penetration depths for anticipated geology		
Bomb Weight	50kg	2.5m
	250kg	4.0m
	500kg	6.0m

These calculations can be refined on receipt of Site-specific information.

The estimated bomb penetration depths given in Table 3 are from the WWII ground level and are based on the following assumptions:

a) High level release of the bomb resulting in an impact velocity of 260m/s (>5,000m altitude).

b) A strike angle of 10 to 15 degrees to the vertical.

c) That the bomb is stable, both in flight and on penetration.

d) That no retarding units are fitted to the bomb.

e) That the soil type is homogenous.

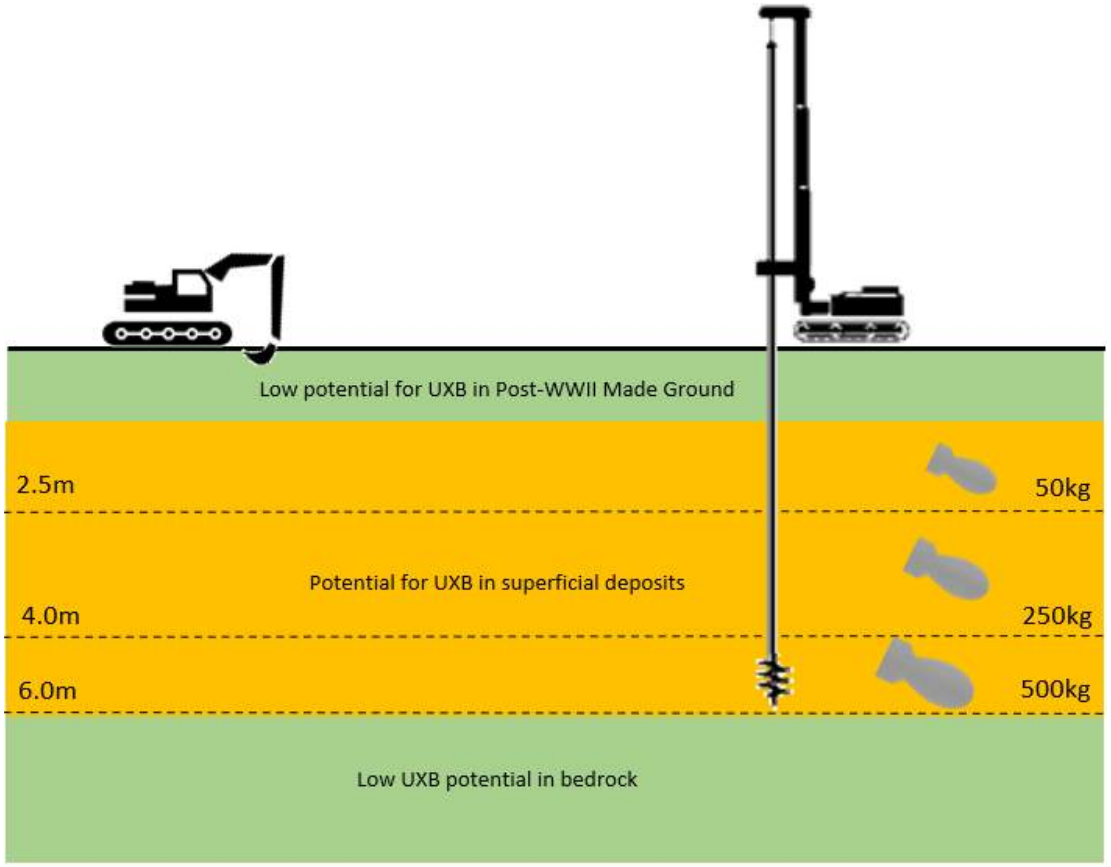
A high altitude release of a bomb will result in ground entry at between 10° and 15° to the vertical with the bomb travelling on this trajectory until momentum is nearly lost. The bomb will then turn abruptly to the horizontal before coming to rest. The distance between the centre of the entry hole and the centre of the bomb at rest is known as the 'offset'. A marked lateral movement from the original line of entry is common.

Low-level attacks may have an impact angle of 45° or more, which will frequently lead to a much greater amount of offset movement during soil penetration.

The average offset is one third of the penetration depth, i.e. an offset of 2m may be expected for a 50kg bomb in dry silts and clays. If hard standings or Made Ground were present during WWII, bomb penetration depths would have been significantly reduced but offset distances may have been up to four times greater.

Figure 6 demonstrates the potential burial setting for a UXB in the moderate hazard zones of the Site, based on the anticipated ground conditions and average maximum bomb penetration depth.

Figure 6	Potential burial setting of UXB on the Site



Source: Zetica *Not to Scale*

5 UXO IN THE MARINE ENVIRONMENT

Both wartime and peace time military and naval activities provide numerous sources of UXO within the marine environment. The principal sources of UXO hazards are from ordnance disposal at sea, WWII aerial laid mines, mines laid as beach defences, crashed aircraft and wrecks containing ordnance.

Clearance certification for UXO within a marine environment may be valid only for a limited period as storms, tides and general current movement can cause UXO to migrate into an area that may have been cleared of UXO only hours before. This also makes it very difficult to accurately predict where UXO may be found.

UXO is most likely to be concentrated on and immediately around the principal sources of the UXO hazard. These are typically ordnance disposal sites at sea, WWII mines, marine ranges and wrecks containing ordnance.

The Site is located adjacent to a beach where there is evidence of a post-war UXO encounter (see Section 6.2). A discussion of UXO in the marine environment which could affect the Site is provided below.

5.1 Marine Ranges and Coastal Defences

The Site was located in the vicinity of several offshore marine ranges and coastal batteries. The nearest of these are described below.

5.1.1 Offshore ranges

Records indicate that during WWII the Site was located within the danger area of Naval Gunnery Range N53A Portsmouth W and N57 AA Range.

The N53A range comprised coastal batteries, and possibly ships, firing out to sea, away from the Site.

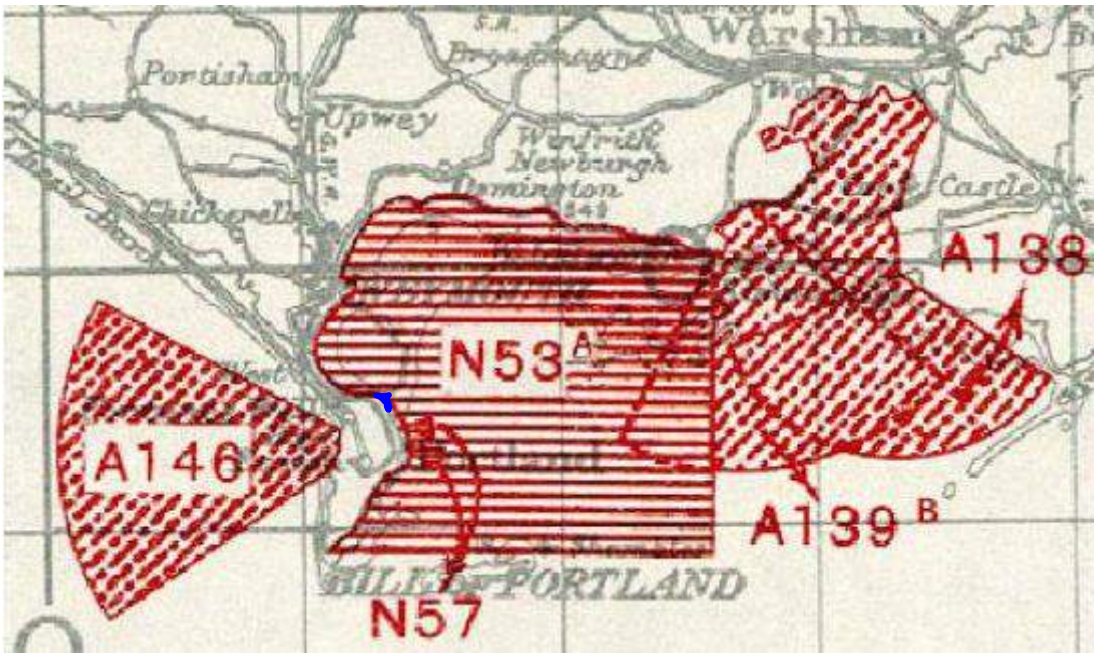
There is evidence that this range area was used by smaller naval vessels, for example MGBs and MLs, for practice firing at sleeve and drogue targets towed either by aircraft or other local vessels.

The N57 range comprised training facilities for LAA units, firing from position located approximately 0.4km south-southeast of the Site. Records indicate that training on the range involved live firing exercises using .303” and .5” machine guns and 40mm guns firing at targets out to sea.

These AA ranges were decommissioned at the end of WWII.

Figure 7 is a plan of military ranges in the vicinity of the Site, dating from 1945. The N53A and N57 ranges can be seen, in addition to other offshore ranges to the east and west of the Site.

Figure 7	Military ranges in the vicinity of Portland, 1945



Source: National Archives

Legend	Site boundary

Potential UXO Hazard

No records have been found to indicate that training on these ranges encroached onto the Site, with firing directed out towards the sea.

Post-war EOC activities in the vicinity of the Site indicate that ammunition associated with training on these ranges can periodically wash up onto nearby beaches (see Section 6.2).

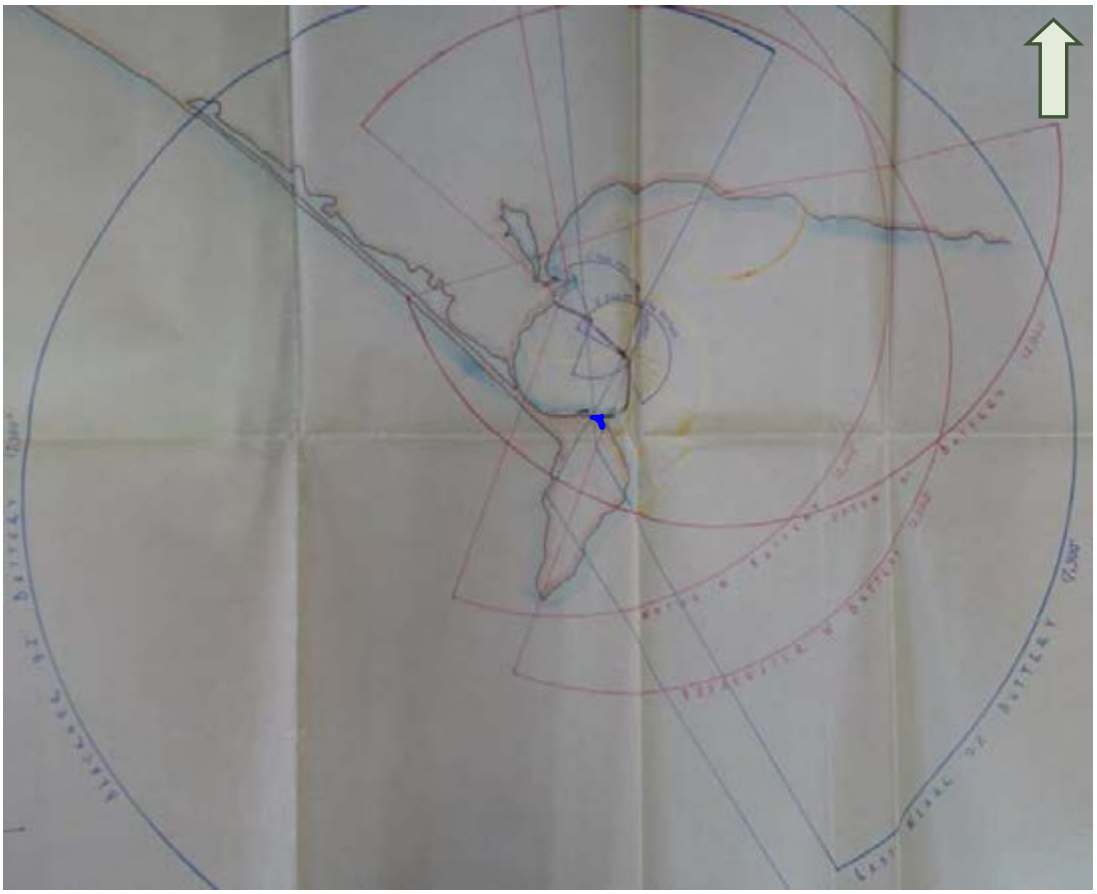
Off-shore ranges are not considered to provide a source of UXO hazard to the Site.

5.1.2 Coastal Batteries

The Site is within the firing templates of nearby coastal artillery batteries, including the Upton 6" Battery, the Nothe 6" Battery and the Blacknor 9.2" Battery.

Figure 8 is a map showing the location of the firing templates for the WWII coastal artillery defences in the vicinity of the Site.

Figure 8	Map showing the location of artillery firing templates in the vicinity of the Site, WWII



Source: National Archives *Not to Scale*

Legend	Site boundary

5.2 Marine Mines

For further information on marine mines, and the potential UXO hazard associated with it, see Appendix 2.6.

5.2.1 WWI Offshore Minefields

No records of offshore British marine mines laid in the vicinity of the Site during WWI have been found.

German mines were deployed from submarines and surface ships off the coast in Weymouth Bay approximately 4.8km north of the Site, through Weymouth Bay, passing the Site and south of the Isle of Portland.

5.2.2 WWII Offshore Minefields

There are records of defensive minefields being laid in the approaches to Weymouth Bay off Portland.

The nearest German air-dropped marine mines were laid during air raids on Portland Harbour, within approximately 4.9km north of the Site.

Potential UXO Hazard

The potential for encountering a marine mine on the beach adjacent to the Site, although unlikely, cannot be totally discounted.

5.3 Wrecks Containing UXO

Wrecks, significant due to the possible presence of UXO in the surrounding marine environment, are detailed below.

HMS Foylebank Wreck No. 18640

On the 4th July 1940, HMS Foylebank, a heavily armed AA ship was sunk in Portland Harbour, approximately 0.7km northeast of the Site. The vessel was recovered in two sections, with the stern section being finally removed in 1952.

During these operations many UXO were recovered. The recoveries included at least 2No. German UXBs and more than 2,500No, rounds of 4" ammunition together with thousands of rounds of 2-pdr ammunition and smaller calibre were removed.

Given these numbers it is possible that, despite numerous diving operations in the harbour, other UXO have been missed.

Potential UXO Hazard

The possibility that munitions associated with this wreck could migrate onto the beach adjacent to the Site, whilst unlikely, cannot be discounted.

Post-War EOC tasks indicate the potential for UXO to wash up in close proximity to the Site (see Section 6.2).

5.4 UXO Migration in the Marine Environment

There are several potential sources of UXO hazard in the marine environment in the vicinity of the Site, including marine ranges, mines, air dropped bombs, AA and naval shells.

Given the tidal currents, wave action and pattern of sediment movement in the vicinity of the Site, it is considered that larger UXO, too heavy for the lower energy waves and near shore currents to move, are unlikely to be transported far but rather would be exposed by scour around them and then be left proud of the sediments.

In such cases, the UXO are unlikely to move from source unless fishing activities disturb the exposed UXO.

Buoyant and semi-buoyant UXO (as may be the case with some marine mines or degrading ordnance), smaller, lighter items of UXO (such as SAA and small or medium calibre shells) and UXO with neutral buoyancy or rounded shapes could move by saltation or roll as bed load particles during spring tides and high wave energy storm conditions.

Given this, the possibility that such UXO may migrate onto the beach adjacent to the Site cannot be totally discounted.

6 EXPLOSIVE ORDNANCE CLEARANCE ACTIVITIES

Official UK bombing statistics have been compiled from both British and German sources. There were differences in the way the figures were originally reported and collated which has led to discrepancies in the summary data.

Based on data from 1939 to 1945, War Office statistics indicate that 200,195No. HE bombs exploded within Great Britain. Additionally, 25,195No. HE bombs (representing 11%) were recorded as UXBs. However, records from the Royal Engineers who were responsible for bomb disposal at the time indicate that as of 27th February 1946 upwards of 45,000No. UXBs were disposed of.

On average 8.5% of UXBs later self-exploded. In some cases the bombs had delayed action fuzes or were never intended to explode, their purpose being to cause inconvenience and fear. Given the discrepancy in records and the fact that UXBs are still being found unexpectedly, it is clear that the original figures are understated and provide only an approximation of the number of potential UXBs in the UK.

War Office statistics also show that between October 1940 and May 1941 most of the UXBs (93%) were either 50kg or 250kg. It should be noted that details of the recovery and the size of the UXB were not always accurately reported.

The larger WWII UXBs are often difficult to recover due to both penetration depths and the presence of two or more fuzes, combined with more sensitive fillings of explosive mixtures including Amatol and Trialen.

6.1 Abandoned Bombs

For further information on abandoned bombs, and the potential UXO hazard associated with them, follow the link below:

- Abandoned Bombs

No records have been found indicating that any officially abandoned bombs are located on the Site.

6.2 EOC Tasks

Records held by Zetica Ltd show that the following post-WWII EOC tasks have taken place in the vicinity of the Site.

2nd April 1995

1No. 500Kg UXB was found in a Quarry off Grove Road, approximately 1.8km south-southwest of the site. It was defused by the military and removed.

30th October 2006

1No. UX 40lb shell was found on the beach in Balaclava Bay, adjacent to the Portland Harbour wall, within approximately 25m of the Site. It was removed to deeper water and demolished.

Given the several offshore ranges located in the vicinity of the Site, it is considered possible that this item was dropped during a training exercise and washed up onto the beach (see Section 3.5.1).

10th March 2010

1No. UX 750kg aerial mine was found in Portland Harbour, within 1.5km north of the Site, as shown in Pate 11. It was removed outside the Harbour to deeper water and demolished.

28th November 2013

1No. UX British marine mine was found close to Portland Breakwater, approximately 1.3km northeast of the Site. It was removed further away from the Harbour to deeper water and demolished.

7 UXO HAZARD ASSESSMENT

7.1 UXO Hazard Level

The definitions for the levels of UXO hazard are provided below.

Definitions of UXO Hazard Level for a Site	
Hazard Level	**Definition**
Very Low	There is positive evidence that UXO is not present, e.g. through physical constraints or removal.
Low	There is no positive evidence that UXO is present, but its occurrence cannot be totally discounted.
Moderate	There is positive evidence that ordnance was present or that other uncharted ordnance may be present as UXO.
High	There is positive evidence that UXO is present.
Very High	As high, but requires immediate or special attention due to the potential hazard.

Records have been found indicating that 7No. HE bombs fell on the Site during WWII, 2No. of which were recorded as UXB and removed. At least 14No. further HE bombs fell in close proximity.

Given the high localised density of bombing in the vicinity of the Site, it is considered possible that a UXB could have fallen unnoticed on the Site.

It is considered that the Site has a moderate UXO hazard level, as shown in Figure 9.

The UXO hazard zone plan of the Site is also given in the accompanying P9692-20-R1-MAP01-A.

Figure 9 UXO hazard zone plan of the Site

Source: OpenStreetMap *Not to Scale*

Legend					
	Very Low		Low		Moderate	
	High		Very High		Site boundary	

Note that the UXO hazard will have been mitigated within the depth and extents of any post-WWII intrusive works.

8 UXO RISK ASSESSMENT

8.1 Proposed Works

It is understood that works on the Site are associated with the construction of an ERF.

For the purpose of this risk assessment, it is assumed that works on the Site may include intrusive ground investigations, excavations and piling.

8.2 Risk Assessment Methodology

A UXO risk assessment has been undertaken for the proposed works, taking into consideration the identified UXO hazard.

Firstly, the probability of encountering UXO (PE) has been considered and rated for the different construction techniques, as detailed below.

Probability of Encounter (PE)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Secondly, the probability of detonating a UXO (PD) has been considered and rated for the different construction techniques, as detailed below.

Probability of Detonation (PD)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Next, the probability of encountering and detonating the UXO (PE x PD) have been used to generate an overall likelihood rating (P).

P = PE x PD	LIKELIHOOD of Encounter and Detonation	Rating
21 to 25	Frequent, highly likely, almost certain.	5
16 to 20	Probable, more likely to happen than not.	4
6 to 15	Occasional, increased chance or probability.	3
2 to 5	Remote, unlikely to happen but could.	2
1	Improbable, highly unlikely.	1
0	Impossible	0
P ranges from 25, a certainty of UXO being encountered and detonated on the Site by engineering activity, to 0, a certainty that UXO does not occur on the Site and will not be detonated by engineering activity.		

The likelihood of encountering and detonating UXO during site works is multiplied by the severity of such an event occurring (P x S), in order to provide a risk level using the following matrix.

Severity (S)	Rating
Multiple fatalities	5
Major injury, long term health issues, single fatality.	4
Minor injury, short term health issues, no fatalities.	3
First aid case but no lost time or ill health.	2
Minor injuries, no first aid.	1
No injuries.	0

UXO Risk Matrix							
	SEVERITY (S)						
LIKELIHOOD (P)		5	4	3	2	1	0
	5	25	20	15	10	5	0
	4	20	16	12	8	4	0
	3	15	12	9	6	3	0
	2	10	8	6	4	2	0
	1	5	4	3	2	1	0
	0	0	0	0	0	0	0

8.3 UXO Risk Level

The UXO risk assessment for proposed works on the Site is given in Table 4.

Table 4 UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Shallow Excavations	3	2	6	3	5	15	**Moderate**
	Deep Excavations	3	2	6	3	5	15	**Moderate**
	Boreholes/Piling	2	3	6	3	4	12	**Moderate**
Other UXO	Shallow Excavations	2	1	2	1	4	4	**Low**
	Deep Excavations	1	1	1	1	4	4	**Low**
	Boreholes/Piling	1	1	1	1	3	3	**Low**
PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)								
Shallow Excavations defined as <1.0m below ground level (bgl.)								

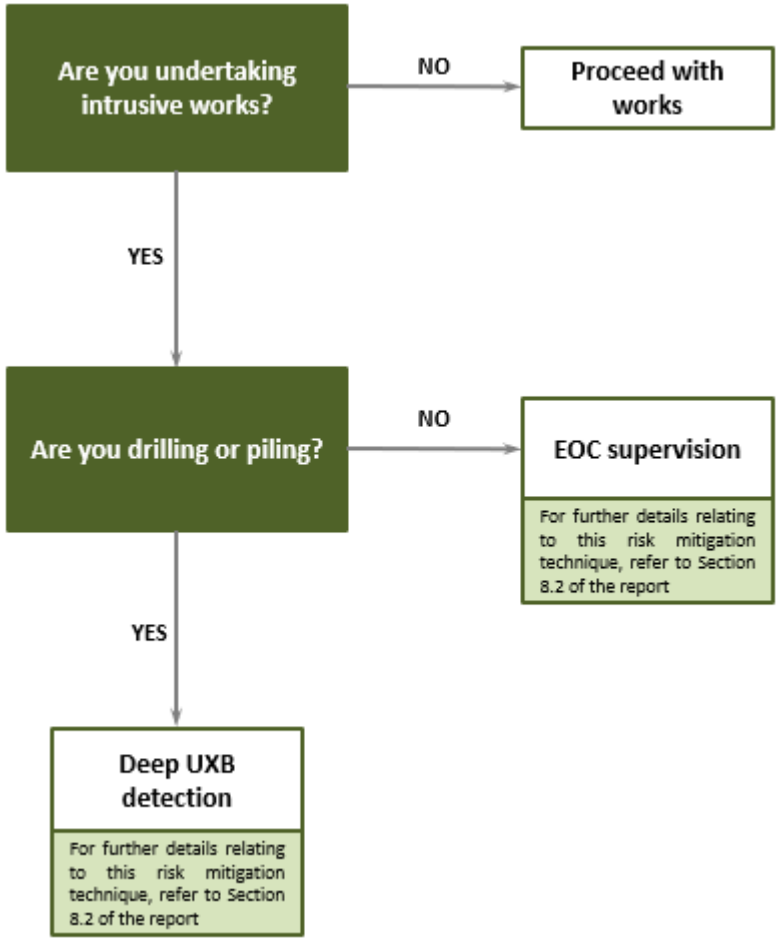
9 RISK MITIGATION PLAN

Key findings: Potential hazard from UXB on the Site.

Key actions: EOC engineer supervision is required for excavations and deep UXB detection is required to clear borehole or pile locations.

Figure 10 outlines the recommended steps to reduce the UXO risk to ALARP.

Figure 10	Recommended risk mitigation plan for the Site



9.1 UXO Risk Summary

Table 5 summarises the most appropriate risk mitigation recommendations for the proposed works on the Site.

Table 5	Summary of UXO risk and mitigation recommendations	
Proposed Works	**UXO Risk**	**Recommended Mitigation**
Excavations		**EOC Engineer Supervision** – to ensure safety and minimise delays, Explosive Ordnance Clearance (EOC) Engineer supervision is recommended.
Boreholes/Piling		**Deep UXB detection –** to clear borehole and pile locations of potential UXB, an intrusive magnetometer survey should be undertaken until either the maximum bomb penetration or maximum drilling/piling depth is reached.

In summary, it is recommended that all excavations are supervised by an EOC engineer.

As part of borehole or pile construction, we recommend that deep UXB detection is undertaken to ensure the safety of those working in the area.

9.2 Risk Mitigation Techniques

The section below provides further details of the recommended techniques for mitigating the UXO risk on the Site.

9.2.1 EOC Engineer Supervision

Given the amount of Made Ground on the Site, the effectiveness of a non-intrusive UXO detection survey is likely to be reduced.

It is considered more practical for an EOC engineer to attend site and supervise during excavation works if required.

The EOC engineer will carry out a visual assessment on any suspect items uncovered during the excavation works and classify them as potential UXO or other material.

If an item of UXO is uncovered, the EOC engineer will liaise with the authorities and arrange for its disposal as appropriate.

9.2.2 Deep UXB Detection

To clear borehole or pile positions of potential UXB, an intrusive magnetometer survey should be undertaken.

The survey should be carried out to either the maximum bomb penetration depth or maximum drilling/piling depth, whichever is shallower.

There are two main systems available:-

MagDrill (Boreholes) – this is a system that is suitable for working with ground investigation drillers.

It allows a magnetometer to be lowered into the borehole to ensure the route is clear of potential UXB.

MagCone (Piles) – this is a CPT-based system that facilitates the pushing of a magnetometer into the ground at the proposed location of a pile.

MagCone is suitable for cohesive/loose soils and has a much higher speed of operation compared to MagDrill. It should be noted that where dense soils or buried obstructions are encountered, MagCone is unlikely to be able to penetrate to the required depth.

Detection - Typical radius of detection should be assumed as approximately 1.0m for a 50kg UXB until site conditions are confirmed.

Assuming no objects comparable to the UXB detection range are identified, then the borehole or pile position can be considered clear of UXB.

If any ferrous anomalies are identified at the borehole or pile position, then it may need to be relocated or the anomaly investigated.

It should be noted that in Made Ground or close to buried/adjacent structures, effective UXB detection is compromised due to geophysical noise.

A clearance report should be issued on completion of the site works.

9.3 What Do I Do Next?

If you wish to proceed with UXO risk mitigation, Zetica would be happy to assist. Just contact us via phone (01993 886682) or email (uxo@zetica.com) and we can provide a proposal with options and prices.

If you have requirements for additional surveys, Zetica can provide a range of options to combine UXO clearance with the detection of other buried hazards (e.g. archaeology, utilities, etc.).

If proposed works on the Site change, or additional works are planned, contact Zetica for a re-assessment of the UXO risk and the risk mitigation requirements. In particular, caution is advised if works extend onto the beach adjacent to the eastern boundary of the Site.

APPENDICES

Appendix 1 Anticipated Ordnance Types

The most likely ordnance types to be encountered on the Site are detailed below. For a more comprehensive set of ordnance data sheets, see http://zeticauxo.com/downloads-and-resources/ordnance-data-sheets/.

Information Data Sheet

Category Small Arms Ammunition
Type Various

Description: Small Arms Ammunition (SAA) is one of the more recognisable categories of ordnance which is primarily designed for anti-personnel use. SAA include items such as bullets, generally up to a calibre (diameter) of 20mm.

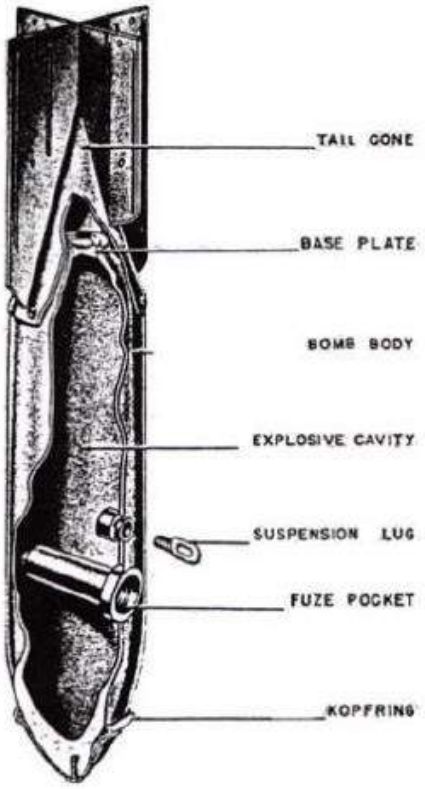
Generally small arms ordnance has a relatively low risk as UXO, although the larger calibre categories may have the same detonation risk as larger high explosive ordnance.

SAA is often associated with discarded ammunition boxes around firing practice ranges and training areas and is often found scattered across former military airfields as a result of aircraft crashes and localised disposal.

Information Data Sheet

Category Bomb (Luftwaffe)
Type Sprengbombe-Cylindrisch (SC) 50kg

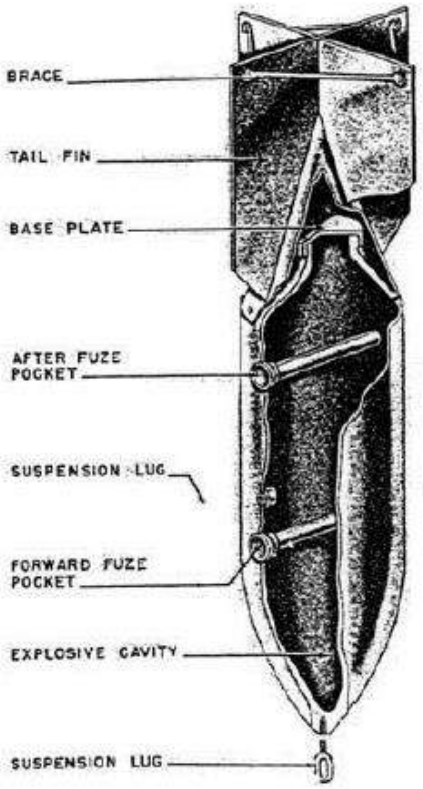
Variants	8
Body Dimensions	762 x 200mm (30" x 7.9")
Weight	55kg (122lbs)
Charge Weight	25kg (54lbs)
Fuze	Single electric impact fuze. Some have short time delay
Composition	Sheet steel
Description	Thick nose welded to a steel body. Nose may be attached to Kopfring (a triangular section steel ring) or spike. Suspension bolt in eye/body and sheet metal tail attached to body with rivets/screws. Originally painted green-grey with a yellow stripe on the tail. Cast TNT, Amatol or Trialen filling.
Function	Designed to maximise shock waves through air, water and earth and for general demolition. Used against easily damageable targets, including roads, aircraft hangars, rolling stock and small buildings. Spike bombs/ 'Stabo' (SC 50 with spikes attached to nose) were used against rail lines and country roads, with Kopfring used against naval targets.



Information Data Sheet

Category Bomb
Type Sprengbombe-Cylindrisch (SC) 250kg

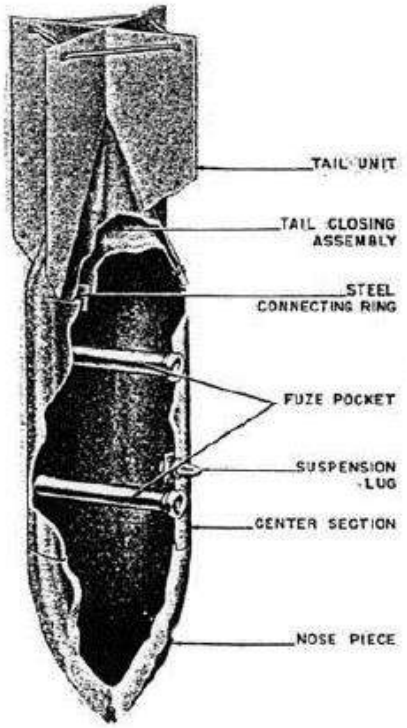
Variants	8
Body Dimensions	1194mm x 368mm (47" x 14.5")
Weight	249-264 kg (548-582lbs)
Charge Weight	130-145 kg (287-320lbs)
Fuze	Electric impact fuze/electric clockwork time fuse & electric anti-disturbance fuze
Composition	Sheet steel with stays
Description	Thick nose welded to steel body. Nose may be attached to Kopfring (triangular section steel ring) or spike. Sheet metal tail attached to body with rivets/ screws. Suspension eye bolt in the nose/body. Originally painted green-grey with a yellow stripe on the tail. TNT; amatol; TNT and aluminium powder, naphthalene, ammonium nitrate and wax/ wood meal filling.
Function	Designed to maximise shock waves through air, water and earth and general demolition. Used against railway installations, large buildings, ammunition depots and below-ground installations (to 8m). Spike bombs/ 'Stabo' (SC 50 with spikes attached to nose) used against rail lines and country roads.



Information Data Sheet

Category Bomb
Type Sprengbombe-Cylindrisch (SC) 500kg

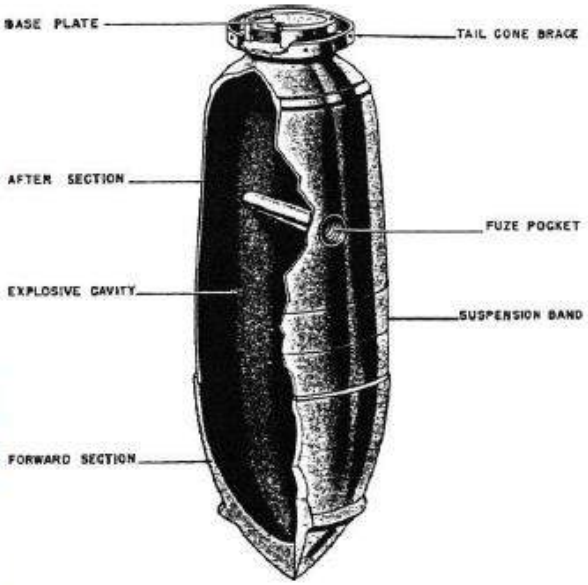
Variants	-
Body Dimensions	1414–1486mm x 470mm (55.7-58.5" x 18.5")
Weight	500kg (1,100lbs)
Charge Weight	220kg (484lbs)
Fuze	Electric impact fuze/electric clockwork time fuse & electric anti-disturbance fuze.
Composition	Sheet steel with stays or drum
Description	Thick nose welded to steel body. Nose may be attached to Kopfring (triangular section steel ring). Tail either steel sheet or drum-shaped. Suspension band. Originally painted green-grey/ buff (some later versions sky blue) with yellow stripe on tail. Filled with amatol, TNT or trialen.
Function	Designed to maximise shock waves through air, water and earth and for general demolition. Used against railway property, large buildings, shipping and below-ground installations.

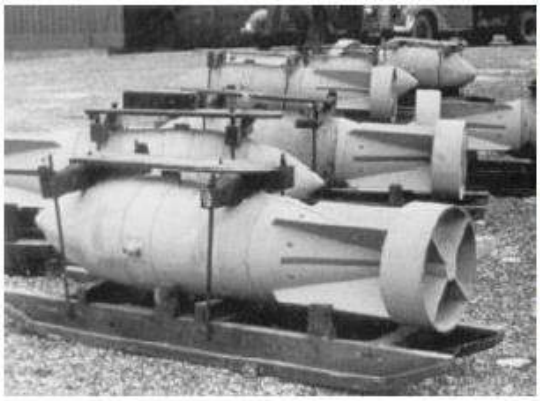


Information Data Sheet

Category Bomb
Type Sprengbombe-Cylindrisch (SC) 1,000kg (HERMANN)

Variants	3
Body Dimensions	1742-1905mm x 648–660mm (68.6-75" x 25.5-26")
Weight	1,000-1,088kg (2,204-2,398lbs)
Charge Weight	529-619kg (1,166-1,364lbs)
Fuze	Electric impact fuze/ electric clockwork time fuze & electric anti-disturbance fuze
Composition	Magnesium alloy with drum
Description	Thick nose welded to steel body. Nose attached to Kopfring (triangular section steel ring). Drum-shaped tail made of magnesium alloy. Suspension band. Originally painted sky-blue. Filled with amatol, TNT/aluminium/wood meal or trialen.
Function	Designed to maximise shock waves through air, water and earth and for general demolition.





Information Data Sheet

Category Bomb (Luftwaffe)
Type Parachute Mine (Luftmine B) LMB

Variants 1

Body Dimensions 8' 8" (2,640mm) x 26" (660mm)

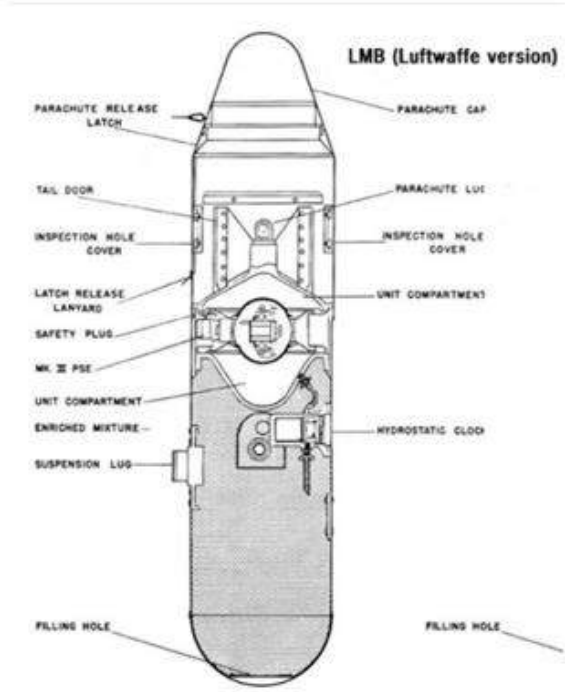
Weight 1000kg (2204lbs)

Charge Weight 705kg (661lbs)

Fuze Impact / Time Delay / Hydrostatic pressure fuze

Composition Aluminium

Description The body was cylindrical in shape with a hemispherical nose and were deployed under a parachute about 8m in diameter. The explosive content was made up of trinitrotoluene (TNT). It is estimated that 10% of all parachute mines employed failed to explode.



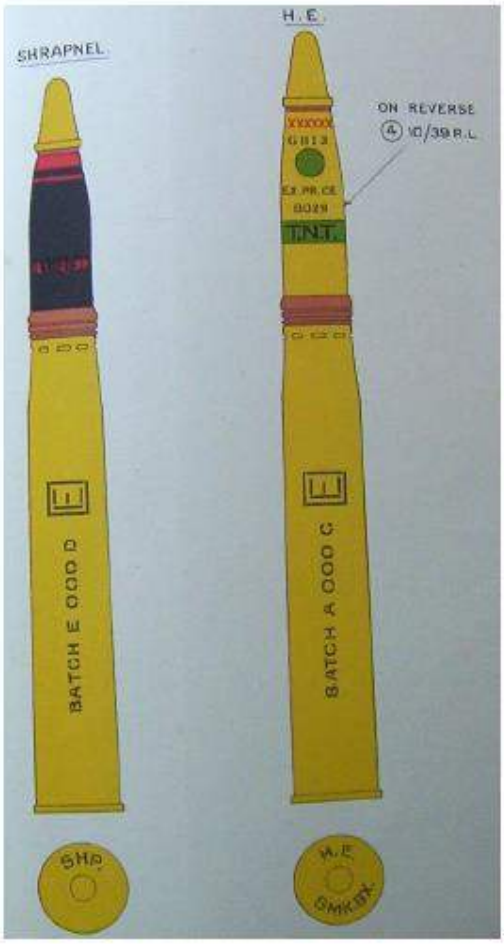
Function Luftmines were designed as anti-shipping weapons, but were also deployed against land based targets as a blast weapon.

They were equipped with a variety of detonator mechanisms for use in both roles.

Information Data Sheet

Category Projectile
Type 3.7" Anti-Aircraft Shell

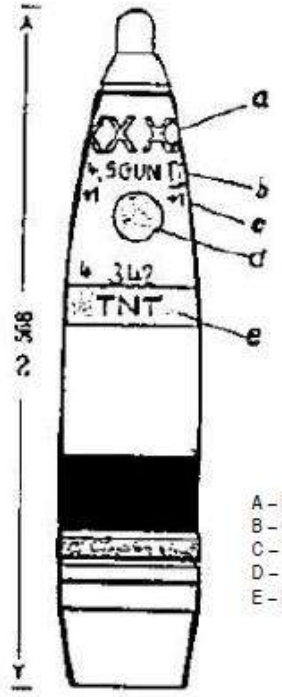
Variants	6
Body Dimensions	94mm x 360mm (3.7 x 14.7")
Weight	12.7kg (28lb)
Fuze	Mechanical time fuze
Composition	Cast steel
Description	Brass cartridge case. Square-based shell with tapered nose, filled with Amatol, TNT or RDX/TNT. MK6 had forward centring bands and a wider driving band.
Function	Used as a defence against enemy aircraft, fired from fixed batteries and mobile mountings. Could fire approximately 20 rounds per minute with a maximum ceiling of 41,000ft and horizontal range of 20,600 yards.



Information Data Sheet

Category Projectile
Type 4.5" Shell (Mark II – Anti-Aircraft)

Variants	-
Body Dimensions	114mm x 566mm (4.5" x 21.9")
Weight	24.9kg (55lb)
Fuze	Mechanical time fuze
Composition	Cast steel
Description	Square-based, tapered-nosed shell filled with TNT or Amatol. Steel casing, rotating band of either copper or gilding metal located 3.5" in front of the base end with single groove.
Function	Used as field artillery and adapted for use in anti-aircraft defence from fixed batteries. Rate of fire of 8 rounds per minute, maximum ceiling of 44,000ft and horizontal range of 22,800 yards.



A – Missile Identification
B – Gun and Bullet Type
C – Weight
D – Smoke pot
E – Explosives Ring

Appendix 2 Sources of UXO Hazard

The sections below provide background information on the most likely sources of UXO hazard affecting the Site. For a more comprehensive set of UXO information sheets, see http://zeticauxo.com/downloads-and-resources/uxo-information-sheets/.

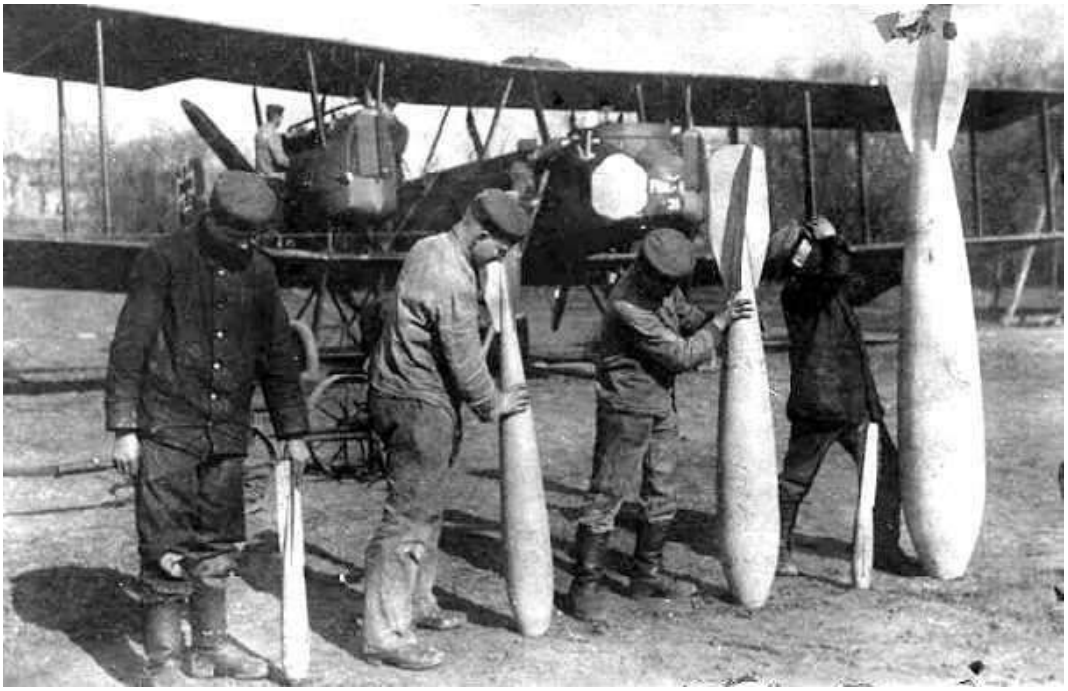
Appendix 2.1 WWI Bombing

It is not generally realised that during World War One (WWI) significant bombing took place across some areas of the UK. An estimated 9,000No. German bombs were dropped on Britain during the course of 51No. airship and 52No. aircraft raids. It was the first time that strategic aerial bombardment had been used. More than 1,400No. people were killed during these raids.

Most air raids were carried out on London and Southeast England. Areas along the East Coast were also targeted regularly due to their proximity to the European continent. Bombing raids further inland were rare and West England and Wales were out of reach for German aircraft of the time.

Aerial bombing during WWI initially relied on visual aiming, with bombsights not developed until later in the war. The inaccuracy inherent in this method meant that bombs often fell some way from their intended targets.

The first recorded raid against England occurred on the 21st December 1914 when 2No. high explosive bombs fell near the Admiralty Pier at Dover. Zeppelin raids intensified during 1915 and 1916, with aircraft raids becoming more frequent after 1917. The last raid of WWI took place on the 19th May 1918, when 38 Gotha and 3 Giant aircraft bombed London and surrounding districts, dropping a total of more than 2,500lbs of bombs.



The potential of coming across an Unexploded Bomb (UXB) from WWI is far less likely than a WWII UXB given the lower bombing densities during raids in the Great War.

Some areas which were subjected to sustained bombing raids, such as parts of London and coastal towns, recorded a higher number of UXB. In these areas, where there has been no significant development for the last century, the potential of a UXB remaining from WWI cannot be totally discounted.

Appendix 2.2 WWII Bombing

Bombing raids began in the summer of 1940 and continued until the end of WWII. Bombing densities generally increased towards major cities or strategic targets such as docks, harbours, industrial premises, power stations and airfields. In addition to London, industrial cities and ports, including Birmingham, Coventry, Southampton, Liverpool, Hull and Glasgow, were heavily targeted, as well as seaside towns such as Eastbourne and cathedral cities such as Canterbury.

The German bombing campaign saw the extensive use of both High Explosive (HE) bombs and Incendiary Bombs (IBs). The most common HE bombs were the 50kg and 250kg bombs, although 500kg were also used to a lesser extent. More rarely 1,000kg, 1,400kg and 1,800kg bombs were dropped.

The HE bombs tended to contain about half of their weight in explosives and were fitted with one or sometimes two fuzes. Not all HE bombs were intended to explode on impact. Some contained timing mechanisms where detonation could occur more than 70 hours after impact.

Incendiary devices ranged from small 1kg thermite filled, magnesium bodied Incendiary Bombs (IBs) to a 250kg 'Oil Bomb' (OB) and a 500kg 'C300' IB. In some cases the IBs were fitted with a bursting charge. This exploded after the bomb had been alight for a few minutes causing burning debris to be scattered over a greater area. The C300 bombs were similar in appearance to 500kg HE bombs, although their design was sufficiently different to warrant a specially trained unit of the Royal Engineers to deal with their disposal.

Anti-Personnel (AP) bombs and Parachute Mines (PMs) were also deployed. 2No. types of anti-personnel bombs were in common use, the 2kg and the 12kg bomb. The 2kg bomb could inflict injury across an area up to 150m away from the impact. PMs (which were up to 4m in length) could be detonated either magnetically or by noise/vibration.

Anti-shipping parachute mines were commonly dropped over navigable rivers, dockland areas and coastlines. The Royal Navy was responsible for ensuring that the bombs were made safe. Removal and disposal was still the responsibility of the Bomb Disposal Unit of the Royal Engineers.

In 1944, the Germans introduced new weapons; the V1, a 'flying bomb' and guided missile, and the V2, a ballistic missile rocket that travelled at such speed that no one could see or hear its approach. London was the main target for these attacks.

WWII bomb targeting was inaccurate, especially in the first year of the war. A typical bomb load of 50kg HE bombs mixed with IBs which was aimed at a specific location might not just miss the intended target but fall some considerable distance away.

It is understood that the local Civil Defence authorities in urban areas had a comprehensive system for reporting bomb incidents and dealing with any Unexploded Bombs (UXB) or other UXO. In more rural areas, fewer bombing raids occurred. It is known that Air Raid Precaution (ARP) records under-represent the number and frequency of bombs falling in rural and coastal areas. Bombs were either released over targets or as part of 'tip and run' raids where bomber crews would drop their bombs to avoid anti-aircraft fire or Allied fighter aircraft on the route to and from other strategic targets. Bombs dropped as a result of poor targeting or 'tip and run' raids on rural and coastal areas often went unrecorded or entered as 'fell in open country' or 'fell in the sea'. The Luftwaffe are thought to have dropped approximately 75,000 tons of bombs on Britain throughout the Second World War and an estimated 11% of all bombs dropped during the war failed to detonate.

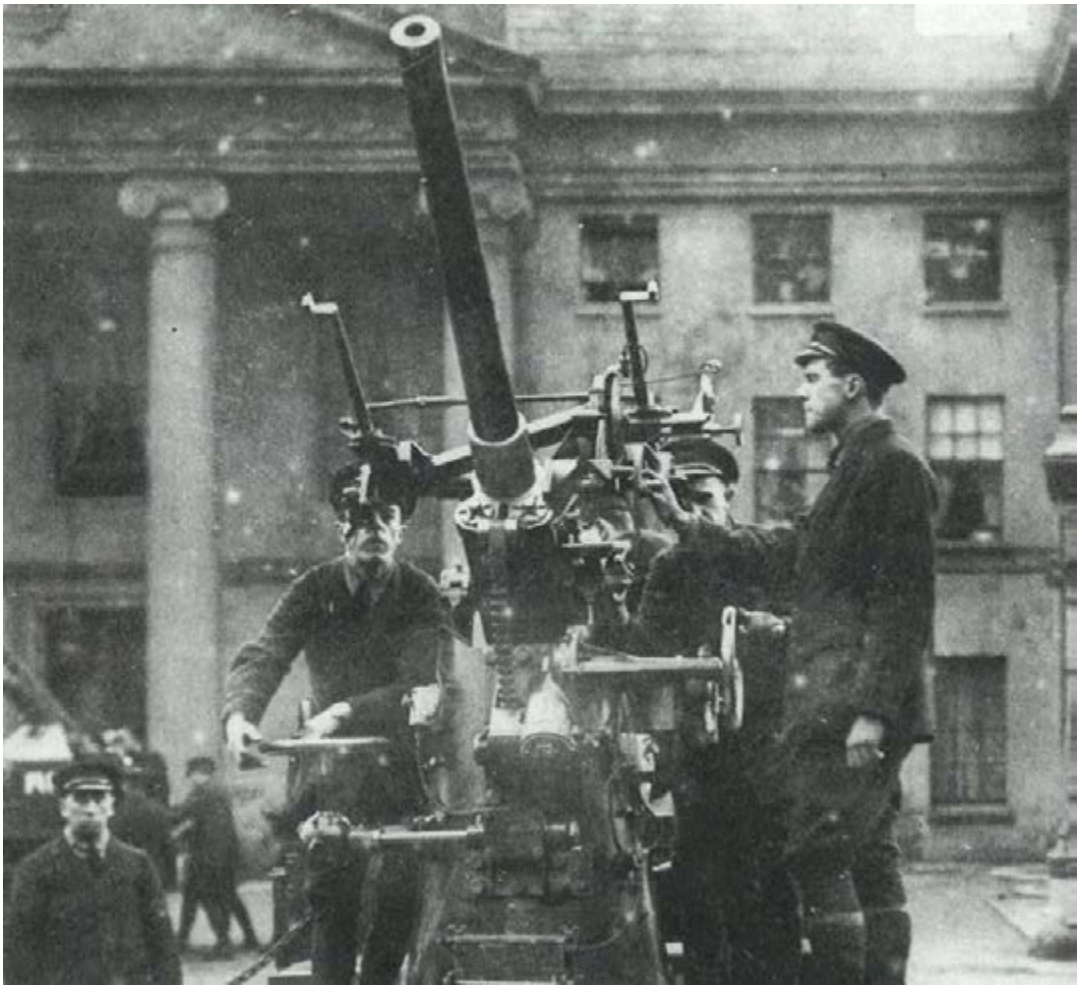
The potential for a UXB hazard to exist on a site depends on a variety of factors. Were there strategic targets in the surrounding area? Was the site bombed? Could a UXB impact have been missed? Even in rural areas, the potential for UXB cannot be totally discounted and therefore it is essential that detailed local bombing records are obtained when assessing the UXB hazard on any site.

Appendix 2.3 Anti-Aircraft Guns

As aerial bombardment first began during WWI, Anti-Aircraft (AA) gun batteries were established were gradually established throughout much of England to counter German bombing raids. By June 1916, there were approximately 271No. AA guns and 258No. searchlight installations defending London alone.

Common AA defences during WWI included 3-inch, 75 millimetre, 6-pounder and 1-pounder guns. Many of these guns were mobile, being mounted on lorry chassis. They were driven about following the course of an airship and fired from any area of open land.

During WWI, Unexploded AA (UXAA) shells, could land up to 13km from the firing point, although more typically fell within 10km.



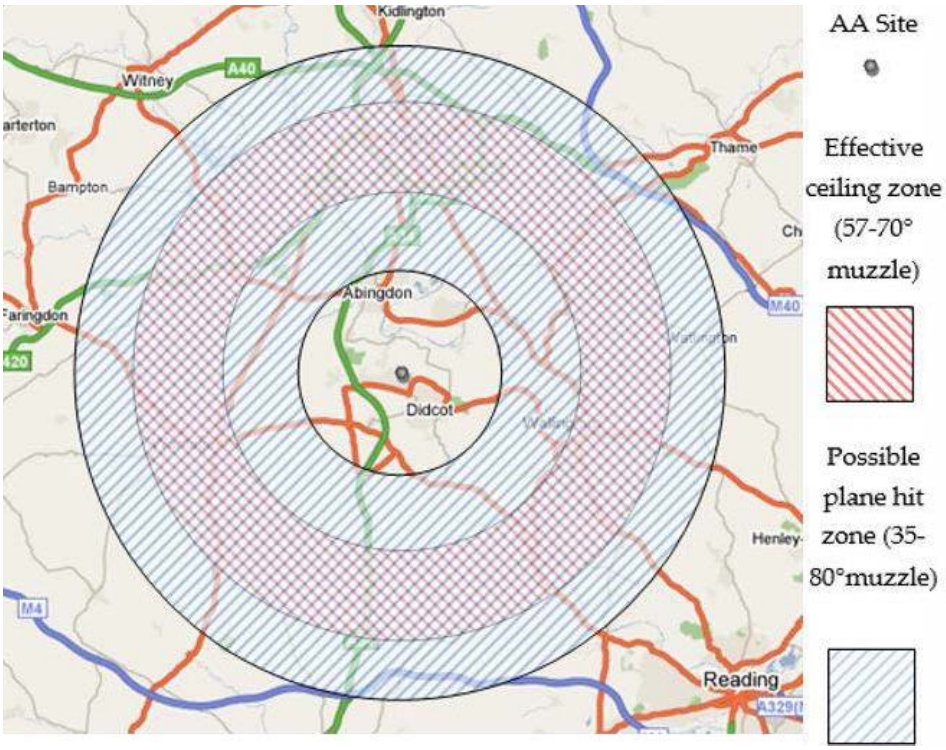
AA gun batteries were used extensively during WWII to counter the threat posed by enemy aircraft. In many instances, AA shells caused damage to Allied territory and in some areas caused significant numbers of civilian fatalities.

During WWII, AA shells could land up to 27km from the firing point, although more typically fell within 15km. These could be distributed over a wide area.

3No. types of AA batteries existed:

- **Heavy Anti-Aircraft (HAA)** batteries of large guns (typically 3.7", 4.5" and 5.25" calibre) designed to engage high flying bomber aircraft. These tended to be relatively permanent gun emplacements.
- **Light Anti-Aircraft (LAA)** weaponry, designed to counter low flying aircraft. These were often mobile and were moved periodically to new locations around strategic targets such as airfields. They typically fired 40mm shells and machine gun ammunition.
- **Rocket batteries (ZAA)** firing 3" or 3.7" AA rockets with a maximum altitude of 5,800m and a ground range of 9km were typically permanent emplacements.

Unexploded AA (UXAA) shells were a common occurrence during WWII. As the figure below demonstrates, shells were unlikely to fall in the immediate vicinity of a gun battery but in the surrounding area. This would be dependent upon the angle of fire and the flight height of the attacking aircraft.



AA batteries were deliberately targeted by the Luftwaffe and therefore areas surrounding a gun battery may have a greater risk of UXB being present.

Munitions stores were also established around AA batteries. These stored the shells for the batteries and small arms ammunition for troops manning the position. Such stores were typically removed at the end of WWII, although some disposal may have occurred in the immediate vicinity of the gun battery.

Appendix 2.4 Strategic Targets

The presence of strategic targets significantly increased the likelihood of bombing within the local area. Airfields, docks, industrial facilities, transport infrastructure and anti-invasion defences were all targeted by Luftwaffe bombers.

The Luftwaffe prepared detailed reconnaissance photographs and target maps in the build-up to WWII and were aware of the location of many of Britain's industrial and military facilities.

Regional bombing densities are typically dictated by the number, and significance, of the strategic targets within the region. The inherent bombing inaccuracies during both WWI and WWII meant that areas surrounding the targets were often subjected to bombing.

Looking at the strategic targets surrounding a site can give an impression of the likely level of bombing and whether a UXB hazard might exist. It should be noted, however, that many important targets were never bombed by the Luftwaffe and other areas seemingly unimportant to the war effort were targeted indiscriminately.

For instance, the 'Baedeker Blitz' of 1942 against cultural centres such as Bath, York and Canterbury (which possessed few significant industrial or military facilities) caused significant damage and resulted in relatively high regional bombing densities.

Whilst looking at strategic targets local to a site can be informative, it is crucial to obtain site-specific bombing data to get an appreciation of the potential UXB hazard.

Even remote areas such as Sullom Voe on the Shetland Islands were photographed by the Luftwaffe in preparation for air raids

Luftwaffe target map of Wallsend on Tyneside

Appendix 2.5 Mined Locations

Minefields were laid along the coast, in estuaries and along the banks of major rivers to deter infantry invasion. They were often surrounded by barbed wire entanglements to obstruct amphibious landings.

Hardened defensive positions, such as roadblocks and pillboxes, were often surrounded by anti-tank mines for further protection. These were usually buried in shallow sockets in an attempt to make them indistinguishable from the road layout.

Strategic points such as bridges and gaps in cliffs were often filled with explosives so that they could be destroyed in the event of an enemy invasion. Canadian pipe mines, filled with nitroglycerine, were also laid under some airfield runways to prevent their use by the enemy if captured.

Typical WWII British land mine used as an anti-invasion defence

A wide variety of mines have been used on the land area of the UK. These can typically be separated into anti-tank and anti-personnel mines.

Most of the mined beaches and other land areas in the UK have been cleared by the MoD. Occasionally, wave action or activities such as bombing caused mines to become displaced and these may have been missed during past clearance activities. Therefore beaches that are known to have been mined need to be treated with respect.

Remnant mines are also sometimes found in the foundations of bridges and other infrastructure which has remained undisturbed since wartime.

More rarely, sea mines are washed up on beaches and shorelines along estuaries (see information sheet on marine mines).

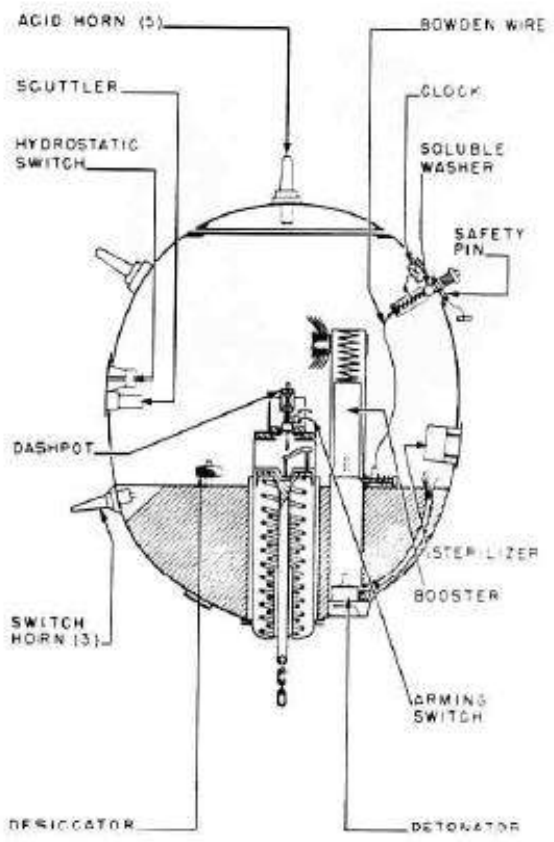
Appendix 2.6 Minefields

During WWI, approximately 128,000No. mines were laid in the sea around the coast of the UK. At the beginning of WWII, the Admiralty ordered the laying of further extensive minefields around the coast of England. This included both defensive mines on beaches in order to prevent enemy landings, as well as approximately 100,000No. marine mines laid at sea to destroy enemy ships.

Known marine minefields were cleared at the end of WWII using the original layout plans, although less than 30% of the total number of sea mines were cleared as many were moved from their original positions by tidal currents and wave action. As a result there is a possibility that some remain in the marine environment and a mine can be washed up on a beach or found drifting in the water around any part of the UK's coastline.

Buoyant mines, designed to float or sit just below the surface, were the most commonly deployed marine mines. They were typically moored, or tethered to the seabed with an anchor or wire. Generally spherical in shape, the mines were comprised of 2No. hemispheres connected with a cylindrical mid-section.

Marine mines typically carried 100 to 500lbs (50 to 250kg) of explosive. They were detonated by contact (being struck) or by influence (a vessel interfering with the mine's electromagnetic field).



German ground mines (Luftmine) were air-deployed naval mines which were also modified for deployment from submarines and surface craft. Although primarily designed to lie on the seabed, many were also moored or buoyant. Designed as an anti-shipping weapon, the WWII Luftmine was also often used on land based targets.

Luftmines typically comprised a cylindrical body with a hemispherical nose and tapered tail, with charges weighing between 675lbs and 1,500lbs (305 to 680kg).

Some German marine mines were composed of aluminium or manganese steel depending on the variant, whereas British mines were typically made of steel.

The initiating mechanisms in these mines have often deteriorated but the explosive charges will not have significantly altered unless the mine has split and the explosives have migrated and dispersed in the marine environment.

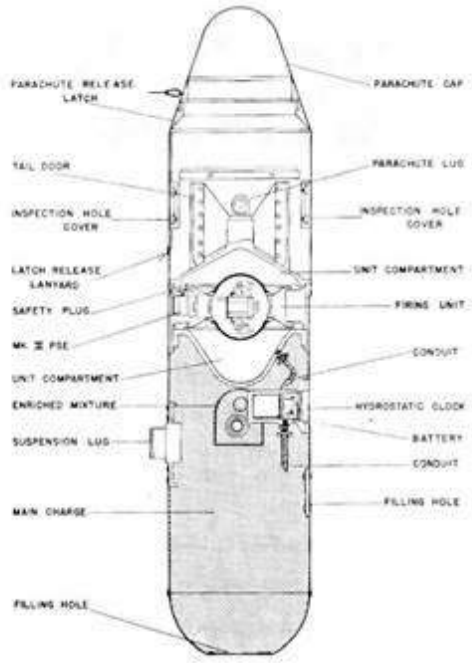
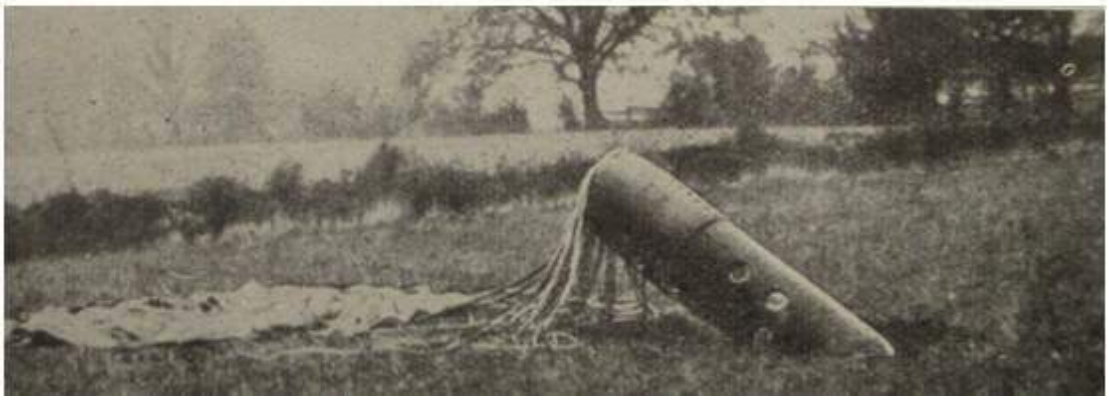


Figure 57 - SMD III Mine - Cross Section



Appendix 3 Recent UXO Finds

UXO finds in the UK are a regular occurrence, although they almost never result in an accidental detonation.

It is still important to note that explosives rarely lose effectiveness with age. In some instances, mechanisms such as fuzes and gaines can become more sensitive and more prone to detonation, regardless of whether the device has been submersed in water or embedded in silt, clay or similar materials.

The effects of an accidental UXO detonation are usually extremely fast, often catastrophic and invariably traumatic to any personnel involved. Such occurrences are largely restricted to current theatres of war and overseas minefields, with occasional events in mainland Europe.

The sections below provide a brief summary of recent significant UXO finds in the UK. To keep up to date with the latest UXO finds, visit http://zeticauxo.com/news/.

On the 4th September 2017, 1No. 50kg UXB was found in a ragstone quarry at Kings Hill near West Malling in Kent. It was destroyed in situ in a controlled explosion by an EOD team.

On the 11th February 2018, 1No. 500kg UXB was found in King George V Dock in London, resulting in the temporary closure of the adjacent London City Airport. The UXB was freed from a silt bed and towed along the River Thames to Shoeburyness where it was destroyed in a controlled explosion.

On the 26th February 2018, an EOD team destroyed numerous items of ordnance including shells and 20mm ammunition which had been exposed by storms on Selsey beach. A similar operation was required after more UXO finds on the beach in April 2018.

On the 31st March 2018, 2No. 870lb British PMs were found in waters off Guernsey. They were destroyed in controlled explosions.

On the 20th May 2018, a 1,000kg German sea mine washed ashore at Elmer beach near Bognor Regis, West Sussex. A 1 mile exclusion zone was enforced before an EOD team towed the device out to sea for a controlled explosion.

On the 24th May 2018, numerous ordnance-related items were found on a proposed residential development in Burntwood, Staffordshire.

On the 10th July 2018, a suspected 1,000kg German UXB was found by scuba divers near Teignmouth Pier in Devon. The UXB was towed out into open sea by a RN EOD team for a controlled explosion.

On the 30th August 2018, a 2,000lb German PM was trawled up by a fishing vessel off Mersea in Essex. The PM was moved to an area of open sea where it was destroyed in a controlled explosion by a RN EOD team.

On the 29th November 2018 a large naval projectile was found at Wembury Point, Plymouth. It was destroyed in a controlled explosion.

During January and February 2019 a military EOD was called out to deal with several items of UXO washed up at Medmerry Beach in Selsey. The site of a former gunnery range, it followed on from several similar incidents in 2018.

On the 21st January 2019 a suspected 1,000lb torpedo was brought into Brixham Harbour by a fishing trawler. It was towed back out to sea and destroyed by a Naval EOD team.

On the 6th February 2019 3No. WWII projectiles were found on Chalkwell Beach near Southend-on-Sea, Essex. They were destroyed in a controlled explosion.

On the 19th February 2019 6No. projectiles were found on the beach at Lilstock, Somerset.

On the 14th March 2019 an unexploded pipe mine was found at the former RAF Manston airfield near Ramsgate, Kent. It was destroyed in a controlled explosion.

On the 21st March 2019 2No. unexploded shells were found on a building site in Brighton. They were removed by an EOD team.

On the 25th March 2019 an unexploded shell was found in Stechford, Birmingham. It was removed to a field and destroyed in a controlled explosion.

On the 22nd May 2019 70No. Self-Igniting Phosphorus (SIP) grenades were found during development works at Tongland Dam in Dumfries & Galloway, Scotland. They were destroyed in a controlled explosion.

On the 23rd May 2019 a 250kg German UXB was found by workers on a building site at Kingston University in London (see plate below). The UXB could not be safely removed and was consequently destroyed in situ by an EOD team.

On the 27th May 2019 24No. SIP grenades were found in a field near Sibton in Suffolk. An EOD team constructed a 2ft deep trench into which the grenades were placed before being destroyed in a controlled explosion.

On the 7th June 2019 a 50kg German fragmentation UXB was found at a building site in Kings Hill at the former RAF West Malling airfield. It was destroyed in a controlled explosion by an EOD team the following day. On the 26th September 2019 another 50kg German UXB was found at Kings Hill and was destroyed in a controlled explosion the next day.

On the 20th September 2019 a suspected 250kg German UXB was found on a construction site in Bordon, Hampshire. It was destroyed in a controlled explosion by an EOD team.

In September 2019 a German PM was found by divers off Southend-on-Sea, Essex. It was towed out to open water off Shoeburyness by a Royal Navy EOD team and destroyed in a controlled explosion.

On the 3rd February 2020, a 500kg German UXB was found on a building site in Soho, London. It was removed by an EOD team.

Appendix 4 Glossary and Definitions

Abandoned Explosive Ordnance (AXO)	Abandoned Explosive Ordnance is explosive ordnance that has not been used during an armed conflict, that has been left behind or disposed of by a party to an armed conflict, and which is no longer under control of that party. Abandoned explosive ordnance may or may not have been primed, fuzed, armed or otherwise prepared for use.
Close Combat Munitions	Items of ordnance thrown, propelled or placed during land warfare, to include grenades, mortars, projectiles, rockets and land mines.
Demil	Derived from the term 'Demilitarisation', it refers to the break down and the recycling or disposal of ordnance components.
Detonation	The high-speed chemical breakdown of an energetic material producing heat, pressure, flame and a shock wave.
Device	This term is used for any component, sub-assembly or completed ordnance, which may or may not have an explosive risk. It can apply to detonators, primers, gaines, fuzes, shells or bombs.
Explosive	The term explosive refers to compounds forming energetic materials that under certain conditions chemically react, rapidly producing gas, heat and pressure. Obviously, these are extremely dangerous and should only be handled by qualified professionals.
Explosive Ordnance (EO)	Explosive Ordnance is all munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads, guided and ballistic missiles, artillery, mortar, rocket, small arms ammunition, mines, torpedoes, depth charges, pyrotechnics, cluster bombs & dispensers, cartridge & propellant actuated devices, electro-explosive devices, clandestine & improvised explosive devices, and all similar or related items or components explosive in nature.
Explosive Ordnance Clearance (EOC)	Explosive Ordnance Clearance is a term used to describe the operation of ordnance detection, investigation, identification and removal, with EOD being a separate operation.
Explosive Ordnance Disposal (EOD)	Explosive Ordnance Disposal is the detection, identification, on-site evaluation, rendering safe, recovery and final disposal of unexploded explosive ordnance.
Explosive Ordnance Reconnaissance (EOR)	Explosive Ordnance Reconnaissance is the detection, identification and on-site evaluation of unexploded explosive ordnance before Explosive Ordnance Disposal.
Explosive Remnants of War (ERW)	Explosive Remnants of War are Unexploded Ordnance (UXO) and Abandoned Explosive Ordnance (AXO), excluding landmines.

Explosive Substances and Articles (ESA)

Explosive substances are solid or liquid substances (or a mixture of substances), which are either:

- capable by chemical reaction in itself of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings.
- designed to produce an effect by heat, light, sound, gas or smoke, or a combination of these as a result of a non-detonative, self-sustaining, exothermic reaction.

Explosive article is an article containing one or more explosive substances.

Fuze

A fuze is the part of an explosive device that initiates the main explosive charge to function. In common usage, the word fuze is used indiscriminately, but when being specific (and in particular in a military context), fuze is used to mean a more complicated device, such as a device within military ordnance.

Gaine

Small explosive charge that is sometimes placed between the detonator and the main charge to ensure ignition.

Geophysical survey

A geophysical survey is essentially a range of methods that can be used to detect objects or identify ground conditions without the need for intrusive methods (such as excavation or drilling). This is particularly suited to ordnance as disturbance of ordnance items is to be avoided where ever possible.

Gold line

This is the estimated limit of blast damage from an explosive storage magazine. It usually means that development within this zone is restricted.

High Explosive

Secondary explosives (commonly known as High Explosives (HE)) make up the main charge or filling of an ordnance device. They are usually less sensitive than primary explosives. Examples of secondary explosives are: Nitro glycerine (NG), Trinitrotoluene (TNT), AMATOL (Ammonia nitrate + TNT), Gunpowder (GP), and Cyclotrimethylenetrinitramine (RDX).

Munition

Munition is the complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological or chemical material for use in military operations, including demolitions. This includes those munitions that have been suitably modified for use in training, ceremonial or non-operational purposes. These fall into three distinct categories:-

- inert - contain no explosives whatsoever.
- live - contain explosives and have not been fired.
- blind - have fired but failed to function as intended.

Primary Explosive	Primary explosives are usually extremely sensitive to friction, heat, and pressure. These are used to initiate less sensitive explosives. Examples of primary explosives are: Lead Azide, Lead Styphnate, and Mercury Fulminate. Primary explosive are commonly found in detonators.
Propellants	Propellants provide ordnance with the ability to travel in a controlled manner and deliver the ordnance to a predetermined target. Propellants burn rapidly producing gas, pressure and flame. Although usually in solid form they can be produced in liquid form. Examples of propellants are: Ballistite often found in a flake form and Cordite used in small arms ammunition.
Pyrotechnic	A pyrotechnic is an explosive article or substance designed to produce an effect by heat, light, sound, gas or smoke, or a combination of any of these, as a result of non-detonative, self-sustaining, exothermic chemical reactions.
Small Arms Ammunition (SAA)	SAA includes projectiles around 12mm or less in calibre and no longer than approximately 100mm. They are fired from a variety of weapons, including rifles, pistols, shotguns and machine guns.
Unexploded Anti-Aircraft (UXAA) Shell	UXAA shells are army ordnance commonly containing HE, though they can also contain pyrotechnic compounds that produce smoke. Most commonly, these were 3.7” and 4.5” HE shells, although they ranged from 2” to 5.25” calibre.
Unexploded Bomb (UXB)	UXB is a common term for unexploded air-dropped munitions.
Unexploded Ordnance (UXO)	UXO is explosive ordnance that has been either primed, fuzed, armed or prepared for use and has been subsequently fired, dropped, launched, projected or placed in such a manner as to present a hazard to operations, persons or objects and remains unexploded either by malfunction or design.

Appendix 5 WWII Bombing Incident List

12th June 1940

There were 2No. separate air raids. In the first, 6No. bomber aircraft attacked the Portland Harbour area. No details of bombing have been found.

1No. Junkers Ju88 bomber aircraft attacked Portland. The HMS Himalaya, a coal hulk, was hit by at least 2No. HE bombs and sank, approximately 1.4km northwest of the Site.

30th June 1940

3No. bomber aircraft attacked Portland. Several HE bombs fell in The Verne Citadel, approximately 0.5km south of the Site.

1st July 1940

2No. HE bombs fell near north entrance to Verne Citadel, approximately 0.5km west-southwest of the Site. 1No. of theses was recorded as UXB.

1No. HE bomb fell on southwest corner of the moat at Verne Citadel, approximately 0.8km northeast of the Site. This was recorded as UXB.

4th July 1940

26No. Junkers Ju87 dive bombers attacked Portland Dockyard. The main objective was to sink HMS Foylebank, an anti-aircraft guard ship that was anchored in the outer harbour, together with other defences. The nearest recorded incidents are described below.

2No. HE bombs fell on the McAlpine base, Old Depot Road, approximately 0.2km west of the Site.

1No. HE bomb fell on Pinnace 2DG near the Southern Ship Channel, approximately 0.6km northeast of the Site, sinking the boat.

1No. HE bomb fell on The Verne Citadel, approximately 0.6km southwest of the Site.

22No. HE bombs together with many near-misses fell on HMS Foylebank, moored approximately 0.8km northeast of the Site, sinking the ship.

2No. HE bombs fell near oil tanks, on Cadets Road, approximately 1.3km west of the Site. 1No. of these was recorded as UXB.

7th July 1940

Approximately 20No. HE bombs fell in water in a line parallel to the Harbour, from west to east, between approximately 0.6km north-northeast and 2.0km west-northwest of the Site.

1No. HE bomb struck the PMS Mercury moored at an unidentified position in the Harbour.

11th August 1940

Approximately 50No. Junkers Ju88 and Dornier Do17 bomber aircraft attacked Portland, particularly the Mere Fuel Oil Depot and ships at anchor nearby. 32No. HE bombs were recorded as falling on Admiralty lands with many more in the sea. The nearest recorded incidents re described below.

3No. HE bombs fell on the Captain A/S offices, HMUDE, Balaclava Bay, on the Site.

1No. HE bomb fell on the Foreman of Works offices, HMUDE, Balaclava Bay, on the Site.

2No. HE bombs fell on the cliffs on Incline Road, south of Captain A/S offices, HMUDE, Balaclava Bay, approximately 20m south of the Site.

2No. HE bombs fell on the beach outside Captain A/S offices, HMUDE, Balaclava Bay, approximately 50m east of the Site.

4No. HE bombs fell along the cliffs south of Main Road, approximately 0.2km west of the Site.

At least 4No. HE bombs fell in Balaclava Bay, off the Captain A/S office, within approximately 0.4km east of the Site.

1No. HE bomb fell on No. 7 Floating Dock, moored in Harbour, approximately 0.4km northwest of the Site.

6No. HE bombs fell in the water off HMS Osprey, approximately 1.0km west of the Site.

14th August 1940

1No. HE fell in the inner harbour immediately north of the Anti-Submarine Jetty, approximately 0.3km northwest of the Site.

3No. HE bombs fell on coal heaps on the Coaling Jetty, approximately 0.4km northwest of the Site. These were reported as UXBs and were later removed.

1No. HE bomb fell in water on the east side of the approach to the Coaling Jetty, approximately 0.5km west-northwest of the Site.

4No. HE bombs fell in water between the Destroyer Pens and Castletown Pier, approximately 0.7km west-northwest of the Site.

3No. HE bombs fell in the water west-northwest of the Destroyer Pens, approximately 0.9km northwest of the Site.

15th September 1940

25No. Heinkel He111 bomber aircraft dropped approximately 70No. HE bombs, 4No. OBs and numerous other IBs on Portland. The nearest recorded incidents are described below.

2No. HE bombs fell on the centre of the AUWE, on the Site. 1No. of these was reported as a UXB.

1No. HE bomb fell on the south side of the AUWE, on the Site. It was reported as a UXB.

About 30No. HE bombs were reported as falling in Balaclava Bay, within approximately 0.5km of the Site. Several of these were reported as UXB.

At least 2No. HE bombs fell near Verne Citadel, one inside and one near the entrance, within approximately 0.6km southwest of the Site. These were recorded as UXB.

Several bombs (type unspecified) fell on Verne Hill, approximately 0.6km south of the Site.

1No. Delayed Action Bomb (DAB) fell on St Johns Church, approximately 1.0km southwest of the Site.

5th October 1940

1No. HE bomb fell on open land near HMS Osprey, within approximately 0.2km southeast of the Site.

1No. OB fell on open land between the Naval Cemetery and the Naval Hospital, approximately 0.5km west-southwest of the Site.

1No. HE bomb fell on Main Road, approximately 0.6km west of the Site.

9th October 1940

1No. HE bomb fell on the McAlpine depot west of HMS Osprey, approximately 0.1km south-southwest of the Site.

1No. HE bomb fell on the grounds of HMS Osprey, approximately 0.3km south-southeast of the Site.

1No. HE bomb fell on Coaling Pier, approximately 0.4km northwest of the Site.

1No. OB fell in the sea of the southern end of HMS Osprey, approximately 0.5km south-southeast of the Site.

22nd-23rd November 1941

4No. HE bombs fell in Portland Harbour, approximately 0.6km west-northwest of the Site.

12th December 1941

4No. HE bombs fell in Balaclava Bay, approximately 0.4km east-northeast of the Site.

23rd-24th March 1942

1No. 250kg HE bomb fell on the quayside at The Camber, on the northern boundary of the Site.

1No. 500kg HE bomb fell on the eastern corner of Castletown Pier, approximately 0.8km west-northwest of the Site.

1No. HE bomb fell in the Outer Harbour, just north of Castletown Pier, approximately 0.8km west-northwest of the Site.

1No. HE bomb fell in the Outer Harbour, on the west side of Castletown Pier, approximately 0.9km west-northwest of the Site.

3No. 500kg HE bombs fell on allotments south of Portland Hospital, approximately 1.0km west-southwest of the Site.

24th-25th March 1942

4No. HE bombs fell in the Inner Harbour west of The Camber, approximately 0.3km northwest of the Site.

14th April 1942

2No. 250kg HE bombs fell on the outer pier of the submarine pens, Portland Harbour, approximately 0.6km west-northwest of the Site.

21st-22nd June 1942

4No. 500kg HE bombs fell on the eastern side of Portland Hospital, approximately 0.6km northwest of the Site.

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