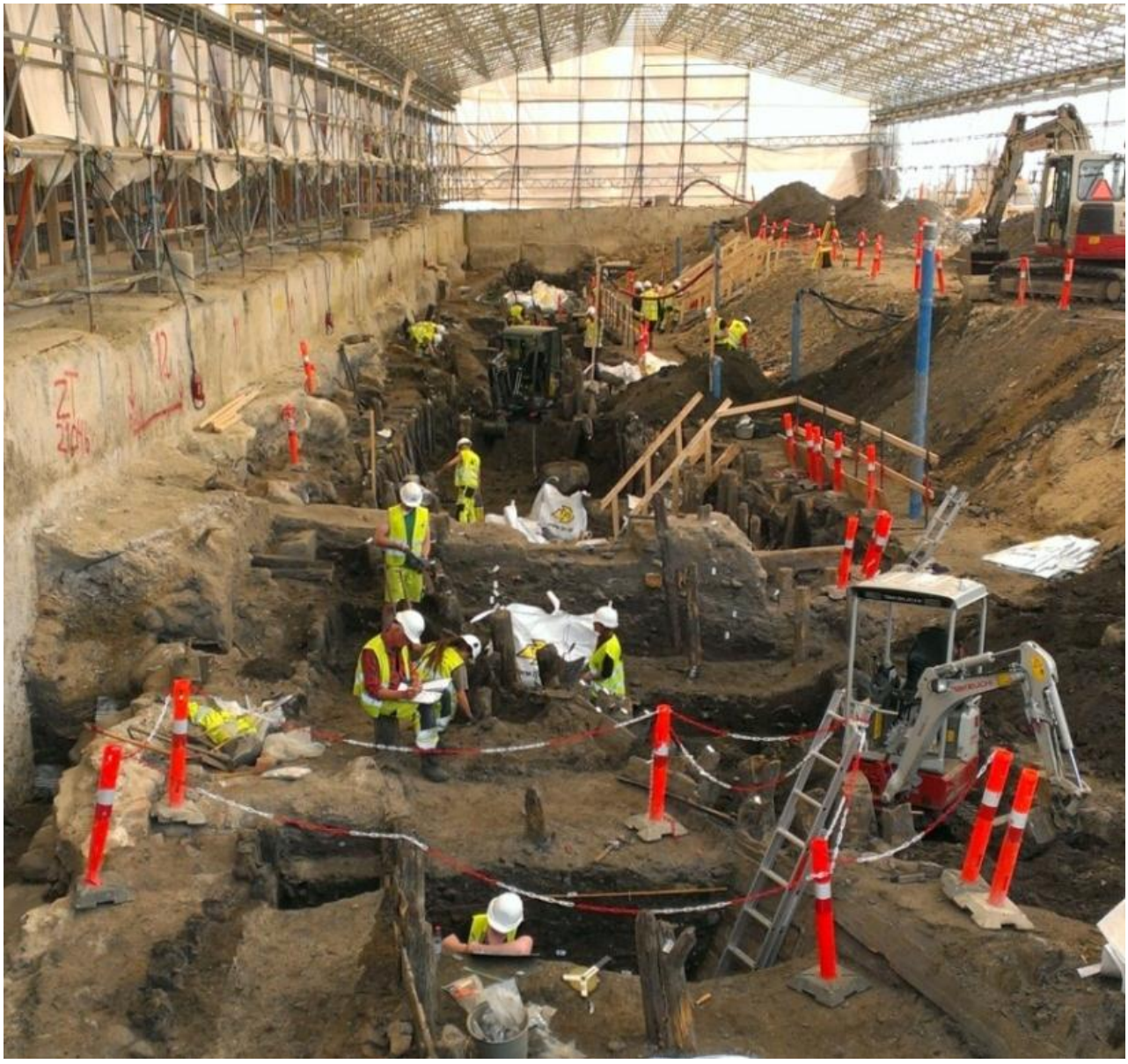
KØBENHAVNS MUSEUM MUSEUM OF **COPENHAGEN** / ARCHAEOLOGICAL REPORT

Gammel Strand, KBM3828

Cultural Historical Report, Metro Cityring Excavation



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Cover picture: The Gammel Strand excavation, Main Excavation trench looking east. Photo by K. K. Tayanin

Foreword

As a result of the extensive archaeological excavation work carried out as part of the "Metro Cityring" project, a vast amount of new knowledge has been brought to light. Previously unseen structures and concise dating of the development of Copenhagen's central harbourside through centuries have provided archaeologists with very important material to improve our understanding of the dynamics of the harbour's layout and functions over time.

Of other important discoveries are the large amounts of find materials, which – in combination with scientific analysis of animal bone and macro-botanical material – can provide a unique source of knowledge of a wide variety of aspects of the city and its inhabitants from the late 15th to the 19th Centuries. The finds, interpreted as primarily household waste and occasional loses of valuables, reveals details of the life of the people living close to the harbour as well as further away in the city, while materials linked directly to trade and exchange of goods portray the routes and networks of the growing capital.

In this cultural historical report the archaeologists describe the most important discoveries from Gammel Strand and give an overview of the results and new interpretations. For those who wish to read more, a comprehensive technical report of the excavation results is available in the museum archives and online.

It is hoped that the report will be read widely and that the results will make the reader reflect upon Copenhagen's rich past and the development of the city's urban way of life from the Late Medieval period and up to the present day.

Thomas Roland, Archaeological Leader, Museum of Copenhagen

Table of contents

The Gammel Strand Archaeological Project

Fig. 1 Daguerreotype by T. Neubourgh from 1840. Museum of Copenhagen/VÆGGEN.

Introduction

The excavation at Gammel Strand was undertaken as part of the new Metro Cityring project which will provide a new transportation system in the city centre to the surrounding areas of the city. Where new Metro Stations are to be constructed over archaeological sensitive remains, archaeological excavations will be undertaken. The Museum of Copenhagen (KBM) is to conduct the archaeological work of the project.

The excavations revealed the expected archaeological remains such as harbour bulwarks, the *Vejerhus*, the Bargemen's Guild House and other administration buildings along with a large collection of archaeological artefacts showing evidence of trade, production, wealth, religion and thus consumption and networking. The single context recording method used on these excavations, in conjunction with the large quantity of dendrochronological dating of the wooden harbour sides enabled the opportunity of building a site chronology, and the creation of various site phases. Extra provenance work on various stone fragments from the harbour walls and from the various timber types also provided knowledge of where each constituent from the site structures was imported from.

The sheer number of harbour structures, and harbour phases from the 1400s to the modern day along with an unbroken finds register from land reclamation starting from the 1300s has enabled the archaeologists to uncover the story of how the area Ved Stranden, by the beach, later called Gammel Strand, the old beach was created and a view to how the harbour area was urbanized to first become the centre of the harbour in Copenhagen in the 1400s, and by the early 1600s, arguably the most important harbourside in Scandinavia as the centre of the harbour of the capital of Denmark. The results from the excavations from Gammel Strand are therefore of international importance, when comparing to the other important harbour cities within Late Medieval and Renaissance periods in Europe as the harbour transforms from a small harbour to a regional harbour and finally an important international harbour. Within the report are the archaeological results, historical documentation and a national and international selection of finds and natural science reports discussing the evidence from the excavations.

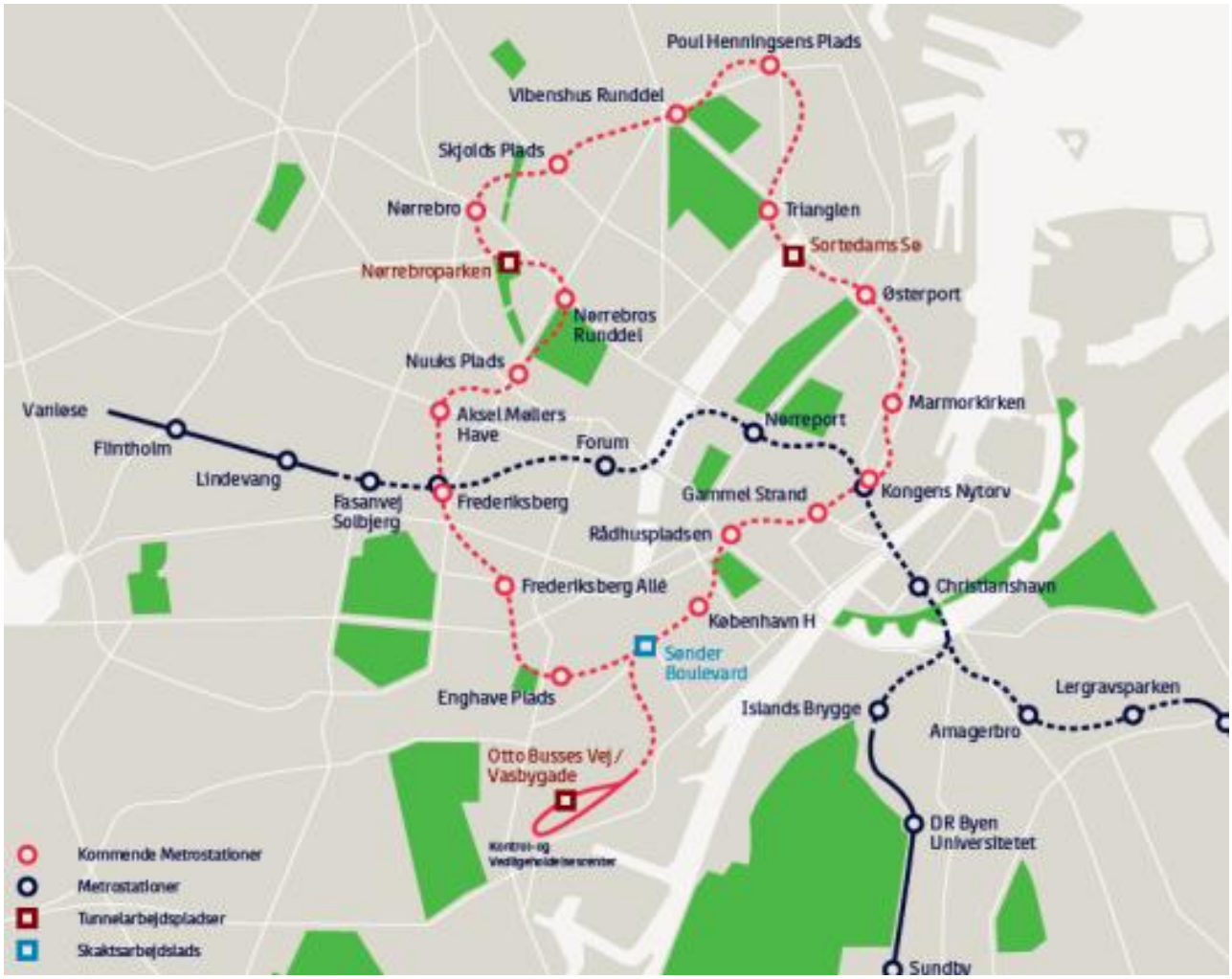


Fig. 2 Plan of the proposed new Metro Cityring. Map by Metroselskabet

The excavation was planned to be undertaken over a period of either 4 or 5 years. The watching brief for realignment and changing of the service pipes would start in 2010 and continue into 2011. It was proposed that excavation for the Guide Wall/station box would start in 2012, ending into 2013. The Main Excavation

experienced many delays and eventually started in January 2014, ending in August 2014 with only minor pieces of fieldwork occurring afterwards.

The location

Gammel Strand is located at the centre of the inner city of modern Copenhagen, bounded by the canal and *Slotsholmen* (Castle Island) to the south, *Højbro Plads* (High Bridge place) to the east, the Kulturministeriet (Culture Ministry) to the west and the most recent (1700s) Gammel Strand housing to the north. The area was created by land reclamation from the 1200s with the former beach and Medieval coastline under several metres of landfill. Today it is a modern tourist hub with cultural and governmental centres, restaurants, bars and private and public housing with Christiansborg palace on the opposite coastline.

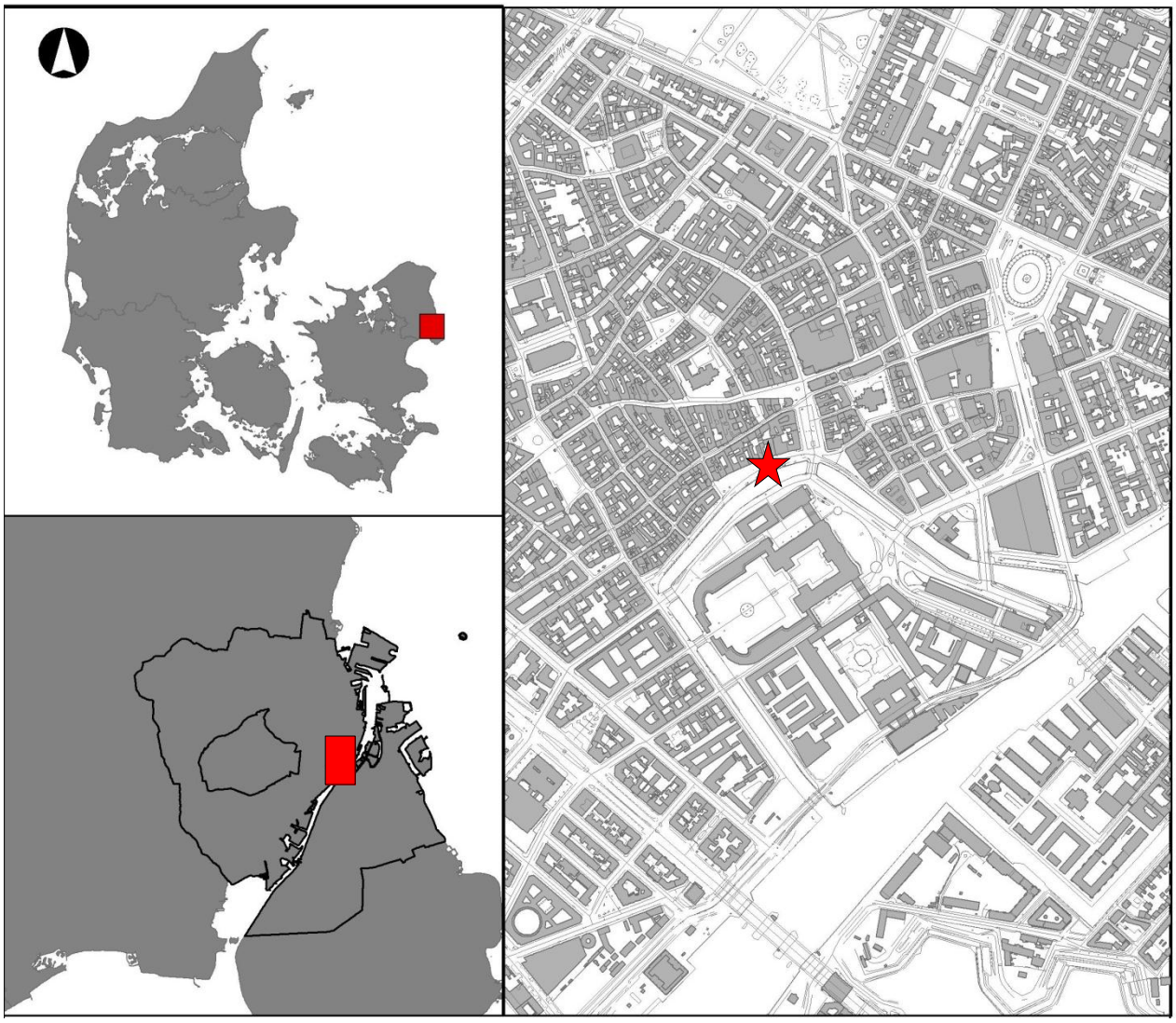


Fig. 3 Location plan of Gammel Strand.

By the Late Medieval period (1400-1536) the area was created and then transformed into the centre of the main harbour of the city with public tax buildings, private housing and moorage for the docking boats. The shape and style of the harbourside changed, at least six times from the 1400s-1800s, showing that the area

has always been undergoing redevelopment. The name of the site has also changed from *Ved Stranden* (by the beach or shore to its most recent incarnation of *Gammel Strand (*old beach*)* by the mid 1700s.

The use of the area as a harbourside had greatly decreased in the 1700s and a change in the tax laws by the mid 1800s made the administrative tax buildings obsolete. These buildings were then demolished and for approximately 80 years the area became a very popular fish market, and popular for tourism, which continued after the market was closed down in mid 20th Century.

Gammel Strand has always been a hub for international visitors from its conception as a boundary zone with the world via the sea. It has also been a transport hub and the new Cityring station and the remodelling of the harbourside is in the continuation of a process that has characterized the area for the last 800 years

The excavation

The excavation project was undertaken at the location of the new Metro Station and the surrounding areas. Firstly the service trenches within the excavation area had to be re-routed and joined to a new system surrounding the area. This led to many watching brief trenches being observed and excavated in 2010, following the schedule of the NCC Construction Company (See Gammel strand watching brief report, Olesen & Bork-Pedersen 2012). Once the area surrounding Gammel Strand was facilitated with power and water the footprint/construction box Guide Wall was excavated so that a cofferdam/station box could be created for the Main Excavation and station box. This construction work was undertaken with CMT Construction Company, who was also involved with building the cofferdam into the canal and providing a building platform to be placed over the canal. Due to health and safety the Guide Wall could only be excavated to a depth of two metres from the modern surface, so excavation ceased at the discovery of the Renaissance harbour wall and the Late Medieval wooden bulwarks which were exposed at various levels. Included in the report are several trenches excavated in 2013 that are related to the regulation and Re-infiltration of the water system for the harbour area.

The Main Excavation began in January 2014 after CMT completed the cofferdam and the surrounding area platform. A tent measuring 80 m long by 20 m wide and 9 m high from the ground surface was erected over the site underneath which the project took place with the assistance of Slagelse Erherv Service, who undertook all of the mechanical excavation and removal of soil.

The stairway trench on the eastern side of the station box measured 7 by 9 m, and was open to the elements. Due to protecting the water level, the water levels were regulated within the station box and outside of the main station box. The excavation was undertaken by a mixture hand digging and use of a mini digger. The Main Excavation method was by single context with sections/profiles sometimes being used to assist with further understanding, measuring and surveying was undertaken using total stations and the IntraSiS database system for storage and recording of data. The main report was written using national and international finds and natural science specialists from autumn 2014 to autumn 2016.

Metro Cityring project

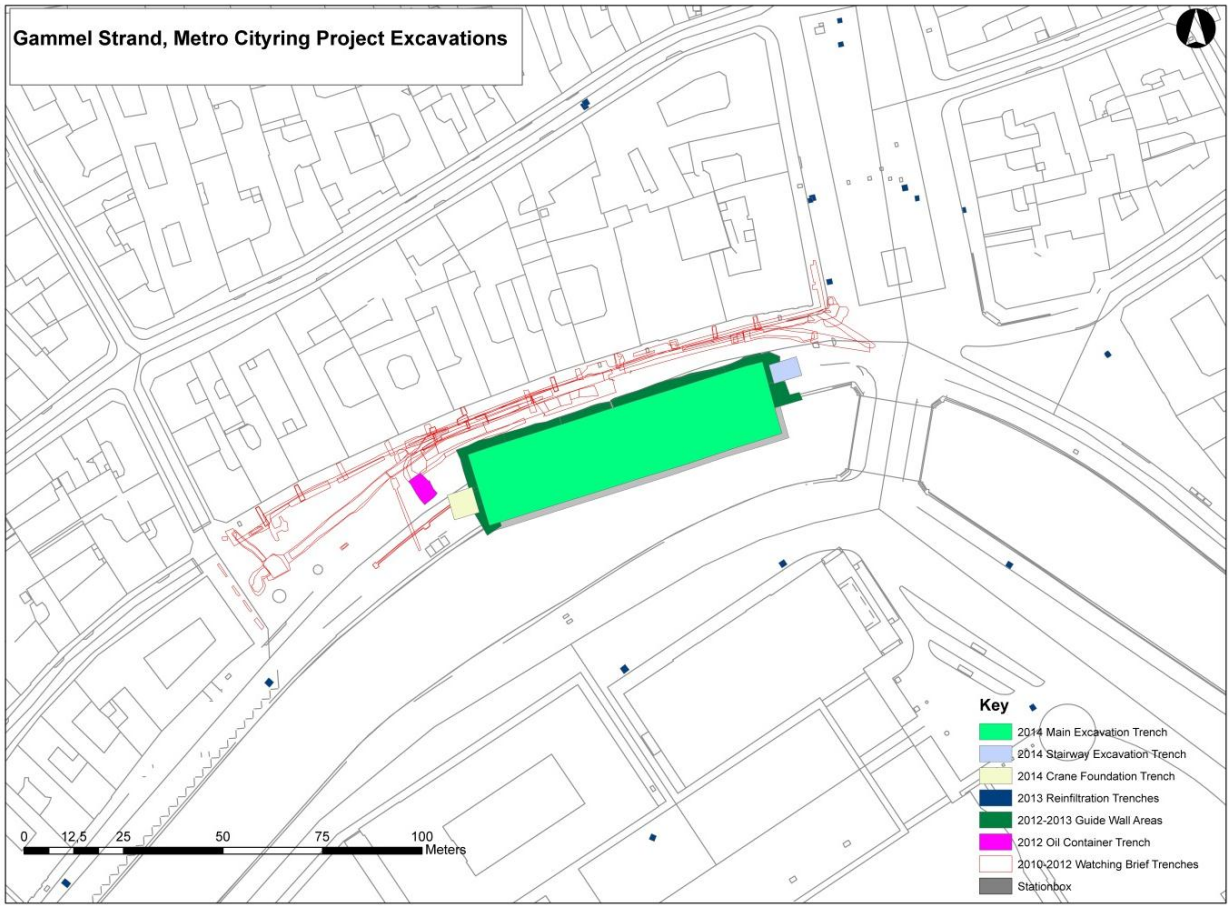


Fig. 4 Plan showing the Gammel Strand Metro Cityring excavation trenches, and their dates

Gammel Strand dates

The Watching briefs

Between February and September 2010 a series of watching briefs were undertaken beneath the Gammel Strand modern road and square. The trench sizes differed, but the area excavated as part of this work equalled 1669 m ^{2}. The watching brief revealed parts of the 1400s harbourfront, two phases of weighing houses, part of the Renaissance stone harbour wall and various fragments of other buildings and infrastructure such as pipes and drains.

Water supply trench

A trench measuring 19 m long and between1 m and 1.85 m wide was excavated in May 2012 to provide new water pipes for cabins in 2012 for the Guide Wall excavation. This was undertaken in watching brief conditions, stopping to record and excavate archaeology in the process. Various bulwarks and posts were uncovered as part of this process. A total area of 16 m^2 was excavated in this trench.

The Guide Wall excavation

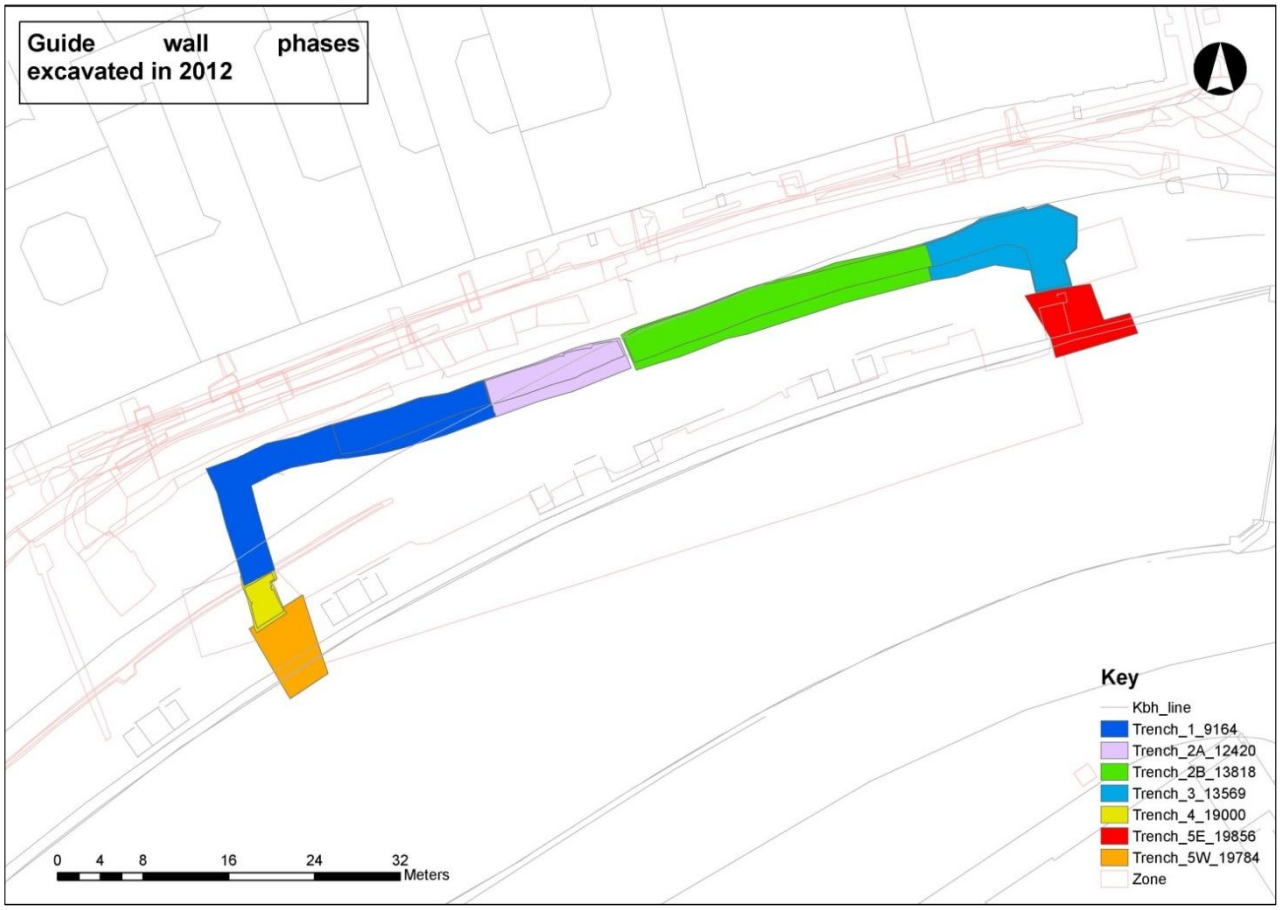


Fig. 5 Plan of the Guide Wall trenches

The trench was excavated in 2012 in Trenches 1-4 as an excavation, with Trenches 5 west and 5 east as a watching brief in 2013. Due to health and safety and the tidal canal, the trench could only be excavated to 2 m deep from the modern surface. The trench was due to be only 2 m wide, but due to modern intrusions such as pipes and strong foundations of certain features, the width increased in certain areas. In various places where the excavation ceased at the 2 m depth, important structures were found, which were largely identified in the Main Excavation. Some of the features uncovered could not be fully identified, so have been given subjective identification. From undertaking the excavation the main wall of the station box could be constructed, and the Main Excavation could occur.

The whole area excavated comprised 570 m^2

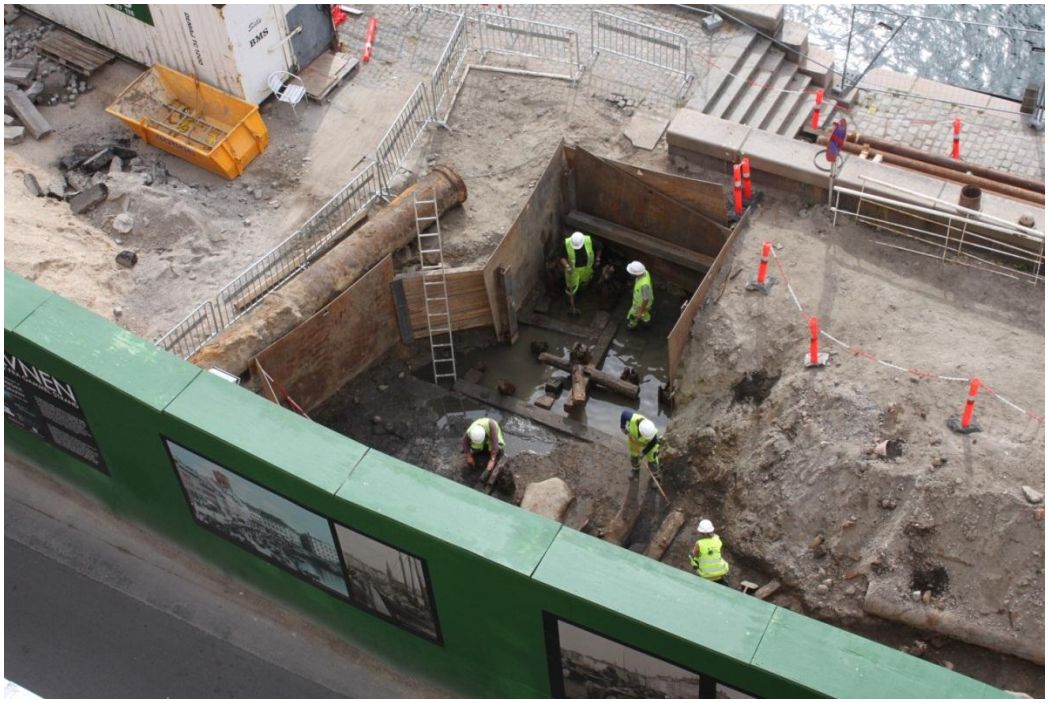


Fig. 6 Gammel Strand Guide Wall Trench 3, From above. C19_20120824_3702

The Oil Container trench

The trench was excavated briefly at the end of areas 1-4 in the Guide Wall excavation in October 2012. The 29.38 m² trench was excavated in watching brief conditions, which became a mini excavation after structures and features were found. The highlights of the trench comprise the unearthing of the foundations of the Renaissance harbour wall, bulwark posts and later Vragerbro building foundations.

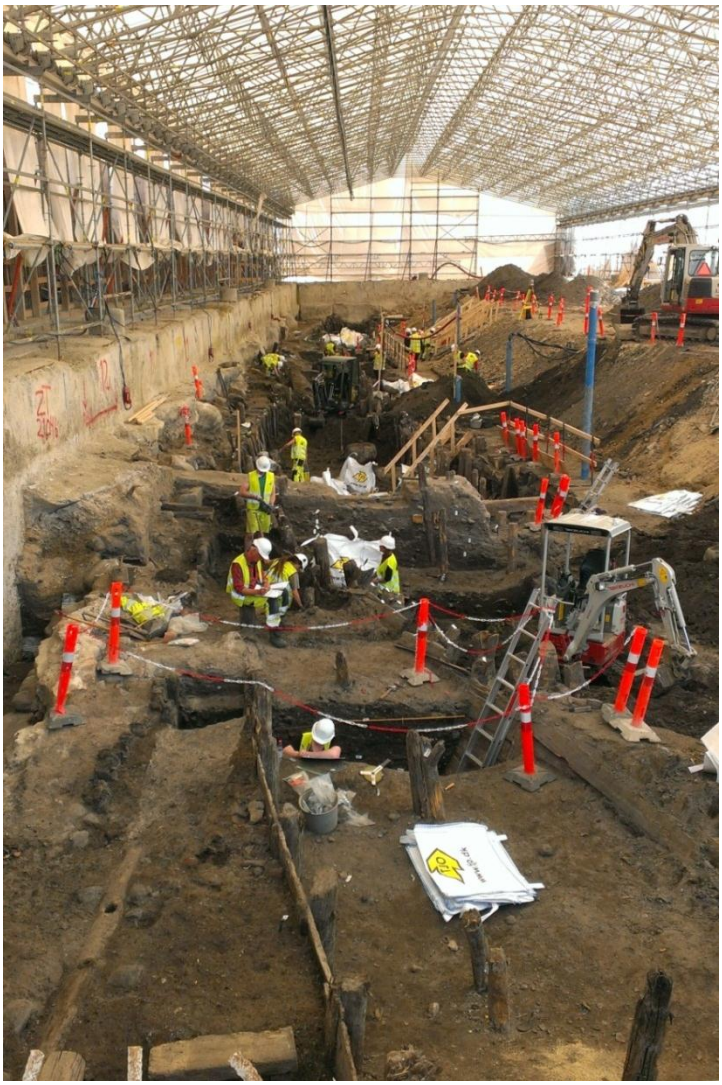
Fig. 7 Working photo of the Oil Container trench and the sawing of wood for a dendrochronological sample. C19-20121123_4354.

The Re-infiltration trenches

Sixteen Re-infiltration trenches were excavated between 2012 and 2013. These were all watching briefs with 1 person following the excavations. The trenches were excavated to up to 2 m deep and between 1-2 m long and wide, with the whole Re-infiltration project leading to 37.92 m excavated.

Fig. 8 Working photo of Trench ZT19718 Re-infiltration well. C03_20121220_5535.

The Main Excavation



The Main Excavation was undertaken in 2014. The station box and the stairway trench consisted of an area 1458.39 m². As part of the trench actually continued into the canal, and with that harbour base area being polluted, only the land part of the trench could be excavated, measuring 729.74 m². The other area was viewed as a watching brief from the trench edges, recorded by photo documentation and notes. The trench measuring 80 m by 16 m by 9 m high was covered in a tent containing a remote winch system for removing big bags of soil.

The main entrance to the excavation area was through the SW side of the trench. It is for this reason that parts of this area was not excavated, as seen by gaps in the plan in this area.

Fig. 9 Main Excavation trench looking NE. The concrete trench walls surround the Main Excavation and represent the former location of the Guide Wall trench. The Stairway trench is located behind (unseen) the eastern trench perimeter (at the far end of the photo). Photo: K. K. Tayanin

The Stairway trench

This trench was excavated in 2014 at the same time as the Main Excavation trench. The trench, measuring 35.25 m², was not covered, so experienced periods of heavy rain, and with flooding, was unworkable for small periods of time. It was excavated in full excavation style and used a winch system to remove big bags.

Fig. 10 Stairway trench looking west C02_20140508_9260

Crane base excavation

This small trench was located just outside of the south west area of the Guide Wall excavation and part of Areas 4 and 5 west. It was observed in September 2014. It was undertaken as a watching brief for the construction of a new base for a crane. The trench measured 6.75 m by 6.38 m and was excavated to a depth of 1m. Only modern deposits were seen.

Staffing

The Gammel Strand excavation team

The amount of project staff and constituents of the excavation team depended on the type of project. Overall, the site was managed by Excavation Leader and Museums Curator Stuart Whatley 2012-2016 and assisted by the field leaders Rikke Simonsen 2012 & 2014, Camilla Haarby Hansen 2014-2016 and Gareth Dickenson 2014. They were supported by Finds responsible archaeologists Jens Winter Johansen in 2012 and Mie Pedersen and Claes Hadevik in 2014. Total station and surveying responsibility was undertaken by; Per Jansson in 2012-2014. Rachel Morgan was Stratigraphic matrix responsible in the years 2012, 2014, 2015 & 2016 and Health and safety by Brendan Fagan in 2012, Jason Leech in 2014, under site responsible Stuart Whatley and Museum responsible Erik Van Acker.

A big thanks and gratitude is given to all the archaeologists who worked on the project in difficult conditions, providing the initial interpretations of the archaeological remains and created the foundation for this report through their documentation. After fieldwork they were also involved with undertaking post excavation work such as sieving, big bag sieving and find processing was also undertaken by this team. Thanks are also given to the University of Copenhagen and Lund University who provided students who later became members of the team.

Archaeologists taking part in the fieldwork and post excavation work over the course of the project included: Amanda Summerfield, Andreas Bonde Hansen, Ann Sølvia Jacobsen, Anthony Ruter, Bo Jensen, Brendan Fagan, Camilla Haarby Hansen, Christopher Reese, Claes Hadevik, Edgar Wróblewski, Fredric Grehn, Fredrik Wirband, Gareth Dickinson, Ilona Carlson, Ingeborg Sæhle, Jason Leech, Jens Winther Johannsen, Joss Davis, John Howorth, Kamilla Ramsøe Majland, Karina Holm Truelsen, Kasia Högström, Kirstine Ejby Møller, Krister Kam Tayanin, Karin Roug, Kristoffer Brink, Lars Haugesten, Lise Christensen, Louise Melchior Rasmussen, Magdalena Lyne, Marc Hauge, Mie Pedersen, Mikkel B. Siebken, Niels Henrik Andreasen, Per Jansson, Rachel Morgan, Rikke Melin, Rikke Simonsen, Sam Keenan, Sofie Renström, Thomas Grane, Toke Østergaard & Truls Månsson.

Fig. 11 Staff photo, Main Excavation 2014. Photo: K. K. Tayanin

Methodology

The purpose and process of archaeology may appear different to how it is portrayed publically. Sometimes it may appear that archaeology is simply excavation and finds retrieval for the purpose of collecting objects for storage and to be put on display. Archaeology, in reality, provides the opportunity to understand how an area was created developed over time, and to study past societies using a selection of methodological practices comprising field observations, finds and natural sciences. Modern, 21st Century archaeology is a process where excavation results and finds are analysed and then presented in a myriad of formats through reports, presentations, public tours, exhibitions and finally, if the material is important, through research.

On-site methodology:

Contrary to the belief of many, archaeological excavations are hardly ever undertaken with tea-spoons and paint brushes. Gammel Strand is no exception to this rule, and most of the site was excavated using larger tools such as shovels and gardening hoes – and in some cases even machine excavators were used to dig into the large amounts of soil and refuse on site. Smaller hand tools were used only when cleaning up areas or structures prior to photography or if anything small and fragile was encountered.

During the excavation, the archaeological remains encountered were perceived as what is known as *stratigraphical objects* or *contexts*. Examples of such contexts are soil layers (called *deposits*), timber structures, cuts and stone structures. When conducting the excavations, it was attempted to continuously excavate the youngest or latest context first, by observing what at all times was lying on top of something else. This is seen as a vertical stratigraphy, which in turn is also a vertical chronology: The events resulting in the different archaeological contexts are investigated in backwards order – from the most recent to the oldest. The contexts were delimited and surveyed using a total station, which recorded the upper outline of any context in three dimensions and created polygons with unique IDs in the GIS-part of the database, IntraSis. Information regarding the character of the single contexts was first recorded on paper (pre-made context sheets to standardize the information and speed up the recording process) and later typed into the IntraSis database, where it was linked to the surveyed polygons. During the excavation of a context, e.g. a soil layer/deposit, finds and samples were collected from this and relations between the collected material and the contexts were made in the database.

The on-site recording was undertaken by surveying, documentation and in some cases drawing and sketching. Photography was also used to document the archaeological observations. To organise the very large numbers of photographs, a journal was kept, in which it was noted which contexts was seen on each photo.

The finds, retrieved from the single deposits were divided into different materials (e.g. ceramics, animal bones, leather, clay pipes, glass, etc.) and put into plastic bags as soon as they were removed from the ground. The bags were then numbered with the ID for the deposit from which the finds were retrieved, along with the date and initials of the archaeologist who excavated them. An archaeologist with responsibility for finds registration added on to each bag a unique number (called FU/Finds Units) and made sure to link the finds unit to the context in the database. Later, once the finds had reached the Museum, a more thorough registration was made of the single finds. They were each given unique numbers (called FO/Finds Objects). Most finds were furthermore included in finds reports made on specific finds types and linked to the deposits in which they were found.

From wooden structures, samples for dendrochronological analysis were collected. As part of a prioritization process, not all timbers were sampled, but only parts representing larger structures. Apart from determining the wood species, the dendrochronological analysis can establish when a tree was felled and in many cases also in which region it had grown. In total more than 200 samples were dated from Gammel Strand.

Soil samples were taken for an array of purposes: Large samples were collected in big bags to be wet-sieved for finds materials through a 5 mm sieve and smaller samples were processed for the retrieval of preserved botanical remains (called macrofossils) as well as smaller zoological remains, e.g. fish bones. Such soil samples can also be used for retrieval of insect remains and other scientific analysis, but these were not conducted with the Gammel Strand material.

Off-site methodology

During the excavation – and to a wide extent after this, attempts were made to interpret the single contexts by using the recorded information as well as the finds and the analysis results of the samples linked to them. The purpose of these attempts was to define what type of events; the contexts were the result of. Furthermore the contexts were grouped to form larger structures or groups of what seemed to go together in terms of interpretation and contemporaneity.

To keep track of all the different groups and contexts, a matrix system (named after Dr. Edward C. Harris, who invented the' matrix system) was used. In this, the stratigraphical relationship (what was laying above and below any given context) was recorded and the matrix drawing thus illustrated a line of events dated relatively to each other. Using the matrix and the observations made in the field, six overall, chronological phases could be established for the excavation area at Gammel Strand.

Most of the timber structures excavated on Gammel Strand were interpreted whilst the excavation was ongoing. Examples include parts of bulwarks, wooden drain pipes and smaller structures such as a livewell and building foundations. Dendrochronology was then undertaken to determine when the timbers were felled, and thus obtain an indication of when the structures were built. In some cases it was then possible to link structures, which in the field had been seen as separate, to each other, and in combination with the matrix, the dendrochronology dates provided absolute dates to the groups and phases covering the period from the 1400s to the present day.

The very large finds rich deposits were, in most cases, interpreted as either the results of dumping of large amounts of the city's household rubbish (as part of the land reclamation processes for extending the harbour area southwards) or as the result of more random dropping and dumping of things and waste as parts of the activities going on near the harbourfront. Most of the finds material were artefacts that were either broken, appeared worn and contained evidence of use, but seen together, they represented household waste of both high and low status Copenhageners throughout the Centuries. This waste can be seen as representing the consumption of goods, preferences and networks of the people living in the city – e.g. the leather shoes and textiles along with personal finds such as jewellery may give insights into the high fashion and daily wear of the people discarding these items.

The macrofossil analysis and the analysis of zoological material (animal and fish bones as well as mollusc remains) provided further insights into aspects of the topographical development of the harbour area,

about the Copenhageners' diet over time and even about trade with foreign countries. This is further supported and extended by the timber provenance analysis carried out as part of the dendrochronology and by the typological analysis of the ceramic materials (pottery and clay pipes) and the glass.

The Late Medieval Harbourside 1400s - 1560s (Phase 1)

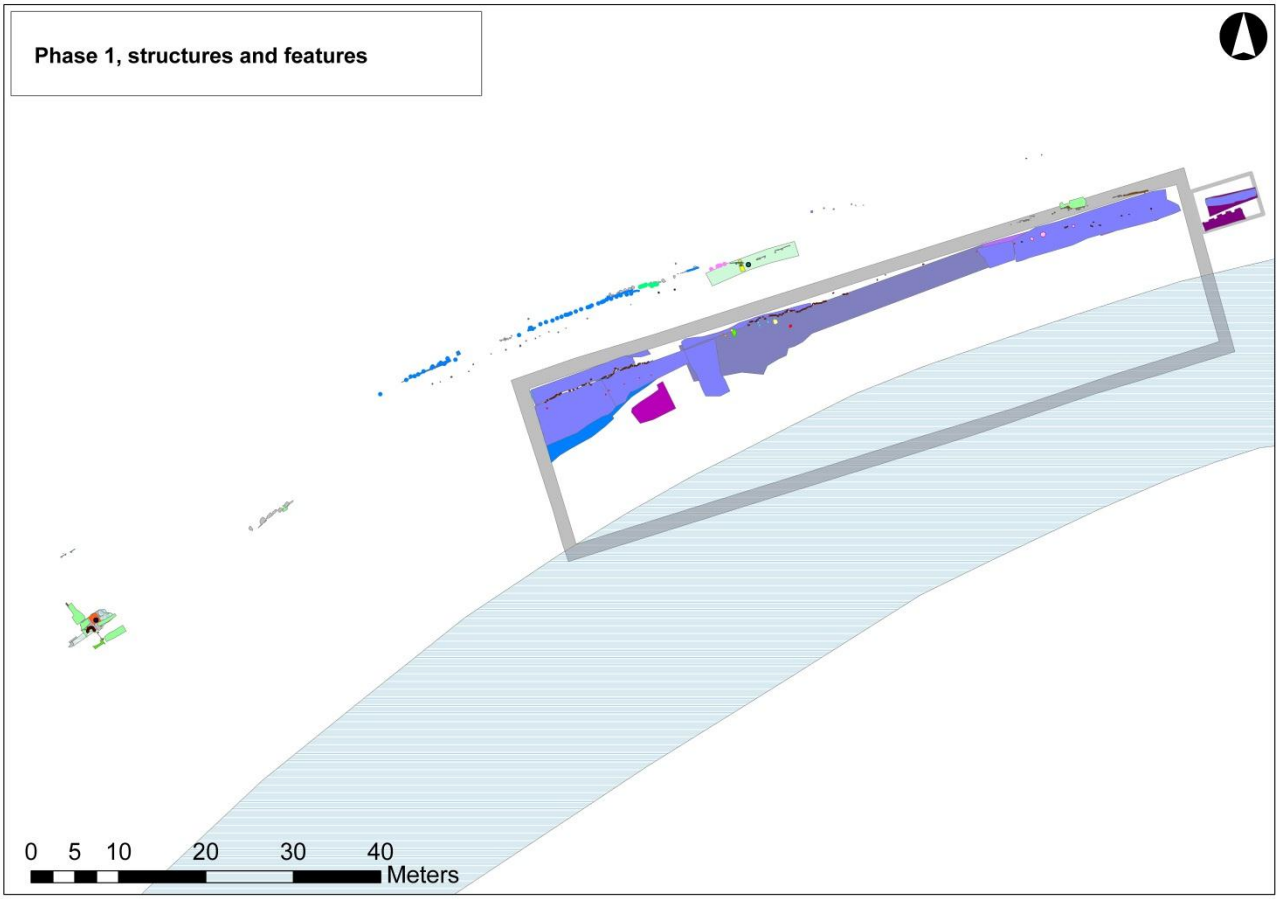


Fig. 12 Plan of the structures and features relating to Phase 1. For more detailed plans, see the internal section plans

Introduction

This chapter will describe the archaeological remains and events that occurred within Phase 1 on Gammel Strand. From the excavations at Gammel Strand it was discovered that the area was largely devoid of human activity until the early 1400s at the beginning of the Late Medieval period. The earliest Medieval activity from Gammel Strand is found within the 2010 watching brief excavations located north and west of the Main Excavation and Guide Wall excavation. In these trenches, bulwarks and posts were set within 1400s land reclamation deposits which were created to increase the urban area of Copenhagen and to provide a deeper harbour for the new larger and technologically advanced ships. Similar trends were seen in all urban maritime centres in Europe at this date. When writing about the harbourside, it should be noted that the Late Medieval harbourfront phase is in reality just another intermediary harbour phase in Copenhagen's long harbour history

The archaeology from Phase 1 has provided new information on the Late Medieval harbourside and the surrounding area. From the natural sciences, structural remains and deposits we have information on how

the area was created, used and how it looked. From the artefacts we have information on what was imported, consisting of finds that were related to fashion, religions, crafts, wealth, personal identity and trade whilst providing absolute and relative dating from the period. The finds from Phase 1 were varied. Some were of great quality, and represent an assemblage of the nearby wealthy elite. The ceramics and glass were imported from Bohemia, central Germany and the east Netherlands representing people who were able to afford more luxurious imports. Others are evidence of daily life for the perceived normal Copenhageners.

The residual finds

Within the excavation area, the earliest archaeological finds were found in deposits dating from the Medieval period. After a closer look, it was seen that some of these finds represent much earlier societies, and that activity at the harbour base had created some mixed period deposits. The earliest finds were therefore, Prehistoric flint, which was found in small quantities on Gammel Strand, and located within the deposits either residually, linked to the mixing of deposits within the city, or was redeposited due to later fluvial activity in the harbour region.

The Prehistoric evidence

The flint represents usage of the Copenhagen area from the Mesolithic period onwards, which far exceeds the use of the area as the urban centre of Copenhagen. The mixture of woodland, good soil, sea and internal waterways provided a good environment for the various Prehistoric and Viking societies to make use of the area. The flint tools that survive are Ertebølle-type flake axes and transverse arrowheads that were probably deposited on eroded glacial sand two metres above current sea level. This transgressive surface was probably created during one of the major transgressions of the Littorina Sea (Ruter 2016). The sand that was uncovered at the base of the trench was created in one of these major Littorina Sea transgressions.

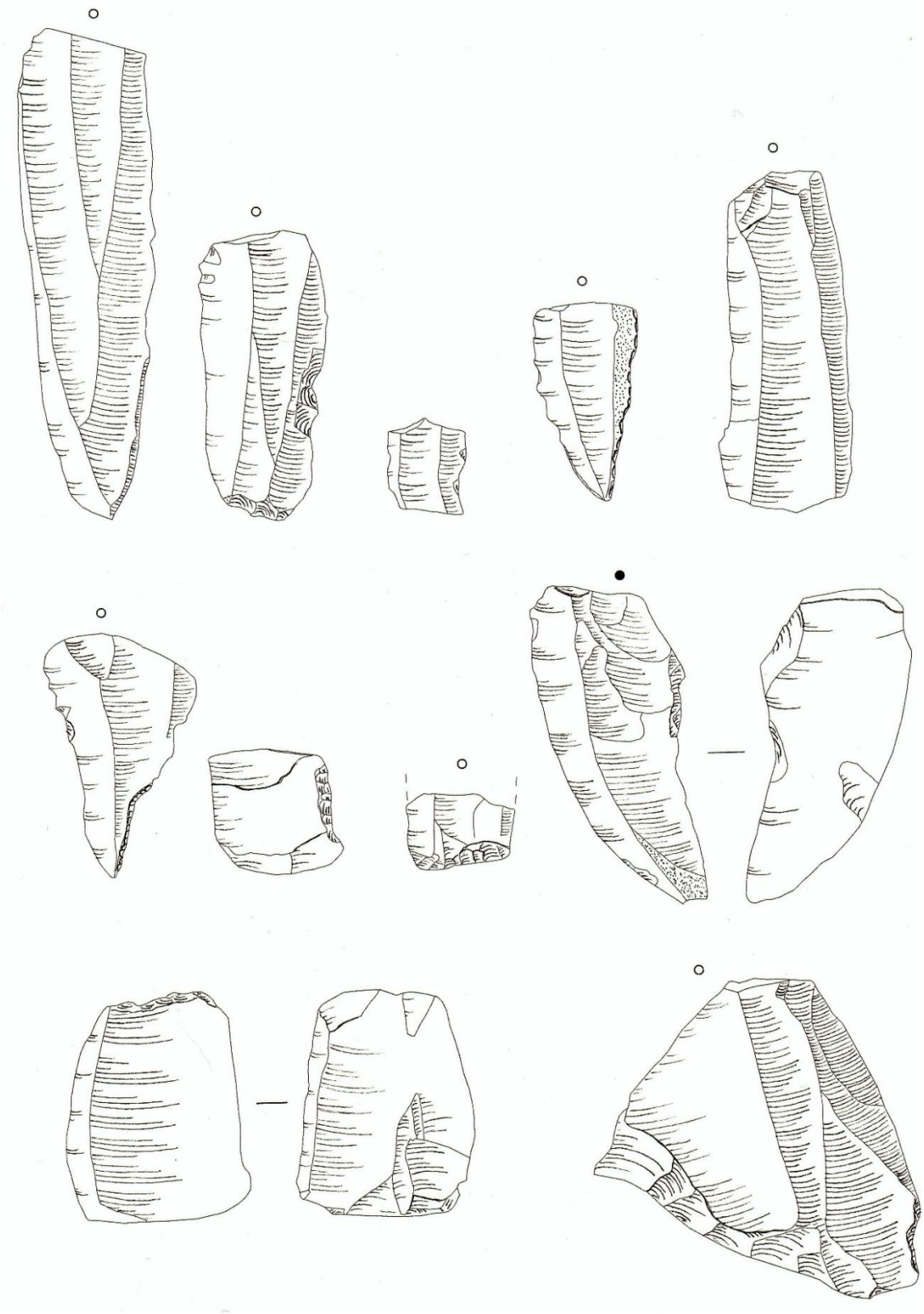


Fig. 13 Selection of lithic finds from Gammel Strand. Drawing: N. H. Andreasen

Viking, Early and High Medieval evidence

The Viking, Early and High Medieval evidence relates to a few ceramic vessels, which like the flint, are residual within later deposits. The ceramic assemblage comprised Baltic ware, which may have been produced either within Copenhagen or within Germany, Nearly stoneware from Germany and green glazed Copenhagen redwares. Of particular interest was a Pingsdorf type fragment, in the form of a flute. This type of musical instrument appears to have been discarded after fracturing, and perhaps shows more trade from central Germany. The location of the late Viking, Early Medieval and High Medieval settlement is located outside of the excavation area to the north, north-east and north-west.

Fig. 14 Pingsdorf type ware FO218772 SD33626, G663, Phase 3. Although not yet provenanced, the tubular shaped vessel represents a rare, (perhaps unique in Denmark) musical instrument from the Early or High Medieval period. Museum of Copenhagen.

Glass is also seen in very small quantities, and represents the trade with Bohemia in the High Medieval and Late Medieval period. A total of six sherds, all from different vessels represent the rare evidence of Bohemian glass in Copenhagen. These vessels were probably used by the wealthier members of Copenhagen and represent the social difference in Copenhagen from the 1300s and 1400s.

Fig. 15 *Fadenrippenbecher* Glass from Bohemia. FO202612, SD11091, G401, Phase 4. Found in Phase 4, but Phase 1 in date. Museum of Copenhagen.

Early Urbanisation, 1200-1300s

Before we discuss the archaeological structures from Phase 1, we should first briefly discuss the urbanisation of the area and creation of the harbour directly north of the excavation. This tie in the artefactual remains from the Early and High Medieval periods that are found residually in deposits from Phase 1 onwards.

The harbour area developed in the same style as many leading urban port centres i.e. Hamburg, Amsterdam, London and Lübeck, by creating new land by the process of land reclamation. By this procedure in Copenhagen, new harbourfronts or bulwarks was created south of the current harbourfronts, which was then filled-in or backfilled with a mixture of rubbish and soil from the surrounding areas. The purpose of this land reclamation was twofold; the first purpose was for creating new land for the city that was cheap to create as the other boundaries of the city were more static, consisting of fortifications, which cost a lot to dismantle, move and rebuild whilst also paying for new land.

The other purpose was for technical and harbour usage reasons linked to changes in maritime trade, the style of ships and the offloading of cargo. In the early 13th Century onwards, the style of maritime trade greatly changed from what was seen in the Late Viking and Early Medieval periods. Trade was more commonly undertaken with money rather than bartering and by merchants acting as middlemen instead of local boat owners and craftsmen transporting and selling their own goods. These merchants sometimes even owned many vessels. The creation of this new profession is seen in Copenhagen in the name of the city, as by the late 12th Century, the small town of *Havn*, (harbour) is from then on called *København* (merchants harbour). The change in technology of ships from rowing vessels in the Late Viking and Early Medieval period to deeper hulled caravels and cogs led to the need of constructing piers or vertical harbourfronts in harbour locations that were deeper, to allow the ships to dock. Within these new harbour areas were also new structures built to organize trade, tax trade and to store the goods from trade such as tax offices, custom houses and warehouses. This is seen at Gammel Strand with the Weighing House (*Vejerhus*) and Customs House (*Accisehus*).

Harbour activity was first denoted at Gammel Strand from the pre Metro Cityring excavations in 2006/7. Core tests in the area revealed a mixture of urban build-up in the area from dating the cores. Dates of764 cal BC, 778 cal AD and 1300's cal AD were obtained, arguably showing a mixture of build-up in the area and secondary deposition.

In between *Lederstræde* and Gammel Strand ,along the north south orientated Naboløs road, many posts, set in a line were found, dating between 1200-1400AD from dendrochronology. These results were seen in the 2003 excavations. These posts may suggest land reclamation and the advancement of the harbour area southwards within these dates. The earliest structural evidence from the site is found from a harbourfront believed to date from the 1400s (from insertion into Late Medieval deposits), when this new type of harbour, a merchant's type harbour, had been in use for at least a few hundred years. The aim of this section is to describe all the major constructions and changes and to show how the area was created, was used and how it was transformed. This will be undertaken by describing each major change in the areas' use and in construction phases.

Gammel Strand and the harbour in the 1400s

The 1400s period on Gammel Strand begins with discovery of a wooden harbourfront and surrounding reclamation deposits. The harbourfront was located beneath the present day street at the centre and western part of the Gammel Strand area, north of the station box.

Fig. 16 A section of bulwark group SG256 looking south. Note the vertical posts, horizontal planks and variety of stone at front of photo. C07_20101026_0455

The harbourfront in the central area consisted of a horizontal wooden façade of planks, set behind vertical posts. Behind the wooden façade were large stones, either as packing, top of the stone harbourfront or road on the stone harbourfront. A line of posts were then located south of this area, suggesting a line of storm posts. To the east of this structure was located an extension of this harbour, or perhaps a new harbour. The 1400s harbour was spread over an area measuring 59.5 m. It was backfilled to the north with Late Medieval waterlogged soils, which then built up south of the harbourfront at the harbour base. Within these soils were late residual High Medieval sherds from earlier rubbish dumps from the city and Late Medieval finds from use of the harbourfront. Finds that represent this harbourfront comprise pottery such as Siegburg ware, grey ware and some local Copenhagen redwares, glass from Bohemia, leather shoes and a rare galloche, fastenings from clothing and diet represented by animal bones and fish bones.

Fig. 17 Medieval galloche FO200484, SD200252. Waste pipe trench, 2010 excavation. Museum of Copenhagen.

These results correspond with many excavations in the area. The 2003 excavations by the museum revealed at Gammel Strand number 52 revealed a bulwark type structure with a terminus ante quem of after 1270 and approximately 1332 AD with finds relating to the 1400s and 1500s. The 2008 excavations revealed within Trench 2 a bulwark dating to 1405/06 AD. This was followed by a cobbled area to the south which was bordered by pine planks and posts. The excavations of settlement undertaken by Johansen (1999a, 139) directly east at Højbro Plads which uncovered wells and corner posts from the winter of 1449/50 along with horn crafting waste and urban rubbish.

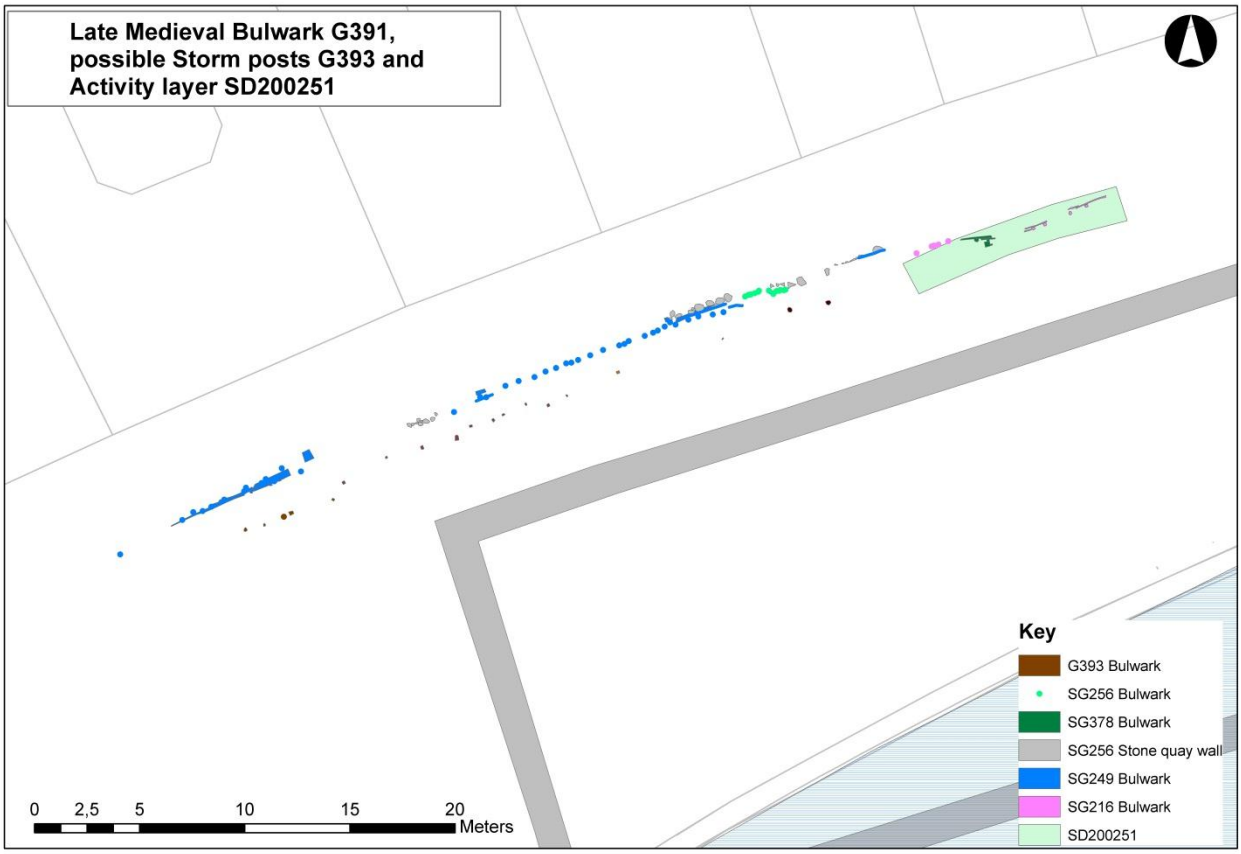


Fig. 18 Plan of the bulwarks uncovered in watching brief phase 2010

The late 1400s/early 1500s harbour

Within the Guide Wall and Main Excavation trenches we found from dendrochronological analysis that the harbourfronts were replaced every 50 years, and behind the new harbourfronts new land was created, as part of the backfilling process. This expansion continued with the build-up of alluvial soils encroaching southwards into the northern part of the Main Excavation trench. These deposits were only discovered in the Guide Wall trench with the use of an auger as they lay below the 2 m depth limit of that phase of excavation. Bulwarks were built into these groups of deposits which represent the harbourside of the late 1400s and early 1500s. One of the posts was from a tree felled *After* 1492 but it is believed to have been incorporated into the harbour in the early 1500s. Unfortunately due to truncation and the 2 m depth excavation limit. The exact form of the harbourfront this bulwark form cannot be completely verified, but it appears to have been a double frontage of oak planks and posts pushed into the soils, very similar to the form in the watching brief trenches.

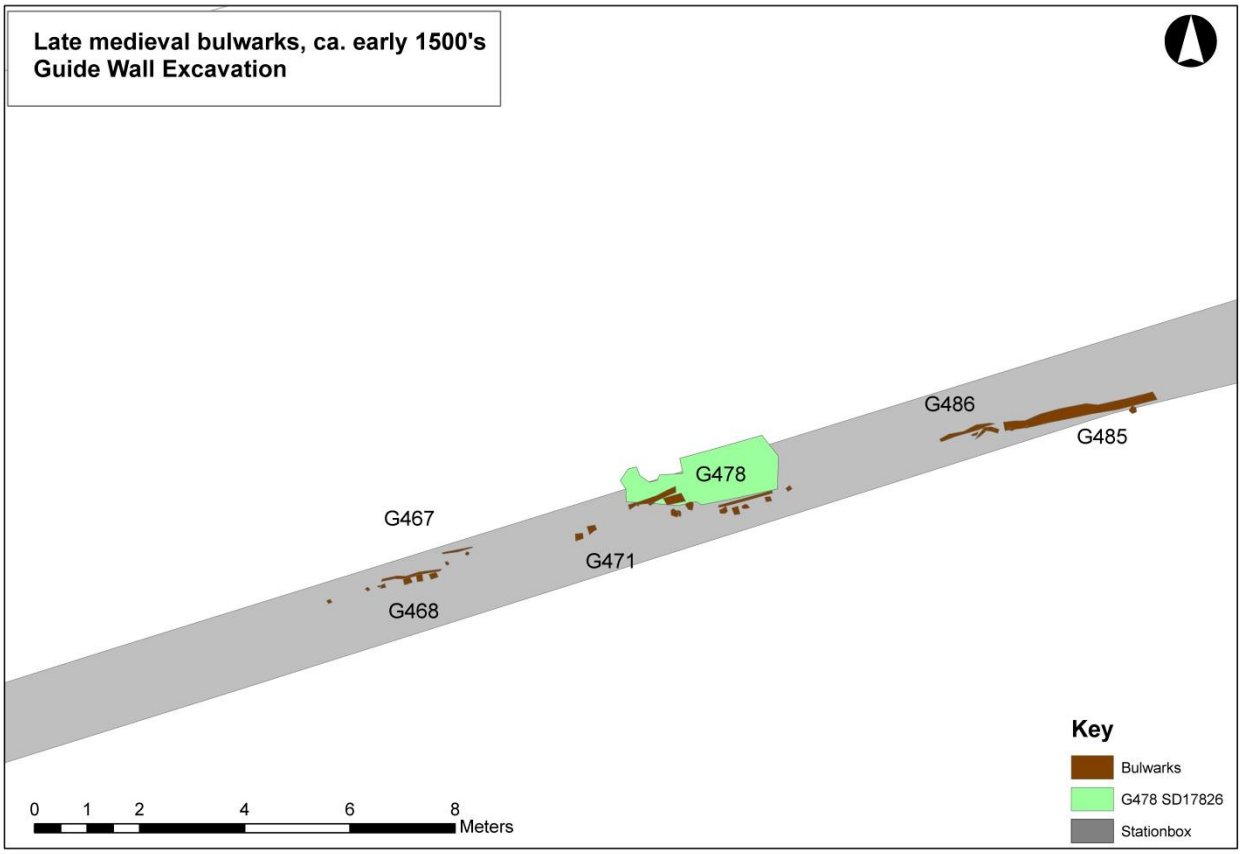


Fig. 19 Plan of the Late Medieval bulwarks from the Guide Wall trench excavated in 2012

The evidence for this bulwark phase comes from 5 disjointed bulwark groups located at the north eastern end of the Guide Wall trench, in Trench areas 2b and 3. They may relate to either a double harbourfront, or a differentially constructed harbourfront. These bulwarks were seen at 2 m below the modern surface, so could only be measured and registered due to decisions made for excavating the Guide Wall trench. At the western and central parts of the trench the service pipes, orientated E-W, had truncated the majority of the archaeology until 2 m deep, and thus perhaps preventing the discovery of the western parts of this possible bulwark. Relating to these structures was one surrounding deposit, and another found from an augur, which also helped to show the depth of natural in the area.

Fig. 20 Bulwark Group 467 in foreground. Stone harbour wall 532 from Phase 2 in centre, with Phase 4 land tie at the top of the photo. Photo facing south east. C19_20120924_3933

Parts of these bulwarks were also found from the 2008 excavations within Trench 1 outside number 42, Gammel Strand. The bulwark continued into the Guide Wall trench area but it is unsure whether the bulwarks dating to this period either related to the early 1500 harbour or perhaps the next 1530s harbour.

The early 1500s harbour as a dumping ground

Directly south of the late 1400s/early 1500s bulwarks and overlying the natural sand were alluvial groups (G647 and G678) which comprised both light brown sand and silt deposits to dark brown organic humic soils comprising components such as twigs and leaves. These groups were created before the harbour was built in the area by a mixture of dumping rubbish and organic waste over the harbour side (located just north from the excavation site in the Late Medieval periods), dumping rubbish from boats and by the action of fluvial activity in the harbour..

Fig. 21 Section containing SD40492 at the base and THE bottom right of photo. Facing NE. C02_20140624_10044 (cropped)

These deposits were pure Late Medieval deposits as seen by the Late Medieval finds. At the northern part of the Main Excavation trench they were "boxed in" by the Phase 2 overlying stone harbour wall group G532 and wooden posts group G602. However as the deposits continued south of this location later activity such as dredging in the Early Renaissance period and machining in the excavation may have pressed in pottery and other artefacts from the late 1500s and. 1600s into the earlier deposits.

Fig. 22 Proto or Nearly stoneware jug from Siegburg, c. 1250-1400, FO218598, SD37646, G647, Phase 1. Museum of Copenhagen

Fig. 23 Plan of G647 & G648. Alluvial and activity layers in Phase 1

The area comprising groups G647 and G678 measured 84.41 m long (east-west) by (north-south) 6.11 m wide in the centre and 8.41 m at the western end of the Main Excavation trench. The deposits in the groups were generally thicker at the northern end of the site, reducing in size as they continued southwards. Groups 647 were mainly located in the central and eastern areas of the main trench and partly in the western area and stairway trench. Group 678 was found in the stairway trench and in the far western end of the Main Excavation beneath the bulwarks in Phases 2 and 3.

Fig. 24 Decorated scabbard FO218150, SD37646, G647. Museum of Copenhagen

The Western Area of Gammel Strand

The harbourfront in this area was not seen, but the remains discovered in the trenches represent the activity behind the harbourfront, and the formation of this area into an urban setting. It comprises a series of levelling groups, pits and bulwarks located 4m south from bulwark group G394. These groups, which can be explored in more detail in the Main Excavation report, show how the area transforms after the initial land reclamation behind the harbourfront. What was seen was the dumping of various rubbish deposits on top of the original reclaimed land. These deposits comprised a wide variety of soils, some urban waste, some soil from urban meadows and some sand dredged from the harbour base and surrounding areas. These conclusions are seen from the different types of soils observed in the deposits, the natural inclusions, and the various types of finds which portray urban rubbish. Examples include High and Late Medieval wares such as old Siegburg stoneware, late redware, early Cologne and Frechen stoneware with Late Medieval bottle sherds redwares, imported grey wares and animal and fish bones.

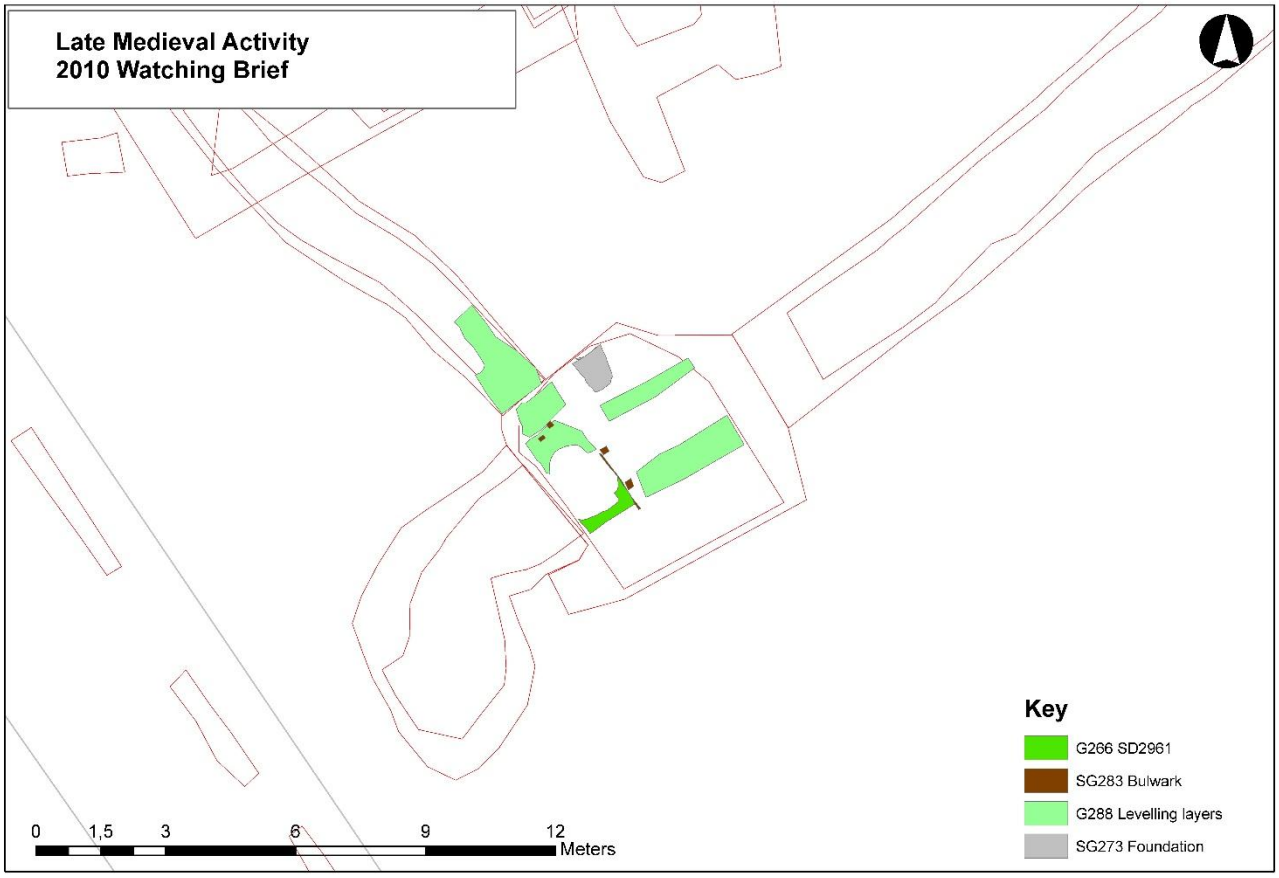


Fig. 25 Plan of land reclamation and Late Medieval activity at the western end of Gammel Strand

As shown in figure, pushed through these soils was bulwark sub group SG283. The bulwark comprised a plank and 2 posts measuring 1.75 m long on a north-west south east orientation. This bulwark was probably an extra foundation for the overlying structural foundations in an attempt to solidify building G389 in newly created land.

The Buildings of Phase 1

The two buildings uncovered from the 2010 watching brief, G389 and G390, has been attributed in the past to the Weighing House (*Vejerhus*) and Customs and Excise house (*Accisehus*) which have been recorded in documentation from the Late Medieval period as being present on the harbourside. Neither of these two structures can be conclusively attributed to either the *Accisehus* or *Vejerhus*, but it is quite probable that G389 represents a wealthy structure on the harbourfront and was probably the *Vejerhus*.

Structure G390 interpreted as the *Accisehus* comprised only of large boulder foundations which suggests the base of a wealthy structure. No overlying remains of the structure were found, so it has been removed in antiquity. The size of the boulders suggests it could support a large wall. No other information can be attributed to the wall though.

Fig. 26 Floor G233 within building G389. Looking NW. C07_20100628_0173

The possible Weighing House/Vejerhus

At the western part of the Gammel Strand street, beneath the present square was the possible remains of an important building of the Late Medieval period, and one of the few that was recorded in historical documents. This building may have been the *Vejerhus* that was asked to have been built by Christopher of Bavaria in the 1440s, and from historical records, existing by at least the 1500s. It was built on a foundation of a smaller building and some bulwarks, inserted to solidify the area. The bulwark here was on a north south orientation, a strange angle due to the harbour lying east-west, so it is believed to have been a former foundation to the overlying building..

The possible *Vejerhus* comprised a few layers of wooden floor, perhaps constantly refurbished due to flooding of the soil below from the tides. It comprised sturdy walls with a basement consisting of a barrel re-used for drainage and an earthen base that was kept relatively clean until its demolishing. The foundations were set with a construction cut consisting of a large stone base with an overlying brick wall. The purpose of the building was to weigh and then tax the goods from the harbour, an essential cog in the trade system. They were located in every major harbour town, sometimes incorporating a custom house or separate from them.

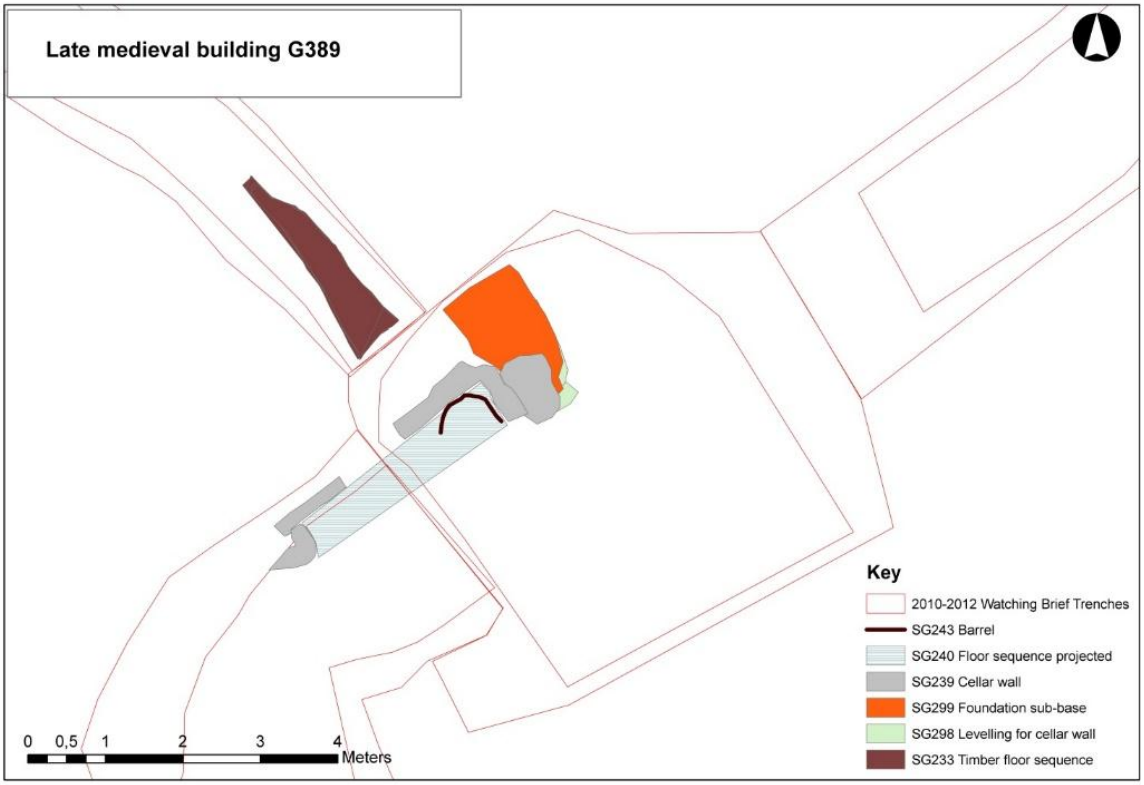


Fig. 27 Remains of building group G389

The 1530s harbour

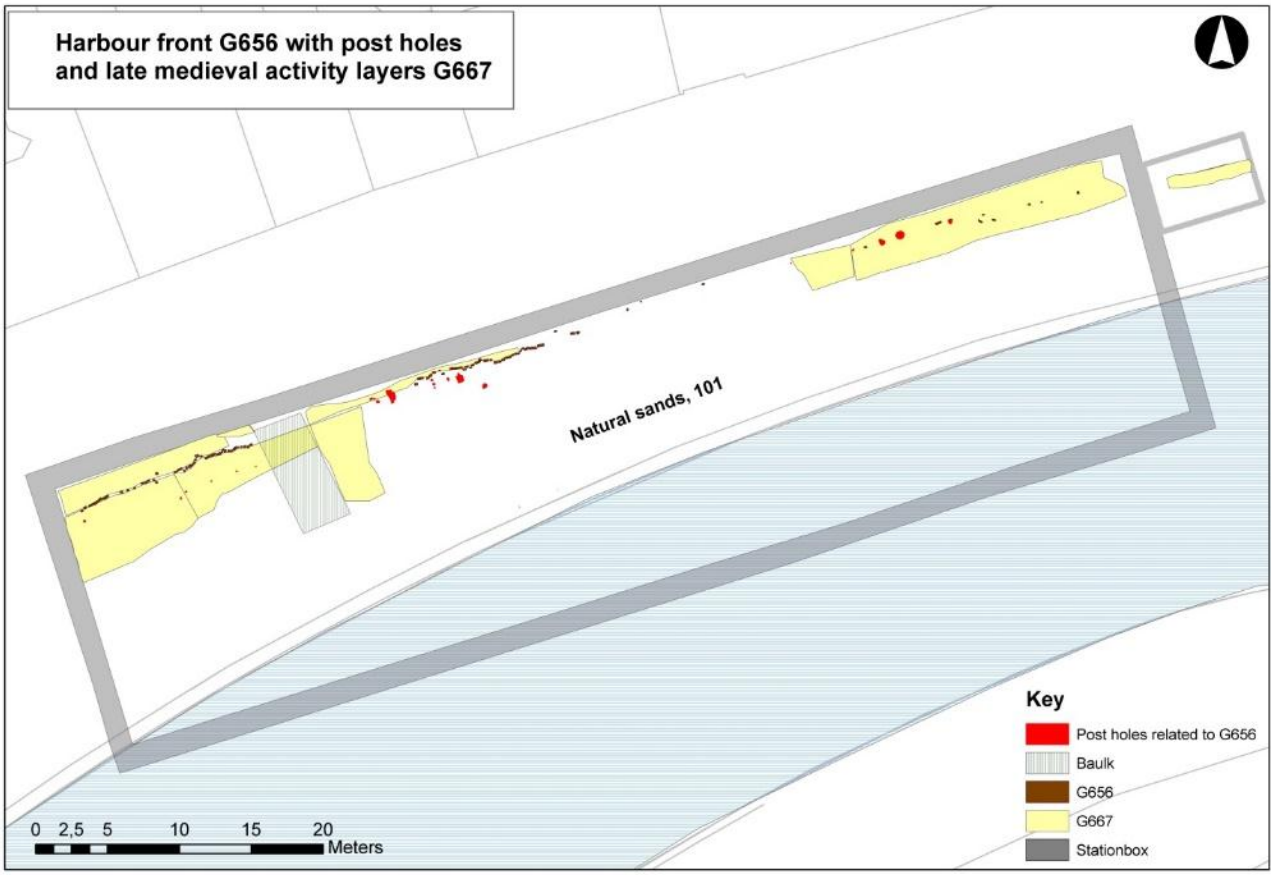


Fig. 28 Plan of the Late Medieval harbour, c. 1530s. Gammel Strand Main Excavation.

Within the Main Excavation trench a new line of oak posts are then set into the harbour floor between 2-4 metres south of the Guide Wall trench harbourfront. The posts were felled between the dates 1510-1532, and are thought to have been used in the harbour very soon afterwards. Around the harbour posts a new group of alluvial deposits built up overlying earlier Late Medieval harbour alluvial deposits, which themselves are a mixture of fluvial action with dumping of rubbish from the city.

The 1530s harbour comprised posts set over an area 76 metres long, and was uncovered only in the Main Excavation trench. These posts were pushed into Late Medieval alluvial deposits which lay at the base of the harbour. They were mainly oak, probably from *Skåne*, *Sjælland* or *Halland*, cut into a rectangular shape with one pointed end and one flat end. The majority of these posts were approximately 2m long and 0.3m long, pushed into the ground, vertically. There date range was quite broad from the 1490s to the 1530s and it is probable that some were re-used from the early 1500s harbour.

Fig. 29 Oak posts from a Late Medieval bulwark in the Main Excavation, central area. Part of Group 656. Note the truncated top of the posts with the c. 1580s stone harbour above, concreted into the Guide Wall. Photo looking NE. C02_20140623_10013

Fig. 30 Working photo showing post ST544550 with carpenters mark. C02_20140612_9723

The majority of the posts were found measuring only 1m long, with one end truncated and one end sharpened. This was due to truncation at the end of Phase 1 where the harbour changes in style and material. These posts appear to have been re-used in another role as part of foundations for harbour wall G532 after the Phase 1 harbour went out of use, whilst some were pushed in at angles and some were simple discarded as seen by post holes.

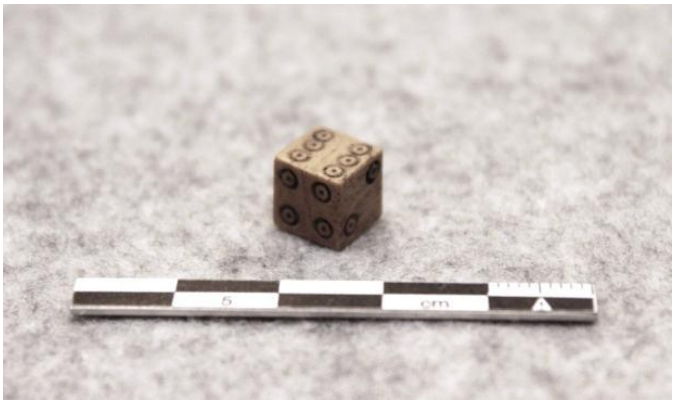


Fig. 31 FO218291. Medieval cubic bone die, with irregular numbering as opposite sides do not equal 7. Ring and dot number decoration. SD54997, G667. Museum of Copenhagen

It is not known if this harbourfront replaced the late 1400s harbourfront, or was an addition to the existing late 1400s harbourfront. The line of posts may have had had a role of protecting the earlier harbourfront rather than being a new harbourfront in themselves. The dates of the posts between the two bulwarks are similar, but in no area do they meet between the Guide Wall and Main Excavation and there appears to be a space of 1-2m between the bulwarks.

No structures outside of the trench related to this particular new harbour phase, and it is presumed no other major building activity occurred in this phase, but as not all of the surrounding area has been excavated, there are possibilities.

Fig. 32 FO213528, Scabbard fashioned from leather and copper alloy. Found in SD42912, G667. Museum of Copenhagen

A mixture of dumping over the harbour walls and fluvial activity led to the creation of new deposits around these posts which also overlay the harbour alluvial deposits. The majority of these deposits comprised a large quantity of Late Medieval pottery and building material.

Fig. 33 Cooking pot FO211681, pre-conservation. Retrieved from SD42912, G667. Museum of Copenhagen.

Fig. 34 Deposit SD42912 of sub-group SG667, central area of Main Excavation. The deposit overlies SD37646 of Group G647, a less organic and more sand rich deposit. C03_20140623_11124

Various finds represent the households from the harbour dumping. From building materials such as munkesten bricks, lead came and floor tile we can see the wealth of the houses. This is further endorsed by the discovery of stove tiles, brass chandeliers and brass cauldrons.

Fig. 35 Brass candle holders from a large candelabra or chandelier. FO212789, SD54997, G667. Pre-conservation photos. Evidence of wealthy households in the region.

Fig. 36 Well preserved Siegburg jugs, c. 1300-1550. FO218513, FO218514, SD54997, G667. Museum of Copenhagen

The date range of the ceramics extends across the entire Medieval period but the majority are from c. 1200-1450. Only one sherd of Baltic ware is datable to the earliest part of the Medieval period (*c.* 950-1250) (FO218593). Late Medieval period is also only represented by a few sherds e.g. Dutch redware, although many of the Medieval sherds could not be split between High Medieval and Late Medieval and it is presumed they had a long phase of use between 1250 and 1500.

In general, the Medieval ceramic assemblage from Phase 1 dates from 1400-1560s, with a few High Medieval and Early Medieval sherds. The majority of the imported ceramics came from Germany, in particular the Rhineland area. The locally made wares were mainly redwares from *Skåne*, *Sjælland* and perhaps from kiln sites yet to be discovered in Copenhagen.

The form types from this period are mainly pots, jugs and drinking vessels with a solitary Siegburg bowl fragment. The truncation of these deposits is represented by the Post-medieval ceramics which represent nearly three times the amount of Medieval sherds at 1,355 ceramic sherds. These sherds mainly dated from

Fig. 37 Sherds from highly decorated early redware jugs, c. 1200-1350. FO218557, SD54997, G667. Museum of Copenhagen

the late 16th and throughout the 17th Century. The Early Post-medieval sherds mainly came from Jutland *(Jydepotte*) but German and Dutch imports are also very common amongst some locally produced ceramics.

The glass artefacts tell a similar story to the ceramics but in smaller quantities, probably due to its fragility. There were only about a dozen of Medieval glass finds which is 4.5% of the total prioritized glass assemblage. Six of them belong to the Bohemian tradition dating to the 14th and 15th Centuries whilst the others represented styles made in Western Germany in the late 15th and early 16th Centuries. The majority recovered from Phase 1 dates from the late 1500s and early to mid 1600s in the form of *Römer* glass, *Pasglas*, beakers as well as normal bottles. These finds are evidence of the dredging of the Late Medieval deposits in the harbour and represent material used in Phase 2 and 3.

Fig. 38 Flower-like prunt (FO214651) found in SD40492 (G667). Photo G. Haggrén.

Destruction of the harbour

The 1530s harbour went out of use in the 1560s with the construction of the new harbourside directly above. Part of the bulwarks were removed and are seen as post holes whilst some were cut at 1m from the base of the post and became part of the new harbour. By this time the Late Medieval harbour had served its use, and was to be replaced by something more important and better constructed.

Fig. 39 Photo showing the west facing section of wall G532. Note that the rear of the wall has been truncated, as had the top of the wall by later activity. The Late Medieval harbour bulwark G656 has been cut or snapped with the upper part of the post horizontally placed on a north-south orientation C03_20140630_11307

It is not known exactly when building G389 was destroyed but the finds relate to use of the structure from the Late Medieval and the Early Renaissance so it is presumed the building was destroyed at the end of Phase 1 or early Phase 2. There is a possibility that the building may also have continued into Phase 2 or 3 existing as a building entitled the hop farm, with a role of assessing the hop.

Fig. 40 FO200592 Schnelle mug with coat of arms of Elizabeth 1st of England, 1560s. Museum of Copenhagen

The harbour base issue

The Late Medieval alluvial deposits chart the gradual movement southwards of the harbour, which is seen at the northern and central part of the Main Excavation trench. These deposits were a real mixture of both sand from the base, and silt and rubbish from the city. The closer the deposits were to the town, the richer they were in quantity of finds. The problem with these deposits was that they became more mixed the further south they went. The depth of the harbour needs to be maintained to enable easy passage for ships, this is achieved by dredging. This process was ongoing to the south of the harbourfront so deposits that formed in these areas would get contaminated with later artefacts pushed into the deposits.

Evidence of this was seen from early 17th Century finds in Phase 1 deposits where *Römer* glass, clay pipe and some 17th Century fabrics.

A total of 273 pipe fragments were recovered from alluvial groups G647 and G667. These finds were later intrusions due to the effect of dredging in the harbour from Phases 2 and 3. As they do not physically date to the Phase 1 period dates, they do not warrant further discussion. Clay pipes were imported into Denmark in the early 1600s (Phase 2 on Gammel Strand) so represent a later intrusion.