

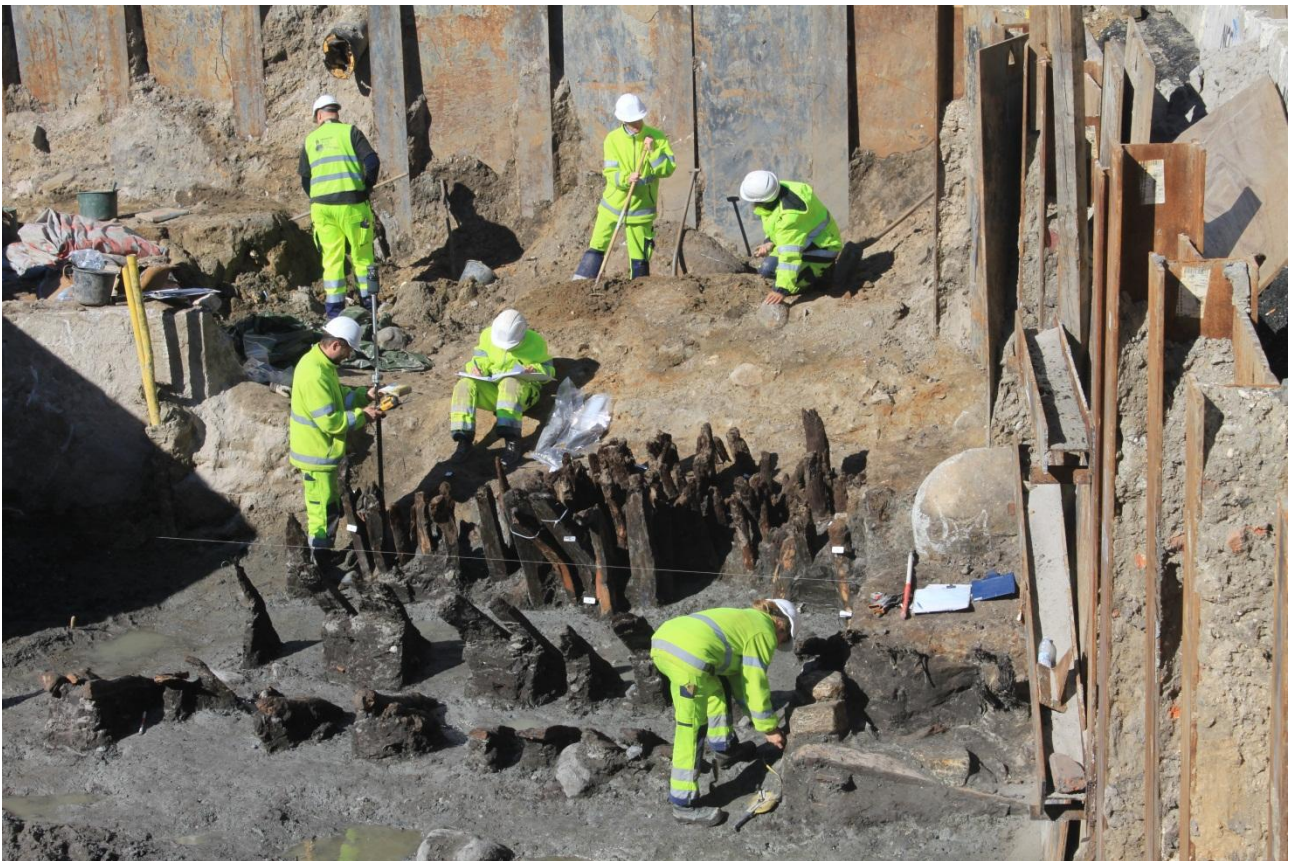
Kongens Nytorv

Metro Cityring Project

KBM 3829, Øster Kvarter, Københavns Sogn

Sokkelund Herred, Københavns Amt

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Cover picture: Kongens Nytorv excavation. Recording medieval bulwark and rampart in subarea phase 5B-2. Photo: Museum of Copenhagen.

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Foreword

The excavations in connection with the Metro Cityring project have been the largest ever archaeological project in the history of Denmark. The results have provided brand new and extensive knowledge about the history and development of the capital of Copenhagen and the former inhabitants. The excavations at the site of Kongens Nytorv carried out between the years 2009–2016 was one of the three main sites and were located partly within the borders of the medieval city.

At Kongens Nytorv the archaeological results not only confirmed the knowledge from previous excavations, but also brought to light very significant new information. The most eye-catching features from the excavations were the discovery of the fortifications and the well preserved remains of the eastern gate to the city. The uncovering of boundary ditches, clay lined pits, workshops and domestic buildings dating from the Early medieval period revealed that the area was part of a settlement that was important enough to fortify, however, it was not until the Late medieval/Post medieval period that this area developed greatly. The finds material is unique and due to the anaerobic conditions found in the moats, the well-preserved organic artefactual reveal the more diverse side of the lives of the inhabitants of historical Copenhagen.

The results are presented in a technical report containing the most important discoveries and a comprehensive appendix with the descriptions of all archaeological features follows this report. In addition a cultural historical report based on the technical report has been produced with the focus on the results in a cultural historical perspective. The expectations are that the reports will be read both by professionals and the general public, but also used for research and comparable material for many years to come.

Lars Ewald Jensen, Archaeological Leader, Museum of Copenhagen

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Abstract

This excavation report features the archaeological work undertaken at Kongens Nytorv, Copenhagen, Denmark (site code KBM 3829) by the Museum of Copenhagen from 2009–2016. This work was conducted in association with the main contractor Metroselskabet I/S prior to the construction of a new adjoining metro station to the present station at Kongens Nytorv. This is a location where the existing metro line will meet the new Metro Cityring, with Kongens Nytorv being one of 17 new stations around the Copenhagen area. The main excavations, which were carried out from December 2009 to September 2011, also included watching briefs of relining around the square of Kongens Nytorv. The area for the new Station Box and Guide Walls was excavated in stages in 2012, 2013 and 2014 as watching briefs in connection to the project around the square. In autumn 2016, the remaining part of the project comprising of a new access point to the Royal Theatre and a new Ventilation Shaft was excavated.

The main excavation zone included the areas within the medieval city and the fortification surrounding the city. These areas were excavated to the natural substrate and all preserved archaeological remains were registered by full excavation. The depth of the Station Box work also meant that this area was archaeologically registered down to natural ground. This differed with the watching brief areas as they depended on the aims of the project and very few of these were excavated down to natural substrate. All archaeological remains were documented by contextual recording, photography, surveyed and measured by total station and GPS, and in some cases, drawn. Natural science such as radiocarbon dating, osteological analysis, dendrochronological analysis, macrofossil analysis and other relevant methods were used when necessary.

During the medieval period Kongens Nytorv was placed in the outskirts of the medieval city, but after the expansion of the city in the 17th century, the square came to play a central role in the city; a role it still has today.

Archaeological observations have been made at Kongens Nytorv for the last 100 years. In 1996–1998 the first metro station was planned at Kongens Nytorv. This led to extensive archaeological excavations. These excavations revealed whilst fortifications were the dominant feature, other remains such as boundary ditches providing settlement evidence of the area before the fortification. This meant that expectations for the recent excavation would include findings of both the medieval and Post medieval fortification as well as traces of earlier settlement prior to the fortification.

An area of nearly 7000 m² were excavated as part of the recent Metro Cityring Kongens Nytorv project and despite the previous knowledge of archaeological remains in the area, the recent excavations exceeded expectations. The most important new knowledge obtained from the area was the uncovering of the city's eastern gate building (Østerport), which was found to date from the early part of the 13th century and part of the city wall from the mid 1300s. Important findings also include the discovery of fishing activities and boundary ditches from the Early medieval period, which define the settlement and crafts in the area from the Early medieval period until present day. The uncovering of settlement evidence outside the moat from the early 16th century came as an unexpected revelation, portraying life outside the city gates.

The archaeological remains at Kongens Nytorv were found to have been greatly affected by both historical and modern truncations from various construction projects. The excavation of the area was quite complicated due to logistic challenges of the overall project. This meant that the overall area was divided into multiple subareas or zones that made the linking of the archaeological features complicated and not always obtainable. Nevertheless, the results of the excavation at Kongens Nytorv are very significant and have contributed greatly to our knowledge of the area and the city of Copenhagen. In particular, the topics such as urbanization and the fortification from Kongens Nytorv are of special importance and place the excavation of national and international importance.

This report contains all results from the last 6 years of investigations at Kongens Nytorv which include the archaeological results, finds and natural sciences reports, the overall setting of the project and the methodological approaches undertaken. All evidence will be presented and discussed in the following pages.

Archaeological periods:

Stone Age, Viking Age, Medieval, Early medieval, High medieval, Late medieval, Renaissance. Post medieval, Late post medieval, 20th century.

Feature types:

Clay lined pits, ditches, pit house, "Grumbod", pits, postholes, wells, fences, buildings, roads, rampart, bulwark, moats, city wall, gate, dam, barrier tower, bastion, curtain, bridge, wooden water pipes, levelling deposits, backfills, dumps, foundations, square, air raid shelters.

Key words:

Fishing activities, the Scanian market, medieval fortification, eastern gate, High medieval settlement, city gardens, urbanization, iron smithing, Kongens boder, Renaissance, Count's Feud, Valkendorf, Post medieval fortification, Christian 4th, Gjethuset, cannon foundary, Bremerholm, urban waste, Kongens Nytorv, Krinsen.

1 Introduction

The excavation at Kongens Nytorv took place in advance of the establishing of a new Metro station. This is a part of the new Metro Cityring system that will provide a new transportation system to the areas of the city surrounding the city core (Fig. 1). The Cityring is eventually going to be connected to the existing Metro system. Kongens Nytorv will be one of two already existing stations where the new metro line will meet the old one.

The establishing of an adjoining Metro station at Kongens Nytorv would affect high potential archaeological remains and rescue excavations were necessary in accordance with the Consolidated Act on Museums.



Fig. 1. Plan of the Metro Cityring with location of Kongens Nytorv marked.

The excavation of the main area was intended to start in December 2009 and end in May 2011. Due to changes in time plans and logistics during the project the archaeological excavation ended in September 2011. The main area of investigation was the location of the future access to the new metro station and in a high potential area of archaeological interest (for further information on archaeological potential in the area of Kongens Nytorv, see Chapter 4 and 5; The Metro excavation 1996–1998 and Other archaeological observations in the area around Kongens Nytorv).

In 2012, 2013 and 2014 the excavation of the Station Box and Guide Walls was conducted under archaeological surveillance. In 2016 an access from the Royal Theatre (Bitrappel) and Ventilation Shaft was established and again this was conducted under archaeological surveillance. Besides the main excavation work mentioned here, some extra work was done separately when needed outside the main area. The last extra work was done in the summer of 2015 in the basement of former Café A'Porta.

1.2 Legislative framework

The Museum of Copenhagen is responsible for the archaeological work carried out in Copenhagen and Frederiksberg municipalities and therefore conducted the archaeological work on this site. The work was carried out under Part 8 of the Consolidated Act on Museums. This means that the contractor must finance the cost of the archaeological work (registration, observation and documentation) in connection with destruction of archaeological remains. See link:

<https://www.retsinformation.dk/Forms/R0710.aspx?id=162504>

The aim of the archaeological work at Kongens Nytorv was to produce a complete, thorough and accurate set of data of high disciplinary standard that would create an adequate foundation for future research. These standards are stated within the document covering the overall archaeological design aspects of the project which was approved by KUAS (present day: Agency of Culture and Palaces) in the autumn of 2009 and in June 2010 (Thomasson & Høst-Madsen 2009). The excavations were designed to allow future research to be undertaken to enhance the archaeological and historical knowledge that can be gained from this site and related to the development of Copenhagen.

No research is allowed to be financed by the contractor, in this case the Metro Company. The end product of the excavation is site reports, which contains empirical conclusions and basic cultural historical interpretations. Further archaeological research and analysis can only be carried out under separate, additional funding. This complies with statements in the Consolidated Act on Museums.

1.3 The location

Kongens Nytorv (translates into the King's New Square) is today a central square of the inner city, with Krinsen as the central area. This was not always the case; the eastern city gate of the medieval fortification was placed here on the first brick built fortification surrounding Copenhagen, but neither written nor archaeological sources so far seem to indicate that the area was used to its potential in terms of close settlement or activities. All knowledge up to the present day seems to indicate an area on the outskirts of medieval Copenhagen with limited activities.

The square of Kongens Nytorv was originally founded in 1688 and placed just east of the medieval city and just west to the New-Copenhagen which was laid out by King Christian the 4th when he expanded the city that outgrew its medieval boundaries in the beginning of the 17th century. The square was laid out as a baroque garden (Kringen) by King Christian the 5th with an equestrian statue of himself as a central figure and the square was lined with mansions. Two of these 17th century buildings still stand today and the square is also home of the Royal Theatre and the oldest existing pub in Denmark – Hviids Vinstue.

For a period between 1749 and around a hundred years after the garden was closed down and the square functioned as a military drill ground.

Kringen was reconstructed back to its original baroque style in 1908 after the original square. With the large mansions surrounding the square, today's Kongens Nytorv has preserved its original characteristics from the 17th century (Fig. 2).



Fig. 2. Krinsen and Kongens Nytorv before the excavations in October 2009. Photo: Morten Steineke.

A prioritization of the large scale excavation area at Kongens Nytorv was necessary in order to keep the archaeological budget at a reasonable level, but also according to the different types of archaeological features, that were expected in the area, that would demand different kinds of excavation methods. On the basis of what was known about the area from both archaeological and written sources, a plan of prioritization was laid out. Some knowledge of Kongens Nytorv was gained from earlier archaeological excavations; in particular the excavation for the first Metro station at the square excavated in 1996–1998 (see Chapter 4; The Metro excavation 1996–1998). From the results of this excavation the museum knew that there would be potentially quite significant remains of the fortification surrounding Copenhagen in the medieval and Renaissance period. At this excavation also remains from the 11th century were retrieved, and the potential of complicated, early medieval stratigraphical remains was also a possibility.

1.4 Excavation areas

In order to prioritize the budget and the archaeological work the investigations were separated in four different areas with different potential based on what was known about the area from historical and archaeological sources (Fig. 3).

Type 1 High potential areas with expected complex stratigraphy

The high priority area with the highest expectations of complex archaeological findings. This was the area that was behind the medieval fortification and which was expected to contain remains from the early medieval period and perhaps even Viking Age. This would include settlements, ditches, wells, etc. This area was fully excavated to the geological layers and mainly by hand.

Type 2 High potential areas with less complex stratigraphy

The medieval fortification and the area just outside. This would include walls, embankments, moats, etc. Less complicated archaeology was expected in this area due to larger and more recognizable archaeological remains. The archaeological fieldwork in this area was often assisted by machine power due to less complex layers.

Type 3 High potential areas with limited documentation possibilities

Mostly watching briefs including the Station Box. As well as in the type 2 area, larger archaeological findings were expected and also of primarily post medieval dating. In these areas the excavation was done by machine to the depth needed by the contractor and surveyed by archaeologists. When archaeological remains were detected the archaeologists registered the remains at a fairly high speed and in less detail.

Type 4 Areas with moderate potential and limited documentation possibilities

Watching brief areas where mostly less complex and larger features like levelling layers were expected. Most of the type 4 area was on the outskirts of the Kongens Nytorv area and expected to be of a relatively young age. When archaeological remains were detected the archaeologists registered the remains at a fairly high speed and in less detail.

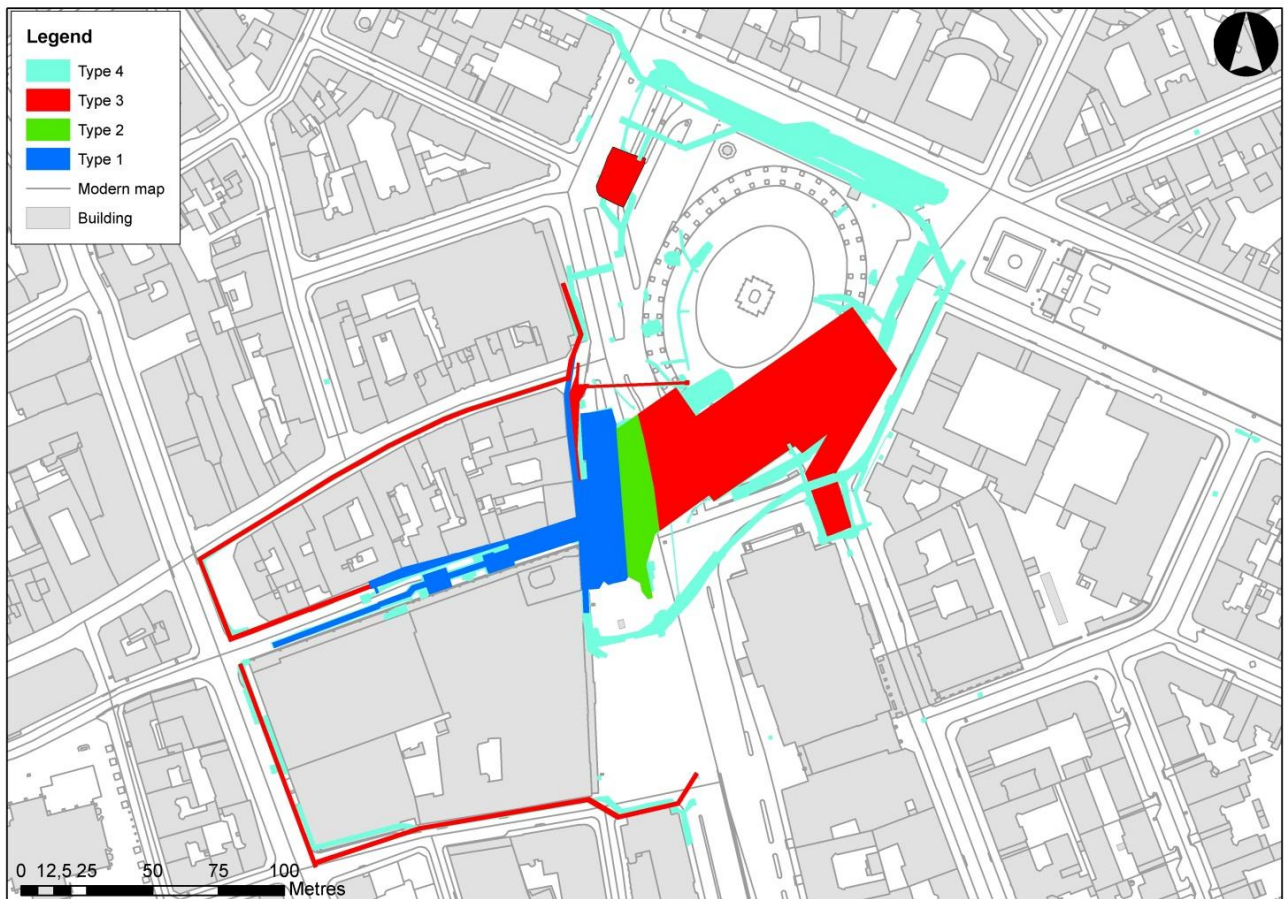


Fig. 3. Map of Kongens Nytorv with the type 1-4 areas.

For start and end dates of all archaeological work see Chapter 2; Administrative data.

1.5 Framework

Different documents made the scientific and logistic base for the excavations carried out at Kongens Nytorv. They were both for the actual archaeological work on site and also on a theoretical and organizational character.

Kongens Nytorv Method Statement for archaeological excavation KBM 3829 (Thomasson (ed.) 2010) is the main document that provides an archaeological strategy at Kongens Nytorv for the excavation of areas type 1-4, documentation and post-excavation work of Kongens Nytorv. This document sets out the basis of information, including previous knowledge and documentary research about the area upon which the management and excavation strategy has been based. It sets out the framework of objectives that define the entire Metro project and focuses on particular relevant themes for this excavation (see Chapter 6; Objectives and aims).

It also provides a quantification of the known archaeological deposits and conditions within the site and describes the resources needed for the project. This document should be read in conjunction with the document covering the overall project design (Project Design 2009).

1.6 Excavation report

This excavation report conforms to specific KUAS guidelines concerning report writing. No research has been carried out on the results; only a working statement of the results and conclusions. This complies with statements in Danish Museum law (Bekendtgørelse af museumsloven nr. 1505). Therefore, when discussing the results in context, there is only limited reference to primary or secondary documentary sources or academic research on the subject. Full analysis and interpretation will rely on future academic projects of which this report provides the foundation.

The report is designed to provide a full statement concerning not just the results and archaeological interpretation of the work, but also to describe in detail the methods undertaken and some of the theoretical basis under which the archaeology was carried out. It also critically examines and assesses the processes and procedures created to deal with the archaeology. The aim of this report is to provide three main points of information: a guide to the data and documentation material, especially for the IntraSiS database which will provide access for interested users, an assessment of the results and an initial, basic cultural historical interpretation.

1.7 Report contributions

The main author of this report is Field Leader Morten Steineke (all Chapters except Chapter 1, 2, 6, 7.10, 8, 9, 17, 19 and 22) who also has been responsible for Appendices 1-12; Contextual presentation and grouping, coordinating natural science specialists and other report related work. Excavation Leader Jane Jark Jensen coordinated overall work, the finds specialist reports and made contributions to the report.

Joakim Thomasson is the main author of project documents (see References) and some of his texts have been reused in this report. Chapter 11; Prehistoric finds and features is mainly based on the Flint report written by Niels Henrik Andreasen (see Appendix 19). A large part of the report dealing with the buildings outside the 17th century moat is based on grouping texts written by Rachel Morgan.

Report Management	Jane Jark Jensen (main), Morten Steineke
Report Production	Morten Steineke (main), Jane Jark Jensen
Figure Production	Karen Green Therkelsen
Final Report Editing	Morten Steineke
External Proofreader	Donna Young

Contributions	Joakim Thomasson
Contextual Grouping	Rachel Morgan, Morten Steineke, Therese Ohlsson, Karen Bork-Pedersen
Contextual Text	Morten Steineke
Matrix	Rachel Morgan (main), Therese Ohlsson, Karen Bork-Pedersen
Images	Museum of Copenhagen unless stated otherwise

2 Administrative data

This section will present the administrative data when it comes to dates, phases (areas) of excavation, contractors, specialists, staff, organization and on-site facilities.

It is important to note that different areas of excavation on the site of Kongens Nytorv were named “phases” of excavation (phase 1N, 1, 2+3, 4B, etc.). In the following text the areas of excavation will be referred to as phases.¹

2.1 Builder and contractors

The builder was the Metro Company, Metro Cityringen which is establishing an adjoining metro station at Kongens Nytorv (see Chapter 1; Introduction).

NCC was the contractor on site through the stage of excavation and watching briefs which took place from December 2009 to September 2011. NCC serviced the archaeological excavation with machine power, removing soil, lifting/transporting heavy-duty finds and stones and also health and safety on site. All work done in cooperation with NCC was financed by the Metro Company. From 2012–2016 the contractor CMT serviced the archaeological watching briefs primarily in the Station Box area and the Bitrappel. In both cases no direct coordination was done between the contractor and the museum without the approval of the Metro Company.

Due to logistic challenges on site because of the ongoing traffic on Kongens Nytorv and need for work space, time plans, staffing, etc. a high level of coordination went on between the site managers from the Metro Company, NCC, CMT and the Museum of Copenhagen – mainly Excavation Leader Jane Jark Jensen and Project Leader Lene Høst-Madsen (2009–2013). Also Field Leaders were involved in coordination of the daily fieldwork. Between 2012–2016 this task was done by temporary Excavation Leader/Field Leader Morten Steineke.

The coordinating persons and primary contact persons on site from the Metro Company were from 2010 till summer 2011 Construction Manager Vibeke Rolle. From summer 2011 till the last phase in 2014 Interface Manager Jimmy Jørgensen, and in 2013 and 2014 also work Site Manager Ole Bellen. In 2016 the Metro Company coordinating person responsible was Site Manager Nikolaj Nørgaard Skytte.

Coordinators from the contractor companies were from NCC – Project Leader Per Mundus Voetmann and Production Leader Keld Brøns Nielsen from 2010–2011. From 2012–2014 the contractor was CMT and the primary coordinators were Site Manager Nanna Krogh Lassen and Construction Manager Per Guillaume Jensen. In 2016 the coordinator was Nanna Krogh Lassen.

2.2 Project organization and staff

Not all staff was at site at one time, but at times more than 30 persons were involved in the archaeological work on site at the same time.

2.2.1 Project management

Joakim Thomasson (Antiquarian Leader 2010–2011), Søren Bak-Jensen (Head of Archaeological Section 2011–2014) and Thomas Roland (Head of Archaeological Section 2015–2017).

Lene Høst-Madsen (Project Leader 2009–2013), Jane Jark Jensen (Excavation Leader 2009–2016/maternity leave 2012 and leave autumn 2013), Duncan Alexander (Field Leader 2009–2013), Therese Ohlsson (part-time Field Leader 2011), Morten Steineke (Field Leader 2009–2016/Excavation Leader temporary position 2012), Gemma Stevenson (Field Leader 2009–2010).

¹ The choice of name for these excavation areas was made before the Museum of Copenhagen became a part of the project. These excavation areas will in the following report be named *phases* unlike *Phases* for the historical time periods.

2.2.2 Field archaeologists, special responsibilities and archaeology students (different time lengths)

Niels Henrik Andreasen, Karen Bork-Pedersen, Lise Christensen (Student), Tina Bonde Christensen (Student), Joss Davis, Gareth Dickinson, Mads Drevs Dyhrfeld-Johnsen (Outreach), Brendan Fagan, Fredrik Grehn, Kirstine Haase (Outreach), Claes Hadevik, Andreas Bonde Hansen (Student), Camilla Haarby Hansen, Jens Hansen (Student), Marc Hauge (Student), Lars Haugesten, Chris Hawksworth, Olle Heimer (finds), John Howorth, Katarzyna Högström, Rikke Isler, Ann Sølvia Jacobsen, Per Jansson (total station), Astrid Wolff Jensen (Student), Michael Alrø Jensen, Bo Bergreen Jensen, Jens Winther Johannsen, Susanne Møller Johansen, Sam Keenan, Grzegorz Kiarszys, Mette Kjelstrup, Jason Leech, Magnus Lindberg, Ed Lyne (photo 2010 and 2011), Magda Lyne, Sabina Harholm Lønsvov, Alva MacGowan, Anne-Dorthe Moesgaard-Christensen, Signe Fog Mogensen, Rachel Ceridwen Morgan, Jacob Mosekilde, Malene Aagreen Nielsen, Therese Ohlsson (stratigraphy 2010 and 2011), Claus Rohden Olesen, Louise Melchior Rasmussen, Christopher Reese, Maiken Ploug Riisom (Student), Charlotte Rimstad, Karin Roug (Outreach), Anthony Ruter, Mikkel Siebken (Student), Terje Stafseth, Amanda Summerfield, Krister Tayanin, Karen Green Therkelsen, Zenon Topcagic (Student), Karina Truelsen (Student) and Maria Louise Tvede (Student).

Also students from Lund University, Sweden and Elizabethtown College, Pennsylvania, USA participated for a limited period of time as part of their internship/education.

2.3 Excavation areas (phases) and watching briefs

Due to the contractor’s logistics and especially the continuation of the ongoing traffic at Kongens Nytorv, the affected areas at Kongens Nytorv were split into several smaller phases (areas). The areas of excavation – type 1 and 2 areas (Fig. 4) and some of the affected areas of the type 3 area (Fig. 5), were split into several minor excavation phases.

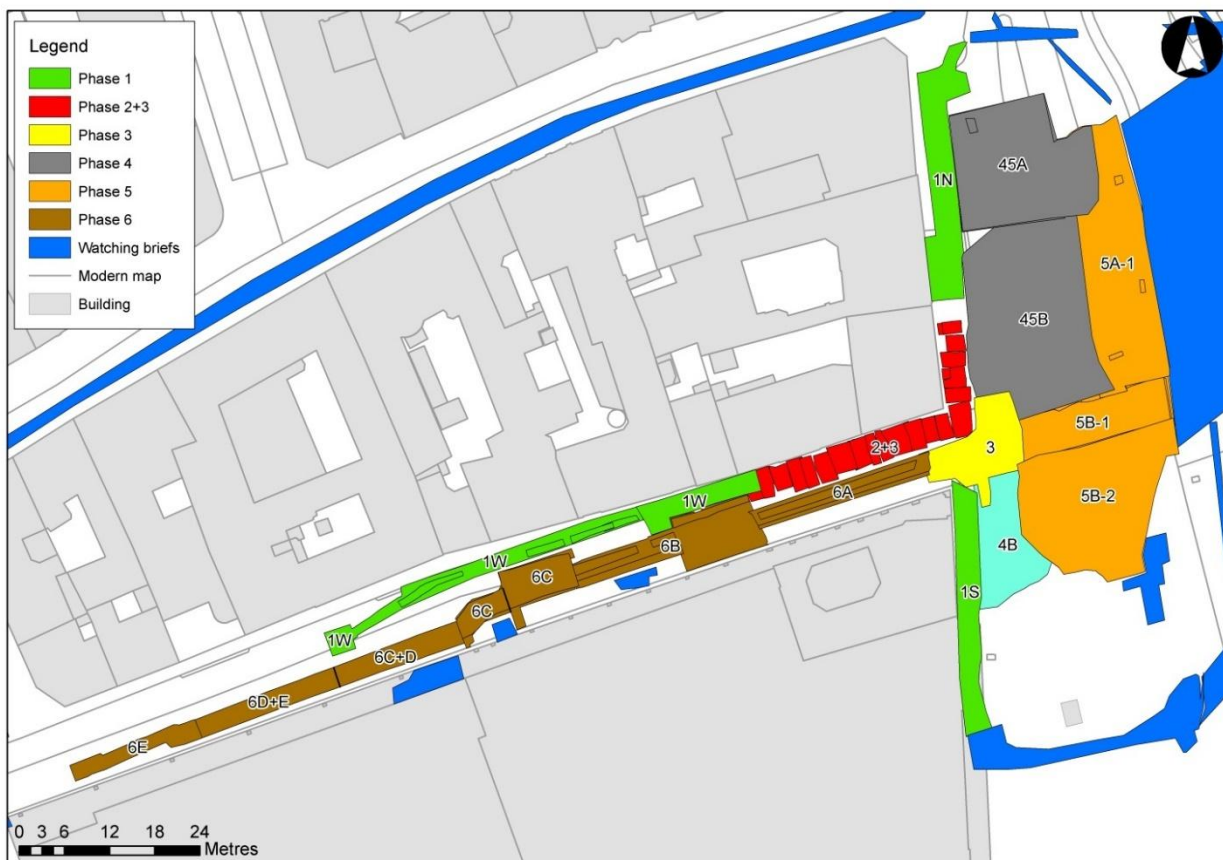


Fig. 4. Kongens Nytorv. The areas of excavation – type 1 and 2 areas.

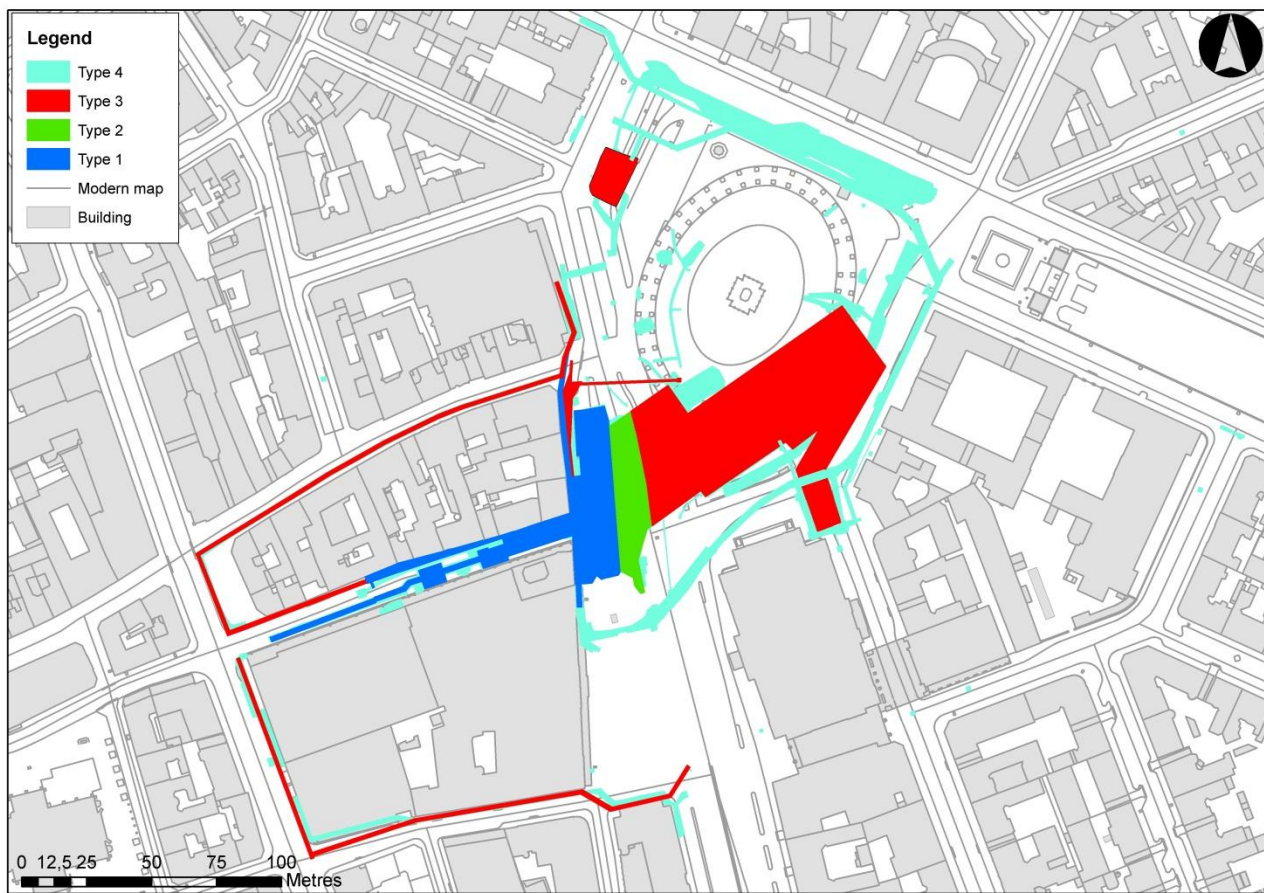


Fig. 5. Watching briefs were undertaken at Kongens Nytorv including service realignments around the square, Guide Wall phases and the excavation of the Station Box. They were all type 3 and 4 areas.

2.4 Dates

Due to planning, logistics, etc. the outline of the phases and start dates were changed several times during the project (Tab. 1). These are the dates that were the actual work phases which involved the Museum of Copenhagen.

Phase (area)	Start date	End date
1N	October 25 th 2010	August 3 th 2011
1S	October 29 th 2010	November 17 th 2010
1W	October 6 th 2010	November 8 th 2011
2+3	April 4 th 2010	July 26 th 2010
3	September 27 th 2010	October 11 th 2010
4B	June 29 th 2011	August 10 th 2011
45A	November 22 nd 2010	March 1 st 2011
45B	April 8 th 2011	August 1 st 2011
5A-1	May 7 th 2010	October 20 th 2010
5B-1	February 3 rd 2011	March 6 th 2011
5B-2	March 7 th 2011	May 2 nd 2011
6A-E	June 30 th 2010	August 30 th 2011

Tab. 1. Timetable for archaeological excavations in the type 1 and type 2 areas mainly based on information in IntraSiS.

Service alignments were done mainly in 2010 but continued all the way through the project, different watching briefs were carried out on and off in connection with minor works outside the excavation areas. Also during the archaeological work in 2012, 2013 and 2014 when the Station Box was dug – see below, the archaeological work was based on watching brief work (Tab. 2).

Phases (areas)	Start date	End date
Service alignments/Minor works/Extra works	2009	2016
Station Box 1	May 24 th 2013	June 28 th 2013
Station Box 2	August 19 th 2013	October 21 st 2013
Station Box 3	September 12 th 2014	November 1 st 2014
Bitrappel and Ventilation Shaft	November 3 rd 2016	December 16 th 2016

Tab. 2. Time table for archaeological excavations in the type 3 and type 4 areas.

2.5 Site facilities

Field season 2010–2011 Museum of Copenhagen shared establishment with the contractor NCC. At the most a total of 11 cabins were set up specifically for the archaeological staff. The archaeologists had one tool storage container and one storage container for finds and samples. Together with NCC, the museum also had one container containing first aid material. In the office there was equipment for 12 people to work at the same time (Fig. 6). Eight of these spaces were used on a rotation based system by the excavating archaeologists. The remaining computers were used by the Excavation Leader, Field Leaders and the IT and stratigraphy/contextual grouping responsible person. The office included stations for storing and charging digital equipment, and all relevant documentation material required. One of the cabins was used for finds storage. A first registration of the finds and samples was done on site where these were sorted and packed before being brought in to the museum for further registration.



Fig. 6. Field office work at Kongens Nytorv 2011. Some contexts sheets are more fun than others... Photo: Museum of Copenhagen.

Field season 2012–2016 Museum of Copenhagen shared establishment with the contractor CMT and CG Jensen. This included 3 cabins at the most. A tool shed was acquired by the Metro Company.

2.5.1 Excavation facilities and equipment

During the excavation of subarea phase 45B (the gate building), a tent was built over the site due to weather conditions. Also a portable heating system was provided to prevent frost together with winter mats. Light was installed in the tent as well.

General heavy equipment and staff were provided by contractors and included excavators in different sizes between one ton and up to 14 tons. Two Trimble Total Stations S6s were used for surveying and digital cameras were used for in situ photos at the excavation.

Equipment available included all relevant digging equipment, barrows, shovels, trowels, mattocks etc., as well as total stations, four cameras, one metal detector and all relevant sized plastic finds and sample bags and boxes. Drawing equipment was also used in certain situations, though archaeological features were mainly surveyed using the total station. Standard archaeological tools were employed on site; with hand tools including smaller trowels and brushes for delicate excavation. Safety clothing and gloves were used for everyday fieldwork. When dealing with contaminated soil the personnel used extra safety equipment.

2.5.2 Excavation in numbers

Investigated area (m²)	6 700 m ²
Investigated volume based on an estimated depth of c. 2.0 m (m³)	13 400 m ³
Coordination system	DKTM zone 3
X-coordinate	1173000
Y-coordinate	652500
Height system	DVR 90
Metres above sea level	3.0-4.3

2.6 Contractors and consultants

The following is a list of contractors and internal and external consultants for natural science, on site advice, finds and finds reports.

2.6.1 Natural science

A series of specialists were involved in the project and in the post-excavation analyses of various material types. Their work was coordinated by responsible excavation curator, Hoda El-Sharnouby 2010–2014 and in 2014–2016 by Field Leader Morten Steineke.

Samples were extracted by archaeologists or (very occasionally) consultants on site and further sampling was undertaken in the laboratories by consultants. For environmental remains (macrofossils) the on site advice was received during excavation from Mette Marie Hald, National Museum of Denmark. The samples were ultimately examined in external laboratories by consultants within the Public Procurement, and sub-sampled as necessary.

- Archaeobotanical Report by Håkan Ranheden, National Historical Museums, Stockholm.

- Osteological Report by Inge Bødker Enghoff and Betina Magnussen, Natural History Museum of Denmark. University of Copenhagen.
- Dendrochronology Report by Hans Linderson, Department of Quaternary Geology, Lund University. Reports have been compiled by Morten Steineke.
- Species and old-wood effect Report by Hans Linderson, Department of Quaternary Geology, Lund University.
- Metallurgical Analysis Report by Arne Jouttijärvi, Heimdal-archaeometry. Virum.
- Analysis of kalot slags by Michelle Taube, The National Museum of Denmark.
- Ceramics Report by Torbjörn Brorsson, Kontoret för Keramiska Studier. Landskrona.
- ICP Analysis Report by Torbjörn Brorsson, Kontoret för Keramiska Studier. Landskrona
- Clay analysis of clay lined pits by Torbjörn Brorsson, Kontoret för Keramiska Studier. Landskrona.
- Chemical analysis of clay lined pits by Jens Glastrup, The National Museum of Denmark.
- Biostratigraphic dating and provenance analysis of limestones by Jan Audun Rasmussen. Natural History Museum of Denmark. University of Copenhagen.
- Mortar analysis by Vibeke Rask. The National Museum of Denmark.
- Limestone lion head analysis by Vibeke Rask. The National Museum of Denmark.
- Limestone and stoneworking marks by Anders Reisernt, Malmö Museer. The report has been compiled by Morten Steineke.
- Radiocarbon dating. Reports by Raimund Muscheler and Mats Rundgren. Department of Earth and Ecosystem Sciences. Radiocarbon Dating Laboratory. Lunds University. Lund.
- Radiocarbon dating. Report by Dr. Andrzej Z. Rakowski Leibniz. Labor für Altersbestimmung und Isotopenforschung. Christian-Albrechts-Universität. Kiel.
- Copper holder Report by Michelle Taube. The National Museum of Denmark.

2.6.2 Finds

X-ray and conservation work was conducted by Bevaring og Naturvidenskab, National Museum of Denmark.

2.6.3 Finds reports

- Curator Rikke Kristensen: Post medieval ceramics, stove tiles and wall tiles.
- PhD-student Jesper Langkilde and archaeologist Mikkel Siebken: Medieval ceramics.
- PhD-student Vivi Lena Andersen: Leather.
- Archaeologist Charlotte Rimstad: Textiles and ropes.
- Conservator Julie Kofod Hansen: Appendix to textiles report.
- Professor of Historical Archaeology Georg Haggrén: Glass.
- Materials Scientist Arne Jouttijärvi: Slag and smithy waste.
- Archaeologist Claes Hadevik: Household materials, textile production tools, tools, security, trade, building materials, personal items and unidentified objects.
- Curator Karsten Skjold Petersen and Claes Hadevik: Arms and armour.
- Curator Michael Märcher: Coins.
- Doctor Steven P. Ashby and Claes Hadevik: Combs.
- Finds coordinator, Archaeologist: Mia Toftdal: Toys and games, writing tools and knives.
- Field Leader and Excavation Leader (2015–2016) Ed Lyne: Horse equipment.
- Archaeologist Hanne Marie Myrhøj: Ships and fishing equipment.
- Archaeologist Niels Henrik Andreasen: Flint.
- Archaeologist John Howorth: Other organic material.
- Archaeologist Mie Pedersen: Clay pipes.
- Editor Mogens Vedsø: Architectual Elements.

2.6.4 Other reports

- Woodworking Report No 1 and No 2 by Karl-Magnus Melin, Knadriks Kulturbygg AB. Kristianstad.
- Analysis of toy horse by Mads Chr. Christensen. National Museum of Denmark.
- Analysis of content of ointment jar from Gothergade by Jens Glastrup and Mads Chr. Christensen. National Museum of Denmark.
- Food remains on pottery by Jens Glastrup and Mads Chr. Christensen. National Museum of Denmark.

3 Regional geology and topography

In this sub-chapter an outline will be given of the geological and topographical background information relevant for the Kongens Nytorv area. This will include a discussion about the general ideas that exist regarding Copenhagen's topography in the past, as well as information regarding what the recent excavation has revealed of the topography locally.

3.1 Natural geology

Copenhagen is situated on ground moraine gently undulating from 0 to 30 metres above sea-level (DVD90). To the north the region is hilly and partially wooded with several large dead-ice lakes. Late-glacial gravel and sand outwash deposits cover the hilltops to the north. To the south the region is dominated by a low open clay-till plain called Heden. Here the region is generally flatter with fewer moraine ridges, Valby Bakke being a notable exception (Kjersgaard 1980:14).

Geotechnical surveys around Kongens Nytorv have recorded the stratigraphy to a depth of 56 m. Danien chalk and bryozoan limestone form the base of the sequence up to a depth of about 13 m. This is overlain by about 10 m of alternating layers of clay till and well sorted coarse outwash sand. The post-glacial deposits are comprised of marine silt and/or sand overlain by detritus "gyttje" and/or humified peat. In some sequences it is unclear whether the silt and fine sand layers originated during the Littorina Transgressions or as Late-glacial Diluvium (Crone & Koch 1965:3; Bahnsen 1973b:2-3; Jeppesen 1982; Geoteknisk Institut 1993; Kristiansen 1998:41; 1999a; Moltzen og Steen Henriksen 1998; Jacobsen 2010; Zander & El-Sharnouby 2011).

3.2 Topography

The landscape around Copenhagen has risen since the last Ice Age leaving the area as flat and low lying moraine with scattered hills. In the Middle Ages the area consisted of a natural coastal bay sheltered by the island of Amager and the islets of Slotsholmen and Bremerholm.

The Littorina Sea existed around 7500–4000 BP and included as many as four transgression and regression cycles producing four relative stationary shorelines during high-stands in the Late-Atlantic and Early-Sub-boreal periods. The determination of the shoreline displacement curve and the Littorina Transgressions are based on dated material from prehistoric settlements and graves, stray finds of flint tools together with pollen analysis, diatom analysis and radiocarbon dating of material within and beneath the Littorina deposits. However, there is still some uncertainty about the isostatic uplift and the eustatic ocean fluctuations. The maximum high-stand during the late-Atlantic Transgression at 4300 BC in the Copenhagen area has been estimated to lie between DVD90 kote +3.2 and +4.1 m (cf. Troels-Smith 1939; Digerfeldt 1975; Christensen 1981; 1995; Jacobsen 1982).

During this transgression maximum, Copenhagen was divided by a narrow strait from Øresund that extended through the "Lake Valley" formed in the present location of Sortedamssøen, Peblingesøen and Skt. Jørgens' defensive reservoirs. This strait connected to Kalvebod Strand near the present location of Vesterbro Torv in the south and near the present position of Frihavnen to the north. The paleo shoreline lie approximately where Kronprinsessegade is today. Refshaleholmen, Plantholm (Mågeøen), Bremerholm, Strandholm (Slotsholmen), Skarnholmen and all other islets between Zealand and Amager were all covered by water (Christensen 1963:2-3).

After the Littorina period the sea retreated gradually to the coastline we know from historical times. According to estimations made by geologists, the shoreline around 1000 AD is believed to have been at kote +2.0 to +2.5 m with a course just east of the Royal Theatre, northeast of Charlottenborg and through the Amalienborg area (Fig. 7). It can not be excluded that the shoreline may have stretched to the north of Vingårdsstræde near Lille Kongensgade (cf. Rosenkjær 1906; Crone & Koch 1965:2; Hartmann & Hartmann 1988:6; Fabricius 1999:Fig. 33b, App. 4, 266), though

as seen on Fig. 7 this suggestion is uncertain. It must be pointed out that shallow marshy areas with low relief coast, such as Copenhagen, were frequently flooded. These floods produced a variable shoreline.

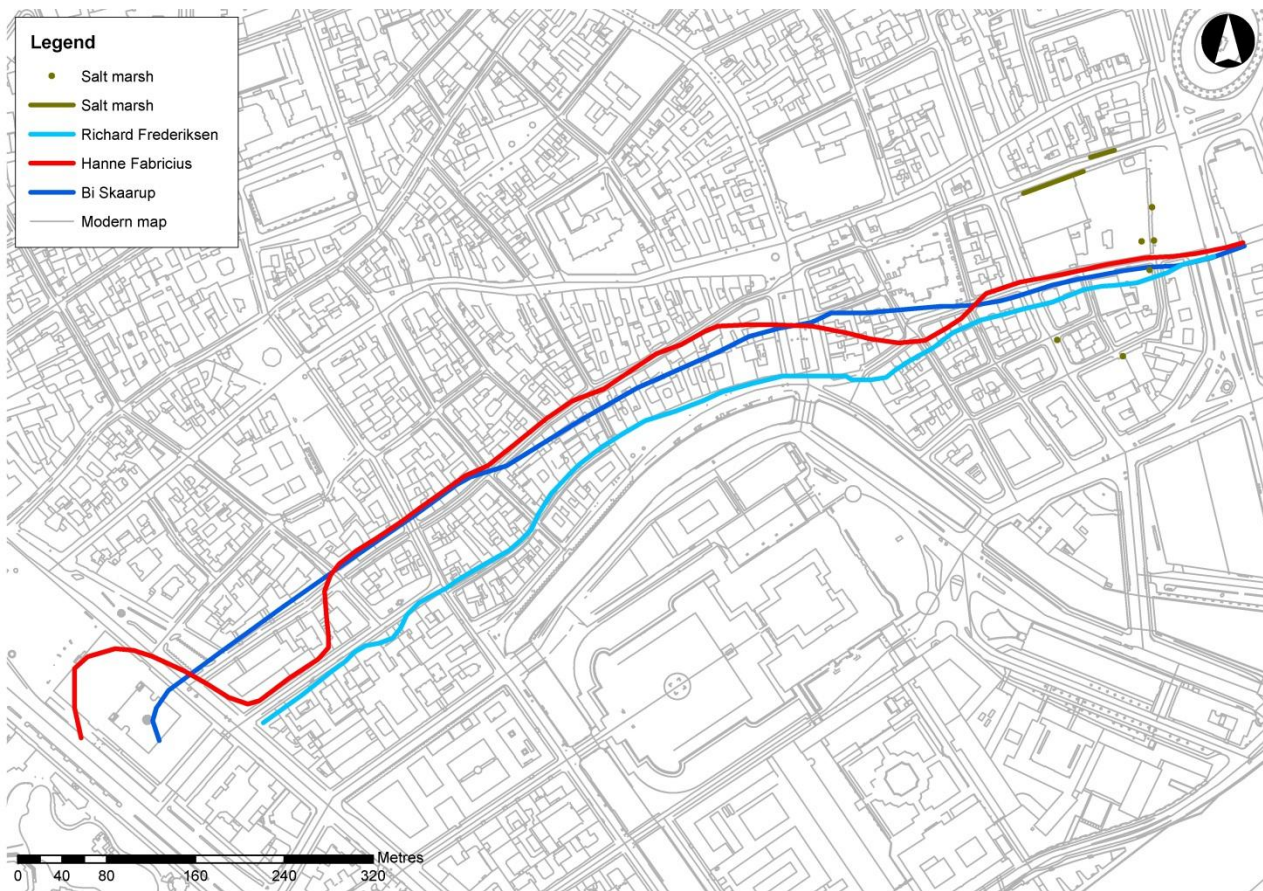


Fig. 7. Estimated shoreline around 1000 AD and previous geological and archaeological observations of peat layers (former salt marshes) around Kongens Nytorv before the excavations in 2010.

The shoreline of the Early Middle Ages has not been completely identified as hardly any excavations have revealed information on this matter. The early 13th century shoreline has been ascertained from Løngangsstræde in the west end to Højbro Plads in the east (Skaarup 1999:81). It is generally thought that marshy, shallow areas existed in many parts of Copenhagen in these centuries, and that these may have flooded frequently, resulting in a fluctuating shoreline.

Analyses of pollen and macrofossil samples suggest that the Copenhagen area during the 11th century was dominated by meadows with reed swamps and wet meadows. This environment in the upper coastal intertidal zone between land and salt water or brackish water produced peat layers of varying thickness from 0.2 m to over 1.0 m, depending on local depressions, stream courses etc. (cf. Rosenkjær 1906:18 et seq.; Ramsing 1910; Christensen 1963:3 et seq.). Earlier Metro investigations proved traces of this wet meadow vegetation survived in the southern part of the excavation area, which indicated that the land had been flooded sometime during part of the 13th century (Kristiansen 1998:41). Pollen and macrofossil analysis has also shown that this natural, dense reed swamp changed over time to pasture land (Rosenkjær 1906; Skaarup 1999:74 et seq.; Moltsen og Steen Henriksen 1998; Boldsen 1996; 1998; El-Sharnouby & Høst-Madsen 2008:148).

Copenhagen's original topography has changed much during the last 1000 years. Refuse from households, livestock and industrial production has been dumped to fill and grade the coastal terrain (Fig. 8). Debris from large fires in 1728,

1795 and 1807, produced when the remaining ruins were demolished to provide room for new buildings, has contributed to the construction of thick cultural layers. The city grew from a small medieval settlement on the Kalveboden strait, sheltered by the island of Amager and former Slotsholmen and Bremerholm islets. Also, islets and small bays have been capped and filled, and the town has broadened far beyond the original shoreline (Rosenkjær 1906:18; Ramsing 1940, bd. I; Christophersen 1985:69; El-Sharnouby & Høst-Madsen 2008:147; Zander & El-Sharnouby 2011).

Dybet was a former strait that separated Bremerholm to the south from Zealand and that until the mid 16th century was the access to Copenhagen's harbour at Gammel Strand. This strait has been demonstrated through post-glacial marine sediments south of Kongens Nytorv where the sedimentation forms a cylindrical and snowshoe shaped east-west orientated pool comprehensive with Holmens Kanal No. 5 and No. 7, Tordenskjoldsgade Nos. 10, 12 and 14 and part of the Royal Theatre. The pool's deepest part was at a line between Tordenskjoldsgade No. 10 and No. 12 and Holmens Kanal No. 5 and No. 7. In the deepest part the post-glacial deposits reached kote c. -3.0 m. This infilling of Dybet started during the Littorina Transgression and ended in the 17th century when discarded ships were scuttled here and large volumes of urban refuse dumped in to fill the strait (Crone & Koch 1965:2; Jeppesen 1982:5-6).

The present-day area of Kongens Nytorv is situated about 4.0 m above sea level and the original topography of the area in the Middle Ages and following centuries is not known for certain, though it seems likely that sea level would not have changed very much in that time. Recent investigations have indicated that the thickness of the paving and cultural layers is between 3-4 m, at the most recent 17th century moat the layers are between 5 to 6 m thick (Kongens Nytorv borings 2012; De Nationale Geologiske Undersøgelser for Danmark og Grønland 2012). Some information has been revealed during the excavation that suggests that the ground level at Kongens Nytorv was only a little lower in the Middle Ages than today, being c. 2.0-2.5 m lower than present day street-level depending on type of feature, etc. It would also appear, based on the original topsoil seen in some areas, that this, contrary to earlier accounts (cf. El-Sharnouby & Høst Madsen 2008), was not a particularly wet or marshy area, but instead consisted of areas of grassland over a thin layer of topsoil, which in turn rested on post-glacial sediments (see further discussion Chapter 10; Phase 1 Moraine, salt marshes and other Quaternary observations).



Fig. 8. The thicknesses of cultural layers around Kongens Nytorv based on drilling results at the establishment of the Metro in the beginning of the 1990s and for the Metro Cityringen (cf. Rambøll. Unknown year; GEUS database). Note the high values in the area of the estimated 17th century moat and Nyhavn's previous coverage.

4 The Metro excavation 1996-1998

During the first phase of the Metro development in 1996–1998 the parking east of Magasin towards Holmens Kanal (c. 1500 m²) was excavated including large parts of the fortifications and early settlement (Kristiansen 1998; 1999a-c). The dominant feature was the city's fortification, but it also uncovered a number of different features that can be linked to the settlement in the area before and after the fortification (Fig. 9). It was possible to divide the constructions and structures into five main phases.



Fig. 9. Overview of Metro excavation in 1996–1998, facing west. Photo: Museum of Copenhagen.

4.1 Before the fortification 1020-1200 AD

Except for a C14-dating of Hemp-agrimony (*Eupatorium cannabinum*) from a natural deposit dated to 7140±70 BP and 6211–5882 BC (cal 2 σ) (AAR-3739)², the earliest activities were represented by several north-south orientated boundary ditches in the northernmost and western parts of the excavation area and about 10 m east of Magasin's department store facade (Kristiansen 1998:41 et seq.; 1999a).

The ditches, which could be divided into four or five sub-phases, probably formed boundaries between a property and the adjacent salt marshes (see Fig. 51; Chapter 12.2.1). Oldest were three ditches (named ACL, ABD = OU? and BND) which replaced each other. After use the latest ditch was followed by an at least 11.5 m long and 0.4-0.5 m high

² The following calibrated radiocarbon dates are presented using the 2-sigma values which account for 95.4% of the probability of the date falling within that particular range. All dating from previous excavations has been calibrated using OxCal version 4.2.

wicker fence and a feature interpreted as some form of boundary bank to the west, at least 0.6 m high and maximum at 5.0 m wide. The stratigraphical relations between these two features were unclear. In the middle and southern parts of the excavation area only one single ditch was documented (BLS) (Kristiansen 1998:41-62; 1999a:101-108).

The ditches were orientated as good as parallel with the current plot boundary at Magasin's eastern facade with a varied length between 6.2-29.5 m, width 0.8-5.4 m and a depth between 0.5-1.2 m, the latter based on the bottom measurements. The sequences of the ditches profiles changed, being slightly rounded to the north and wide to flat-bottomed with gently sloping sides to the south. South of the oldest ditch (ACL), and the extension of this, a series of elongated pits were documented without further determination (see Fig. 51; Chapter 12.2.1).

The fill in the ditches consisted of decomposed buried soil (salt marshes) and fine washed blue to grey clay, not naturally found in the local moraine and where the sedimentation must have happened incrementally. The mud deposition showed that the ditches had been used over several years and that they may have been regularly cleaned. The occurrence of silt and stagnant brackish water also showed that the ditches had not been in connection with the sea, but flooded at regular intervals.

The fence consisted of horizontal wicker. Some of the vertical poles were still in place, but the majority had been drawn up and the fence tipped over to the east (Fig. 10).



Fig. 10. Excavating north-south running wicker fence. Photo: Museum of Copenhagen.

A total of nine radiocarbon datings were completed in connection with the boundary ditches (Kristiansen 1998; 1999a:113 and 114). Seed (*species unknown*) from fill in the oldest ditch (ACL) was C14-dated to 937±25 BP or 1029–1158 AD (cal 2 σ) (KIA 6107). Seed from one of the elongated pits (EFA) was C14-dated to 886±24 BP or 1045–1217 AD (cal 2 σ) (KIA, without lab. number) and “gyttje” from the bottom of ditch (CDL = OU) was C14-dated to 1335±45 BP or 620–776 AD (cal 2 σ) (AAR-3740). Twigs and a wood artifact from the next phase (ditch OU) was C14-dated to 845±40

BP or 1046–1270 AD (cal 2 σ) (K-6662) (Kristiansen 1998:65 and 90; 1999a:115), but the date is highly likely to be second half of the 12th century/early 13th century, partly due to CBM in a structure stratigraphically older than the ditch and the reservoir effect on the “gyttje” sample (cf. Kristiansen 1999a:158; cf. Rud og Heinemeier 1998a).

Traces of flax retting and animal bone in ditch (ABD) could be dated to late 12th century/early 13th century. A bundle of flax (*Linum usitatissimum*) from the same ditch was C14-dated to 915±50 BP or 1024–1215 AD (cal 2 σ) (AAR-3738) and animal bones (*Ovis aries*) to 985±40 BP or 989–1155 AD (cal 2 σ) (K-6807). Collected ceramics were dated to 1100–1500 AD, 1225–1350 AD, 1315–1350 AD and as late as 1300–1700 AD and 1350–1800 AD. A later contamination could be the case since several of the ditch fills consisted of red bricks, but without further description or information. A branch and wood from the wicker fence (/DSY) (*species unknown*) were C14-dated to 1185±45 BP or 694–971 AD (cal 2 σ) and 772±39 BP or 1185–1288 AD (cal 2 σ) (K-6816 and K-6862), where the latter dating is most likely. Twigs and wood chips (*Fraxinus*, *Juniperus*, *Fagus Quercus*, *Corylus* and *unknown*) in a layer of seaweed (TB) were C14-dated to 930±50 BP or 1021–1212 AD (cal 2 σ) (K-6806) (Kristiansen 1998:65 and C14-datings from KBM 1410. 2012).

The boundary ditches and the wicker fence were disused in the last decades of the 13th century, and then covered by salt marshes (/EFG) and a faeces layer (ACE) from humans and animals, where wood (*unknown species and old-wood effect*) and twigs were C14-dated to 550±35 BP or 1308–1436 AD (cal 2 σ) (K-6808), 685±45 BP or 1256–1398 AD (cal 2 σ) (K-6863), 765±45 BP or 1173–1295 AD (cal 2 σ) (K-6864) and 830±30 BP or 1160–1265 AD (cal 2 σ) (AAR-4247). A handle made of deer antler with animal ornamentation recovered from this rubbish layer could be dated to the 11th century. After this the area was covered by the facilities of the city's fortification (Kristiansen 1998:11, 43 et seq., 65, 86; 1999a:101 et seq.; 1999b:158 and 159; cf. Rud og Heinemeier 1998b).

Due to the excavation's orientation, the supposed settlement in the west was affected only to a lesser degree by the survey. Some layers and observations in the NW part could be interpreted as remains of buildings consisting of floor layers and imprints of a north-south orientated foundation belonging to a building dated to the 1200–1300s, a north-south orientated base plate, a fireplace, pits and trenches. Three of these pits were interpreted either as postholes, board- or erosion holes (?) (cf. Kristiansen 1998:48; 1999a:109 and 110). Activity layers registered against Magasin's facade in the same way as the levelling and rubbish layers over the boundary ditches indicated different types of activities from the 11th century, perhaps as early as the first half of the century, though this suggestion is based on only one C14-dating (cf. Kristiansen 1998:11) and the Viking Age handle.

The osteological material was varied, consisting of sheep and lamb (*Ovis aries*), cattle (*Bos taurus*), pigs (*Sus scrofa domestica*), poultry (hens and geese), dog (*Canis lupus familiaris*), cat (*Felis catus*) and horse (*Equus ferus caballus*). Fish was mainly represented by herring (*Clupeidae*), but cod (*Gadus*) and eel (*Anguillidae*) also exist among the bones. In the archaeobotanical material there were traces of the salt marshes, marine material and culture specific plants interpreted as household waste, flax retting, latrine- and stable material (Kristiansen 1999a:108 and 109; Moltsen 1998).

4.2 Medieval fortification 1200-1550 AD

The medieval rampart's oldest range was documented in the western part of the excavation area approximately 10.5-11.0 m east of the current facade of Magasin (see Fig. 73; Chapter 13.2.1). Due to the orientation of the excavation area, the rampart and city wall were predominantly documented using profiles where different and interpreted phases and construction details were compared. Only smaller areas were excavated contextually (cf. Kristiansen 1998:63 et seq.; 1999b).

The High medieval rampart was divided into 14 more or less identical and chronologically contemporary sequences and could be followed for at least 75 metres with a minimum height of 1.7 m, where the top had been dug away by modern truncations. The foot of the structure was recorded from 4.5 to 6.0 m west of the foundation of the city wall,

to the east the distance was 2.6 to 3.6 m to the edge of the moat, which made the width between 7.1-9.6 m (Kristiansen 1998:66 et seq.; Kristiansen 1999b:156, 157, 160 and 162).

During fieldwork the rampart was suggested to consist of a “core rampart” (named /AIT and /DPZ), 2.20 m wide and 0.30-0.35 m high (cf. Kristiansen 1998:66 et seq.), but this suggestion was later reinterpreted as part of the same embankment consisting of /AHB and /DPZ in area 1, /AIT, /AIU and /EEG in area 2 and /AIT, /DCA, /DCB, /DCE and /EEG, /AIT in area 3 and 4. No reliable growth horizons were recorded either archaeologically or through macrofossil analysis and the building material consisted of sub-surface material (moraine) mixed with organic material (peat and topsoil), with the exception of /AIC that to a greater extent consisted of brick rubble (Kristiansen 1998:66 et seq.; Kristiansen 1999b:160). Only a few finds were collected (from layer ACX, /AIC and AYR) consisting of ceramics dated to late 13th century, 13th–15th century and 14th (15th)–17th century (cf. Kristiansen 1998:66, 67 and 73).

The city wall was interpreted to be contemporary with the oldest rampart, and not a later addition. The courses and the rampart layers had been built “step by step”, where the purpose of the rampart had been to stabilize the boulders. No part of the brick wall was preserved. The foundation of this medieval structure could in a more or less fragmented extent be recorded in a large part of the excavation area (see Fig. 92; Chapter 14.2) (Kristiansen 1998:73 et seq.; 1999b:156-158, 161 and 162).

The High medieval rampart layers were placed up against the foundation stones, although some foundation stones were also recorded as dug into the rampart (DAI), which the responsible archaeologist interpreted as a local phenomenon (cf. Kristiansen 1998:75; see also discussions Chapter 13.2.1).

The city wall was preserved as three foundation courses and boulders (named ADE, /BUR?, CRS, DAI, DAL, DDZ, EDI, MC and UZ) consisting of two rows of stones with a width between 1.1-1.7 m and a height of at least 1.4 m. The top of the foundation was not preserved and no mortar was recorded on the stones.

Part of the city wall, consisting of a continuous remnant of a brick wall at least 1.8 x 1.2 m with medieval course (CBB), was documented in the moat together with bricks and limestone ashlars. The remnant was interpreted as part of the parapet. The wall had been 0.42 m thick with unfilled joints. No reused bricks were identified in this part of the brick wall. Three thermoluminescence dates (TL-dates) from mortar connected to the remnant (/BOB) were dated to 1227±60 AD, 1255±60 AD and 1230±60 AD (R-960504, R960505 and R969506) (Kristiansen 1998:65, 77 and 78; 1999b:165 and 176).

Inclusions of smaller 16th century bricks together with medieval bricks (“munkesten”) in the decomposition layers in the Late medieval moat and within the new rampart in the southern part of the excavation area (see Phase 6; Chapter 18), were an indication of repairs and extensions of the wall. The interpretation was also that the city wall mainly had been demolished in connection with Valkendorf’s work on the fortification in the late 1500s (cf. Kristiansen 1998:73 et seq.; 1999b:162-165).

The High and Late medieval moat (CSR) could be followed the entire length of the excavation immediately east of the city wall foundation (Fig. 11) (Kristiansen 1998:82 et seq.; 1999b:156, 168 and 169). This could, however only with certainty be separated from a later post medieval moat phase (FAM) in the moat’s westerly part located under the so-called BOB-rampart (see above). The moat had been cleaned up through the Middle Ages and the edge could from the south to the north be recorded from kote c. +2.6 m – +3.6 m – +3.0 m – +2.6 m from the western extent of the city wall foundation. Based on the height of the /BRE-sequence, the moat had been at least 1.4 m deep (Kristiansen 1998:82 and 83).



Fig. 11. Profile through Late medieval moat, facing SW. Photo: Museum of Copenhagen.

At the base and the western edge of the moat, a layer (/O) consisting of sandy and sterile fill was documented. East of this the sedimentation consisted of different mud layers (“gyttje”) of varying thickness (0.2-0.6 m). It could not be clarified if the erosion and the mud layers were the result of long-term sedimentation or a late stage in the moat’s life. No datable finds were collected. Layer (IK) consisted of clean mud (“gyttje”) without inclusions of peat, which suggests that there had been at least 0.5 m of water in the moat providing a water level at kote 0 or upwards (Kristiansen 1998:83 and 84; 1999b:168 and 169). Archaeobotanical analysis showed that the environment had consisted of brackish, stagnant water. A weak salt effect showed that the mud had been formed before the filling up of Dybet between the coast and Bremerholm in the 1530–1540s (Kristiansen 1998:83 et seq.; 1999b:169).

At the excavation a north-south orientated palisade used as alternative rampart reinforcement at the edge of the moat was documented (/FT) (Fig. 75). This consisted of several pits and postholes in a row at an estimated length of either 42.0 or 64.5 m (Kristiansen 1998:84 and 85.; 1999b:156–158 and 168).

/FT was registered both as stratigraphically younger than (/O, DFA and DFB) and cutting or lying up against (/O, DFC and DFE) (Kristiansen 1998:84 and 85; 1999b:168). Only the lowest parts of the pits (DFA and DPD) were preserved in natural ground (minimum kote +0.6 m), and the pits’ levels had at all places probably been dug away when cleaning the medieval moat. /FT was in the northern 6.0 metres of the excavation area recorded as pits/postholes with pointed bases, whereas the remaining row consisted of wider (up to 0.8 m) pits with round bases. The bottom kote for /FT was between 0 and -0.5 m.

A bigger structure (named /ABH and AHO) was recorded orientated across the rampart and consisting of two to three courses of foundation stones and a 6.7 m long, 1.0 m wide and 1.7 m high double faced wall of edge set courses, coated with lime mortar and with intermediate fill of mortar (AHP and AKT). Mortar from the northern side of /ABH was C14-dated to 655±35 BP or 1276–1396 AD (cal 2 σ) (AAR-3469), bricks from the lower course in /ABH, TL-dated to

1140±70 AD (R-970502) and animal bones (*species unknown*) from the same context C14-dated to 910±45 BP or 1028–1213 AD (cal 2 σ) (AAR-3737) (Kristiansen 1998:85-87; 1999b:156, 157, 169, 170 and 177; cf. Rud og Heinemeier 1998c). The construction could not be stratigraphically related to the rampart and it is unknown if this was contemporary with the medieval fortification or a later structure. The feature was, however interpreted as part of the medieval tower Smørhætten, described in written sources in 1496 and 1523.

Other post-rampart activities in the area consisted of a brick kiln built in several phases (kiln, brick floor, two brick benches, six heating channels and brickwork of so-called “munkesten” preserved in six courses (/BDA)). The sides were remarkably built with lime mortar. The heating room was 6.0 m wide and 3.2 m deep (inside dimensions). In front of the kiln, to the south, a fire pit with charcoal was recorded. The suggestion was that the brick kiln had been used for brick production connected to the construction of the city wall and covered by a later phase of the rampart. TL-dates of bricks in the kiln were dated to 1210±60 AD and 1310±60 AD (R960515 and R-970501). Charcoal (*Fagus silvatica* and unknown with unknown old-wood effect) from the fire pit was C14-dated to 770±50 BP or 1161–1297 AD (cal 2 σ) (K-6815) (Kristiansen 1998:65 and 93-95; 1999b:156, 157, 159, 169 and 176 and C14-datings from KBM 1410. 2012).

The rampart street (AGP) covered the foot of interpreted rampart phase (/AIU) and consisted of a regular and compact layer of pebbles with inclusions of animal bones. Several wheel ruts were recorded. The street had been covered by a later rampart sequence of unknown date. Animal bones (*species unknown*) collected from AGP were C14-dated to 835±45 BP or 1047–1275 AD (cal 2 σ) (K-6661) (Kristiansen 1998:65, 90 and 91; 1999b:156–158, 162, 163 and 175 and C14-datings from KBM 1410. 2012).

Structure AOE and ALA consisted of a north-south orientated flat based wood reinforced ditch cut into rampart layer /DCE and under rampart layer /AIC. The ditch had a length of 10.5 m, but could also have been as long as 60.0 m. The total width was 5.8 m. The fill consisted of kitchen and stable waste: bones of cattle, domestic pig, sheep/goat (*Capra hircus*) and fish (herring) together with plant remains such as bog myrtle (*Myrica gale*), hops (*Humulus lupulus*) and figs (*Ficus carica*). Dendrochronological analysis dated the wood to winter 1298/1299 AD (NNU-21020019, NNU-21020029 and NNU-21020039) and a repair to c. 1303 AD (NNU-21020049) (Kristiansen 1998:65 and 91-93; 1999b:156, 157, 171 and 177).

4.3 Post medieval fortification 1550–1608 AD

Under the rule of Frederik the 2nd, the fortification underwent a major modernization along its length headed by Christoffer Valkendorf in 1581 (Kristiansen 1998:13, 98 et seq.; 1999c:185 et seq.). The rebuilding of the fortification could be seen as a substantial stone structure consisting of two to three courses immediately east of the foundation of the city wall, although the relationship between this development phase and older features was unclear at several places within the excavation area (Fig. 12).



Fig. 12. Interpreted addition to the fortification in the 1580s conducted under Valkendorf's management consisting of a large foundation of boulders, facing west. Photo: Museum of Copenhagen.

The suggestion of a new city wall was based on the orientation and traces of mortar fringe after a masonry with 0.42 m thickness on the foundation stones (/ACP, CAH, CAL, CAS, CZS, CU, DCI, FBA, /FBB, FBC, FBD and FBE), demolition material and looting ditches, but it is worth mentioning that this interpretation is rather uncertain (cf. Kristiansen 1998:110).

The oldest sequence of the "new" city wall was recorded as courses of foundation stones together with demolition material from the original brick wall. Since there were no traces of the brick wall itself, this was explained by the fact that this could have been standing on higher placed sill courses. Suggestions that the city wall was restored at some time (/FBB) could also be explained by functional differences within the new structure (cf. Kristiansen 1998:108-110 and 115).

The medieval city wall had probably been torn down, whereupon the demolition material of limestone ashlars, rubble (both medieval bricks and smaller 16th century bricks), larger pieces of the city wall (ABN, /CAK and GZ) combined with other materials had been re-used in a new foundation front. The rampart had partially been made of peat (/AIC, /BOB, CF, /DCF and DRF) and made taller and wider, covering at least 1.4 m of the wall base (Kristiansen 1998:108 et seq.; 1999c:188). Over the rampart (/BOB) a straw layer was documented (CPB), interpreted as remains of a growth horizon on the rampart's surface (Kristiansen 1998:107).

A regular paving or work surface recorded in connection with stone structure CU at a length of 16.0 m (DCI) was TL-dated to 1430±60 AD, 1454±60 AD, 1576±60 AD and 1587±60 AD (R-960509 and R-960510). Another related layer (NI) was TL-dated to 1480±60 AD (R-960507) (Kristiansen 1998:65, 100 and 104).

In the new phase the embankment was pushed approximate 4.0 m to 5.5 m beyond the medieval moat (Kristiansen 1998:106). The post medieval moat (FAM) could not be separated from the earlier moat (CSR), but had been approximately 10.0 m wide, where the bottom kote lay between -1,0 to -0,5 m. The depth had not been more than 1.0 m. The sedimentation in the moat (/EFT) consisted of natural “gyttje” deposited in freshwater and swamp peat with vegetation that thrived in low water, the latter at kote +0,4 to +0,6 (DHL, GI and GY), which proves that the connection to the sea at this moment was interrupted. Some of the layers recorded were interpreted as cleanup layers from the moat when still in use (FX, GB, LX, LU and LY) (Kristiansen 1998:112 and 113; 1999c:188-190).

Ditches connected to the foundations suggested a looting of the wall in the early 17th century, but the traces were not clear (AAL, AFI, AOT and BTP) (Kristiansen 1998:98).

4.4 Christian the 4th's fortification c. 1608–1647 AD

The excavation also came to affect the city fortification from the years 1608–1647 AD. A new fortification was constructed around the city, consisting of small bastions and the long intervening stretches of ramparts (curtains). The excavation area included the rampart between the new Østerport and its bastion and the so-called Bastionen ved Iskulen.

The medieval moat was filled up, while the rest of the medieval fortifications were incorporated in the new defences. All of the work on this part of Copenhagen's fortifications was completed around 1617 AD (Kristiansen 1998:13, 82, 116 et seq.; 1999c:190 et seq.).

Based on the written sources (*Rentemesterregnskaberne*) the rampart at Østervold was approximately 4.4 m high with a 1.9 m high parapet, 12.7 m wide (besides parapet and berm) including an outer “bench”. Only a few layers could be interpreted as remains of the curtain (/EEP, EL and /FAG). A row of stone imprints was suggested as the western part of the curtain foundation (/AZI) (Kristiansen 1998:117-122; 1999c:193).

The moat was believed to have been about 39.2 metres wide and about 3.2 metres deep. A new and navigable moat or canal was built east of the fortification where the street Holmens Kanal is placed today. At the excavation a 40 metre long bulwark of boulders of at least three courses, orientated in a north-south direction was recorded (BIU, DBI, DKA, DKB and KU), possibly a western reinforcement or bulwark of the new harbour (Kristiansen 1998:125 and 126; 1999c:194 and 195).

Through the curtain there was a gate, the so-called Vandporten (Fig. 13), which served as a transportation route into the city for the goods that were unloaded from the ships in Holmens Kanal (AAP, /DDO, /DDP, EB, EI, LE and YG).



Fig. 13. Vandporten and later sewer pipe from above. Photo: Museum of Copenhagen.

The gate had been 11.6 m long with a west facade 0.8 m thick. The gate room was 5.8 m wide, the sidewalls 1.9 m wide with the foundations slightly wider. The preserved height varied from 1.78 m to 2.75 m of an estimated total height of 6.0 m. The foundation of the facade was 13.0 m long and stretched respectively 1.8 m and 1.5 m outside the rest of the structure's dimensions. In relation to the gate room's width the facade was twice as wide based on the total length of the structure. The foundation was partially made of reused medieval bricks and this had survived up to street level. TL-dating of reused bricks from the gate's facade gave the dates 1200±60 AD, 1170±60 AD and 1270±60 AD (R-960501, R-960502 and R-960503). Placed between the sidewalls there was a 14.8 m long brick sewer with walled barrel vault built with small yellow bricks (LI) and an associated wooden water pipe (ASB). This sewer was somewhat misleading, TL-dated to 1400±60 AD (R-960508). In the gate room's north-eastern part traces of the paving was recorded (ED) placed c. 0.70 m under the current street level (Kristiansen 1998:124, 130, 131 and 136; 1999c:176, 194 and 195).

4.5 Other activities and buildings behind the fortification line

Building remains that may be identified in the written records mentioning buildings behind Christian the 4th's rampart were also identified. BFD consisted of the remains of a brick chimney C14-dated to 805±40 BP or 1163–1278 AD (cal 2 σ) (AAR-4248) (*charcoal with unknown species and old-wood effect*). Beside this, a foundation of boulders (/DSA), looting ditches connected to the former city wall (AAL, AFI, AOT and BTP), ditches (DDS, DDT, DDU and DDX) and pits (BCZ, CDE, CYO, DAR and KC) with unknown function, rows of sill stones and floor layers (/EFE) and wooden water pipes (ASB) were recorded (Kristiansen 1998:12, 127 et seq.; 1999c:162, 197 and 198; Rud og Heinemeier 1998b).

Remnants of the demolition of the fortification consisted of looting ditches (EG), 20 wooden water pipes and one pipeline trench (DRC) mainly orientated in a north-south direction and where two of the pipes were dendrochronologically dated to 1618–1619 AD and 1749–1750 AD (Kristiansen 1998:13 and 137 et seq.).

The existing moat had gradually been filled up with different material (ATA, CL, /DDR, /DEY, DFF, /EEO, GD, GE, GK, GL, HZ, PL, ZH, ZI and ZK).

5 Other archaeological observations around Kongens Nytorv

Previous archaeological observations in the area around Kongens Nytorv are presented by street (Fig. 14). Observations within plots are marked with the current matrikel number in Kortbog 1:4000 – København & Fredriksberg 2002.

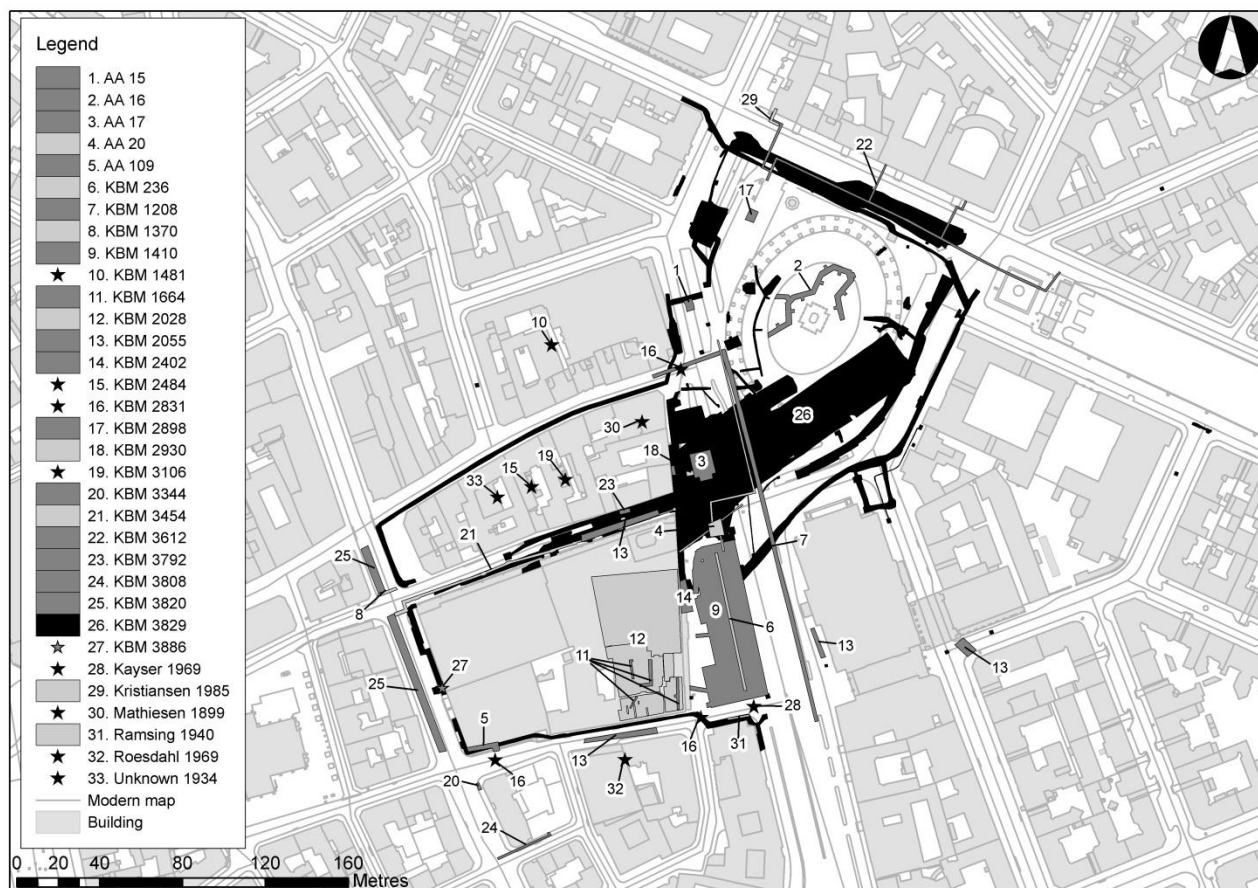


Fig. 14. Previous archaeological observations and excavations around Kongens Nytorv based on Københavns Museum's file numbers and other archival material.

Asylgade No. 10 (Matr. No. 435): Boulders and finely carved sandstones dated to the 17th and 18th century together with fragments and frames of sandstone; a large royal crown, lion's paws, stove plate with Frederik 3rd's monogram, Copenhagen's coat of arms, a stone with chain of the Elephant Order and the chain of the Grand Cross, three keystones, where one had Christian 4th's abbreviated motto in Latin (R. F. P.), a tomb stone (1510), a pillar chapter (1580) and several building decorations from gateways and windows. Probably reused as foundation material to stabilize the area (Advis 1968; Archival material, Asylgade 4, AA40; Archival material, Asylgade ved Laksegade, AA41).

Bremerholm Nos. 2-18: Building structures consisting of masonry of medieval bricks, a separation wall, a base plate, foundation stones and possibly a cellar belonging to the former Skipperbodene from the 17th century together with four wooden pipes. The Zealand side of Dybet, i.e. the narrow strait that divided Bremerholm from Zealand to the beginning of the 16th century, was recorded as an easterly directed slope with 5 metres thick levelling layers (Harholm Lønsvkov 2011:22 et seq.).

Bremerholm No. 4 (Matr. No. 93): Cultural layers and wells with finds from the 16th and 17th century (Martens 1970).

Bremerholm No. 18: Square well with corner posts, wooden frame and a pump pipe dated to the 18th century (Kayser 1960).

Bremerholm Nos. 18-28: Exact location unknown. Cultural layers consisting of 16th century finds, a post medieval stone foundation and part of a masonry structure of six courses of red and yellow bricks with north-south orientation (Structure 1). Parts of masonry (Structure 4 and 9), a timber structure dendrochronologically dated to 1457–1590 AD (Structure 5; see also Bremerholm No. 26 below), a timber structure (Structure 6) and piles (Structures 7, 8 and 10) were also documented (Archival material, KBM 2246).

Bremerholm No. 24: Large faeces and rubbish layers outside No. 24 containing 17th century finds (Bork-Pedersen 2010:9).

Bremerholm No. 26: A plank and pile construction interpreted as bulwark and dendrochronologically dated to 1525–1526 AD together with a levelling layer dated to the 16th century. According to the author two wooden constructions of reused half-timber were recorded in the same area at an earlier excavation in 2001, probably from the same structure and dendrochronologically dated to 1457–1536/1537 AD. Another wooden structure with unknown function approximately 0.5 m further south has been dendrochronologically dated to 1583 respective 1586 AD (Bork-Pedersen 2010:9 et seq.).

Bremerholm No. 28. Wooden water pipe of pine (Bork-Pedersen 2010:12). Collected finds dated to c. 1200–1730 AD (Søndergaard Kristensen 2010).

Bremerholm No. 29: In conjunction with diggings different types of leather material were collected, consisting of a narrow leather belt dated to late 15th century and Late medieval shoes (Archival material, Bremerholm 29, AA48; Archival material, Bremerholm ved Nr. 29, AA49).

Bremerholm (Magasin's Torv): Information about a brick wall of "munkesten" (medieval?) and a clay and brick floor (Martens 1995).

Bremerholm at Lille Kongensgade: Without street number. At investigations in Bremerholm at the corner of Magasin, traces of buildings after the fire in 1795 were recorded along with street cobbles from the 1600s together with a wooden pipeline (Jark Jensen 2007:10). At a smaller excavation in the sidewalk outside Magasin nothing of archaeological interest was observed (Summerfield 2010).

Bremerholm at the corner with Vingårdstræde: Without street number. Peat layer, cultural layers, an arch from the 18th century over a Late medieval wooden well, stone foundations and part of a brick wall (Linvald 1955; Kayser 1966; P. P. 1983a).

Bremerholm at Østergade: Without street number. Investigation of a masonry foundation from a former building parallel with Østergade approximately 0.5 m from the existing buildings (Harholm Lønsvkov 2011:20 et seq.).

Gothersgade No. 5 (Matr. No. 351): Stone foundations, wooden posts and levelling layers with post medieval finds investigated in the basement (Poulsen 1998).

Gothersgade No. 8 (Matr. No. 25): Wall foundation, pavement, wooden pipe of pine together with 18th century finds. In conjunction with digging for pillar outside the facade organic material interpreted as rotten seaweed was recorded (Gothersgade 8, K 1952; P. P. 1983b).

Gothersgade No. 14 (Matr. No. 644): Human bones from a plague cemetery and possible tomb stone dated to 1604 AD (Danneborg 1893).

Gothersgade No. 26 (Matr. Nr. 17): Part of former fortification consisting of Christian 4th moat at Skt. Klaras Bastion together with one or two building remains dated from 1660 AD and onwards together with a wooden water pipe (Simonsen 1998).

Heibergsgade: Without street number. Skeletal remains recorded by digging in the street (Berlingske Tidende 1985).

Holmens Kanal No. 2: Immediately NW of Danske Bank at the corner of Vingårdstræde two courses of a masonry structure (0.65 m wide) on three courses of granite boulders orientated NE-SW. Below the foundation a plank floor on beams was documented (Kayser 1969). The interpretation of the structures being part of a tower is uncertain. A continuation of this foundation, at least 25.0 m long, 2.15 m wide and orientated ENE-WSW, together with the wooden structure was investigated on the occasion of the Metro construction in 1996–1997 and suggested as part of an unknown building (Kristiansen 1998:146).

Across Vingårdstræde at the same corner as Magasin, a north-south oriented wooden water pipe has been recorded (Lomholdt Poulsen 2004b:4).

Holmens Kanal No. 7 (Matr. No. 288): Well-preserved skeletons recorded in connection with digging in the back yard. Outside the former Landmannsbanen remains of a bulwark and rivets belonging to the copper foreskin of ships, a cannonball and interpreted boulders from the Naval shipyard were investigated (Ahlefeldt-Laurvig year unknown; HMK 1968:174).

Holmens Kanal: Without street number. On the west side of the Royal Theatre at the southern part of the building masonry from late 19th century has been documented (Lomholdt Poulsen 1999). Peat and so-called “gyttje” layers (moat fills?) have been recorded by drilling west of the theatre (Frederiksen 1989:54). Another digging in Holmens Kanal between Kongens Nytorv and Niels Juels Gade did not reveal anything of archaeological interest (Lomholdt Poulsen 2004a).

At the Metro investigations in 1996–1998 the archaeologists also recorded a number of more or less diffuse structures and unidentified remains of buildings in Holmens Kanal where some of the recorded masonry could be part of Eigtveds Komediehus from 1748 or a later building. A bulwark consisting of 10 piles and vertical and horizontally laid planks, where one of the piles was dendrochronologically dated to after c. 1513s could belong to the fortification and Holmens Kanal before the filling up of this in 1864. Some of the cultural layers were interpreted as clean-up layers of the moat and finds in the levelling layers were dated to between the 17th and 19th century (Kristiansen 1998:143 et seq.; 1999c:198).

At Holmens Kanal (drilling 73) cultural layers have been identified to kote -3.2 m, indicating that the depth of water in this place had been 3.3 m. The upper layer consisted of mixed material with “natural” sedimentation at the bottom (Jeppesen 1982:7).

Hovedvagtsgade No 1: North of No. 1 part of a wall, fire layers and probably remains of the medieval rampart have been documented (Skaarup 1986a).

Kongens Nytorv No. 5: Wooden water pipe recorded in conjunction with foundation work (Rode-Møller 1992).

Hovedvagtsgade No. 8 (Matr. 362): A 3.5 m long wooden water pipe interpreted as part of a pump tube (da: pumperør) (Skaarup 1989).

Kongens Nytorv Nos. 8–12 (Matr. No.377): Former street number. Information about a defined topsoil layer (Ramsing year unknown).

Kongens Nytorv No. 9 (Matr. No. 267): At the building site for the Royal Theatre several skeletons including children were documented, without coffins, which suggests that these may be connected to a plague cemetery (Berlingske Tidende 1872).

Kongens Nytorv No. 9: Foundation of two courses of granite stones on two smaller stones, a masonry wall of medieval bricks and boulders orientated in a north-south direction, a wooden pile, part of a sewer well (?) and levelling layers with bricks were investigated at the NE corner of the Royal Theatre. The foundation was interpreted as part of a tower or crane in connection with former Holmens Kanal and the pile as part of a bulwark (FA 1975; Engberg 1975).

At the SW part of the theatre and immediately north of No. 3 at least three structures of bulwark and planks were recorded, one orientated N-S and two orientated E-W, the last ones consisted of four and seven wooden piles (Engberg 1975; Kgl. Teater. Besigtigelse d. 6-7/5-1976). The responsible archaeologist interpreted the bulwark as either part of the quay along Holmens Kanal, belonging to a smaller connecting channel from late 17th century, or a bridge.

Two parallel masonry structures consisting of foundation and facade stones of two courses together with massive brick walls of yellow post medieval bricks with a distance of 1.35 m (total width 3.8 m) was documented in Holmens Kanal. Under the structure wooden piles were observed. The southern wall's sloping surface was interpreted as a form of breakwater. The masonry structures were probably remains of the dam or road embankment to the passage over the moat and Holmens Kanal ("Kammen"), belonging to the Christian the 4th fortification from the 17th century (Archival material, KBM 418; Christiansen 1994; Engberg 1994).

Kongens Nytorv No. 13 (Matr. Nr. 428): An earlier acknowledged curtain wall belonging to a structure with a diameter of 33 m, but unknown location in Magasin's basement (Both 1873; Ramsing year unknown). In connection with an excavation in the same area possible looting pits destroying this structure, boulders, peat layers and 0.8-1.0 m thick rubbish and cultural layers dated to the 13th and 14th century were documented (Skaarup 1997). It should be noted that only one of the archeological trenches (No. 4) affected the curtain wall's interpreted location.

Further investigations in 1998 identified peat layers, cultural layers and an east-west orientated and at least seven metres wide drainage (?) ditch with High medieval finds and C14-dated to 749±28 BP or 1223–1286 AD (cal 2 σ) (KIA11470), and another ditch and postholes. The bottom layers contained large amounts of fish bones and one of these deposits was C14-dated to 775±36 BP or 1188–1285 AD (cal 2 σ) (KIA11471). A foundation of boulders on the location and curvature was interpreted as Both's curtain wall, however dated to the 17th or 18th century, and thus not of medieval origin. High medieval cultural layers were observed directly on natural ground (Poulsen 2000; Moltsen 2001).

At the establishment of the tunnel between Magasin's basement and the Metro station at Kongens Nytorv cultural layers, paving, foundations (?), ditches (?), a cellar (?), other types of pits and wooden water pipes were documented. The finds could be dated from the 13th–14th century and onwards and elder (*Sanbucus sp. L*) from one of the features (A178) was C14-dated to 870±35 BP or 1044–1254 AD (cal 2 σ) (KIA16626) (Jark Jensen 2001; Grootes 2002).

Other investigations in Magasin's basement have demonstrated a medieval stone set well, nine pillars of an E-W orientated bulwark, traces of stone foundations, masonry, wall foundations (laid in monk bond) and well-preserved cultural layers of High medieval origin (Danneborg 1894; Linvald & Bülow-Olsen 1952a; 1952b; Kayser 1958; Skaarup 1998b; Vingårdstræde, Foto Billedarkivet).

Kongens Nytorv No. 13: Cultural layers and a 2.1 m wide brick wall ("munkesten") perpendicular to No. 13 facade approximately 30 m from Magasin (Fig. 15) interpreted as belonging to the Late medieval tower Smørhætten (Skaarup 1988), but later interpreted as part of Vandporten (cf. Kristiansen 1999c:200).



Fig. 15. Part of the brick wall in Vandporten investigated by Bi Skaarup in 1988. Photo: Museum of Copenhagen.

Observations done by Axel Christophersen in 1984 showed modern disturbances outside Magasin's facade at the location of Both's so-called curtain wall about 2 metres from the building (Christophersen 1984a).

Kongens Nytorv No. 14 (Matr. No. 377): Former street number. Information about peat layer and an interpreted road surface (Ramsing year unknown).

Kongens Nytorv No. 16: Information about a defined topsoil layer, c. 16 m and 43 m outside the facade (Ramsing year unknown).

Kongens Nytorv No. 17: At the corner of a'Porta approximately 15.3 m from the building there are observations of masonry 0.86 m wide consisting of 7-10 courses of medieval bricks and limestones on granite boulders, which has been interpreted as part of the former city wall. This was recorded together with several rubbish layers (Kayser 1961).

Kongens Nytorv No. 19: Two trenches were located in Lille Kongensgade and on Kongens Nytorv outside Hviids Vinstue (Summerfield 2009). The remains of two red brick ("munkesten") wall foundations and irregularly shaped granite boulders were uncovered. The brick foundations could date back to the early 1500s at the time when the original Lille Kongensgade was established.

Kongens Nytorv Nos. 19 and 21: In connection with the construction of a transformer station part of the rampart and foundation stones to the former city wall were documented. The foundation appears on several images and drawings as a c. 11.25 m long and 2.00 m NW-SE orientated line of boulders consisting of at least two courses. What the proposed dating to 1490 AD is based on is unclear. Several wooden pipelines parallel to the facade (?) were also recorded (Berlingske Tidende 1941; Jensen 1941). At an archaeological watching brief in the same area levelling layers and finds from the 17th century was registered (Kjems 2004).

Kongens Nytorv Nos. 20 and 22 (Matr. No. 212): Information about pits and defined topsoil layers (Ramsing year unknown).

Kongens Nytorv Nos. 22: Wooden water pipe of pine oriented parallel with the facade and more than 2 metres of cultural layers (Christiansen 1985).

Kongens Nytorv No. 2-24: Deposits from the 17th century when the area in front of the city walls was taken into use. The excavation also documented remains of the medieval main roads from Østerport with an associated road ditch where seeds (*species unknown*) were C14-dated to 722±60 BP or 1182–1395 AD (cal 2 σ) (KIA35921). Finds were primarily from the period c. 1550 to 1750 AD. Approximately 34 m west from the waterfront in Nyhavn, bulwarks belonging to the former harbour and a land anchor were recorded (Poulsen year unknown; Leen Jensen 2007).

Krinsen: In the 1940s human skulls and jaws belonging to three men, aged c. 30-45, were collected while digging shelters in Krinsen (KBM 1413; Lynnerup 1995). These may stem from the area of one of the 16 circular bunkers built in the middle of the square and outside Hotel D'Angleterre (6) during the 2nd World War. At the same excavation several finds were collected consisting of well preserved iron and metal artefacts related to urban and military culture (Bunkersudgravningen på Kgs. Nytorv 1944). Related to everyday life were padlocks, knives, scissors, tongs, a metal tap and a carving fork, while musket forks and panzer glows, etc. were all connected with the military use. Most of the finds represent tool types, e.g. spring scissors and pivoted scissors, used since ancient or Early medieval times. However, a more precise date can be offered in a few cases. Thus, a clay pipe (c. 1610 AD et seq.) and a signet belonging to the individual S' Detleff Ratlow, dated to c. 1550 AD, are of significant value in that regard. Hence, these typological facts combined with observations regarding the decoration and fabric of the other artefacts point towards the second part of the 16th century and the beginning of the 17th century. The versatile nature of these finds does indicate that we are dealing with waste and/or lost objects. On this basis we can assume that the finds come from the 17th century moat or terrain levelling deposits accumulated around the time the fortification was demolished.

When digging for trenches at an earlier occasion, foundations of yellow bricks and part of the 17th century rampart and moat were documented close to the statue ("*Hesten*") (Archival material, AA16). When drilling, stones were located south and SE of Christian 5th equestrian statue (Geo-Tekniske Undersøgelser 1946), which suggests complex structures and building foundations in the area.

Krinsen: Corner of a dressed stone plinth consisting of three dressed stones and masonry of "munkesten" and lime mortar on a foundation of boulders and demolition material from the 16th century or later revealed in the street outside Kongens Nytorv No. 21. The dressed stones were sloping 15-20 degrees (Skaarup 1994).

Krinsen: The outer part of the 17th century moat with waste material, the possible foot of the rampart and part of a marsh (stagnant freshwater) older than the fortification, although it could not be determined whether this represented part of the peat layers ("*gyttje*") in the former moat or older salt marshes (?) (Poulsen 2004; Sørensen 2004; Kristensen 2004; Moltzen 2004).

Krinsen: Approximately 17.3 m outside Hotel D'Angleterre part of the medieval rampart and city wall consisting of two courses of granite boulders, a 1.2 m wide brick wall, lime dressed stones and the moat with 16th century fill have been recorded. The underlying peat layer was visible in the section (Linde 1929; Berlingske Tidende 1929; Ramsing year unknown).

Laksegade No. 4/Vingårdstræde No. 3 (Matr. No. 435): Several house foundations of unknown date orientated both parallel and perpendicular to the streets, a bulwark, a square wooden well and planks. Large quantities of footwear dating from between 1550 and 1650 AD were collected during the ground digging (Ramsing year unknown; Archival material, Laksegade).

Laksegade No. 6: Part of a wreck of a smaller ship typologically dated to the 13th–15th century revealed outside the house facade in natural sand and consisting of the port side near the bow. Bottom deck and table planks of mirror split oak and fender lists of pine (Jeppesen 1977; Bill 1993; Erichsen 1995).

Laksegade Nos. 4–14: Recent investigations have documented archaeological remains including medieval street surfaces in the eastern part of the street together with post medieval building remains and wooden water pipes (Hadevik verbal information).

Laksegade Nos. 9 and 11/Asylgade No. 11: Information about peat layer (Rosenkjær 1906:20).

Lille Kongensgade Nos. 3-15 (Matr. No. 428): Information about peat layers, demolition and waste layers, defined topsoil, three square, wooden wells, a barrel with 16th century finds, a clay pit and a suggested street surface under current Magasin (Rosenkjær 1906; Ramsing year unknown).

Lille Kongensgade Nos. 8 and 10 (Matr. No. 11): Information about a wooden well, natural peat, cultural and a defined topsoil layer. Coin dated to 1626 AD collected (Rosenkjær year unknown; Ramsing year unknown).

Lille Kongensgade Nos. 15 and 17: Remains belonging to the former building facades from the 16th century to the 20th century were documented along Magasin (Lomholdt Poulsen 1999).

Lille Kongensgade No. 18: Documented wooden water pipe with lead joints (Lomholdt Poulsen 1999).

Lille Kongensgade No. 22: Uncertain location, but probably outside No. 22 – masonry consisting of red bricks, Flensborg stones, limestones and boulders together with two floors dated to the 17th century (Pedersen 2009).

Lille Kongensgade Nos. 2-22: Smaller excavation from Bremerholm to Kongens Nytorv. In situ foundation stones and layers belonging to previous facade south of Lille Kongensgade No. 20 which may have medieval origin. In the western part remnants of a cellar foundation and walls were recorded, which in its oldest part may date to the Middle Ages. Paving and a clay layer were documented outside No. 16. Worth mentioning are two sandstones with carved human figures and Latin text, which were parts of porches built in front of entrances on timber framed houses during the 16th and 17th centuries, found between No. 16 and No. 18 (Jark Jensen 2007; Fig. 16).



Fig. 16. The two porch stones found in Lille Kongensgade 2007. Photo: Museum of Copenhagen.

Lille Kongensgade Nos. 30 and 32 (Matr. No. 430): Partly in the area where Bremerholm street is today. Recording of a foundation of boulders, a clay floor, a stone layer, a ditch and pits together with defined topsoil, demolition and fire layers (Ramsing year unknown).

A brick built vault was recorded c. 8.5 m beyond Magasin's northern facade together with a brick layer in 1928 (Archival material, Kongens Nytorv). Based on the size the bricks used in the structure were not of medieval type.

By Magasin's northern corner at Østergade (should be Lille Kongensgade), in association with excavation in the street, part of the former city wall was visible, consisting of boulders and a brick wall of "Renaissance bricks" together with ceramics dated to c. 1570–1580 AD and onwards (Frederiksen 1981).

Nyhavn No. 1: In the street outside Nyhavn No. 1 two wooden water pipes of pine parallel with the facade were documented (Skaarup 1986b).

Nyhavn between Nos. 2 and 4: Masonry (c. 5 x 1 m) of unknown date was documented in 1903 at the end of Heibergsgade (Archival material, Kongens Nytorv).

Tordenskjoldgade No. 3: Approximately 10 m north of the colonnade and perpendicular to the Royal Theatre. Information about bulwark bound together with timber (Vedr. Besigtigelse i og omkring det Kgl. Teater 1976).

Tordenskjoldgade No. 5: In the intersection between Heibergsgade and Tordenskjoldgade fragments of human skeletons were observed and interpreted as part of Holmens Kirke's old cemetery from 1628–1666 AD (Lomholdt Poulsen 1999). There is also information about skeletons in levelling layers with 16th century finds along the columns of the colonnade (Unknown 1976).

Tordenskjoldgade No. 8 (Matr. No. 385): A coffin burial interpreted as part of Holmens Kirke's old cemetery from 1628–1666 AD (Archival material, Tordenskjoldsgade 1967).

Tordenskjoldgade No. 9 (Matr. No. 372): A coffin burial together with 17th and 18th century finds interpreted as part of Holmens Kirke's old cemetery from 1628–1666 AD (Als Hansen 1974).

Tordenskjoldsgade No. 10 (Matr. No. 330): A total of 12 skeletons including a child together with scattered skulls and human bones where some of the skeletons had gunshot wounds. Other finds consisted of remains of coffins; wood and handles. Encountered within the area of Holmens Kirke's old cemetery from 1628–1666 AD (Hauberg 1906).

Vingårdstræde No. 1: Excavation of cultural layers, cellar foundations, dressed stone and brick walls (laid in monk bond) from one or two supposed medieval buildings together with a wooden pipeline dated to the 1700s (Martens 1996).

Documentation of cultural layers together with remains of one or two east-west orientated buildings c. 2.5-5.0 m north of Danske Bank. These consisted of the base of the foundations and the facades of two walls to the north preserved to 5-9 courses and represented at least two phases. The remains could not be dated more accurately than the time between the demolition of the fortification in 1647 and the construction of the currently standing building in 1797 (Kristiansen 1998:139 et seq.), and could be part of similar masonry documented in 1995 (cf. Martens 1996).

Vingårdstræde Nos. 1 and 3 (Matr. No. 435): In the area a 3.0-3.5 m wide and J-shaped structure of boulders limited to the west of a NE-SW orientated bulwark, a big boulder, a pole, a wooden pipe, a wooden well and cultural layers from the 16th century were recorded in connection with the construction of Handelsbanken in 1927–1928. Among the finds part of Frederik 4th's coat of arms in sandstone can be mentioned (Ramsing 1910:562 et seq., Fig. 8-9; Archival material, Vingårdstræde/Laxegade; Foto Billedarkivet, Vingårdstræde). Observation of a ditch in the area was

interpreted as a circular moat surrounding the medieval tower Kringelen (cf. Ramsing 1940, Vol. III:12). The ditch has however later been interpreted as a natural slope (cf. Fabricius 1999:123 and 143).

Hereto Ramsing examined a 10-metre-long stone foundation under Danske Bank's north facade at Holmens Kanal (Ramsing 1910:562 et seq.).

Vingårdstræde No. 1/Laksegade No. 2: Information about natural peat layer (Ramsing 1940, Vol. III:63).

Vingårdstræde No. 4: Small, oblong granite stones, east-west orientated together with older street pavings and the former frontage of the buildings before 1795 documented in the middle of the street (Lomholdt Poulsen 1999). Across Vingårdstræde between No. 3 and No. 4 several older street surfaces (8?) have been recorded, c. 1.3 metres below today's street level (Lomholdt Poulsen 2004b:3).

Vingårdstræde Nos. 3–7: An east-west running masonry structure interpreted as part of the former facade in Vingårdstræde from the 16th century (Lomholdt Poulsen 1999).

Vingårdstræde Nos. 5 and 7/Asylgade Nos. 1-5: Observation of a ditch interpreted as the south side of a trench running along the shoreline south of Østergård (Roesdahl 1969; 1970; Fabricius 1999:123 et seq.). At the same survey cultural layers, scattered remains of stone foundations and a curved base in Vingårdstræde Nos. 5-7 were recorded – the latter interpreted as the remains of a tower. The report, however, does not specify the size and location. An arch of bricks (Flensborg stones) could be followed at least 3 m out into the street. Not far away from the arch, piles, planks, a bulwark and wooden pipelines were recorded perpendicular to Asylgade with the bulwark possibly dating to the early 1500s (Ahlefeldt-Laurvig 1969; Roesdahl 1970; Fabricius 1999:123 et seq.).

Vingårdstræde No. 6 (Matr. No. 428): Square wooden well with corner posts and frame together with building foundations of boulders of suggested medieval origin (Ramsing year unknown).

Vingårdstræde No. 6: A wooden well with corner posts and frames, paving and cultural layers investigated in 1932 (Archival material, Vingårdstræde 6; matr. 131).

Vingårdstræde Nos. 8-16 (Matr. No. 428): A wooden well with corner posts and frames from 1520 AD (?) investigated in connection with the construction of the garage in Magasin 1966 (Politiken 1966).

Vingårdstræde No. 13: Across Vingårdstræde between No. 6 and No. 13 an east-west orientated masonry structure belonging to the former frontage and dated before 1795 (Lomholdt Poulsen 2004b:4).

Vingårdstræde Nos. 14 and 16: Excavation uncovered cultural layers, two parallel walls oriented perpendicular to Vingårdstrædets length including a 0.77 metre wide vault arch together with a wooden pipeline. The brick wall was part of a building with an arch gate, dated to the period after the big city fire in 1728 (Christoffersen 1984b). Granite boulders, dressed stones, part of a brick foundation and rubble were also documented in the street at the corner between Vingårdstræde and Bremerholm outside Danske Bank (Borake 2006).

Vingårdstræde: Without a street number. Approximately 3 m long, east-west orientated wooden plank with unknown function (Kristiansen 1998:146).

Vingårdstræde: Without a street number. Rubbish layers with different finds from the 16th to the 19th century (Pedersen 2009).

Østergade No. 1/Kongens Nytorv No. 26 (Matr. No. 6): Two masonries of medieval bricks and foundation stones of granite in 3-4 courses. Approximately 0.75 m wide and parallel with Kongens Nytorv and the property's southern end.

A brick wall was also recorded perpendicular to these. A square wooden well with corner posts and frames of oak was investigated in the SW corner of the property. Finds consist of a spur and cornice of medieval origin (Mathiesen 1899).

Østergade No. 7 (Matr. No. 11): Investigations have encountered defined topsoil layers and possible remains of Østertorv in form of pebbles under a layer of made ground and different cultural layers. A peat or so-called “gyttje” layer could be seen at the bottom of the trench (Berlingske Tidende 1927; Ramsing year unknown).

Østergade No. 13 (Matr. No. 13): Remains consisting of levelling and rubbish layers dated to the 16th century, a ditch and a square wooden well with corner posts and frames dendrochronologically dated to 1521–1550 AD. By test drilling one could determine that the area was within the medieval coast line, and influenced by the previous Littorina Sea Transgression (Skaarup 2002; Sørgard Sørensen 2002). At further investigations in 2005 a 5.5 m wide and 2.0 m deep north-south oriented ditch was documented. Saline affected peat was recorded and the bottom fill was C14-dated to 771±30 BP or 1217–1281 AD (cal 2 σ) (KIA27387). Based on the finds the ditch went out of use in the 16th century (Poulsen 2005).

Østergade No. 15 (Matr. 14): Two parallel masonry structures including yellow bricks orientated in NE-SW direction with a distance of 1.52 m (Unknown 1934).

Østergade No. 16 (Matr. 72): Masonry together with several arches and a brick floor interpreted as part of a sewer dated between 1650 and 1750 AD (Gabrielsen 1998).

Østergade No. 24 (Matr. No. 68): Wall and a paved floor interpreted as part of a cellar (Archival material, Østergade 24).

Østergade No. 32 and 34 (Matr. No. 375): Documented wooden water pipe (Archival material, Østergade 32-34).

Østergade: Near Bremerholm there are observations of house foundations with medieval origin, street levels, several wooden water pipes and rubbish layers (Simonsen 1998). In the intersection between Østergade and Kongens Nytorv a north-south orientated wooden water pipe was documented (Lomholdt Poulsen 2004b:5).

6 Objectives and aims

The objectives of this excavation were a site specific application of the overall aims defined in the project design (Thomasson & Høst-Madsen 2009). In this chapter, the aims and examples of questions connected to the different areas and expected features at Kongens Nytorv are specified. They are also related to the overall project aims of the Metro excavations which were:

- Urbanization
- Economics and demographics
- City life and urban culture

The following is an adapted reproduction of the Objectives and aims described in the Method Statement for Kongens Nytorv (Thomasson (ed.) 2010) and the overall assessment of these aims for the excavation will be evaluated in Chapter 21.3; Future potential).

6.1 Site questions

The questions for the excavation were aimed at the site in general, and then at the different areas with different expected cultural historical potential. Prehistoric activities, including Viking Age, and original topography, are however areas of interest that do not necessarily relate to the city area, and are therefore dealt with in this first sub-chapter.

6.1.1 Prehistoric period

Although it was not anticipated that there were significant remains of prehistoric date in the area, there might have been low levels of activity in the form of residual artifacts. There might have been evidence of occupation as the site lies in an area surrounded by wetlands/marshlands. Locations similar to these can be places of preferential activity during the prehistoric period as they provide ample resources for hunting, fishing and foraging. Any information on the area during this period might help to clarify how this area was used prior to the urbanization of Copenhagen.

Examples of questions:

- Could the ground topography and the extension of the coast line be further established?
Could prehistoric activities be identified? What kind of activities did these represent? Could the remains be dated and divided into phases?

6.1.2 Viking Age and Early medieval period

The earlier excavated Viking Age settlement remains (see Chapter 4; The Metro excavation 1996–1998) could also be related to a wider context of coastal use and the urbanization of these places. Findings of remains dating to this period, from Viking Age to Early Middle Ages, could provide opportunities to understand if there had been market activities on the beach and how this could be related to the settlement in what became the town area.

Examples of questions:

- Could settlement remains from the Viking Age and Early Middle Ages be identified? How did this relate to the earlier known settlement from this period?
- Could market activities be identified and dated on the former beach? Did these represent seasonal or permanent activities? Was there proof of an Early medieval fish market (i.e. clay lined pits)?

6.2 Settlement areas

Settlement remains have mostly been found in the western areas in conjunction with the medieval town of Copenhagen and the archaeological investigations inside the town limits would provide opportunities to explore the

development of the settlement. The objectives of the investigations were to contribute to new knowledge concerning the constitution of and changes to everyday life, building culture, craft and trade. The aims are foremost related to periods when the area emerged as a part of the town; i.e. from the Middle Ages onwards.

6.2.1 Constitution and changes in everyday life

The archaeological source material could clarify land use, not at least in the relationship between streets and public space on the one hand, versus private space of plots and buildings on the other. By producing a thorough source material, it would be possible to investigate changes in the interaction between public and private places in the town, as well as changes in movement. On a more detailed level, changes in how people moved and enclosed space within plots and houses, as well as how and where different activities were organized, also reflects the constitution of everyday life.

Examples of questions:

- How large were and which form did the plots have? Were there changes in the plot structure? How were the borders expressed in material culture? Can the plot structure be related to the Viking Age borders? (see Chapter 4; The Metro excavation 1996–1998; Chapter 12; Early medieval activities 1050–1200 AD).
- How were the buildings organized on the plots? Where were dwellings and economic buildings placed? Were there diversities in different parts of the area and in time? Can different patterns be established? How were the buildings oriented toward the public spaces?
- How were the empty areas within the plots used? Could paths and yards be identified? How were they constructed? Which kinds of pavements were used? Could gardens be identified? What was cultivated? What other activities could be established? Could gender patterns be identified?
- Which kinds of material culture were represented in the households? Which vessels were for example used in storing, preparation and serving food and drink? How were these designed? Are there differences between different social and/or gender groups? Which kinds of consumer goods were present? Were there differences over time and in different households? What was imported?
- What kinds of food were consumed? How was the food prepared and organized (spatially and socially)?
- Can the spatial organization in the area of Lille Kongensgade from the period before the street was laid out in the 15th century be reconstructed?
- Has there been further Early Middle Age settlement in the area and how was this organized?

6.2.2 Buildings

There were possibilities to investigate the construction and design of buildings. Observations of foundation walls, most often not dated, one preserved brick building (King Hans Vingård) and notes of so-called "*curias*" in the written record indicate the presence of stone based houses in the area. The finding of the porch stones (Danish: *bislagssten*) in Lille Kongensgade certainly suggests that they may have been parts of an elaborate timber framed house, probably built around the 16th and 17th centuries (Jark Jensen 2007).

A typical urban phenomenon is booths. These could have been dwellings as well as work shops, prestigious stone architecture or petty constructions for poor people. There is mention of three rows of booths in the area: the King's booths mentioned in 1529 and situated along the south of Lille Kongensgade (Fabricius 2006:90).

Examples of questions:

- How were the houses constructed and designed? Could the layout be identified? Were there diversities in different parts of the area and in time? Could different patterns be established?

- Were there differences in construction, design and layout between dwellings and economic buildings? Were there differences between social groups such as merchants and craftsmen?
- Which kinds of house type (in relation to construction, design and layout) could be identified?
- Were there differences in design between houses facing towards public space and others? Which? Were there differences in design between houses with gables or the long side towards the public space?
- Were there buildings alongside the city wall?
- Could booths be identified in the areas? Where were they situated and how were they constructed? To follow up: can remains from historically known booths in the area be identified?

6.2.3 Craft and trade

During the Middle Ages towns were the allocated spaces for trade and craft; towns had special legislation different from the countryside making them juridical enclaves. In the early written material both merchants and craftsmen are mentioned in the area, but are yet to be more elaborated archaeologically.

Examples of questions:

- Could workshops be identified in the area? Which crafts were represented? How was production organized (spatially and socially)? Were there differences in time?
- What kind of goods was imported? To which places and/or areas were there connections? Did this differ over time?
- Could differences in use of money be identified? Were there differences in which areas or socially where money was handled? Did this differ over time?

6.2.4 Østergård

There are clear indications that Østergård (see Chapter 12.2.2) was located in close proximity to the forthcoming excavation site (cf. Frederickson 1999).

Examples of questions:

- Finding remains and establishing existence related to Østergård.
- To establish a clearer relationship with the Viking Age settlement remains.
- To examining the spatial extension of the estate to the north. Did the boundary ditch found during the excavation KBM 1410 continue to the north, and what was its chronology and morphology?

6.2.5 Roads and public space

Knowledge of older streets in Copenhagen is only based on limited written source material. Through the years some evidence of roads has been documented archaeologically such as pebbled streets.

The stratigraphic sequences in older street environments were characterized mainly by the surviving street layers as well as drained carrying layers.

Examples of questions:

- When were the streets established? Has their location varied? Was the block/plot structure stable? Could patterns be established (i.e. from narrow to wider streets, etc.)?
- Where were streets established? What was the previous land use? In connection with plot and street regulations in the area? Along plot borders? Detecting and dating a former rampart street (Voldgade) along the fortification?

- How were the streets constructed, relating both to the degree of foundation layers and type of pavements? Were there differences between different streets? Were there differences in time?
- How was the maintenance organized? Who was responsible?
- Investigate whether free standing booths existed along or on the streets.
- Could Østergade (western part of present Strøget) be interpreted archaeologically as a former market street in terms of its location at Østertorv?
- Is it possible to further identify and date the medieval market place Østertorv and any features such as booths or spatial marking stones?

6.3 Rampart and moat areas

A large proportion of the excavation areas were within the extension of the former city border. In general there were possibilities to investigate a vital part of the city border with a long term perspective, from the Viking Age to the mid 17th century. These circumstances implied that there were opportunities to cover relevant issues in medieval and historical archaeology regarding the symbolism and status of the city's borders. The finding of Viking Age settlement remains during the 1990s excavation also suggest the spatial limitations of this can be related to the later medieval demarcations, and revealed the later city border corresponds to an older framework. Another vital issue was trying to define what was regarded as the beach (Danish: forstranden). Because of the extensive fill layers in the different generations of moats, a likewise extensive finds assemblage, deposited as garbage, could be expected. This is a vital source of knowledge regarding everyday life of the city's citizens.

Examples of more detailed questions:

- Could the chronology and morphology of the eastern part of the city border be established?
- Was there correspondence between the spatial limitations of the Viking Age settlement and the later town area? If so, was this connected to the limitations of Østergård?
- Were there differences between the construction of city borders when Copenhagen was governed by the Bishop of Roskilde and later on when the city became the seat of the royals (from the 15th century onwards)? Can inclusions in deposits indicate how the works were organized? If so, could this be connected to independence versus dependence of city the council towards different kinds of lordship?
- The archaeological investigations carried out beside the fortification and the moat would provide opportunities for finding archaeological evidence of different phases.
- Did the ditches and fences constitute boundary ditches and allotment fences for dividing the land behind the former shoreline? What is the chronology between these and the later medieval rampart?

6.3.1 The medieval fortification c. 1200–1550 AD and Valkendorf's modernization in 1581–1583 AD

Copenhagen was one of few the Danish medieval cities to get a fortification with wall and tower. In Copenhagen's first town privileges the city walls are mentioned (1254), but it is possible that this is a fixed expression which means fortification rather than actual wall (Skaarup 1998a:26). The medieval fortification dating back to the 13th century has been demonstrated at several archaeological sites along Kongens Nytorv's western part (see Chapter 4; The Metro excavation 1996–1998).

6.3.2 Østervold and the moat

Østervold were identified in Metro investigations in 1996–1998, where it was possible to follow the construction in three main phases, the rampart was moved, and the medieval moat filled in (Kristiansen 1998:12 et seq.; 1999b:162). It is not known where the ramparts end in the east and west, down to the shoreline.

Examples of detailed questions:

- At the Metro investigations in 1996–1998 the medieval fortification was seen to be constructed in three phases. Could this structural division also be followed in the upcoming excavation area or were there variations as earlier archaeological investigations suggest?
- Could the phases be defined more firmly? One of the objectives of the forthcoming investigations was a more accurate dating through stratigraphical observations, finds and scientific analyses.
- Documentation and interpretation of the High Middle Ages rampart had foremost been based on comparing sections (cf. Kristiansen 1998:79). Could the rampart be investigated in larger and contiguous levels?
- It has not been possible to determine the medieval fortification's relationship with the contemporary shoreline (which should have been by the end of Vingårdsstræde in Kongens Nytorv). Could this relationship be established in the forthcoming excavation?
- To follow up: Could the construction work done during the early 16th century, not proven at the Metro investigations in 1996–1998, be identified? If so, how large were they? What was reinforced? Could Valkendorf's modification be identified? Are there differences versus the area investigated in the 1990s?
- Could the dimensions of the moat be clarified? Could a finer chronology be established? Was the extension stable over time? What was the spatial relationship with the Viking Age boundaries?
- Could the different fill materials be related to the settlement? What kind of finds material was deposited as garbage in the fill? Could it be related to life circumstances in the neighbouring plots? How were the works organized?
- Was the 17th century moat an extension and adaptation of the existing moat?

6.3.3 Byens Planker and the city wall

The so-called "*Byens Planker*" has not yet been proven archaeologically, probably because the rampart crown in earlier investigations had not been preserved. The city wall has not with certainty been identified before mid year 1400. The construction of the city wall must therefore have started before this time.

Examples of questions:

- Could the oldest part of the city palisade be identified? Which material was used? How was it constructed? When was it constructed and demolished?
- Could the city wall be identified? Could different phases be identified and dated? How did this correspond with the written records? How was it constructed?
- In 1929 a piece of the wall was documented in front of Hotel D'Angleterre (consisting of boulders, chalk stones and bricks). The remains could not be dated. What was understood as remains of the city wall were uncovered at the end of Lille Kongensgade on the corner in front of restaurant Stephan a' Porta (cf. Kristiansen 1998:74; 1999b:157; Fabricius 1999:117 et seq.). Could the remains of these walls be detected? Could their age be determined?
- Could "*Byens Tårn*" and Østergård as early as the end of the 13th century (based on an old deed from 1298; DD 2:4:284), and an additional wall ("*thend gamell mantellmwr*") mentioned in a deed from 1546 (KD I:288) be identified and dated?

6.3.4 Østerport

The oldest Østerport, probably a tower gate, is known from *Roskildebispens Jordebog* from 1294 (the account book of the Roskilde bishop). It was called *Røde port*. The gate was probably placed at the end of Østergade, but its exact location is unknown (Christophersen 1985:109; Skaarup 1998a:38; Fabricius 1999:120).

Examples of questions:

- Could Østerport be identified? Could it be dated?
- The design of the gate was unknown, but in the Middle Ages it was walled in brick. How was it constructed? Could different phases be established? Could function and usage be established?
- Did a guard house or custom house exist near Østerport?

6.3.5 Byens Tårn and Kringelen

A tower near the shoreline is mentioned in the town privileges given to Johannes Krag in 1294. In 1496 a tower called Kringelen is mentioned lying south of Østerport and east of the large area where the department store Magasin du Nord is situated today. The tower(s) has not yet been proven archaeologically. Remains which could be interpreted as a tower foundation were investigated below the current Magasin's south-eastern corner in 1873 (Both 1873).

Examples of questions:

- Was the tower situated on the beach?
- Could the existence, location and dating of "Byens Tårn" be clarified?
- A dating and further understanding of the circular ring wall found in 1873 will only be achieved by further archaeological investigations.

6.3.6 Christian 4th's fortification c. 1608–1647 AD

Compared to earlier stages of the fortification, Christian 4th's fortification work is well elucidated through *Rentemesterregnskaberne* which is a thorough book-keeping record of the government's expenditure.

The rampart consisted by the mid 1620s of a rampart row with twelve bastions. Østerport, situated between Sankt Klara Bastion to the north and the bastion Bastionen ved Iskulen to the south, was built in 1608, as a solid earthwork (Westerbeek Dahl 1996). The bastion's larynx was in the immediate extension of Østerport and its two facades met roughly where l'Amoureux's statue of Christian 5th stands. Østervold was moved in 1647, and the bastion was demolished and the area was later to become Kongens Nytorv. The moat lay in front of Østerport.

Examples of questions:

- Could the remains of the Østervold's curtain and bulwark (stronghold) in its different phases be detected?
- Could the inner gate tower of the fortification from 1611 be identified? It should have been situated about midway between Østergade and Lille Kongensgade.
- Could remains from the outer gate connected to the drawbridge on the other side of the moat (pictured on Jan van Wijcks prospect from 1611) be identified?
- Could the moat's extension and backfilling stages be further clarified? The outer edge of Christian the 4th's moat is archaeologically proven to the northwest side of Kongens Nytorv and dated to the middle of the 17th century (Sørensen 2004; Leen Jensen 2007:5).
- Could the different fill materials be related to the settlement? What kind of finds material was deposited as garbage in the fill? Could it be related to life circumstances in the neighbouring plots? How were the works organized?

6.4 Outside the medieval city gate – the eastern parts of Kongens Nytorv

The archaeological investigations to be carried out beyond the city rampart, would provide opportunities for finding archaeological evidence of prehistoric settlements, craft or industrial areas, trade, suburban housing, older fields and country roads. Such activities and buildings are likely to have been lived in by people rarely mentioned in the written sources and to whom scant attention is given in historical accounts. This part had also served as temporary quarters for visitors waiting for their turn to pass Østerport and get inside the city limits.

6.4.1 Suburban activities

There is very little information about the settlement and other activities outside the medieval city gate in the archaeological sources, written records or older maps. Previous archaeological investigations carried out in close proximity to Kongens Nytorv revealed remains of roads and a few buildings, dated to the Late Middle Ages or Renaissance period (Leen Jensen 2007). It was suggested that evidence of similar infrastructure and scattered buildings might be found during the excavations. It was plausible that there had been settlement outside Østerport during the pre 17th century period, because it is likely that contaminated, flammable, noxious and space-intensive activities were situated in more sparsely settled and inexpensive areas; i.e. outside the city gates. It is important also to reconstruct the topography of the area and to establish where the shoreline was situated during different periods.

Examples of questions:

- Could settlement remains be identified and dated? Was it possible to determine the residents/tenants professional and social status? Had the area been inhabited by for poor people who weren't city's citizens?
- What characterized the land use? Were dangerous and noxious activities sited in this area?

6.4.2 Roads

The main roads that radiated from Østerport were Lille Strand Stræde, Store Strand Stræde and Bredgade. Their extensions can fairly be based on the older *Jordebøger* (written source on land tax). Lille Strand Stræde started approximately where Charlottenborg is today and Store Strand Stræde immediately east of Krinsen.

Examples of questions:

- Could roads to and from Østerport from before the 17th century be identified and dated? This applies particularly to the road that continues into today's Store Strandstræde.
- Could changes in the road pattern be established? Older roads could indirectly be used to prove Østerport's oldest location.
- How were the roads constructed? Were there differences in time? Were there differences in comparison to their construction inside the city wall?

6.4.3 Bremerholm, Holmens Kanal and Nyhavn

The street Holmens Kanal is a former wetland that was filled up during the Middle Ages and the current Bremerholm is named after the low-lying islet Bremerholm, situated approximately outside Vingårdsstræde. Nyhavn is still a canal, constructed in the period 1671–1673 from the sea to Kongens Nytorv north of Charlottenborg.

Examples of questions:

- The area along Holmens Kanal could determine the circumstances surrounding the earliest topography including the coastline's development in the Middle Ages.

- Confirm the pier which had gone over Holmens Kanal immediately south of Østerport.
- Identification of structures and marine activities in the form of rope, wood chips and waste that had belonged to King Hans' shipyard (cf. Jark Jensen 2006:1).
- Investigation of the original area for Nyhavn through the presence of the bulwark and the dammed area.

6.5 Objectives of the project in light of the project aims

The earlier phrased site specific questions, connected to the special empirical circumstances in the area of Kongens Nytorv, all contribute to the project aims (Thomasson & Høst-Madsen 2009). These aims related to standard urban historical questions, but were designed to use the results from Metro excavations as a case study and to compare the specific city of Copenhagen to the regional urban characteristics and development in general. The following paragraphs describe how the site specific questions could contribute to the overall project aims. These questions are however overreaching; what is in empirical focus in the different areas of the excavation could have bearing within several perspectives covered in the project aims.

6.5.1 Background, organization, direction and characterization of urbanization

This first setting of project aims referred to the emergence and development of urban structures in a wider time and landscape perspective. Of interest was the landscape in Copenhagen and its surroundings, from prehistoric to early modern times. Urban structures were on this occasion defined in close connection with the town concept (cf. Thomasson 2008); i.e. presence of:

- Spatially denoted densely built up settlement, which is clearly divided into public and private space (plots vs roads and squares).
- Activities/production and infrastructure related to central authority, trade and craft; i.e. non agrarian production.

The more general questions regarding all of the four different area types at Kongens Nytorv (see Fig. 3 above), relating to the original topography and prehistoric land use, were of course contributing. Knowledge of the physical condition, under which the urban structures and the town grew and developed, is vital. Also, to understand the chronological depth of the place and surrounding landscape, the diagnostics of what kinds of activities were localised to this area were fundamental for the understanding of why "*Havn*" was an obvious place to establish and invest in urban structures.

In the type 1 and 2 areas, there were great possibilities to explore the establishment and changes of plots and roads, which in turn contribute to knowledge about public and private space. Excavations of predecessors to Lille Kongensgade, Vingårdsstræde, Østergade, etc. (type 2 area), together with possible unknown and unexpected roads, could for example yield information about maintenance, how it was done, if there were differences between the roads, and thereby lead to more in depth understanding of the organization of public space.

According to the current knowledge there were no institutions relating to central authorities, other than Østergård (perhaps Østerport could be understood as the same as well). If the possibilities were there, this give cause both to contribute to new knowledge about the motley and disputed status of this estate, and in a more overall perspective investigate the relations between the town and the upper societal orders.

Kongens Nytorv is situated in an area that once was a border zone. The city wall marked the difference of jurisdiction and production. This implicated great possibilities to explore the establishment and development of the spatial denotation of the town, and thereby one of the key parameters in the spatial structure of medieval and early modern urbanism. The findings of Viking Age spatial structures during the last Metro excavation, and the opportunity to fill in the gaps of knowledge regarding chronology and morphology of the later versions of town limits, were especially

interesting to follow up in the forthcoming excavations. Of interest in this circumstance was the chance to follow up the development and construction of the fortifications, not at least relating to the making of Copenhagen as a capital.

Even if the field conditions might not be optimal (type 4 area), there could be chances to establish land use outside the city wall. As of now, there is limited knowledge of how these areas were used. Notes in the written records are late and influenced either by planned or occurring refurbishments. According to circumstances in other comparable towns, areas just outside city gates, such as the case here, were used for market activities, settlement and agriculture. Knowledge about the areas immediately outside the town could contribute to the understanding of how the town structures reacted towards demographic and economic fluctuations (compare discussion Chapter 20; Phase 7b Outside the moat. Settlement and activities 1550–1650 AD), as well as social stress.

6.5.2 Economic and demographic fluctuations

The essence of the second project aim related to economics and demographics. Whereas the first and earlier discussed project aim was oriented to establish presence of non agrarian production, focus has now changed to content and changes. Due to the source value of the archaeological material, the ability to elucidate figures about quantity and statistics were limited.

Regarding economics, it was vital to establish knowledge about the different kinds of crafts and crafts industries (including food producing crafts such as butchers, bakers, etc.), their organization, infrastructure and development. It was equally important to study the means of exchange, whether it was based on a redistributive gift economy, reciprocity or trade, and due to the close connection with production. Of significance was the development of a consumer oriented economy, as detected in several other Nordic towns (Christoffersen 1990; Carelli 2001).

In Copenhagen, it would be of special interest to focus upon the economic implications of the making of a capital; how did craft production change, which new commodities and goods were produced, and how did domestic production change when the merchants of Copenhagen during early modern times were given continuously positive discrimination and trade privileges. The excavations in the Kongens Nytorv area had possibilities to contribute to these questions. In the type 1 and 3 areas there were possibilities to find traces of workshops or trading facilities, where possible findings of booths could yield information. Analyses of the finds material, as representatives of consumed material culture, contain vital information regarding domestic crafts industries as well as imports, both regarding identification and development. Finally, artefacts that could be understood as the means of trade, such as coins, scales and weights, were of course evident as study objects.

Existence and development of agriculture and grazing in the areas just outside the town limits could be of importance. Through macrofossil and pollen analysis in type 4 areas, it could be possible to establish such types of land use.

The investments in infrastructure, such as Kongens Nytorv, Nyhavn, Holmens Kanal and Bremerholm situated outside the town limits (type 3 areas), were also related to the privileged status of Copenhagen as a trading town. These had to be seen as a part of the state trying to govern the trade, through merchants acting from the capital. The excavations could contribute information on the organization of the works, the constructions, more precise dating through dendrochronology and finally their maintenance.

Regarding demographics, there were of course limitations in the area in question. Research on tendencies and fluctuations in population figures during late prehistory and the Middle Ages was traditionally made from excavations of cemeteries, often in relation to notes in the written records. But regarding settlements, the best possibilities lay in investigations of plot sizes and how densely built these were (related to type 1 areas). Variations according to these parameters could however be explained by other factors, such as access to land, economical and social status, etc., but can serve as one factor among many. Also, the earlier discussed situation just outside the town limits could be yet another such factor.

6.5.3 Cultural and social implications and consequences of city life

The third project aim related to how people related to the urban structures and to the special circumstances of living in a town; urban culture. In relation to the economic and demographic aims, focus had changed from established content, towards studying social interaction and lifestyles.

Within the stipulated long time perspective of the project, a vital issue is the creation and development of a new social order in society, the burghers. Agency relating to material culture is in this sense not just a matter for the individual, but also occurs in a collective framework where the cultural formation of the burghers is vital. At the same time, this class was a heterogenic composition with social hierarchies and genders with completely different life conditions.

Lifestyle issues can be studied in traditional archaeological questions related to development of the buildings (construction, layout, spatial organization of houses on the plots, etc.), food, household items, personal equipment, and other kinds of material culture relating to consumption. Of interest was not least if there were changes in lifestyles during the process from bishop town to capital, which kinds of changes could be established and their dispositions in the different urban social groups. While the options to excavate settlement remains were most plausible in the type 1 area, collections of finds material from all areas could contribute to knowledge regarding consumption in general.

The extension of these topics was to establish differences and thereby development of social topography. This could involve comparisons between Østergård as a type of manor, the socially high ranking plots surrounding the main street Østergade, with other areas including possible settlement outside the city gate (type 4 areas).

Towns were gathering places during for example markets and religious festivals. This did not only have great economic importance, but also meant that the urban centres were arenas of interaction between social orders and ethnical groups. The importance of public space and monumental structures in preindustrial towns has been underlined by several scholars (cf. Tittler 1991; Larsson & Saunders 1997; Magnusson Staaf et al. 1996; Giles 2000). Studies of construction, development and maintenance of roads (type 2 areas; for example what kind of pavements and foundations were used) as well as the architecture of Østerport as one of the town's most visible landmarks, could increase our knowledge on the importance of public space.

Finally, there were possibilities to study the social framework of production and trade. A first step was to try to identify where on the plots these kinds of activities occurred, and how these constructions were displayed architecturally and spatially. A second step could be to investigate if there were different organizations relating to different crafts and their development over time.