

## Chapter I

# Introduction

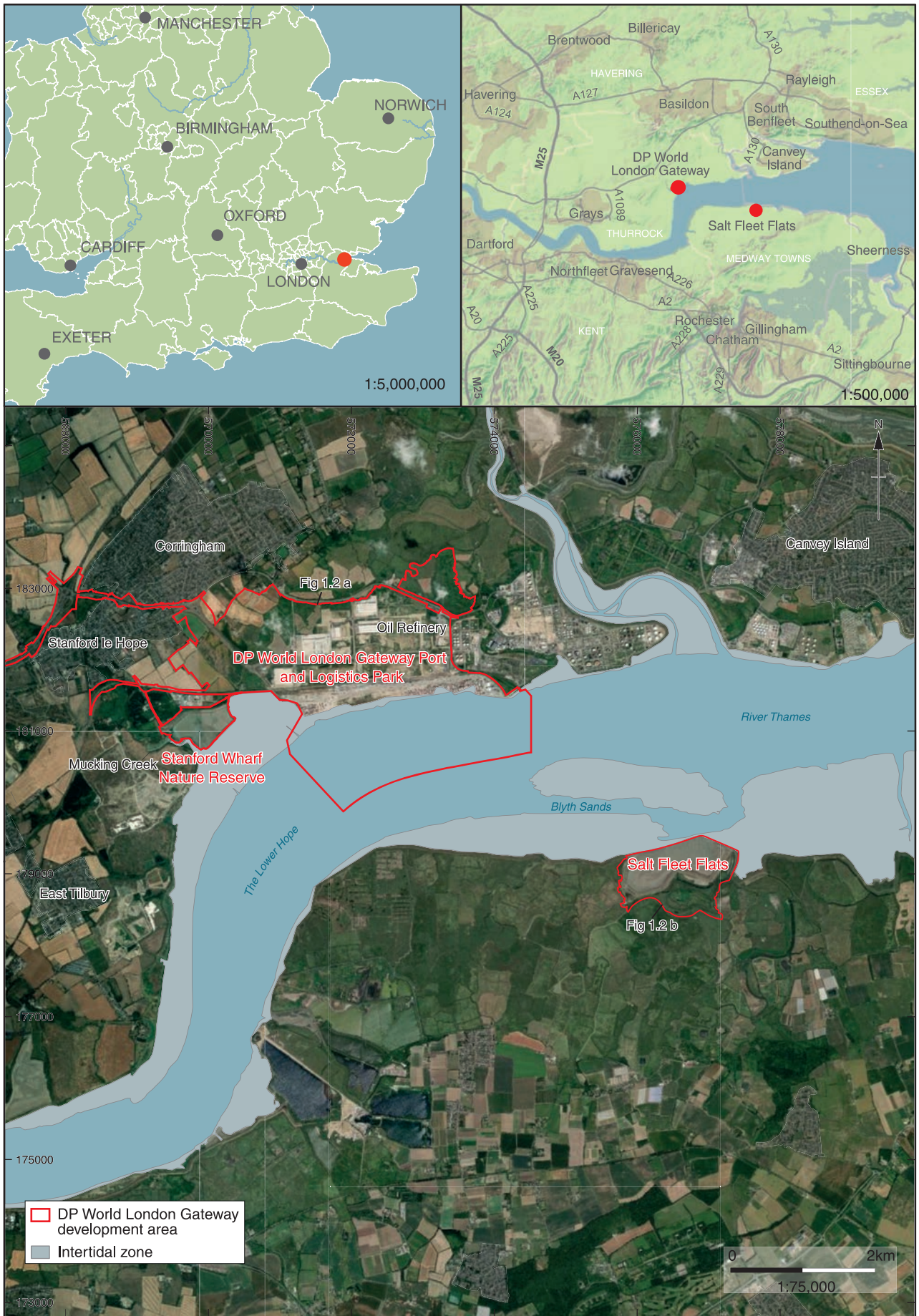
### BACKGROUND TO THE INVESTIGATIONS

The site of the DP World London Gateway Port and Logistics Park (Fig. 1.1), comprising a main site located between two creeks – Mucking Creek to the west and Shellhaven Creek to the east – that issue into the Essex side of the Thames Estuary and, on the Kent side, an associated marine intertidal habitat compensation scheme (Salt Fleet Flats) on the Cooling Marshes on the Hoo Peninsula, has attracted settlers, farmers and others seeking to exploit its rich natural resources since prehistory. People came to the marshes in Mesolithic and Neolithic times, perhaps on a seasonal basis, to hunt the birds and other animals found along the creeks and within the reeds and gather plants and seafood. Pottery and flint tools attest to short-term occupation here in the Bronze Age, and in the Iron Age people trapped seawater and evaporated the brine over hearths to extract salt, a valuable commodity used for food preservation or preparation. Salt attracted the Romans, too, who extracted it from the sea on an industrial scale. The marshland and the river continued to provide salt, fish and fowl in the medieval period and offered unrivalled pasture for the sheep and cattle belonging to dry-land farms on the gravel terraces. Over time, the marshes were drained to increase the pasture and the value of the farming estates. The creeks were also a means of communication and trade. Wharfs were built on the edge of the creeks, allowing boats carrying goods and passengers to enter the Thames on their journey to the north coast of Kent, London or the sea beyond the estuary. In more modern times, the sparsely populated area proved an ideal location for the establishment of explosives factories and oil refineries, although workers would find the isolated landscape dispiriting. Conflict, too, has touched the shores of the estuary. In 1667, diarist Samuel Pepys recorded the Dutch fleet at Shell Haven on the eve of the Dutch raid on the Medway. In the Second World War, anti-glider ditches, gun emplacements, bomb decoys and the like were built to protect the oil refineries at Shell Haven. Writers and filmmakers have also been attracted to the area. Joseph Conrad, who lived for a time at Stanford-le-Hope, wrote about the marshes along the Essex coast in his 1899 novella *Heart of Darkness*, while Hammer Films sought the otherworldly vistas of the oil refinery for the backdrop for scenes in its science-fiction horror productions. This volume reports on extensive archaeological investigations across the area that have peeled away the layers of the past to reveal the stories of the people who left their mark over the centuries.

A series of investigations were carried out by Oxford Archaeology (OA) in connection with the development of the DP World London Gateway Port and Logistics Park in Essex and habitat compensation schemes in Essex and Kent between 2008 and 2016 (Fig. 1.2). Archaeological investigations at the site began in 2002, when Shell and P&O, then landowners, commissioned an environmental impact assessment of the archaeology and built heritage within the proposed development area (Chandler *et al.* 2002), which was presented at Public Inquiry in 2002. Desk-based studies and non-intrusive surveys undertaken to support the London Gateway environmental statement suggested that the development had the potential to impact on important archaeological remains. The archaeological work arose from the requirements of the London Gateway Archaeological Mitigation Framework (AMF). The purpose of that document was to establish a strategic framework applicable to the entirety of the archaeological resource, within which the London Gateway archaeological programme would operate. An updated version of the AMF was included within the ‘Statement of Common Ground’ agreed between the developer (P&O, by then DP World) and Thurrock Council in July 2003 (Andrews *et al.* 2003). Outline planning approval (OPA) for the London Gateway Logistics Park was granted in May 2007, while approval for the related port development, issued under a Harbour Empowerment Order (HEO), came into force in May 2008. A condition of both permissions was the implementation of the AMF.

This volume is the third in the series of books that report on the archaeological investigations at London Gateway. *London Gateway: Iron Age and Roman salt making in the Thames Estuary* (Biddulph *et al.* 2012a) presented the findings of excavations, also for DP World London Gateway, by Oxford Archaeology at Stanford Wharf Nature Reserve, the marine intertidal habitat compensation scheme west of the Port and Logistics Park, while *London Gateway: maritime archaeology in the Thames Estuary* (Firth *et al.* 2012) set out the results and challenges of investigations by Wessex Archaeology within the marine environment of the estuary. The current volume brings together the results of the remaining investigations carried out across the London Gateway development.

Forty-one sites within the London Gateway development area were subject to some form of archaeological assessment. Some sites required various levels of mitigation by fieldwork; other sites, where mitigation was deemed unnecessary, required only the preparation



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Figure I.1 Site location

Table 1.1 List of sites within the DP World London Gateway development and type of mitigation applied

<i>Site</i>	<i>Planning reference</i>	<i>Mitigation</i>
Access Road Phase 1	11/50362/TTGCON	Trenching and landscape survey
Access Road Phase 2		No mitigation required
Workshop Welfare and Building	11/50415/TTGFUL	Watching brief
A13/A1014 Junction Improvements	OPA	Targeted monitoring during construction
LG Park LORDI Compound	None	No mitigation required
Rail Corridor	HEO	Fieldwork
East and West Culverts	HEO	No mitigation required
Port Electrical Ducts and Substations	HEO	No mitigation required
Border Control Post and Border Force Examination Building	HEO	No mitigation required
Temporary Compound construction	HEO	No mitigation required
33kv Substation	11/50440/TTG	No mitigation required
Fibre Optic Cabling	HEO	No mitigation required
Admin Building	11/50442/TTGFUL	Trenching and landscape survey
Gate 3 Utilities	OPA	No mitigation required
Cable Ducting	OPA	No mitigation required
Gate 2 Access Road widening	OPA	No mitigation required
Gate Complex	OPA	Precautionary monitoring on deep drainage features
Carter's Lagoon	HEO	Trenching
Compensation Site A (Stanford Wharf Nature Reserve)	HEO	Detailed excavation; strip, map and sample; watching brief
Port Stormwater Outfall	HEO	No mitigation required
Phase 1 Infrastructure	OPA	Trenching
Common User Facility	LDO	No mitigation required
Prologis Plot	LDO	No mitigation required
Compensation Site X (Salt Fleet Flats), Kent – Evaluation	HEO	Desk-based assessment
Compensation Site X (Salt Fleet Flats), Kent – Mitigation		Trenching and watching brief
Access Road Phase 3	HEO	Strip, map and sample excavation; watching brief
Berth 7 Access Road	HEO	No mitigation required
LG Park Ground Raising	HEO	Deposit model; initial watching brief; environmental impact assessment; no requirement to record former refinery features as archaeology
Proposed Development at Great Garlands Farm	Separate application, subject to EIA	Trenching
UPS London Hub Parcel Distribution Facility – Plot 1020	LDO	No mitigation required
Pipeline Diversion	Access Road	Trenching
Pentalver Berth 7 Phase 2	HEO	No mitigation required
LG Port Western Cross Bund	HEO	No mitigation required
LG Port – Marine Reclamation and Quay Wall	HEO	Two marine boreholes; deposit model; intertidal survey
Obstacle Removal in Park and Misc Work	LDO	Deposit model; initial watching brief; environmental impact assessment; no requirement to record former refinery features as archaeology
Northern Triangle East		Trenching
Petroplus Cable (Shellhaven Creek WB)		Trenching and monitoring
Deposit Model		Electrical resistivity survey, borehole compilation and specialist analysis and final report
Tongue Land HGV Lorry Park		Trenching
Pentalver Berth 7 Phase 1	HEO	No mitigation required
Plot 1050	LDO	No mitigation required

Key: HEO Harbour Empowerment Order; LDO Local Development Order; OPA Outline planning approval

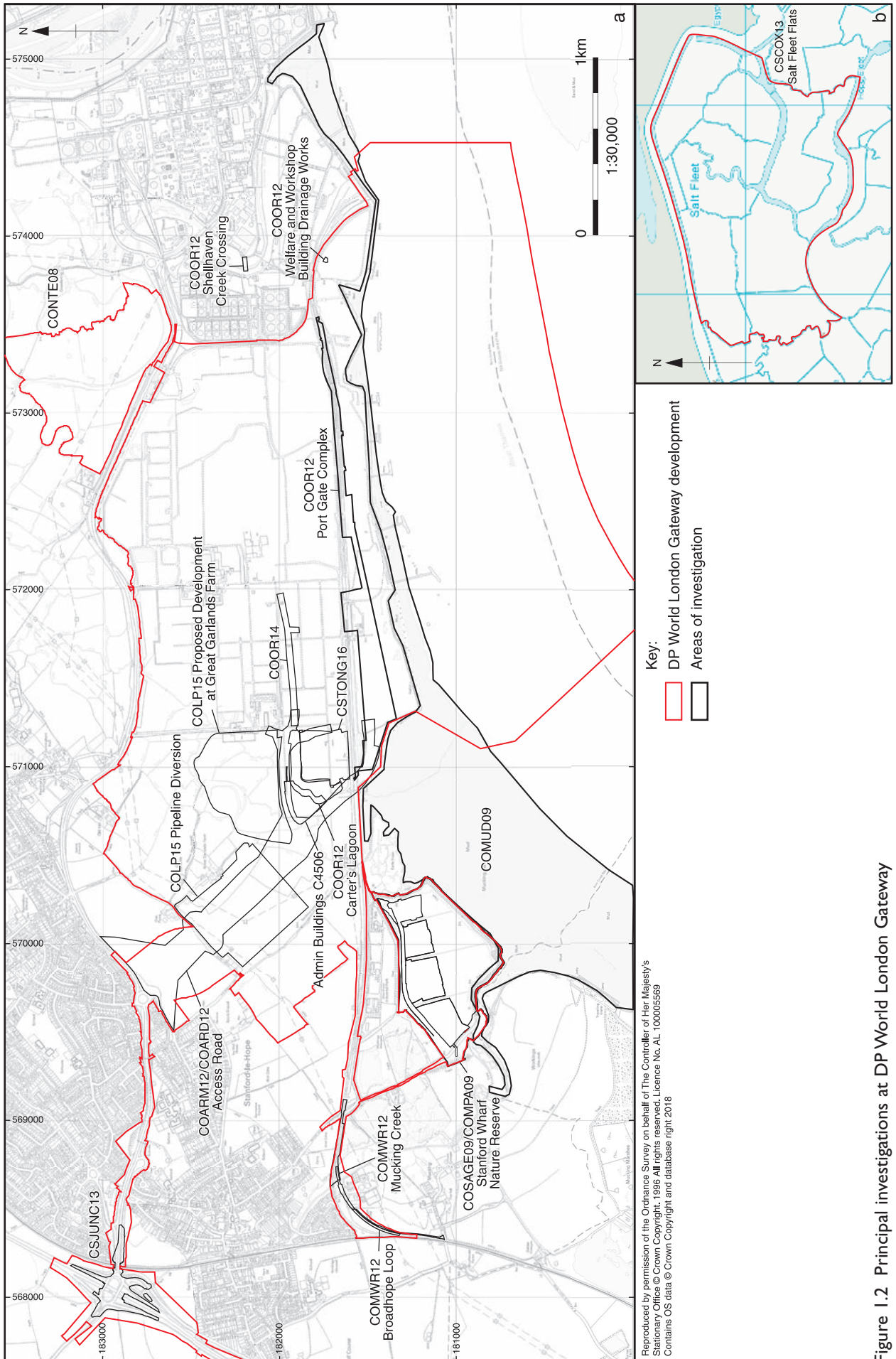


Figure I.2 Principal investigations at DP World London Gateway

Table 1.2 Principal sites investigated at DP World London Gateway

Site	Code	Type	Report reference
LG Deposit Model*	-	Deposit model	Bates <i>et al.</i> 2012
Stanford Wharf Nature Reserve*	COSAGE09/ COMPA09	Evaluation; excavation; monitoring	Biddulph <i>et al.</i> 2012a
Geotechnical investigations at Shell Haven	CORSH08	Watching brief	OA 2008a
Northern Triangle East Habitat Creation and Enhancements	CONTE08	Evaluation	OA 2008b
Intertidal zone	COMUD09	Walkover survey	OA 2009
LG Rail Corridor: Broadhope Loop	COMWR12	Strip, map and sample	OA 2012
LG Access Road	COARM12/ COARD12	Trenching; strip, map and sample	OA 2013a
Salt Fleet Flats (Site X), Cooling Marshes, Kent	CSCOX13	Evaluation	OA 2013b
A13/A1014 Junction Improvements	CSJUNC13	Monitoring	OA 2014a
LG Logistics Park Infrastructure	COOR12/ COOR14	Evaluation	OA 2014b
LG Port Gate Complex	COOR12	Monitoring	OA 2014c
LG Rail Corridor: Mucking Creek	COMWR12	Monitoring	OA 2015
Pipeline Diversion	COLP15	Evaluation	OA 2016a
LG Logistics Park: Proposed Development at Great Garlands Farm	COLP15	Evaluation	OA 2016b
LG Logistics Park: Tongue Land HGV Lorry Park	CSTONG16	Evaluation	OA 2016c
LG Welfare and Workshop Building Drainage Works	COOR12	Monitoring	OA 2016d
LG Logistics Park: Shell Haven Creek Crossing	COOR12	Monitoring	OA 2016e
LG Logistics Park: Carter's Lagoon	COOR12	Evaluation	OA 2017

\* Not reported on in this volume

of an archaeological project design. The full list of sites is provided in Table 1.1. Sites described in Table 1.2 are the most significant across the development area (Fig. 1.2) and provide the bulk of the evidence described in this volume.

## PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Excavation by Oxford Archaeology in 2009 during construction of Stanford Wharf Nature Reserve, funded and supported by DP World London Gateway, uncovered remarkable evidence for Iron Age and Roman-period salt-making. The excavations, in the south-western part of the London Gateway development, shed light on evolving methods of salt production from the middle Iron Age to the end of the Roman period. In the middle Iron Age (*c.* 400–100 BC), the site was dominated by red hills, a characteristic feature of ancient salt production on the Essex coast. Following a late Iron Age hiatus, salt-making resumed in the early Roman period (*c.* AD 43–120). During this period a piled wooden structure, possibly a boathouse, was built facing onto a tidal channel. The 3rd and 4th centuries AD saw the level of salt production intensify to an almost industrial scale. Some salterns of this period were open air while the later ones were inside a variety of buildings. In some respects, late Roman production methods were similar to the earlier periods, but significant innovations were introduced, including lead evaporation pans and the use of wood charcoal rather than marshland plants as fuel. The range of activities diversified to include the on-site production of salted meat and fish sauce, and there are indications of relatively

high-status domestic life, notably the remains of exotic fruit and seeds. The findings of the fieldwork and post-excavation analysis were presented in the first London Gateway monograph (Biddulph *et al.* 2012a).

Construction of the DP World London Gateway Port was accompanied by a dredging scheme designed to increase the depth of the approach from the outer reaches of the Thames Estuary to the container terminal. Between 2001 and 2012, Wessex Archaeology undertook a series of investigations within the river and identified and recorded almost 600 maritime sites, including several wrecks. These investigations also provided a chance to test and develop methodologies. The results of the work and discussion of the challenges faced and the approaches taken were published in 2012 (Firth *et al.* 2012).

Two other investigations in the area are worth highlighting here. One was a programme of archaeological monitoring by the Essex County Council Field Archaeological Unit in 1999 along the route of a gas pipeline from Coryton Refinery to Mucking. Limited evidence for prehistoric, Roman, Anglo-Saxon and medieval activity was recorded at the western end of the route at Butts Lane, Mucking, but more substantial remains, belonging to a late medieval farmstead, was uncovered within the boundary of the London Gateway development itself to the south of Great Garlands Farm (Peachey and Dale 2005). No account of the archaeology of London Gateway can ignore the results of the extensive excavations carried out at Mucking, some 5km to the south-west, between 1965 and 1978 by Margaret and Tom Jones. The fieldwork uncovered thousands of archaeological features and over a million finds dating from the Mesolithic to medieval periods. Iron Age settlement, Roman pottery kilns and Anglo-Saxon settlements

are among the site's many highlights (Evans *et al.* 2015; Lucy and Evans 2016; Hamerow 1993).

While no systematic archaeological fieldwork has been undertaken within Salt Fleet Flats on the Hoo Peninsula, several small-scale excavations have been carried out over the years within the wider area. The work, undertaken by the Lower Medway Archaeological Research Group, the Kent Archaeological Society and others, has shed light largely on the major Roman-period industries in the area – salt-working and pottery production. Salt-working sites are known, for example, at Cliffe Creek, Bush Wick, Broomhey Farm and High Halstow (Miles 1968; 2004; Thornhill and Payne 1980). The products of north Kent's pottery industry, which encompasses sites on the peninsula, are well-known (Monaghan 1987). Fieldwork undertaken by Archaeology South-East at the Damhead Creek Power Station in the south-eastern area of the peninsula uncovered remains of middle Bronze Age activity of a non-domestic, possibly ritual character, a late Bronze Age/early Iron Age farmstead and Roman-period field systems and pottery production (Dawkes 2017). An excavation and a watching brief were carried out in 2008,

again by Archaeology South-East, along the route of the Isle of Grain–Shorne Gas Transmission Pipeline. The work recorded, among other discoveries, a middle Bronze Age ring ditch, evidence for late Bronze Age salt-working and Roman pottery manufacture, and Anglo-Saxon occupation (*ibid.*). The Hoo Peninsula Historic Landscape Project, carried out by Historic England (then English Heritage) in 2009 and 2012 in response to proposed developments in the region and the potential threat of sea-level rises, is also of relevance to our understanding of Salt Fleet Flats. The study used aerial survey, earthwork and building survey, archive research, historic mapping, and palaeoenvironmental analysis, among other techniques, to characterise the historic landscape and improve understanding of the area and its role in future change and development (Newsome *et al.* 2015).

## GEOLOGY AND TOPOGRAPHY

Historically, settlement has favoured the elevated land of the gravel terrace. The first edition Ordnance Survey

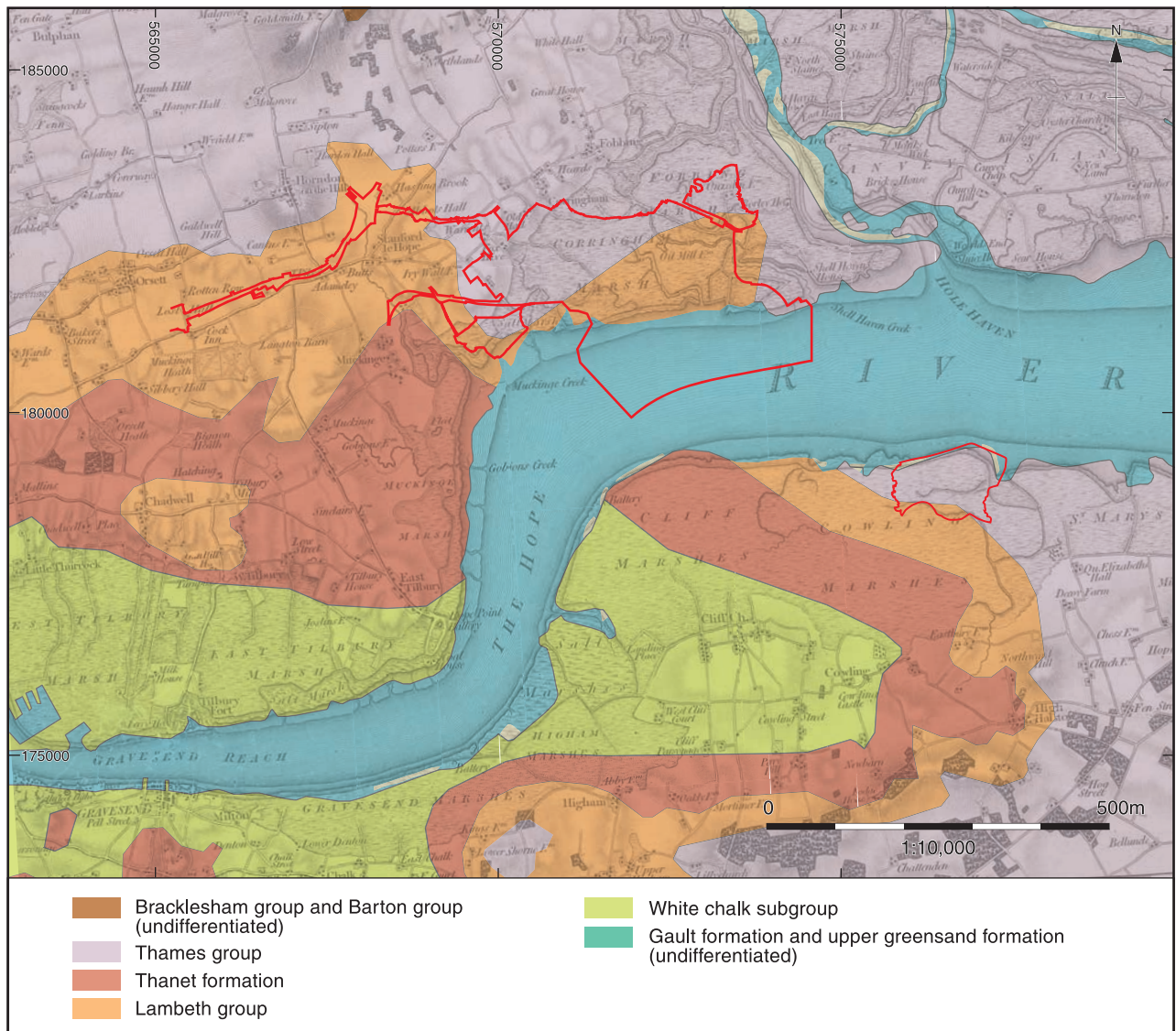


Figure 1.3 Solid geology of the Lower Thames

map (1863) shows a belt of settlement – Ivy Wall Farm, Fox Hive, Old Hall, Corringham, Heards and Fobbing – along the edge of the gravel terrace that borders the almost entirely empty marshland of Stanford Marsh, Corringham Marsh and Fobbing Marsh (Fig. 1.3; see also Fig. 5.27). Since the 19th century, reclaimed marshland has been extensively developed as an industrial landscape. In the 20th century, the area was developed as part of the Shell Haven oil refinery. In broad terms, the bedrock geology of DP World London Gateway comprises clay, silt and sand of the London Clay Formation and the Lambeth Group, with areas of Thanet Formation also represented (Fig. 1.3; BGS nd). Superficial deposits vary across the site. Tidal flat deposits, encountered during work at Carter’s Lagoon, the Tongue Land HGV Lorry Park, the Proposed Development at Great Garlands Farm, the Logistics Park Infrastructure, Northern Triangle East, Welfare and Workshop Building Drainage Works and the Shellhaven Creek Crossing, lie across much of the southern and south-eastern part of the development. These comprise clay-silt and peat deposits laid down by the River Thames since the end of the last Ice Age. The underlying solid geology is the Palaeocene Lambeth Group, consisting of shelly sands with lignite or coarse gravel.

The Lambeth Group continues into the foreshore, the site of the intertidal walkover survey, but here is overlaid by undifferentiated beach deposits (clay, silt and sand).

The Access Road extended through several geologies. Tidal flat deposits were encountered at the south-eastern end of the area, while undifferentiated head and river terrace 3 deposits, laid down during the Pleistocene, were recorded at the north-western end and on the adjacent Pipeline Diversion (Fig. 1.4). All superficial geologies here overlay London Clay Formation. The route lies between *c* 2m and 18m above Ordnance Datum (aOD), and generally slopes gently downwards from north-west to south-east, although the interface between the terrace and tidal flat deposits is marked by a dip in the surface topography. The lower-lying areas to the south-east have been systematically reclaimed from the intertidal zone since the 17th century through drainage and the construction of sea walls. Existing land use in the Access Road Corridor at the time of investigation was characterised by arable land on the river terrace areas at the north-west end and rough pasture in areas of former marshland to the south-east.

The Rail Corridor sites similarly traverse complex geologies. The Mucking Creek site is located on River Terrace 2 deposits, but also encompasses a thick

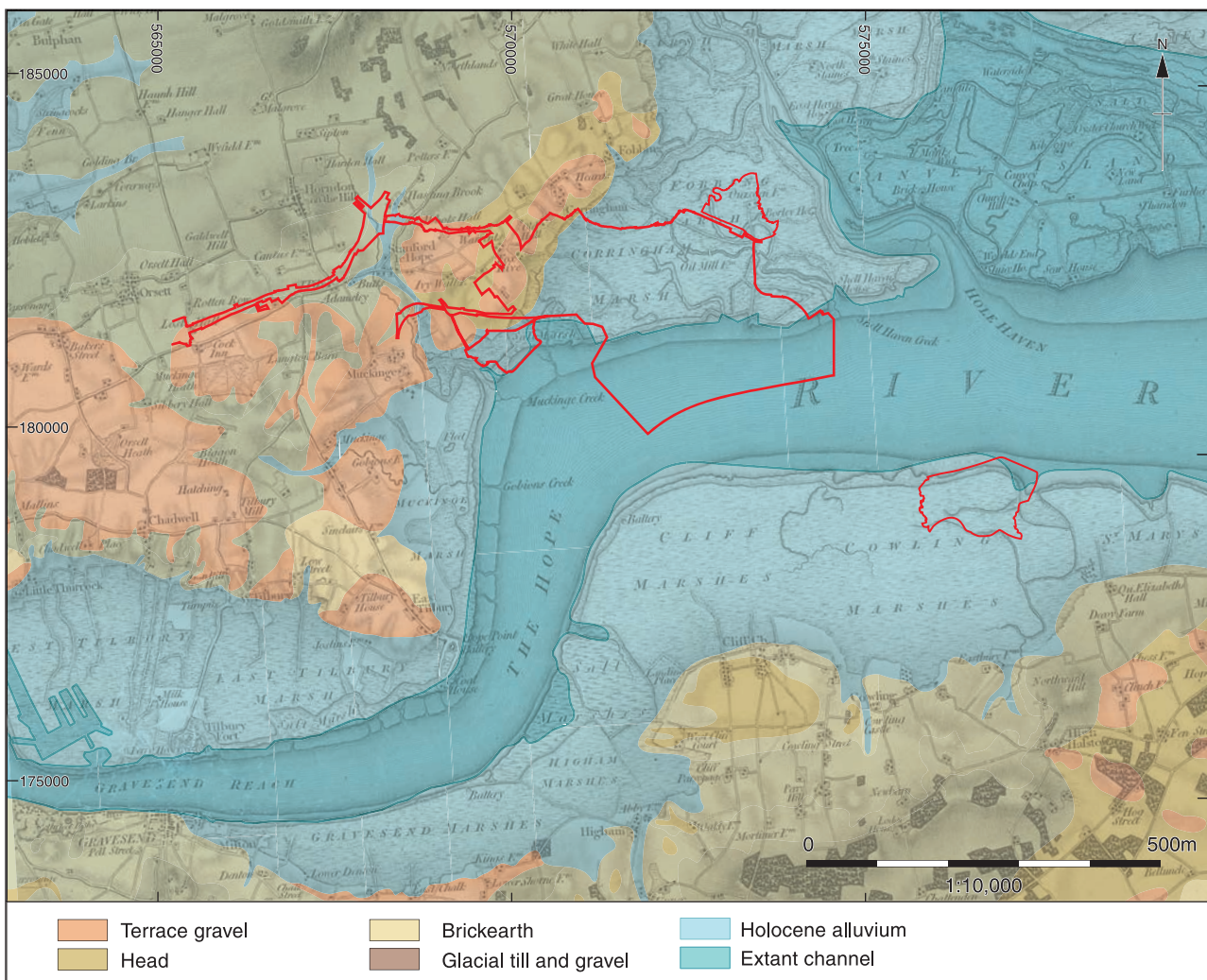


Figure 1.4 Superficial geology of the Lower Thames on a background of the 1805 Ordnance Survey map

sequence of Holocene alluvial deposits that infill the valley of the creek. Thanet Formation sand lies beneath the alluvium. The Broadhope Loop section is located on undifferentiated head deposits, also above Thanet Formation sand, and formed in either the late Wolstonian glacial period or the Ipswichian interglacial period. The site rose from 6.48m aOD at its north-east end to *c* 8.15m aOD in the centre before dropping to 7.68m aOD at the south end. The geology of the A13/A1014 junction improvement site, in the north-western part of the development area, was used to determine areas of mitigation, of which three were defined: one within the Holocene alluvium infilling the Hassenbrook stream valley, another within head deposits, and the third above the Lambeth Group (clay, silt and sand).

The survey area of Salt Fleet Flats on the Cooling Marshes in Kent is flat reclaimed marshland at an elevation between *c* 0m to 0.5m aOD and at the time of investigation was covered by improved grassland, subdivided by watercourses and tidal channels. Salt Fleet crosses the centre of the site and Hope Fleet forms the southern boundary. The geology of the site is mapped as estuarine and marine alluvium overlying London Clay in the north-east and Lambeth Group (sand, silt and clay) to the south-west. The alluvium, which comprises silt and clay with interbedded peat and seams of sand and gravel, is *c* 15m to 23m deep.

## STRUCTURE OF THE VOLUME

The objective of the analysis, as outlined in the AMF, was to produce an accessible and interesting presentation aimed at a wide audience for the archaeology of South Essex and the Thames Estuary. The stimulation of that interest will contribute to the use of the archive for additional and future work. Accordingly, this monograph brings together the findings of the various archaeological investigations across the DP World London Gateway Port and Logistics Park development, including Salt Fleet Flats on the Cooling Marshes, to better understand the archaeological sequence and to place it within its cultural environment. The volume discusses the stratigraphic, artefactual and environmental evidence and takes a broader view of the evidence to offer a narrative of human occupation and exploitation of the Thames Estuary from prehistory to modern times (Fig. 1.5). Sites are placed in their local and regional context and the publication also draws on other archaeological investigations in the region.

Chapter 2 considers the investigative framework and methodologies of the archaeological work at London Gateway. It summarises the legal, planning and research framework underpinning the investigations, discusses how building a detailed knowledge base was crucial to the design of investigative strategies, and presents the timeline of interventions and methods of investigation.



Figure 1.5 Aerial view of the DP World London Gateway Port and Logistics Park © DP World London Gateway



Chapter 3 looks at the Thames Estuary in prehistory. It sets the scene for human occupation and inhabitation, summarises the stratigraphic, artefactual and environmental evidence, and presents an overview of the period, discussing themes such as settlement pattern, exploitation of resources, communication, responses to changing landscape and the use of the estuary.

Chapter 4, turning to the Thames Estuary in the Roman period, similarly paints a picture of the landscape during this period and summarises the stratigraphic, artefactual and environmental evidence. The chapter also considers the settlement pattern, cultural connections and economy of the period.

Chapter 5 considers the Thames Estuary in the medieval and post-medieval periods, a time that saw dramatic changes in the landscape as the marsh was reclaimed and made available for farming. The stratigraphic, artefactual and environmental evidence is summarised and the chapter concludes with an overview that discusses settlement, land reclamation, the economy, communications, transport, the use of the Thames, the estuary during the Second World War, the arrival of the oil refinery and the port development, among other aspects. General conclusions about the project are offered in Chapter 6. It draws out common themes across periods and reflects on the scope, achievements and legacy of the archaeological project.

Findings from environmental and artefact reports, on which conclusions and interpretations are drawn, have been integrated into the monograph text. The full

reports, along with supporting data and illustrations, are available to download from Oxford Archaeology's digital library (<https://eprints.oxfordarchaeology.com/5778/>). These add to the existing online repository of specialist reports produced for the Stanford Wharf Nature Reserve volume (<https://eprints.oxfordarchaeology.com/909/>). Where the reports have been referenced in the monograph, the authors of the reports are identified (for example, Poole, Specialist Report 4), and readers are invited to consult the digital volume for detailed information. In cases where a feature or aspect of the site is identified largely by the environmental or artefactual evidence, such as the putative salt-processing hearth in the Pipeline Diversion site, larger extracts from the specialist reports have been included. Catalogues of illustrated material are not given here but can be found in the full specialist reports.

The unpublished reports for the individual sites (Table 1.2), known as client or grey literature reports, are also available to download from the digital library.

## THE ARCHIVE

The project archive, including that of Stanford Wharf Nature Reserve (COSAGE09/COMPA09), has been prepared for museum deposition in accordance with current professional practice (Brown 2011; CIfA 2014). The digital archive from all sites listed in Table 1.2 will be prepared for deposition with the Archaeology Data Service.