Approaching Near Zero Energy in Historic Buildings

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Title: Refurbishment and Change of Use at the Rectors' House, Raahe: Art Residence Plans and Co-Design Process

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Introduction

This document was written by Julia Heinonen, a student of Construction and Architecture at Oulu University of Applied Sciences at Oulu, Finland, and was completed in the Spring of 2022.

This version of the document is a translation that was created by processing the text through Google Translate. Historic Environment Scotland (HES) required a translated copy of the thesis and the associated Thermal Imaging Report for the analysis that would inform Deliverable 3.3.1. The Thermal Imaging Report was written by Enni Hukka and Ella Korpi in 2022.

The thesis has its own introduction (p.11) which sets out the aims of the study as part of the Pathfinder Project. The purpose of this introduction is to confirm that this document is largely a 'digital' translation of the Finnish text with some limited editing by the original author to address the most significant errors and omissions arising from the translation process.

It should be noted that Google was not able to translate text which was embedded in some tables and the drawings, including those in the Appendix. As such, these have been simply inserted into the document and appendix as they were.

Simon Montgomery
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29 September 2022

OULUN AMMATTIKORKEAKOULU

Julia Heinonen

Refurbishment and Change of Use at the Rectors' House, Raahe.

Art Residence Plans and Co-Design Process

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Art Residence Plans and Co-Design Process

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Thesis
Spring 2022
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Thesis title: Refurbishment and Change of Use at the Rectors' House, Raahe: Art Residence Plans and Co-Design Process

English title of thesis: Refurbishment and Change of Use at the Rectors' House, Raahe: Art Residence Plans and Co-Design Process

Supervisor: Kai Tolonen Semester

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Historic buildings are a major challenge in achieving energy efficiency and carbon neutrality goals in the northern regions. The thesis is part of the international Energy Pathfinder project, which researches the retrofitting of historic buildings using co-design methods and creates an online tool for building users to find the best solutions. In the thesis, plans and a data model were drawn up for the transformation of the former house of directors at Raahe (Built 1899) into an Art Residence as part of the Brahe Art Space project which aims to implement an international network of artists and a residency.

In the design of the Art Residence, project-specific stakeholders were defined in the co-design process and involved in the design through workshops. The first workshop was held in Raahe at the building, and was attended by future users of the Art Residence. There were challenges in organizing co-design workshops and involving stakeholders, and not all stakeholders were involved in the process. The second workshop was attended by civil engineering students, who also produced material for the renovation of the building.

A condition assessment was made of the building and a cost estimate and achievable energy efficiency and carbon footprint improvements were calculated. Based on them, the renovation of the building was found to be profitable. Co-design was found to be a useful design method, although it could not be implemented in an ideal way in the project.

The plans for the artist's house were drawn up on the basis of the co-design process and the design goals and regulations considered essential for the design of the artist's house, and taking into account the building protection regulations.

Enforcement of accessibility and fire regulations proved to be a challenge in the old building. The artists' house was designed as a communal building, whose apartments and common areas, as well as galleries and work spaces, are multi-purpose and serve the functional needs of different fields of art.

Keywords: co-design, renovation, renovation, energy efficiency

ABSTRACT

Oulu University of Applied Sciences
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Author: Julia Heinonen

Title of thesis: Refurbishment and Change of Use at the Rectors' House, Raahe: Art Residence Plans and Co-Design Process
Supervisor: Kai Tolonen

Term and year when the thesis was submitted: Spring 2022
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Historic buildings are a significant challenge for improving energy efficiency and achieving carbon neutrality in the Northern Periphery and Arctic region. The study of the thesis is a part of the Energy Pathfinder project which is an international project aiming to build and demonstrate an online toolkit that allows owners of historic buildings to approach co-culturally appropriate and energy efficient retrofit solutions. The former Rector's residence completed in 1899 located in the teachers' college in Raahe, Finland, is one of the historic demonstration buildings in the Energy Pathfinder project. In this thesis, plans were also created for the building as an artist residence as a part of the Brahe Art Space project to create an innovative network of international artists' residencies in North Ostrobothnia, Finland.

The project was studied using a co-design method involving stakeholders in the design process. A total of five stakeholder groups were identified for this project but due to scheduling challenges only four groups were successfully involved in the process through workshops. The first co-design workshop with future users was held in Raahe and later the second workshop with the last stakeholder group including civil engineer students was held as a video meeting. The research material from co-design was applied to the plans and technical measurements and calculations for the alteration work as well as a proposal for the renovation were produced by the engineering students.

Based on Improvements in energy behaviour achieved through repair and cost analysis the renovation was found to be profitable. The plans for the new artist's residence were created by BIM modelling and considering the co-design process and planning regulations concerning the intended use of the building. Compliance with accessibility and fire regulations proved to be a challenge in the historic building. A completely new entrance terrace was decided to be designed and additions to the façades were designed to fit and highlight the existing building. The artist residence was planned as a communal building that offers multipurpose and various sized apartments, shared rooms, and workspaces for practitioners of different arts. Co-design proved to be a great designing method that provides a broad perspective to support the design. Although the method could not be carried out ideally in this project, the material from the held workshops were beneficial for achieving the project goals.

Keywords: co-design, alteration work, renovation, energy efficiency

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INTRODUCTION

I would like to thank Kai Tolonen, the teacher who supervised my thesis, under whose encouraging guidance I was able to implement the plans. to transform a historic building and thus be part of an international project study. Many thanks also to all the parties involved in the project and to all those who took part in the co-design workshops of the project, who contributed to the objectives of the project and to the study of co-design as a design method.

1.5.2022

Julia Heinonen

1 INTRODUCTION

Built cultural environment is part of our history and at the same time our future. Preserving the historical building heritage contributes to the diversity of the built environment, while preserving the special features and originality of the area and the construction period. These buildings have cultural, architectural and economic value. However, historic buildings pose a significant challenge in the northern regions in improving the energy efficiency of buildings and striving for carbon neutrality. The energy consumption of buildings can be high and, in addition, difficult and expensive to measure. (Cork Centre for Architectural Education 2021.) The House of Leadership, completed in 1889 in the Raahe Seminary area, is a historically significant site whose renovation and conversion planning is part of a project to meet these challenges.

Achieving energy efficiency goals in historic buildings requires solutions and tools to demonstrate the most appropriate and efficient retrofits and measures. This thesis is part of the international Energy Pathfinder project, which aims to provide owners and users of historic buildings with an online tool that can be used to find the best retrofit solutions and energy efficiency improvements. The project involves 5 participating countries, with 8 historic buildings undergoing co-design through the design process. (Cork Centre for Architectural Education 2021; Oulu University of Applied Sciences 2021.)

The former House of Directors of the Raahe Seminary is currently empty. The aim of the thesis is to draw up plans from the point of view of the principal designer for the change of the purpose of the building and its renovation into an art residence. The design of the House of Artists is part of the Brahe Art Space project to create an international artist residency that would serve as a multidisciplinary meeting place for the arts. The plans for the artist's house are implemented using co-design methods, and the plans aim for an energy level of almost 0. An information model is created for the project and the plans are drawn up in a format that can be used for the purposes of the project. The change in the purpose of the site will create new requirements for the building, so they will also be addressed in the design process.

2 ENERGY PATHFINDER PROJECT

The thesis design project is linked to the international Energy Pathfinder project and thus to the participatory design method as a design tool. The goal of the Energy Pathfinder project is to produce a toolkit to find the best retrofit solutions for historic buildings. The project has a total of 5 participating countries and 8 historic buildings, for which plans for retrofitting solutions are produced using the co-design method. (Cork Centre for Architectural Education 2021; Oulu University of Applied Sciences 2021.)

Different types of buildings, climatic conditions, cultural environments and site-specific government regulations are represented in the project. The produced solutions and results will be exported to the Toolkit platform to be developed in the project. The project examines the energy consumption of buildings both before and after retrofitting, the profitability of different retrofitting solutions and their environmental and economic benefits. Thanks to its comprehensive information base on sites, the Toolkit network tool can enable users of historic buildings to achieve a near-0 energy level in the building and to find suitable retrofit solutions and measures for the use of renewable energy. (Figure 1.) (Cork Centre for Architectural Education 2021; Oulu University of Applied Sciences 2021.)

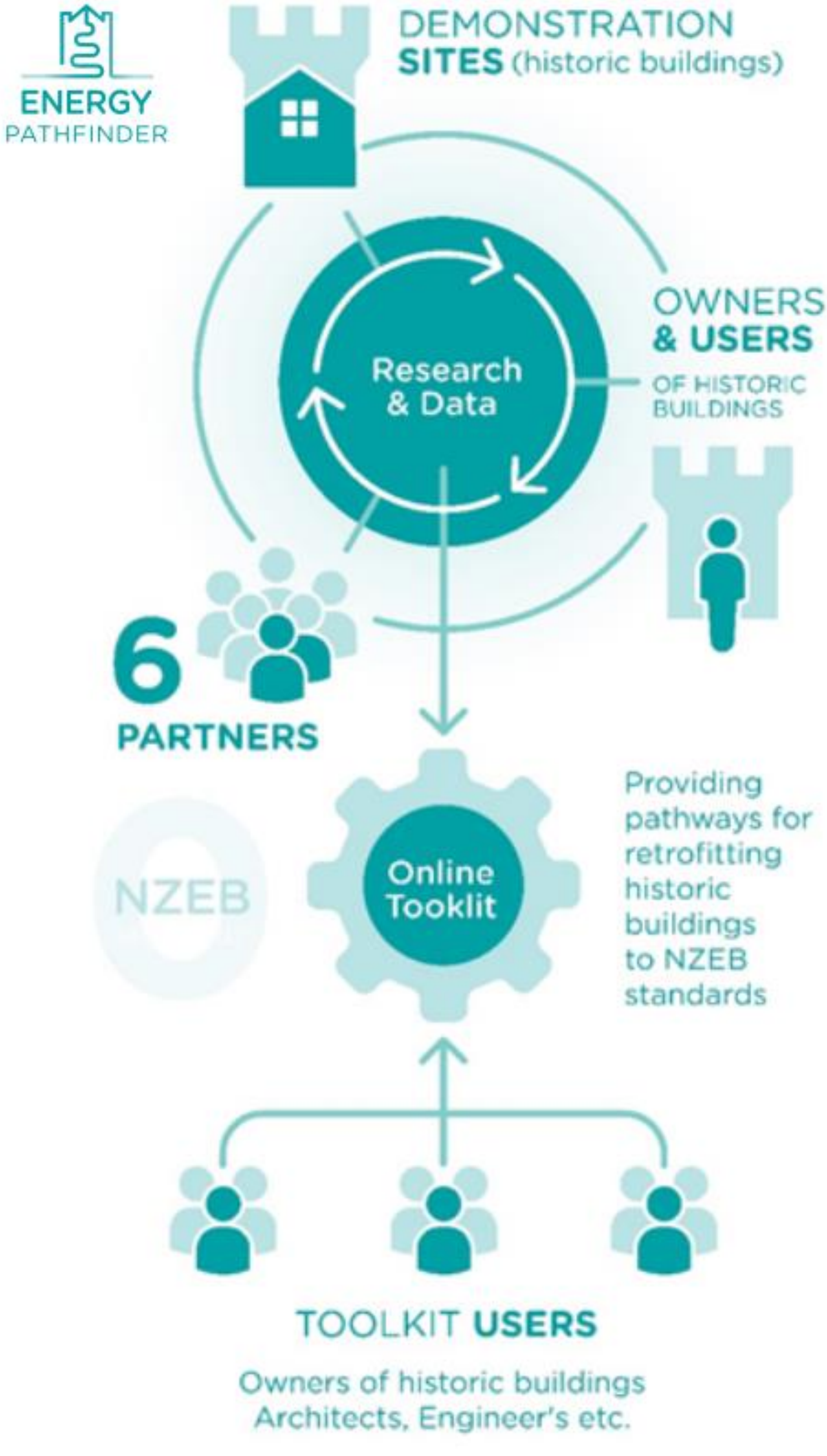

FIGURE 1. Description of the Energy Pathfinder project process

3 CO-DESIGN METHOD IN ART RESIDENCE DESIGN

The thesis design project is linked to the international Energy Pathfinder project. , for co-design, as a design tool. Chapter 3.1 first discusses the co-design method in general in the design processes and then in Chapters 3.2 and 3.3 how it will be utilized in the Energy Pathfinder project and in the design of the art residence.

3.1 Co-design as a design method

Co-design is a growing design method. It involves several parties in the design, i.e. it enables extensive user interaction in the design process. The uses of the co-design method in the design process depend on the design object itself, but the general principles apply to almost any case. In the method, the project first defines the stakeholder groups from whom the information is to be utilized in the process, as the starting point for planning is always a need or a thoughtful user and target group. Once the groups have been defined, stakeholders will be involved in the planning process in a way that serves the purposes of the project in question. Different methods can be used to influence the information to be obtained in support of the design and the outcome of the design. Information from stakeholders can be gathered through, among other things, interviews, various surveys, assignments or workshops. (Design Council 2021.)

The use of this method has been found to significantly improve the end products of the design, as the co-design process ensures that the needs of the users are met and taken into account in the design (Design Council 2021). In case co-design is used at the very beginning of the design, the background information obtained can be immediately used in the design. Co-design expands the know-how and perspectives used in design, and thus the process can achieve the result that best serves users and the environment.

3.2 Co-design in the Energy Pathfinder project

The co-design process of the Energy Pathfinder project works together on a project-by-project basis with the owners and users of historic buildings and involves stakeholders in the early stages of the design process for each site. The studies of the project sites have a common goal: to achieve energy efficiency goals through retrofitting. (Oulu University of Applied Sciences 2021.)

Energy efficiency targets also run in the co-design process, as information gathered from stakeholders is utilized in the design of retrofits. For each project, individual stakeholders are defined, the size of which depends on the impact of the building itself. In the Energy Pathfinder project, in the study of historic buildings, stakeholders can be roughly divided into four groups: owners, primary users, secondary users, and public authorities and experts. (Figure 2.)

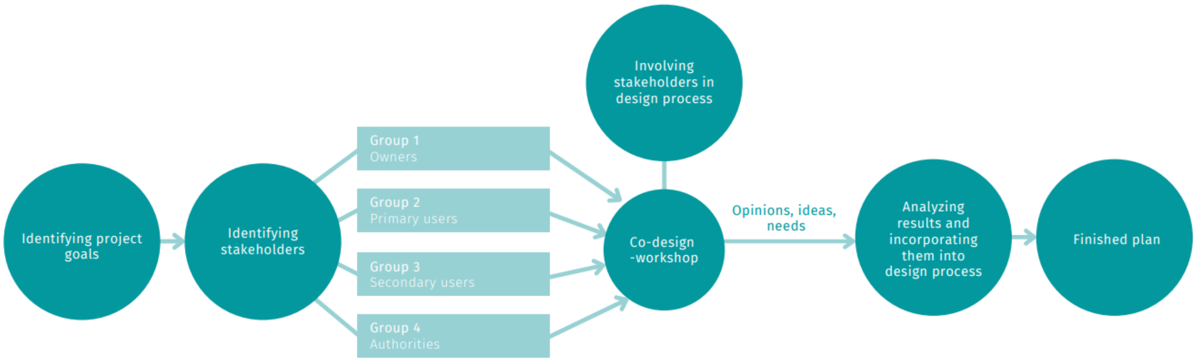

FIGURE 2. Description of the ideal co-design process in the design

In the ideal co-design process, stakeholders can be involved in the design in a joint event in which all stakeholders are involved. In this case, stakeholders can interact with each other and the flow of information is freer. Stakeholders can be involved in the design through a variety of tasks, the most concrete of which is, for example, a pen and paper. The information gathered from stakeholders in the co-design event will be analyzed for use in the design process and could be used to produce plans that take into account all parties involved in the project.

3.3 Co-design process in the design of the artist's house

In accordance with the ideal co-design process described above, the employees of the Raahe Rectors' House were defined in each of the four groups; owners, primary users, secondary users, and authorities and experts (Figure 3). However, the corona pandemic and the thesis schedule, along with the reachability of the individuals and their schedules, posed challenges to the co-design process; Stakeholder owners and, in part, public authorities and experts could not be involved in the co-design process.

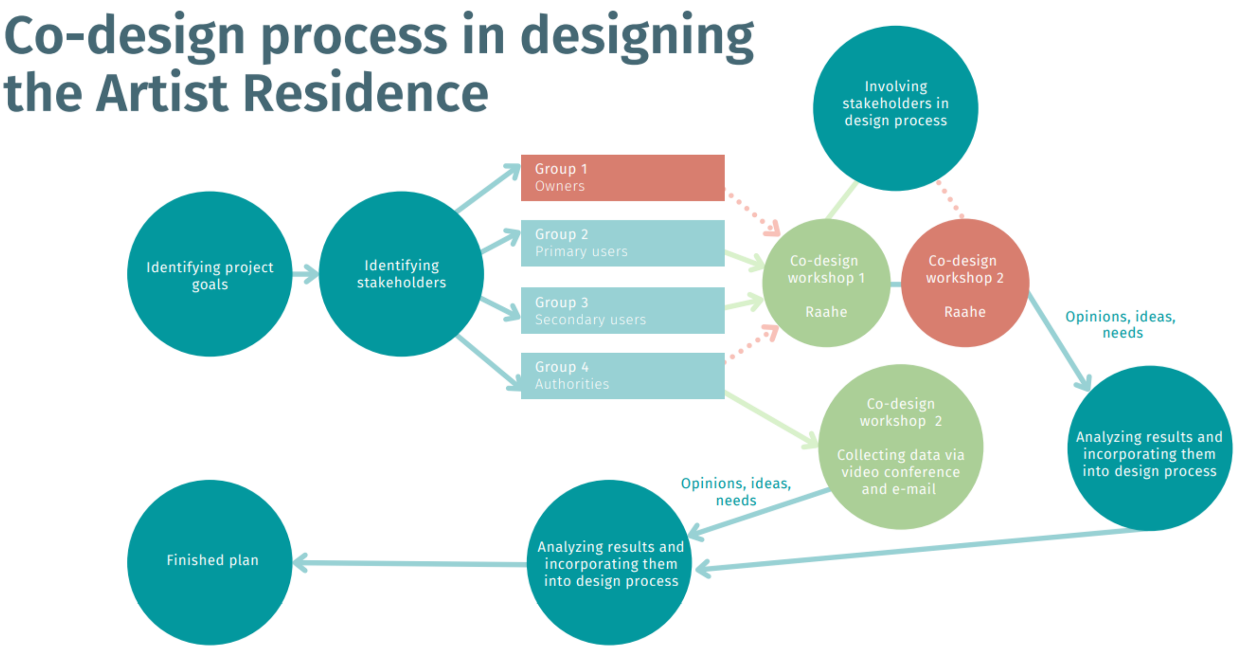

FIGURE 3. Description of the co-design process in the Rectors' House project

3.3.1 The first co-design workshop

The first co-design workshop for the design of the artist's house was held on 8 June 2021 on site in the Raahe seminar area. The various stakeholders identified above were invited to the co-design workshop. Only stakeholders identified in the user group were allowed to participate in the first workshop on site. (Figure 3.)

The aim of the co-design workshop was to create an opportunity for participants to make observations on their own initiative and to present their own ideas freely. Initially, the workshop described the objectives of this project and thesis and, in general, the objectives of the change in the use and design of the site. Workshop participants were then given floor plans printed on the site showing the current facilities and functions of the building. Next, the workshop program moved to the target building and participants were given time to tour the building, discuss, make observations and mark their thoughts on the floor plans distributed to them. During the tour of the building, the ideas that arose together were also discussed.

Finally, they came together to gather ideas and thoughts on the change of use of the building. Each in turn presented their own conclusions and ideas and discussed their suitability for the project. As a condition assessment of the building was not available at the time of the first workshop, it was not yet possible to present suggestions for technical improvements to the workshop or to ask stakeholders for their opinions. The materials from the first co-design workshop were collected and analyzed for architectural design. The results of the first workshop and its impact on the design process are discussed in Chapter 6.1.

3.3.2 Second co-design workshop

As not all the stakeholders considered could be involved in the first workshop in Raahe, it was decided to hold a second workshop in August 2021. All stakeholders who were unable to attend the first workshop were invited to the second workshop. The remaining stakeholder groups included both building owners and building authorities. The aim was to hold a workshop in August so that the architectural design process could start in September within the schedules set for the thesis.

However, due to difficulties in coordinating the schedules of the invited stakeholders, a second workshop in Raahe could not be organized despite the companies (Figure 3). Due to this, the architectural design was started already on the basis of the information obtained from the first workshop.

In February 2022, one group of engineering students from Oulu University of Applied Sciences was also involved in the project during the design process. In the co-design process, engineering students were classified as experts in the fourth stakeholder group, as they are considered to represent the professional group they are studying, bringing their own perspective on design. Architectural design in February was now well advanced from the draft stages to the near-final space program. A co-design workshop was held with a group of engineering students on February 7 via video conference (Figure 3). The group had previously visited the site on site during their own visit, as the building was also part of their studies on the renovation course. The condition assessment generated by the engineering students on the site as part of the course could also be utilized in this project.

The meeting introduced the objectives of this thesis and the Energy Pathfinder project and discussed how the group could contribute to supporting them. Engineering students would produce material about the structures that could be utilized in the project. The meeting discussed the structures of the building, the problems identified and some suggestions for improvements in the structures and energy efficiency. The issues raised in the second workshop and their consideration in the design are discussed in Chapter 6.2.

4 SEMINAR AREA AND THE RECTORS’ HOUSE

The history of the Raahe seminary area dates back to the 19th century. The history of the seminar still lives in the area today in the architecture and surroundings of the buildings. However, the buildings in the area, including the Rectors’ House, have undergone stages of change over the decades. (Museovirasto 2009a; Renovation 1 course 2021)

4.1 History of the seminar area

Located in a park-like setting, the Raahe seminar served as a teacher seminar/seminary at the turn of the 19th and 20th centuries. The Raahe seminar was built as a result of the then state's underground construction project and the planning of the government's general government. Several teacher seminars were established when the seminar degree became a qualification for teachers and the need for seminars increased. (Museovirasto 2009a.)

The decree on the Raahe Teachers' Seminary was issued in 1896, and the following year, in 1897, the Senate approved the drawings by architect Werner Polón. The seminar area comprised about a dozen buildings and construction work continued until 1899, but the teachers' seminar began as early as 1898. (Figure 4; Museovirasto 2009a.)

FIGURE 4. View of the seminar area from the beginning of the 20th century (Raahe Museum)

The buildings of the Raahe Seminary include a brick bottomed and wooden-topped main building and training school, a brick sauna building, and a wooden manager's and manager's apartment (Figure 5). The buildings of the Raahe seminary, designed partly from brick and partly from wood, differed in architecture from previous seminars, which were either entirely wooden or stone. (Museovirasto 2009a.)

FIGURE 5. Seminar area and Rectors' House at the beginning of the 20th century (Raahe Museum)

4.2 Rectors' House in the history of the seminary

The one-storey wooden building, completed in 1899, originally served as the apartment of a rector (headmistress). The two apartments in the building had their own entrances from the end porches of the building and a common main entrance from the middle of the courtyard façade. From the stairs of the entrance porches there were also visits to the open-air strike and the economic cellar. The apartments had bedrooms with sleeping alcoves, kitchens, storage rooms and bunks, and were joined by larger halls on the garden side. The larger apartment also included a maid's room and a dining room. However, unlike the seminar leader's building, the building and its two residential apartments did not have a bathroom. (Renovation 1 course 2021.) In 1955, the use of the building became partly an office. In 1971, the seminar was closed down and in 1972 the building housed the Raahe School of Computer Science when it began operations. The School of Computer Science continued its operations until 1997, when of it became the technical unit of the Oulu

University of Applied Sciences. The technology unit continued construction on the premises until 2014. The former office building is still part of the seminar area, but is now empty (Figure 6). (Museovirasto 2009a; Renovation 1 course 2021)

FIGURE 6. Rector's' House in the seminar area photographed in May 2021 (Tolonen 2021)

4.3 Stages of the Rectors' House

The stages of change to the Rectors' House have been studied as part of the Energy Pathfinder project (Cork Centre for Architectural Education 2021). The building has undergone a period of change in the 1950s, 1970s and 1990s. The biggest changes to the building were made in the 1950s, when the smaller apartment at the east end was converted into an office and archive space with a vault attached. Indoor toilets were built in the office space. An entrance and a staircase to the attic were also opened from the porch at the east end. A bathroom with a bathroom was built on the second floor, with access from the open staircase next to the entrance. (Renovation

1 course 2021.)

The following alteration drawings of the building date from 1977, where the downstairs apartment was equipped with a modern kitchen, toilet and bathroom. Similarly, the second-floor apartment was expanded with a kitchen, among other things. (Renovation 1 course 2021.)

In 1991, the entire building underwent a complete renovation and modernization. The repair was commissioned by the Raahe School of Computer Science from Matti Leiber's plans. Office and toilet facilities were built on the first floor and an open and large meeting room as well as sauna and living areas on the second floor. Almost all surfaces were renovated during the renovation, except for the panel ceilings and mouldings of the largest rooms on the first floor. The rest of this interior door was also kept original. The changes included plastering the walls of the building and possible additional insulation, renovating the floor surfaces with linoleum and parquet, and renovating the interior doors and exterior. (Renovation 1 course 2021.)

5 CURRENT SITUATION OF THE RECTORS’ HOUSE

The former Rectors’ House in the Raahe seminar area is now empty and the lack of maintenance has caused damage to the building. Next, the current and renovated facilities of the building in the 1990s are presented. After that, the organoleptic observations made during the first visit to the site and the condition assessment produced by the engineering students are discussed in outline.

5.1 The current premises of the building and the old space program

The current premises of the Rectors’ House are in accordance with the 1991 renovation. The premises are designed for the use of a computer school and an office. On the first floor, in addition to the entrance and hallway, there are secretary and principal rooms, a housekeeper room, a course director room, two larger office spaces, a customer service space, archive and photocopying facilities, and a cleaning closet and toilet facilities. (Figure 7.)

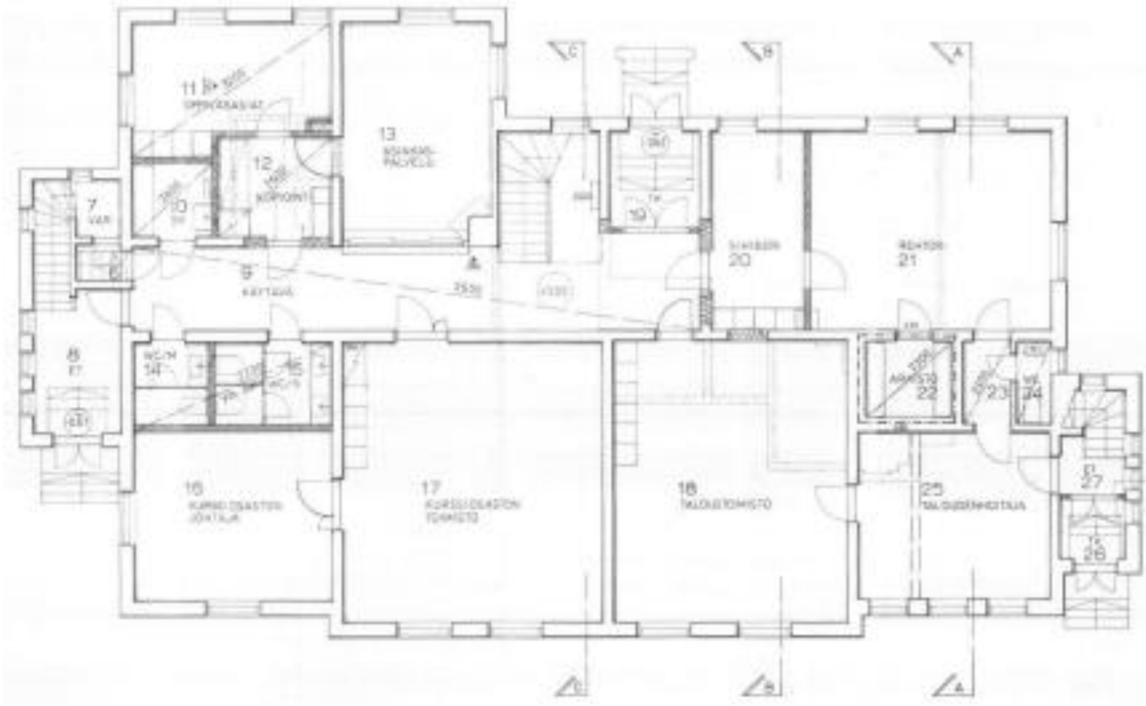

FIGURE 7. First floor plan and space in a 90's renovation (not to scale)

On the second floor, at the end of the building, is a larger meeting room with access to a small kitchen and dining area or sleeping area with a glass wall overlooking the stairwell. The second floor also has a few office rooms, toilet and dressing rooms, a cleaning room and an air supply engine room. (Figure 8.)

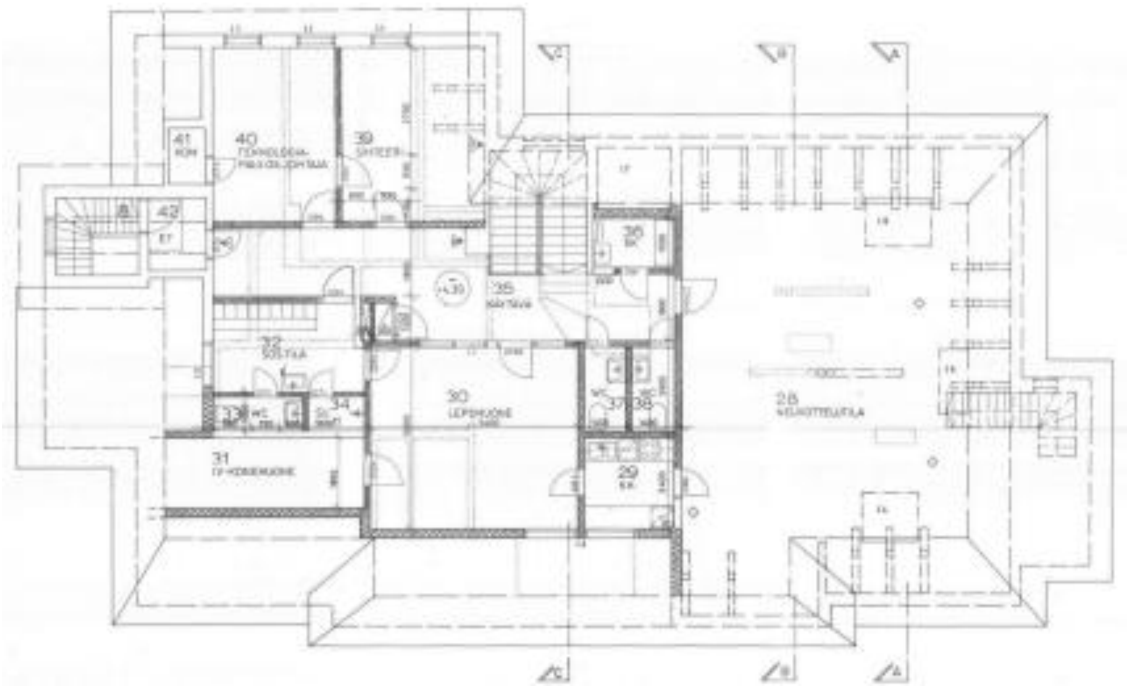

FIGURE 8. Floor plan and facilities of the second floor in the 90's renovation (not to scale)

Based on the available drawings and the data model created for the building, the current estimated space plan of the building was created. The dimensions of the building and the premises were deduced from the drawings and matched to them. According to the created space program, the building's current apartment area would be 477 m^2, most of which, 306 m^2, will have various workspaces. The building has 33$m^2$of laundry and changing rooms, and^{2}of maintenance facilities^2 and in addition other facilities, such as corridors, storage and storage facilities, totalling 102 m^2. (Table 1.)

TABLE 1. Current

Tilat	1. krs	2. krs	Yht. (hym²)		1. krs	2. krs	Yht. (hym²)
TYÖTILAT				**PESU- JA PUKUHUONETILAT**			
Kopiointi	7,0		7,0	WC-tilat	11,0	8,0	19,0
Oppilasasiat	13,5		13,5	Pesutilat		1,5	1,5
Asiakaspalvelu	19,0		19,0	Pukuhuonetilat		9,0	9,0
Kurssiosaston johtaja	21,0		21,0				**29,5**
Kurssiosaston toimisto	43,5		43,5	**HUOLTOTILAT**			
Taloustoimisto	39,0		39,0	Siivous	3,5	3	**6,5**
Sihteeri	11,0	17,5	28,5	**MUUT TILAT**			
Rehtori	28,5		28,5	Tuulikaappi	7,5		7,5
Arkisto	4,5		4,5	Eteinen	8,5	3,0	11,5
Taloudenhoitaja	18,5		18,5	Käytävä	28,0	25,5	53,5
Neuvottelutila		68,0	68,0	Porrashuoneet	1,0	14,5	15,5
Teknol.palv.os. johtaja		14,5	14,5	Varasto	1,5		1,5
			306	Tekninen tila		11,0	11,0
YHTEISET TILAT				Komero		1,5	1,5
Keittiö		6,0	6,0				**102**
Lepohuone		27,0	27,0				
			33,0	**Huoneistoala yhteensä**			**477**

5.2 Inventory

In the early stages of starting the thesis in May 2021, a visit to the Raahe seminar and, more specifically, the former Rectors' House was visited. During that visit, observations were made about the structures, environment and facilities of the site, and thought work for the design of the artist's house set in motion.

5.2.1 Facade and environment

The ornamentation and diversity of the building's facades were emphasized. The decorations on the façade have been enhanced with a darker shade of brown than the exterior cladding (Fig. 9). The decorativeness makes the facades impressive and their preservation is a requirement of the site's building protection decision.

FIGURE 9. View of the entrance to the building and the decoration of the façade

Damage was noticed in the stairs leading to the entrance to the building. Damage to the brick structure of the stairs appeared as packaging damage or possible brick cancer (Fig. 10). Damage to the structure in the future would be repaired by lowering the terrain around the building and treating the mudflats properly next to the building.

FIGURE 10. Damage to the structures of the stairs leading to the external doors (Tolonen 2021)

The windows were mostly in good condition. The outer windows of most of the windows were blown glass. However, replacing blown glass with modern window glass would be unnecessary and in addition the old glass surface respects the era of the building and the overall look of the façade. The second floor windows on the entrance side have been replaced at some point (Figure 11). However, the design and hinges of these windows do not fit the style of the façade as well as the older windows mentioned above.

FIGURE 11. Second floor window on the entrance side (Tolonen 2021)

There was deterioration and a thick layer of paint in the frames of the windows, so it would also be necessary to renovate the windows. Inside the windows had been sealed with masking tape and in some of the windows the masking tape had come off in places and left glue marks on the frames. During refurbishment, the masking tapes and stains and marks left on the inside of the windows can be removed and the sealing tapes can be replaced with adhesive paper, which is both a better and more suitable option.

There were signs of wetting on the horizontal decorative boards on the facades below some of the windows. There were no window dampers at all in the existing windows of the building and the decorative board was placed directly below the window (Fig. 11). In order to preserve the façade structures and decorations from moisture damage, it would be a good idea to install dampers on the underside of the windows to divert water away from the structures.

When installing window dampers, the horizontal trim panels under the windows can be moved, for example, 50 mm lower. Drip mouldings installed on the underside of the façade would also help to protect the structures.

The decorative wooden doors at the entrances were thick in structure, so there is no need to replace them from an energy efficiency point of view, but instead the doors should be sealed. The wind cabinet at the main entrance is also an important part of the thermal performance of the building.

The water roof seemed to be in good enough condition that no major measures were needed. Maintenance painting as well as inspection and sealing of joints and joints could be sufficient for sheet metal roof. On the other hand, damage was visible in the parts below the eaves, especially on the southeastern facade. Damage occurred as well at the right end of the south-east façade next to the downspout and at the seams elsewhere on that façade (Figure 12). The above damage is not necessarily an indication of a water roof defect. Downspouts were clogged in the building, so they are likely to have come over the vines and put extra moisture on the eaves. Damage to the eaves can be prevented from re-emerging by sealing the joints and maintaining and repairing rainwater systems.

FIGURE 12. Damage to the underside of the eaves of the south-east façade (Tolonen 2021)

There were considerable damage and deficiencies in the rainwater systems of the building. Gutters and drainpipes were clearly blocked and mossy, with a high risk of rainwater flooding and diverting to façade structures. The location of the drainpipes was slightly too high, allowing water to flow close to the façade (Fig. 13).

FIGURE 13. Damage to the lower part of the façade at the downspout

A few upper parts of the downpipe had completely detached and fallen next to the building, which has inevitably caused damage to the façade and eaves structures at these points (Figure 14). The building's rainwater systems should be inspected for any other damage and cleaned of moss, twigs, leaves and other potential debris. The downspouts can be serviced and repainted. Fallen downspouts should also be serviced and re-installed as soon as possible to prevent further damage, and it should also be extended to be at least 100 mm from the underside of the façade.

***FIGURE 14. Significant deterioration of the* end façade surface, a door leading to the basement near the ground and a fallen downspout on the left.**

There was considerable deterioration of the paint surface on the façade of the south end of the building. The ground surface of the façade cracked significantly, the paint surface was the so-called crocodile-coated. Exposure to heat and sunlight, as well as a layer of paint that is probably initially too thick, have combined to affect the condition of the façade. (Figure 14.) Repairing the end facade would require painting and possibly air vents in the end structure to increase breathability. The facades of the building were completely worn out and the building would have to be repainted in its entirety.

When planning the renovation of a façade, it is possible to study the colour options and whether, for example, the decor of the exterior doors can be further emphasized with a different colouring. Respecting the style of the building, oil-based paint could be used to paint the façade; above all, the paint must be breathable in order to prevent the accumulation of moisture in the surface structures.

Before signs and screws can be removed from the façade so that the previous coats of paint can be seen clean and paint samples can be taken to find out the type and colours of the paint. In addition, it would be justified to remove facade lamps and check their tightness, especially on interior surfaces.

The basement ventilation windows and the outer door leading to the basement at the south end were very close to the ground (Figures 14 and 15). Lowering the terrain around the building and tilting away from the foundations would also help prevent rainwater from entering the basement and its outer wall structures.

FIGURE 15. Basement ventilation hatch (Tolonen 2021)

In the yard area of the building, opposite the main entrance, there was a well that was not protected and its surroundings were not clean (Appendix 1). The safety of the well and its environment and access to the well should be improved; for example, a well canopy would protect the well from environmental debris and highlight the look of the well to the level of the rest of the historic built environment.

5.2.2 Structures

Indoors, moisture damage was observed on the first floor in the structures adjacent to the two toilets. Viewed from the entrance, in the back corner of the small toilet at the left end, there was visible moisture damage to the back on the wall surface. Water has entered the structure from probable leaking water pipes which had apparently already been cut off in the toilet but the piping had not been repaired. In addition, the part above the toilet window was filled with insulating wool when the window glass was broken. (Figure 16.)

FIGURE 16. Moisture damage in the room behind the first floor toilet and toilet water pipes and insulated window

On the first floor, one of the office rooms had moisture damage on the ceiling surface (Figure 17). Above the damage site, there was a heat distribution room on the second floor, so moisture has passed from there through the midsole. Below the area affected by the moisture damage, on the first floor, there were toilets built later in the building during the renovation. The toilet on the premises in the office room had a shallow loft, so moisture has not passed below the ceiling surface.

FIGURE 17. Moisture damage to the ceiling surface below the heat distribution room.

Tojax wood fibre cement board was used, which can cause microbial problems when wet. Production of Tojax was discontinued in 1967. (Raksystems 2017.) It is possible that asbestos-containing pipe insulation has also been used in kel Lar, which, when in poor condition and damaged, can release asbestos-containing material into the surrounding areas. The insulation materials used in the basements of the building are problematic and do not meet modern methods and requirements.

5.2.3 Premises

The premises and rooms of the building have previously served as office space for their users, but now the functions and facilities no longer serve the same purpose, so the facilities need renovation and clarity. Changes to the premises during the renovations in the 1990s and the details of the building and the materials used do not all fit into the spirit of the building. Some of the rooms had fixed furniture left over from the time the building served as office space, and some of the fixed furniture had been partially demolished. The floors in the rooms were partly parquet and linoleum. The rooms have ornate floor, door and ceiling mouldings and wooden floors.

Upon entering the interior of the building, the indoor air was found to be very stagnant. However, there was a lot of extra items and rubbish in the entrance hall, and the building had not been cleaned or maintained for a long time. Thorough decontamination, as well as cleaning of ventilation ducts, would already have a significant impact on overall indoor air quality.

The large meeting room on the second floor was impressive with its visible beams and pillars. Due to its high room height, the space was spacious and would allow for a wide range of uses in the future. (Figure 18.)

FIGURE 18. Large meeting room on the second floor

The rooms had various pendant and recessed luminaires and were old-fashioned. Replacing old energy-using luminaires with new ones that are more energy efficient would be a major factor in improving the energy efficiency of a building. As such, the existing lighting in the conference room would be well suited, for example, for performance lighting.

5.2.4 Technology

The technology in the building was old-fashioned and their placement was unnecessarily bulky (Figure 19). Indoors, the supply and exhaust air valves were placed too close together, as a result the air cannot circulate enough in the rooms (Fig. 20). When replacing the ventilation equipment, the appropriate placement of the valves may be considered more appropriate.

FIGURE 19. Technology in a partially dismantled cabinet on the first floor

FIGURE 20. Side-by-side supply and exhaust air valves

5.3 Condition assessment and repair plan for the site

This condition assessment was carried out at the site later than the inventory visit to the artist's house design. The condition assessment contained some of the same findings as the inventory of this thesis discussed in Chapter 5.2. Calculations of the target price, energy consumption and carbon footprint were also produced for the building, taking into account the space program of the artist's house planned for this project.

The originally thick sheet metal roof, which was typically thick during its manufacturing period, was visually in good condition, with the exception of occasional paint wear and surface rust, as well as the few leaks and moisture damage to the underside of the eaves mentioned above. On the water roof, the foot girders were loose but intact (Fig. 21). (Riekki 2021.)

FIGURE 21. Paint and surface rust detached from the sheet metal roof and dirty footstool (Riekki 2021)

By the inventory visit of this condition assessment, the downspouts of the building had already been renovated (Figure 22). The roofing was not recommended for renovation or complete renewal; painting, patching leaks and adding drops to the eaves are sufficient as corrective measures. There was significant wear on the facade surfaces and damage to the exterior stairs. The façade must be renovated as necessary. (Riekki 2021.)

FIGURE 22. Leakage from the eaves on the lower surface and a new downspout (Riekki 2021)

Rainwater control was deficient; some of the downspouts descended into the gutter well and some to the parasitic rocks and ground slopes were inevitable. The ground level had risen around the building, resulting in the basement ventilation hatches being too low (Fig. 23). In addition, the edges of the building had vegetation that increased moisture stress and some harmful alien species. The yard area should be basic repaired. The renovation includes e.g. improving rainwater management with sufficient slopes, determining the bearing capacity of the ground and installing drainage systems where one does not exist. (Riekki 2021.)

FIGURE 23. Basement window on a stone foot (Riekki 2021)

In the building, the structure supporting the upper floor, a log so-called the roof truss of the front house, was partially unventilated. In the upper part of the unventilated sloping roof and the rafters, a trace of moisture-induced leakage was observed (Fig. 24). In the room air, a typical cellar odour was observed, which may indicate microbial growth. The condition of the components of the upper sole should be checked and the ventilation of the upper sole improved. (Riekki 2021.)

FIGURE 24. Leakage trace and signs of microbial growth at the base of the lattice (Riekki 2021)

The foundations of the building were mostly in good condition compared to their age, so it was considered unnecessary to provide drainage or frost protection. Moisture could enter the basement and ventilation was inadequate. There was an unpleasant odour in the room air, which was noticeable in some of the nearby rooms. There was a lot of waste in the basement crawl space, some of which was rotting and problematic Tojax board had been used for insulation. The crawl space should be emptied of waste, a basic condition survey should be carried out on the subfloor, problematic materials should be removed and more suitable surface treatments should be applied to control moisture. The floor looked straight and the ventilation of the lower floor seemed to work in some way. The floor surfaces were in relatively good condition. (Riekki 2021.)

There were pipe leaks in the heat distribution room and the small toilet room on the first floor, which were also noticeable in the adjacent structures. Pipe leaks require immediate action due to the high risk of leakage. The water and sewage systems in the building were functional, so they needed to be serviced. The supply and exhaust air valves in the rooms were placed too close together; their location needs to be corrected at the same time as building technology is being rebuilt to meet new uses and the ventilation system is being replaced by a more environmentally friendly one. In addition, it is proposed to renovate the sewer, air conditioning and radiator piping. The building had functional electrification, but old-fashioned lighting and should be replaced with more energy-efficient ones. According to the space plan of the Artists' House, the layout of the rooms will be changed to correspond to the new use, the floor, wall and ceiling surfaces of the first and second floors will be renovated as necessary and the wet rooms will be waterproofed. (Riekki 2021; Ka Mula, Kauppila, Palosaari, Riekki & Törmälehto 2022.

During the renovation in the 1990s, the building was further insulated, so further insulation is no longer necessary. Repairing components, improving ventilation and airtightness, and improving the energy consumption during the use of a building are the most cost-effective repair methods in this case.

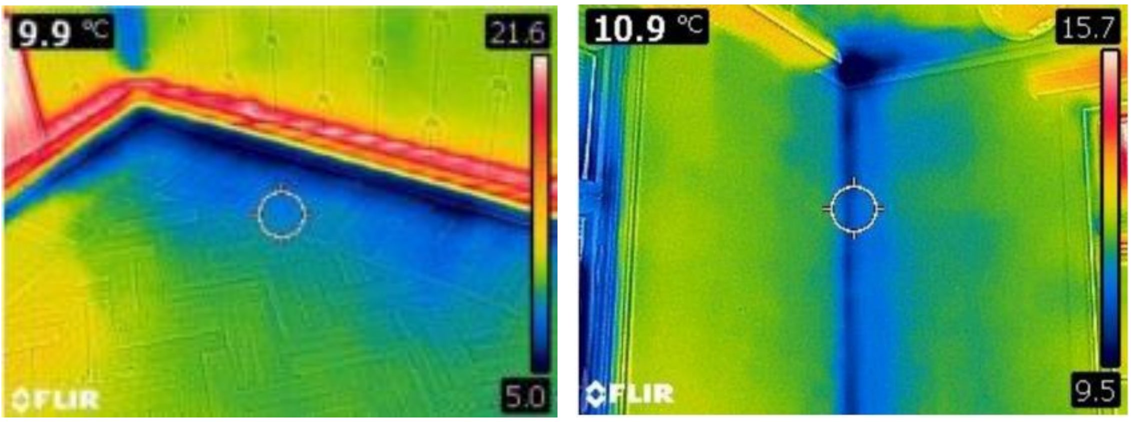

FIGURE 25. Heat leakage at the bottom and at the junction of the walls (Hukka & Korpi 2022)

Price of the repair and energy efficiency of the building and carbon footprint after the repair

For the renovation proposal based on the condition assessment, calculations were made for the building in terms of targets, energy consumption and carbon footprint, taking into account the condition of the Art Residence planned for this project. The costs were determined with Haahtela's TAKU software. A correction of 37.9% for the proposed remedies resulted in a price of € 932 / m^2 (VAT 0%), i.e. € 1,156 / m^2 (VAT 24%). The total price of the repair would therefore be € 475,000 (VAT 0%), € 589,000 (VAT 24%). The price of a similar new building would be € 2,460 / m^2 (VAT 0%), i.e. 3,051 m^2 (VAT 24%), in which case the total price would be 1 253 000 m^2 (VAT 0%), i.e. 1 554 000 m^2 (VAT 24%). (Kamula, Kauppila, Palosaari, Riekki & Törmälehto 2022.) The price of a new similar building would be almost three times higher than the price of the repair.

According to the energy efficiency calculations, the total energy consumption of the building before the renovation was 122,135 kWh / a. After the renovations, the total energy consumption would be 49,319 kWh / a. (Figure 26.)

Address	Raahe		BEFORE	AFTER
Total Heating Energy Consumption			122135	49319
THEC / total-m2		lämmin	220,9	89
THEC/total -rm3			62	25
THEC/housing-m2			243	98

Distribution of Total Heating Energy

	BEFORE RENOVATION		AFTER RENOVATION	
	KWh/year	KWh/asm^2	KWh/year	KWh/asm^2
The Envelope	48360	96	42208	84
Floor	3465		3465	
Outer Walls	16057		16057	
Roof	4560		4560	
Windows	17684		14147	
Balcony Doors	0		0	
Outer Doors	6594		3979	
Air Leakings	25210	50	8403	17
Air Ventilation	52522	104	9086	18
Domestic Hot Water	0	0	0	0
Internal Energy Sources	3957	8	10379	21
Heating Energy	122135	243	49319	98
Losses in Energy Production	0		0	
Total Heating Energy	122135	243	49319	98

FIGURE 26. Energy consumption calculation before and after the renovation

The most important factors in a building's energy consumption are ventilation and air leaks, so repairing them can significantly reduce the energy consumption of a building during its use. Renovation of a building would also have a significant impact if the building's carbon footprint is more than halved from 58 kg / asm^{2}to 23 kg / asm^2. (Figure 27.)

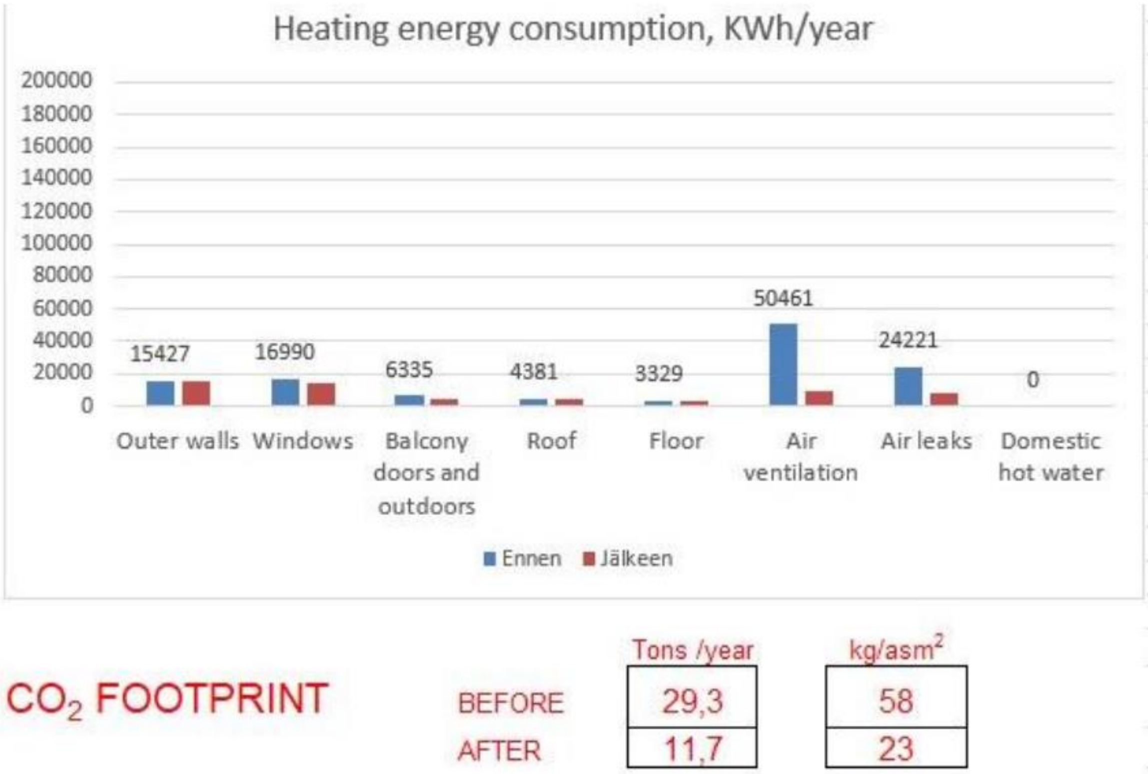

FIGURE 27. Building energy consumption and carbon footprint before and after renovation (Kamula, Kauppila, Palosaari, Riekki & Törmälehto 2022)

Based on the price of the renovation and the achievable energy efficiency and carbon footprint improvements, the renovation of the building is justified and profitable. By improving the functionality and general refurbishment of the structures, the lifespan of the building will be extended and the historically valuable protected site can be kept usable and appropriate repairs can prevent future damage caused by current problems.

6 GUIDELINES FOR THE DESIGN OF THE ART RESIDENCE

In the design of the artist house as part of the Energy Pathfinder project, co-design is the most significant process guiding the design. In addition to co-design, other aspects must be taken into account in architectural design. In addition to the building regulations, the plans must take into account the cultural and historical significance of the area, the possible building protection and the new requirements for the building brought about by the change of use. The above provisions and regulations are design requirements separate from the co-design process; co-design does not affect their implementation in design. One of the goals of the Energy Pathfinder project is also energy efficiency, so when designing retrofitting solutions for a building, efforts should be made to select the most suitable improvement solutions for the site in terms of energy use.

6.1 Impact of the first co-design workshop on the space program

The participants in the first workshop presented design considerations, especially in terms of user experience in relation to their own field of art. As the ideas were discussed in a group during the workshop, many of the ideas presented were commented on or agreed upon. (Table 2.)

TABLE 2. The ideas presented in the first workshop and the designer's comments on how they were taken into account in the design

	ENSISIJAISET KÄYTTÄJÄT			TOISSIJAISET KÄYTTÄJÄT		
	Tanssija	Kuvataiteilija	Raahen Kirjaklubi Ry:n edustaja	Brahe Classica ry:n edustaja	Raahen kulttuuripalvelupäällikkö	Rajatsi Ry:n edustaja
SUUNNITTELIJAN KOMMENTIT		Asuntojen sijoitus rakennuksen päätyihin 1. kerroksessa ja yksityiset sisäänkäynnit.		Riittävästi asuntoja	Perheiden / ryhmien majoitusmahdollisuus	
	Useampi eri kokoinen asunto mahdollistaisi monipuolisen majoituksen.					
	2. kerroksen keittiön laajentaminen			Yhteisöllisyys, yhteisiä tiloja	Tiloja luoennoille ja leireille	Yhteisöllisyys, hotellimaisuus
	1-2 yhteiskäyttöön tarkoitettua tilaa. Huomioitava vuokrattavien ja julkisten tilojen suhde					
	Tilaa yleisölle ja suuremmille ryhmille. 1. kerroksen kahden keskihuoneen yhdistäminen? Esitystilojen monipuolisuus;esim. myös yläkerran lasihuone esiintymistilana.	Muunneltavuus projekten mukaan ja monialaisuus. Onko 1. kerroksen tilat yhdistettävissä? Tilojen jakaminen siirreltävillä seinillä.		Muunneltavuus	Monialaisuus, yksilö ja ryhmätyöskentely	Monialaisuus
	Asuntojen muunneltavuus: 1. kerroksen oikea pääty mahdollista käyttää yhtenä suurempana tilana tai jakaa kahdeksi pienemmäksi. Kahden keskitilan yhdistämistä ei voisi todennäköisesti toteuttaa väliseinän purkamisella kokonaan. Voiko tilojen yhdisteltävyyttä toteuttaa muulla tavalla?					
			Äänitystila muusikoille ja tilojen ääneneristys.			Äänieristettyjä tiloja taiteenalojen harjoittamiseen, joissa syntyy melua.
	Äänieristettyjen tilojen rajaaminen rakennuksessa; kaikkia tiloja ei tarvitse äänieristää.					
						Esteettömyys; liikuntarajoitteisten pääsy asuntoi-. hin ja tiloihin.
	Esteettömyyden toteuttamisen mahdollisuudet tarkasteltava.					
	2. kerroksen suuri tila helppo saada pimeäksi ja mahdollistaa esiintymisvalaistuksen.		2. krs suuren tilan hyödyntäminen, akustointimahdollisuudet		2. kerroksen suuri tila hieno kattopalkkeineen.	
	Tila on jo pienillä muutoksilla hyvin monipuolisesti käytettävissä.					
	Lattiamateriaalin soveltuminen tanssiin					
	Lattiamateriaalin tulisi soveltua tanssitilalle vähintään 1. kerroksen kahdessa keskitilassa.					
	Valaisimien soveltuminen tanssiin; 1. kerroksen kattovalaisimet liian alhaalla.					
	Valaistuksen uusiminen sekä tanssi- että työtiloihin sopivaksi. Valaistuksen uusimisella voidaan vaikuttaa myös rakennuksen energiankulutukseen.					
	Piha-alueen hyödyntäminen; voi toimia esiintymistilana.	Rakennuksen ja miljöön ainutlaatuisuus huomioitava.				
	Puistomaisen ympäristön vaikutus sisätiloihin. Rakennuksen piha-alueella tilaa tapahtumille ja esityksille.					

The main focus of the future use of the building would be on the accommodation of artists and the provision of workspaces, and in the workshop many hoped for adequate and varied housing design; the building should also allow accommodation

for families or groups. Visits to the ends of the building were proposed as private entrances to the apartments planned at the ends. (Table 2.)
The facilities and activities were expected to be flexible, multidisciplinary and communal. The work spaces were intended to be suitable for both individual and group work. Common facilities and hotel-like facilities were also proposed for the building. A few also put forward the idea of merging the middle rooms on the first floor, making it a larger performance or work space. Many noted that the large meeting space on the second floor was well utilized. It was found possible to implement good acoustics and performance lighting, as the space would be easy to darken. The kitchen space on the second floor was found to be small and it was therefore suggested whether the kitchen could be expanded. (Table 2.)

The workshop also pointed to sound insulation, as the artist's house also needs soundproofed workspaces to practice noise-producing arts, such as musicians. Regarding the suitability of the premises for dance, the ceiling lights in the middle rooms of the first floor were found to be possibly too low. It was said that the floor material should be suitable for the space used for the dance. (Table 2.)

In the discussion, the building and the environment were found to be unique and that it would be good to take this into account in the design. The yard area was also proposed to be used for, among other things, performance. (Table 2.)

First co-design workshop

Based on this information from the first workshop, drafts of the Art Residence's layout were created; the type, distribution and location of the required spaces in the building were outlined, on the basis of which more detailed space planning and data modelling could be started. In the draft spatial plan, there would be three apartments on the first floor instead of the existing office and work space, and one of them would be divided into two smaller ones. A shared apartment would allow a group or family to stay in a shared apartment, and a cold porch on the side of the building would act as a private entrance to the apartment. The other two living rooms on the first floor would be smaller. Each apartment would have its own bathroom in the existing wet room. There would also be a public toilet in the lobby. (Figure 28.)

FIGURE 28. Draft floor plan for the first floor based on the first co-design workshop (not to scale)

A common space would open in the lobby on the first floor, serving as a living space for both artists and outsiders. The two largest medium spaces would be gallery and work space for rent, and could also be used as ballrooms. (Figure 28.) However, the idea presented in the workshop of combining spaces by dismantling a partition would not be ideally feasible, as bearing lines would probably have to be left at the partition (Table 1). However, the facilities are already individually large enough for smaller groups.

Communality would also be considered in the second floor premises. The current kitchen and adjoining space would serve as a common kitchen and living and dining area. The small kitchen space could be expanded to the side of the dining area by dismantling the partition. The largest space at the end of the second floor would be a multi-purpose space for rent, e.g. for various meetings, workshops, presentations or even larger workflows. The two existing office spaces would be studios for rent. According to the draft, the changing rooms, toilets and cleaning facilities as well as the technical space would remain in their current locations. (Figure 29.)

FIGURE 29. Draft floor plan for the second floor based on the first co-design workshop (not to scale)

6.2 Effects of the second co-design workshop on the design

The energy efficiency of the building has been somewhat improved since the 1991 renovation, when the external walls were further insulated. The idea of further insulating the upper floor of the building to further improve energy efficiency was raised at the meeting. However, it was found that insulating the diverse and partially sloping ceiling of the building would be unnecessarily challenging. Instead, sealing doors and windows would be more central to improving energy efficiency.

It was recalled at the meeting that the ventilation equipment in the building is not up to date; 1990s air supply units are no longer efficient compared to the equipment currently available. Upgrading ventilation and heat recovery systems would therefore also significantly improve the energy performance of a building.

In the outer wall of the basement, engineering students had noticed brick cancer, as fine brick dust and crumbling had been noticed on the inner surface of the wall. The outer wall structure was found to be uniformly weathered and no cracks were observed in the structure. The paint on the inner surface of the basement exterior was also suspected to be incorrect on that surface. To improve the structure of the exterior wall, external moisture should be removed and drained from the structures, the old paint surface of the wall should be removed, the dilapidated bricks of the exterior wall should be replaced intact and then the interior surface treated accordingly.

Cold bridges were found in the basement structures, as cracks have occurred locally in the structures as a result of the freezing. To improve the basement structures, the building would need a ground survey to determine the groundwater level at this time. As the basement of the building has been damaged by moisture, it is likely that moisture has accumulated in the soil surrounding the building. The solution for draining the soil and lowering the groundwater level would be to dig the necessary drains and install a submersible pump to pump the groundwater. Tojax wood fibre cement board has been used to insulate the basement, and removing it from the building and replacing it with SPU insulation, for example, would improve the functionality of the basement structures.

The clear weathering of the façade on the south side of the building was also highlighted at the meeting. It was suggested that further erosion of the porch on that façade could reduce weathering in the future. However, in the most recent renovation of the building, the exterior walls have been insulated, and additional insulation of the porch would not necessarily be of significant benefit. In addition, when looking at the surface of the façade at the site, a square crack emerges from the paint surface, which would indicate the cause of natural aging of the oil-based paint, incorrect application of the paint or too many coats of paint. In this case, it would be sufficient to renovate the façade by removing all the old paintwork, treating and priming the façade surface for new paint and painting the façade with thin coats of exterior paint suitable for the conditions and the object.

6.3 Cultural-historical significance and building protection

According to the National Board of Antiquities, nationally significant built cultural environments, RKY, provide a diverse overview of the history and development of our country's built environment by region, time and site type (Renovation 1 course 2021). A built cultural environment refers to a concretely built environment as well as the history of land use and construction and the way in which it was created. The cultural environment is thus a multi-layered entity that reflects stages of culture and the interaction of buildings, people and the environment. (Museovirasto 2009b.)

In a presentation given by the National Board of Antiquities in Helsinki in 1994, a decision was made to protect the Raahe seminar in order to preserve the national cultural heritage. The office building of the seminar, i.e. the former building for directors, was defined in the statement as protection category S2. In the protection classification of state buildings, the S2 building is partially protected and the building protection guidelines only apply to protected parts. In the office building, the protection concerns the appearance of the building. (Ympäristöministeriö 1994.)

6.4 Energy efficiency

One of the main goals of the Energy Pathfinder project is also, as the name implies, energy efficiency. The renovation planning of the buildings involved in the project aims to achieve near-zero-energy building (nZEB) standards (Oulu University of Applied Sciences 2021). The NZEB standards were set by the European Union in the 2018 EPBD, Energy Performance of Buildings.

However, the European Union has been preparing an update to the above-mentioned EPBD Directive from 2020, as part of the European Commission's Renovation Wave strategy. The EU has set a target of carbonising by 2050. The updated directive strengthens the requirements for the energy performance and climate emissions of new and existing buildings and introduces ZEB (zero emission building) standards alongside the nZEB standards, which aim to achieve zero emission targets. (Green Building Council Finland 2022.)

The energy efficiency requirements for buildings and their implementation are governed by the Land Use and Construction Act. In 2013, the Ministry of the Environment issued a decree on improving the energy efficiency of a building during repairs and alterations. According to the Land Use and Building Act, the energy efficiency of a building must be improved in connection with a repair or change subject to a building or operating permit in connection with the change of work or use of the building, if it is technically, functionally and economically feasible.

Statutory building categories and buildings that are not subject to energy efficiency improvement obligations include, to the extent that they are protected and in the event that compliance with the regulations would result in unacceptable alterations to the protected parts. (Land Use and Construction Act 132/1999 section 177 g; Decree of the Ministry of the Environment on improving the energy efficiency of a building in repairs and other works 4/13.)

6.5 Suitability of premises as accommodation, dance and work premises

When designing a building partly for accommodation use, fire safety and accessibility requirements must be implemented in an appropriate manner. The building containing the living, accommodation and work premises must be located and the premises of the building must be arranged taking into account environmental factors and natural conditions. Adequate access to natural light and appropriate lighting, adequate ventilation, safety and lighting of exits, the adequacy of necessary back-up systems and comfort must be taken into account. (Land Use and Construction Act 132/1999, section 117 j.). In the design of dance facilities, special attention should be paid to e.g. floor structures and coverings, acoustics, lighting, fittings, comfort and basic sizing of the space (RT 96-10504 1993).

Next, Chapters 6.5.1 to 6.5.5 discuss some of the design objectives associated with the change in the purpose of the Rectors' House.

6.5.1 Accessibility

In renovation construction, the starting point for the application of the Accessibility Regulation is the expediency of improving accessibility. In design, the goal is the accessibility of all facilities, and the goals of building protection and accessibility can be reconciled with good design. (RT 103141 2019.) In the design process of the artists' house, the aim is to solve the accessibility objectives as comprehensively as possible, however, building protection and renovation planning are the main objectives. Accessibility was also highlighted by those involved in the first workshop of this project (Table 2 on page 42).

In the accommodation building, the common areas and their equipment must be suitable for persons with reduced mobility and function, so a free space of 1,500 mm is used for the design of accessibility in the accommodation. At least 5% of the accommodation in the building, but at least one accommodation, must be accessible. The wheelchair space requirements and possibilities for wheelchair operation are generally used as the dimensioning principle for accessible pathways, doors and spaces. The space requirements for mobility with other mobility aids should also be taken into account in the design. In addition to taking into account the needs of the space, good acoustics, materials and lighting in the spaces can affect accessibility. (RT 103141 2019.)

In accessibility design, the accessibility of passageways is taken into account primarily by modifying the terrain. When designing stairs for access routes, there must be an unobstructed ramp or lift. The sloping sections of the ramp must be straight and turning on the ramp must take place only on horizontal intermediate levels. The recommended ramp width is 1,200 mm and the minimum width is 900 mm. (RT 103141 2019.)

The maximum slope for the ramp is 5%, i.e. 1:20; with the exception of a situation where the total height difference does not exceed 1000 mm, with a maximum gradient of 8% (1: 12,5). When the slope is 8%, the difference in height between a continuous ramp shall not exceed 500 mm, after which the gangway shall have an intermediate platform at least 2 000 mm long. An outdoor ramp may have a slope of more than 5% if it is covered or heated. The ramp shall be designed to be easily visible and the downhill passage shall be indicated as a warning area by darkness and material contrasts. In addition, the ramp must have a smooth, hard and non-slip surface and be provided with uniform handrails on both sides. (RT 103141 2019.)

According to the principles of accessible design, stairs must be safe and fit for purpose, and their surface must not be slippery. The recommended height for stairs designed for outdoor use is 120 mm. If the external steps are covered or heated, the progress of the steps must be at least 300 mm and the rise must not exceed 160 mm. Uncovered and unheated external steps shall comply with a minimum pitch of 390 mm and a maximum pitch of 130 mm. (RT 103141 2019.) As this project concerns the renovation planning of an existing building, the possibilities of accessibility of the exterior and interior stairs already in the building must be examined separately.

6.5.2 Fire safety

The decree of the Ministry of the Environment on the fire safety of buildings applies to the planning of repair and alteration work only if the building or part of it becomes more dangerous for fire safety and the improvement of fire safety in the building is therefore justified. Decree 848/2017 on the fire safety of buildings). If the decree is applied to repairs and alterations, all the conditions of the decree must be met (RT 103131 2019). For the Rectors' House, a fire category corresponding to its new use must be assigned to the building.

The buildings are divided into four fire classes: P1, P2, P3 and P0. Fire classes P1, P2 and P3 are used when the building is designed according to the categories and numerical values according to the regulation. Fire class P0 is used in projects where the design is made substantially or entirely using sizing based on assumed fire development. (RT 103131 2019.) The purpose, size, number of persons, number of storeys and height of a building affect the determination of the fire class building.
In addition, fire loads specific to the fire department (Decree of the Ministry of the Environment on the fire safety of buildings 848/2017.)

The artist's house, mainly as an accommodation building, belongs to fire category P2 when it contains overlapping dwellings. In the building, both accommodation and work space are determined for a fire load group of less than 600 MJ / m^2. (Decree of the Ministry of the Environment on the fire safety of buildings 848/2017, section 8, section 7.) The class requirement for compartmentalizing components is EI 60.

Adjacent accommodation or other functionally adjoining spaces may be connected to the same fire compartment, but the fire compartment must be subdivided. The class requirement for subdivided building components is EI15. (Decree of the Ministry of the Environment on the fire safety of buildings 848/2017, section 16; RT 103131 2019.)

It must be possible to leave the building safely in the event of a fire. Exits must be adequately located, easy to navigate and sufficiently open and lead to the ground or other safe place. (Decree of the Ministry of the Environment on the fire safety of buildings 848/2017, section 31.) The maximum length of the access route to the nearest exit is generally 30m (Decree of the Ministry of the Environment on the fire safety of buildings 848/2017, section 31). The basic requirement is that there are two independent, separate and suitable exits from the exit areas (RT 103131 2019). In the building, the exits are marked and illuminated accordingly. Illuminated exit signs are used for doors leading out.

The premises must be equipped with smoke extraction and rescue operations in accordance with the regulations. However, the organization of smoke extraction does not require special measures, for example in the event that the windows and door openings of the premises are easy to open or can be safely broken, in which case they can be used for smoke extraction. (Decree of the Ministry of the Environment on the fire safety of buildings, 848/2017, § 42.)

Accommodation facilities must be equipped with appropriate equipment to notify of an early fire. For accommodations with up to 50 accommodations, only locally reported mains fire alarms are required. (Decree of the Ministry of the Environment on the fire safety of buildings 848/2017, section 38.) The decree of the Ministry of the Environment does not require the building to be equipped with initial fire-fighting equipment; It is the responsibility of the property owner to determine the number and type of hand fire extinguishers in the building and the location of the fire extinguishers (RT103034 2019).

6.5.3 Space Planning

In the planned artist's house, the premises will be located in the building's former office premises and the premises will be designed to be suitable for use in several different fields of art. The facilities should be available as workshops for visual artists, musicians and writers, among others, and some facilities should also be suitable for dancing. However, the size, location, and other structural factors of existing facilities at the site place constraints on space design. The design of artists' study rooms must take into account the working methods, quality requirements and space requirements of different art fields. It is important to have sufficient and appropriate natural and artificial light in the premises, as well as sound insulation. In addition, things to consider include adequate space for work and good ventilation of the desk, if necessary, exhaust ventilation, the versatility of the space, the possibility of water intake and cleaning of work equipment, and fire safety. (RT 94-10819 2004.) For dancing, the space must be suitably open, sufficiently spacious and have a flat floor surface. Floor surfaces suitable for dance will be examined later in the context of the chapter on sound insulation.

6.5.4 Lighting

Lighting is an important part of the functionality of work and performance areas. Choosing the right kind of lighting can also have an impact on energy efficiency, and it is profitable to replace old luminaires with more energy-efficient ones, especially if the principals change the building. The suitability of the lighting for the workspaces and especially the dance rooms was highlighted in the first co-design workshop. The pendant lights in the two largest spaces on the first floor were found to be too low to be suitable for a dance space (Table 2).

In workplaces, the possibility of regulating natural light is important to eliminate possible reflections or unwanted light and its colour (RT 94-10819 2004). The natural light available to the premises in the planned artist's house is determined by the existing windows of the premises; however, the amount of natural light available can be influenced, for example, by the use of existing blinds in the windows. The height of the windows also allows desks to be placed under them.

There must be various lighting options in the premises of the artist's house. The design of artificial lighting in the workspace must take into account the correct colour of the light, the natural light entering the room, the position of the luminaires parallel to the work walls and the adjustability of the luminaires. The lighting should be easy to maintain and allow for spot lighting, and it is a good idea to have separate work lights at workstations. (RT 94-10819 2004.) At the same time as replacing more energy-efficient LED lamps in the building, the luminaires can be selected to suit the purpose of each space, be it an artist's workspace or a ballroom.

6.5.5 Sound Insulation

Sound insulation is a technical feature that must be taken into account in the design. The implementation of sound insulation in the premises was also highlighted in the first co-design workshop of this project (Table 2 on page 42). In the event of a change in the use of a building, the procedures laid down for the new building may be applied in the sound insulation design.

However, the soundproofing properties of the building must not be impaired by the change and the sound insulation must be designed taking into account the courtyard and living areas of the building so that the sound environment does not cause harm to the residents (Decree of the Ministry of the Environment on the sound environment of the building 796/2017, section 7). According to the design, the artist's house houses both accommodation and work and performance spaces.

The sound insulation plan must therefore take into account the intended use of the premises so that a sufficiently good sound environment corresponding to its functions is realized in each space (Decree of the Ministry of the Environment on the sound environment of a building 796/2017, Section 4).

In the acoustic design of a building, it is important to look at the building as a whole, taking into account all possible sources of sound and the paths of sound propagation. As the uses of the premises change, acoustic improvements may be required in the partitions and, in addition, in the floor and ceiling structures, provided that improving the sound insulation of the walls alone does not have a significant effect, as sound transitions between the spaces may be impaired. (Puuinfo 2021.)

The sound insulation of structures is divided into step and airborne sound insulation. According to the Ministry of the Environment's regulation, when designing accommodation, the minimum permissible sound level difference between rooms is 55 dB and the maximum permissible step sound level 53 dB. Between the exit and the accommodation, the minimum permissible step sound level difference is 39 dB and the maximum permissible step sound level difference is 63 dB. (Decree of the Ministry of the Environment on the sound environment of a building 796/2017, Section 4) Thus, by compacting the building components between the rooms, some sound can be isolated. At the same time, the sound insulation of the structures can be increased by implementing fire compartments in the building.

Floor structures

In the first co-design workshop, attention was paid to the suitability of floor structures for dance (Table 2). The floor suitable for dancing has a flexible structure and wood is usually the most suitable surface material (RT 84-10958 2009). Floor structures also play a role in the acoustics of spaces (Puuinfo 2021).

An acoustic survey should be carried out on the building to be modified or repaired in order to determine the current acoustic properties of the building, and if the changes are significant, the requirements will be considered on a case-by-case basis in connection with a building permit (Puuinfo 2021). In connection with the change of the principals' house, suitable methods for improving the acoustics according to the intended use must therefore be examined separately with expertise, as the change in the functions of the premises is significant.

7 PLAN OF THE ARTIST’S HOUSE

On the basis of the co-design process, the condition assessment of the building and the repair proposal, as well as the examined design instructions and regulations, a final plan was drawn up for the transformation of the Raahe Seminary House into an artist's house. The design was based on draft spatial plans created with the help of the first co-design workshop. It is only from the very beginning that an information model was created for the building, in which the new functions and solutions planned for the artist's house were started to be adapted. By comparing and researching several alternatives and solutions, it was possible to produce plans for an artist's house in which the above-mentioned design objectives are equally taken into account.

7.1 The new space plan of the Artist’s House

The design of the premises of the Artists' House was aimed at functionality, versatility and efficiency. Artist residences, common areas as well as performance and gallery premises for rent, as well as meeting and work spaces were planned for the building.

It was wanted to have the most leased premises planned for the building in relation to other premises, as they are revenue-generating premises for the building. In the new space plan of the Artists' House, there are 331 m^2 of the total apartment area, which is estimated at 477 m^2. The living space is 180 m^2. The common areas in the building are 58.0 m^2. (Table 3.)

TABLE 3. New space program

TILAT	1. krs	2. krs	Yht. (hym²)		1. krs	2. krs	Yht. (hym²)
ASUNNOT				**MUUT VUOKRATTAVAT TILAT**			
AS1, 1h + k + alkovi				Galleria / työtila / tanssisali 1	39,0		39,0
ET	6,0		6,0	Galleria / työtila / tanssisali 2	43,5		43,5
ALKOVI	5,0		5,0	Vuokrattava kokous- / monitoimitila		68,0	68,0
K + H	28,5		28,5				**151**
KPH	4,5		4,5	**YHTEISET TILAT**			
AS2, 1h + k				WC-tilat		6,0	6,0
K + H	18,5		18,5	Yhteiskäyttöaula	19,0		19,0
KPH	4,0		4,0	Yhteinen keittiö + oleskelu		33,0	33,0
AS3, 1h + k							**58,0**
ET	3,5		3,5	**HUOLTOTILAT**			
K + H	21,0		21,0	Siivous		3	**3**
KPH	6,0		6,0	**MUUT TILAT**			
AS4, 1h + k				Varasto	1,5		1,5
ET + K	7,0		7,0	Tuulikaappi	5,0		5,0
H	14,0		14,0	Eteinen	8,5		8,5
KPH	3,5		3,5	Käytävä	28,0	15,5	43,5
AS5, 2h + k				Porrashuoneet	1,0	14,5	15,5
ET		3,0	3,0	Tekninen tila		11,0	11,0
K		9,0	9,0				85,0
ALKOVI		6,5	6,5				
TYÖH		7,5	7,5				
OH + TYÖH		18,0	18,0				
KPH		9,5	9,5				
Suihku		3,5	3,5				
Komero		1,5	1,5	**Huoneistoala yhteensä**			**477**
			180	**Vuokrattavat tilat yhteensä**			**331**

7.1. Artists' Apartments

There are a total of five apartments of different sizes, four of which are located on the first floor. Each apartment has a small kitchen, the water point of which can be used as part of the artist's workstation. The apartments have space for a larger desk in addition to the sleeping area. (Appendix 2.)Contrary to the draft spatial plan based on the first workshop, according to which there would be two apartments to be combined at the right end of the building, the apartments were decided to be designed separately (Figure 30).

Apartment 1 originally combines two office spaces and an adjoining former archive room that has been converted into an apartment bathroom. The apartment is designed for two people. The entrance hall of the apartment opens to a small alcove and the larger room houses the artists' workstations, the kitchen and the living area.

Adjacent to the gallery space and apartment 1 is apartment 2, which has one room and a small bathroom on the site of the former small toilet space and the adjacent corridor. The apartment has a door for both a gallery and a visit from the outside porch of the building.

The other two apartments on the first floor are at the other end of the building (Figure 30). Apartment 3 has one room and an en-suite bathroom. The toilets in the bathroom and hallway planned in this apartment will be demolished and the upper floor of the loft will not be used in the artist's apartment.

Apartment 4 is next to the common hall on the first floor and has one room and a kitchen connected to the entrance hall. The bathroom of the apartment is on the farm of the former cleaning room, from which the door leading to the corridor is removed and the wall is built closed.

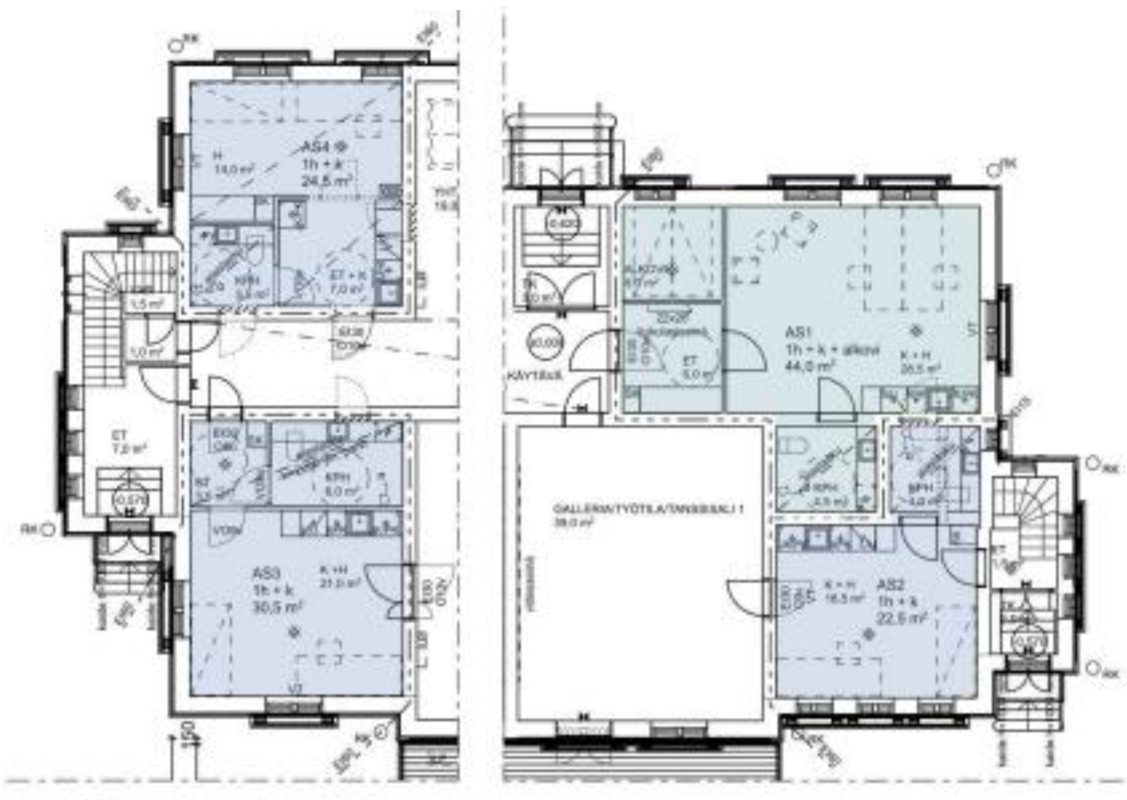

FIGURE 30. First floor dwellings (not to scale)

The artist's house had to have enough dwellings, so the premises presented as work rooms for rent in the draft spatial plan were converted into one dwelling. The fifth apartment is the largest apartment in the artist's house and, in addition to the two former office spaces, it has former changing rooms (Figure 31). There is an access to the living room from the end porch of the building via a staircase as well as from the corridor on the second floor. From the porch staircase there is access to a small hallway and then to the kitchen. There is a sliding glass wall between the kitchen and the living and study room, which allows light into the kitchen area from the living room windows. The apartment can accommodate three people if needed.

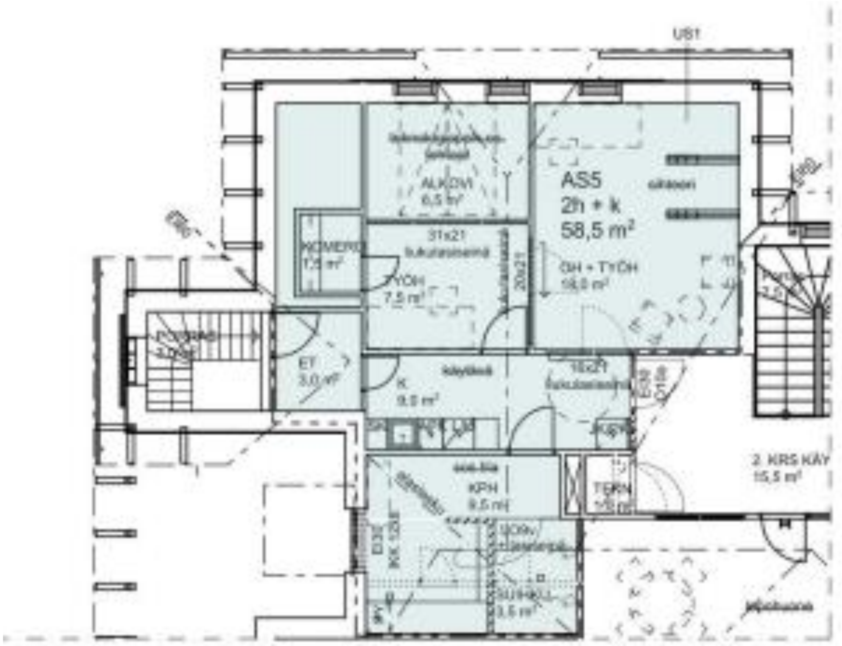

FIGURE 31. Second floor dwelling (not to scale)

7.1.2 Workspaces and gallery and performance spaces

In addition to overnight accommodation, the artists' dwellings function as private workrooms for artists. The artist's work points are located in the apartments under the windows, giving the workstations natural light. The work point must also have a suitable work light and targeted work lighting in the room.

On the first floor there are two larger rooms that serve as gallery spaces, work spaces and ballrooms. Premises are for rent, the use of which changes as needed.

Instead of dismantling the wall between the rooms, the rooms can be connected to each other via a video wall between them. The video wall can be used as an aid for various presentations and can also be used to create repetitive presentations in another space.

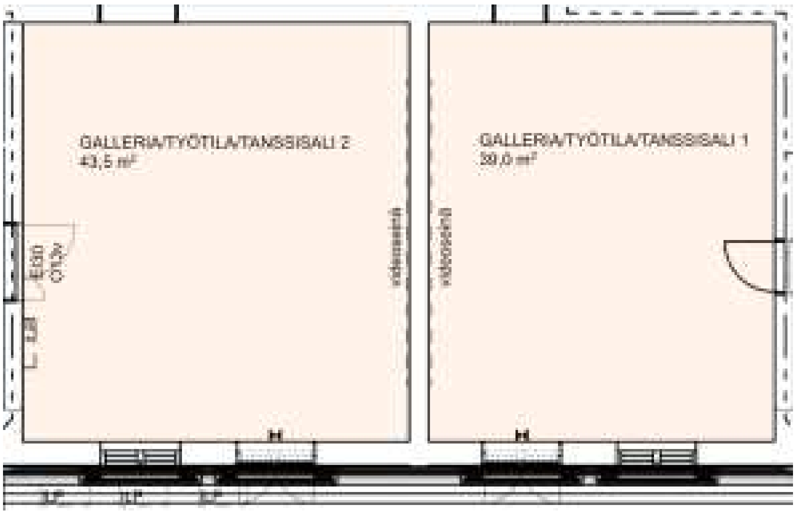

FIGURE 32. First floor gallery space

The second floor meeting space will be converted into a meeting and multi-purpose space for rent (Figure 33). The multifunctional space can also be used as a performance space for dancing, for example. The wall and ceiling surfaces of the room are made of gypsum board, so the sound insulation of the room can be improved and reverberation reduced, for example with acoustic plaster, which is also suitable for renovation construction. If necessary, acoustic panels can be added to the walls.

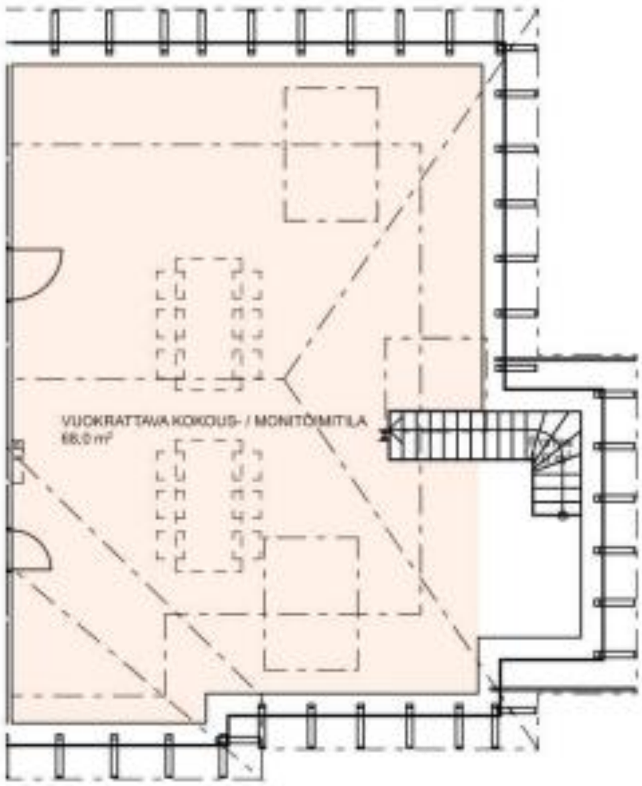

FIGURE 33. Second-floor multi-purpose space for rent (not to scale)

Interior materials for the Artist’s House

The spaces designed for the artist's house use surface materials that are suitable for the originality of the building. The colour scheme indoors is light and the colours are neutral, suitable for the artist's workspace.

The slab ceilings on the first and second floors will be converted to wood panelling, which is better suited to the other materials used in the historic building. The original, in good condition and usable parts of the interior of the building will be preserved as much as possible and the surfaces will only be renewed, which is necessary and in accordance with the new purpose.

7.1.3 Community in the artist's house

There are two spaces in the building, mainly for shared use. There is a shared lounge in the corridor of the first floor (Fig. 34). Today, the space is separated at a high level from the corridor space of the floor, so it is demolished to widen the space and allow passage from the corridor side. The old fireplace in the shared lounge will be preserved, but its usability must be examined separately.

The second floor of the building has a common kitchen and living area (Fig. 34). The former small kitchen is combined with a larger living room, increasing the space and brightness of the space. The old fixed furniture in the kitchen will be dismantled and replaced with new furniture suitable for the room. The material of the furniture would be, for example, natural wood, taking into account other original materials used in the building. As an extension of the kitchen furniture on the outside wall, a bench is placed in the living area along the length of the wall, which can be used for relaxing as part of a dining group seat or as a reading corner, for example.

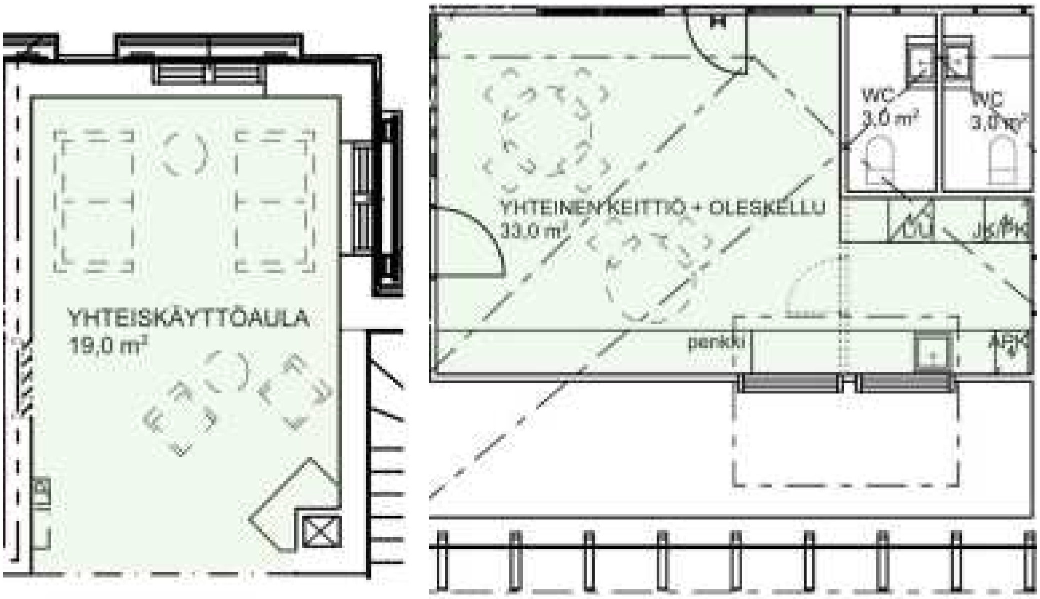

FIGURE 34. Shared lobby on the first floor and shared kitchen and living area on the second floor (not to scale)

The shared lobby and living room can be used for both relaxation and socializing. The common areas designed for the artists' house and the multi-purpose workspaces suitable for individual and group work enable the desired communality and hotel-likeness in the building. Or the common spaces designed for the artist's house are located in the middle of the building, surrounded by the artist's dwellings; the placement of the premises in this way evokes the idea of people gathering together.

7.2 Implementing

In the design of the Artists' House, implementing accessibility at the entrance proved to be a challenge. The exterior stairs at the current main entrance to the building lead to a wind cabinet with a few more steps to the first floor lobby. There is very little space at the beginning and end of the steps in the wind cabinet, which makes it impossible to carry a ramp or other unobstructed passage. An accessible entrance would also not be possible from the end porches of the building for the same reason. The entrance was therefore first attempted to be made accessible to the current main entrance via the first floor common hall by replacing the entrance window with a door (Figure 35).

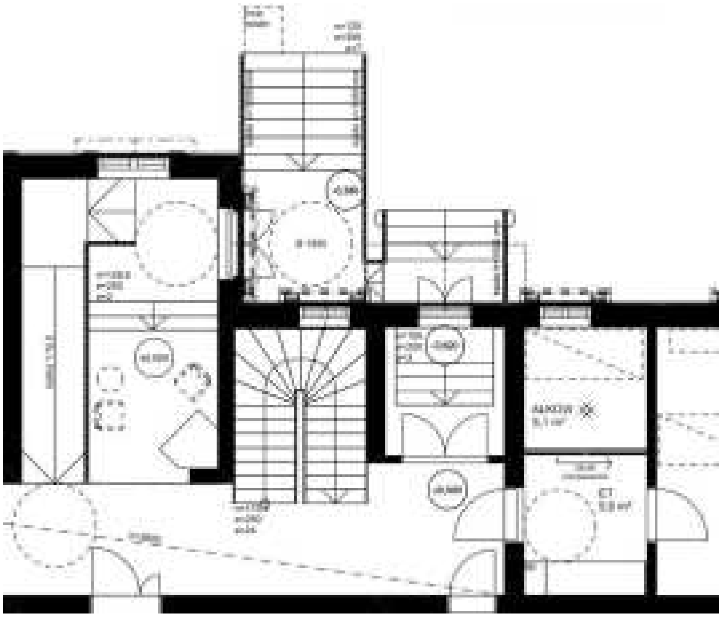

FIGURE 35. Examining the implementation of a barrier-free entrance from the side of the current main entrance (not to scale).

However, in this case, the large level difference between the first floor and the ground floor would have required a partial lowering of the floor in the common hall and the addition of a ramp to the interior in addition to the stairs leading to the entrance terrace and the disabled lift. Implementing an accessible entrance to the side of the current main entrance was found to be too challenging and would become too complicated due to the above. In addition, the entrance was intended to be suitable for the appearance of the façade of the historic building and to emphasize the entrance, and this option did not achieve the desired goals in the design.

The addition of a wheelchair lift to the main stairs was considered to provide access to the second floor, but only the first floor was designed to be accessible. Access to the second floor and hence the facilities on the second floor, including one apartment, are not accessible. Accessibility on the second floor and access to it was considered unnecessary, with all essential accessible spaces also located on the first floor. The public spaces on the first floor and the four apartments located there were able to be designed in the country while achieving accessibility goals.

Accessibility was improved by existing exterior entrances by adding wooden handrails to the side of the stone stairs, as the exterior stairs initially had no handrails and would require them when the terrain was lowered around the building.

New terrace and entrance

After examining the first option, it was decided to design an accessible entrance to the south-east façade on the other side of the current main entrance, where the end porches are located (Fig. 36). The new main entrance is highlighted by a large terrace with an unobstructed ramp. The terrace is accessed by stairs on both sides, making it easy to access the terrace and through it both indoors and outdoors.

The building has two entrances from the terrace through double doors, which replace the middle existing windows on the façade. Above the doors that replace the windows, shallow windows are placed that reproduce the look of the other windows in the façade. The new main doors are wooden and their decorative theme mimics the original main entrance to the house. The new terrace structures are not directly attached to the façade of the building, but there is a steel grille separating them between the terrace and the façade, which helps to prevent moisture from passing directly from the terrace surfaces to the façade. Snow barriers will also be added to the water roof of the building on the entrance terrace.

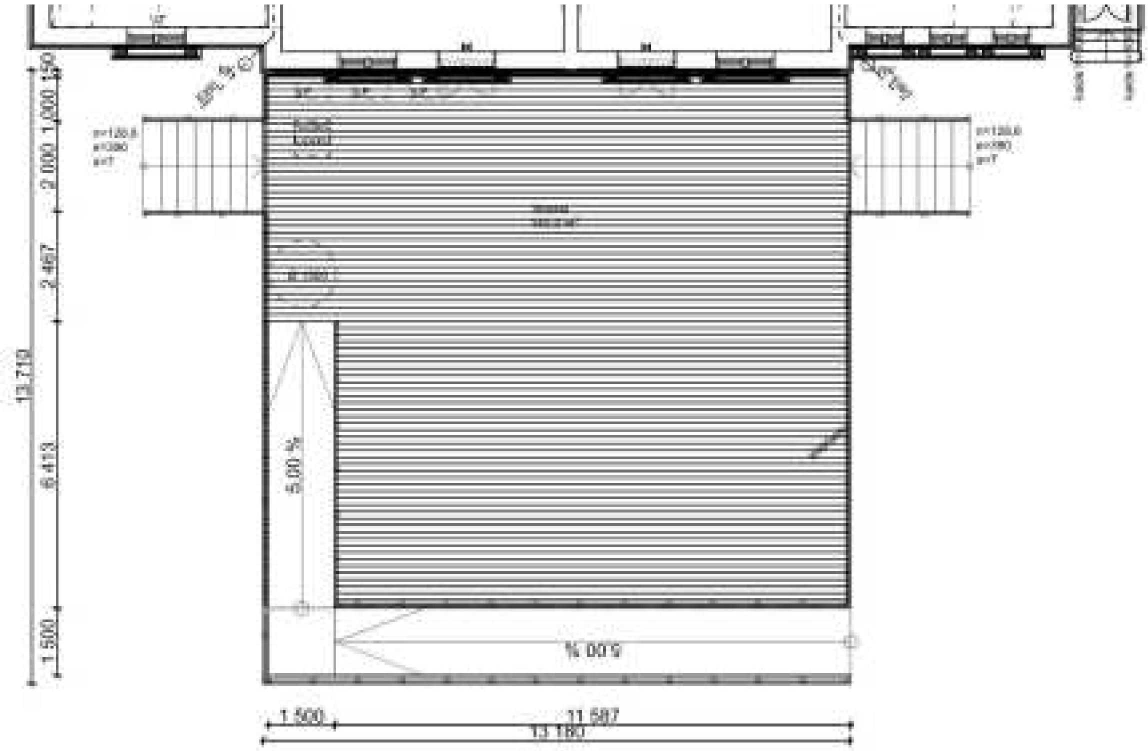

FIGURE 36. New terrace and entrance (not to scale)

From the terrace, double doors lead to the two gallery and dance rooms on the first floor of the artist's house. As the gallery spaces are separate and not connected, it is also possible for the large terrace to serve as a performance space. In addition to performances, the terrace can be used as a common living area for the artist's house, as an outdoor work space for artists, or for other events that can be held outdoors. (Fig. 37.)


37.

The new terrace makes the outdoor space comfortable

7.3 Fire Safety in the Old House

The artist apartments were provided with fire separation from the other rooms as the building was designed in fire category P2. Since the old wooden doors leading to the rooms are worth preserving, fire doors can be placed as double doors on some of the doors on the walls. (Appendix 2.) When installing fire doors against wooden doors, they are also sealed with fire seals.

Double doors can also help to improve the sound insulation of rooms. As the subdivisions of the first and second floors for dwellings overlap, the subfloor of the building must also be subdivided as necessary.

Smoke extraction in the rooms can be arranged through the opening windows and smoke alarms are located in the planned apartments. The doors leading out of the building have illuminated exit signs and all apartments have at least two exits. In the first floor dwellings 1, 3 and 4, the opening windows can act as back-up due to their width; spare roads are also marked on the floor plans.

7.4 Facade materials and colours

Facades are the most visible and impressive part of a building. In the former Rectors' House, the exterior had been designated for protection, so all existing parts of the façade and its decorations were preserved. The layout and materials of the new entrance and railings were designed to fit into the existing building, respecting the original façade. (Fig. 38.)

FIGURE 38. Exterior view from the side of the entrance terrace

The façade colour of the building will be preserved as it is today. The building next to the artists' house, which still serves as the most residential building, is similar in colour to the former office building, so it retains its current colours, and the building complex in the seminar area remains the same. The wood cladding of the façade and the wooden exterior doors and windows are very light brown, and the decorative elements and mouldings on the façade are dark brown. The new entrance terrace of the artist's house is covered with wood with a panel of the same width as the facades of the building, and the decoration of the terrace with mouldings takes the model of the decorations of the building. The new wooden railings used outdoors are dark brown, which reproduces the theme of the façade.

The grey tone of the sheet metal roof is maintained by maintenance painting. Facade signs and lighting will be maintained and refurbished.

7.5 Yard and pavements

The terrain surrounding the building is modified to implement suitable ground slopes and to build access routes to the entrances. Smaller stones or crushed stone are used at the edges of the plinth of the building, and smooth and clear passages are built around the building, adapting to the existing courtyard area of the area, to each entrance and to the main entrance terrace and the accessible ramp. (Appendix 1.)

Gutter wells are placed under each downpipe to control rainwater. The yard area of the building will be kept as natural and park-like as possible, and plants suitable for the area will be planted there to increase, among other things, the comfort of the terrace area (Fig. 39). The area around the well will be cleaned up and a canopy will be built for the well, which will model the building in terms of materials and appearance. The well canopy emphasizes the location of the well and also helps protect the well.

FIGURE 39. Paths lead to the entrances to the building and the building environment is park-like

7.6 Building technology and energy efficiency

The drawings produced by the artist's house do not show the luminaires, but more detailed lighting design should be done according to the design guidelines discussed earlier. The luminaires in all rooms will be renewed to be more energy efficient.

Solar panels were placed on the roof of the building, which can be used to generate electricity for the building. The solar panels were placed on the long side of the building on the southeast side of the main entrance. Some of the solar panels are on the side of the middle ceiling lamp on the façade, and the rest are in the same line on both sides of the two main panels. (Appendix 3.)

The plan of the artists' house took into account the new ventilation system. The new outdoor units of the air source heat pump can be placed in a shelter under the terrace of the main entrance, which has a hatch for servicing the outdoor units. Three outdoor units of the air source heat pump were placed under the terrace and sufficient space was left between them and the façade of the building to ensure the ventilation of the façade. The indoor units, in turn, are on the first floor in gallery space 1 and in the common hall, which is connected to the main lobby on the first floor. On the second floor, the third indoor unit was located in the largest space, i.e. the meeting and multi-purpose space for rent. (Appendix 3.)

8 CONSIDERATION

The aim of the thesis was to produce plans for the change of the purpose of the office and residential building in the area of the Raahe seminary and for the renovation into an artist's house. From the point of view of the principal designer, the plans were produced in such a way that they could be used for the purposes of the project. The aim was also to draw up plans for a near-0 energy level. However, a key aspect of the work in the design process was the participatory co-de sign method, which sought to find the best solutions for retrofits and energy efficiency improvements. The co-design method was implemented in the design project with the help of workshops, and people defined for both user and authority groups were involved in the design.

In architectural design, user knowledge and experience are valuable resources, and the co-design method makes these available to designers immediately in the early stages of the design process. In order to achieve the best results with this method, the target groups of the user survey should be sufficiently comprehensive and, above all, reachable and committed to participate in the design process. The challenge in the thesis was to implement co-design in an ideal way.

The stakeholders identified in the study eventually formed a small group as a whole, as both the future user base planned for the building and the current target district are relatively limited. The implementation of the processed building regulations in the existing premises of the building, without compromising the facades of the building and the functionality of the premises, also posed challenges in the design. In particular, compliance with fire compartmentation and accessibility requirements requires more consideration in the design process.

Co-design can produce significant results in architectural design, as it allows designers to make assumptions and existing knowledge to support design from a broader perspective. In her dissertation “Design games as a tool, a Mindset and a structure”, Kirsikka Vaajakallio presented interestingly how the utilization of participatory design in the early stages of design processes has led to changes in the work environment and role of designers; Creativity is not only focused on the design of new products, but also on the possibilities of creative co-operation between different actors (Vaajakallio 2012).

The functionality and usability of the method are affected by practical challenges, such as the availability of stakeholders in relation to the schedules set for the project. Not all imagined stakeholders were allowed to participate in the co-design process of the thesis in the workshop organized at the site.

Utilizing the co-design method, despite the challenges, also brought the desired results in the design of the artist's house. Most of the potential future user groups of the building were involved in the design, providing information and observations to support the design that would directly affect the user experience and functionality of the building from their perspective. Users' suggestions could be implemented in an appropriate way within the framework of building regulations and energy efficiency targets. In addition to the initial stage of the process, the co-design method could be utilized during it and in the data modelling itself, when a second workshop was held with the engineering students. The material and research produced by engineering students, mainly concerning structures and building technology, provided valuable information for use in design. They were utilized in the project, which made it possible to create a whole from the produced plan that supports the renovation planning of the building from several perspectives.

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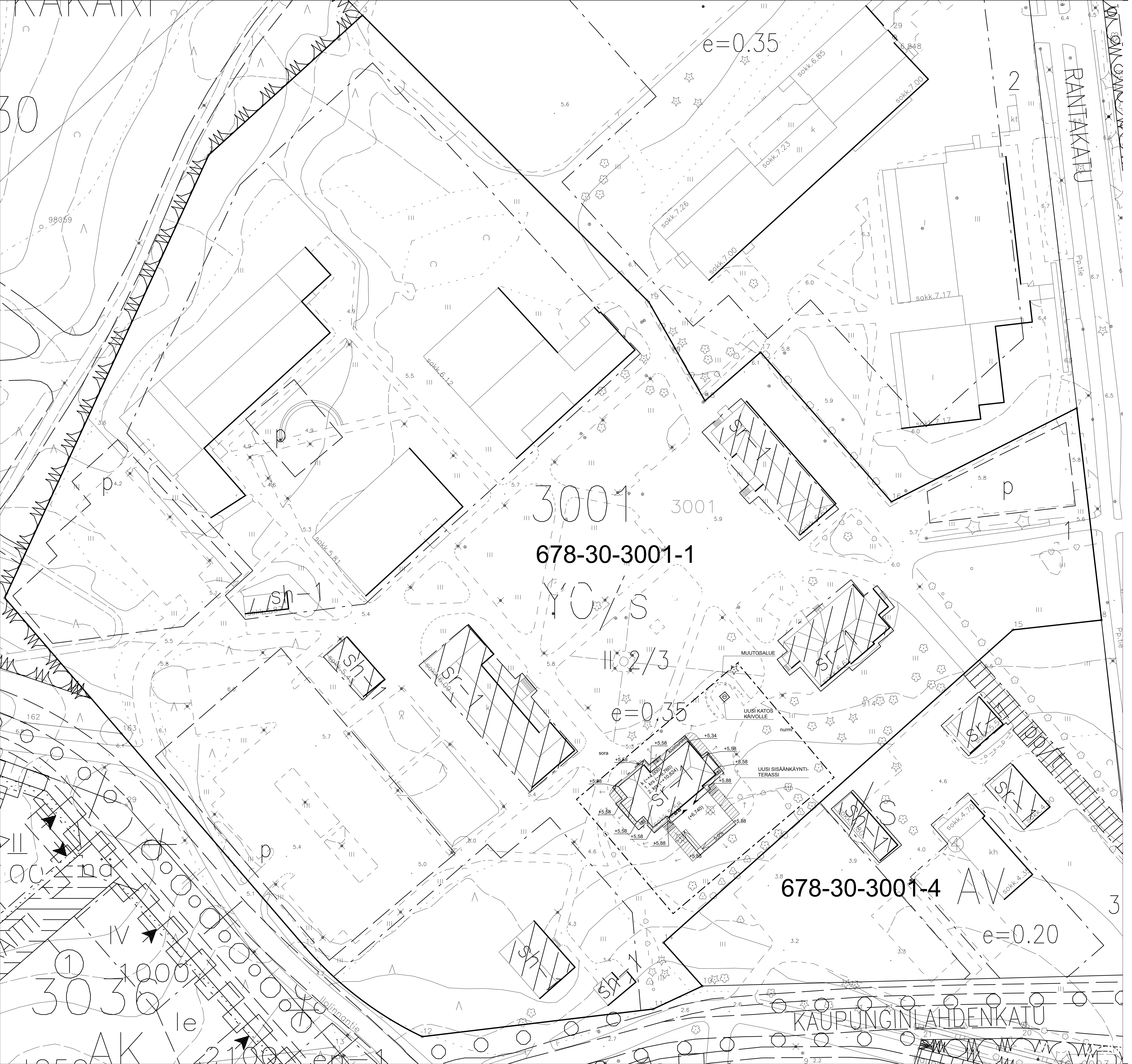


PITKÄNKARIN OPPILAITOSTEN ASEMAKAAVA

ASEMAKAAVA 30. KAUPUNGINOSAN, PITKÄKARI, LAAJENTAMISELLE KORTTELEILLE 3001 JA 3002 SEKÄ VIRKISTYS-, KATU- JA VESIALUEILLE.

ASEMAKAAVAN MUUTOS KOSKEE 30. KAUPUNGINOSAN, PITKÄKARI, KATUALUETTA.

ASEMAKAAVAN MUUTOKSELLA MUODOSTUU 30. KAUPUNGINOSAN, PITKÄKARI, OSA KORTTELISTA 3001 SEKÄ VIRKISTYSALUETTA.

ASEMAKAAVAMERKINNÄT JA -MÄÄRÄYKSET:

AV	Asuin- ja kasvitarharakennusten korttelialue.
Y	Yleisten rakennusten korttelialue.
YO	Opetustoimintaa palvelevien rakennusten korttelialue.
VL	Lähivirkistysalue.
VV	Uimaranta-alue.
W	Vesialue.
	3 m sen kaava-alueen ulkopuolella oleva viiva, jota vahvistaminen koskee.
	Korttelin, korttelinosan ja alueen raja.
	Eri kaavamääräysten alaisten alueenosien välinen raja.
	Ohjeellinen eri kaavamääräysten alaisten alueenosien välinen raja.
	Ohjeellinen tontin raja.
	Risti merkinnän päällä osoittaa merkinnän poistamista.
30	Kaupunginosan numero.
PIT	Kaupunginosan nimi.
3001	Korttelin numero.
1	Tontin numero.
TAKARANTA	Kadun, katuaukion, torin tai puiston nimi.
400	Rakennusoikeus kerrosalaneliömetreinä.
II	Roomalainen numero osoittaa rakennusten, rakennuksen tai sen osan suurimman sallitun kerrosluvun.
II 2/3	Murtoluku roomalaisen numeron jäljessä osoittaa, kuinka suuren osan rakennuksen suurimman kerroksen alasta saa kaavassa lukumäärältään mainittujen kerrosten yläpuolella olevasta tilasta kerrosluvun estämättä käyttää kerrosalaan laskettavaksi tilaksi.
e=0.20	Tehokkuusluku eli kerrosalan suhde tontin pinta-alaan.
	Rakennusala.
sa	Rakennusala, jolle saa sijoittaa saunarakennuksen.
	Katu.
pp/t	Yleiselle jalankululle ja polkupyöräilylle varattu alueen osa, jolla tontille ajo on sallittu.
vu	Ohjeellinen ulkoilureitti.
p	Pysäköimispaikka.
ajo	Alueella oleva ajoyhteys.
/s	Alue, jolla ympäristö säilytetään.
sr-1	Rakennustaiteellisesti tai historiallisesti arvokas tai miljöön säilymisen kannalta tärkeä rakennus.

Rakennusta ei saa hävittää ilman pakottavaa syytä.

Rakennuksessa suoritettavien korjaus- ja muutostöiden sekä käyttötarkoituksen muutosten tulee olla sellaisia,

että rakennuksen rakennustaiteellisesti tai historiallisesti tai miljöön säilymisen kannalta merkittävä luonne säilyy. Mikäli tämän pyrkimyksen vastaisesti on rakennuksessa aikaisemmin suoritettu rakennustoimenpiteitä, on rakennus korjaus- ja muutostöiden yhteydessä pyrittävä korjaamaan entistäen taikka muulla rakennukseen ja ympäristöön soveltuvalla tavalla. Korjattaessa on katsottava, että ovi- ja ikkuna-aukot sekä näiden muodot ja jaot, kattomuoto ja erilaiset ulokkeet, savupiiput ja vesikourut sekä muut rakennukselle ominaiset yksityiskohdat ja käytetty materiaali säilytetään taikka niiden laatu entistettäessä otetaan huomioon.

Rakennuslautakunta voi erityisestä syystä sallia, että rakennuksen ullakolle saa sisustaa huonetiloja rakennusalalle tai tontille merkityn rakennusoikeuden ja kerrosluvun sitä estämättä.

Rakennuksen tai sen osan purkamiseen, oleelliseen muuttamiseen tai siirtämiseen on hankittava rakennuslautakunnan lupa.

sh-1	Historiallinen tai ympäristöön sopeutuva rakennus.

Rakennuksen säilyminen on suotavaa, mutta sen korvaaminen ympäristöön sopeutuvalla uudisrakennuksella on mahdollista.

Korjaus- ja muutostöiden sekä käyttötarkoituksen muutosten tulee olla rakennukseen ja ympäristöön soveltuvia. Milloin tämän pyrkimyksen vastaisesti on rakennuksessa aikaisemmin suoritettu rakennustoimenpiteitä, on rakennus korjaus- ja muutostöiden yhteydessä pyrittävä korjaamaan joko entistäen taikka muulla rakennukseen ja ympäristöön soveltuvalla tavalla.

Rakennuslautakunta voi erityisestä syystä sallia, että rakennuksen ullakolle saa sisustaa huonetiloja rakennusalalle tai tontille merkityn rakennusoikeuden ja kerrosluvun sitä estämättä.

Rakennuksen tai sen osan purkamiseen, oleelliseen muuttamiseen tai siirtämiseen on hankittava rakennuslautakunnan lupa.

LIITE 1

Rakennuksen uusi käyttötartkoituksen mukainen rakennusluokitus:
Muut majoitusliikerakennukset 0329

Rakennuksen paloluokka on P2.

Savunpoisto rakennuksessa avattavien ikkunoiden kautta.

Majoitustilat osastoidaan muista tiloista: osastoivat rakennusosat ovat EI60 ja osiin jakavat rakennusosat EI15. Asunnot varustetaan palovaroitinjärjestelmällä.

HULEVESIEN HALLINTA

Rakennuksen katto- ja pihasadevedet johdetaan tontilla olemassaolevilla painanteilla kaupungin vesilaitoksen hulevesiverkostoon. Maanpinnat rakennuksen ympärillä muotoillaan viettämään poispäin rakennuksesta min. 5 % kaltevuudella.

TALOTEKNIIKKA

Rakennus varustetaan tulo- ja poistoilmanvaihdolla, jossa on lämmöntalteenotto. Rakennus on liitetty kaupungin vesijohto- ja viemäriverkostoon. Rakennuksessa on kaukolämpöverkkoon liitetty vesikiertoinen patterilämmitys.

Rakennuksen katolle sijoitetaan aurinkosähköpaneeleja julkisivukuvien mukaisesti.

RAKENNUSOIKEUS

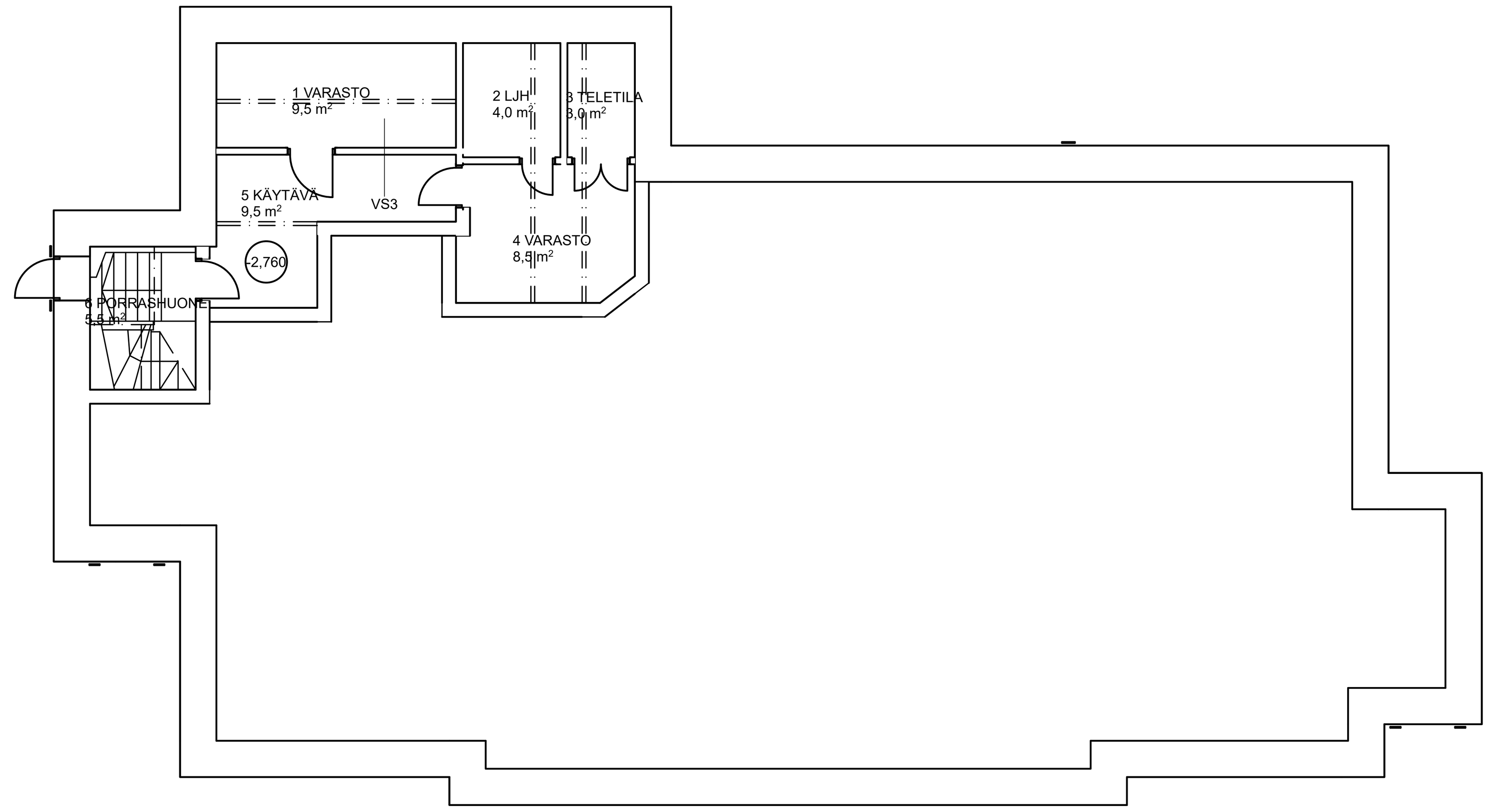
Rakennuksen muutostyöllä ei ole vaikutusta rakennuksen kerrosalaan ja siten tontilla käytettyyn rakennusoikeuteen.

Rakennuksen tilavuus: 2340 m^3
Rakennuksen kokonaishyötypinta-ala: 384 hum^2
Rakennuksen kokonaiskerrosala: 645 brm^2

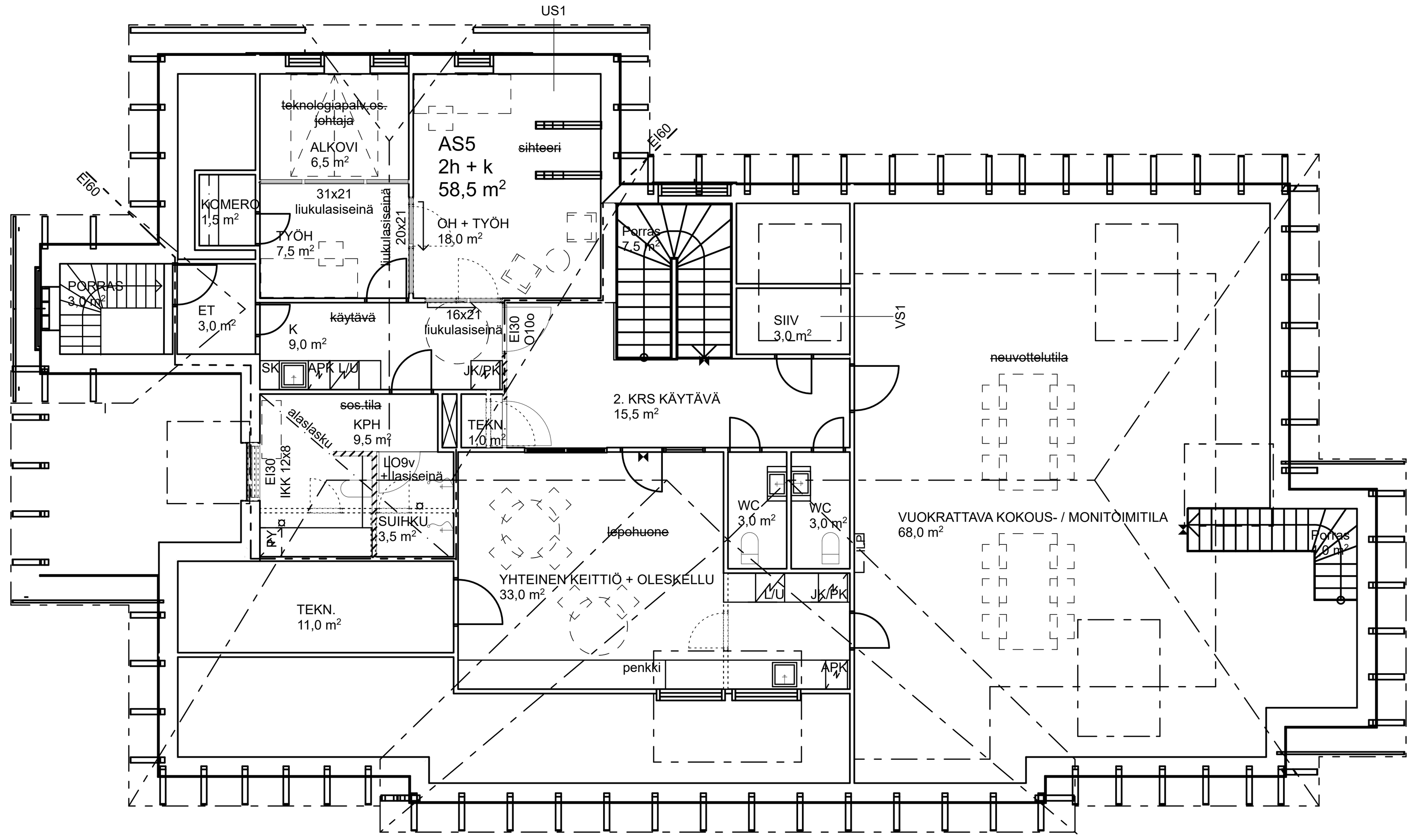
Kaupunginosa/Kylä	Kortteli/Tila	Tontti/Rnro	Viranomaisten merkintöjä
PITKÄKARI	3001	1	
Rakennustoimenpide: MUUTOSTYÖ			Piirustuslaji: PÄÄPIIRUSTUS
Rakennuskohde: Raahen seminaarin taiteilijatalo Raahen seminaari 92100 RAAHE			Piirustuksen sisältö: Asema Mittakaava: 1:500
Suunnittelijan yhteystiedot: Oulun ammattikorkeakoulu t7peju01@students.oamk.fi			Piirustuksen ID: 01 Muutos:
Vastuullinen suunnittelija: nimi, tutkinto, allekirjoitus ja päiväys Julia Heinonen RA (opiskelija) 24.5.2022			Suunnitteluala: ARK

LIITE 2

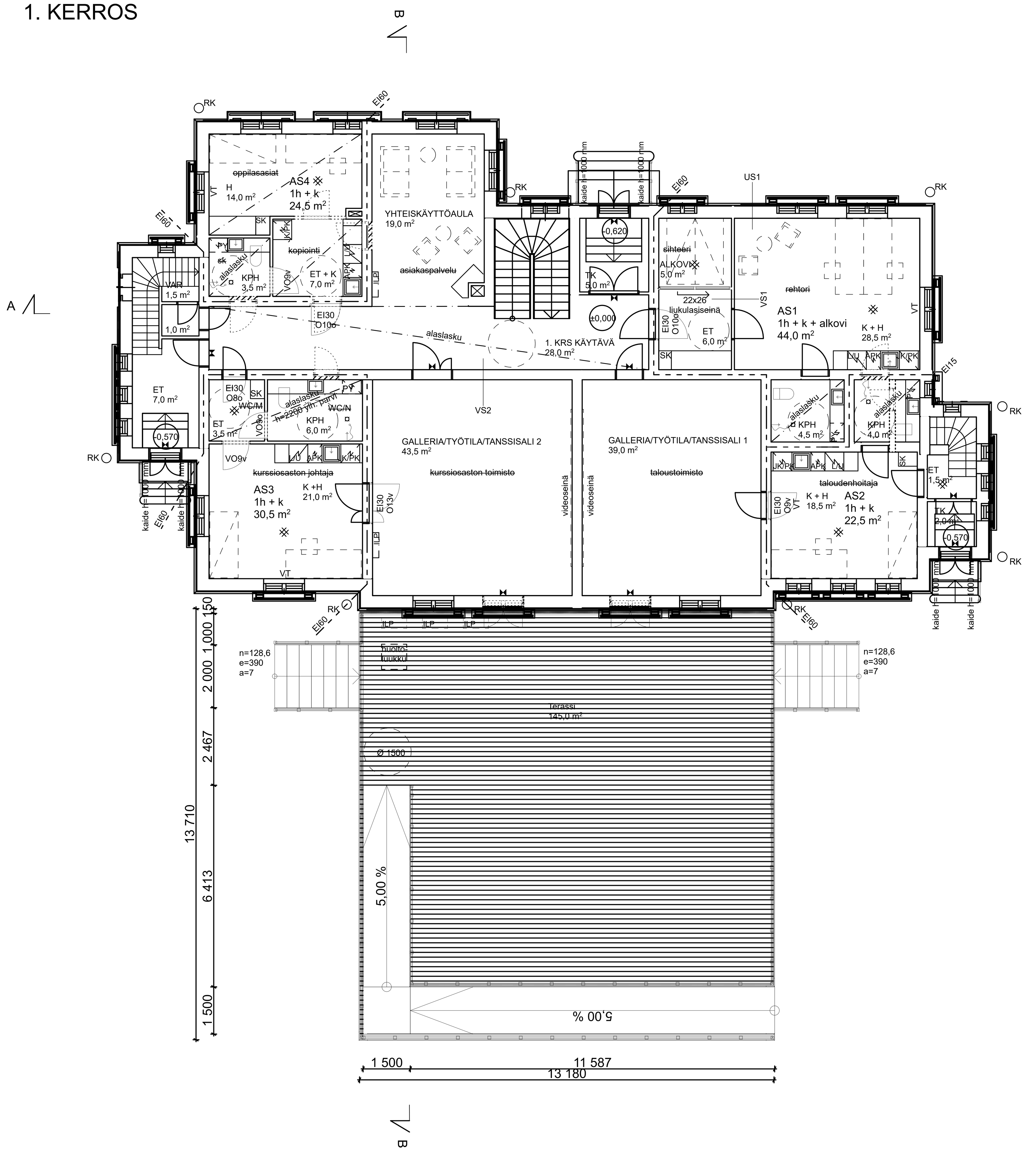
KELLARI



2. KERROS



1. KERROS



Rakennuksen määrätiedot:

Tilavuus 2340 m³

Hyötypinta-alat:

kellari	-
1. kerros	211 hum²
2. kerros	173 hum²
yhteensä	384 hum²

Kokonaiskerrosalat:

kellari	51 brm²
1. kerros	350 brm²
2. kerros	244 brm²
yhteensä	645 brm²

Rakennuksen muutostyöllä ei ole vaikutusta määrätietoihin.
Esitetyt määrätiedot viimeisimmän peruskorjauksen piirustuksien mukaisia vuodelta 1990.

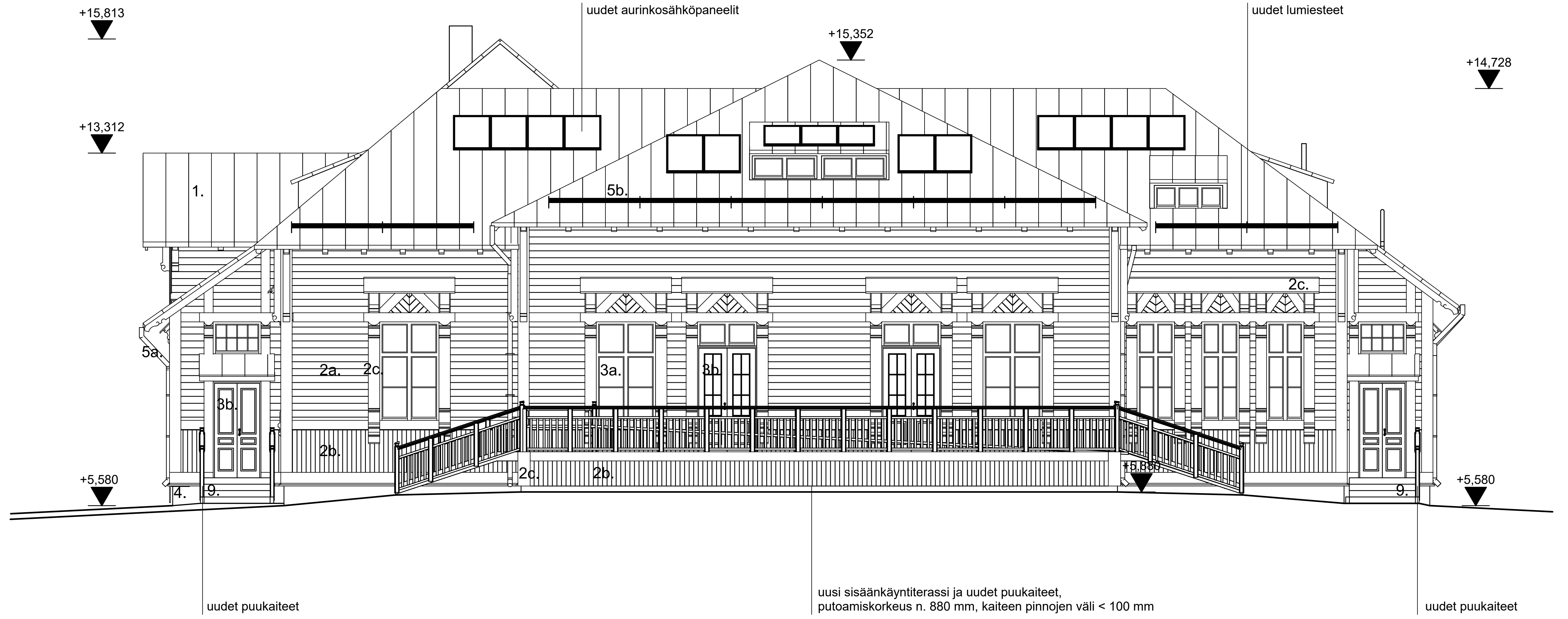
Kaupunginosa/Kylä: PITKÄKARI; Kortteli/Tila: 3001; Tontti/Rnro: 1	Viranomaisten merkintöjä
Rakennustoimenpide: MUUTOSTYÖ	Piirustuslaji: PÄÄPIIRUSTUS
Rakennuskohde: Raahen seminaarin taiteilijatalo, Raahen seminaari, 92100 RAAHE	Piirustuksen sisältö: Pohjapiirustukset; Mittakaava: 1:100
Suunnittelijan yhteystiedot: Oulun ammattikorkeakoulu, t7peju01@students.oamk.fi	Piirustuksen ID: 02; Muutos:
Vastuullinen suunnittelija: nimi, tutkinto, allekirjoitus ja päiväys: Julia Heinonen RA (opiskelija) 24.5.2022	Suunnitteluala: ARK

LIITE 3

JULKISIVU LUOTEESEEN

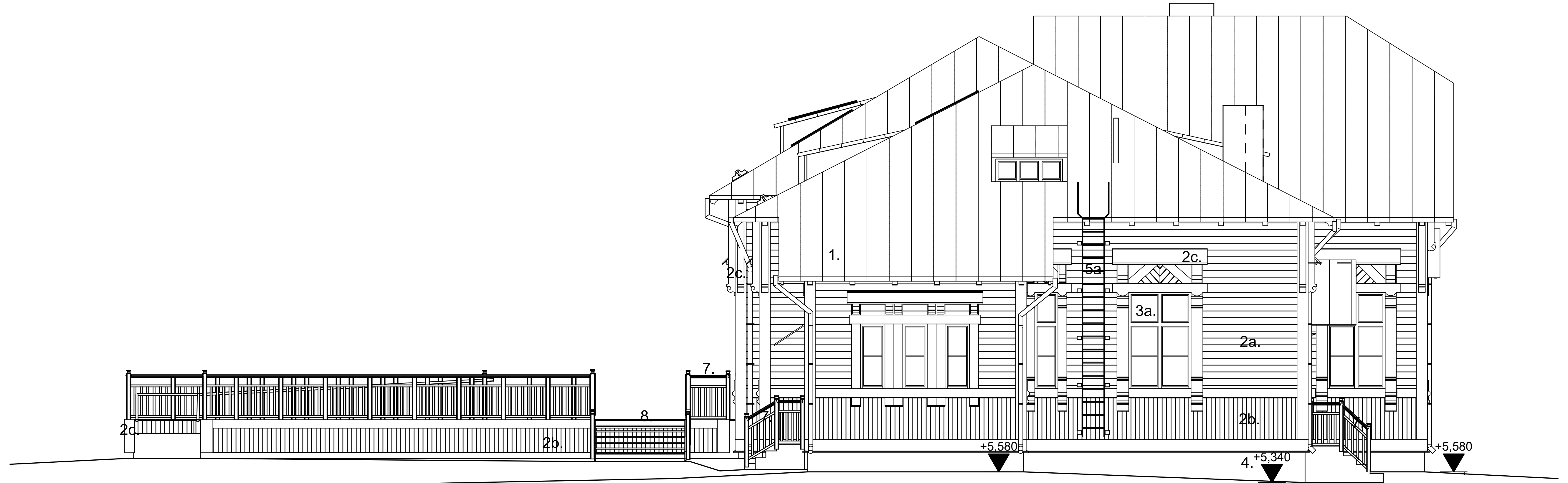
JULKISIVUMATERIAALIT JA -VÄRIT:

1. Peltikate; väri: tummanharmaa
2a. Ulkoverhous vaakaan; väri: beige/vaaleanruskea
2b. Ulkoverhous pystyyn; väri: beige/vaaleanruskea
2c. Pielilaudat, nurkkalaudat ja julkisivukoristeet ja -listat; väri: ruskea
3a. Ikkunat; väri: beige/vaaleanruskea
3b. Ovet; väri: beige/vaaleanruskea
3c. Ikkuna- ja oviaukkojen vesipellit; väri: beige/vaaleanruskea
4. Kivijalka, graniiti
5a. Syöksytorvet ja talotikkaat; väri: beige/vaaleanruskea
5b. Lumiesteet; väri: RR23 tummanharmaa
6. Räystäiden ja katoksien aluslaudoitus; väri: beige/vaaleanruskea
7. Kaiteet, puu; väri: ruskea
8. Terassilauta, lämpökäsitelty mänty 28x145
9. Kiviportaat, graniitti



JULKISIVU KAAKKOON

JULKISIVU LOUNAASEEN

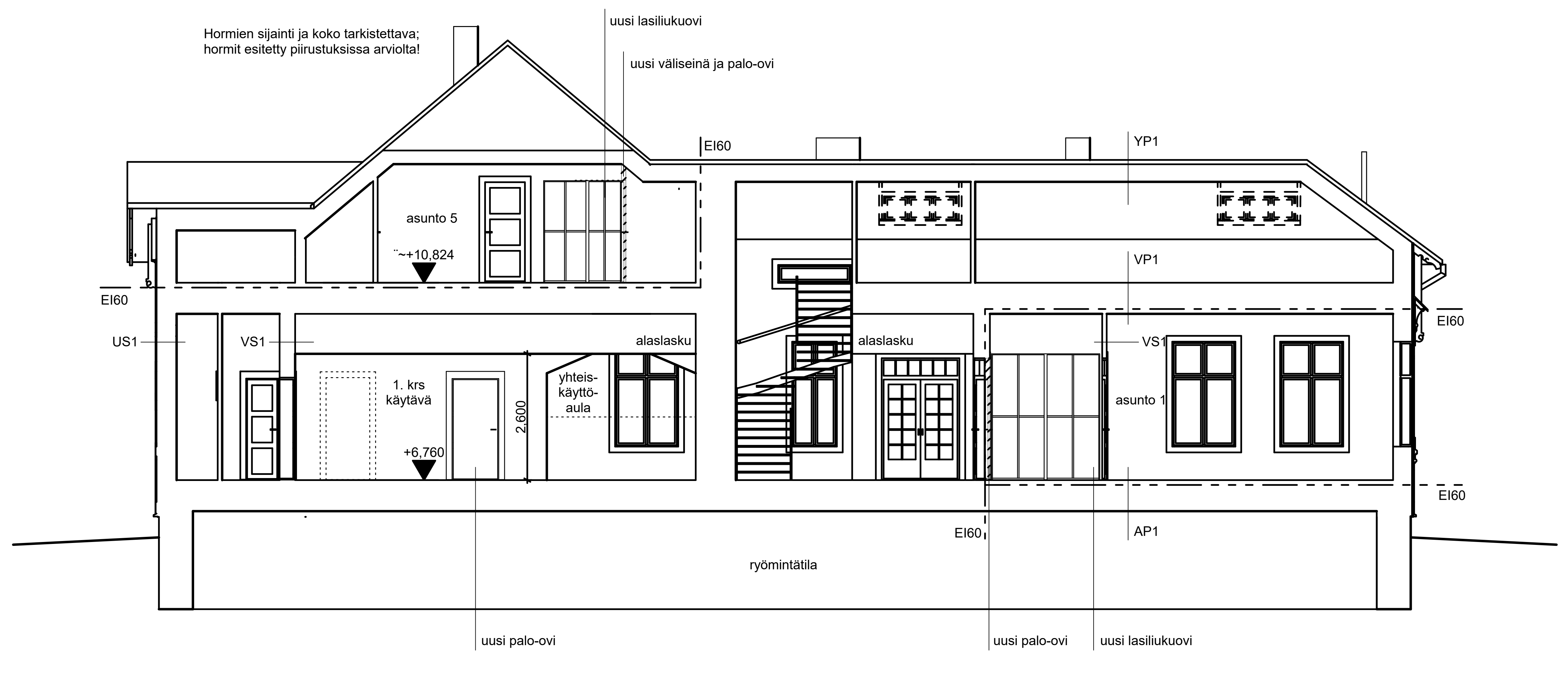


JULKISIVU KOILLISEEN

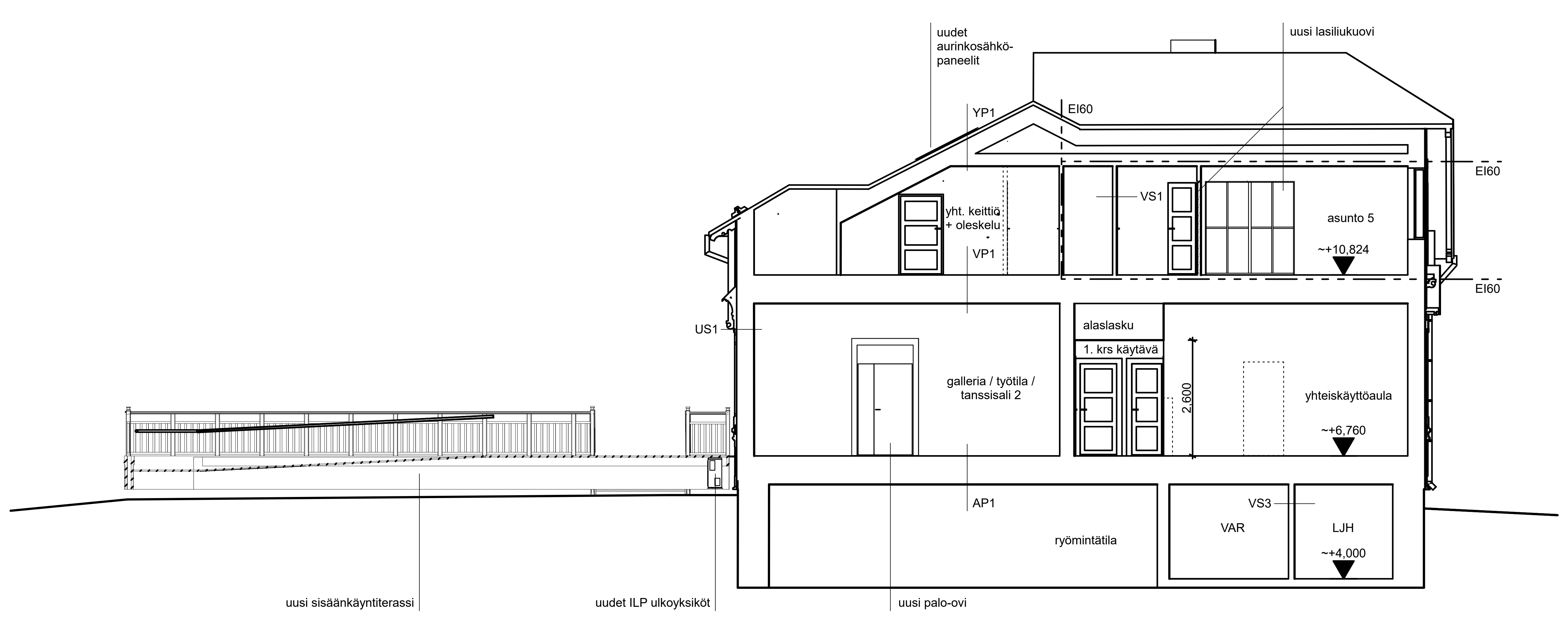
Kaupunginosa/Kylä	Kortteli/Tila	Tontti/Rnro	Viranomaisten merkintöjä	
PITKÄKARI	3001	1		
Rakennustoimenpide MUUTOSTYÖ			Piirustuslaji PÄÄPIIRUSTUS	
Rakennuskohde Raahen seminaarin taiteilijatalo Raahen seminaari 92100 RAAHE			Piirustuksen sisältö Julkisivut	Mittakaava 1:100
Suunnittelijan yhteystiedot Oulun ammattikorkeakoulu t7peju01@students.oamk.fi			Piirustuksen ID 03	Muutos
Vastuullinen suunnittelija: nimi, tutkinto, allekirjoitus ja päiväys Julia Heinonen RA (opiskelija) 24.5.2022			Suunnitteluala ARK	

ARCHICAD-OPISKELIJAVERSIO

LIITE 4



LEIKKAUS A-A



LEIKKAUS B-B

US1 RAKENNE:

	maali
28 mm	ulkoverhouspaneli
50 mm	koolaus
	ilmansulkupaperi
250 mm	hirsikehikko
50 mm	lisäkoolaus + eriste
13 mm	kipsilevy
	pintamateriaali

LÄMMÖNLÄPÄISYKERROIN: 0,2803 W/ m^2K

Rakennetyypistä ei varmuutta

VS1 RAKENNE:

	pintamateriaali
13 mm	kipsilevy
66 mm	runko + eriste
13 mm	kipsilevy
	pintamateriaali

Rakennetyypistä ei varmuutta

VS2 RAKENNE: mahdollisesti kantava väliseinä

	pintamateriaali
20 mm	kipsilevy + tasoite
140 mm	tiili
140 mm	tiili
20 mm	kipsilevy + tasoite
	pintamateriaali

Rakennetyypistä ei varmuutta

VS3 KELLARI RAKENNE:

	maali
135 mm	tiili
	maali

YP1 RAKENNE:

135 mm	runko
105 mm	eriste
	ilmansulkupaperi
23 mm	koolaus
19 mm	panelointi

LÄMMÖNLÄPÄISYKERROIN: 0,1891 W/m^2K

Rakennetyypistä ei varmuutta

VP1 RAKENNE:

32 mm	lattialauta
60 mm	koolaus/ eriste
270 mm	EI TIEDOSSA
200 mm	eriste
60 mm	koolaus
19 mm	panelointi

Rakennetyypistä ei varmuutta

AP1 RAKENNE:

32 mm	lattialauta
	ilmansulkupaperi
60 mm	koolaus/ eriste
500 mm	ilmarako/ purueriste
160 mm	koolaus/ eriste
	ilmansulkupaperi
	ryömintätila

LÄMMÖNLÄPÄISYKERROIN: 1,295 W/m^2K

Kaupunginosa/Kylä PITKÄKARI · Kortteli/Tila 3001 · Tontti/Rnro 1	Viranomaisten merkintöjä
Rakennustoimenpide MUUTOSTYÖ	Piirustuslaji PÄÄPIIRUSTUS
Rakennuskohde Raahen seminaarin taiteilijatalo Raahen seminaari 92100 RAAHE	Piirustuksen sisältö Leikkaus A-A ja B-B · Mittakaava 1:100
Suunnittelijan yhteystiedot Oulun ammattikorkeakoulu t7peju01@students.oamk.fi	Piirustuksen ID 04 · Muutos
Vastuullinen suunnittelija: nimi, tutkinto, allekirjoitus ja päiväys Julia Heinonen RA (opiskelija) 24.5.2022	Suunnitteluala ARK