Late medieval city wall 1350–1550 AD

Results

The presentation of the Late medieval city wall will be given from two perspectives. Firstly there will be an account of the different feature types that form the city wall together with related scaffolding. After the overall description the features are placed in a structural and historical context. Recorded robber pits in connection with the city wall are presented under time Phase 6, since these truncations represent secondary activities in the 17th century.

City wall – building material and construction details

The construction cuts for the city wall had vertical, straight sides to the east and irregular sides to the west. Depth varied, but recorded in section this was between 0.5-2.0 m, and deepest in the area where the wall was best preserved outside Lille Kongensgade. Measured width was at the most c. 4.0 m and much wider than the wall itself (see below). The maximum length was 19.7 m – a length that must be seen together with later disturbances and larger truncations within the excavation area. The base was variously concave, flat or irregular, dependent on the imprints from the overlying foundation stones.

To the east at least two stepwise ledges were recorded, probably dug to simplify work when placing the large boulders in the construction pit. This construction work must have happened from the west, since the moat constituted an obstacle when working on the stone structure.

The foundation consisted of three layers of unfinished granite boulders (Fig. 62 and 63). The foundation had a length of 39 m from north to south, a width of 2.3 m and a height of at least 2.0 m (based on the difference between the top of the stones and the base of the construction cut). The courses and the rampart layers had been built “step by step”, where the purpose of the rampart primarily had been to stabilize the foundation and brick wall, where the upper coursing was placed 0.6 m west of the underlying foundation stones. The tops of all the boulders were almost level which suggests that great care was taken to ensure their stability. At least two of the boulders exhibited tool marks in terms of chisel marks and wedge holes.

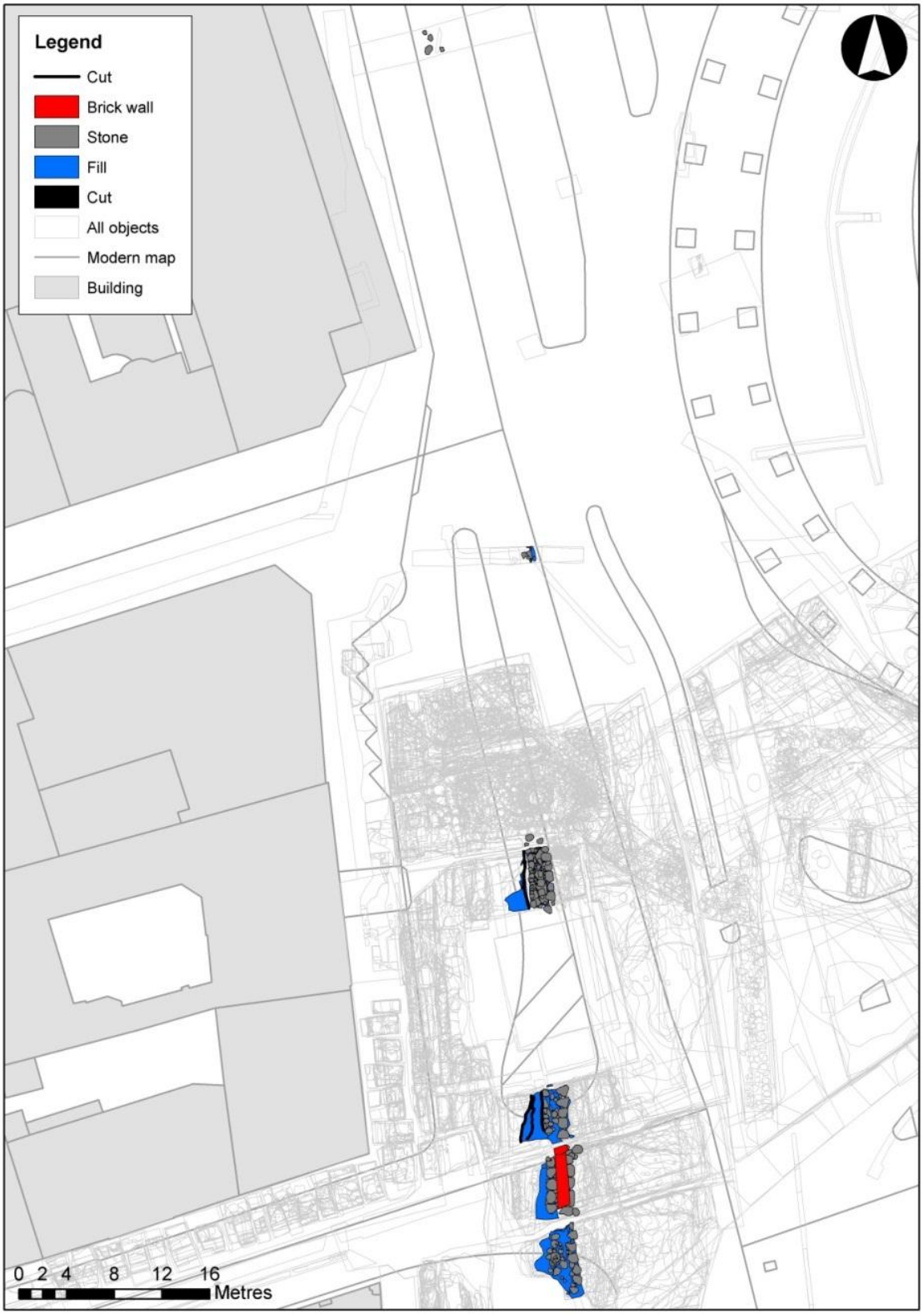

Fig. 62. Overview of investigated medieval city wall with construction cuts, foundation stones, limestone ashlars and brick walls outside Hotel D'Angleterre and between Lille Kongensgade and Østergade.

Fig. 63. The eastern face of the city wall foundation with two courses of boulders and intermediate stones and backfills, facing NW. To the right – part of the sloping moat. The structure was truncated by the shoring to the north and the Transformer Station to the south. Photo: Museum of Copenhagen.

The upper eastern faces of the boulders exhibited soft and hard, white-beige sandy lime mortar bonding in some of the joints between the stones and occasionally in small quantities on the actual faces of the stones. The appearance of hard white lime mortar up to 1 cm thick on the east face of the upper two courses could perhaps represent some sort of render. Where mortar was found in the joints between the stones, it was covering small pieces of red brick, up to 3 cm long, which had been rammed into the gaps.

The infill in the gap between the east and west facing courses consisted of sand, pebbles and flint together with bigger and smaller stones. Some of the stones seemed to have been arranged intentionally in a line behind the face of the wall to the east, whilst others were placed in randomly in the core of the foundation (Fig. 64). The purpose was to strengthen the structure and inhibit later movement or slippage.

Fig. 64. The lower part of the foundation together with filling the core between the lower east and west facing courses, facing west. In front – part of the moat, behind the built rampart. Photo: Museum of Copenhagen.

The remaining part of the curtain wall consisted of five courses of medieval bricks (“munkesten”), mortared together with sandy lime and a lower course of rectangular limestone ashlars on the eastern side facing the moat (Fig. 65). The bricks general size was 0.28 x 0.12 x 0.09 m, but there were also bricks with varying sizes between 0.27-0.29 x 0.10-0.13 x 0.07-0.11 m. In the base of the wall some of the bricks were cut into size. To make the coursings fit better, some of the bricks were placed upright so the top of the bricks were facing front. One brick had also been halved lengthwise (so-called “mesterpetring”).

Fig. 65. General view of brick wall and foundation, facing east. Photo: Museum of Copenhagen.

The facing mortar was destroyed, so the finish could not be determined with certainty. The mortar consisted of yellow-grey lime and sand with occasional inclusions of charcoal, small 2 mm stones and gravel.

The brick wall had originally been c. 0.9 m wide (1.5 cubit or three tiles thick, where one Zealand cubit = 0.6326 m). The brick wall was built in monk bond, i.e. two stretchers between every header with the headers centered over the perpendicular joint between the two stretchers in the course below, in the bond's most symmetric form (Fig. 65).

No certain maintenance work could be detected on the brick wall with the exception of a smaller area close to the gate building and an isolated posthole interpreted as part of scaffolding placed 0.5 m from the stone foundation. No putlog holes from scaffolding or damage from cannonballs were recorded either, nor were the remains of reinforcements in form of stiffeners, castellations, parapets or traces of a wall elevation.

The lowest course of limestones on the west side had been laid with limestones (Fig. 65) whose length was up to 0.28 m with a thickness between 0.09 and 0.16 m. The limestones were mainly rectangular, but a few of the stones were also quadratic. Most of the limestones were coursed in the medieval manner, but there were some irregularities occurring where there was a need to adjust the overlying, mostly linear courses on the underlying very irregular granite boulder base. Therefore it had been necessary in several places to vary the width of the limestones as well as place them on edge. The limestone course acted as a transition zone, between base and wall, where it passed on regularity to the overlying brick courses.

The limestone blocks and the bricks used in the wall construction looked reused. This indicates that the wall, at least in the lower foundation parts, was made by reused materials.

Different parts of the city wall were also recorded among the demolition material and backfills in the Late medieval moat and reused in the 17th century dam structure (Fig. 66 and 67).

Fig. 66. Collapsed and partially truncated brick wall in the Late medieval moat. Photo: Museum of Copenhagen.

Masonry reused and documented in the 17th century barrier tower can perhaps tell something about the city wall's upper parts. Two square blocks consisted of 3 courses of red bricks ("munkesten") with white tuck mortar within foundation. The features are interesting – the shape and the finished edges suggest that these represent the lower part of merlons, reused as building material when the city wall was demolished, the latter dated by building material in the Late medieval moat. A crenellated parapet can also be seen on the northern part of the city wall between Vesterport and Nørreport on Braun and Hogenberg's prospect over the city from 1587 AD (Braun and Hogenberg 2008).

Fig. 67. Close-up photo. Part of an interpreted merlon probably from the former city wall between two of the stones in the dam structure, facing north. Photo: Museum of Copenhagen.

Outside Danske Bank's facade foundation stones from the former city wall had been reused as foundations for a later brick wall, probably part of the building seen on Geddes elevated map from 1760 replaced by Peschiers Gård (Danske Bank) in 1796. Seven large boulders of at least 2 courses forming a U-shape were documented in an area of approximately 2.7 x 1.4 m surrounding an open area with a buried bucket. Post-excavation interpretation concludes that the boulders, or at least some of them, were part of the city wall after comparing these with the city wall foundations investigated in 1996–1998 (Kristiansen 1998:73 et seq.; 1999b:162-165). Further investigations were not done in the trench due to the excavation limit.

Dating

Based on stratigrahical observations the city wall is later than the bulwark and rampart dated to the early 13th century, but no stratigraphic relationships can date the city wall more accurately. The matrix shows that the wall truncates the embankment and is placed above the 13th century bulwark. In connection with the city wall the rampart was reinforced on the outside covering the first High medieval moat with finds dated between 1100–1400 AD, at some time before the wall is finally destroyed in the early 17th century in conjunction with the new defences (Østervold).

Based on stratigraphical observations, finds and uncertain AMS-results the oldest part of the city wall is therefore dated to the mid 14th century – a suggestion that should be seen together with the fact that the oldest part of the city wall at Vesterport is dated to 1372 AD (cf. Lyne and Dahlström 2015:189).

The construction of the city wall

Copenhagen is one of the few Danish medieval market towns which get a fortification with wall and towers (the other two are Kalundborg and Vordingborg). Already 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 an actual wall and should be seen together with the fact that Ingvar Hiort thanks the citizens for fortifying the city in the year 1289 (KD I:18; Skaarup 1998a:26). Not until mid year 1400 is the wall mentioned in a way that cannot cast doubt on its existence. The building of the city wall must therefore have started before this time. The first stage is initiated on the city's eastern borders from the shoreline south of the medieval Østerport at the end of Østergade.

The walls are first mentioned in Jacob Erlandsen's town privileges in 1254; *"...infra muros et fossata ciuitatis..."* and later in Bishop Johannes Krag's town privileges in 1294 (KD I:18). In 1298 a plot belonging to Nicolay parish between *"... fossatum curiæ suæ orientale et mare juxta murum..."* is mentioned (KD I:64; Thorsen 1926:217).

The fortification wall ran along the current Gothersgade, Nørre Voldgade and Vester Voldgade. There were several towers built along the wall, and the names Kattetårn, Hanetårn, Kringelen, Smørhætten and Løvetårn are known from contemporary sources from the second half of the 15th century. Jarmers Tårn at the corner of Vestervold and Nørrevold is not mentioned before 1529 AD, but would probably have also been part of the fortification's 11 original towers.

During the 14th century the country was affected by the Danish central power's total solution, of German expansion and Swedish interventions. In 1249 the city was burnt down by the Lübecks and the city wall was not completed in 1259 AD when Jaromar the 2nd of Rügen conquered the city through the plank fortification in what we know today as *"Jarmers Gab"* and where Jarmers tower exists today. If "*Byens Tårn*" is identical to Kringelen by Østervold this part of the city should have been walled already in 1289. In 1329 the king pledged both castle and city to Johan of Holstein who retained power for over 10 years and the prerequisite for major construction activities on the fortification must have been extremely limited. The same repeats itself in the year 1341 AD when King Valdemar Atterdag pledges the city to Marquard Stowæ the Elderly and in 1368/1369 when the city was conquered by the Hanseatic League and Copenhagen Castle demolished by Hanseatic stonemasons. The castle was rebuilt in 1387 AD, and perhaps this also led to extensive building activities on the city fortification? The construction of the city wall was a costly project that the average city could not pay for itself. In cases where the citizens themselves contributed on the funding one can assume that capital came from the dominant merchants.

To this comes the Black Death which must have hit the growing cities harsh including the city of Copenhagen. The written sources do not illustrate in more detail the harmful effects of the plague, but clearly there was economic stagnation extending from the 1330s until the end of the century. The king did not fully take over the supremacy of the city and castle from the Roskilde diocese before 1416/1422 – so construction of various fortifications, city walls included, was the citizens' responsibility and primarily based on private initiative (cf. Thorsen 1926:221).

The use of firearms in the 14th century can explain why the rampart defences were increased with walls and fortification towers. The Hanseatic League used cannons ("bøsser") at the storming attempt in 1428 AD and in the middle of the 1400s a definite wall is mentioned and it is likely that this was built using bricks and stone, which was standard at the time.

Based on this information there are clear similarities between the city wall investigated in 2010 and earlier documentations, both in respect to building material and techniques and to stratigraphical relations to the original

embankment. The width of the brick wall varied from 0.86 m to 1.20 m placed on 2-3 courses of large granite boulders where the width of the foundation was 1.1-2.2 m. The construction cut truncated the salt marshes and the foundation stones had been placed step-wise. Limestone ashlars were later placed at the base of the wall to level the masonry built using monk coursing and with brick size 27.0 x 12.5 x 9.0 cm (Fig. 68).

Fig. 68. Detail of brick wall and limestone coursing, facing east. Photo: Museum of Copenhagen.

Lassen (1855:20) describes a 4-5 cubit high wall between the former Østerport and the guard house, though without mentioning the precise location. 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 with lime dressed masonry and the moat with 16th century fill have been recorded (Fig. 69). The underlying salt marsh layer was visible in the section (Linde 1929; Berlingske Tidende 1929; Ramsing year unknown).

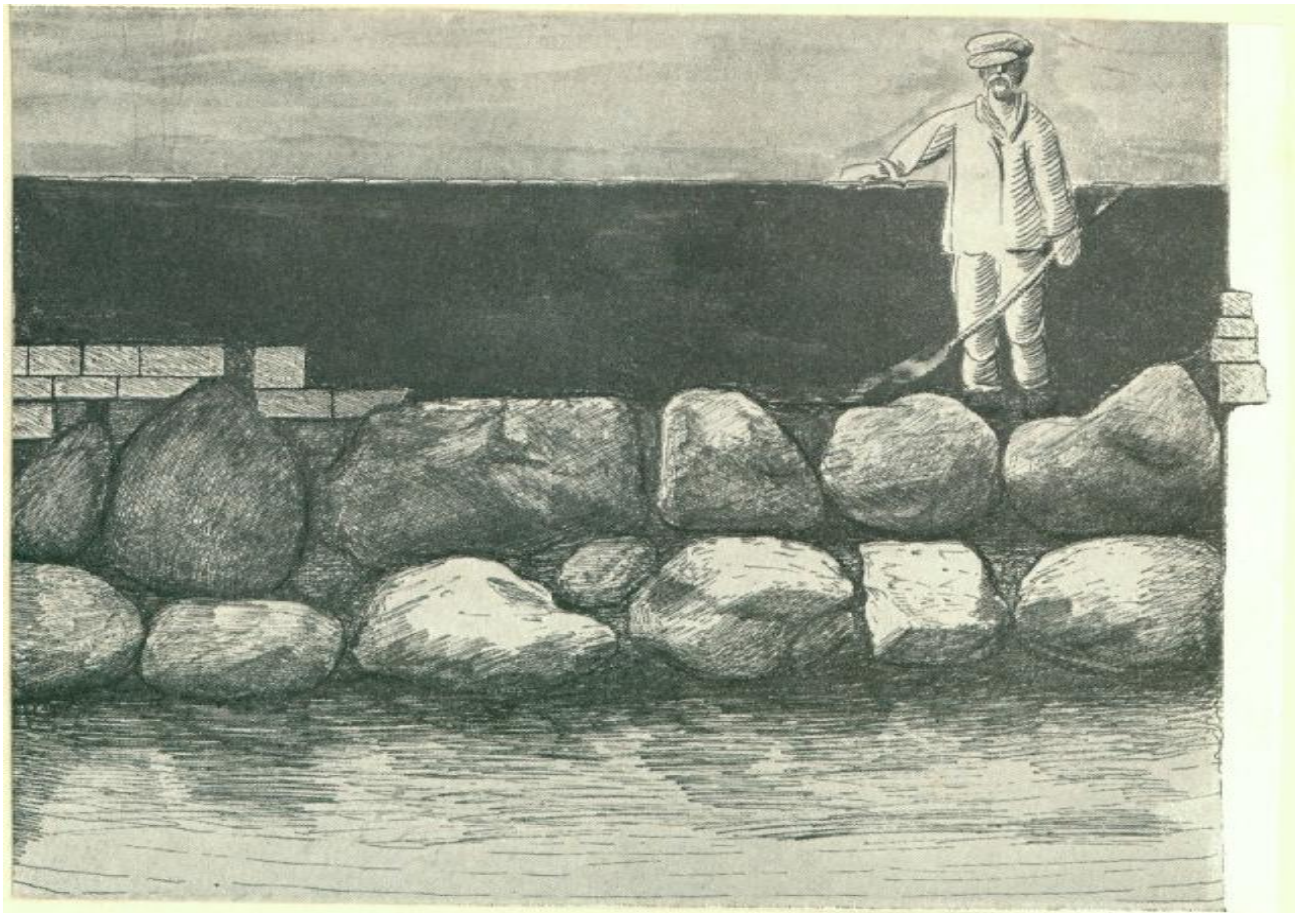

Fig. 69. Medieval city wall exposed outside Hotel D'Angleterre. From Linde 1929.

In connection with the construction of a Transformer Station in 1941 part of the rampart and stones belonging to the city wall was documented. The foundation appears on several images and drawings as a c. 11.25 m long and 2.00 m wide NW-SE orientated line of boulders consisting of at least two courses lying between kote +1.60 and +2.08 m. East of the boulders part of a collapsed brick wall and seven stones were recorded. What the proposed dating to 1490 AD is based on is unclear (Berlingske Tidende 1941; Jensen 1941).

At the end of Lille Kongensgade at the corner of former a'Porta, approximately 15.3 m from the building, a 0.86 m wide masonry structure consisting of 7-10 courses of medieval bricks and limestones on granite boulders was recorded. This was recorded together with several rubbish layers (Kayser 1961), and the brick wall investigated must be seen as part of the city wall. Not far away – at Magasin's northern corner at Østergade (should be Lille Kongensgade), in association with excavation in the street, part of the city wall was visible, consisting of boulders and a brick wall of Renaissance bricks together with ceramics dated to c. 1570–1580 AD and later (Frederiksen 1981).

At the Metro investigations in 1996–1998 the city wall was preserved as three foundation courses consisting of two rows of stones with a width between 1.1-1.7 m and a height of at least 1.4 m (Fig. 70). The top of the foundation was not preserved and no mortar was recorded on the stones. The courses and the rampart layers had been built "step by step", where the purpose of the rampart primarily had been to stabilize the boulders. Part of the wall was also found as decomposition layers of bricks and ashlar limestone above the mud layers in the former moat (Kristiansen 1998:73 et seq.; 1999b:156-158, 161 and 162). This destroyed part of the city wall consisted of a continuous remnant of a brick wall, at least 1.8 x 1.2 m with monk coursing 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. The suggestion of a new city wall was based on the orientation and traces of mortar scar by masonry of 0.42 m thickness on the surface of the foundation stones and demolition material and robber trenches, but it is worth mentioning that this interpretation was rather uncertain. Since there were no traces of the brick wall itself, this was explained by the fact that the wall could have been standing on higher placed sill courses. Suggestions that the city wall was restored at some time could also be explained by functional differences within the new structure (Kristiansen 1998:108-110 and 115).

Fig. 70. Foundation for the city wall investigated in 1996, facing west. Photo: Museum of Copenhagen.

During this archaeological excavation three samples from mortar connected to a wall remnant were TL-dated to the 12th and 13th century. A brick kiln built in several phases (stove, brick floor, two brick benches, six heating channels and brickwork of “munkesten” preserved in six courses was recorded west of the oldest rampart line (Fig. 71 and 72), interpreted as being 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 stove were dated to c. 1210 AD and 1310 AD. Charcoal from the fire pit was C14-dated to the early 1200s (Kristiansen 1998:65, 77, 78 and 93-95; 1999b).

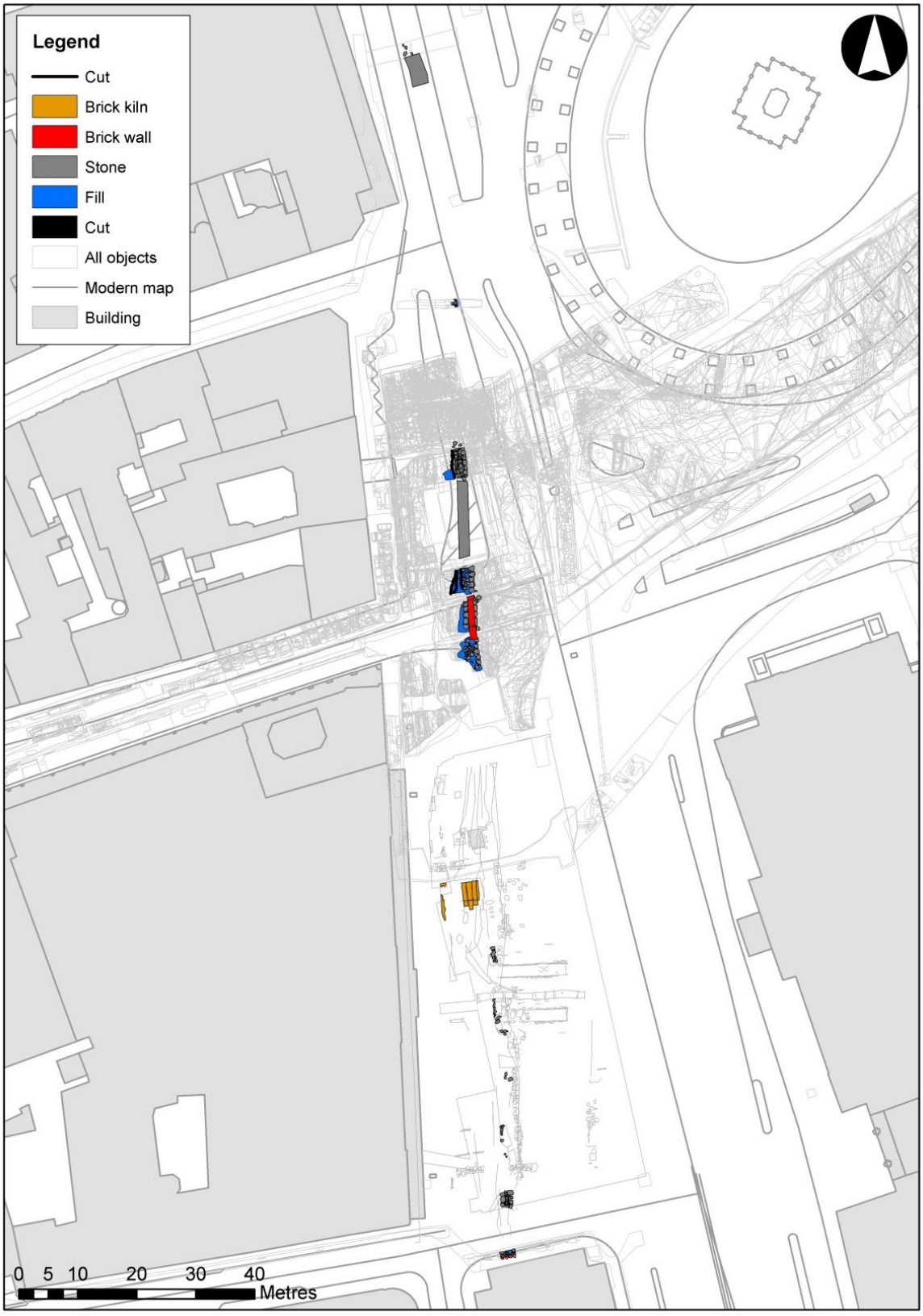

Fig. 71. The medieval brick wall investigated in 2010 together with earlier traces of the city wall and a brick kiln suggested to be the same age as one of the wall phases. The location of the latter is based on information from Linde 1929, Jensen 1941, Kayser 1969 and Kristiansen 1999b:156.

Fig. 72. Tile stove investigated at the Metro excavations 1996–1998, facing south. Photo: Museum of Copenhagen.

The wall had probably been 9 cubits high (5-6 m) with an earthwork lying behind. During the time of Fredrik the 1st the fortification was straightened with an inner embankment as high as the city wall and with a width of 16 cubits – though it is uncertain if the latter is valid for the area around Østerport (cf. Thorsen 1926:226 and 234). In comparison the city wall in Malmö, Scania from the early 15th century would have been 9 cubits high – c. 5.5 m with a width of "three stones" (c. 0.9 m) standing on a one metre high foundation of natural boulders (Rosborn 1984:37; Reisnert 1998:32 et seq.; Olsson och Ödman 2009 and Fig. 73).

Fig. 73. Part of the medieval "strandmur" investigated in Norra Vollgatan in Malmö. Photo: Malmö Museer, Rapport 2009:047.

The ring wall in Absalon's castle was 1.5 m wide and Valdemar's wall in Dannevirke from the second half of the 12th century was between 6.0-7.0 m high and c. 2.5 m wide, Vordingeborg's city wall was 8.0 m high, etc.

Both Ramsing (1940, Vol. III:10) and Engqvist (1951:9) believed that there should have been a city wall south of *"Byens Tårn"* and Østergård based on an old deed from 1298 (DD 2:4:284), and *"thend gamell mantellmwr"* is mentioned in a deed from 1546 (KD I:288; Thorsen 1926:233), though neither describes a wall along the shoreline or Vingårdsstræde. Based on the foundation north of Danske Bank (see Fig. 62) the original masonry must have continued south of Vingårdsstræde, and probably continued along the beach as a so-called "strandmur" similar to the city walls in e.g. Malmö and Visby.

So is it possible to estimate the amount of bricks needed for the city wall in this part of the city? The season for brick firing is short, and it is limited by what it is possible to produce with just one tile stove in a year. A proposed calculation of six firings per year with 12 150 bricks per firing gives approximately 72 900 bricks per year (cf. Nordeide 1983:107). For the Romanesque church of Maglarp in Scania, Sundner calculates for a capacity of up to 11 000 bricks for every burning (Sundner 1982:62). Based on these suggestions the amount of bricks needed for the outer curtain wall with monk coursing and not including the core itself, would have been c. 75 000 bricks, from the estimated beach at Vingårdsstræde to the gate building at the end of Østergade – and possibly equivalent to one year's production in the brick stove investigated in 1996.

Maintenance work and final demolition

The results from the latest Metro excavation prove that the investigated city wall is a later addition to the 13th century fortification and probably dated to the first half of the 14th century. This interpretation is based on stratigraphical observations and relations with identified construction cuts into the Early medieval rampart, several reinforcing deposits placed against the foundations stones and at the same time covering the original moat. Similar construction details were also recorded at the former Metro excavation in 1996–1998 where the High medieval rampart layers were placed up against the foundation stones, although some stones were also recorded as dug *into* the rampart, which the responsible archaeologist interpreted as a local phenomenon (Kristiansen 1998:75). The city wall probably also had a watchman's gallery or top corona of stone to avoid frost damage on the top courses.

With one exception, all rampart layers with inclusions of CBM were placed *behind* the city wall. A further assessment and separation of the potential construction phase has not been possible on the basis of height values due to the structure's oval design.

At the former Metro investigations some of the interpreted rampart layers had a great quantity of brick rubble in the fill (Kristiansen 1998:66 et seq.). The medieval city wall had probably been torn down, whereupon the demolition material of limestone ashlars, rubble (both "munkesten" and smaller 16th century bricks), and large pieces of the city wall combined with other materials had been re-used in a new foundation front. The rampart had partially been made of peat and was made taller and wider, covering at least 1.4 m of the wall base. Over the rampart a straw layer was documented, interpreted as remains after a growth horizon on the rampart's surface (Kristiansen 1998:107 et seq.; 1999c:188).

In the area from the beach at Kringelen, along Østervold and all the way to Nørreport, it was replaced by a wall with several towers. One of these towers was built in 1511 and used as the gate tower of Østergade's estuary (Østerport). In the turbulent years from 1520 and up to the siege of Copenhagen in 1536 the last section of the city wall was built from Nørreport to Vesterport and on to the beach south of the current Vartov.

From 1496 to 1515 construction work was carried out on the fortification, especially in 1510 when the mayor and aldermen took out a large loan for the (re)construction of the city wall. Further work was implemented by Fredrik the

1st (1523–1533 AD) and Christian the 3rd (1534–1559 AD), who both carried out a considerable modernization program for the state defence during their reign.

The state and need of maintenance work on the city wall in the mid 16th century is clarified by the information from 1543 where the citizens of Copenhagen went as far as asking the King if they could tear down the wall:

"Sammeledes bede Vi Eder endnu og begiærer, at I aldeles ingen Flid eller Umage sparer, at de Volde og Befæstninger baade imellem Østerport og Bremerholm og desligeste der ved Slottet - eftersom Vi baade Eder, Joackim Beck og Peder Godske, alle tre tilhobe, tilskrevet haver - mue blive færdige, overveiende hvad Magt derpaa liggende er, det Gud forbyde at Noget paakommer." (Eremit.dk 2012-10-04).

On the other hand one should not forget that in relation to the Reformation in 1536 a number of Catholic symbols disappeared from the cityscape – monasteries were demolished, also several churches, and in the void left by the clergy's loss of power, the city government now had the opportunity to seize building materials from the demolished institutions, such as bricks and tiles, which could be reused later.

As a nearby example, the medieval city of Malmö was not fortified until 1393, after the ravages of the Victual Brothers. The construction work was carried out in stages – notes are made in Registrum three times and there is a significant time difference between the two former. In 1419 the city borrowed 300 silver marks from the church for the building of a brick wall without delay by order of Eric of Pomerania, which should have been finished in three years, though the construction took a considerably longer time than that. As late as 1434 Eric of Pomerania again commanded all citizens to contribute to the city's new fortification, but not before 1517–1519 AD was the last part of the city wall completed (Reisnert 1998).

At the former Metro investigations inclusions of smaller 16th century bricks together with medieval bricks in the decomposition layers in the medieval moat and within the new rampart in the southern part of the excavation area, were seen as an indication of repairs and extensions of the city wall. Comparing the surviving brick wall outside Lille Kongensgade with part of the collapsed wall exposed in the Late medieval moat shows different types of bricks, which could argue for maintenance work, though no closer timing can be made. There is also information about Renaissance bricks in the interpreted city wall investigated in 1981, but this brick type provision has not been further clarified (cf. Fredriksen 1981).

The final demolition of the city wall was completed in connection with the Østervold bastion in the early 17th century when the Late medieval moat was backfilled with rubbish including a large amount of demolition material from the wall itself together with the excavated soil from the new and larger moat. These observations fit well with the results from the Metro investigation in 1996–1998 where the backfill included demolition material of limestone ashlars, rubble (both "munkesten" and smaller 16th century bricks), and larger pieces of the city wall combined with other materials reused in the new foundation front. At the former excavations there was an interpretation that the city wall mainly had been demolished in connection with Valkendorf's work on the fortification in the late 1500s (Kristiansen 1998:73 et seq.; 1999b:162-165), but this suggestion could not be proven at the later investigations in 2010, and the written sources including selected items from *Rentemesterregnskaberne* from 1608 and 1609 (a book-keeping of government expenditure), describe the demolition and reuse of bricks from *"the old wall at Østerport"* in the construction of the new fortification (Lassen 1855:20-21; Kristiansen 1998:13 and Appendix 8; Westerbeek Dahl in press).

Eastern gate building 1200–1600 AD

Results

The presentation of the remains from the eastern gate building (G-524) will be given from two perspectives. Firstly there will be an account of the different features which consists of 33 subgroups including stone foundation and walls, construction cuts, levelling layers within and outside the building, potential activity layers, floors, posthole(s), a suggested retaining wall or buttress, a well and several road surfaces. The abutting guard- or customs building to the west (G-275) presented here consists of 10 subgroups such as foundations and a brick wall, construction cut, postholes, road- and levelling layers (Fig. 74).

All parts of the gate building including a well with Late medieval finds and several road surfaces are included in this chapter, also certain Late medieval additions, since it in most cases has been impossible to separate these from the original structure. With certain exceptions, all road surfaces with associated structures outside Østerport are also presented here, although in some cases there is uncertainty regarding dating – specifically and partly due to survey methodology (machine) but also due to limits of excavation (Guide Wall areas). There are obvious structural similarities between the road surfaces and levelling layers in the gate building and the surrounding areas that also argue that these should be viewed as landscaped and maintained before the extensive changes of Østervold in the early 1600s.

Some of the robber pits recorded with connection to the building could be of Late medieval origin, but are presented under time Phase 6 (Post medieval fortification and the eastern gate building), in case stratigraphy or find material do not suggest otherwise. The opposite is true for a lot of the demolition material in SG-226 – most likely representing the destruction of Østerport in the mid 1600s, but grouped together with the rest of the medieval building, since it has been difficult to separate these contexts from earlier activities onsite. After the overall description the features are placed in a structural and historical context.

Eastern gate building – building and construction details

The construction cut for the gate building was excavated in stages, of which these were measured separately according to when these were identified and documented in place. Since the construction pits were not measured at the final stage of excavation, the units are based on the outer limits of each context.

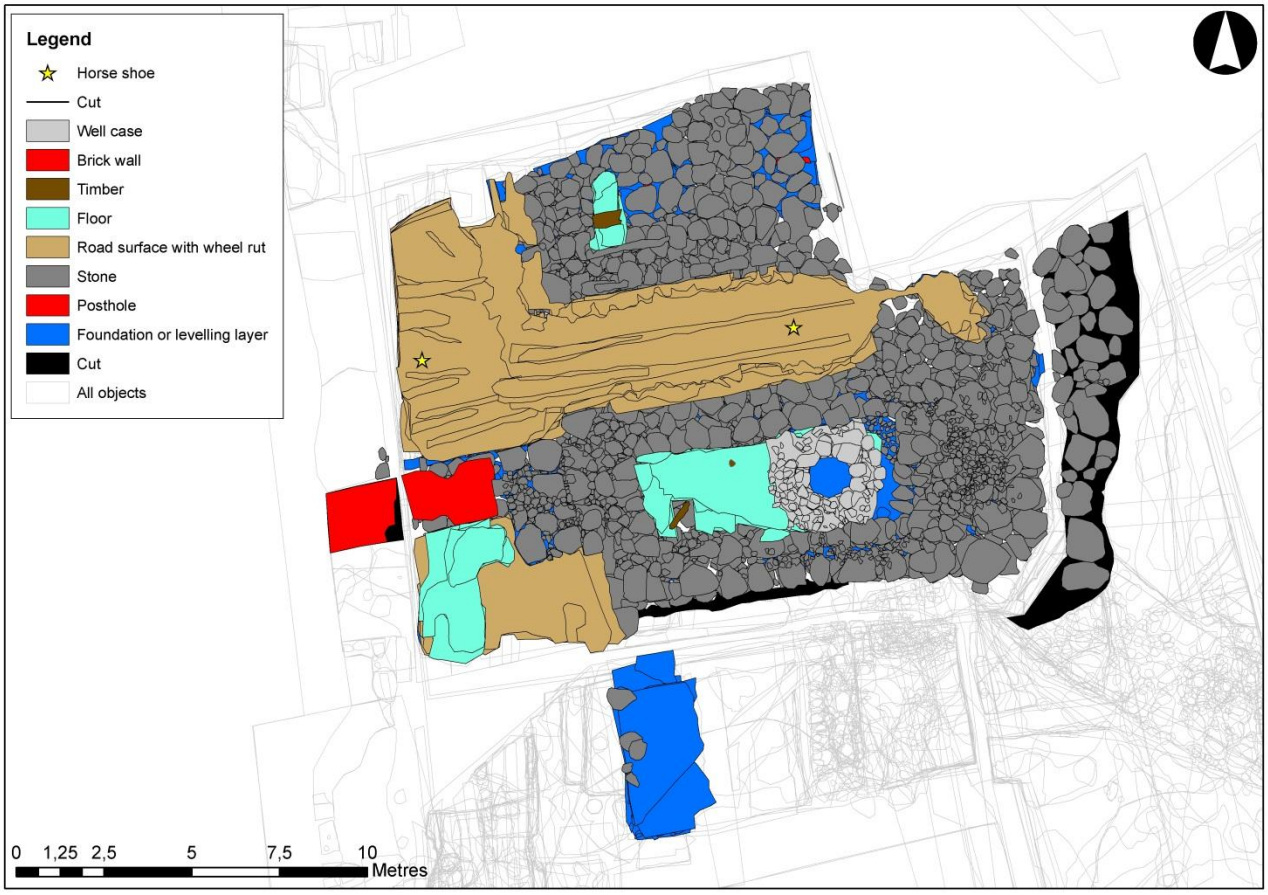

Fig. 74. The inner gate building with different structural elements. Be aware that the features on the figure are not presented in stratigraphical order, but the objective has been to highlight the individual parts, presented and discussed in the text below.

The construction cut for the gate building could be followed both in the northern and southern parts of the structure truncating the natural clay and sand. Only half of the northern part of the gate building was investigated where the foundation cut formed four separate L-formed cuts recorded at a distance of 8.4 x 4.4 m. Four cuts surrounded the southern foundation over a total distance of 7.2 x 6.5 x 9.1 m. Both truncations were limited by the excavation area and by the Late medieval moat cut to the west (Fig. 75).

Fig. 75. Post-excavation. Northern construction cut of the gate building without foundation stones, facing east. Photo: Museum of Copenhagen.

The cut sides were gradual/straight/steep and the base flat. Depth was 0.5 m at the most. Two of the cuts were part of a secondary, irregular construction cut, diffuse and only possible to follow in the northern part. A lot of smaller stones were present suggesting that these stones were placed here for some sort of drainage purpose.

Smaller stones were within the gateway area extending for a distance of 10.0 m up close to the northern and southern foundation walls. These may have functioned as a stabilizer within the created construction cut and the later backfill (Fig. 76).

Fig. 76. Backfill and concentration of smaller stones in the construction cut on both sides of the gateway area, facing east. The extension of Østerport in the 17th century can probably be seen as a slight bend of the gateway. Photo: Museum of Copenhagen.

The main foundation to the gate building consisted of a dry stone structure comprising of light and mid grey unfinished stones and boulders (Fig. 77). The dimensions varied – the main foundation stones and the outer skin of stones in the foundation had an average of 0.50-1.50 m in diameter, the packing consisted of smaller fill stones with an average of 0.05-0.40 m in diameter. In between, the fill consisted of firm, yellow-brown clay, silt and sand together with smaller stones.

Fig. 77. Southern foundation layer of big boulders and smaller stones dug into natural, facing SE. Photo: Museum of Copenhagen.

The gate building had been divided into four rooms where the NW and SW rooms could be measured to 4 m^2 and 6 m^2 (Fig. 78). The building itself including the outer walls was approximately 140 m^2, where the gateway constituted c. 25 m^2, though the size is uncertain due to later additions in the 15th century. One of the structures formed an upper row of foundation stones for the northern wall of the two rooms in the northern part of the building. Like the foundations, the walls consisted of light and mid grey roughly unfinished stones and boulders; outer skin stones were an average of 0.50-1.50 m and the packing of smaller stones were between 0.05-0.40 m in diameter.

The natural boulders had been carefully placed in relation to each other where flat side(s) were placed out- or upwards, either to achieve a smooth surface or to facilitate the work with the next layer of stones. After placement, the remaining gap was filled with stones and compact light white-yellow mortar and firm brown-grey sand and clay with inclusions of charcoal, pebbles, small stones and red brick fragments. The foundation material between the stones and boulders within the separated rooms consisted of compact and hard silty clay and sand of different colours and inclusions of charcoal, CBM, pebbles and stones. Nothing implies that the upper and exposed stone walls had been plastered, etc. (Fig. 78 and 79).

Fig. 78. The NW room in the gate building, facing west. In the foreground – part of the partition wall. Photo: Museum of Copenhagen.

Fig. 79. Construction detail. The southernmost and double faced wall with packing material of smaller stones, facing west. Photo: Museum of Copenhagen.

Two lengths of a limestone wall of blocks on top of the northern foundation wall in the gateway area had survived. The length was 0.9 m and 2.4 m respectively (Fig. 80). Despite the fact that only a minor part of the structure was recorded, this sequence of limestones had probably existed on both sides of the gateway in connection with the top section of the foundations.

Fig. 80. Cut through the NW gateway showing the two faces of ashlar stones and core consisting of smaller and bigger stones with mortar, facing west. Photo: Museum of Copenhagen.

The largest limestone block was 0.45 x 0.18 x 0.21 m and the smallest 0.21 x 0.11 x 0.20 m (Fig. 81). The pointing was very varied in thickness – from approximately 0.025 m to 0.010 m. The limestones were in some cases tapered at the back. At the northwest corner of the ashlar structure there was one stone that formed a corner with a wall going in a north-south direction keyed into this part of the wall.

Fig. 81. Detail. Close-up photo of limestones, facing north. Photo: Museum of Copenhagen.

The bonding material consisted of smooth grey/white compact lime mortar without further description. The limestones in the gateway area and upper layer of the foundation wall could be contemporary since the mortar between the limestones and the pointing on the face of the foundation was the same. Another explanation could be that there had been a considerable rebuild of the foundations when this wall was established/renewed in the 16th century (?).

Bio-stratigraphic dating and geological provenance analysis was made on some of the limestones. The three samples analysed are composed of chalk of the same age, suggesting that they may have the same origin (Rasmussen 2012). Most likely the limestone blocks originate from either the lower, but not very bottom, part of the cliffs at Stevns Klint or from Limhamn in Scania, in the latter case quarry was in use when the gate building was erected. Earlier studies indicate that the zone with the relevant limestone is about 9 m thick at Stevns Klint. The analysed ashlars originate from a level of the cliff that is lower than the one which characterizes the building material analysed from Absalon's Castle under Christiansborg Palace (Lauridsen et al. 2010), but further and more precise dating is not possible (Rasmussen 2016).

The demolition material consisted of mortar and light and mid white, brown, grey and yellow sandy silt and clay with mixed inclusions of charcoal, ash, shell, pebbles, stones and fragments of lime- and “munkesten” (Fig. 82). The cuts were remains of stone imprints and interpreted as robber cuts of different size and depth.

Fig. 82. Demolition material consisting of red bricks, stones, limestone and mortar in the gateway area, facing east. In the middle traces of a modern pipe line cut. The truncation in the middle represents a modern disturbance. Photo: Museum of Copenhagen.

A limited number of ceramics was collected in connection with the building phase of the structure and consisted of Late greyware; 1200–1400 AD. Finds from interpreted demolition material consisted of ceramics (Early redware; 1200–1450 AD, Late greyware; 1200–1400 AD, Late redware; 1500–1750 AD and stoneware; 1580–1700 AD), rib bricks, a column fragment, floor tiles, slate roof tiles, iron nails and bones. The latter material argues for a demolition or re-building of the structure in the early 17th century (compared with the finds material in the well, below).

Part of a wall was recorded continuing in a N-S direction from the southwestern part of the gate building (SG-226) before this was truncated by the modern Transformer Station from the 1940s.

The feature consisted of a very diffuse north-south orientated layer (5.50 x 1.90 x 0.20 m) with a base of greyish sand, big chunks of yellow clay and several stones of different sizes (Fig. 83). The largest stones were 0.86 x 0.47 x 0.15 m, but there was a great variety in sizes – from larger to smaller stones and rubble. Approximately 55 stones were recorded. Yellow lumps of clay indicated traces of removed stones beside the ones surveyed. The subgroup was interpreted as traces of a retaining wall or buttress that had been robbed out and where only a few stones and the clay between them were left.

Fig. 83. Foundation layer in connection with the eastern gate building, facing south. Photo: Museum of Copenhagen.

Traces of floors were identified in both the northern and southern rooms of the gate building. In the northern part of the building two parallel horizontal set planks placed in an east-west direction were recorded. The floor abutted the northern gate wall and was built up around a stone and brick structure. The stones and bricks were lying on a bed of clay and together with a mortar layer this deposit was part of a floor foundation layer. The subgroup was overlain by a clay layer with inclusions of CBM, which might be a repair following the removal of the wooden floor.

In the SE room of the building a clay floor was recorded in association with and partly overlying the well, together with foundation layers of mortar with inclusions of pebbles, charcoal and CBM underneath an irregular brick built pavement (Fig. 84). The irregular brick pavement (2.5 x 4.5 m), laid to provide a dry surface close to the well, consisted of various bricks and large brick fragments (“munkesten”) mixed with worked limestones.

Fig. 84. Part of brick and limestone floor in connection with the well, facing NE. Photo: Museum of Copenhagen.

The foundation material in between the stones and boulders within the separated rooms consisted of compact and hard silty clay and sand of different colours and with inclusions of charcoal, CBM, pebbles and stones.

No datable finds were collected from the northern floor layers. From the SW room the finds consisted of ceramics (Early redware; 1200–1400 AD, Late greyware; 1200–1400 AD and Proto-stoneware, 1250–1375 AD), bricks, a copper alloy (undated and undefined), iron nails and bones.

The foundation and levelling layers consisted of mixed and mottled make-up material of different colour, composition and homogeneity, with inclusions of ash, charcoal, bone, red brick fragments, lime fragments, mortar, wood, peat (salt marshes (?)), pebbles and stones (Fig. 85). The deposits represent mainly construction waste overlying and abutting the foundation stones within the building.

Fig. 85. Part of foundation layer north of the foundation wall, facing west. In front – truncation by a 19th century wooden water pipe not yet exposed. Photo: Museum of Copenhagen.

Finds form the levelling layers consisted of different household waste such as ceramics (Early redware; 1200–1400 AD and Late greyware; 1200–1400 AD), bricks, a copper alloy (undated and undefined), slag, a flint blade and -flakes, a bone toy and bones.

In conjunction with the gate building 17 postholes were documented (Fig. 86). Six of these were located close to the northern gateway wall and must be considered as remnants of a scaffold during subsequent work on the gate as these postholes cut through older road surfaces (Fig. 87). This maintenance work cannot be more closely dated than between 1400–1550 AD. In the building's NE part there were three rows of postholes – one running N-S and two running in an EW direction.

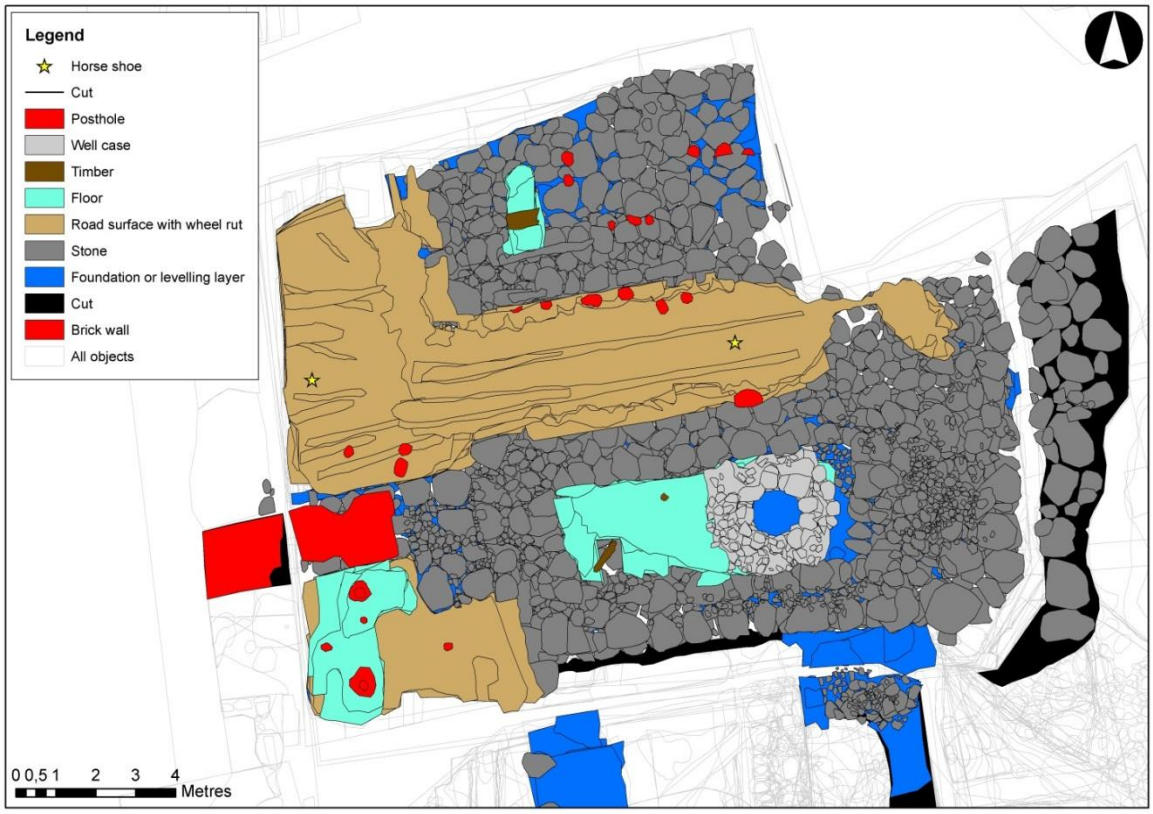

Fig. 86. Traces of scaffolding in the gateway area and other postholes in relation to Østerport and its annex. Be aware that the features on the figure are not presented in statigraphic order, as the objective has been to highlight the individual parts presented and discussed below.

Eight postholes were recorded within the gate building. Besides having a bearing function considering the size of the truncations, further interpretation is difficult, although, either these postholes represent traces of a partition within the rooms or remnants of repair work on the building.

Fig. 87. Post-excavation. Row of interpreted scaffolding holes within the gateway area, facing north. Photo: Museum of Copenhagen.

In the SE room of the building a well was recorded. This consisted of a circular dry stone structure, approximately 2.5 m in diameter (Fig. 88). Depth is unknown since the last stones were removed by machine due to time pressure and inflow of ground water, and therefore the bottom was not fully investigated. This should though have been around 4.0 m at the most.

The stones in the well case consisted of a total of seven courses of mid grey, uneven granite stones, with the exception of a line of three squared, well finished chalk blocks (Fig. 88). Construction details show that the stones had been gradually built up together with surrounding clay deposits to keep the well tightly sealed. The stones were placed with flat side inwards. Bigger stones were documented at the top, more squared, shaped stones further down in the underlying courses.

Fig. 88. Top of well case and surrounding packing material, facing west. Photo: Museum of Copenhagen.

The packing material consisted of rubble and smaller stones placed around and butting the larger stones in the well case. This was then sealed with bonding material of firm, light and mid yellowish green and grey clay with inclusions of CBM, mortar and bones (Fig. 89).

Fig. 89. Packing material of clay and smaller stones, facing E-NE. Photo: Museum of Copenhagen.

A special type of clay was placed around the well to achieve desirable qualities. Using this clay as sealing material had also avoided contamination from surrounding layers.

Finds from the well were collected from between the stones and the surrounding packing material and consisted of ceramics (Late greyware; 1200–1400 AD), a flint blade and bones. A variety of finds were also collected from the backfills consisting of ceramics (Early redware; 1200–1450 AD and Late greyware; 1200–1400 AD), iron nails, slag and bones.

Several big bags were wet sieved from the deposit(s) in the well which reflects the amount and variation of finds. The material consisted of ceramics (Early redware; 1250–1450 AD and Late greyware; 1200–1400 AD), bricks, daub, roof tile, gunflint, iron nails, slag, wood fragments, a bone dice and bones.

The road surface had been repaired several times and at least five major maintenance works could be identified within the gateway area. The height difference of c. 1.3 m between the top road surface and the oldest foundation layers can partly be explained by the fact that the surface was sloping east-west c. 0.5 m, but still the different deposits and levelling layers constitute as much as 0.8 m. There was a slight difference between the material used in the foundation/levelling layers which consisted of mixed deposits of different colour, composition and homogeneity – though mainly silty sand or clay with inclusions of charcoal, CBM, mortar, lime fragments, wood, pebbles and stones.

In one phase of the maintenance work the foundations consisted of light yellowish white sandy mortar with inclusions of pebbles and stones. Limesstones had in a great degree been used as foundation material. The layer covered the entire gateway area and continued eastwards overlying some of the boulders in the former moat. In the western part of the excavation area the deposit continued in a north-south direction immediately west of the foundation layer in the northern part of the gate building.

The road surface consisted of brown-grey silty sand and clay with inclusions of soot, charcoal, red brick fragments, pebbles and stones. Some of the deposits had a high content of decomposed organic material and still contained

pieces of twig and straw. The average stone fragment size was 2.0-3.0 cm in diameter where in some places the surface had sunk into (or filled) the wheel ruts (Fig. 90).

Fig. 90. Road surface with wheel ruts, facing west. Photo: Museum of Copenhagen.

Different wheel ruts were recorded within the gateway area and in the area west of the gate building at a length of c. 13.4 m (see Fig. 74 above). With one exception represented by four imprints in the direction of the current Østergade and two running in a NE-SW direction, all wheel ruts had an east-west orientation.

The sides of the ruts were irregular/gentle and the depressions had a concave and irregular base. The deepest parts of the ruts were 0.08-0.20 m wide and the maximum depth varied from 0.04 m to 0.18 m. The ruts became much deeper and wider just at the western end of the gate, where they were about 0.15 m deep and 0.60 m wide. The width and depth indicates heavy loads and wear which had necessitated the subsequent maintenance work filling the depressions with smaller stones and pebbles. The cart wheel spacing varied from 0.9-1.1 m and shows that the spacing had not changed during the time the gate building was in use. In places, it seemed like there were identifiable hoof marks from horses (Fig. 91).

Fig. 91. Road surface with wheel ruts, facing west. Note how the mortar layer overlaps the foundation stones in the wall. Photo: Museum of Copenhagen.

No datable material was collected from the foundation layers (roof tiles, part of a button, an iron nail, a flint blade and bones), but finds from the different road surfaces consisted of ceramics (Early redware; 1200–1400 AD and Late greyware: 1200–1400 AD) and an iron horseshoe (Fig. 92) from one of the oldest road surfaces was dated to between 1150–1350 AD and most likely between 1200 and 1270 AD (cf. Clark 1995:95-96).

Fig. 92. Horseshoe in situ from above. Photo: Museum of Copenhagen.

Dating

Ceramics from different contexts and parts of the structure date the first construction and usage of the gate building to between 1200 and 1400 AD, where the presence of Proto-stoneware in one of the deposits can be dated to 1250–1375 AD. A horseshoe dates one of the road surfaces to between 1200 and 1270 AD. Stoneware among the demolition material suggests a deconstruction or rebuilding of the medieval gateway which corresponds with the written sources and the reconstruction of the fortification in the early 17th century.

Wheel ruts can also be used as a dating proposal – at least as a *terminus ante quem* for the road usage phase. Early medieval wheel ruts have been investigated at Rådhuspladsen with a width of approximately 1.0 m (Lyne and Dahlström 2015:89), similar to the gauge for the coaches which passed through Østerport. Horse-drawn carriages in the countryside do not change much over time. A width of 120 cm is older than the 1500s for the farmers' wagons concerned. Transport wagons and high status wagons in the 1500s (and later) were 130-140 cm wide and this was one of the reasons why Frederik the 2nd established royal roads, roads which farmers were forbidden to use with their narrow carts. After Christian IV introduced vehicles that could drive on the same roads as the farmers, the peasants started a new trend where the gauge was reduced to c. 90 cm (Schovsbo 2016).

Timber and building material (SG-500988) consisted of a piece of beech with a clear axe mark in one end documented in situ between foundation stones and the natural moraine. It was not possible to date the timber through dendrochronological analysis and the piece of wood was therefore later C14-dated. The AMS-analysis with respect of the old-wood effect (using the maximum of 5 years) dates the timber to 1210 AD. AMS-analysis of bones from retaining wall or buttress dated this structure to the early 13th century.

Revetment and road surfaces outside the gate building

Different types of revetments and several road surfaces was recorded outside the gate building (Fig. 93).

Fig. 93. Østerport with traces of revetments and road surfaces. The void among the foundation stones and the road surfaces is caused by modern shoring on the building site and a NW-SE running central heating trench.

Two rows of standing timber and postholes were documented east of the gate building (Fig. 94). Structure (G-815) consisted of a row of vertically set timber posts running in a NE-SW direction, partly truncated by the central heating trench and not fully exposed due to the excavation limit in 2012. The other row of posts (G-829) was recorded 6.0 m to the north and represented a NE-SW post line consisting of 20 postholes (Fig. 93). Despite the stratigrapical relation being unclear, and the height difference is as much as 0.9 m (kote = +1.8 m and +2.7 m), the spatial location and direction argue respectively that the structure is connected in some way to the road surfaces.

Fig. 94. Partly exposed row of timber posts in a created test trench, facing NW. Photo: Museum of Copenhagen.

South of the identified road surfaces and between the timber structures two lines of NE-SW running, unfinished granite stones was documented (Fig. 95). The height above sea level varied between 1.9-2.2 m. The 26 stones were interpreted as part of foundation line for the overlying road surfaces. The gap to the west and some missing stones are related to machining/safety concerns and due to machining it is uncertain whether the stones could have been structural and related to the N-S running stones in fortification group G-503795 (see Fig. 93).

Fig. 95. Stones beneath and up to the road surfaces, facing NE. Photo: Museum of Copenhagen.

The road surfaces were heavily truncated by a modern central heating pipe trench running in a NW-SE direction. The surfaces consisted of a mixture of dense gravel, rounded pebbles, broken flints and brick fragments (Fig. 96 and 97). The crushed flints were approximately 1-5 cm in diameter. Some fragments of medieval bricks and bones had been incorporated, but these were not common and constituted less than 5%. The material between the stones consisted of silty brown and grey sand with decomposed organic material. The stones used ranged from cobbles > 10 cm to pea gravel, but most were between 3 and 7 cm. With the exception of the cobble surfaces, the deposits were very hard and the gravel matrix very cohesive compacted.

The south-western half of the road surface was generally intact and smooth, but sloped down to a much more rough uneven and possibly rutted surface with larger cobbles. This north-western sunken portion of the pavement would have continued towards the centre of the road and was probably exposed to more heavy traffic (wagons and horses), while the margin of the road probably carried primarily pedestrians. Despite the generally pitted or uneven character of the NW margin of this road surface no continuous well defined wheel ruts were visible.

Fig. 96. Road surface, facing east, with interpreted post imprints and to the left. Photo: Museum of Copenhagen.

A cobble surface had been laid along the edge and part of the structure had been robbed. Along the SE side was an edge defined with six bigger stones. The stones in the curb were worn on one surface and could represent some sort of boundary, though the functional or practical difference between these two surfaces is unclear (median in the middle of the road?).

There was a slight difference between the material used in the foundation/levelling layers which consisted of mixed deposits of different colour, composition and homogeneity – though mainly silty sand or clay with inclusions of charcoal, CBM, mortar, lime fragments, wood, pebbles and stones.

Additionally, wheel ruts were seen as depressions, approximately 0.4 m wide and 0.1 m deep, with a distance of approximately 1.0-1.2 m in between. One of the surfaces was exposed during the watching brief in 2012. Two wheel ruts running NW-SE with a separation distance of 1.0 m were recorded on the surface.

The road surface had been repaired several times and at least four major maintenance works could be identified. The height difference was c. 0.8 m between the top road surface and the oldest, but this difference can also be explained by the fact that the road area sloped from the east to the west. The latter together with modern truncations has made it difficult to compare and merge the different road surface, and wheel ruts with the documented surfaces inside the gate building, but a suggestion is that G-821 could be comparable with road surface SG-281 with its mixture of packed gravel, rounded pebbles, broken flints and brick fragments.

The road surfaces can be dated to the 16th and 17th century. The gauge for the coaches which passed the gate building was approximately 1.0 m, suggesting a relatively late date (cf. Schovsbo 2016). No datable finds were collected from the bedding and levelling deposits, the road surfaces included ceramics (Late redware; 1550–1650 AD) and a

"kobbersterling" dated to c. 1420–1440 AD. Late redware (1400–1750 AD) was found in one of the activity layers, the deconstruction phases are represented by ceramics (Late redware; 1600–1750 AD), stove tiles and an iron nail. The coin from one of the road surfaces consists of a "kobbersterling" connected to Eric of Pomerania, c. 1420–1440 AD, but whether this accurately dates this uppermost road surface in this area or not is uncertain.

A big boulder was recorded within the road surfaces to the west. Boulders of this type were typically used as foundations in massive masonry structures or at the base of earthen ramparts. This was probably the original use of this boulder, but its surface had been exposed and it formed a part of the lower gravel pavement. The stone was presumably reused from a foundation, perhaps as a northern boundary stone for the entrance, as it was apparent that traffic had polished the surface, and it was presumed to be contemporary with road surfaces (G-821) which are later according to the matrix, although the layers between could amount to levelling and foundation layers for the construction of the road.

Fig. 97. Boulder and road surface, facing NW. Photo: Museum of Copenhagen.

Customs- or guard building next to the gate building

The L-shaped annex interpreted as part of a customs- or guard house consisted of a brick wall partly made of "munkesten" abutting the southern part of the eastern gate building (Fig. 98).

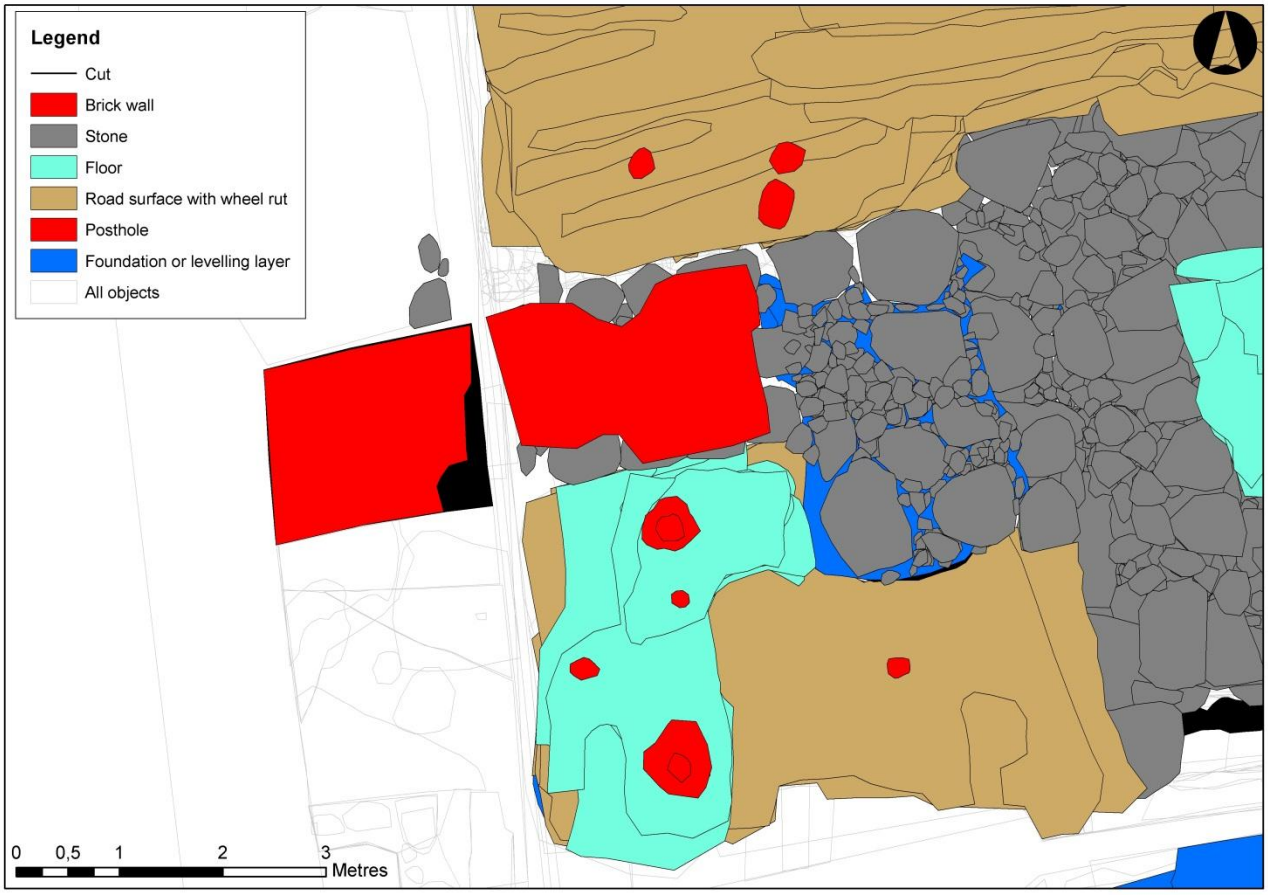

Fig. 98. Customs- or guard building west of the inner gate building.

The construction cut consisted of an irregular truncation in the natural moraine with moderate, straight sides and a flat base together with imprints from the removed foundation stones. The backfill in the construction cut consisted of mottled light and mid brownish grey sandy clay and silt with lime- and CBM fragments, charcoal, pebbles and smaller stones.

The 1.9 m wide and 4.5 x 3.4 m long foundation consisted of a dry stone structure of unfinished and uncoursed mid grey granite boulders. The number of courses varied between one and two. The fill between the boulders consisted of smaller stones and loose, brownish and yellowish grey silty sand with inclusions of CBM. On the north side of the brick wall in subarea phase 1N there were two or three stones that could possibly be part of the foundation, however, this relationship remained unclear as no more excavation was carried out in the area (limit of documentation). The boulders had their flat side to the ground.

The wall was a mixture of large granite stones (c. 0.8 m) and coursed brickwork, where the bricks had been broken to fit around the larger stones (Fig. 99). The stones built into the faces of the wall were flat and smooth, and flush with the brickwork. At the most – six to seven courses of fully laid fragmentary “munkesten” with smooth and struck mortar were recorded. The middle of the wall consisted of smaller stones and red brick fragments mixed with mortar.

Fig. 99. Cut through brick wall, facing west. Photo: Museum of Copenhagen.

With the exception of the medieval bricks and indication of monk coursing, no datable material was collected in relation to the construction or usage phase of the stone foundations and brick wall, though finds from interpreted demolition layers included ceramics (Late greyware; 1200–1400 AD and Late redware; 1500–1650 AD), where the latter can be used as a *terminus ante quem* date for the structure and fits well with the larger construction work on the fortification and gate building known from the early 1600s.

From interpreted floor layers inside the building ceramics were collected – from levelling deposits; Late greyware (1200–1400 AD) and usage deposits; Early redware (1200–1400 AD), which suggest a dating of the annex to the 14th century. Based on finds (ceramics) the deconstruction of the building is dated to between 1500–1650 AD.

Macrofossils from one of the foundation layers (chosen because of the lack of datable material and despite source critical arguments) and fill in one of the postholes within the building were AMS-analysed. These samples date the construction to the mid 14th century which together with the pottery above argue that the structure is a later extension to the gate building and probably built at the same time as the city wall in the 14th century.

Østerport – the eastern entrance to the city

The oldest Østerport, probably a tower gate, is C14-dated to the early 13th century and known from *Roskildebispens Jordebog* from 1294 (written source on land tax). It was called Røde port (*rubeam portam*) and placed at the end of Østergade (KD I:105; Thorsen 1926:214; Christophersen 1985:109; Skaarup 1998a:38; Fabricius 1999:120). Røde port is a common name, and demarking important or main gates to the medieval towns (Altenberg 1996). In former Danish towns as such Flensborg in Slesvig-Holsten and Lund in Scania the southern gate was called Røde port and in Roskilde Østerport had the same name (Thorsen 1926:214).

As the archaeological excavation shows there had been extensive maintenance and modification work on the eastern gate throughout the years, especially in the 1600s, before the final reconstruction of the building in the early 17th century. These results fit well with what we know from the written sources:

At Kong Hans' last reign considerable work was done on the fortification particularly with respect to the gate; in 1505 a bulwark was built outside Østerport. In 1510 the accounts for the city's amount *"till then bghningh thill Østhre porth"* is mentioned. Since the money mentioned is being used to *"kalck oc stheen"* this must represent masonry, either to an extension and appearance of the present gate building or to a new gate building outside the moat. In 1511 Mayor Oluf Adsersen accounted his outlays spent on the *"then hommeydh weeth Øster porth"* (extension in the wall or entrenchment) at Østerport and in 1512 Alderman Mogens Lavridsen reported the costs for the gate's vault and thatching (Nielsen 1877–1892; Thorsen 1926:229-231). The latter information is of interest since there are several traces of construction work within the gate building – not only the several road and surfaces, traces of scaffolding, but also on the foundation walls themselves. As seen on figure 100 the second course of foundation stones is placed nearly 0.35 m into the gateway area compared to the uppermost boulders and limestone ashlars.

Fig. 100. Extended entrance and rebuilding work in the 1500s? Foundation stones, facing south. Photo: Museum of Copenhagen.

There is also a suggestion that the well could represent the public well that Christoffer Valkendorf reportedly had constructed at Østerport in 1579, but this assumption is less likely considering the collected finds material.

The estimated size of the gate building with its 140 m^2 (where the edge of the Late medieval moat constitutes an eastern limitation) is much larger than both Nørreport (c. 50 m^2) and the remains of Västerport (c. 81 m^2). The size probably reflects rebuilding and expansion of the gate building during the 1500s (Fig. 101). Medieval Västerport in Malmö with its 100 m^2 is also smaller in comparison. The gateway has been c. 32 foot long (c. 9.8 m) and the archway at least 2.5 m high. If two carriages had to pass each other the entrance must have been at least 2.5 m, preferably 3.0 m wide. Østerport with its width of 2.7 m must have impeded such passage.

It has not been possible to determine the exact height of the building, but on the basis of surveys of Nørreport and the suggested height of the city walls to c. 5.0 m, this should have been at least 10 m for effective defence in case the city wall was captured by enemies.

The design of the gate is unknown, but based on the demolition material within the gateway area the latest version of the inner gate building was walled in red brick with rows of limestone ashlars – common for these types of buildings in the Late Middle Ages and especially seen on high status buildings from the 16th century. This is also suggested through *Rentemesterregnskaberne* from 1608, describing both the destruction and re-use of bricks from the old gate building (Kristiansen 1998:Appendix 8).

Fig. 101. Overview. The southern part of the gate building with gate walls and well, facing west. Photo: Museum of Copenhagen.

Østerport during the 1400s had probably been a High Gothic building with a pointed arched door. It does not seem to have been equipped with a roof, but with upper parts that formed a platform with surrounding parapet (cf. Thorsen 1926:227). This suggested description differs from the oldest known depiction of the gate building seen on a prospect of Braun and Hogenberg from 1587 and Resen's Atlas from c. 1596 [1677] showing a building with Late Gothic blinds, pointed gables and a circular rose (Fig. 102).

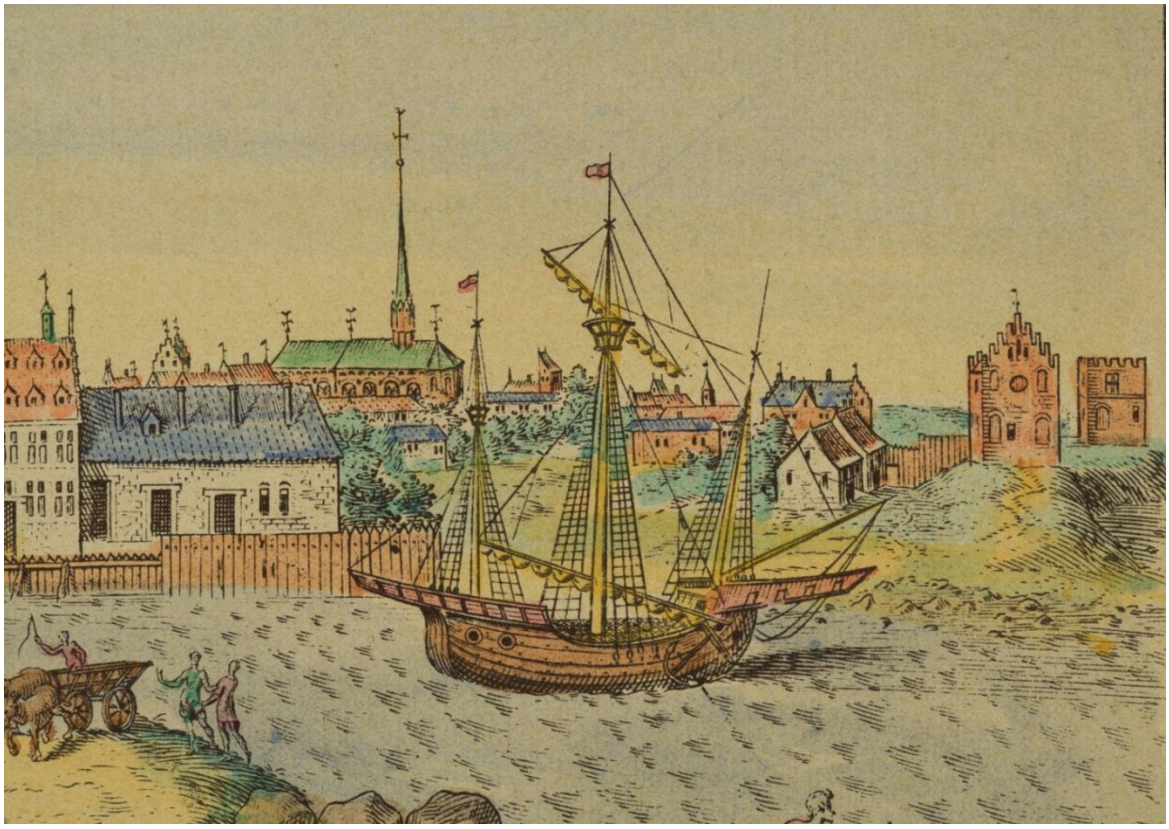

Fig. 102. The eastern part of Copenhagen and the interpreted gate building to the right. The image is cropped. From Braun and Hogenberg 1587.

The gate building had several floors above the archway built into the rampart with windows/loopholes above the fortification line similar to the gate buildings exposed at Nørreport when the 17th century fortification was demolished in the mid 1800s (Fig. 103). The medieval Nørreport was squared (c. 7.0 x 7.0 m) with a gateway width of 4.0 m and with a round arched vault. The southern wall was 1.0 m wide and the north and east 1.26 m (Lassen 1855:Planche III; Thorsen 1926:239).

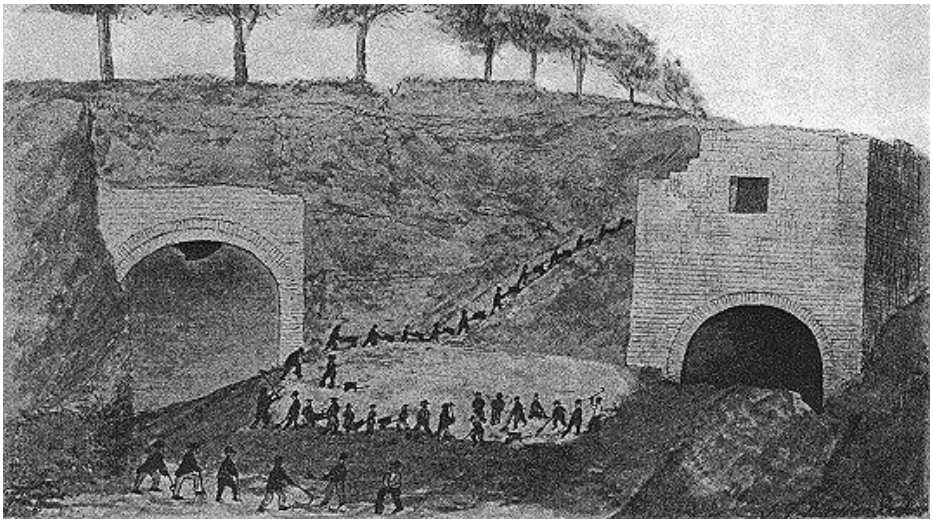

Fig. 103. Nørreport's inner and outer gates exposed in the 1854. Drawing from Pontoppidan (1936). Omkring Københavns gamle Volde og Stokhuse, København and taken from Dansk Center for Byhistorie (2015).

Part of Vesterport was investigated at the Metro excavation at Rådhuspladsen in 2011–2012. The gate itself, based on the foundation remains, measured 9 x 9 m, where the gap between the foundations of the outer gate was 2.75 m, while a projecting wall extended c. 5.1 m to the southwest of the gate's western corner (Fig. 104). The projecting walls would have connected the gate structure to a bridge which spanned the city moat to the gates immediate southwest, possibly preventing the embankment from slumping on to the road. It seems most likely from the way the layers of stone were laid, that the gate and the projecting wall were built at the same time. The building was dated to 1375 AD (Lyne and Dahlström 2015:180-181 and 200).

Fig. 104. Part of medieval Vesterport investigated at Rådhuspladsen, facing SW. Photo: Museum of Copenhagen.

With a gate building dating to the early 13th century it can be interesting to do comparisons with other similar and dated structures in Copenhagen. The presence of rough hewn stones has similarities to the limestone ashlars seen in Absalon's Castle from the late 12th century (Fig. 105) – though there are also dissimilarities if one compares the wells in the same castle (carefully built with lime ashlars) and the natural granite stones used in the gate building.

Fig. 105. Limestone ashlars in Absalon's Castle under Christiansborg. Compare with the limestone blocks in the eastern gate building; figure 81. Photo: Morten Steineke.

The pavement was often made of tightly packed pebbles, so-called "knadder". Moreover the investigation revealed small areas with cobbled surfaces just outside the Late medieval moat. Though pebbles were the most represented and preserved pavement, this does not mean that it has been as dominant in the past. Its conservation benefits from the fact that pebbles, compared to more easily picked cobblestone, are labour intensive to remove, and thus not economical to re-use.

Since the road and foundation layers lacked datable finds it has been impossible to get a more precise dating for most of the surfaces, but those which nevertheless were dated, were all landscaped in the period between 1300 and the 1600s. Mixed roads of pebbles have been used from the 13th to the 17th century. Preserved cobbled surfaces were preserved in the eastern part, and may have been constructed during the late 16th century. The upper layers from the 16th and 17th century contained components and leftover materials from building, material either taken from nearby building sites or mixed up with material from maintenance work on the gate building itself.

The road surfaces were as was the main fortification a substantial investment in the form of civil works, procurement of soil and transport, and should therefore have been organized and funded by municipal taxes. This fits well with Christian II's not persistent city law from the beginning of the 1500s, where the precedents being set there are that it is the cities (councils) responsibility to keep the streets serviceable for the passage of verticles (Anderssen 1991).

In front of the gate semi-circular islands known as redoubts were built at the beginning of the 16th century for defence, as it was necessary to pass through these on the way into the gate. The gate was demolished with the relocating of the city wall in 1647.

The annex west of the main building is interpreted as a separated customs- or guard house often seen in association with gate buildings in the High Middle Ages (cf. Middle Holsten Gate in Lübeck) (Fig. 106).

Fig. 106. House for riding servants connected to the Middle Holsten Gate in Lübeck from the 15th century. Photo: Morten Steineke.