

Revisiting the Stockholm Public Library during its ongoing renovation with a review of archival plans and alterations, together with 3D laser scanning, lays the foundations for future research.

# Archival plans, alterations, and 3D laser scanning of Erik Gunnar Asplund's Stockholm Public Library

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Erik Gunnar Asplund's Stockholm Public Library (*Stadsbibliotek*) is widely recognised as an influential work in twentieth-century architecture. The library's plan and interior spaces have been often presented and discussed in various books on modern architectural history and the history of libraries,<sup>1</sup> monographs on Asplund's architecture,<sup>2</sup> and within lighting and environmental design studies.<sup>3</sup> Yet despite the library's acknowledged status in general architectural literature, the building has received relatively little attention in academic research articles in architecture journals, compared to Asplund's work in general.<sup>4</sup> One underlying reason, besides the tradition of scholarly monographs, may be due to the relatively few number of archival plans formerly available for studying the library's design process, original construction, and subsequent alterations, including the distinct lack of updated drawings on the actual building as it exists today. For example, detailed architectural and engineering plans of the library and its original construction were only partially saved or archived. Moreover, some of few general architectural plans that were saved were much later sold to private collectors.<sup>5</sup> And although the majority of the remaining archived library plans have been recently digitised and made available in the online collections of Sweden's National Centre for Architecture and Design (ArkDes), they are easy to access but still challenging to organise, interpret, and especially understand relative to one another.<sup>6</sup>

This article represents a vital first step towards opening up future architectural research related to the Stockholm Public Library for an international audience. This work is structured into three main sections: first, involving the library's archival plans and historical documents; second, subsequent alterations in the library; and lastly, state-of-the-art 3D laser scanning of the library today. To begin, readers and researchers are presented with the first systematic review of the digitised and readily available archival plans and documents related to the library and its design process. As some of the available materials are undated, the archived and detailed minutes from the Library Committee's

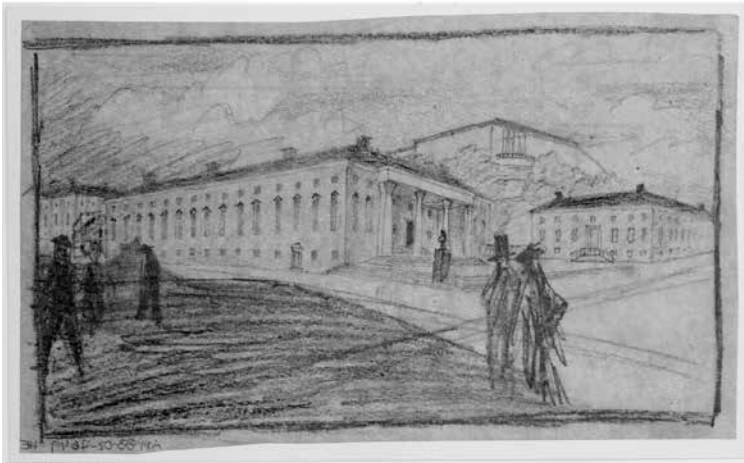
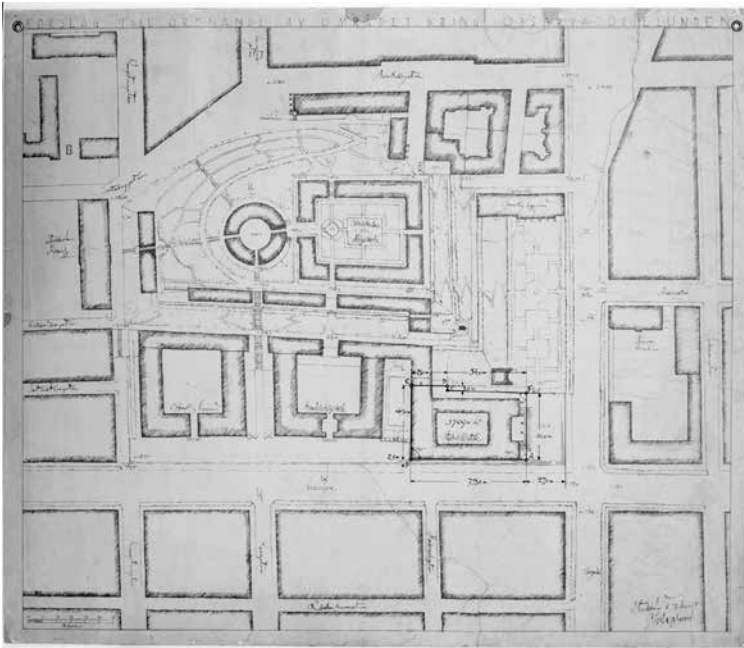
meetings are also used to supplement such plans. This review results in a historical understanding of the library's design and gradual development from 1919 to 1925, which led to its eventual completion in 1928. Subsequent alterations to the library are then reviewed next, as many of the later changes in the library have been subtle and can be challenging to differentiate relative to older features and original details. Finally, to recover lost knowledge from missing plans of the library, and also establish a detailed record of the building as it currently stands, this article lastly presents the results of recent 3D scanning performed throughout the library. The resultant 3D point cloud from laser scanning is the most detailed and comprehensive representation of the library ever made, and can support future teaching and research, heritage preservation, and especially the ongoing renovation efforts in the library today.

## Archival drawings and design process (1919–25)

### *Early site plans and sketches (1919)*

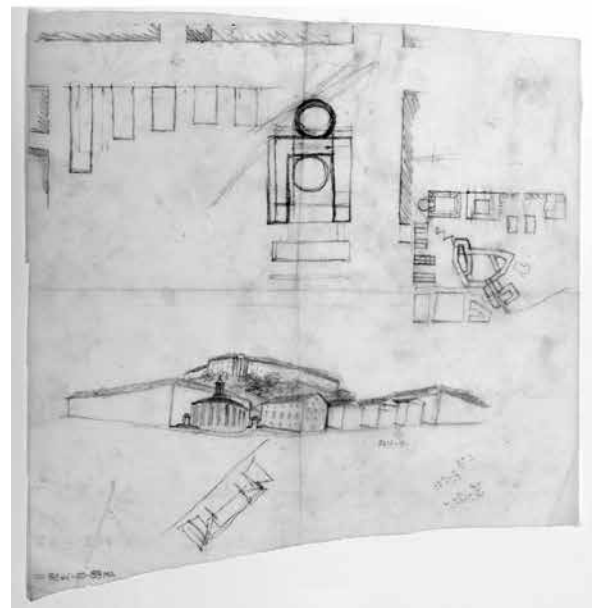
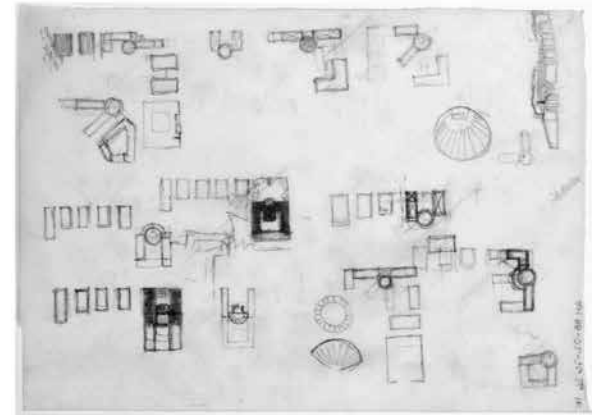
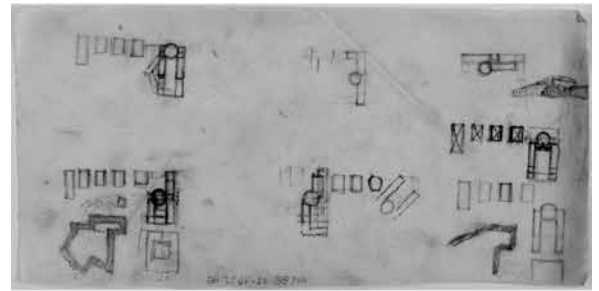
Asplund's involvement with the library can be traced back to 1918, when he joined the official Library Committee that was formed to establish a public library in Stockholm following a donation by Knut A. Wallenberg. It was slightly later in 1919, however, when the committee officially appointed Asplund to become the architect of the sub-committee, with the task of designing the library in close collaboration with library experts. At first, he produced a site plan and various design sketches in connection with an assignment from the City of Stockholm, which aimed to develop the area around the library's future site, known as Observatory Hill [1]. From this early design period, only one formal site plan remains, which is dated 12 December 1919, and signed by Asplund. A copy of this early site plan is also available online in the ArkDes collections.<sup>7</sup>

This early site plan and massing for the library differs considerably from the eventual built version. Asplund's early, undated design sketches further show several variations for the library's massing on the site, including many schemes with an external cylindrical volume at the entrance of the main



1 E. G. Asplund, Stockholm Public Library, copy of a preliminary 1919 site plan (above), and an undated perspective sketch (below) showing an alternative variation of the site arrangement. ARKM.1984-05-10 and ARKM.1988-02-7649 H-E, respectively.

2 E. G. Asplund, Stockholm Public Library, design sketches (a, above; b, centre; c, below) showing numerous variations for the form and massing of the building. Only one sketch (c) is dated, 22 January 1919. ARKM.1988-02-7635 H-E, ARKM.1988-02-7636 H-E, and ARKM.1988-02-7638 H-E, respectively.



rectangular library building [2]. One specific sketch appears to illustrate the key development of moving the cylindrical volume inside the rectangular building form, with Asplund sketching cylindrical volumes both outside and inside of the main building perimeter [2c].<sup>8</sup> In any case, all of these early design efforts predate Asplund's tour of the United States with the future head librarian Fredrik Hjelmqvist, where they visited numerous public libraries in cities such as New York, Washington, Albany, Boston, Cleveland, Indianapolis, Detroit, Chicago, and Madison.<sup>9</sup> From their tour, Asplund and Hjelmqvist saw first-hand how modern public libraries could function with open shelves, and also with dedicated areas for children. The former could provide visitors and readers with direct access to books on the shelves, instead of having to order books from a librarian working behind a counter. Considering Stockholm's growing urban population at the turn of the twentieth century and the rapidly expanding printing and publication market, this direct, open-shelf model became an important design issue, as the Stockholm Public Library eventually became the first large-scale, open-shelf library in Sweden.<sup>10</sup>

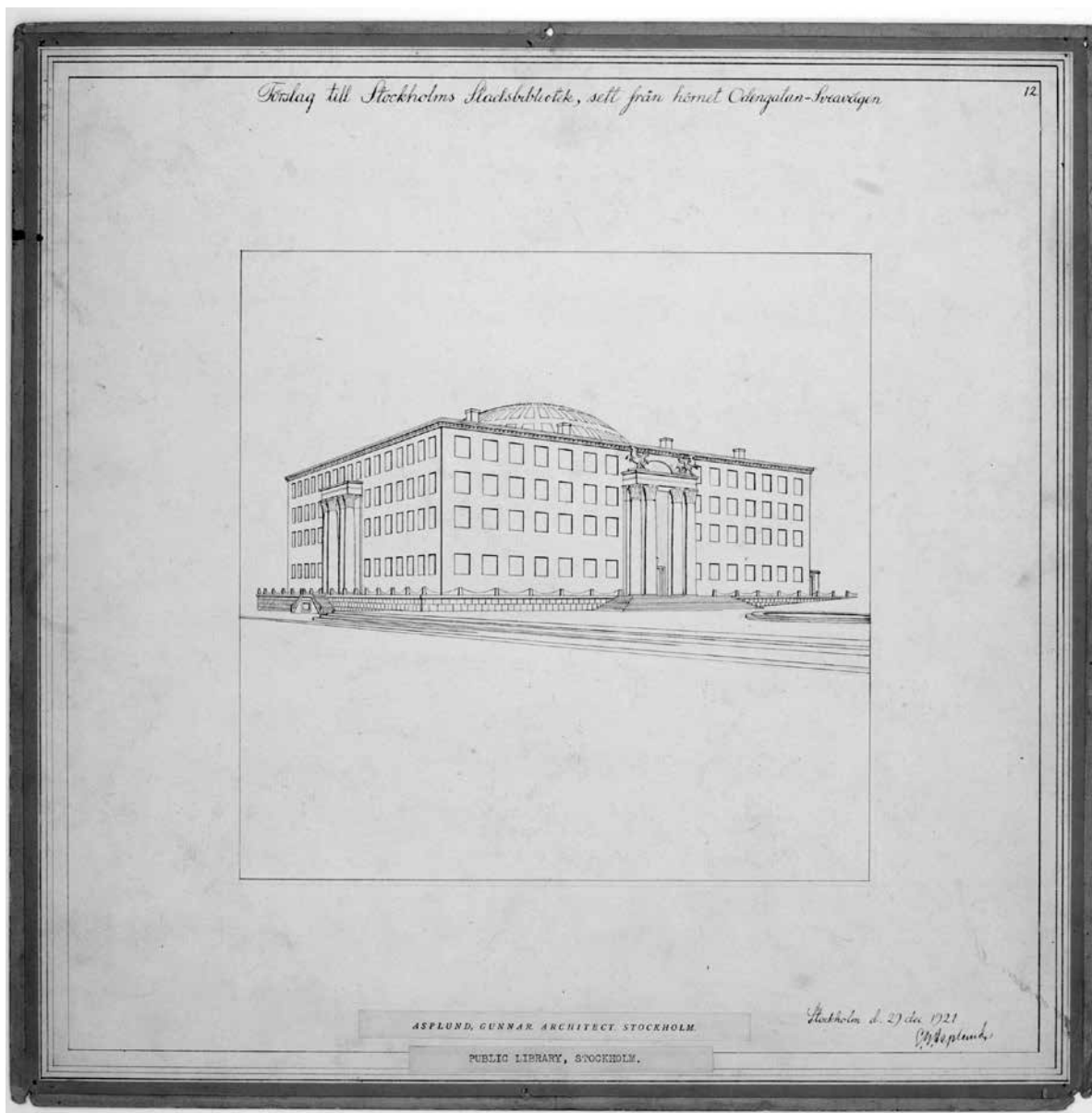
*First proposal of 1921 with additional sketches, and drawings from 1923*

The first official library design proposal, signed by Asplund and dated 29 December 1921, consists of fourteen drawings: one site plan, five plans, three façades, and two sections, and three perspective drawings [3]. These drawings were originally ink on paper, mounted on cardboard, with text labels in English added later for an international exhibition. They are available in the online ArkDes collections and are partially included in Blundell Jones's Asplund monograph.<sup>11</sup> Part of this set was published in the Library Committee's report in spring 1922, as well as in the journal *Byggmästaren*, and these later 1922 prints have most often been used in later publications<sup>12</sup> rather than the original drawings.<sup>13</sup> In existing international literature, this first complete scheme is generally presented and considered as the starting point of the library's design process, with an often-noted dome with glazed coffers over the library's central rotunda.<sup>14</sup> In considering early plans and sketches, however, this first initial complete scheme marks a point well into the library's overall

design process that Asplund had already started two years earlier in 1919.

Besides these 1921 drawings, there are some additional preliminary plans available in the online ArkDes collections from around this time. For example, a single paper with four plans showing an octagonal rotunda, unsigned and undated, which according to the Library Committee meeting minutes, was drawn and presented to the Library Committee in summer and early autumn, 1921 [4].<sup>15</sup> Moreover, there are four additional preliminary plans drawn on tracing paper, representing further developments of the 1921 plan, with a circular rotunda, and different solutions for the main staircase. Later proposals for the site were also made in 1922–3 and published in *Byggmästaren* and other

3 E. G. Asplund, Stockholm Public Library, exterior perspective drawing of the first official design proposal, dated 29 December 1921. ARKM.1990-04-53.



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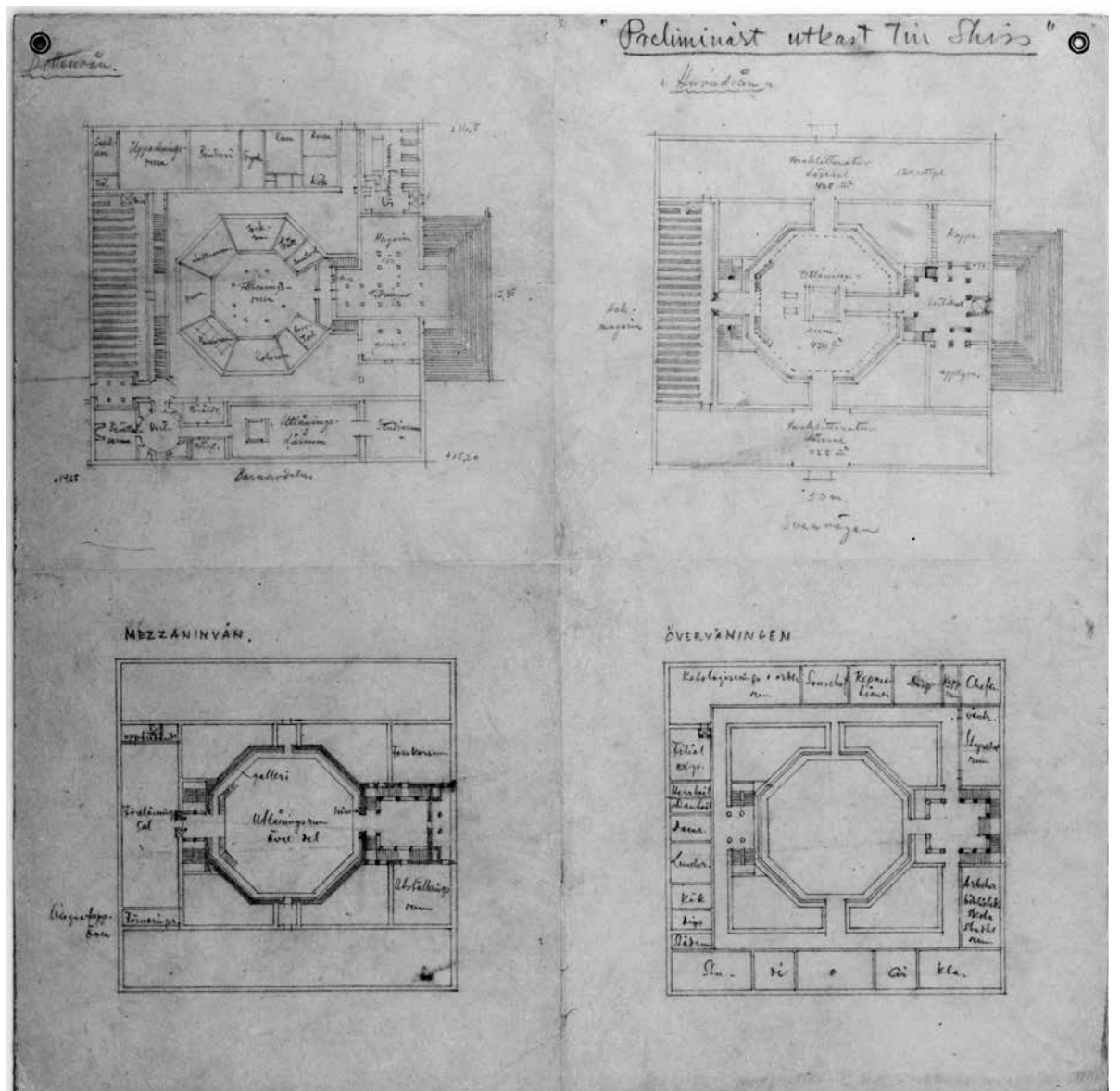
more recent publications, but the original drawings have been unfortunately lost.<sup>16</sup>

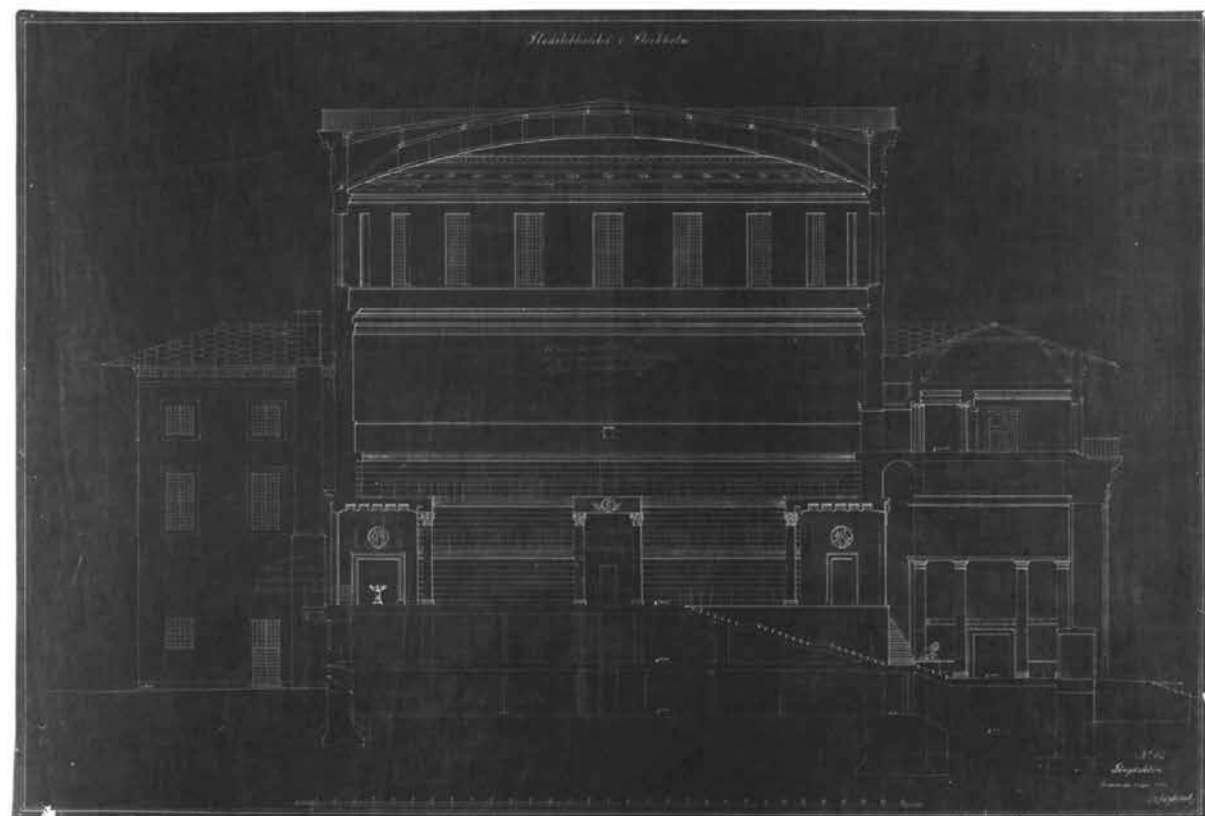
Following updates to the site plan and expected cost constraints, a new set of definitive drawings was produced and signed by Asplund and dated 14 November 1923. For the first time, these plans show only three rather than four wings for the library. Compared to the earlier complete set of 1921 plans, these 1923 plans were never intended to be a full set, since the façades and sections were only partly changed. Today, only three 1923 plans of the library are available in the online ArkDes collections.<sup>17</sup> As a result of these updated 1923 drawings, however, Asplund received the formal commission to produce drawings for the subsequent construction.

4 E. G. Asplund, Stockholm Public Library, plan drawings showing an early design variation with an octagonal rotunda, presented to the Library Committee in summer, and early autumn, 1921. ARKM.1984-05-11.

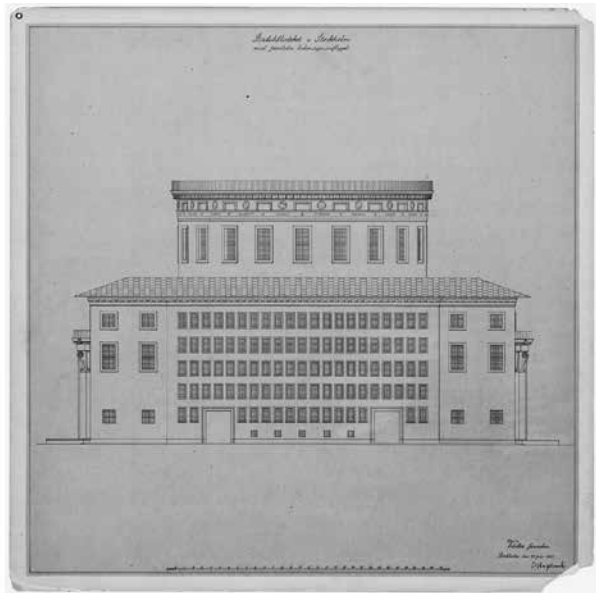
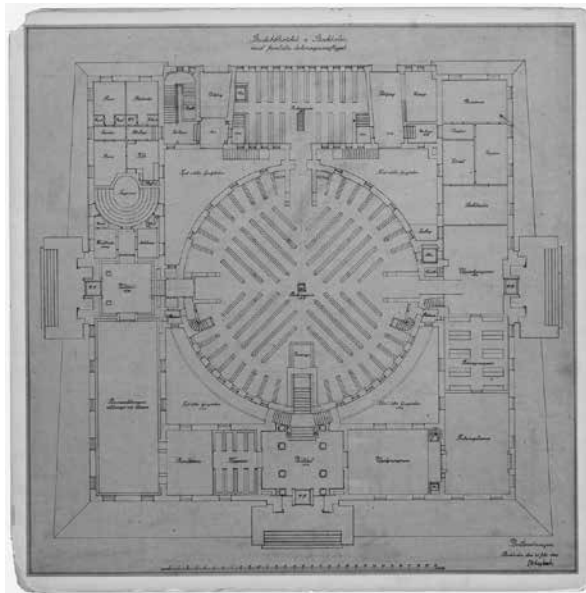
*Drawings from 1924 and 1925, and as-built plans from 1928* During spring 1924, the library site was finally fixed, and the section of the rotunda was changed from being covered by a large dome to the final solution as a taller cylindrical volume. This change in the rotunda roof from a dome to a taller cylinder is commonly understood in previous literature as the most important development in the library's design process.<sup>18</sup> Construction drawings signed by Asplund and dated 29 September 1924, however, show the updated cylindrical volume, yet with a shallow domed ceiling inside the rotunda and suspended from the structural roof members above [5].<sup>19</sup> Unfortunately, no original drawings exist today of these 1924 plans, and only copies remain in the online ArkDes collections: one plan, two façades, and two sections. Some of these scanned copies in the ArkDes collection are blueprints left from reproducing consultant drawings.<sup>20</sup>

A new set of presentation drawings were produced next in early 1925 to further refine the library's overall design. At this stage of the design process, Asplund was anxious to make sure that the fourth



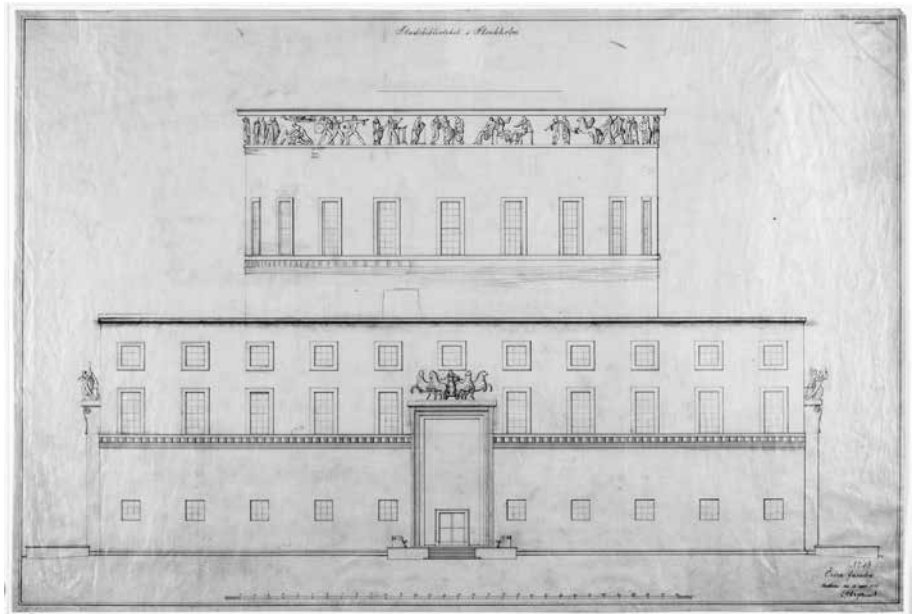


5 E. G. Asplund, Stockholm Public Library, blueprint copies of the library's updated construction drawings, dated 29 September 1924, showing the library's façade (above) and section (below) with a cylindrical rotunda. ARKM.1984-05-17 and ARKM.1996-20-09, respectively.



6 E. G. Asplund, Stockholm Public Library, ground floor plan (left) and western façade (right) drawings, dated 23 February 1925, with the western wing included. ARKM.1996-20-28 and ARKM.1996-20-33, respectively.

7 E. G. Asplund, Stockholm Public Library, eastern façade drawing from the updated set dated 15 April 1925. ARKM.1984-05-19.



wing would eventually be completed, even though it was not included in the contract for the upcoming construction. Unlike the previous plans from both 1923 and 1924, the fourth wing was therefore included in this set of updated drawings, signed by Asplund and dated 23 February 1925. In total, there are eight drawings from this set available in the online ArkDes collections, all of which are ink on paper and mounted on cardboard: six plans, one façade, and one section, all showing the fourth western wing [6].<sup>21</sup> Like the previous section and façade drawings from 1921 and 1924, these 1925 drawings still show hipped roofs over the wings of the library. And similar to the 1924 drawings, the shallow domed ceiling over the rotunda was still included here in early 1925. Overall, this February 1925 set is the finest, and best preserved of all remaining drawings, and has not been published before. These drawings originally belonged to the library, and were not included in the ArkDes collections until 1996, when

general interest in Asplund's architecture had waned after a series of publications in the 1980s around the time of the centenary of Asplund's birth.<sup>22</sup>

During spring 1925, when construction work had already begun, the library plans needed to be updated once again in light of the harsh economic limitations of the building contract. A new set of drawings were produced, signed by Asplund and dated 15 April 1925. They are ink on Ozalid, but only a few of these drawings have been preserved: two façades, a general section, and a detailed section of the reading rooms. There is also an unsigned and undated copy of a façade drawing that was not completed, but was most likely meant to serve as basic background information for the updated work. These drawings are all now available in the online ArkDes collections, and have also been presented in earlier work by Drugge.<sup>23,24</sup>

Compared to the previous drawings from just a few months earlier, in February 1925, this updated

set from April 1925 shows a more simplified construction for the library. Simple flat roofs were now planned over the library wings, and a basic flat ceiling was drawn suspended over the rotunda. In parallel with these construction simplifications, however, the April 1925 façade drawings show a far more elaborate ornamentation on the entrance portals and the upper, outer walls of the rotunda [7]. These final drawings from April 1925 highlight Asplund's persistence to preserve ornamentation in the project, and resist compromises to the monumental character of the library as a public institution. As we see in later plans and in the completed building today, however, these details and ornamentation were also eventually discarded, not for stylistic reasons related to a later transition to functionalist architecture, but more so due to further cost constraints as the construction project progressed.

Finally, there is a set of as-built, completion drawings of the library, which are ink on paper, and unsigned and undated. They were produced in spring 1928, partly in connection with the publication of the summer issue of the journal *Byggmästaren*.<sup>25</sup> These have most often been reproduced in subsequent publications. Today, four original 1928 drawings, including one plan, two façades, and one section, are held in the archives of the Museum of Modern Art (MoMA) in New York and available online.<sup>26</sup> Further drawings from this set also exist in the ArkDes Collection, but they have not been digitised.

### Historical alterations and renovations

#### 1931–2 Western wing and interior alterations

Following the library's official inauguration on 31 March 1928, Asplund began work for the 1930 Stockholm Exhibition and rapidly adopted functionalist design principles during the course of developing the exhibition. The simple, temporary exhibition buildings in turn strongly influenced a complete redesign of the library's fourth western wing, which was finally completed in 1932 and officially opened on 2 January 1933. Similar to the general plans, sections, and façade drawings still available from the original library construction project, there is also a set of updated architectural drawings for the fourth western wing of the library preserved in the online ArkDes collections.<sup>27</sup> A total of eight architectural drawings are available, including six plans showing the different floor levels of the western wing, a façade drawing, and a section through the western reading room. All drawings, with the exception of one preliminary floor plan, are stamped by Asplund and dated, with the floor plans and façade drawing dated 30 April 1931, and the section drawing dated 17 September 1931.

In addition to architectural drawings, there are also eight detailed structural and construction drawings for the library's western wing in the online ArkDes collections.<sup>28</sup> They are stamped by Kreüger's Consulting Engineers Office and simply dated May 1931. Like Asplund, Kreüger was also a member of the original Library Committee and a professor at the



8 Stockholm Public Library, 1932 construction site photograph of the library's fourth western wing. Svenska Dagbladet, photographer unknown. Fa 50280.

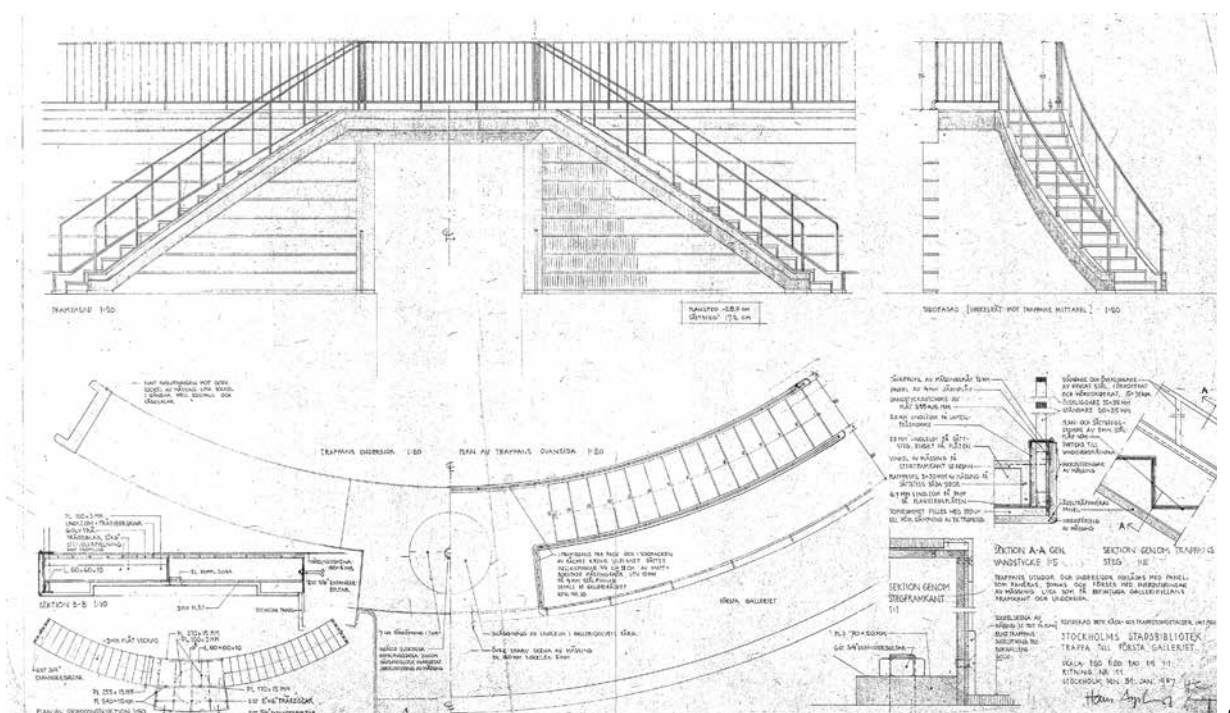
KTH Royal Institute of Technology in Stockholm. Furthermore, he was a leading structural engineer in Sweden at that time. Kreüger's plans give a detailed overview of the western wing's floor construction. For example, these drawings outline the locations and specified profiles of steel beams for each floor level of the western wing, the layered materials for the floor construction between the beams, and the steel reinforcement specified in the cantilevering gallery and spiral stairs of the western reading room. These construction plans also appear to closely correspond to an archived photograph taken of the construction site of the library's western wing [8].<sup>29</sup> The construction materials and details of the library's original construction and those of the final western wing will be further discussed in greater depth in a forthcoming publication.

In the years following the construction of the fourth library wing, some notable alterations were also made in the original parts of the library that have been noted in Swedish literature, but not acknowledged or emphasised in international literature.<sup>30</sup> For instance, the interior surfaces of the older 1928 reading rooms were originally finished with a coloured render in a shade of olive in the northern reading room, and light red in the southern reading room. These interior wall surfaces were painted white in 1935, to correspond with the demands of both staff and users for a better lighting situation, and at the same time, to create a more unified whole for the library's interiors with the completion of the more functional and modern fourth wing with white walls. Repainting the relatively dark original reading room walls increased the rooms' overall brightness and enhanced their natural daylight. The original colours of the interior wall finishes, however, can still be seen in the library today inside the recessed bookshelves at the end of each reading room, as these specific shelves are unaltered.

*Alterations in the 1950s, 1960s, and early 1970s*

Further alterations to the library were completed during the 1950s and 1960s, followed by a major alteration project in the early 1970s. Summaries of these and later alterations and renovations have been documented and graphically illustrated in overview plans in reports for the City of Stockholm, so they are only briefly summarised here for accuracy and completeness.<sup>31</sup> For instance, in the early 1950s, a new ground floor level was constructed in the northeast corner courtyard for a large cloakroom next to the library's newspaper hall. At the same time, two short curved stairs were created to connect this cloakroom with two new public toilets located directly under the rotunda. Later from c. 1957–64, Hans Asplund, who was the son of Gunnar Asplund and also a prominent architect, introduced a new double-stair over the main entrance of the rotunda to allow public access to the rotunda galleries and upper bookshelves [9].<sup>32</sup> He further adjusted the hand railings along the rotunda galleries, by raising and shifting the original railings and support posts outwards to create a wider path along the galleries. Lower horizontal elements were added between the support posts, together with new intermediate uprights underneath the hand railings for safety. On the exterior of the building, from 1963–5, the library's original two-tone façade was also completely refinished with the singular tone seen today.<sup>33</sup> Later on in 1973–4, Hans Asplund

9 H. Asplund, Stockholm Public Library, 1957 construction drawing (with revisions dated October 1961) of the double-stair over the main entrance of the rotunda.





additionally coordinated a major alteration of the library that involved further infill construction of the entire northeast corner courtyard, with two elevators and new floors giving further storage spaces. Minor changes in the secondary walls in the basement were also completed at this time.

#### *First major renovation from 1979–81*

From 1979–81, the library underwent its first major renovation project. New mechanical ventilation machinery was added in the basement of the southeast and northwest corner courtyards outside of the rotunda, with large ventilation stacks and ductwork rising up along the entire height of the building within the corner courtyards. At this time, a new internal stairway was also created in the southwest courtyard, wedged in between the rotunda and the western reading room. In the basement of the library, the lowest northwest courtyard space, which lies at the same height or level as the nearby Sveagatan Street outside of the main entrance of the library, was also closed off from the neighbouring book stacks and left as an unfinished storage space. The two elevators installed from 1973–4 also descended down to this lowest basement level in the northwest courtyard, with the option of one day creating an accessible, street-level entrance to the library without ramps or steps.<sup>34</sup>

#### *Current ongoing maintenance and renovation (2020–5)*

In recent years, a street-level access concept was again revisited for the library. As an alternative to the results from a polarising international architecture competition in 2006–07 for an exterior extension to the library, Caruso St John Architects were later appointed in 2015 to consider and develop two possibilities for the library's future.<sup>35</sup> One option involved a basic maintenance and minimal renovation project. The other, preferred by the architects, proposed converting the street-level retail and restaurant properties directly outside the library into a new library area.<sup>36</sup> This new library area was also planned with an underground connection to the original library, via Hans Aplund's 1973–4 elevators in the basement of the northwest courtyard. However, support for this latter, more ambitious proposal could not be confirmed, and the City of Stockholm eventually decided to pursue the simpler maintenance and renovation option with local practices. Accordingly, maintenance and renovation work began in the library in 2020, with a scheduled completion date in 2025.

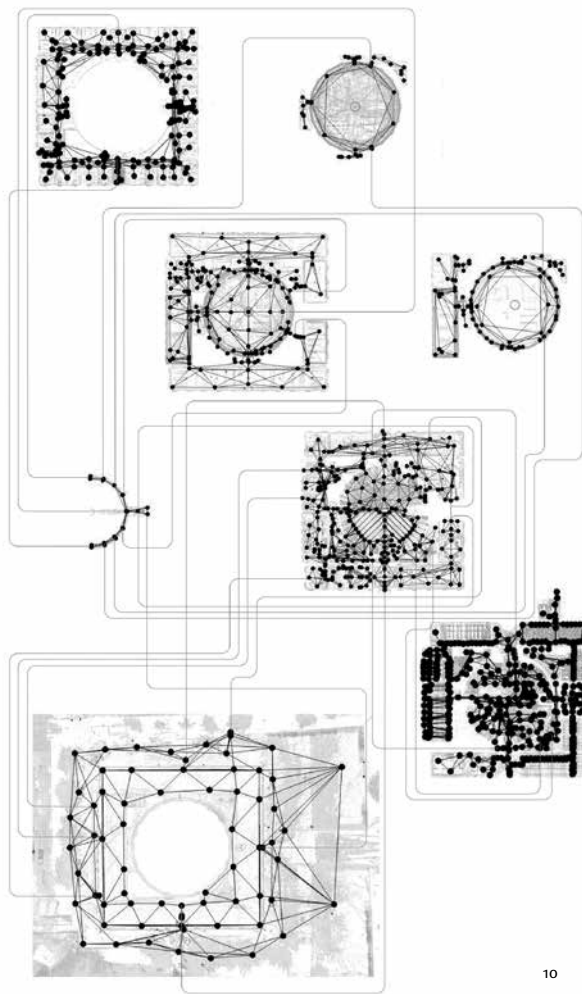
The current ongoing renovation work is planned to address a range of issues in the library for future visitors and readers. Aging mechanical equipment in the library will be replaced, including piping that was originally installed in the walls and floors. Replacing existing electric lighting with contemporary, energy-efficient systems is also planned in the reading rooms. In the rotunda, the hand railings along the galleries once again require alterations, with vertical extensions and a new railing at a raised height to satisfy the requirements of contemporary safety standards. While other

general interior and exterior work is planned, this relatively rare process of maintenance, repair, and renovation in the library presents an immense opportunity to research the library's historical construction and interior environments. As hidden surfaces and parts of the library are briefly uncovered and exposed during the course of the current renovation project, the authors are involved in a parallel academic research project that examines the library building's architecture, construction, acoustics, and lighting.<sup>37</sup>

#### **3D laser scanning**

Current research on the library as it undergoes renovation work has begun with 3D laser scanning. Such 3D laser scanning leads to a complete and comprehensive record of the library for future teaching and research, and can also provide important support to the ongoing renovation work. Finally, lost knowledge from missing archival plans can be recovered, while the fragmented knowledge available from various alteration plans are synthesised in a representative 3D model of the building. The scanning process began in October 2020, just as maintenance work was also beginning at the library, and continued with additional scanning campaigns in December 2020, June 2021, and May 2023. In coordination with library officials, the City of Stockholm, and the current renovation planners, privileged and complete access throughout the library for scanning purposes was offered when the building was both officially open and closed to the public. To minimise the presence of library visitors within the laser scans, public areas were therefore scanned during the early mornings and late evenings when the library was officially closed. During the library's opening hours, laser scanning was done in the library's basement levels and other areas not open to the public. Due to safety concerns, the attic and exterior roof directly above the rotunda were only accessible and scanned in spring 2023.

A Leica RTC360 laser scanner was used throughout the scanning process due to its overall versatility and balanced performance in terms of speed, accuracy, and range. Using the scanner's high-resolution setting, this instrument can cover a range of 65m, with an accuracy for a single 3D point measurement of about 2 mm at a distance of 10 m.<sup>38</sup> An individual scan with this high-resolution setting takes just under 3 minutes to complete, and can yield approximately 170 million points covering 360 degrees in the horizontal direction, and 300 degrees in the vertical direction.<sup>39</sup> For each scan, a panoramic image is also taken with the scanner's onboard cameras to later colour the scanned measurement points. The laser scanner's high-resolution setting was used in places of relatively high architectural importance, such as the library's rotunda, reading rooms, main entrance, and children's story room. Other spaces such as offices, mechanical rooms, corridors, and book stacks were scanned with a slightly faster and less detailed medium-resolution setting.



10 Stockholm Public Library, overview of 3D laser scanning locations and registered links between individual scans. Lines forming vertical links between various levels are only partially shown for illustration purposes and clarity.

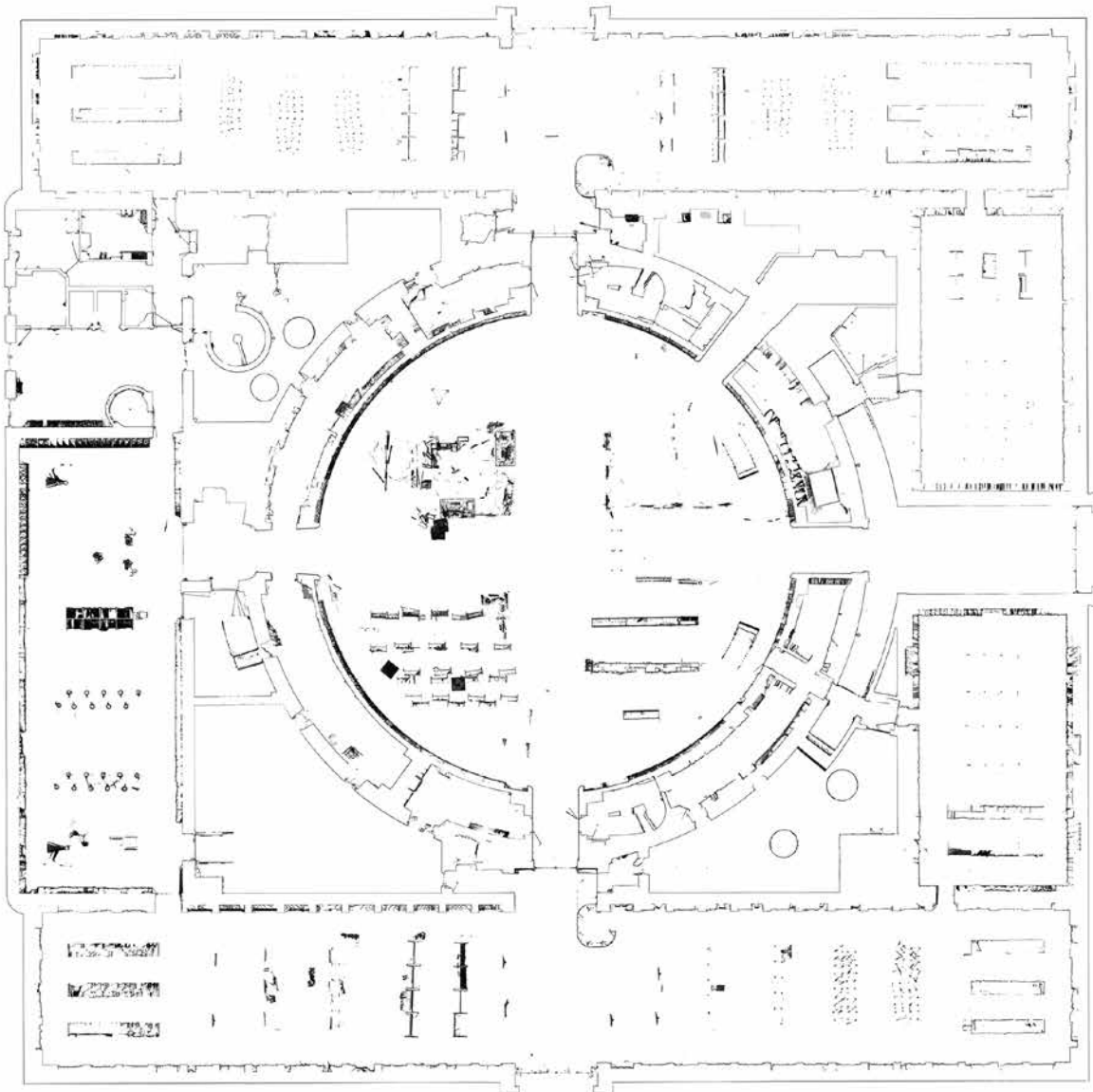
Several spaces in the library required a considered approach for the exact placement of the laser scanner for individual scans. In the library's basement level, where rolling bookshelves fill the majority of the spaces, the rolling shelves were incrementally moved and shifted over one by one, with corresponding scans performed after each move so that the complete floor, wall, and ceiling surfaces of the entire room could be effectively scanned incrementally. For general spatial thresholds such as doors and windows that separate interior spaces and different rooms, and also between interior and outdoor spaces, individual laser scans were generally completed in three locations: once just inside a threshold, again directly at the threshold such as within a doorway, and lastly, just outside the threshold. This scanning approach resulted in just over 1,300 individual laser

scans throughout and around the interior and exterior of the library, totalling approximately 1.5 TB of raw scan data. More importantly, even with separate rooms and spaces, this scanning approach ensured sufficient overlap and accuracy between individual laser scans for the later alignment and registration process.

Following the established cloud-to-cloud registration method, Leica's Cyclone Register 360 software was subsequently used to accurately register the points from individual scans into a whole, combined point cloud of the library. This cloud-to-cloud registration approach requires adequate overlap between individual scans, while foregoing the need to set up tedious spatial markers or targets throughout the library during scanning. In the registration process, individual scans were first organised according to their floor level in the library. Exterior scans outside of the library and scans located on the roofs above the reading rooms were collected into their own bundle. A similar process was also done for scans of the library's main pair of curving stairs around the outer walls of the rotunda. Resultant points associated with reflections and refractions were carefully cleaned or hidden from individual scans to maximise the accuracy of the cloud-to-cloud comparison process when linking or combining adjacent laser scans. In rooms or spaces with relatively dense and complex geometry, such as furniture or bookshelves, or with ductwork and exposed cable trays in the mechanical rooms in the basement, only the points from relatively simple wall, floor, and ceiling surfaces were used in the cloud-to-cloud comparison process. Furthermore, for sustaining a high degree of accuracy, closed-looped and triangulated linking structures were formed throughout with the laser scans on a given floor [10]. Individual floors were finally vertically linked through laser scans in vertical circulation spaces like stairways and also in the courtyards.

### Points for the future

The resultant point cloud of the library features just over 45 billion points in its full, unfiltered state before exporting for use in subsequent CAD software. According to Leica's Cyclone Register 360 software, the final registration process statistically yields an overall mean accuracy of about 3mm for the complete point cloud of the library. In the mechanical rooms in the library's basement level, however, the accuracy of point cloud is expected to be slightly less, but still within 10mm, due the relatively little wall and ceiling areas that are visible behind the large-scale ventilation equipment and highly reflective ductwork that are densely packed within these rooms. The resultant point cloud model of the library can now yield accurate plans and vertical sections at any location of the library to represent its current state [11, 12]. Novel visualisations of the library such as perspective sections can also be readily rendered [13]. Although some preliminary laser scanning of the library's central rotunda was already performed in recent years, the current work's thorough and detailed



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coverage of the library is unprecedented. The only previous on-site measurements of the actual building, accomplished by hand, date back to around 1967–8, which were coordinated by Hans Asplund for his various interventions.

Going forward, as the current renovation work progresses, additional laser scanning is planned to capture features and surfaces within the library that are normally hidden from view during the library's regular operation. This future work has already begun by rescanning the ground-floor entrance lobby of the library when the suspended ceiling in this space was taken down for electrical and lighting work. At this time, the original 1928 ceiling surface located above the suspended ceiling level was visible and accordingly laser scanned. Only the points from this original ceiling surface were then carefully cleaned and combined into the existing point cloud model, as seen in the previous section through the north reading room [12]. This edited combination process was achieved by using the cloud-to-cloud comparison method with measured points only from the unchanged surrounding walls. The results of such laser scanning, timely rescanning efforts, and a corresponding edited registration process

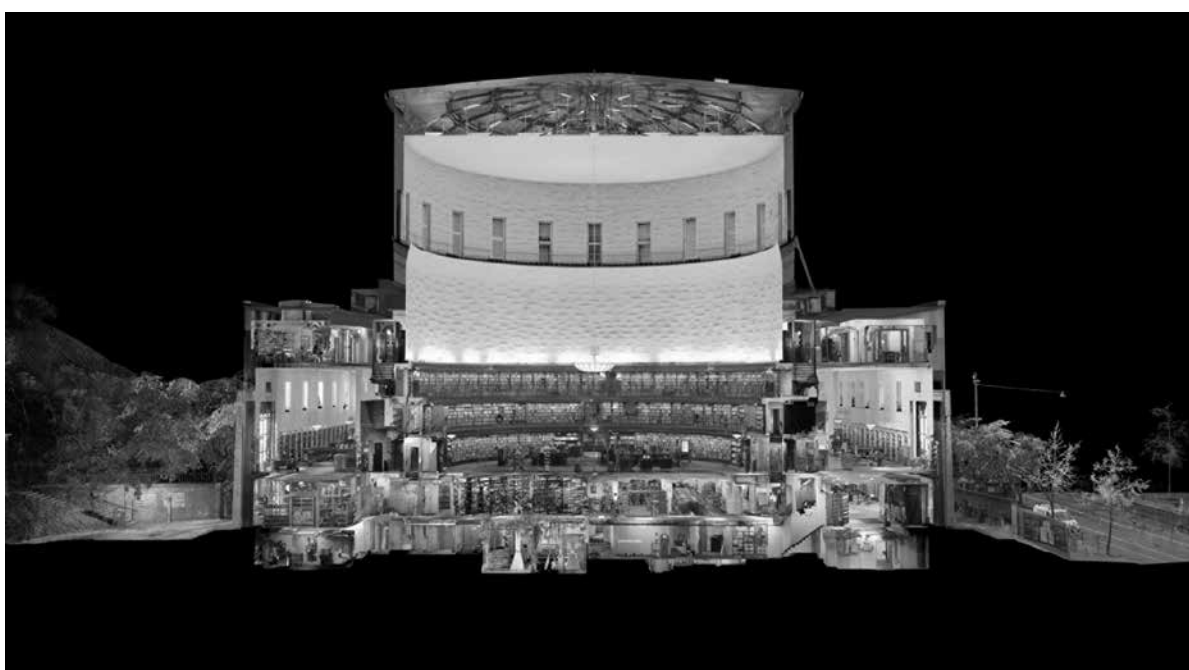
11 Stockholm Public Library, first floor plan generated from a 50 mm horizontal slice of the resultant point cloud model from 3D laser scanning.

emphasises the mutual benefits of conducting academic research in parallel with contemporary renovation projects in historical architecture.

Starting with a detailed review of the limited available archival plans for the Stockholm Public Library, this work has clarified how Asplund gradually designed and developed the building. Due to missing plans, details regarding its original construction and realisation still remain elusive, but a brief summary of subsequent alterations and contemporary 3D laser scanning have formed an important step in creating a complete and comprehensive record of the building. As most of the original drawings that still exist do not coincide with the actual building, laser scanning complements the archival material, and makes it possible for future researchers to highlight aspects of the building that have not yet been possible to acknowledge.



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With the thorough review of archival plans as a precedent for state-of-the-art laser scanning attempts, we have tried to imbue the latter technological approach with relevant historical considerations that are often overlooked or ignored. Although the resultant 3D point cloud of model can support teaching, research, and practice in the short- and long-term future, the creation of such detailed point clouds or digital twins should not be considered an end in itself. A point cloud can further serve as a framework for articulating and communicating additional research results, relationships, and findings, such as those related to historical construction details or acoustics and lighting studies that are already planned for the future. The work presented here is therefore not intended as a conclusive study, but a new point of departure for a broad range of research on Asplund's influential Stockholm Public Library.

12, 13 Stockholm Public Library. Section through the north reading room and perspective section of the entire library, generated from the resultant point cloud model from 3D laser scanning.

## Notes

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5. See Christina Pech, 'Collecting "Slowly but Surely": Constructing the Swedish Museum of Architecture in Stockholm', in *The Routledge Companion to Architectural Drawings and Models*, ed. by Federica Goffi (Abingdon and New York, NY: Routledge, 2022), p. 452. Compare n. 25 and the drawings currently held in the archives of the Museum of Modern Art in New York, which were sold to a private collector and donated to the museum.
6. The potential for further studies on the library is exemplified by considering the extensive ArkDes archival material available for Asplund's Gothenburg Courthouse extension project, totalling about ten times that of the library, and the corresponding scholarly work by Claes Caldenby, Eva Eriksson, Nicholas Adams, and Kerstin Wickman on the extension project. See *Tiden platsen, arkitekturen: Asplunds rådhus i Göteborg [Asplund's Law Courts Extension in Gothenburg]*, ed. by Claes Caldenby (Stockholm: Arkitekturmuseum, 2010); Nicholas Adams, *Gunnar Asplund's Gothenburg: The Transformation of Public Architecture in Interwar Europe* (University Park, PA: Pennsylvania State University Press, 2014).
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#### Competing interests

The authors declare none.

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