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Implementation of Urban Solution for New Faculty Facilities within Spatial Historical and Cultural Units—A Case Study of Belgrade, Serbia

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Abstract: The focus of this study is buildings for public purposes, specifically for higher education, planned in zones of spatial cultural-historical units. Sustainable urban planning in areas with cultural-historical heritage is a particular challenge since the higher education facilities themselves have their own functional requirements, which are much easier to fulfill in "softer" locations. The research objective is to prove the hypothesis that it is possible to indicate a prescription for the practical application of the theoretical model and define the necessary steps to achieve the best sustainable quality results in practice. The paper analyses the associated process, relational settings, circumstances, participants, and timelines, and it presents the results of final designs based on two parallel case studies of new capital buildings for the University of Belgrade. Methodologically it gives an overview of the context, referring to other research and examples, detailing chosen case studies, and describing their backgrounds, conditions and requirements, frameworks, chronologies, approaches, and results. The discussion concludes with theoretical models originating from the comparison of implemented steps in the process of creation and evaluation of architectural ideas and summarized similarities and differences, aiming that there is a common model suitable for further applications. The practical result of the research is findings about the pathway for the best original planning solution emphasized through the institution of urban architectural competitions as a mandatory step, recommending wider participation of experts in the process of evaluation.

Keywords: urban plan; urban architectural competition; protection of architectural heritage; participatory processes; higher education facilities

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1. Introduction

The purpose of this research is to present an approach and procedure for locating buildings for higher education facilities in urban areas with heritage values based on two case studies. This paper explores how to include heritage in urbanization processes in a sustainable way, processing local characteristics, and promoting integrated, inclusive, comprehensive, and multidisciplinary ways in the process of planning, designing, and decision-making. The goal is to test an initial hypothesis about the possibility of an indication of the practical application of the theoretical model and a prescription of the necessary steps to achieve improvements in sustainable urban planning and design. The novelty is in the multilevel analysis of the customary processes but in a specific and demanding context, with the added value of simultaneously two comparable case studies, unlike other research or articles that are based on individual examples. The necessity for such a scientific investigation lies in the need for summarizing important methodological steps, drawing parallels between requirements and achieved results, and indicating possible applications in other conditions that require special attention when interpolating new content. Sustainability is reflected both in the care for the city's cultural heritage and in efforts to improve the educational conditions of future generations.

For a better and easier understanding, the subchapter Contextual Base explains the concept of organization and spatial arrangement of facilities belonging to the University of Belgrade. Information follows about the legal framework in the scope of planning and heritage protection procedures and the demand for careful monitoring of the future construction of missing faculty capacities in sensitive areas. In the literature review, the paper refers to relevant research that is thematically close to the topic, and this is compared with findings from the case studies later in the Discussion. The Materials and Methods chapter gives an overview of the methodology used in the research, the advantages of the case study, and methods of analysis and interpretation of the results, including the expected effects on similar future cases, providing guidelines for qualitative improvements. The methodological context is followed by Results with a description of the case studies. The authors analyze in detail the competition procedure that followed the development of the urban plan, creating summary timelines for each case study. The chapter Discussion, besides referring and comparing to international experiences, imparts a schematic representation of key (milestone) methodological steps in the process leading to implementation and comparison of similarities and differences between two selected case studies. In the conclusions, the authors underline the sensitivity of interpolating significant educational buildings into historical surroundings. They assert that the participation of and cooperation between professionals of different specializations during the planning and design process is essential and very welcome in the phase of evaluating the competing proposals. The findings can be used as input for decision-making and upgrading the methodology and followed by further research based on other case study models. The conclusions are about lessons learned and the impact of the process. Despite the urban competition being quite a common instrument for screening and exploration, the contribution of the paper is its focus on describing phenomena within the contexts in question, with the possibility of using experiences from these contexts and comparing them with other similar situations, demands, and locations.

Contextual Base

The facilities of higher education institutions—Faculties within universities—Primarily include spaces for teaching, such as lecture halls and amphitheaters, classrooms, practice rooms, offices for teaching staff, etc. However, they can also include supporting buildings related to the education process (scientific research institutes, laboratories, libraries and reading rooms, sports facilities and playing fields, art studios and exhibition spaces, incubators and multidisciplinary innovation centers, management and administration facilities, student accommodation, dining halls, etc.). Conceptually, the buildings can be organized within a unique complex, a so-called campus, or several locations, which is the case with Belgrade University. Founded in 1808, today, it consists of 30 different faculties, and the confluence of historical circumstances and opportunities has resulted in the facilities being located throughout the city. One specificity in relation to the university is its endowments, a tradition by which wealthy and prominent members of society have gifted the university with facilities or financial gifts with the aim of developing science and education. Some faculties still do not have their own buildings, or their existing buildings are in need of expansion or modernization. This is a very important issue because it directly affects the quality of the teaching and research, as well as their competitiveness. Free locations outside the central city zone of Belgrade, which are in a completely different environment of modernist urban blocks, have already been considered for expanding part of the university's capacity. But a special challenge is when the location is within a zone of cultural and historical heritage.

This study analyses the current urban practice of carrying out planning solutions through urban architectural competitions by means of two case studies in areas with the highest level of protection for cultural and historical heritage. The case study of the Faculty of Applied Arts (FAA) follows the connection between the Amendments and additions to the Detailed Regulation Plan of Kosančićev Venac (AAPDR) in Belgrade and

the public, open, single-stage architectural competition for the conceptual solution for the new FAA building. The case study of the Faculty of Electrical Engineering (FEE +) shows the relationship between the Amendments and Additions to the General Regulation Plan of Belgrade (AAGRPB) and the call for entries to a competition for developing an urban architectural solution for the new FEE building, which shares its contents with the technical faculties in Belgrade. The Law on Planning and Construction [1], the umbrella law of the Republic of Serbia in the field of urban and spatial planning, states that urban plans can establish urban architectural competitions with regard to the solution for particular locations. A competition is a set of activities related to collecting and evaluating original solutions by means of which a program, urban, compositional, landscape, or preliminary architectural solution is selected. An invitational competition is announced for specific tasks and needs, in which the advertiser invites certain participants to join a competition based on previous professional qualifications and other conditions related to the task. A special bylaw regarding the regulations on competitions defines the procedure for the preparation and call for entries, as well as the collection and evaluation of the authors' solutions on the given theme in the field of urbanism, architecture, and landscape architecture.

2. Literature Review

A number of accessible studies refer to the design and implementation of standards for public higher education facilities, especially in relation to campuses [2–8]. Others highlight the importance of location in the struggle for competitiveness in the field of research [9,10]. Another large group of studies deals with the interaction between cities and universities, the importance of university city status in the social and economic sense, and social issues relating to the integration of students in a new environment [11–18]. The theme of the surroundings having an impact on the quality of teaching and academic results achieved is also represented [19–21]. Part of the study is focused on the techniques for reconstructing and preserving historical buildings in which faculties are located [22–24], including the issue of new technologies and requirements for renewable energy and energy efficiency [25]. Studies on the urban renewal of Leipzig, Germany [26,27] also touch on the topic of constructing a new building for the university in the very center of the city, on the foundations of a sacred building. Architectural heritage, as a part of cultural heritage, and the methodology for producing planning documents for revitalization, is a frequent topic in scientific papers [28–30], which provides the basis for a deeper study of interpolating public educational facilities. In connection with the importance of competitions for shaping cities as a key method, it can be concluded that "direct participation of the professional public is often reflected in the preparation of urban-architectural competitions as a programmatic or compositional crosscheck of the arrangement and design of specific locations and wider spatial units. At the same time, in professional architectural circles, the institution of the competition is considered as one of the fairest and most popular ways of obtaining spatial solutions" [31].

In contrast to scientific papers, there are many more professional and critical reports. Some of them are dedicated to designing buildings for educational purposes [32] or interpolating new university buildings within protected cultural-historical environments, which highlight the quality of the dialogue between the old and the new. They show that new faculty buildings, which are generally large in volume, are often built in the immediate vicinity of protected zones in compact historical environments. Any smaller interventions involving additions or reconstructions in the actual core need to be carried out with particular care. These articles provide current examples from two of the UK's best-known university cities (along with a number of other, smaller university centers), Oxford [33,34] and Cambridge [35], then from Bergen, Norway [36], and Toronto, Canada [37]. In the case of Coimbra, Portugal, within the university complex founded in the 13th century, the method of reconstructing and converting an existing sacred building was used [38]. Other new faculty facilities and student accommodation have, nevertheless, been located outside the historical core [39,40] because their size and number demanded it, enabling a

freer architectural expression, unencumbered by fitting into the context of the cultural and historical environment and the conditions for protecting it.

By analyzing the available scientific literature, the authors came to the conclusion that the majority of published papers refer to the vital and motional importance of universities for a city's image or its economic development. Others discuss the issue of locating the university campuses inside the city area and mutual connections. Fewer papers focus on preserving and reconstructing historical faculty buildings. Urban regeneration topics and interpolation into historical surroundings are much more common, but for the purpose of this paper, the authors selected those within the scope of land use for higher education. The professional articles about these types of structures in historical surroundings give a good insight into new urban and architectural solutions and ideas (Table S1).

3. Materials and Methods

The authors chose the case study methodology as being the most applicable and relevant because it makes it possible to observe the process on the basis of examples. In addition, two comparative case studies within a close time range and similar conditions regarding the relationship between the purpose of the new planned structure and the historical context make it possible to compare the results. Authors use basic methods, such as analysis, synthesis, and formation of conclusions by combining induction, deduction, and comparison on different levels, relying on a descriptive approach and chronological order (Appendix A). The goal is to develop theoretical implications and models based on practical experiences and create a report of cross-cases for dissemination.

The peculiarities of research in architectural and urban design, unlike other scientific disciplines, are in the creation of unique evaluations balanced and combined from precise standards to reactions to the imaginary and abstract. It is based on various criteria, from contextuality and background conditioning, sensitivity to human needs, esthetical imprint, social and environmental impact, and economic circumstances. The design is the fundamental way of thinking and process of production, transformation, and interpretation of the built environment and the articulation of space at various scales; the combination of philosophy and craft, and research methodology is in this scope, using the same mode, tactics, and strategies [41,42]. The expertise about achieved quality goes from individual attitude, experience, and understanding of the creation to the group opinion justified with crossed criteria and ratings and finally to collective acceptance or rejection of the proposed solution. An experiment in architecture and urban design is an expensive and uncertain method, besides highly expressed visualization and animation in the designing phase.

This paper investigates the methodological and procedural steps in the implementation of planning solutions, verified through an urban architectural competition for specific public higher education institutions in cultural-historical units under a high regime of architectural heritage protection. The paper provides a selective but extensive review of international scientific and professional literature related to the topic of university centers, with an emphasis on their impact on urban environments, their form, and how they fit into the urban matrix. The review includes studies that consider issues of access and analyze the proposed solutions.

This then provides the basis for an analysis of two current examples of planned faculty buildings in Belgrade's city core [43], using the basic methodological approach of case studies. For each case study, there is an overview of the characteristics of the location, from the aspects of protecting cultural and historical units and urban planning, followed by a synthesis of various conditions, limitations, benefits, and capacity for designing representative and specific buildings for public purposes. The discussion considers the process, from the initial idea to the final result, pointing out the most important moments and stages and comparing them with references and examples. The scientific contribution of the paper is the presentation of formal phases and procedures and the roles of a number of actors. The authors use practical examples and indicate the possibility of an additional step towards a joint solution, which is not only a compromise but is valued as being of high

quality and desirable. The paper also points out the role of state institutions in making strategic decisions related to the construction of higher education facilities and public finances in this regard. Following the established methodology of preparing an urban plan, and its adoption and implementation, the paper analyses all steps leading to the announcement and implementation of a competition. The authors aim to present a more detailed overview of the possibility of integrating the plan, as well as a re-examination of its indications and instructions, followed by a selection of the most creative solution for implementing the plan within the given conditions and limitations. The authors insist on a legal framework to form and direct the planning model, i.e., given the opportunity to apply the widest possible range of planning and design tools for this type of purpose and place. This achieves close interaction between protection services, planning, citizens (through the public insight procedure), decision-makers, and finally, the teams offering solutions, with the purpose of selecting the best one, which will then have a chance for implementation. The paper offers schematic representations of the procedural steps mentioned in the time frame of their implementation. The conclusion is based on this particular procedure being the only acceptable one for the specific relationship between the location and the planned purposes. The results of interpolating the new into the old, and the relationship with heritage, public purpose, and public space, can only achieve a satisfactory result in this way through a number of levels of re-examination. In particular, the willingness to cooperate with different levels of national and local administration stands out, as well as the precedent of introducing a consultative body composed of professional representatives from the fields of urbanism and the protection of cultural monuments to help the jury to assess fulfillment of the given competition requirements. Authors rely on expert assessments in the process of evaluation. Finally, a recommendation is given for improving practice in Serbia, which can also be applied in other areas (Figure 1).

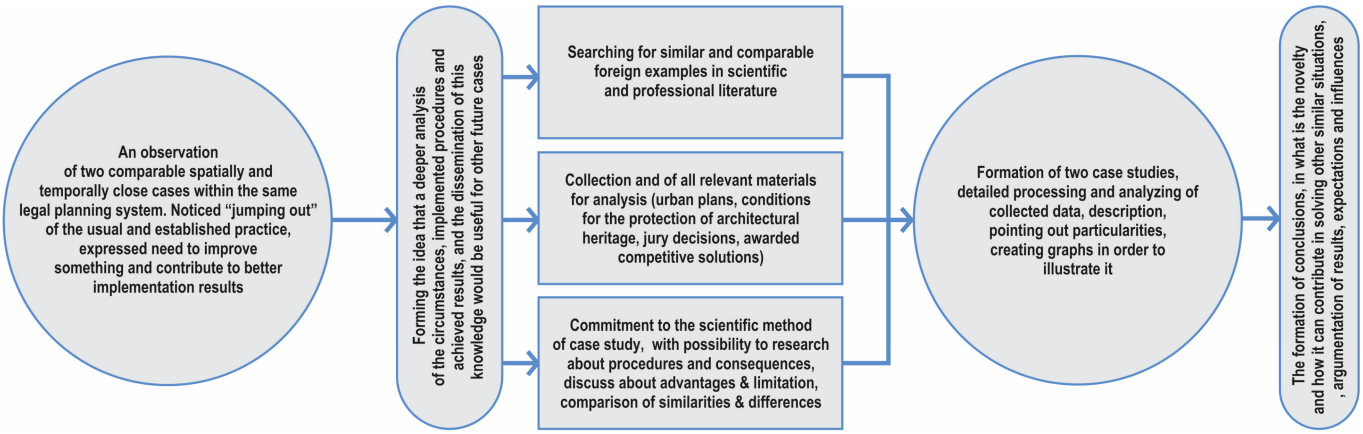


Figure 1. Illustration of the methodical workflow.

4. Results

Using the selected case study method as the methodological approach, the paper analyzes two locations in the city core, specific for their historical origin and importance for the narrow and wider surroundings. These two locations are not in direct contact (Figure 2), and they are significantly different in terms of morphology and purpose, but they are connected in terms of the intention to add within them the missing capacities of faculty buildings, in addition to fitting them into the existing urban structure, and the approach towards finding the best solution. They are also connected by the fact that they are located in sensitive zones under a high degree of architectural heritage protection, which stands out as a special feature of both locations.

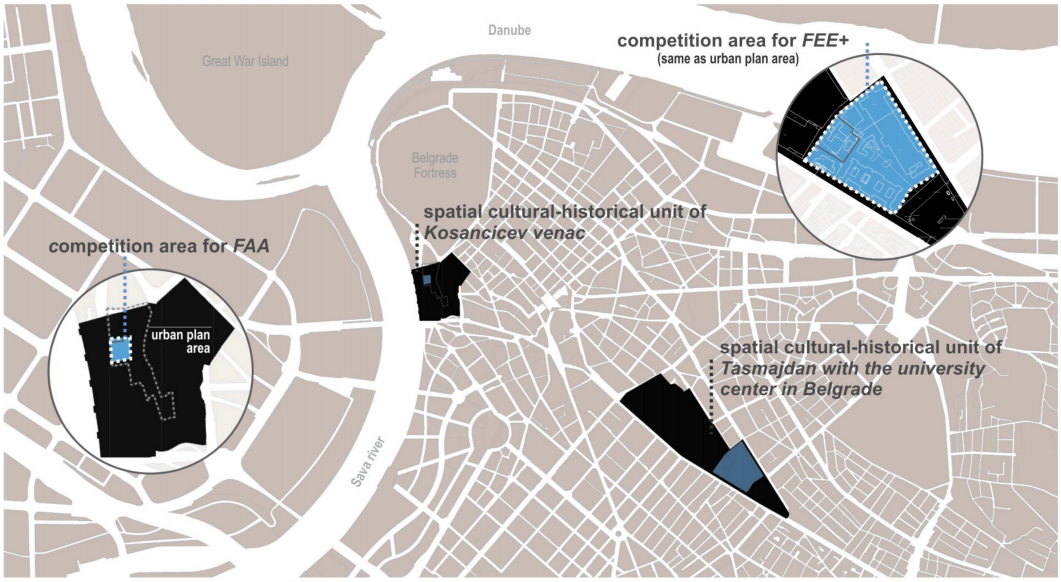


Figure 2. Location of spatial cultural-historical units and coverage of the urban and architectural competition for the two case studies—FAA and FEE+ (source: authors).

4.1. The Case Study of FAA

Kosančićev Venac is one of the most significant and sensitive urban areas in old Belgrade, which in the chronology of urban development, represents the oldest preserved part of the city fabric, with a spontaneously formed urban matrix that harmoniously connects with the city in the moat, reconstructed according to the plan of Emiljan Josimović [44]. The spatial cultural-historical unit of Kosančićev Venac is a historical urban unit in Belgrade, declared as a cultural asset in 1971 [45] and as a cultural asset of exceptional importance in 1979 [46]. It is the oldest compact Serbian settlement in the ancient town of Belgrade and the first administrative, cultural, spiritual, and economic center developed in Belgrade in the restored Serbian state. It is also part of contemporary Belgrade, with its own distinctive ambient and artistic qualities.

The spatial cultural-historical unit of Kosančićev Venac overlaps with the Antički Singidunum Archaeological Site [47] and borders the Belgrade Fortress, a cultural asset of exceptional importance [48]. Therefore, in the process of forming the planning solution, care was taken to preserve and improve the monumental heritage in the space, and above all, to keep the character and ambiance of the oldest city space, with its special cultural and historical, architectural, urban, and ambient features. Kosančićev Venac, with the Belgrade fortress, represents the essential and most valuable part of the city landscape that participates in the image of the city. Its high spatially dominant landmarks (the Orthodox cathedral and Patriarchate), horizontal lines of the built structures, and connection with the Belgrade Fortress (fortification with a landscaped park area and city promenade) form a playful, authentic, and unrepeatable skyline and the outline of this unique historic European city. The location can be seen from several directions—it is part of the view of Kosančićev Venac with the river, which is a segment of the oldest historical part of the city in the overall panorama of Belgrade. It is clearly seen from the position of the Sava Promenade on the Belgrade Fortress and from the New Belgrade side, from the bridges on the Sava and the Sava coast.

While respecting the conditions and measures of protection and the monument status of the area, according to the Law on Cultural Assets [49], in the Amendments and additions to the detailed regulation plan (AAPDR) of the Kosančićev Venac spatial unit for the part of the block between Karađorđeva, Velike stepenice and Kosančićev Venac streets, Municipality of Stari Grad, from 2021 [50], the planning solutions were reassessed for parts of the territory covered by the previous plan of detailed regulation for Kosančićev

Venac (PDR) from 2007 [51]. The aim of the plan was to preserve, affirm and improve the space, protect the public interest, create conditions for new ambient values, and include the cultural-historical and architectural heritage in the contemporary life of the city. Adopting the AAPDR made it possible to construct public capital buildings in the field of culture and higher education, as well as to arrange public areas according to the highest standards of urban, architectural, and landscape design. The planning area is a segment of Kosančićev Venac, which makes up the essence of its visual value. The plan obliges public and invitational competitions to protect the view and the final definition of the spatial relationships in this valuable and attractive space for all construction plots (area for public and other purposes). The plan also makes it necessary to carry out checks on the volume and architecture in accordance with the importance and context of the location. The planning solution followed the planning basis, the general and special objectives of the plan, special conditions for the protection of the area, and the conditions and initiatives of the competent national and city institutions, checking and improving the planning solutions in the PDR of Kosančićev Venac from 2007. The process included the legal procedure for the participation of interested professionals and the general public.

The timeline for the AAPDR is tumultuous (Figure 3) and it began in 2015, after the first Decision on Development [52], and then the boundaries of the plan were expanded twice based on the suggestions and conclusions of the Commission for Plans of the City Assembly of Belgrade. This is an appointed body that carries out an expert inspection of all planning documents, primarily because of public interest in the construction of buildings for public purposes and the arrangement of public space. A new Decision on the development of the plan was adopted [53]. From an initial 0.54 ha, the area was increased to around 2.0 ha, resulting in the area for public purposes representing 92% of the total area. One feature of the plan was to develop representative buildings for the Faculty of Applied Arts (FAA), for which a public urban planning and an architectural competition was announced after the adoption of the plan.

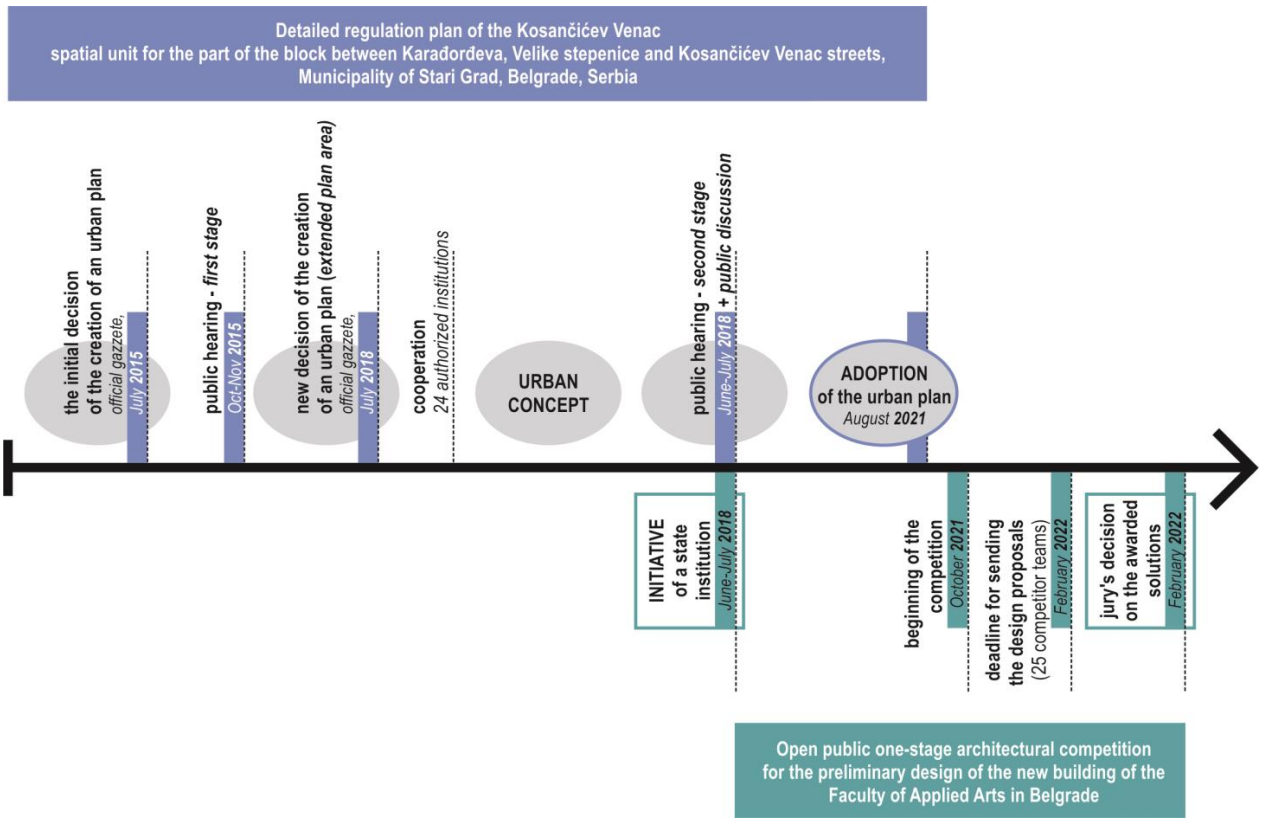


Figure 3. Timeline for the FAA case study (source: authors).

The planning decision defines the areas of public purposes and public services: higher education institutions—The Rectorate of the University of Arts and the Faculty of Applied Arts; cultural institutions—Đumrukana Multifunctional cultural facility, Kosančićev Venac City Gallery and the Memorial Center of the National Library; traffic and green areas, and areas for other purposes, i.e., housing. Other features of the plan are based on the potential of the specific location, namely its underground artificially created caves and corridors, for which revitalization and adaptation are planned in order to enhance their attractiveness and activate this segment of Kosančićev Venac. Other possibilities are Velike Stepenice (Large Steps) and Male Stepenice (Small Steps), which are pedestrian paths and connections between the city and the Sava coast. These are the oldest traces of the former urban matrix, created as a result of a large natural height difference between Kosančićev Venac and Karadjordjeva Street (18 to 25 m). In this context, new steps, as well as public elevators, are planned for pedestrian communication between the ridge and the banks of the Sava River. The planned public green area, the promenade at the middle level between the Kosančićev Venac plateau and Karadjordjeva Street, has multiple roles. It is a zone that stabilizes the slope, enriches pedestrian flows, improves the ambiance, gives the opportunity to open new views, and makes it easier to overcome the land height differences.

The plan designates a building plot with an approximate area of 0.25 ha for the Faculty of Applied Arts (FAA) building, with its purpose and program defined in accordance with the initiative of the Ministry of Education, Science and Technological Development of the Republic of Serbia. The new faculty building will be located in the place where the temporary building of the Faculty of Arts is located today and where the Kragujevac Hotel was previously located. One of the elements for implementing the plan was the mandatory organization of an urban architectural competition, followed by the development of an urban project and verification of the conceptual solution at the Commission for Plans of the City of Belgrade Assembly. The plan proposes a special expert inspection with regard to protecting views in the location in accordance with their importance and context. The scope of the FAA case study competition consisted of FAA construction plots and integrated pedestrian and vehicle paths, covering a total of 0.26 ha, with the survey zone of Male Stepenice (Small Steps) (0.05 ha). The plan prescribes building regulations and urban planning parameters on the construction plot, harmonized with the conditions of protecting the area, competent institutions, and public companies. Considering the spatial disposition of the building and that it can be observed from the river, as well as its participation in the image of the city, competition entries were supposed to pay attention to the treatment of its facades in terms of its architectural articulation, materialization, and color treatment. Another element was that some parts of the FAA should be available to the wider public as much as possible. In this sense, entries were supposed to envisage a model involving the availability of the teaching process and the resulting work through the design of an exhibition space or through occasionally opening the studio space for visitors. The design was supposed to pay special attention to contact between the building, the pedestrian promenade, and Male Stepenice. Another expectation of the design was to have green roof terraces with viewpoints towards the Sava River, the unique confluence of the Sava and the Danube, and New Belgrade.

In accordance with the plan, prescribed guidelines, and building rules, on 12 October 2021, a "Public, open, single-stage, architectural competition for the conceptual design of the new building of the Faculty of Applied Arts in Belgrade" was announced [54]. The competition was commissioned by the Government of the Republic of Serbia, the Ministry of Education, Science and Technological Development, with the support of the United Nations Development Programme (UNDP). The organizer of the competition was the Union of Architects of Serbia (UAS). Funds for this investment were secured from the Framework Agreement between the Republic of Serbia and the Council of Europe Development Bank for financing the project "Support for strategic investments in education in Serbia". The reason for announcing the competition was the need to improve and strengthen the capacities of university education by constructing new facilities, reconstructing existing facilities,

and equipping them, which was identified and analyzed through the project "Improving and strengthening the capacities of university education in the Republic of Serbia". The competition was announced with the aim of choosing, in accordance with the competition task, program requirements, and the importance and potential of the location, the best architectural and urban planning solution for the new FAA building in Belgrade, which corresponded with and adapted to the surroundings, and the functional needs of this institution. The participants submitted their competition entries in electronic form via an internet portal. The deadline was 11 February 2022, by which time 25 competition entries had been submitted.

The entries were evaluated according to four groups of criteria, which were aligned with the propositions defined by the plan and the special requirements of the project assignment:

1. Spatial concept and architectural expression—How the solution meets the goal of creating an internationally significant higher education institution; how the proposed solution relates to the context and creating identity—Relationship with the spatial cultural-historical unit of Kosančićev Venac; quality of the solution in relation to the characteristics and significance of the purpose, a clear spatial concept, recognizable in its basic idea; relation towards public city space; character and quality with regard to improving the urban identity; urban architectural design and ambient characteristics of the solution; relation to context, architectural and cultural heritage.
2. Functional solution, fulfillment of spatial requirements from the program task—Strategy and approach to spatial and ambient requirements of the facility in terms of flexibility and programming the space; analysis and solution regarding the concept for use and maintenance of the facility, including access, movement of students, teachers, and visitors; distribution of purpose and content in space; functionality of the solution.
3. Sustainability, energy efficiency—How the characteristics of the proposed solution relate to environmental and social sustainability and its compliance with the goals of sustainable development; how the design of the building relates to energy efficiency and efficient operations during its exploitation; how it deals with the goals of sustainable development; economy of the solution in its execution and exploitation; application of environmentally and energetically sustainable solutions for preserving and improving the quality of the environment.
4. Potential for further implementation of the project—Technical and financial feasibility of the solution.

The jury awarded three prizes and three purchases amounting to a total of 40,000 USD, and all of the entries have been available in an electronic exhibition since 28 February 2022 [53]. The Jury Explanation for the first-prized solution for the new FAA building (Figure 4a,b) includes the following: "The first-prized work is very well integrated into the sensitive context of a complex urban location. It is one of the few projects that emphatically draws passers-by towards the inner square open towards Karađorđeva Street, with the main entrance on the back facade of the building. The uneven cascade of the small auditorium from the level of Kosančićev Venac towards the pedestrian promenade has a good connection with the green roof at the top of the faculty building where the public square is formed, with views towards the inner atrium and towards the Sava River. This organization of public spaces at different levels forms two public entrances, through which the building is connected to both sides of the city—With a small structured inner core around Kosančićev Venac and a large open promenade along the Sava River. The idea of the project is both simple and complex. All of the programs are organized around the open courtyard. The entrance is positioned on the inner facade at the bottom of the public atrium in order to enable communication and public life in the open inner square. One wing of the building, facing north, has large studios, while the other, towards the south, is narrower and oriented towards either the south or north, depending on the floor. The circular movement enables a flexible and differentiated organization of the floors and communication with the empty inner space as well as with the outer spaces. This passage

through the floors has the potential for further development by defining interior public and private spaces and their programs. All the passages between the floors are connected to the main system of corridors around the inner courtyard, where there is the possibility of creating smaller or larger public spaces. The ambiance is well articulated, creating spaces of good proportions in the inner courtyard as well as towards the outer space. The roof pavilion with the cafe, and the small hall, are in declination in relation to the main building, without any clear logic, and redesigning this position is recommended so that it is placed in accordance with the logic of the surrounding urban fabric and the geometry of the building itself. The concept of the building allows for flexible use when creating public spaces, as well as faculty workspaces—Workshops for teaching. The volume and diversity of public spaces make different purposes possible and create the necessary public workspace for the proposed programs. The articulation of the main cube is reduced on the outside of the building and glazed on the inside. By developing the street facade, it is possible to achieve a greater connection with the surroundings, as well as the interior spatial organization (wall/light ratio). Due to all the qualities of the proposal, the jury decided to award it with the first prize." [55].

(**a**)

(**b**)

Figure 4. (**a**,**b**). The first prize-winning solution for the FAA project—View from Karadjordjeva Street and from the green, publicly accessible roof (authors Bojana Kovač Djurasinović and Miloš Djurasinović, source: WEB izložba—Konkurs FPU (WEB exhibition FAA competition)) (konkurs-fpu.rs).

4.2. The Case Study of FEE+

The purpose of the Amendments and Additions [56] to the General Regulation Plan of Belgrade (AAGRPB) [57] was to harmonize it with the measures for the protection of cultural and natural monuments which were adopted in the meantime. This necessity came after adopting the basic planning document and reviewing the location and norms for areas for public purposes, i.e., public services and complexes, in accordance with the conditions laid out by the competent institutions. The planning basis for developing the AAGRPB was the Master Plan of Belgrade 2021 [58], which prescribes the announcement of public competitions in certain mandatory cases or as a recommendation for individual locations or planned purposes. For locations under protection, in addition to the mandatory development of a detailed regulation plan, it also recommends special implementation instruments, such as expertise, specific analyses, and studies, as well as public competitions.

The AAGRPB [59] supplements the solution from the previous version of the plan in the section "Immediate application of building rules for public service facilities and complexes" with building rules for new locations, among which the FEE+ case study site is elaborated in detail. The boundary of the area includes the block bordered by Bulevar kralja Aleksandra, Ruzveltova, Kraljice Marije, and Karnegijeva Streets (an area of approximately 5.8 ha), which is part of the cultural assets of the spatial cultural-historical unit "Tašmajdan with the University Centre in Belgrade" [60]. Apart from the park area of Tašmajdan and Mali Tašmajdan and the buildings that surround it, the whole unit includes a block in which there are facilities of higher education and culture: the building of the Technical Faculty (which includes the faculties of Electrical Engineering, Civil Engineering and Architecture, built in 1925–1931, and declared a cultural monument in 2007), "Svetozar Marković" University Library (Carnegie Endowment, cultural monument since 1977), the State Archives of Serbia (built in 1928, cultural monument since 1984), and the buildings of the Faculty of Mechanical Engineering and Technology and Metallurgy. During the preparation of the draft plan, an initiative was submitted by the Office for Public Investments of the Republic of Serbia for the expansion of the Faculty of Electrical Engineering of the University of Belgrade and the construction of common contents for all technical faculties in the block. This is the result of harmonizing the program at the level of grouping technical faculties, and the essence is "modernization of the teaching and educational process by introducing new study programs that are in line with world trends in the field of technology, science, the needs of the labor market and, in the broadest sense, with social needs". The plan highlighted the lack of space for the Faculty of Electronics, as well as the fact that the space inside the block was neither organized nor functional. There was also a need to reconstruct the existing building in accordance with current safety standards, functionality, and energy efficiency. Detailed elaboration defined two building plots—For the University Centre of Technical Faculties (area 5.2 ha) and for the State Archives of Serbia (area 0.6 ha), which make up the unique scope of the mandatory urban architectural competition (area 5.8 ha). The rules defined the purposes, the ratio of basic and compatible purposes, the plot occupancy index, the rules and conditions for interventions on existing buildings, the conditions for free and green areas, the height of the planned buildings, architectural design rules, construction zones, etc. They also defined the relationship with existing buildings in accordance with the new protection for architectural heritage. Other requirements include preserving the existing horizontal and vertical dimensions, the structural assembly, materials applied, basic features of the functional assembly and interior, the appearance, stylistic features, decorative elements, and overall artistic expression of the cultural monument. The planned interventions envisage applying conservation methods (rehabilitation, restoration, reconstruction, revitalization, adaptation, and presentation) with the aim of preserving the structures (cultural monuments and particularly valuable structures). The interventions also apply to integrative protection, with the aim of preserving and improving the aesthetic and functional features of the space. In terms of protection, there is a plan to retain and preserve the unique wrought iron railings along the regulation line of the streets—Bulevar kralja Aleksandra, Karnegijeve, Kraljice Marije, and Ruzveltove Street. The planned inter-

ventions include new constructions and extensions in the inner part of the block, aimed at preserving and improving the features of the buildings and space, the character of the ambiance, as well as integrity and representativeness. The plan involves retaining the existing accesses from the street network, with the possibility of forming new ones or correcting the existing ones, in accordance with the competition results and the conditions set by the competent institutions. A radical transformation of the interior of the block is proposed, which includes the removal of objects that are, from the aspect of protecting cultural heritage, valorized as having no cultural-historical, architectural, urban, or ambient value. An exception is the Aerotechnical Institute, where the parts above ground should be removed, while the tunnel and research laboratory fit into the structure of the underground and basement parts of the structure. Another feature of the plan is to construct a new part of FEE that will support the teaching needs of the Faculty of Architecture and Civil Engineering, in addition to constructing common spaces for all faculties. These elements will include increasing the student support facilities, forming an information documentation center, cafe space, restaurant, exhibition space, student start-up companies, fitness clubs for students and teachers, spaces for the promotion of achievements at faculties, and others. Some of the rules for constructing the new building are as follows:

1. Adapt the volume of the new building/s primarily to the cultural monuments in the immediate environment. The relationship between the size and volume of the existing building that is retained and the new structure must be carefully considered and adjusted to the existing location and wider context, as well as to the visibility of the entire block, in a way that affirms the monumental features and improves the ambiance of the complex. The plan allows for the physical connection of the main faculty buildings with the planned new construction or extension.
2. The new physical structure should be planned as original architecture, of modern architectural design, adequately integrated with the architectural, urban, and ambient features of the existing structures that are cultural monuments so that it participates in accentuating their value and affirms the space as a unique complex.
3. When planning the ground-floor arrangement of the indoor space in the block, focus on forming a unique space that corresponds with all the buildings in the university center while respecting historical connections and matrices, primarily to create views of Ćirila and Metodija Park, as well as Mali Tašmajdan Park. Pay special attention to planning the use of open areas and different ways in which people can spend time outdoors. Plan green roofs in the complex.

On the building plot of the State Archives of Serbia, the extension of the gallery space/pavilion and/or connection with the existing building of the State Archives of Serbia is permitted. The plan also includes a green connection which will create a visual and functional continuity of green areas, i.e., connect Ćirila i Metodija Park with Tašmajdan Park. A mandatory part of the competition solution must be a conceptual architectural landscape solution for the free and green areas. The plan was adopted at the session of the Belgrade City Assembly held on 14 February 2022 (Figure 5).

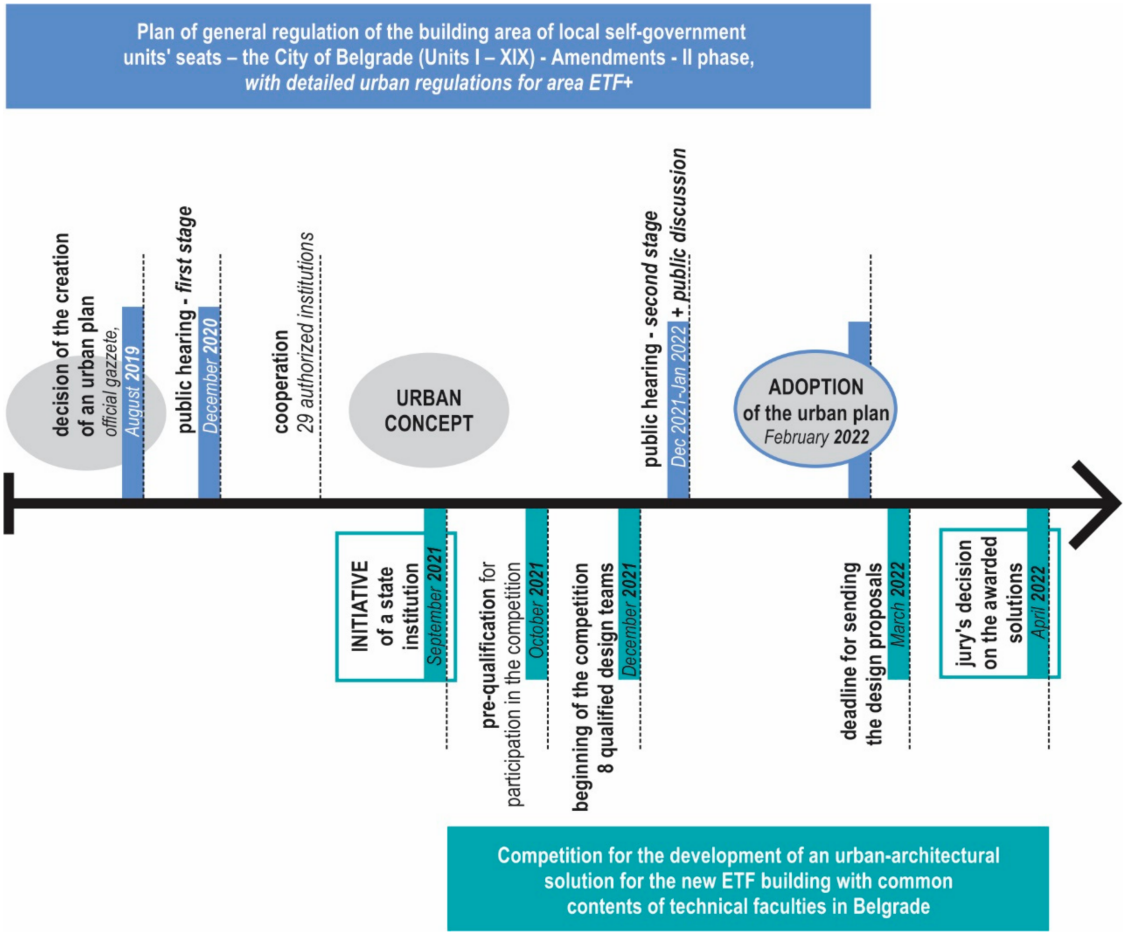
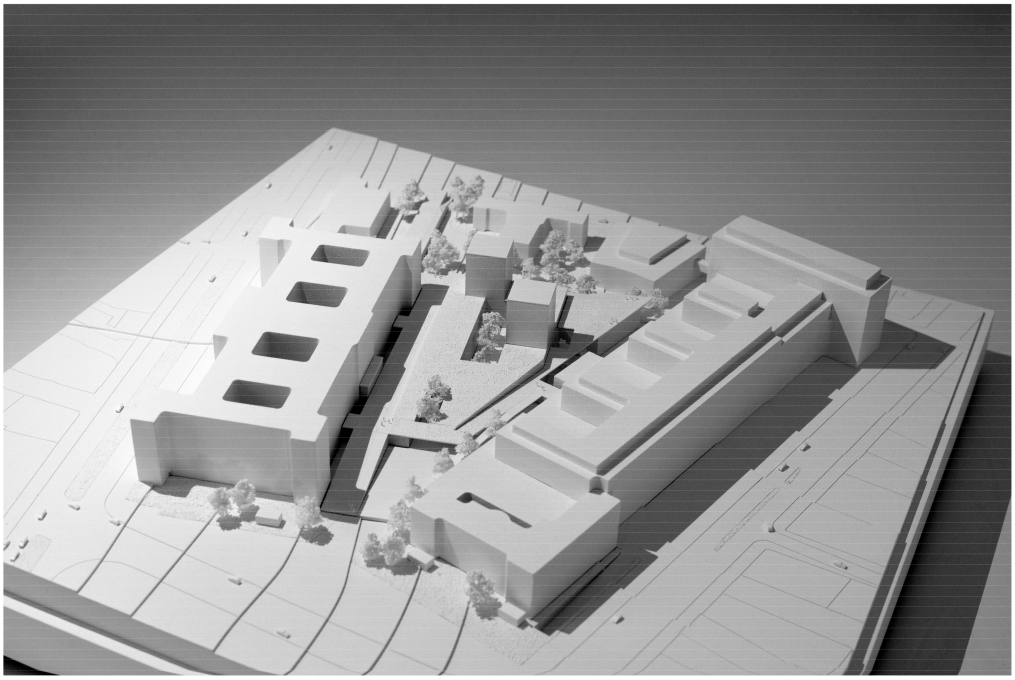


Figure 5. Timeline for the FEE + case study (source: authors).

The competition to develop an urban architectural solution for the new FEE building, which has common contents with the Technical Faculty in Belgrade, was announced in accordance with the guidelines for implementing planning solutions and as part of the project WB24-SRB-SOC-01: Serbia New Campus for the Electrical Engineering and Technical Faculties in Belgrade: Concept Design, Urban Design, Preliminary Design, ESIA and Feasibility Study, as technical assistance to the Ministry of Education, Science and Technological Development of the Republic of Serbia, funded by the Western Balkans Investment Framework (WBIF), and implemented by the consulting consortium IPF7 led by Hill International.

The task of the competition was the urban development of space within the block and the architectural solution for a new building with a gross area of around 22,000 m^2 and around 7000 m^2 of garage space. The competition was organized according to the rules on the method and procedure for announcing and conducting an urban architectural competition [61] after consultation with the Union of Architects of Serbia and the Association of Architects of Belgrade. Regarding participation, the competition was invitational. Its aim was based on urban and architectural design, and it was a single-stage competition. Eight project bureaus/consortiums were invited to participate, which, after the public call for prequalification, were selected by the competition organizer as the best ranked according to the qualification criteria: general experience, experience relevant to the project, awards, and recognition of lead designers and team composition. The competition was announced on 7 December 2021, and all eight entries were submitted in electronic form by the submission deadline of 31 March 2022 [62]. Public presentations of the competition entries were held for the jury and the interested professional public, after which the jury decided on 7 April 2022 that the first prize belonged to the competition entry by the project bureau 4 MIND

(Figure 6a,b). Three other prizes were awarded, and four entries were compensated. The total amount of awards and compensation was 45,000 euros. The results of the invitational competition are publicly available on the website of the Union of Architects of Serbia [63].



(**a**)

(**b**)

Figure 6. (**a**,**b**). First prize winning entry by the 4 MIND Studio—Model solution of the complex and rendering of the central part of the block of the University Center of Technical Faculties (Source: www.4mind.rs accessed on 29 June 2022).

The criteria for evaluating the projects were: relation with architectural heritage monuments, relation with the project task, urban setting—Volume of the newly planned building, architectural and functional solution, and energy efficiency. From the jury's explanation for the first-prized solution, the following comment can be singled out: "In

terms of total volume with two vertical objects on a relatively low platform—An artificial topography—this work occupied the smallest volume on the site in question. In achieving that goal, the solution for the basement floors in some places is too close to the building of the Technical Faculty, which is a monument under protection. The jury considered that this approach was correct and that the reduction of the total volume was the best way to protect the building's monumental features, indeed, the whole surroundings. According to one of the most important criteria—the urban setting and the volume of the object with the purpose of protecting the monumental, architectural, urban, and spatial features of the competition location—the entry by the 4 MIND bureau succeeded in reducing the designed volume to the greatest extent possible by placing most of the functions/programs in the floors below the urban platform—artificial topography. At the same time, through careful planning of the pedestrian ramps, the newly formed artificial topography is integrated into the pedestrian paths that connect Tašmajdan Park with Ćirila i Metodija Park. Two objects located on the platform—artificial topography—partially disrupt the quality achieved. By clever setting of the main entrance from the direction of the Ćirila i Metodija park, logically guiding pedestrian flows with ramps across the newly formed three-dimensional park on the urban platform—artificial topography—the new FEE building is fully functionally integrated into its narrower and wider environment." [64].

5. Discussion

Bearing these parallel case studies in mind and comparing the contexts of the locations and contents related to faculty facilities, the discussion focuses on the methodological approach itself in solving the spatial relations of the existing environment and desired interventions. In both cases (Table 1), the basic starting point should be the act of recognizing cultural and historical features, formally declaring them a monument, and establishing clear conditions for their protection, preservation, and improvement. Urban plans are initiated with the aim of improving spatial capacities and relations, which in both cases here is in the form of amendments and additions to existing ones. Plans open new questions and re-examine the needs expressed in the initiatives that originally came from the universities. The request for the replacement of existing, unsuitable, higher education facilities of low quality and quantity, the preparation of a comprehensive program task, and the harmonization of needs and management of modern standards for new facilities are the input data that guides the team of urban planners in their research. Of course, the process of urban planning includes a series of adjustments and re-examinations, balancing between the requirements of preserving the characteristics of the space, the needs of other compatible uses in the space, infrastructural equipment, analyses of traffic flows and open public spaces, etc. The essence of the task is to find a compromise solution that is satisfactory for all actors, and at the same time is extremely transparently displayed and presented. The urban plan is a key instrument with which ideas, needs, conditions, requirements, conflicts, potentials, and restrictions on the use of space are integrated and shaped into a whole, i.e., they turn into a set of rules that lead to shaping the space. Aware that the plan in such complex cases as these cannot provide all the answers, i.e., look at all the details and subtleties, urban planners prescribe several more mandatory steps that lead to the final implementation (Figure 7). In this case, competitions are an accepted and tested method for insisting on a creative approach and a deeper compositional analysis of interpolating new, contemporary faculty buildings into the inherited urban fabric and matrix [31]. Experts from the fields of protecting monumental heritage and urban planning are also included, in addition to the jury, to help evaluate the proposed solutions, guaranteeing compliance with all the set conditions. This practice should be applied more widely because it has proved to be useful and gives good results.

Table 1. Comparison between two case study areas and awarded projects (FAA & FEE+).

Comparison between Two Case Studies Areas and Awarded Projects (FAA & FEE+)	
Similarities	**Differences**
Both locations are located in sensitive zones under a high degree of architectural heritage protection and historically significant areas in the mental map of the city of Belgrade.	FAA is part of the historical center of Belgrade, in the contact zone of the Belgrade Fortress, with more strict conditions of protection than location of FEE+.
Interpolation of the new faculty building into the protected city zone in a sustainable way.	FAA—Independent Facility structure in the mixed-use area. FEE+—Creating a functional link and complex with other existing objects in the block belonging to the university.
Procedure of the implementation of the urban plan conditions with urban & architectural competition as mandatory step.	Different urban plans as a starting point. FAA—Amendments and Additions to the Detailed Regulation Plan of Kosančićev Venac (AAPDR). FEE+—Amendments and Additions to the General Regulation Plan of Belgrade (AAGRPB).
	FAA—Public, open, single-stage, architectural competition for the conceptual design of the new building, 25 competition entries had been submitted. FEE+—Competition was organised by invitation of eight respectable designing teams.
Specific requirements related to the purpose of the higher education facilities.	The difference in the sizes of the locations and the square footage of the buildings, program conditions related to teaching technics. FAA—Plot area of 0.25 ha, gross building area of 11,000 m^2; need for art studios, exhibition space, . . . FEE+—Plot area 5.3 ha, gross building area of 22,000 m^2 with 7000 m^2 for garage; need for scientific research centre with laboratories, student's canteen, . . .
Sustainable relation to the public space in surrounding.	FAA—Parts of the building accessible to the public (exhibition space, atrium and street connection on different levels). FEE+—Public space within the block accessible to the citizens, connection with square and streets.
Requirements for renewable energy and energy efficiency, usage of vegetative roofs.	/
Interaction between services for protection, planning, citizens (through the public insight procedure), decision makers.	/
Investment of the Government of the Republic of Serbia Ministry of Education, Science and Technological Development.	FAA—Support of the United Nations Development Programme (UNDP).

By analyzing once again the list of references given and comparing the conclusions on various topics and approaches, the authors conclude that for such sensitive locations, in the case of FAA in the oldest zones of the city core, with historical heritage as a burden, and in the case of FEE+, a rounded and grouped complex, with certain indications and "campus" features [2–8], an integral overview, multidisciplinary cooperation and transparency of the process are key. The cited sources point to a list of "tasks" that must be fulfilled: conditions of protection and revitalization, possibilities of reconstruction and adaptation, integration and interpolation [27,34,36–38], standards for modern teaching and research that lead to better quality, academic success [19–21] and greater competitiveness [9,10]. Integration and interpolation are not only urban architectural topics. They do not only refer to the relationship between the volume, style, and materialization of a newly planned facility and the environment that surrounds it, neither do they refer just to the establishment of connections with the surrounding public space and integration into the inherited flows of movement and ways of use. These are much broader concepts, which can be considered from the socio-economic aspect of the importance and relationship between the city and university and the importance of the student population for the vitality of the urban

center [11–18]. Bearing in mind the above, this paper makes its scientific contribution by considering the methodological process by means of analyzing two case studies under specific location conditions and ambitious requirements for the construction of new public facilities. Established steps and key moments lead to the goal of successfully defining the conditions, evaluation, and selection of solutions for implementation.

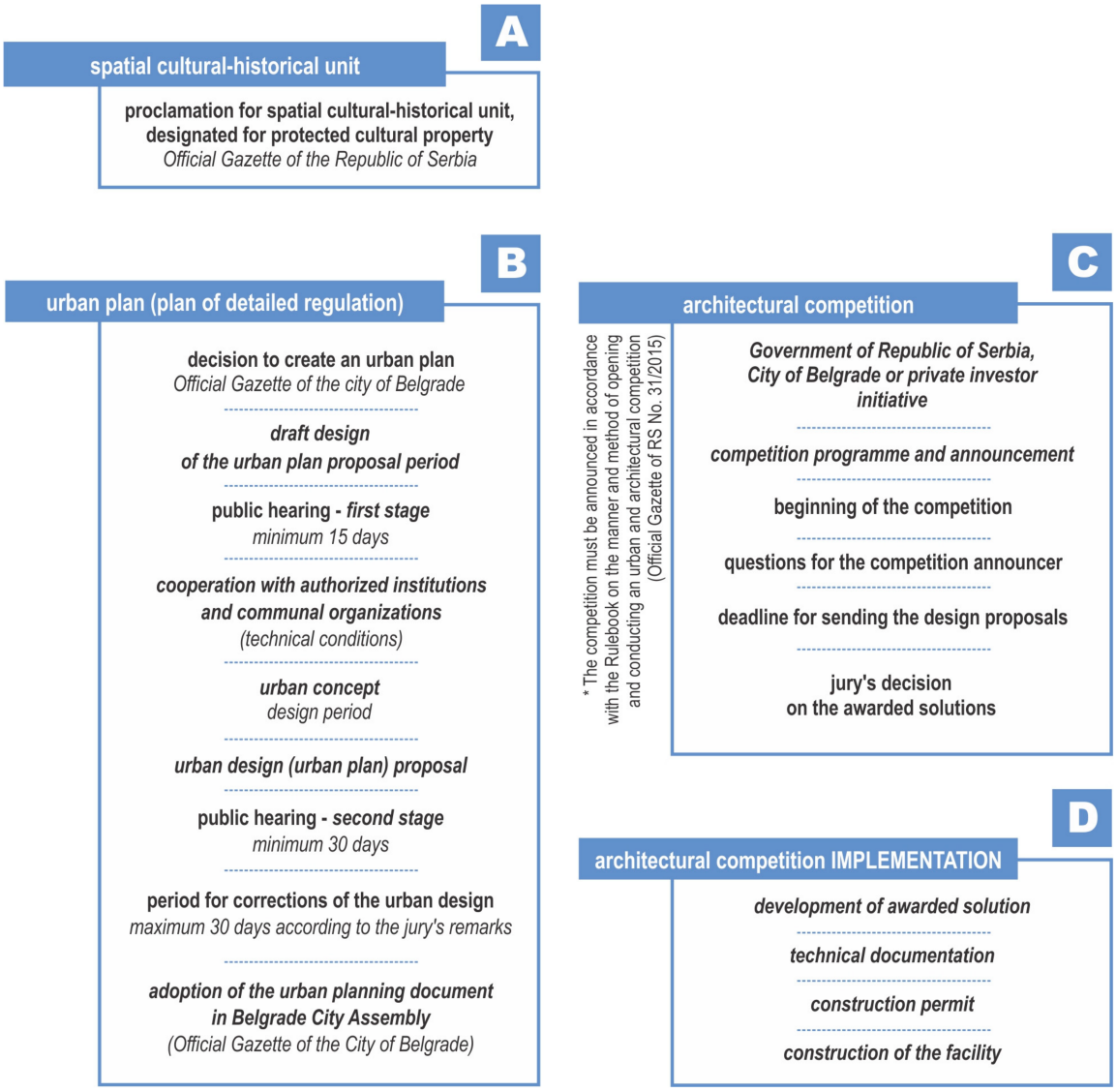


Figure 7. Schematic, unified representation of key (milestone) methodological steps in the process leading to implementation, where A, B, C and D represent sequence of steps (source: authors).

6. Conclusions

The starting point was that the value of historical Belgrade is contained in the material evidence of its architectural heritage, with traces and signs of several historical periods and specific social, cultural, anthropological, and geographical connections. The continuity achieved between individual historical buildings and the urban context, the basic condition for the treatment of immovable cultural assets in the planning documents of both case studies, was respect for their features and status. The case studies show examples of good practice in reaching the best design solutions and engaging authors, author teams, and professional organizations, as well as their empowerment, that is, engagement of the profession in the broadest sense. This set methodology, which the institutions of the City of Belgrade and the Republic of Serbia "tested out" on the two case studies presented, is an

indicator of a positive synergistic approach that strengthens the importance of the architect and the dignity of the profession. Additionally, it shows the willingness of the City and the Republic to significantly invest in the prize funds for the selected solutions, as well as the willingness to "hear" the profession and trust it. In the presented case studies, a wide engagement and cooperation of actors were achieved during the process of preparing, developing, adopting, and implementing the plans. A particularly important segment is the process of cooperation and coordination with the heritage protection service, from setting the urban solution to selecting the first-prized solution, which is an extremely important part of the methodological procedure for zones in spatial cultural-historical units.

The introduction of consultants to support the competition jury, which is permitted by the Competition Rules, from institutions responsible for the protection and urban planning is a step towards ensuring that competition solutions are monitored from the aspect of protecting architectural heritage and ensuring the rules of arrangement and construction set by the urban plan. The way participants are engaged in the competitions and the number of submitted works point to the conclusion that architects have for decades considered urban architectural contests to be the fairest model of professional competition. The process of the public competition—From the call for entries to the public presentations of the prize-winning solutions—Ensures transparency, which is a feature of a modern and democratic society. It is necessary to breathe fresh energy into the current urban and architectural practice in the Republic of Serbia by ensuring the mandatory preparation of urban and architectural competitions for all public purpose buildings. A phased adaption of this model could be the addition of legal provisions such as an additional article in the umbrella national Law on Planning and Construction. It would oblige local governments to implement planning solutions for all locations of public-purpose in spatial cultural-historical units, i.e., those with the highest level of protection of monumental heritage, through the institutions of public urban planning and architectural competitions. On the part of the participants in the process, constant readiness for additional engagement, courage, and persistence are necessary for the public space and the city to receive the best from us.

Urban and architectural competition as an implementation model of the urban plan is a regular and established path. But Authors consider these two particular case studies as a potential contribution to urban design and had a goal to present achieved results. The paper focused on interpolating specific structures for faculty buildings in complicated situations burdened with limitations in the spatial units. In order to test, discuss and review all ideas and finally choose the best one, the evaluation process was enriched by the participation of additional experts and practitioners. The lessons learned may be useful to other professionals, and the description of the experience may lead to further research.

The goal of the paper is to indicate the practical application of the theoretical, methodological approach and prescribe necessary steps to achieve possible simple improvements. The initial hypothesis was tested through a detailed description of the procedures in specifics of two case studies and proven during the research process, with the final schematic, unified representation of key (milestone) methodological steps in the process leading to implementation and parallel comparison of similarities and differences. These cognitions lead to the conclusion that the process and metrological steps, established by the legal framework in the first place, but upgraded for the specific situations, are the same or extremely similar and may present methodological prescriptions of steps in resembling cases. On the other hand, the list of likeness and distinction indicates that the similarity is far greater in the sense of a general and substantive level or achieved sustainable spatial correlations and that differences are mostly in the details regarding urban and historical context or gratification of project programs by designed buildings.

A distinctive feature in the methodology of research in architecture consists of (1) significant public participation in the methodological process, which is a feature of the contemporary democratic society; (2) application of the competition as a method for obtaining the highest quality of solutions by giving the opportunity to experts to present their cre-

ations; (3) interdisciplinary cooperation at all stages and at all levels, which is carried out consistently, carefully and coordinated in the field of architecture and urban planning, with the aim of special treatment of sensitive urban areas with significant cultural, historical, monumental and urban values; (4) cooperation of professional organizations in the field of architecture, urban planning and protection of architectural heritage.

The novelty is in the multilevel analysis of the established and usual processes of urban planning and design but in the specific context regarding demanding public use and protected historical surroundings. The empirical experience helped to observe the course of events, draw conclusions about the important milestones, and by deduction and evaluation, give guidelines for further use of knowledge. It will be possible and useful to apply the same methodology in other case studies and test the success of the model. The added value of the paper having two simultaneous comparable cases was a unique opportunity to investigate the implementation of the architectural and urban planning competition with the resolution of details that the plan did not fully process, and finally, the progress in the organization and the wider professional base for the evaluation of submitted ideas. Parallel observation leads to the conclusion that the chosen procedure is not an isolated case, as well as that the shift beyond the mandatory one contributes to quality. Other mentioned researches were based on more than one case and did not cover all phases in the process of creation, shaping the space with structure. On the other hand, the limitation of the research is in the local contextual base and legal framework, but it is easily manageable, bearing in mind the similarity in relation to heritage in traditional and historical city zones based on generally accepted international agendas, as well as similar needs and standards for the design of modern higher education institutions. The practical side of the research is reflected in the applicability of the methodological concept in resolving potentially conflicting issues and transforming them into dialogue and spatial unity with the help of good design and respect for the urban layers and matrixes. The final recommendation of the research is that the institution of urban architectural competitions should be a mandatory step for such cases, including wider participation in the process of evaluation of various experts with profiles compatible with the topics.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su15065590/s1, Table S1: Review of researched literature by type and main topics (Chapter 2. Literature Review).

Author Contributions: Conceptualization, M.L. and N.D.H.; methodology, M.L. and N.D.H.; formal analysis N.D.H. and M.L.; investigation, M.L. and N.D.H.; resources M.L. and N.D.H.; data curation, N.S.; writing—original draft preparation, M.L.; writing—review and editing, N.D.H. and M.L.; visualization, M.L.; supervision, N.S. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement: The data presented in this study are publicly available, but mostly in Serbian. Where possible, links are provided in the References. If there is interest for the rest of used documentation (for example urban plans) contact corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

For purpose of resourcing materials Authors used research and browsing platforms such as Google Scholar, Research Gate, Academy, Web of Science, Orcid and Base. Other used materials, such as local urban plans and legal acts, including materials about competitions are publicly accessible. For processing data Authors used package of Microsoft Office programs, and for graphic creation and presentation Authors used CorelDRAW and Adobe Photoshop.

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