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ASPECTS OF DESIGNING EDUCATION BUILDINGS IN A CONSERVATION AREA: A CASE STUDY OF A BUILDING DESIGNED FOR THE SCHOOL OF CIVIL ENGINEERING AT THE UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Marek Zagroba

Department of Civil Engineering and Building Constructions
University of Warmia and Mazury in Olsztyn

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A b s t r a c t

Designing architectural objects in a conservation area usually involves many problems, whose solution most often means complying with a series of restrictions, which pertain to elements of urban and architectural design. Creating spatial connections between the new and the existing, listed architecture is not an easy task. Many historic locations experience architectural chaos, which ensues from inapt attempts at combining these two types of architecture and the historic part of the academic campus in Kortowo is a good example in this resepct.

This paper presents the architectural, structural and services design problems encountered while working on a design of an education and laboratory building localized in a conservation area. The building in question is to replace the existing, one-storey and flat-roofed building, which will be demolished. The main obstacles to designing the building caused by the conservation requirements were how to adapt the new building's functions to the specific character of the civil engineering course of study and how to create an architectural form that would fuse with the historic shape of this part of the academic campus.

The oldest part of the campus, which has been designated as a conservation area, in practice excludes construction of larger buildings on undeveloped land. This, however, does not mean that the area is completely closed to possible and, in some cases, necessary investment projects. New constructions, in compliance with the local development plan, should eliminate the buildings whose form, plan and architecture introduce discord to the historically defined space.

PROBLEMATYKA PROJEKTOWANIA OBIEKTÓW DYDAKTYCZNYCH W STREFACH OCHRONY KONSERWATORSKIEJ NA PRZYKŁADZIE BUDYNKU DLA KIERUNKU BUDOWNICTWO UNIWERSYTETU WARMIŃSKO-MAZURSKIEGO W OLSZTYNIE

Marek Zagroba

Katedra Budownictwa i Konstrukcji Budowlanych
Uniwersytet Warmińsko-Mazurski w Olsztynie

S ł o w a k l u c z o w e: architektura, urbanistyka, projekt budowlany, kompozycja przestrzenna, strefa ochrony konserwatorskiej, miasteczko akademickie, Kortowo.

A b s t r a k t

Projektowanie obiektów architektonicznych w strefie ochrony konserwatorskiej wiąże się najczęściej z wieloma problemami, których rozwiązanie wynika z wielu obostrzeń. Dotyczy to elementów projektowania urbanistycznego oraz architektonicznego. Przestrzenne powiązanie projektowanej architektury z istniejącą – objętą ochroną, nie jest zagadnieniem łatwym. W wielu miejscach o historycznym rodowodzie można zaobserwować chaotyczne skutki takich działań. Za przykład posłużyć może historyczna część kampusu uniwersyteckiego w Olsztynie.

Artykuł przedstawia architektoniczne, konstrukcyjne i instalacyjne problemy związane z projektowaniem budynku dydaktyczno-laboratoryjnego, położonego w strefie ochrony konserwatorskiej. Obiekt ma zastąpić istniejący parterowy, płaski pawilon przeznaczony do rozbiórki. Główne trudności projektowe wynikające z warunków konserwatorskich skupiły się wokół dostosowania funkcji do potrzeb związanych ze specyfiką kształcenia na kierunku budownictwo oraz stworzenia formy architektonicznej odpowiadającej zagospodarowaniu historycznej części miasteczka akademickiego.

Objęta ochroną konserwatorską najstarsza część kampusu uniwersyteckiego nie nadaje się praktycznie do wznoszenia obiektów kubaturowych na niezabudowanym terenie. Nie oznacza to jednak, że jest to strefa pozbawiona możliwości czy nawet konieczności prowadzenia działań inwestycyjnych. Nowe inwestycje, zgodnie z zapisami planu miejscowego, powinny eliminować obiekty, które swą formą, układem i architekturą dysharmonizują przestrzeń historycznie zdefiniowaną.

Introduction

Designing architectural constructions in a conservation area will typically involve many problems, which must be solved without violating numerous restrictions. The actual restrictions vary depending on the binding form of conservation[1]. They can pertain to elements of urban design – adjustment of a new structure to the existing composition, which is contained in the development plan, as well as to architectural design, namely the functional layout, form and material, found in particular technical drawings.

[1] Historic buildings can be listed in a national heritage register, which in consequence means quite strict restrictions regarding possible investment changes. Another, more lenient form of protection is when a building or a complex of buildings are under the Conservation Officer's protection.

Creating spatial connection between the architecture in the process of being designed with the existing buildings, under conservation, is not an easy task. Many historic locations experience chaotic results of inapt solutions. The historic part of the academic campus in Kortowo, Olsztyn, is a good example, and the present spatial management of this area calls for some serious, planned and executed changes. However, any decision about raising a new building at a site already occupied by another construction is difficult to implement due to the economic considerations alone, and often remains as a study plan. The historic part of Kortowo is different in this respect. The idea of demolishing the one-storey, light-construction building, topped with a flat roof, and replacing it with a new building, which will resemble the historic buildings in its plan and form is a rare but certainly executable example of such construction projects[2]. This can also be the beginning of further actions aiming at the elimination of the chaos present in a historically defined space.

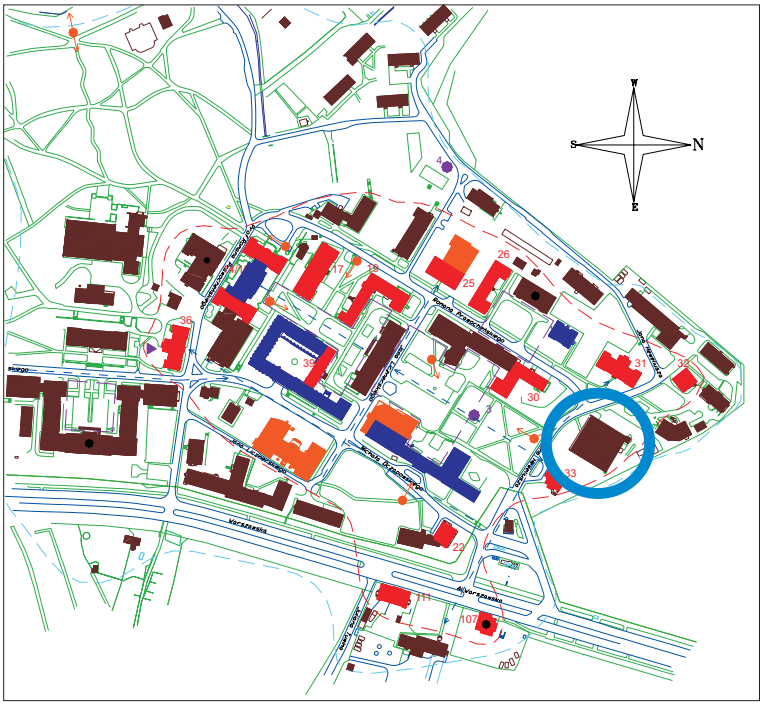

Fig. 1. The historic part of the university campus in Olsztyn (the blue circle marks the localization of a new building which will replace the existing one-storey building)
Source: Study on cultural values of Kortowo, by M. ZAGROBA.

[2] When this article was being written, the multi-branch building design for the education and laboratory building for the School of Civil Engineering at the University of Warmia and Mazury in Olsztyn had already been given administrative approval – a building permit.

The issues connected with designing a building to house classrooms and laboratories for the School of Civil Engineering at the University of Warmia and Mazury in Olsztyn, situated in a clearly defined space, are the subject of this paper. The designer's task was difficult not only because of the complicated functional plan, which needed to accommodate the specific functions of the school, but also because the new form was to be created in a way that would enhance and emphasize the historic part of the campus[3] – a conservation area.

The oldest buildings on campus are the remains of a psychiatric hospital compound, dating back to the late 19th century. The preserved urban and architectural pattern is composed of material culture objects which create spatial interactions between one another and, from the designer's point of view, have added to the difficulty of making a design. These consist of:
– archaeological objects – archaeological sites,
– urban objects – the compositional pattern, interiors, viewing axes,
– architectural objects – single buildings and their compounds,
– nature – nature monuments, green areas,
– landscape assets – landscape interiors, scenic overlooks.

Space management

The urban pattern of Kortowo has only partially retained its original layout. The changes took place at the end of World War Two, when some of the buildings were destroyed. Although the preserved foundations of the pre-war buildings were used to raise new edifices, the form and architecture of the post-war buildings has been in sharp contrast to the historic buildings until the present day. The one-storey, flat-roofed building at 4 Heweliusza Street, where the newly designed building will stand, is an evident example (Fig. 2). The existing one, located in the conservation area, with its form, layout and used building materials contrasts sharply with the historic buildings, typical for Kortowo (Figs. 3, 4)

The location of the present building has for many years been violating the recommendations contained in the relevant urban development plans, including the most current legal document, such as the binding local development plan for Kortowo[4]. According to the extract from the above plan, the one-storey building violates the rules of the historic conservation, with the concern raised by its architectural appearance, size and proportions. The document recom-

[3] Dr Marek Zagroba, BSc in Civil Engineering, MSc in Architecture, is the author of the building design, the architectural branch.

[4] The local development plan for the grounds of the University of Warmia and Mazury in Kortowo, the town of Olsztyn, was passed by the Act of the City Council of 17the January 2004

Fig. 2. The one-storey building at 4 Heweliusza Street. Photo: M. ZAGROBA

Fig. 3. The psychiatric hospital ward for women, block no 31. Photo: M. ZAGROBA

mends demolishing this building. The solutions included in the local plan comply with the conservator's decision to list Kortowo compound as a heritage site.

When approaching the task of creating a conceptual design for a new building, based on the prepared functional and services program, we encountered difficulties due to the detailed conservation restrictions for the new investment project. The conditions in the local plan specify quite precisely the scale, height and footprint of a new building, its shape, wall elevation and the building materials. To what extent that has been a complicated task is made

Fig. 4. The historic building of a post office in Heweliusza Street. Photo: M. ZAGROBA

evident by the fact that the Historic Conservation Office required a compliance assessment of the design documentation not once but twice[5] (which happens very rarely). Another problem to solve was how to adapt the new building to the size of the parcel of land without destroying any of the trees there, which are also protected. Complying with the Building Law meant not only designing properly the paths, drives and emergency exits, etc., but also the localization of the technical equipment, needed for the building's fittings (air intake vents and exhaust terminals)[6].

The extensive division of the building's floor plan enabled us to draw on the historic buildings in Kortowo. In addition, it provided the interiors with enough sunlight, made it easier to organize the public space in front of the entrance and design appropriate street furniture.

The functional and services programme for the building, or more precisely, the specific nature of a general building engineering laboratory, forced us to divide the building into two parts, with a glazed patio[7] connecting both parts and used for holding exhibitions and seminars.

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[5] The design underwent a compliance assessment with the Municipal Historic Conservation Officer during the architectural conceptual stage and during the stage of making the building design.

[6] The restrictions formulated by the Conservation Officer forced us to place the air intake and exhaust vents on the ground rather than on the roof, which in turn needed to be approved by the Sanitary Hygiene Inspector for the District of Olsztyn.

[7] It was planned to place a resistance testing machine in the general laboratory, and the parameters of this machine forced us to design a special floor (80 cm in thickness) and some technical service space under the floor. The whole building was divided into two sections so as to protect the other part of the building from vibrations and noises from the laboratory.

Fig. 5. The conceptual plan for managing the grounds. Elaborated by M. ZAGROBA

The functional plan of the building

The work on the conceptual architectural design for the building began the moment the previously commissioned functional and services plan was ready and the usable floor space had been determined[8]. From the point of view of the designer, it was rather difficult to verify the actual additional floorage, which in the above plan was mentioned only in general terms. This aspect is associated with the relations between the expected number of users and the required parameters of communication passages, toilets, the width of staircases, etc.[9]

[8] The usable floor of the building is nearly 3.500 m^2. The footprint is over 1.500 m^2 and the cubage is 21.238 m^3.

[9] The parameters ensuing from adjusting elements of buildings to human anatomy and number of users are established in the Ordinance of the Minister for Infrastructure of 12th April 2002, on the technical conditions to be fulfilled by buildings and their location (Journal of Laws of 15th June 2002, No 75, item 690) as well as some more specific regulations.

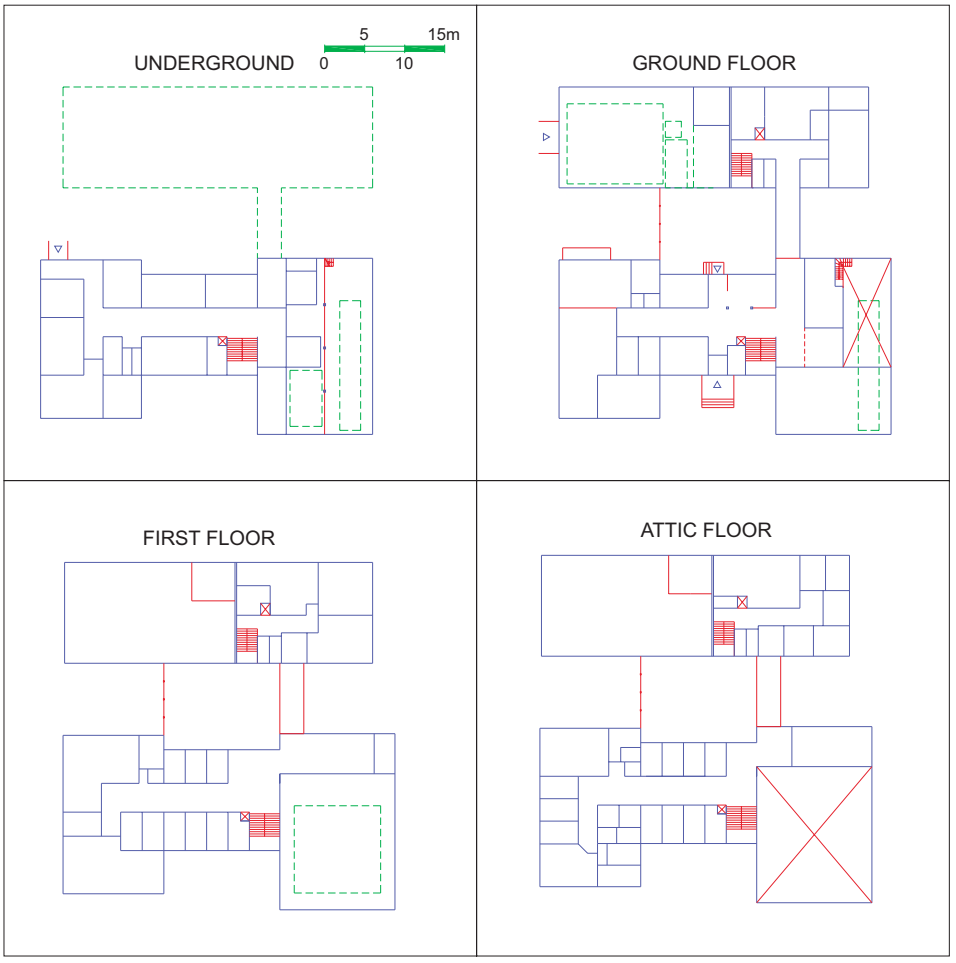

Fig. 6. The conceptual design of the functional layout of the building. Author: M. ZAGROBA

The changes introduced to the functional plan of the building were a consequence of the many meetings with the future users of the building, with ensuing eight concept design versions. This aspect reflects the sociological role of an architect but can be highly undesirable when working for a tender bid, with very strict deadlines, particularly for the other participants of the designing process, who are unable to begin their work on particular branch solutions until the general design is "finalized".

Buildings which combine education and laboratory functions are among very difficult objects to design. Classrooms, staff offices, specialist laboratories, workshops or utility rooms either have to be interconnected or separated, and

this means that the designer must engage much imagination and produce a huge number of sketches which will contain multi-plane aspects such as, for example, proper sunlight, good floor space and indoor capacity, integrity with the building's shape and wall elevation, adjustment to the adopted construction and fittings solutions or compliance with the Building Law in terms of work safety regulations, ergonomics, hygiene and health, fire protection, etc. One of the biggest challenges for the designer, caused by the complicated functional plan of the building, was to work out the technological solutions for particular laboratories and workshops. This aspect has largely added to the design's complexity.

Some other engineering problems were associated with the fact that the building needed to be furnished with specialist equipment, and some elements of the building had to be adjusted to the equipment's parameters. The length

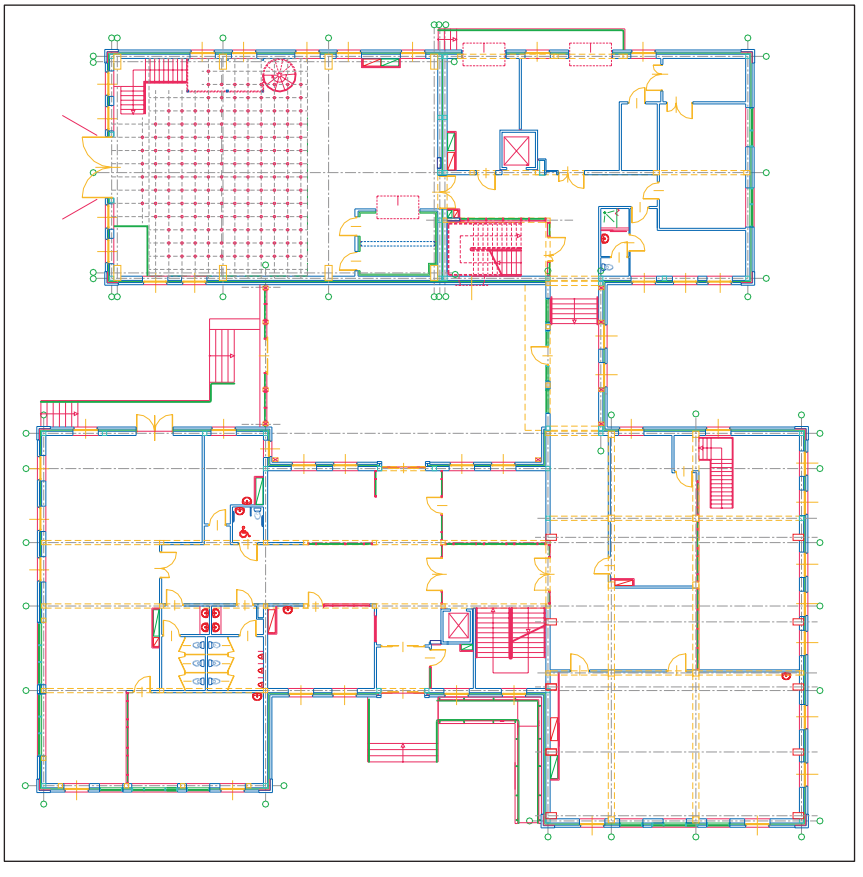

Fig. 7. The ground floor plan. Author: M. Zagroba

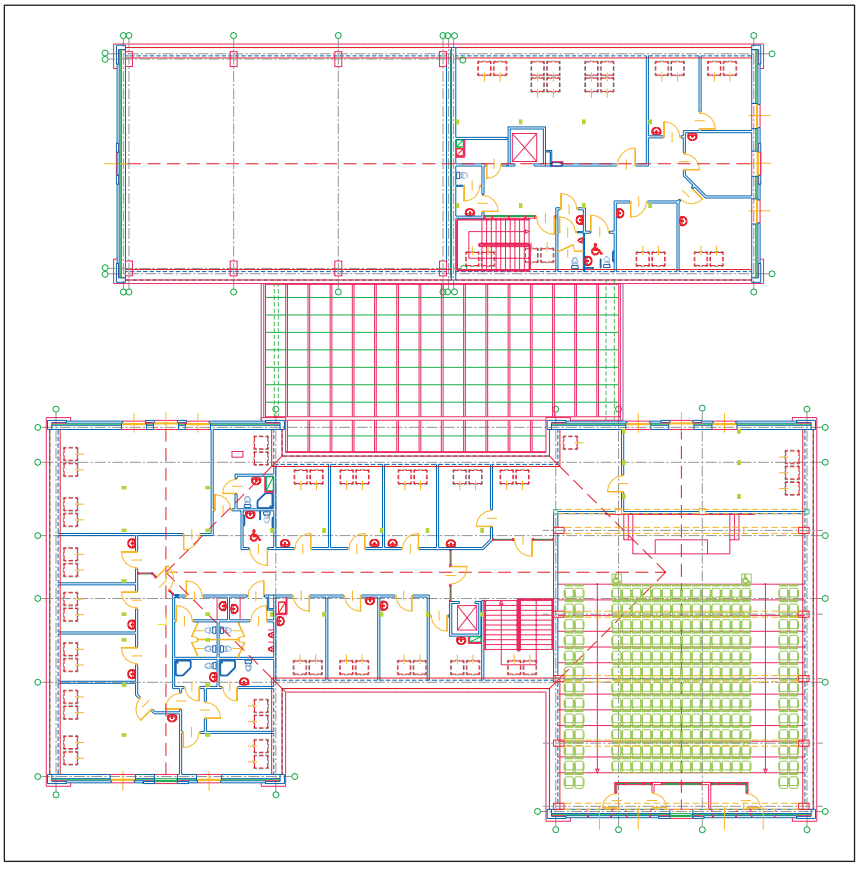

Fig. 8. The attic floor plan. Author: M. ZAGROBA

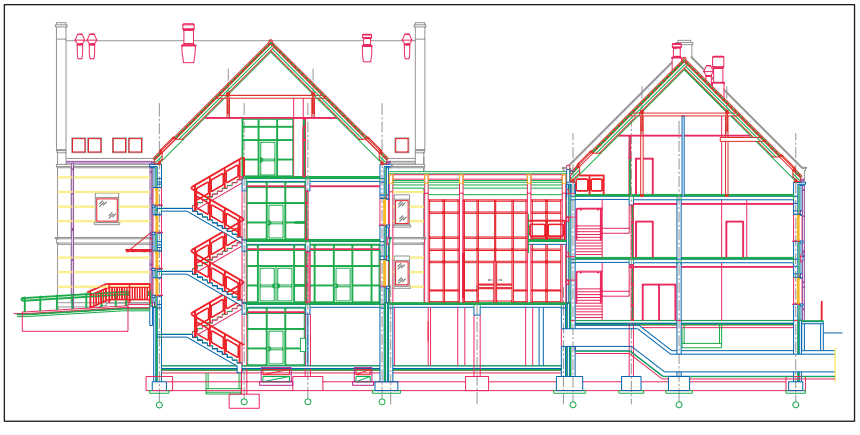

Fig. 9. The vertical cross-section of the building. Author: M. ZAGROBA

and height of a rubble-overflow channel imposed certain functional and space-management solutions. The parameters of a resistance testing machine in the civil engineering laboratory forced us to divide the building into two parts and to design a specially strengthened floor as well as some technical service space underneath. Another big challenge was to design a roof construction over a lecture theatre seating 238 persons, which because of the incline between rows of seats occupies the height of two storeys. The problem of finding support for the pillars holding the roof had to be solved by searching for a compromise between the architecture and the construction. The attention given to the energy-saving solutions made us reject gravitational ventilation, replacing it with a mechanical system including forced air intake and exhaust. This it turn meant finding additional surface area (on a small land parcel) to place large ventilation and A/C equipment (which needed over 190 m^2 of land surface).

The changes introduced to the design solutions, which are unavoidable when creating a multi-branch design, were on the one hand suggested by branch designers. On the other hand, they were a consequence of hearing suggestions and opinions of individuals and institutions involved in the process of the design's approval. Since the binding law forces designers to take into consideration such remarks, the preparation of the documentation took more time[10].

The architecture of the building

The preserved historic buildings in Kortowo possess characteristics typical for the regional architecture, namely they are red-brick buildings, with gable roofs covered with clay roofing tiles. Their facades are typically divided with risalits and the walls show some interesting architectural detail, for example brick cornices and tops of risalits or timber elements of the roof construction.

The Conservation Officer's recommendations dealing with the new building to replace the one-storey light-construction building were very strict[11]. The documentation prepared for the design of a new building underwent twice a compliance assessment at the Municipal Historic Conservation Office, which proves how important the building is for the whole conservation area.

[10] The compliance assessment procedure by the Design Documentation Assessment Unit or by the Historic Conservation Officer is an administrative procedure, which is time consuming, and designers have no influence on the length of the process.

[11] According to the Conservation Officer's recommendations, the scale, height and footprint of a new building should be adjusted to the historic urban composition. The building's shape, the shape of its roof, the composition of the wall elevation, including risalits, pattern, proportions, shapes of windows and doors should correspond to the architecture of the existing buildings.

Fig. 10. The south wall elevation. Author: M. ZAGROBA

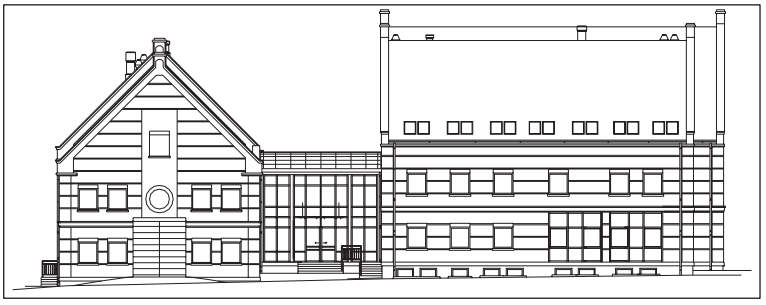

Fig. 11. The west wall elevation. Author: M. ZAGROBA

The new architecture is set in the spatial context of the historic part of the academic campus. The divisions of the building's shape, its scale, layout and roof angle, the divisions on the outside wall elevation, the proportions and the materials (brick and clay roofing tiles) correspond to the architecture of the historic buildings. The glazed elements in the wall elevation, the square shape of the windows and doors as well as the exposed aluminium and glass elements of the patio are a expression of the modern aspect of the building, a toned down expression because of the proximity of historic buildings.

One of the most difficult stages in our work on the design was associated with our attempt at preserving a pure shape of the building, undisturbed by technical solutions. Considering the fact that we often had to adapt the building to housing some specialist equipment, this aspect created a great challenge for the designers[12]. It was not uncommon for us to look for a compromise between particular branch designers.

[12] It is far too often that we can spot ugly A/C boxes or other devices which are components of fittings on walls of buildings (including historic ones).

Fig. 12. The visualization of the building. Author: M. ZAGROBA

Fig. 13. The visualization of the building. Author: M. ZAGROBA

Conclusions

Many buildings constructed in the historic part of Kortowo after World War Two largely depreciate the value of this conservation area. Their shapes, forms and structural solutions as well as the materials and techniques used for finishing their wall elevations are highly divergent from the harmonious historic architecture. The zoning documents, such as the local development plan, have for years been trying, rather unsuccessfully, to direct new invest-

ment projects (construction, expansion, addition of storeys, re-construction, and even demolition) so that they agree with the form, cubage and architectural expression of the historic buildings.

The design presented in this article proves that such attempts bordering between restoration and revitalization in a historically defined space can go beyond an analytical study stage. However, this has not been an easy task. Many solutions were dictated by the need to attain the contemporary standards set for buildings and meet the requirements imposed by the specific character of an education building while complying with the stricter regulations connected with the designated conservation area.

While discussing the presented design of a building for the School of Civil Engineering at the University of Warmia and Mazury in Olszyn, it can be concluded that the spatial development of the historic part of Kortowo should focus on restoration, namely on re-organisation of the form and surroundings of the buildings and on liquidation of the buildings which depreciate the value of this historically rooted space. However difficult it is, the contents of this article demonstrate that it is possible to achieve such aims[13].

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[13] When this article was being written, the building design already had a building permit. The decision when the existing building will be demolished and the new one will be constructed depends on the university's investment strategy.