VOLUMETRIC READING OF THE MIDDLE EAST TECHNICAL UNIVERSITY CAMPUS' ALLEY

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ABSTRACT

VOLUMETRIC READING OF THE MIDDLE EAST TECHNICAL UNIVERSITY CAMPUS' ALLEY

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This thesis positions itself as an archival effort on the METU Campus and aims to carry the ideas of "research by design" and "conservation by documentation." The conceptual focus of this research is "Volume" and "Volume Defining Enclosures" on the campus, especially on the "Alle", the main pedestrian circulation space of the academic zone. The "Alley" and the exterior spaces surrounding it are researched extensively utilizing the architects' original drawings, by conducting on-site research and using the metaphor of brush strokes. The findings are presented in the form of case studies, resulting from a systematic representation process, and include a series of axonometric models paired with original architectural drawings and photographs.

Keywords: Archive, Volume, Enclosure, Middle East Technical University, University Campus, Modern Campus

ÖZ

ORTADOĞU TEKNİK ÜNİVERSİTESİ KAMPÜSÜ ALLEY HACİMSEL OKUMASI

Doğan, Ege
Yüksek Lisans, Mimarlık
Tez Yöneticisi: Prof. Dr. Ayşen Savaş Sargın

Aralık 2022, 123 sayfa

Bu tez, ODTÜ Yerleşkesi üzerine bir arşiv çalışması olup, "tasarım yoluyla araştırma" ve "dokümantasyon yoluyla koruma" fikirlerini taşımayı amaçlamaktadır. Bu araştırmanın kavramsal odak noktası, kampüsteki "Hacim" tanımlayan "Çevreleyici" öğelerdir. Akademik alanın ana yaya dolaşım mekanı olan "Alle" ve onu çevreleyen dış mekanlara odaklanmaktadır. Araştırmanın ana kaynakları mimarların orijinal çizimleri ve saha çalışmalarıdır. Bu araştırma sonucunda "Alle" üzerine çeşitli alanlarına "fırça darbeleri" metaforu kullanarak vaka çalışmaları oluşturulmuştur. Bulgular, sistematik bir temsil süreci aracılığıyla orijinal mimari çizimler ve fotoğraflarla eşleştirilmiş aksonometrik model serileri ile sunmaktadır.

Anahtar Kelimeler: Arşiv, Hacim, Orta Doğu Teknik Üniversitesi, Üniversite Kampüsü, Modern Kampüs

To my grandfather

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CHAPTER 1

INTRODUCTION

This thesis positions itself as an archival effort on the Middle East Technical University Campus. It is a result of an ongoing project originated by the Getty Conservation Institute "Keeping It Modern" Project, and interrelated graduate courses in the Master of Architecture program at METU since 2016.[1] Two concepts that occupy a central position in these graduate courses are "Conservation by Documentation" and "Research by Design." These concepts form the theoretical foundation of this archival research and are detailed further in this chapter.

Conceptual focus of this thesis is "Volume" and "Volume Defining Enclosures," which was one of the research topics of the graduate course Arch 505 Advanced Architectural Research in the collaborative study "Campus Utopias" with Delft University of Technology.

Definition of "Volume" in this thesis refers to the 1932 book "The International Style" and, more specifically, the chapter "A First Principle: Architecture as Volume."[2] It argues that modern architecture is designed with "volumes" as opposed to mass. Moreover, in the book, the process of defining volumes is described as "thin

[1]These are Arch524 Architecture and Different Modes of Representation, Arch505 Advanced Architectural Design Research, Arch571 Directed Studies in Environmental Design and lastly Arch 723 Advanced Architectural Design Research II, conducted by Ayşen Savaş. It also has benefited from the outcomes of the exhibitions organized by the same research group between 2016 and 2020. The references in this study are from the syllabuses of these courses, outcomes of which will be published in OverHolland journal by the editorship of Ayşen Savaş and Esther Gramsbergen. Ayşen Savaş and Agnes Van Der Meij, eds., Diamonds in Sahara: METU Lodgings Documented, Ankara: Middle East Technical University, Faculty of Architecture, 2018.

[2] Henry Russell Hitchcock and Philip Johnson, Modern Architecture: International Style, (New York: Museum of Modern Art, 1932), 40-49.

shells enclosing a skeleton." Beginning from this description, this thesis defines the term "enclosure" as architectural elements and their arrangements that are thought to define immaterial volume. Utilizing these definitions on volume, supported with original drawings of the architects and on-site research, a "volumetric reading" of the METU campus is attempted, resulting in a series of representative digital models. It is thought to explore architects' design processes and document the architectural qualities of the METU Campus.

A method, which played a key role in the presentation of these representative models, is the use of a metaphor: the brush strokes. Brush strokes are understood as a metaphor and interpreted to provide a process for organizing the amount of detail displayed in representative models presented in this thesis. In the context of architectural representation, the "form" a painter depicts in painting and the "volume" an architect defines are assumed counterparts. This study argues that it is possible to gain insight by observing the painting process and developing suitable presentation approaches for this thesis.

In the context of the greater archival effort, it is essential to make a distinction between the designed and the built campus. Architects do not work directly with the buildings they design; rather they work through some intervening medium, almost always drawings. These drawings are not comparable to sketches an artist may make as a preliminary study. Architect has to provide a complete determination in advance.[3] This displacement of effort and indirectness can be interpreted as the drawings being the "original." A primary concern of this research is to be able to present the architects' original vision. Thus, this research takes the original drawings -designed campus- as its primary source and treats the on-site research -built campus- as complementary material. Original drawings of the campus consist of plans,

[3] Robin Evans "Translations from Drawing to Building and Other Essays." In Translations from Drawing to Building and Other Essays, 153–93. Cambridge: The MIT Press, 1997.

sections, site plans, and elevations. Orthographic projection does not correspond to human perception of the world; they seem hard to read.[4] They are more abstract and axiomatic. Orthographic drawings are drawn to make things with and preserve the shape and dimension of what is drawn.[5] This concern led to the design decision to use axonometric models. Original drawings by the architects were combined into a series of axonometric models. Axonometric projection is seen as a compromise between the objective presentation of the orthographic projection and the subjective human perception. Axonometric models preserve the shape and dimension while communicating the human perception of the visual condition.[6] Another result of the distinction between designed and built campus is the discovery of unbuilt elements. Many of these abandoned designs were not realized, presumably due to budget limitations. They were often part of volumetric arrangements this thesis aims to study and is thought to be valuable for exploring architects' design process; thus, they were included in the research wherever possible.

As stated in the article entitled "'A University is a society': an environmental history of the METU 'campus', published in 2013, the METU campus is understood as one of Turkey's "second wave of modernization" projects, which populated the mid-20th century.[7] A national competition was held in 1961 for the design of the campus. Altuğ and Behruz Çinici won this competition, foundations were laid, and the couple worked forten0 years to build what is now known as the original campus.

[4] Robin Evans "Architectural Projection." In Architecture and Its Image: Four Centuries of Architectural Representation: Works from the Collection of the Canadian Centre for Architecture, 19–35. Cambridge: The MIT Press, 1989.
[5] ibid
[6] Yve-Alain Bois, "Metamorphosis of Axonometry," Daidalos: Berlin Architectural Journal, 1, 40–58, 1981.
[7] Güven Arif Sargın & Ayşen Savaş (2013) 'A University is a society': an environmental history of the METU 'campus', The Journal of Architecture, 18:1, 79-106, DOI 10.1080/13602365.2012.751806

METU became a major source of intellectual, ideological, and architectural capital for the region.[8] The university was designed as "a total entity" and in half a century, beginning as a barren Anatolian prairie, it succeeded in transforming its immediate environment into an "ideal landscape."[9] In drafting the competition brief in 1955, the report submitted to METU's Board of Trustees on the Campus Plan placed great emphasis on "treatment of spaces between buildings"; that meant design of the landscape as a whole was to be prioritized over planning of individual buildings.[10] The landscape was designed by the architects as well, thus landscape elements can be treated as part of the architecture in this context; rows of trees, bushes and flora play a key role in exterior spaces of the Campus. It was clear from the start that the environment would make a large part of the university's character. As stated by Savaş, consultants in particular emphasized this in the title of the brochure prepared for the first competition, indicating that the foundation of the governing conceptual approach was that; "a university is a society"[11]

[8] Ibid
[9] Ibid
[10] Report to the Board of Trustees on the Campus Plan of METU, December 1959, approved by Trustees in January 1960 (METU Archive).
[11] Güven Arif Sargın & Ayşen Savaş (2013) 'A University is a society': an environmental history of the METU 'campus', The Journal of Architecture, 18:1, 79-106, DOI 10.1080/13602365.2012.751806



Figure 1. A potograph of the METU Campus, source Salt Archives



Figure 2. A potograph of the METU Campus, source Salt Archives

As this study positions itself as an archival effort, establishing a definition of "archive" is necessary. This thesis borrows ideas from Michael Foucault's "Archeology of Knowledge"; an archive is not an inert body of works, which was

produced and happened to survive, it is a discursive formation. Archive is thought as systems of statements developed through discourse. It is not an accumulation of statements forming an unorganized mass, rather statements organized in accordance with regularities they communicate.[12] Furthermore, the purpose of the archive is to identify key questions and issues that will regulate the discursive process of presenting and organizing statements.[13] Two terms that can particularize this definition of archive comes from Eric Ketelaar's article "Archivization and Archivalization." Webster's dictionary definition of archive is "to file or collect as records or documents in or as if in archive," it is understood as an action that comes after creation. Archival theory however, carries this process deeper, "archivization" goes beyond capturing, it includes the creative process preceding the capture. Before "archivization", there is another phase, "archivalization" which means the conscious or unconscious choice to consider something worth archiving.[14] In the context of this thesis, these statements find existence as systematic processes of representation aimed to investigate the volumetric qualities of the campus and ultimately result in a series of digital axonometric models.

[12] Michel Foucault, *Archeology of Knowledge and the Discourse on Language*, trans. by M. Sheridan Smith (New York: Pantheon Books, 1972), 126-131.
[13] Stuart Hall (2001) Constituting an archive, Third Text, 15:54, 89-92, DOI: 10.1080/09528820108576903
[14] Eric Ketelaar, "Archivalization and Archiving", *Archives and Manuscripts* 27 (1999) 54–61; Eric Ketelaar, "Archivistics Research Saving the Profession", *American Archivist* 63 (2000) 328–329.



Figure 3. Archive at the METU Department of Architecture (photograph: Setenay Özsoy)

An example within the scope of "Keeping it Modern" project is the archive established at the METU Department of Architecture[15]. (Figure 3) This archive can be described as an archival process in the form of architectural space. The idea was to start a process of "archivization," rather than establishment of an institution. The final product of "archivization" is not meant to be a frozen entity; rather it aims to become a "progressive collection" emerging from a series of collection processes. This process aims to address the functional, practical, physical, technical, social, environmental, and political factors that shaped and changed the original design ideas and construction methods.[16]

[15] This archive is established within the course Arch524 Different Modes of Representation during 2019-2020 fall semester

[16] A.Savaş, B.Derebaşı, İ.Gürsel Dino, S.Sarıca, S.İnan, Ş.Akın, "Research and Conservation Planning for the METU Faculty of Architecture Building Complex by Altuğ-Behruz Çinici, Ankara, Turkey", Keeping It Modern Project Report, (Getty Foundation, 2018), 81.

1.1 "Conservation by Documentation"[17]

The Campus is located in a challenging geography that faces ongoing social, political and economic conflicts. Following the argument developed in the conservation planning report, the research on its conservation has been done in this study with the argument that documentation is another way to overcome the mass destruction of cultural heritage.[18] The documentation here is understood as a step in the conservation process motivated by the desire to uncover the initial design principles of the Middle East Technical University Campus.[19]

The idea of "Conservation by Documentation" is a prominent idea in the aforementioned graduate courses. Furthermore, this documentation process is perceived as a creative process, employing the idea of "research by design", which will be explained in the next sub-chapter. The main tools of this documentation are photos, drawings, digital and physical models. While there is already an extensive database concerning the METU Campus, as most of the original drawings of the architects are made public, and there are many productions during the previous courses, the creative process also lies within the act of re-tracing. This is discovered to be a prominent approach during these courses as a directed process of abstraction and subtraction of the object thought to uncover underlying principles of the METU Campus.

This thesis ultimately aims to contribute to this archival effort by designing systematic representation processes focusing on the term "volume". Ultimately, this

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[17] "Conservation by Documentation" is the motto of "Getty Foundation Report: Research and Conservation Planning for METU Faculty of Architecture Building Complex", a comprehensive archiving project on METU Faculty of Architecture which was published in 2020.
[18] A.Savaş, B.Derebaşı, İ.Gürsel Dino, S.Sarıca, S.İnan, Ş.Akın, "Research and Conservation Planning for the METU Faculty of Architecture Building Complex by Altuğ-Behruz Çinici, Ankara, Turkey", Keeping It Modern Project Report, (Getty Foundation, 2018), 81.
[19] It was the main goal of Modern Campus courses given between the years 2016-22 and conducted with the collaboration of TUDelft Architecture Department.

thesis aims to uncover the initial design principles of the METU Campus and present its findings in an organized manner.

1.2 Research by Design

A clear explanation of the term "research by design" is essential for understanding the concepts and the methodology explored in this study, which transforms the documentation process into a creative process. Following the argument developed by Hauberg, the definition of research is understood as a systematic inquiry with the aim of communicating knowledge.[20] This thesis accepts the notion that design and research is interconnected in that new knowledge about the discipline is produced through the act of designing.[21] If design can be defined as how an architect asks a question and comes up with complicated solutions,[22] the practice of the architect is not a linear process in which designer's thoughts are transformed into form. It should be understood as an iterative process between inquiry and proposal. It functions as a dialectic tool and facilitator of insight and knowledge.[23]

Architects create knowledge through their work; drawings, models, diagrams, etc... Research by design aims to incorporate working method of architects into academic discourse as a means of gaining knowledge.[24] By acknowledging practice as a method for acquiring new knowledge, it is possible to examine the research question through the practitioner's perspective.[25] Thus, separation of the researcher and the

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[20] J. Hauberg, (2011), Research by Design – A research strategy. Revista Lusófona de Architectura e Educacao, 5, 46-56.
[21] Research by Design - International Conference (2000). - Delft University of Technology - Faculty of Architecture, in cooperation with the EAAE/AEEA, November 1-3.
[22] M. R. Thomsen, and Tamke, M. (2009). Narratives of Making: thinking practice led research in architecture. *Proceedings of the Conference Communicating (by) Design*, Brussels.
[23] J. Hauberg, (2011), Research by Design – A research strategy. Revista Lusófona de Architectura e Educacao, 5, 46-56.
[24] ibid
[25] ibid

practice is rejected, instead, the architectural practice itself is accepted as a crucial part of the research process and its findings.[26] In the context of this thesis, this approach is thought to be valuable in gaining insight into the initial design principles the architects operated with during the design of the METU Campus.

The preferred design tools used in this research were digital. The deciding factor has been the evident speed with which digitized images of traditional modes of representation, such as perspective, axonometric, plan, and elevation, can be altered and worked with.[27] Especially, in an iterative design process such as this research, the ability to go back and forth on research material has been significant.

Within this conceptual framework, the first attempts of this research are detailed in the second chapter "Initial Research" in the form of a report on an unpublished essay, titled "A Volumetric Reading: the METU Campus as a Single Architectural Entity."[28] This chapter reports on how the term "Volume" was first discovered, how and why it became a central term for this study on the METU campus. The third chapter is the continuation of the research and focuses on the aforementioned "enclosures." It attempts archival representation in the form of case studies consisting of axonometric models. In this research, the focus is on the main pedestrian axis of the campus' academic zone, the *alle*[29] and the spaces surrounding it. Lastly, chapter four is the conclusion and summarizes the findings of the research.

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[26]H. Borgdorff, (2005). The debate on research in the arts. Amsterdam School of the Arts.

[27] A. Vidler (2000). Diagrams of diagrams: Architectural abstraction and modern representation. Representations (Berkeley, Calif.), 72(72), 1-20.

[28] This study is the result of two graduate courses Arch 505 and Arch 571 during 2019-2020 spring semester.

[29] An English term for the main pedestrian axis of the academic zone can be "Alley", however throughout this thesis "Alle" -originally French for "alley"- is preferred, as it was the term used by the architects.

CHAPTER 2

THE INITIAL VOLUME RESEARCH

This research originates from two graduate courses given in the spring term of 2019-2020, Arch505 and Arch571 in METU Department of Architecture. The aim of the courses was to develop methods of representation to reveal initial design principles of the METU Campus, in accordance with the notions of "research by design" and "conservation by documentation". This chapter details the representative production of myself and my research partner Uzay Doğan on the subject of "Volume." [30]

There are two major sources for this study, which became a significant inspiration on the pursuit of this subject. These sources play an important role in establishing the terminology used in this research. The first major source of this research was an interview excerpt from one of the architects of the METU Campus, Behruz Çinici:

> *The art of creating spaces between buildings is lost today. We see the building as a positive shape used volume. The 'outdoor' established by this volume with the other masses around is generally neglected. I wanted to do this in the forum (the alle). I saw a positive shape in these empty spaces and worked on it by using the tension in the volumes…*[31]

In this interview, he explains the process of defining exterior spaces with the mention of the term "volume". Architect refers to the *alle*, being conceived as positive shapes. *Alle* forms the backbone of the campus as its primary circulation space. It is roughly

[30] Next semester, during fall 2020 this concept became the focus of the course Arch 524 Different Modes of Representation and a digital exhibition was organized with the same title.
[31] Salt Research, https://archives.saltresearch.org/handle/123456789/133?locale=tr, retrieved 23.07.2022

1 km in length, lined by faculty and administrative buildings on both sides. Described as "the main classroom of the METU Campus"[32], it is also a recreational and intellectual space for the residents of the campus. In the following chapters, *alle* becomes the focus of this thesis and investigated with detail.

This research argues that the architects of the METU Campus adopted a "volumetric" understanding of architecture. It would allow them to interpret both interior and exterior spaces as "volumes"; rather than a "mass and void" understanding, which separates interior and exterior spaces. This principle would allow them to design the interconnected interior and exterior spaces present in the METU Campus.

The other major source in this research was the MoMA exhibition "The International Style" and the 1932 book published by Henry Russell Hitchcock and Philip Johnson, a comprehensive source about the underlying principles of early 20th Century architecture. This book features a chapter on volume titled "A First Principle: Architecture as Volume."[33] This chapter explains how a modern building is conceived differently than buildings in previous eras. It further states that a masonry wall is both the support and the shelter, however in modern architecture; these two concepts are separated into a skeleton and a shell. Walls became subordinate elements fitted to the skeleton like screens or carried like a shell outside of it. This gave architects the freedom to design with spaces, rather than walls. In other words, The International Style argues, in mid-20th century architecture, the first principle is volume, as opposed to mass. The terms "volume" and "mass" in this research refer

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[32] A.Burak Büyükcivelek, Berrin Zeytun Çakmaklı, Duygu Cihanger, Ela Alanyalı, Ela Babalık Suttcliffe,
Korkut, Ensar Temizel, Ezgi Balkanay, Funda Baş Bütüner, Güliz Bilgin Altınöz, Olgu Çalışkan, Sıla Akman, Neris Parlak, Yiğit Acar Danışmanlar: Adnan Barlas, Ali Türel, Baykan Günay, Gülay Hasdoğan, Lale Özgenel, Güven Arif Sargın, Ayşen Savaş, "Orta Doğu Teknik Üniversitesi Ankara Yerleşkesi: Strateji ve Tasarım Kılavuzu", 2016, pp 5.

[33] Henry Russell Hitchcock and Philip Johnson, Modern Architecture: International Style, (New York: Museum of Modern Art, 1932), 40-49.

to this interpretation.[34] Moreover, "Volumetric Reading" is understood as a way of reading architecture by focusing on volumes and their arrangement. As opposed to a "Mass Reading" which focuses on mass-void articulations.

Progressing from the argument that the architects of METU Campus adopted a volumetric understanding of architecture and interpretation of terms "volume" and "mass" discovered from "The International Style", this study raised the question: Is it possible to understand METU Campus through a volumetric reading rather than focusing on mass articulations? As a result of this inquiry, a series of digital models are produced, with each iteration gaining insight into the representation process and volumetric arrangement of the METU Campus. Taking the original drawings of the architects, their interviews, previous studies, on-site research, photographs, and satellite images as reference, these researches attempted to combine and refine these sources into an informative whole using digital tools.

2.1 Relief Models

This study started with experimentations with relief models. These digital models are built by utilizing the original drawings of the architects; plans, sections and elevations. They are traced and extruded into simplified cubic shapes using 3D modeling software.[35] (Figure 6, Figure 7) The main inspiration behind this approach was the intention to build upon research conducted in this course the previous year. The significance of the first models made in the course for this study is that they were all based on mass and solid-void articulations.

[34] Henry Russell Hitchcock and Philip Johnson, Modern Architecture: International Style, (New York: Museum of Modern Art, 1932), 14.
[35] The primary 3D modelling software used in this thesis is Rhinoceros3d.

One of the major points of reference was the METU Campus relief model assigned to METU graduate students,[36] which in turn was inspired by Bauhaus' Rudolf Lutz's relief model. (Figure 4, Figure 5)

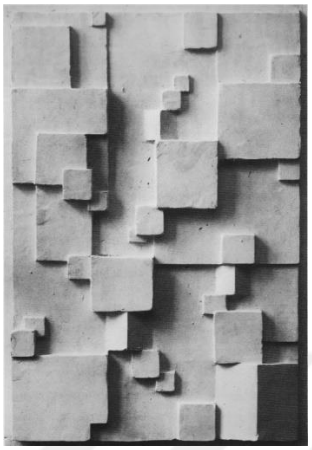


Figure 4. Rudolf Lutz's relief model

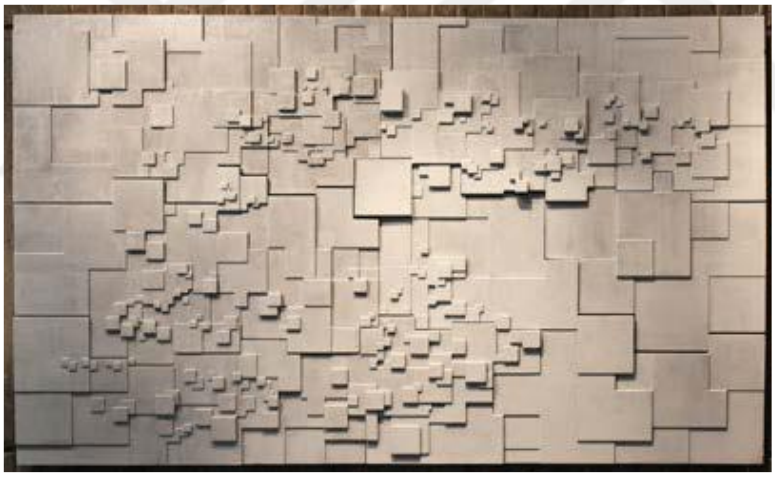


Figure 5. Relief Model, Sezin Sarıca, 2019

[36] This refers to the ARCH524 course given by Prof. Dr. Ayşen Savaş in 2019. METU graduate students Sezin Sarıca, Bengisu Derebaşı and Damla Erkoç were assigned to represent the campus in a relief model.

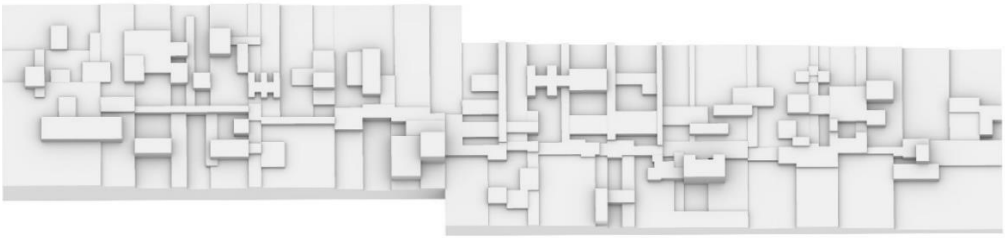


Figure 6. Relief Model by Uzay Doğan and the author

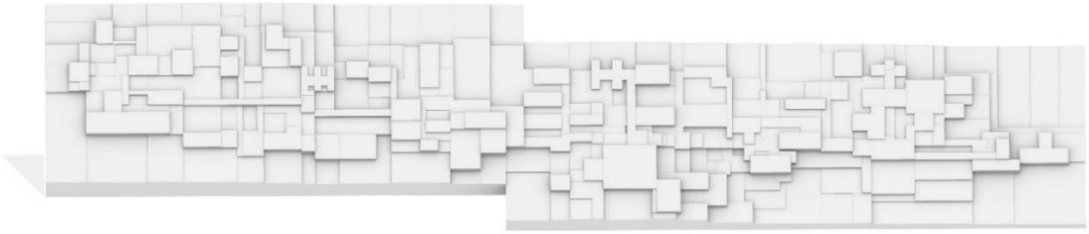


Figure 7. Relief Model by Uzay Doğan and the author

These two models became the first iterations of representative models produced within the scope of the initial research. (Figure 6, Figure 7) An attempt was made to read both the interior and exterior spaces as volumes. In the first model, *alle* - informed by the architects' interview- was the only exterior space to be read as volumes. However, exterior spaces such as the raised platforms surrounding the entrances of the buildings, landscaped elements, and space defining trees were s pattern of volumes connecting the *alle* to the faculty buildings was absent and this resulted in an impression of solid-void or figure-ground. Ultimately, this relief could have been perceived as a mass model.

The next attempt was an effort to represent this interconnected volumetric pattern of the METU Campus with a different approach. It resulted in a relief model. (Figure 7**Error! Reference source not found.**) In the relief model, the absence of figure and ground relation is thought to communicate the volumetric principle of the METU Campus' architecture. The intention of this relief model is to display that a building is no longer understood as a mass with void surrounding it, but rather as a collection

of surfaces with volumes defined on both sides. This generates a different interpretation of the campus as a collection of volumes. However, although this relief model eliminates the figure-ground relation present in the previous model, it is still a mass model. It was decided the process of defining and representing "volume" needs further work.

2.2 Translucent Models

The ambiguity of volumetric representation was evident after the first iteration of models, thus an attempt was made to develop a more detailed representation process. This method borrows from the International Style's definition of volume, a skeleton enclosed by thin surfaces[37] and aims to expand it. A representative prototype was designed in the form of series of models in order to systematize the process; it would serve as a visual guide. (Figure 8)

Before moving on to the prototype models, an important distinction must be made concerning The International Style's definition regarding surfaces. This research claims surfaces do not necessarily have to be physical surfaces. They can be defined by "phenomenal transparencies." Colin Rowe makes a distinction between literal and phenomenal transparency and the latter is understood as transparency that can emerge from an arrangement. Learning from Colin Rowe's definition, in this study, the phenomenal transparencies are thought of as implications of architectural and landscape elements, and their arrangements, that imply enclosures. This definition of enclosures includes physical surfaces such as walls, ceilings and floors, moreover it also includes architectural and landscape elements such as arcades, retaining walls, raised platforms, rows of trees, pools, gates… These elements have spatial implications and are arranged in a conscious manner to define both interior and

[37] Henry Russell Hitchcock and Philip Johnson, Modern Architecture: International Style, (New York: Museum of Modern Art, 1932), 40-49.

exterior spaces and to blur the boundaries between them. A volumetric reading is proposed by understanding the campus as being composed of literal surfaces and "phenomenal transparencies", both interpreted as "enclosures" which define interior and exterior spaces as positive shapes. The claim of this exercise is to show that Çinicis' approach[38] is not different from what The International Style was suggesting: volume vs. mass. This representation mode is further developed for the interpretation of the METU Campus, where the interior and exterior spaces form a complex arrangement of volumes. The following models were conceived with this understanding.

In this research, two different model types are proposed. The first type is thought to represent an abstraction of enclosures implied by literal architectural elements, which can be thought of as "the skeleton and the surfaces" mentioned in the book "The International Style." They are called "enclosure models" in this study. The second row contains the "volume models" corresponding to each of the enclosure models, represented by translucent boxes. The volume models are informed by the enclosures and are thought to represent the volume defined by them. (Figure 8)

[38] Behruz Çinici's interview, Salt Research, https://archives.saltresearch.org/handle/123456789/133?locale=tr, retrieved 23.07.2022

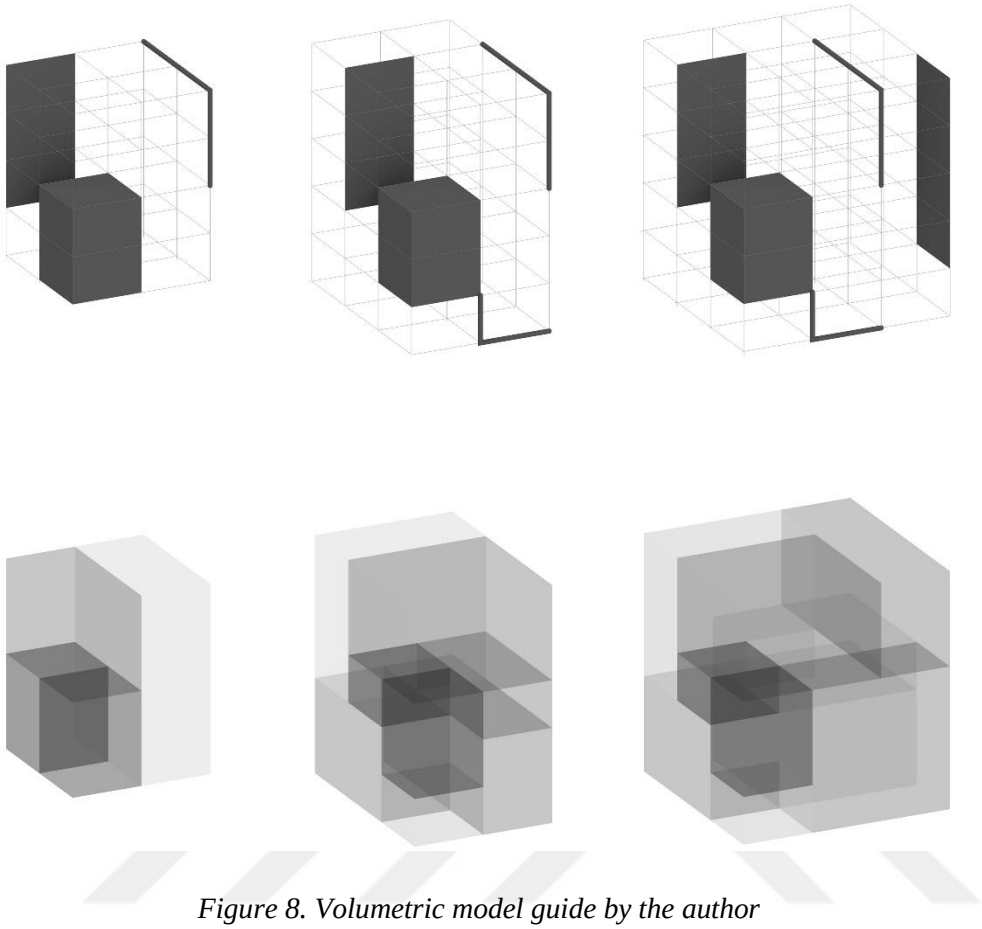


Figure 8. Volumetric model guide by the author

Subsequently, this process is implemented in the whole METU Campus. In this research, the locations selected for this process are often building entrances connecting to the *alle*, which often feature a variety of architectural and landscape elements. It is done in an attempt to read the complex interconnected patterns of a variety of volumes formed by multiple connections. (Figures 9-14)

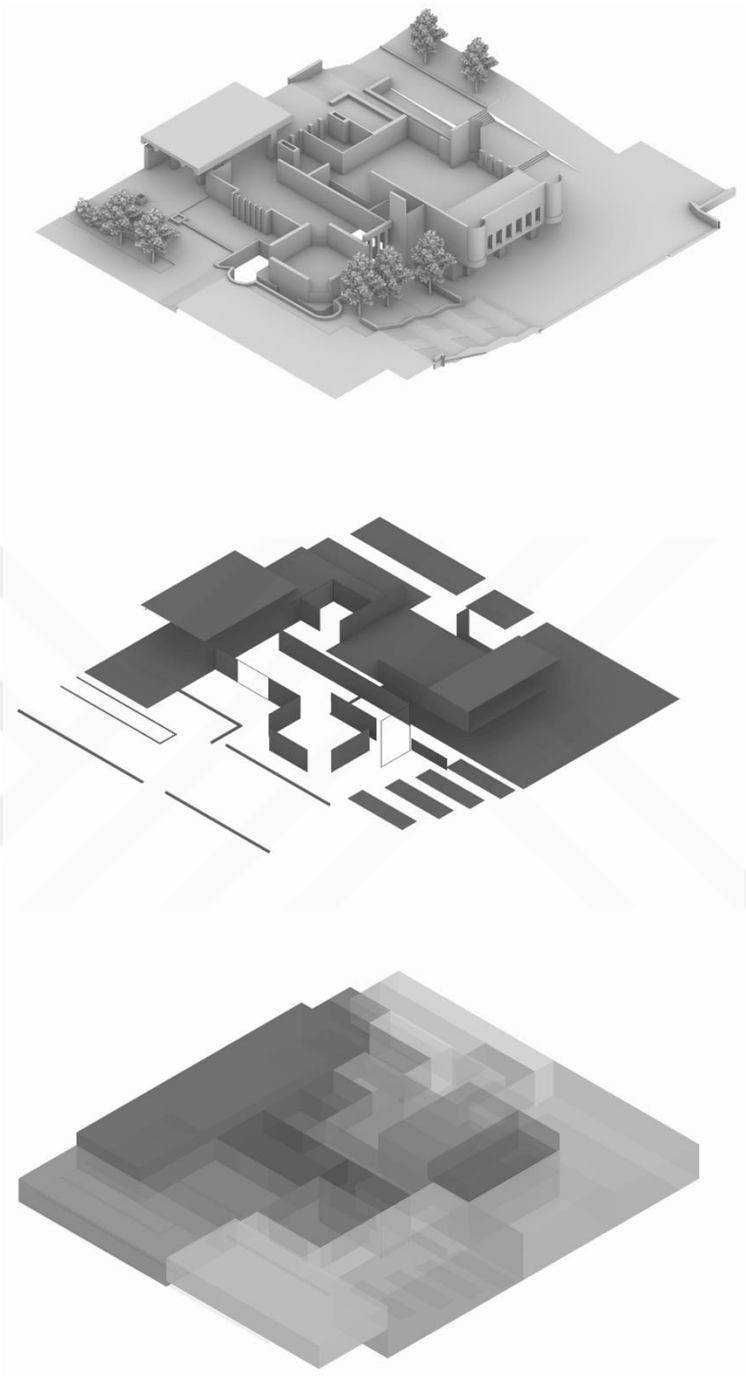


Figure 9. Library entrance and immediate surroundings, top: literal model, middle: enclosure model, bottom: volume model

A key difference between the model and the implementation is the existence of realistic “literal models,” which were presented along with “enclosure” and “volume models.” “Literal” and “volume models” would become the focus of this study. However, “enclosure models” play a major role in the continuation of this study. Although the enclosure models were constructed for the campus, literal models alone would have been proved sufficient for developing volume models in the context of this research. It was discovered that the abstraction of architectural and landscape elements into “enclosure models” in a consistent, organized manner would require a more detailed inquiry into the architectural and landscape elements on the campus.

A usual workflow in the implementation of this process would start with a site being selected, using site plans and on-site observations. Later “literal models” were built by taking the original drawings as the primary reference. Taking these models as a foundation, following architectural and landscape elements as well as their implications, “enclosure models” were developed. Finally, translucent cubic shapes were placed within the arrangement of these enclosures to develop “volume models.”

The process of representing and organizing architectural and landscape elements as enclosures would later become the focus of this thesis. However, in the context of this initial research, representing the campus as enclosure models was ultimately decided to be a detour in terms of what this research intended to accomplish, which was to develop a singular volumetric model of the campus, thus it was discontinued.

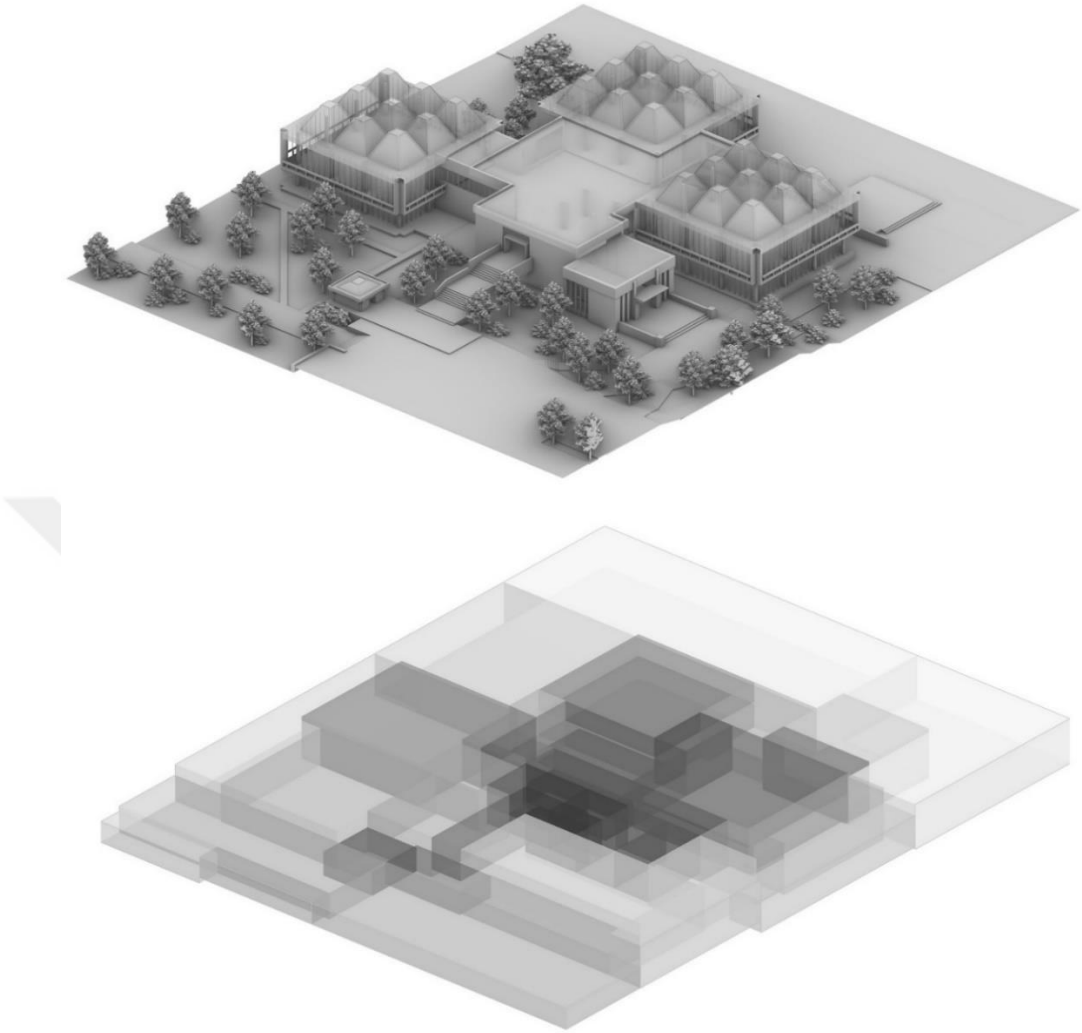


Figure 10. Cafeteria Building and the Alle

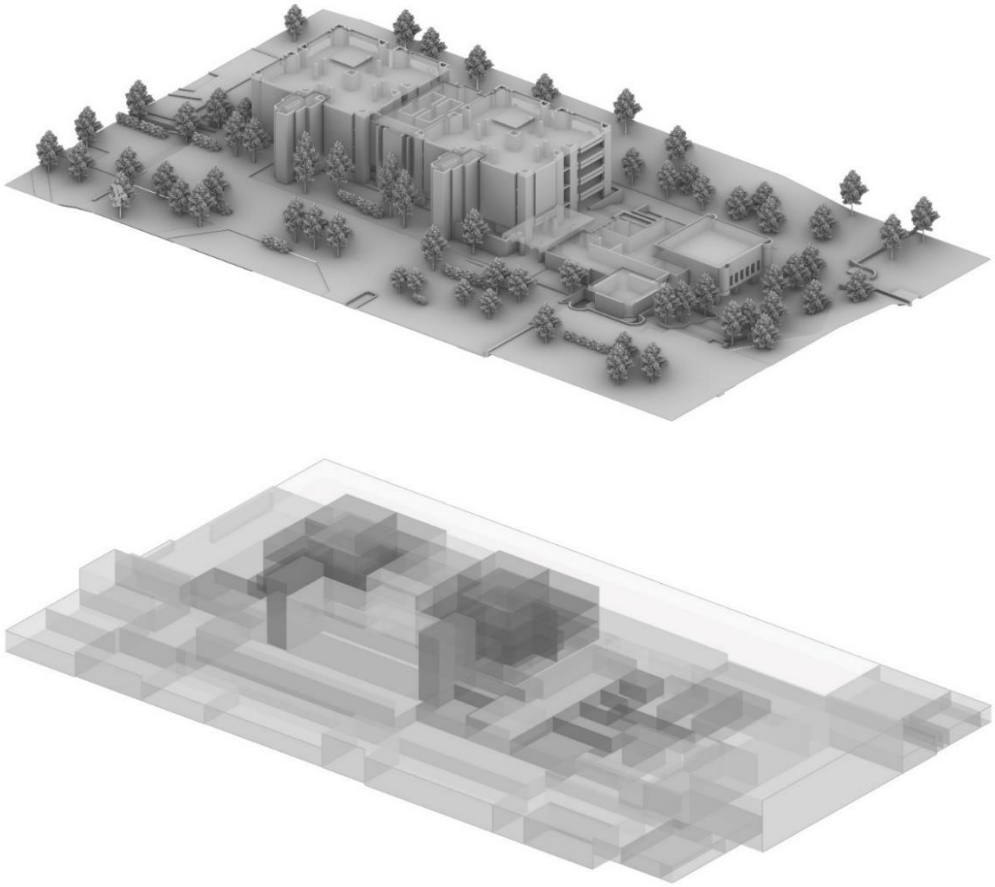


Figure 11. Library Building and the Alle

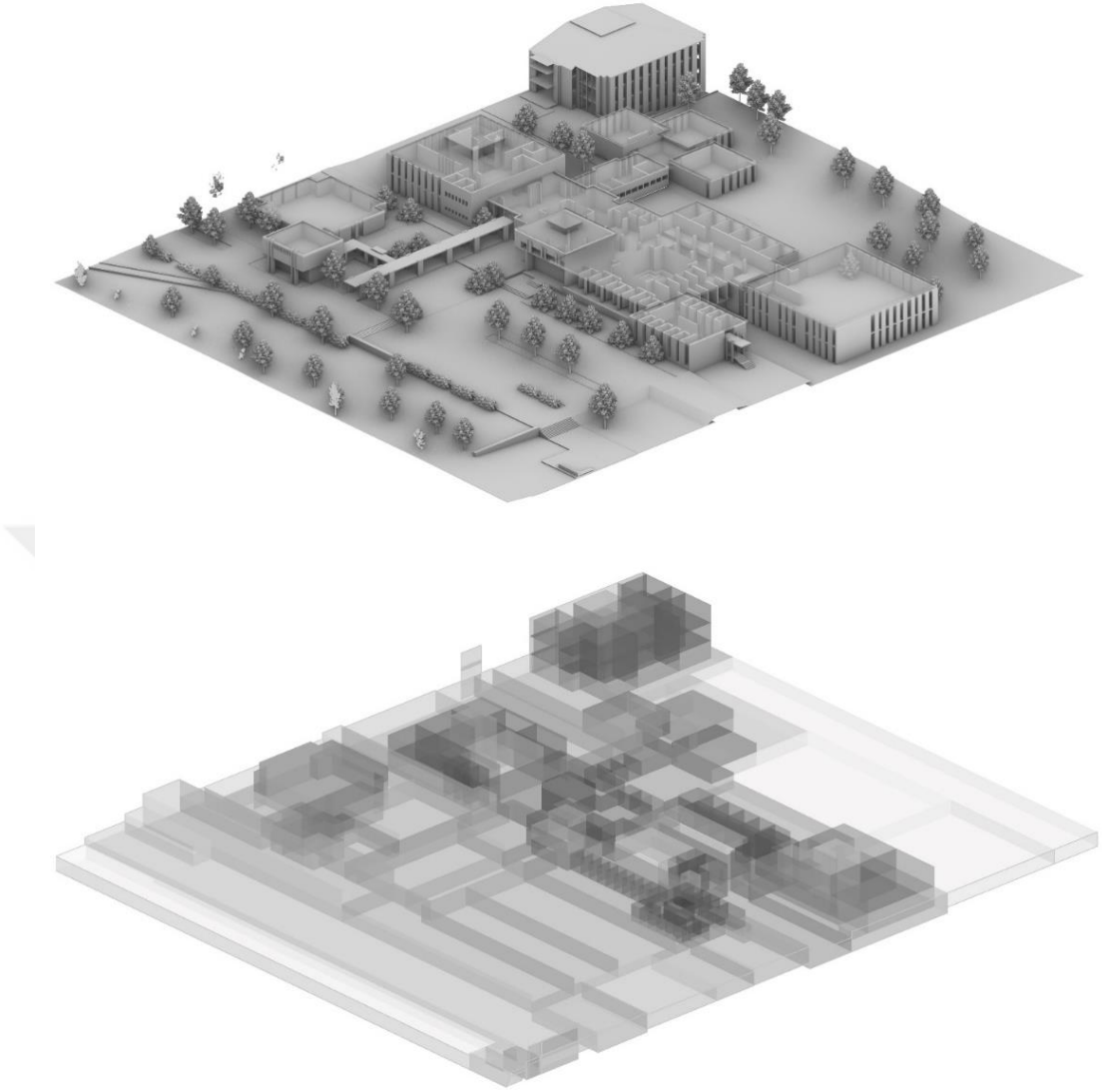


Figure 12. Architecture Faculty Building and the Alle

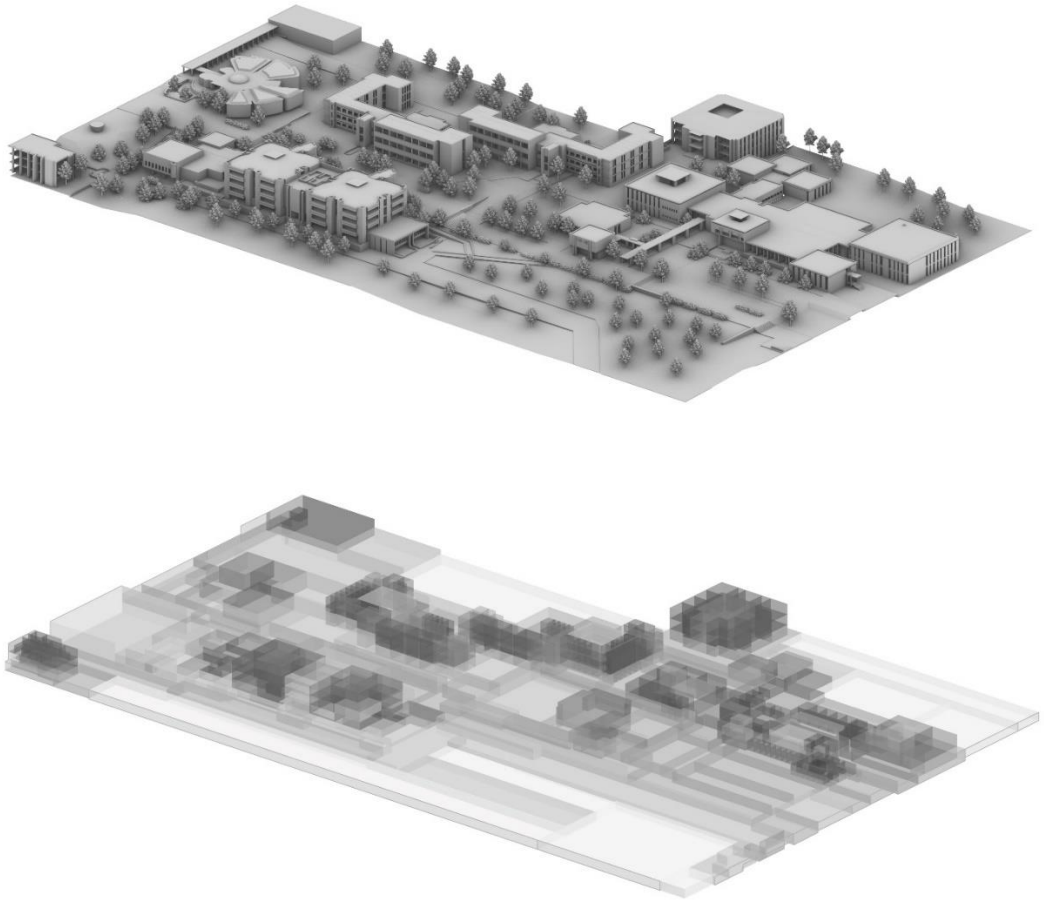


Figure 13. Architecture Faculty Building to Library, Alle

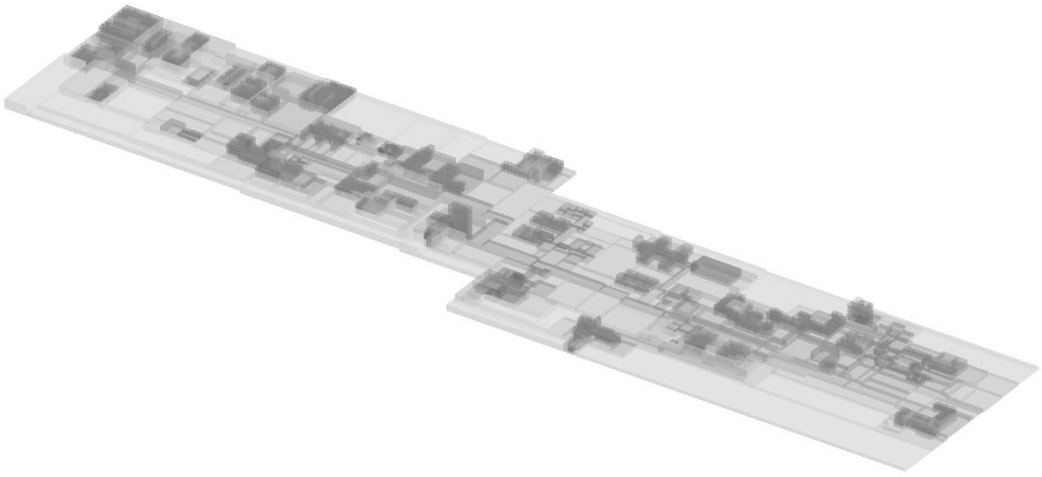


Figure 14. Volumetric Reading of the METU campus, translucent model

Finally, by combining the partial volumetric models, a comprehensive volumetric model of the campus was constructed in digital environment. This model became the final product of "A Volumetric Reading: METU Campus as a Single Architectural Entity" essay written for the course Arch571. (Figure 14) The interconnected pattern of volumes in the campus are represented with translucent shapes. Starting from an individual space such as a classroom and reaching to the *alle*, this technique helps to perceive the wholistic arrangement of volumes of its unique architecture.[39] These models is partially successful in displaying some of the initial design principles of the Çinicis. This research works to uncover the intricacies of volumetric arrangement of the METU Campus and transformed the model into an impression of a volumetric arrangement.

The ambiguity of volumetric representation and the disparity between intended detailed reading and the final volumetric impression achieved at the end were the two major shortcomings of this initial research faced. The goal of this thesis is to

[39] Uzay Doğan, "Volume Defining Architectural Elements in the Middle East Technical University Campus." Master's Thesis, Middle East Technical University, 2022

address these shortcomings. In other words, a well-defined approach for volumetric representation and a more straightforward visual reading is the aimed in the development of the new representation technique in the continuation of this study.

CHAPTER 3

VOLUMETRIC READING CASE STUDIES

The research continued by developing a new series of visual representations, particularly focusing on the *alle* in the form of case studies rather than attempting to develop a comprehensive representative model of the campus. These case studies aimed to present selected sites throughout the *alle*. The documentation process began with an on-site examination. The objective was to discover cases of exterior volumes as "positive shapes," as mentioned in the architects' interview.[40] This examination leads to the entrances of the buildings connected to the *alle* and spaces surrounding them. Later, these sites were digitally modeled using 3D software to produce a series of axonometric drawings, a volumetric reading is developed on these drawings and are paired with original orthographic drawings and photographs.

As stated before, the volumetric models that were constructed at the beginning of this research fell short of providing a sufficient visual tool to represent the complex volumetric structure of the campus. Thus, this research changes its direction by proposing a new systematic representation process; reading volume through "enclosures." Enclosure is understood as volume defining architectural and landscape elements and their arrangements. It is thought to offer more in terms of readability.

Another major problem was the visual readability of the spatial articulation, especially when depicting large-scale models. The goal, therefore, was to develop a visually clearer modeling technique. There were two modeling techniques proposed.

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[40] Salt Research, https://archives.saltresearch.org/handle/123456789/133?locale=tr, retrieved 23.07.2022

The first approach is to focus on the exterior spaces, described as “positive spaces” by Behruz Çinici.[41] In other terms, the exterior volumes, positive spaces between the buildings were included, while the interior spaces were excluded in this trial.

The second approach aimed to solve the visual shortcomings and use a metaphor to explain the methodology: the brush strokes. Brush strokes were understood as a metaphor and interpreted to provide a process for categorizing enclosures and organizing the amount of detail displayed in each iteration of selected locations on the campus. This metaphor is built on observation, the “form” a painter depicts in painting and the “volume” an architect defines are assumed counterparts in the context of architectural representation. From this observation, a system is developed to organize the detail displayed in representational models developed in this study.

To do this, an extensive reading of the campus from the original drawings was made, and on-site research was conducted. The end product of this two-sided research was the production of a series of axonometric models. “Enclosures” were depicted on the axonometric models representing the arrangement of the architectural and landscape elements. Enclosures were represented in an abstract visual format, aiming for clear readability in terms of arrangement. From these enclosures, a volumetric reading, comparable to the initial research’s translucent models, is attempted. Unlike the translucent models, which turned out to be an impression, these volumetric models are thought to be a systematic reading by focusing on a limited area, paired with enclosure models and organizing the detail displayed.

Lastly, It is essential to reiterate the distinction between the designed and the built campus. This research takes the original drawings -designed campus- as its primary source and treats the on-site research -built campus- as complementary material. It should be noted that throughout this research, it was discovered that there were

[41] Salt Research, https://archives.saltresearch.org/handle/123456789/133?locale=tr, retrieved 23.07.2022

unbuilt architectural and landscape elements. Many of them contribute to the volumetric arrangement of the METU Campus but likely were not realized due to budget limitations. These abandoned designs were usually pools, auditoriums, and intricate landscape elements. They were often part of volumetric arrangements this thesis aims to uncover, thus they were included in the research wherever possible.

3.1 The Alle

Before moving on to the case study models, a more detailed investigation of the *alle* is necessary. The central pedestrian axis of the academic zone, known as the '*alle*', forms the backbone of the campus. Being the primary circulation space of the academic zone, the *alle* is roughly 1 km in length, lined by faculty and administrative buildings on both sides. It is not solely a circulation space; rather it is also a recreational and intellectual space for the residents of the campus. Behruz Çinici further emphasizes the importance of *alle*, describing it as the "main classroom of the METU Campus."[42] The *alle* is surrounded by a variety of architectural and landscape elements such as raised platforms, colonnaded arcades, gateways, pools and more which presents a complex volumetric arrangement. Before making on site investigations, the original drawings of the campus were investigated.

The claim was, it was possible to understand the significance of the *alle* in METU Campus' design by observing the original drawing boards submitted to the architectural competition.[43] (Figure 15, Figure 16, Figure 17, Figure 18)

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[42] "Orta Doğu Teknik Üniversitesi Ankara Yerleşkesi: Strateji ve Tasarım Kılavuzu", 2016, pp 5; Prepared by a group from the METU Department of Architeture and Urban Design. A.Burak Büyükcivelek, et. aAll, under the supervision of Adnan Barlas, Ali Türel, Baykan Günay, Gülay Hasdoğan, Lale Özgenel, Güven Arif Sargın, and Ayşen Savaş,

[43] A.Savaş, B.Derebaşı, İ.Gürsel Dino, S.Sarıca, S.İnan, Ş.Akın, "Research and Conservation Planning for the METU Faculty of Architecture Building Complex by Altuğ-Behruz Çinici, Ankara, Turkey", Keeping It Modern Project Report, (Getty Foundation, 2018), p. 91-95



Figure 15. All 10 drawing boards submitted to the competition by Çinici Architects

METU precedes its Campus, founded in 1956, a competition was held in order to design its campus in 1958. Although, this first competition was canceled, it laid the groundwork for the initial design ideas and the core of the architectural program. A second competition was held in 1961. Çinici architects' design was given the first prize out of 21 entries. The architects submitted a total of 10 drawing boards to this competition. These drawings represented the design intentions of the architects, or in better terms, "dream of the architects."[44] The first and the second drawing boards can be observed in order to glimpse how the architects conceived the "*alle*."

The first of the drawing boards was a 1/5000 scale site plan, showing the architectural elements as hatched surfaces. The masses of the building were visually dominant in this plan, however the *alle* was not ignored, it was also hatched with parallel lines.[45] (Figure 16)

[44] ibid
[45] ibid

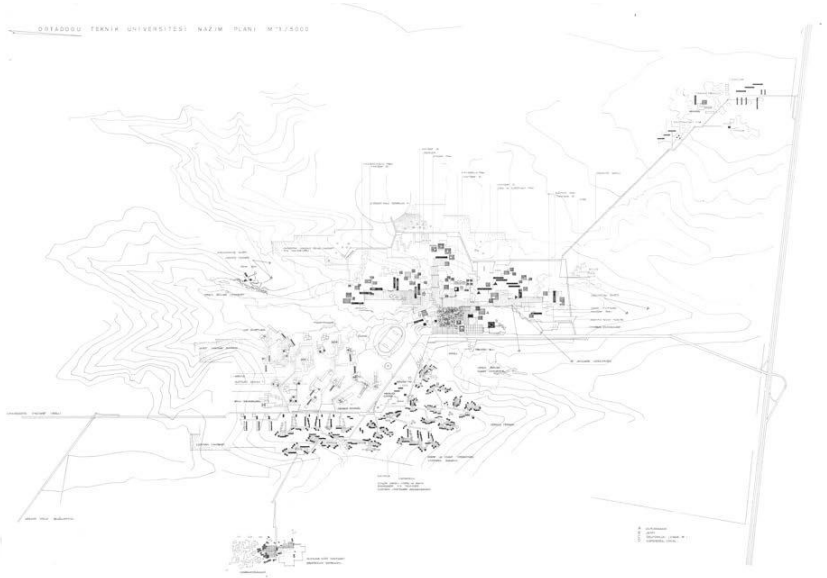


Figure 16. 1/5000 site plan of the METU Campus

The second drawing board submitted to the competition was also a site-plan, although it depicted the same site, it had a different scale of 1/2000. (Figure 17, Figure 18)

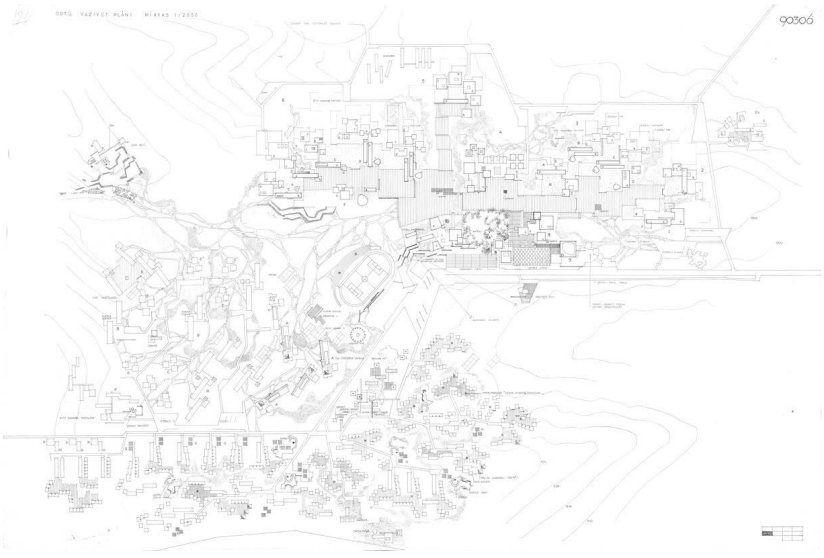


Figure 17. 1/2000 site plan of the METU Campus



Figure 18. 1/2000 site plan of the METU Campus cropped to focus on the pedestrian path.

In this site plan, *alle* is the focus. The buildings are not hatched, they are left as lines, on the other hand the pedestrian path is emphasized, it is hatched and is clearly readable as a collection of positive shapes with architectural masses positioned around it. Ultimately, *alle* is experience as a volumetric space, formed by enclosing masses.[46] This notion is reinforced by the aforementioned interview excerpt from Behruz Çinici.[47] From the drawings of the architects' it is possible to sthat ee the main pedestrian path, the *alle* was designed as a "positive space" and was a core design element from the very conception of the METU Campus.

Lastly, a significant aspect of the *alle* and the METU Campus is the use of greenery as enclosures. As stated before, the site that is now the METU Campus was "a barren Anatolian prairie"[48] before its transformation into a forest. The landscape was designed by the architects as well, thus they can be treated as architectural elements

[46] P. M. Condon, (1988). Cubist space, volumetric space, and landscape architecture. *Landscape Journal, 7(1),* 1-14.
[47] Salt Research, https://archives.saltresearch.org/handle/123456789/133?locale=tr, retrieved 23.07.2022
[48] Güven Arif Sargın & Ayşen Savaş (2013) 'A University is a society': an environmental history of the METU 'campus', The Journal of Architecture, 18:1, 79-106, DOI 10.1080/13602365.2012.751806

in this context. Rows of trees, bushes and greenery surrounding outdoor spaces play a key role as enclosures.

3.1.1 The Dimensions of Alle

It will also be beneficial to briefly illustrate the physical properties of the a*lle*. It reaches from the Administration Sciences Faculty Building on the north to Civil Engineering Faculty Buildings on the south for a total of about 1000 meters. (Figure 19, Figure 20)

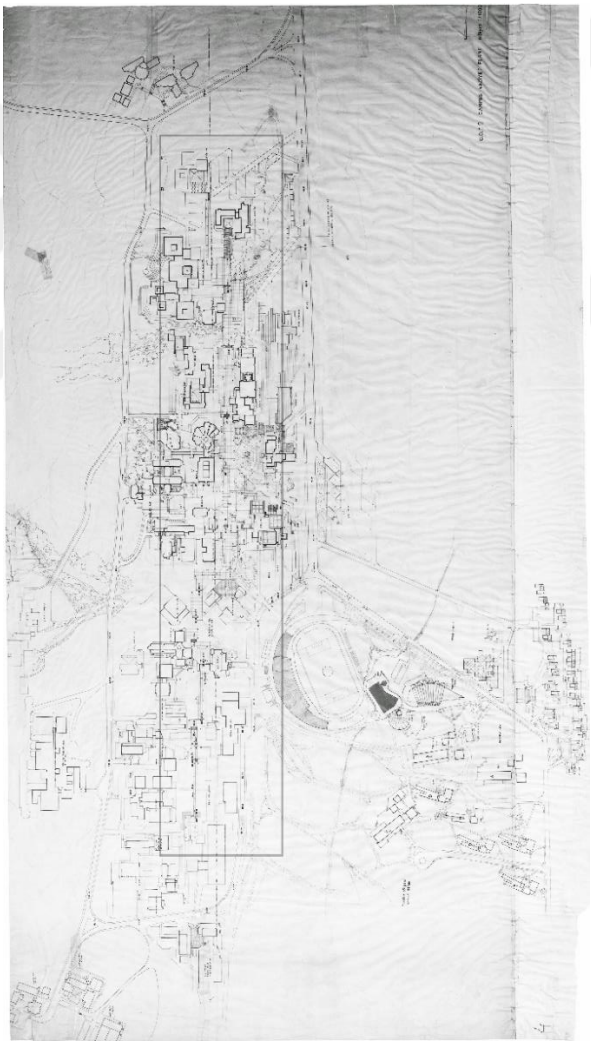


Figure 19. Campus site plan 1/1000

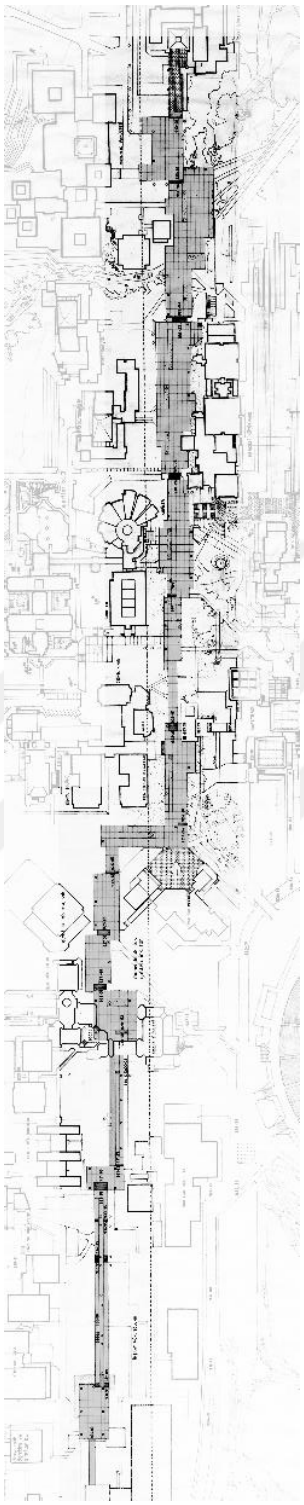


Figure 20. Site plan 1/1000, cropped, shaded to focus on the Alle



Figure 21. Site plan 1/500, cropped to focus on the alle segments near the Architecture Faculty Building

Alle is made out of flat segments divided by level changes, these segments are connected to each other with steps. There are 12 segments in total throughout the *alle*. Each step is 12 cm in height and 20 cm in length, and the number of steps between segments ranges from 2 to 11. Depending on the dimensions of the *alle* segment, commonly one or two buildings are connected to each *alle* segment. As a result, in the following case studies, often a single *alle* segment is the focus. (Figure 21)

Progressing into a smaller scale examination, *Alle* is made of rectangular tiles called "Ano" which are placed on a 600 to 340 cm grid. (Figure 22, Figure 23, Figure 24)

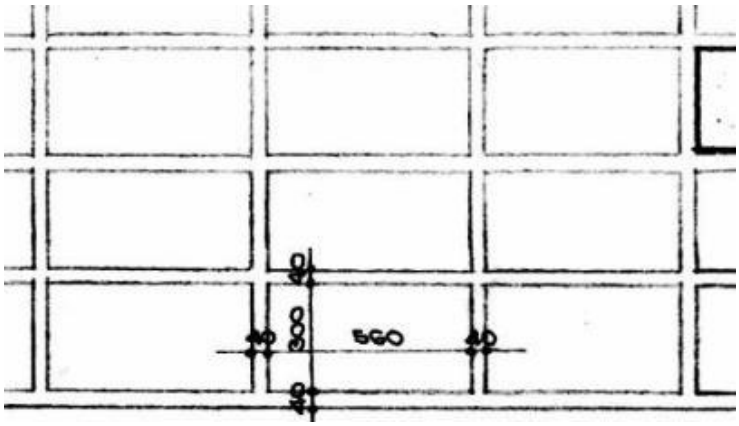


Figure 22. Ano Tile depiction in the Architecture Faculty site plan

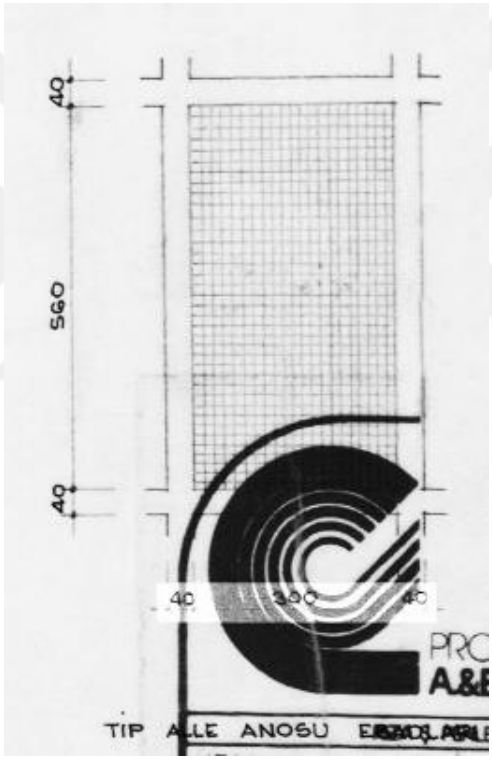


Figure 23. Ano Tile depiction in the Architecture Faculty site plan, unfortunately partially covered by architects' stamp



Figure 24. Photograph of an Ano Tile by the author

3.2 Case Studies

The selection and the documentation of these site studies started with an on-site examination of the *alle* with the objective of discovering examples of exterior volumes, mentioned as "positive shapes" by the architects.[49] Later, this observed visual condition is systematically verified by using the architects' original drawings. A primary concern was to be able to present the architects' original vision. Thus, original drawings by the architects were taken as primary references and were combined into a series of axonometric models. It is argued that axonometric models can provide a more "objective" presentation of original drawings while preserving the visual condition observed on the site research.[50] Primarily referring to the 1/500 site plans, a series of 3D models were digitally constructed. Subsequently, architectural elements implying enclosures were indicated with translucent surfaces on these axonometric models. Multiple enclosure readings were done on each of these axonometric models depicting a section of the a*lle*, focusing on different scales of enclosures, from the tall facades to rows of trees and slight level changes. Lastly, volumetric model counterparts are produced for each of these enclosure models, comparable to the initial research's translucent models.

In addition to the axonometric models, site plans of the buildings along the *alle* that were used for the construction of the models are merged into a single detailed site plan. The purpose of this unified site plan is practical. Often the areas depicted by the axonometric models are split into multiple site plans in the 1/500 plans which were impractical to read, and the 1/1000 and 1/2000 site plans left out details. Thus,

[49] Salt Research, https://archives.saltresearch.org/handle/123456789/133?locale=tr, retrieved 23.07.2022

[50] Yve-Alain Bois, "Metamorphosis of Axonometry," Daidalos: Berlin Architectural Journal, 1, 40–58, 1981.

the unified *alle* site plan was produced to better access fragmented information. (Figure *25*)

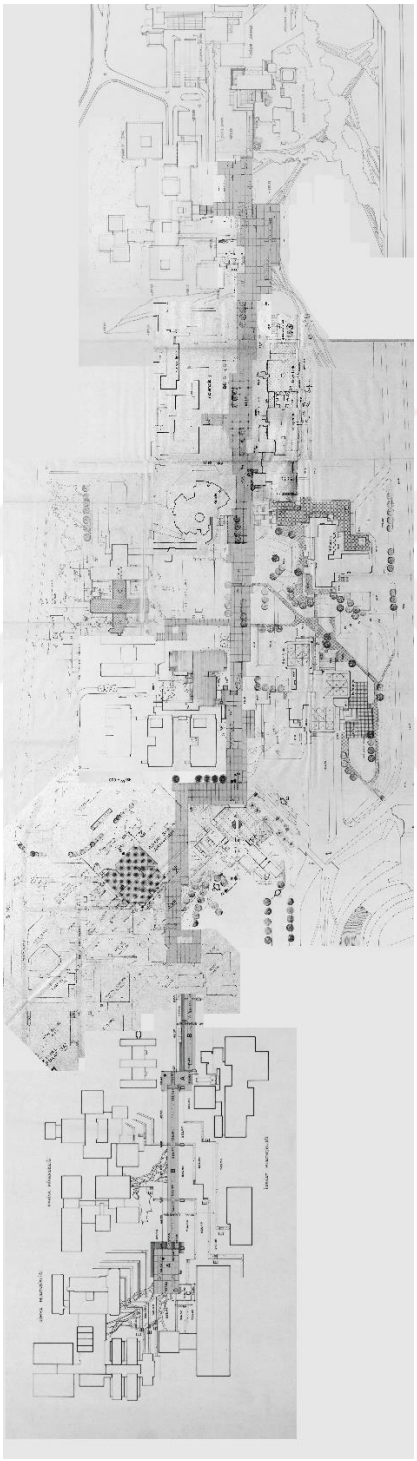


Figure 25. Merged site plan by the author

Seven sites throughout the *alle* were selected as case studies, they cover major entrances to faculty and administration buildings in the *alle*, reaching from the architecture faculty building to the electrical engineering buildings. The *alle* has a separate design at the southern part of the electrical engineering buildings where narrow stone roads are favored instead of an arrangement of ano tiles and rows of trees. The design of the *alle* between the architecture faculty and the electrical engineering faculty is thought to more clearly displaying the volumetric qualities of the campus, thus, it became the focus of the case studies. The selected sites are indicated on the merged site plan and each case study will begin by referring to it regarding its position. (Figure 26) However, the sequence the case studies are addressed does not follow the numerical order shown on the figure, rather they are approached starting from basic and progressing into more complex in terms of its enclosure arrangement. In this context, basic is understood as clearly readable enclosure arrangements, complex on the contrary is understood as more complicated enclosure arrangements and exceptions to design patterns that are present in other case studies. This progression from basic to complex is by no means a strictly measurable property and relies on subjective impressions, nonetheless it can serve as a guide for the presentation of the case studies.

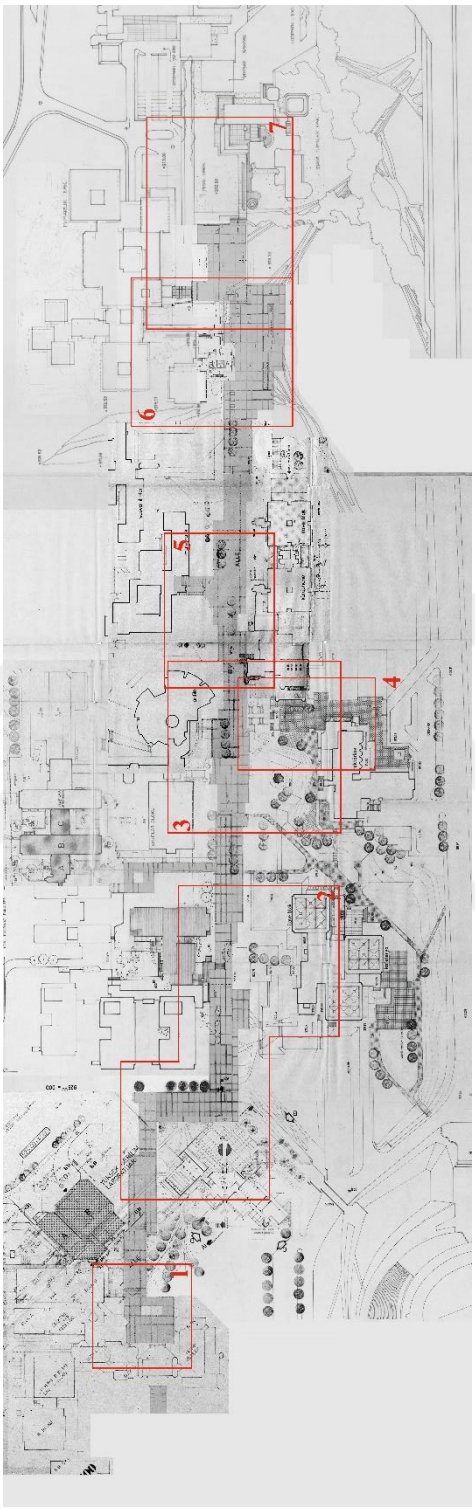


Figure 26. Merged site plan, case study areas indicated, cropped

Presentation of the case studies should be discussed in greater detail before moving forward. An approach mentioned in the introduction of the third chapter was the metaphor of brush strokes. It was explained as a process for categorizing enclosures and organizing the amount of detail displayed in each iteration of representative digital models. This thesis argues, the "form" a painter depicts in painting and the "volume" an architect defines can be assumed to be counterparts in the context of architectural representation. In order to depict "form," painter uses his brush to leave patches of color on canvas. As the painter arranges and organizes the brush strokes, they begin to be perceived together as a whole and generate the "form."[51] This process is argued to be comparable to how an architect first designs with "volume" and later arranges the architectural elements to imply "enclosures" to define these volumes. This study argues that, in the context of this research, it is possible to gain insight into how to present the architects' design process by observing painting processes.

A major aspect of the painting process is the scale of brush strokes. The painted form starts as blurry, emerging from large brush strokes, creating the general shape of the form. Later, as the scale of strokes get smaller and individual strokes become more numerous, a more detailed form emerges.

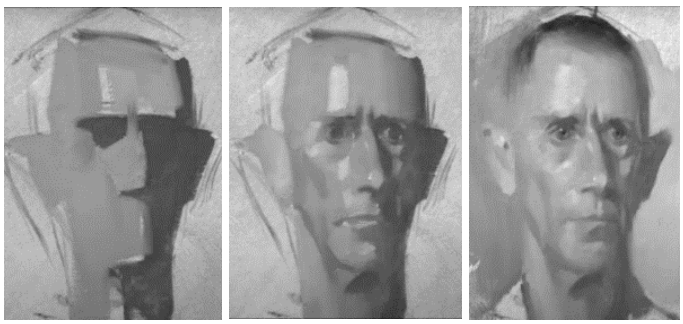


Figure 27. Painting progress at three instances, artist: Alex Tzavaras

[51]P. Crowther, (2012). The phenomenology of modern art: Exploding Deleuze, illuminating style (1st ed.). Continuum. pp. 12-78

This process observed in painting is interpreted to categorize the "enclosure" representations based on the scale of the volume they define. In practice, based on the amount of detail intended to be displayed, smaller scale architectural and landscape elements are omitted. This system is used to organize the detail displayed in representational models developed for these case studies.

In the case studies, architectural and landscape elements are divided into three categories in terms of scale; large, medium and small. The inspiration for this terminology comes from Rem Koolhaas' book, "S, M, L, XL." Architecture is complex, even described as chaotic. Organization according to rigid categories of scale is a tool to impose coherence into its presentation and not a comprehensive claim on the essence of architectural practice.[52] (Figure 28) Dividing the scale into three, rather than any other number, might seem arbitrary at first, however it has a justification. Although there are exceptions, each of these categories follows a pattern. The "large" category consists of architectural elements enclosing large volumes, often spanning across *alle* and between the facades of buildings surrounding it. This category includes, the *alle* as a ground surface, facades of the buildings or dense flora surrounding the *alle*. The second category, "medium" often consists of architectural elements that divide the aforementioned large scale volume into smaller volumes, such as rows of trees and raised platforms positioned on the *alle*. The "small" category consists of sculptural architectural elements which often defines the entrances of buildings, such as sculptural gates, slight level changes, pools and fountains. Description of these categories as "large", "medium" and "small" may be misleading, those terms do not describe the physical dimensions of the architectural (wall, window, roof, etc.) or landscape elements (platforms, steps,

[52] R. Koolhaas & B. Mau (1998). *S, M, L, XL: O.M.A*. Taschen.

retaining walls, etc.) that imply those enclosures, rather they describe the size of the volume which those enclosures define.

Visualization of this approach is attempted at the space between the library and rectorate buildings, indicated as area 4 on the merged site plan. (Figure 26, Figure 28) A “literal model” of this site is manipulated to omit smaller scale architectural and landscape elements and then progressively reveal them. Next to it “enclosure model” counterpart of these models is displayed. Starting with large scale architectural elements; between the facade of the library, facade of the rectorate building, dense vegetation and the *alle*, a large scale volume is defined. Medium scale architectural elements; raised platforms and rows of trees divide the large volume. Lastly, small scale architecture elements; slight level changes, retaining walls, pools, material changes and other minor interventions around the entrances of the buildings and *alle* staircase are placed to create the final arrangement.

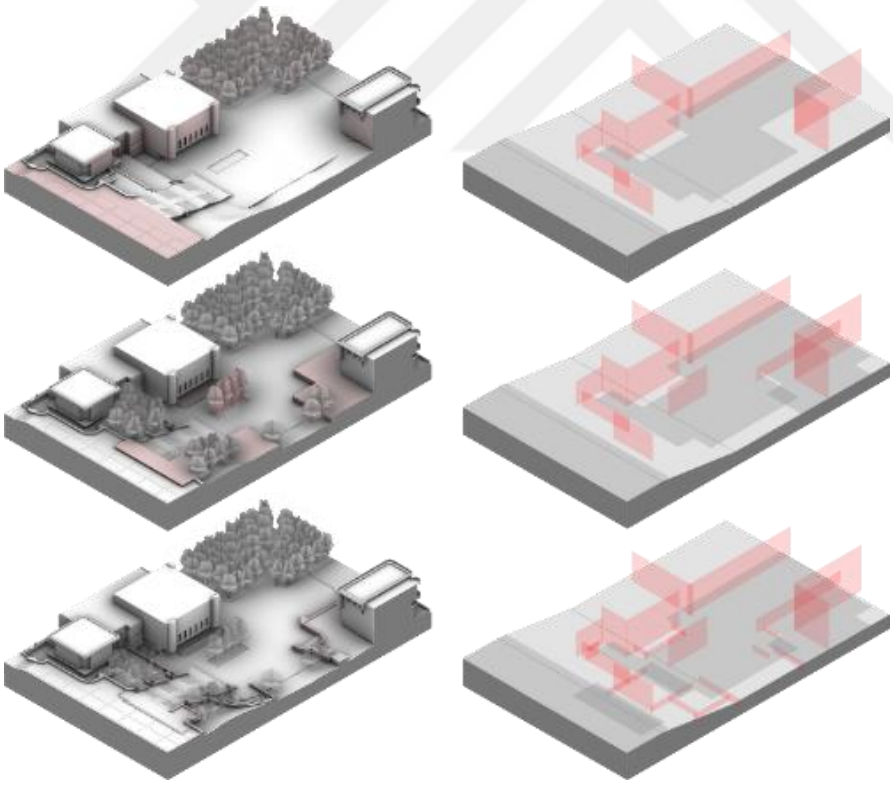


Figure 28. Elements are placed at progresively smaller scales,
3D Model by the author and Uzay Doğan

Lastly, another aspect that should be discussed here is the orientation of the axonometric models. Although the initial intention was to view each model from a fixed direction, it was discovered to be impractical in terms of readability as larger architectural elements often obscured smaller ones in these models. Thus the orientation was decided in a case-by-case basis while presenting the axonometric models. (Figure 29)

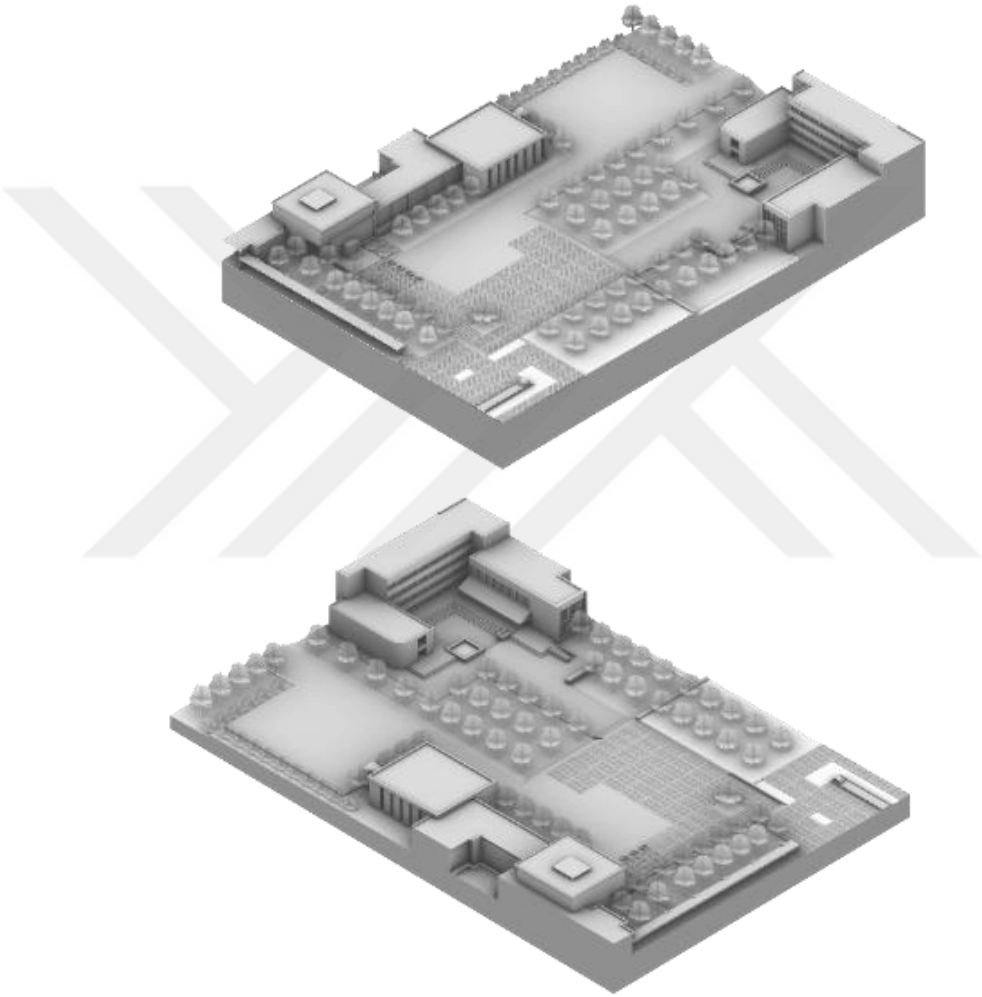


Figure 29. Example of different orientations, the elaborate entrance of the administration sciences faculty building is partially obscured in the upper image unlike the bottom image

3.2.1 The Library, Alle and The Mathematics Faculty Building

This part is indicated as number 5 in the unified site plan. (Figure 26) A focused partial site plan and the axonometric model depicting the indicated area can be seen in following figures. (Figure 30, Figure 31)

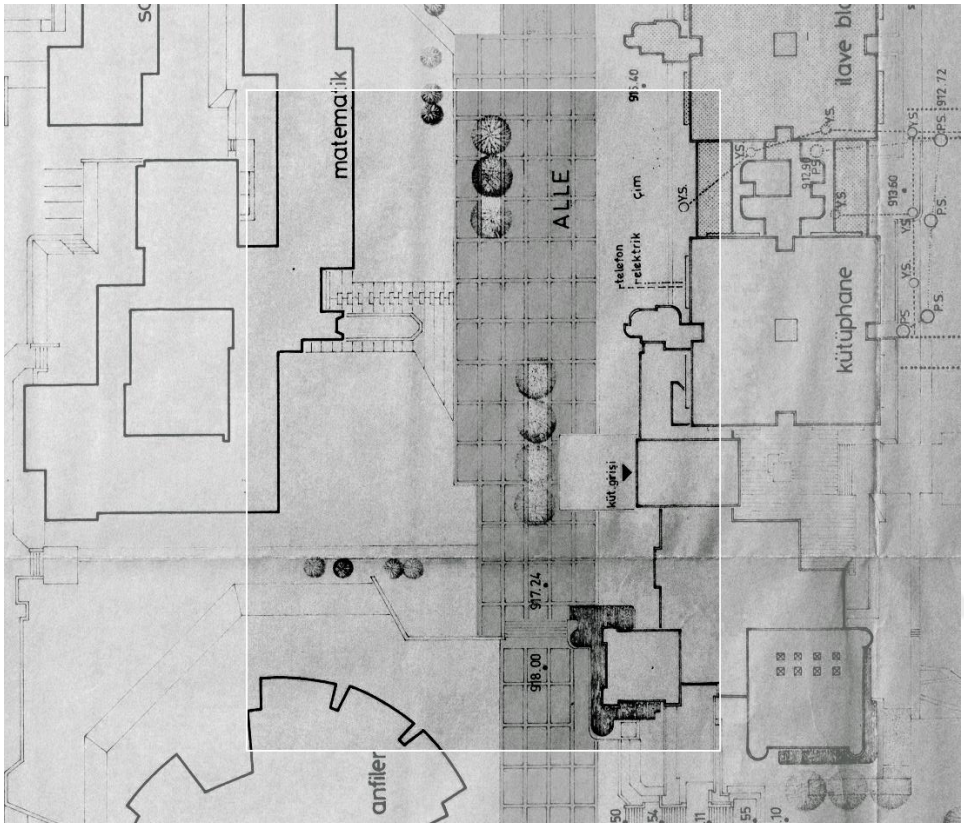


Figure 30. Partial site plan focusing on the Library, Alle and Mathematics Faculty Building

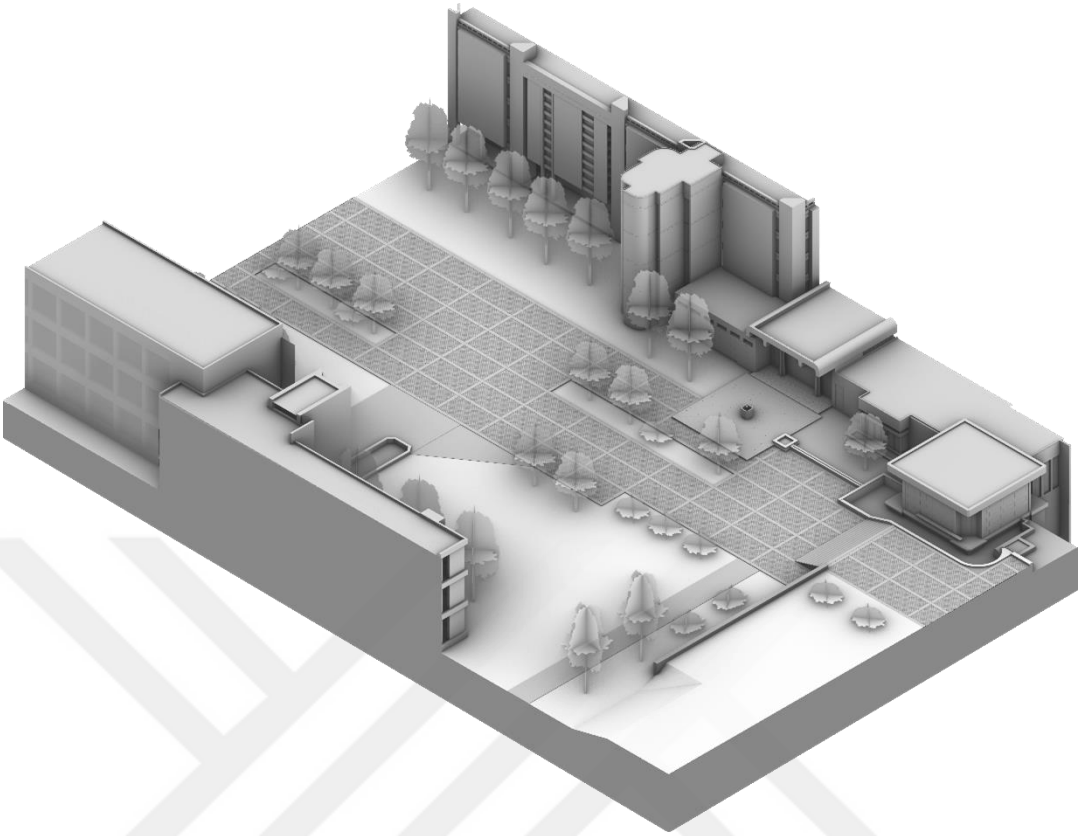


Figure 31. Axonometric model of the Library, Alle and Mathematics Faculty Building by the author and Uzay Doğan with contributions from Ibrahim Ekici



Figure 32. Photograph of the Library, Alle and Mathematics Faculty Building

In these figures, large scale enclosures are indicated. The vertical enclosures surrounding the major horizontal enclosure are indicated in red translucent surfaces. They consist of facades of the buildings with the exception of a retaining wall supporting a significant level change. All of these enclosures together define a series of large interconnected volumes. A simplified interpretation of this model is also presented, displaying only the abstraction of these enclosures on a flat ground plane. (Figure 33, Figure 34)

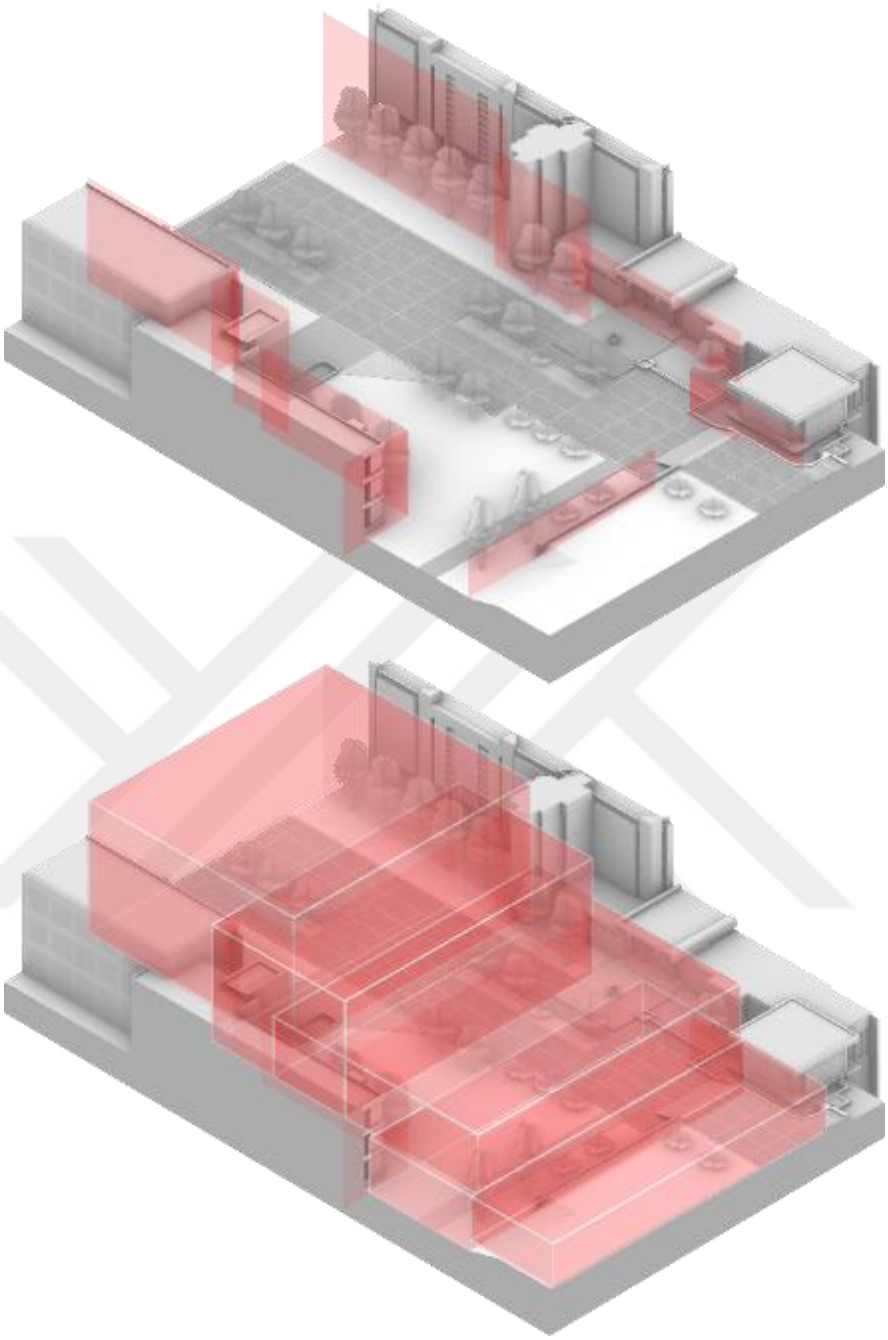


Figure 33. Axonometric model of the Library, Alle and Mathematics Faculty Building, displaying large scale enclosures and their volume counterparts, produced by the author

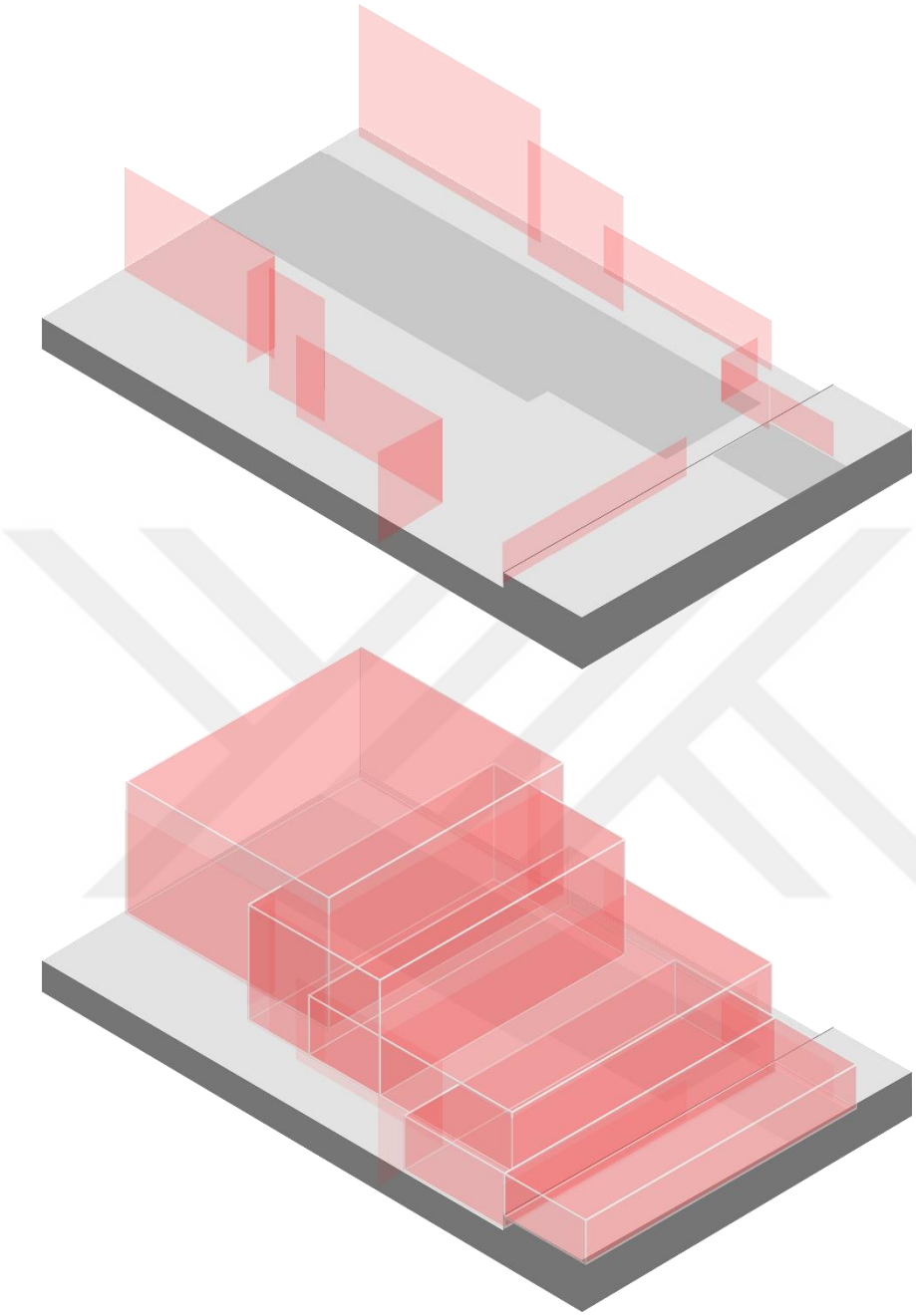


Figure 34. Axonometric model of the Library, Alle and Mathematics Faculty Building, displaying large scale enclosures and their volume counterparts, produced by the author

The next figures show the medium scale enclosures in addition to large scale enclosures. Medium scale horizontal enclosures are the raised platform at the Library

main entrance and the platform leading to Mathematics Faculty Building entrance. Vertical enclosures are the rows of trees situated parallel to the *alle*, dividing the single volume defined by large enclosures into smaller volumes. (Figure 35, Figure 36)

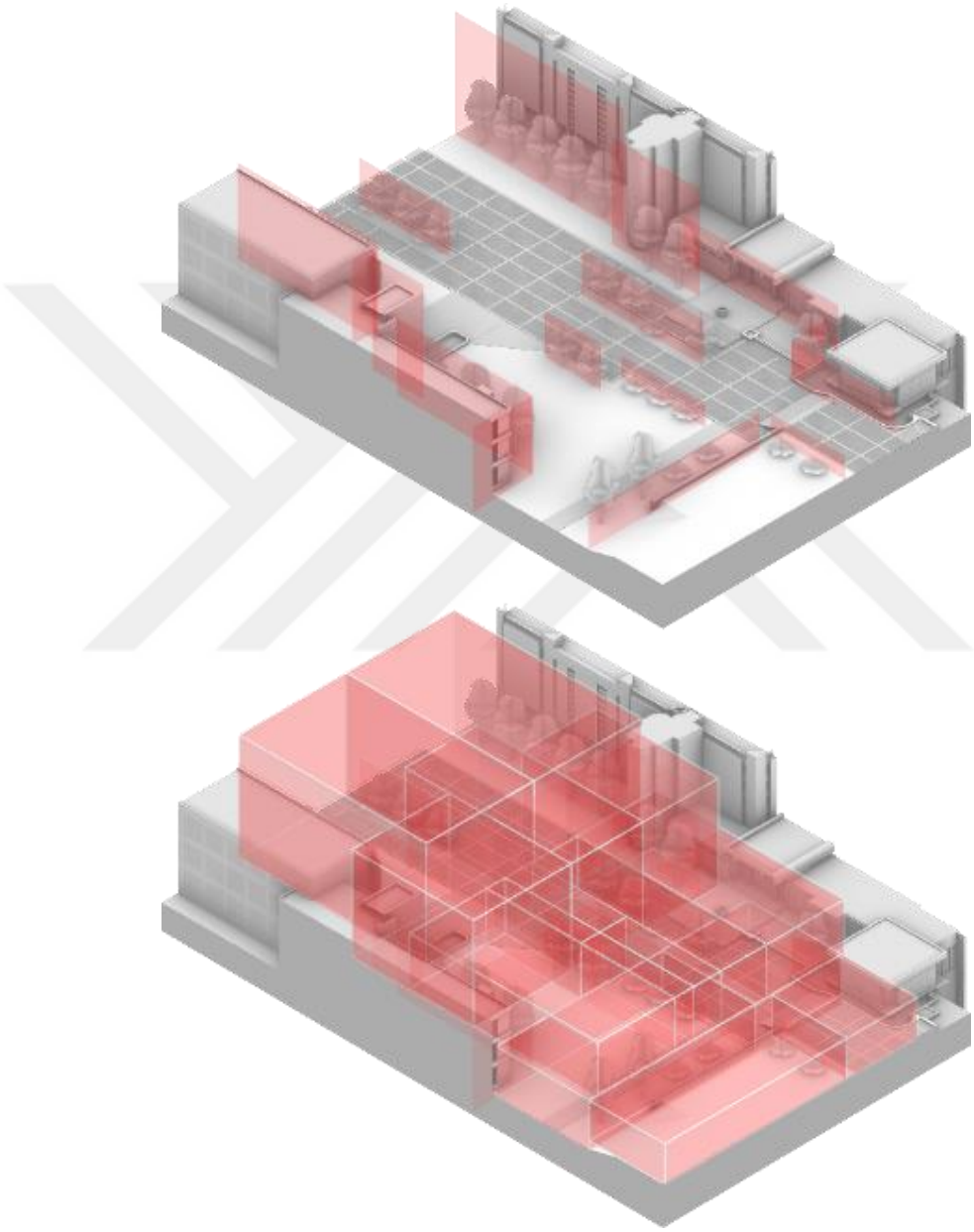


Figure 35. Axonometric model of the Library, Alle and Mathematics Faculty Building, displaying large and medium scale enclosures and their volume counterparts, produced by the author

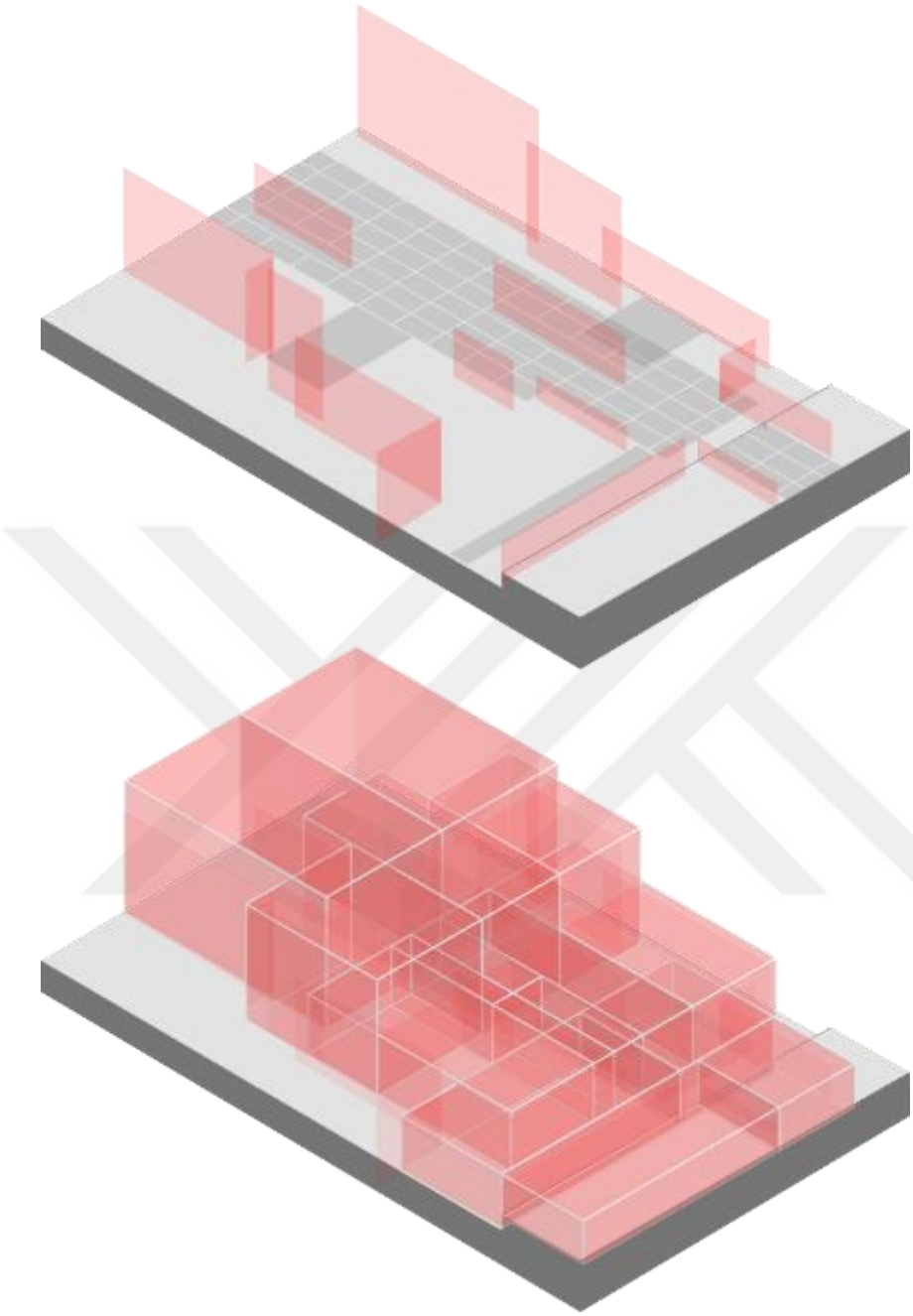


Figure 36. Axonometric model of the Library, Alle and Mathematics Faculty Building, displaying large and medium scale enclosures and their volume counterparts, produced by the author

The last two figures show the small-scale enclosures in addition to the others. These enclosures are the sculptural entrances of the buildings as well as the pools and fountains leading to them. (Figure 37, Figure 38)

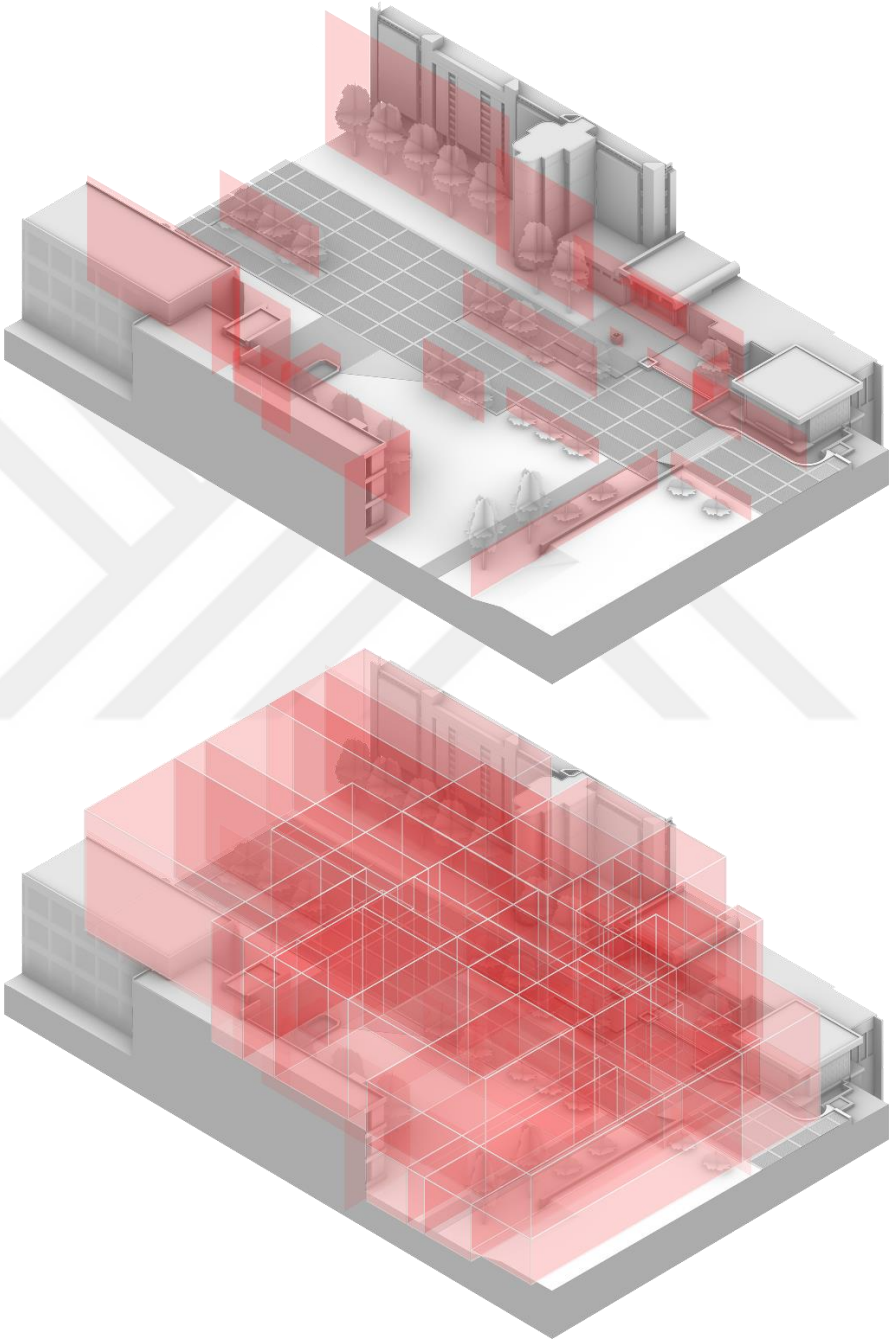


Figure 37. Axonometric model of the Library, Alle and Mathematics Faculty Building, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

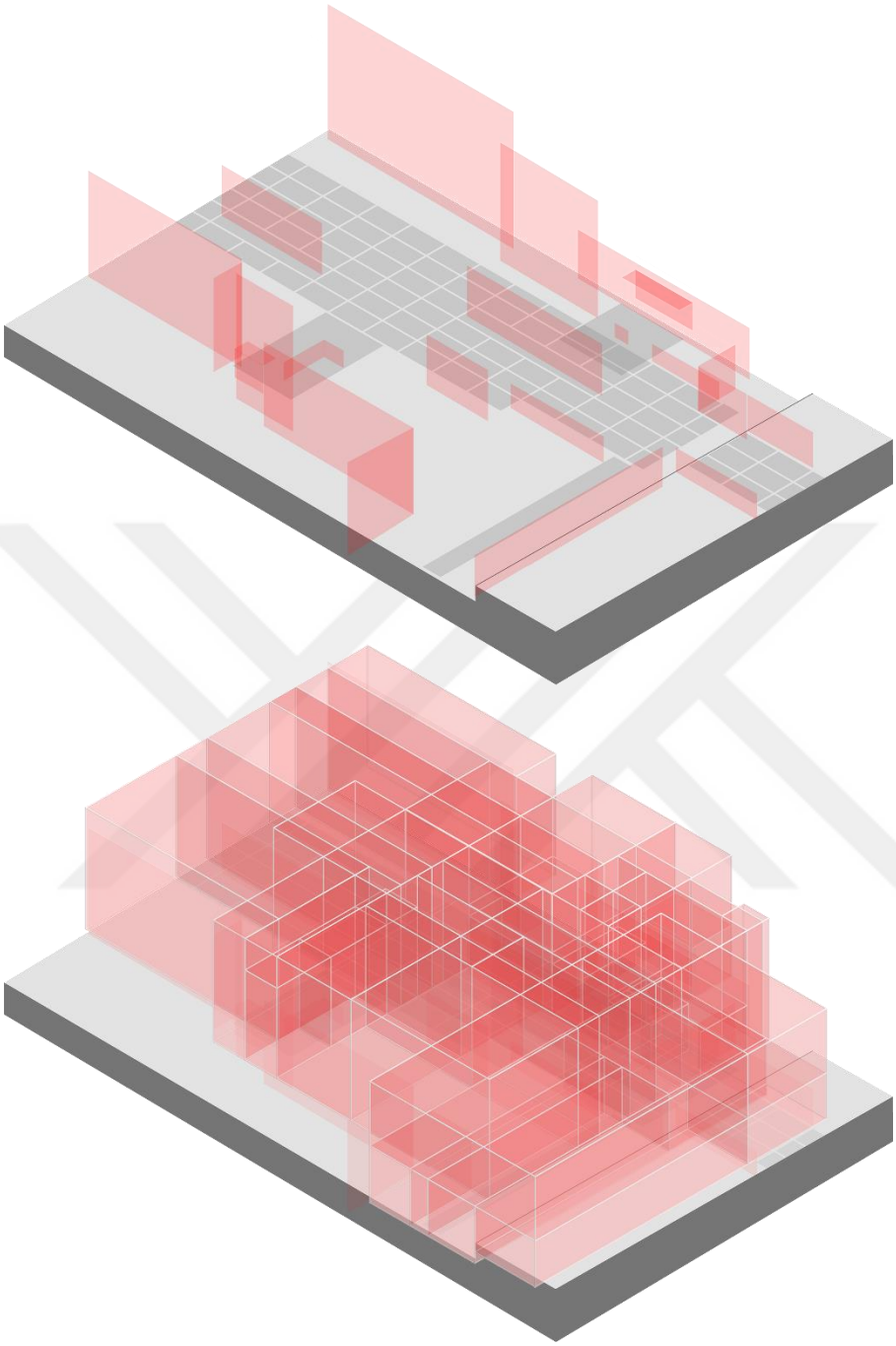


Figure 38. Axonometric model of the Library, Alle and Mathematics Faculty Building, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

3.2.2 The Electrical Engineering Faculty Buildings, Information Processing Department Building and The Alle

This part is indicated as number 1 in the unified site plan. (Figure 26) A focused partial site plan and the axonometric model depicting the indicated area can be seen in the following figures. (Figure 39, Figure 40)

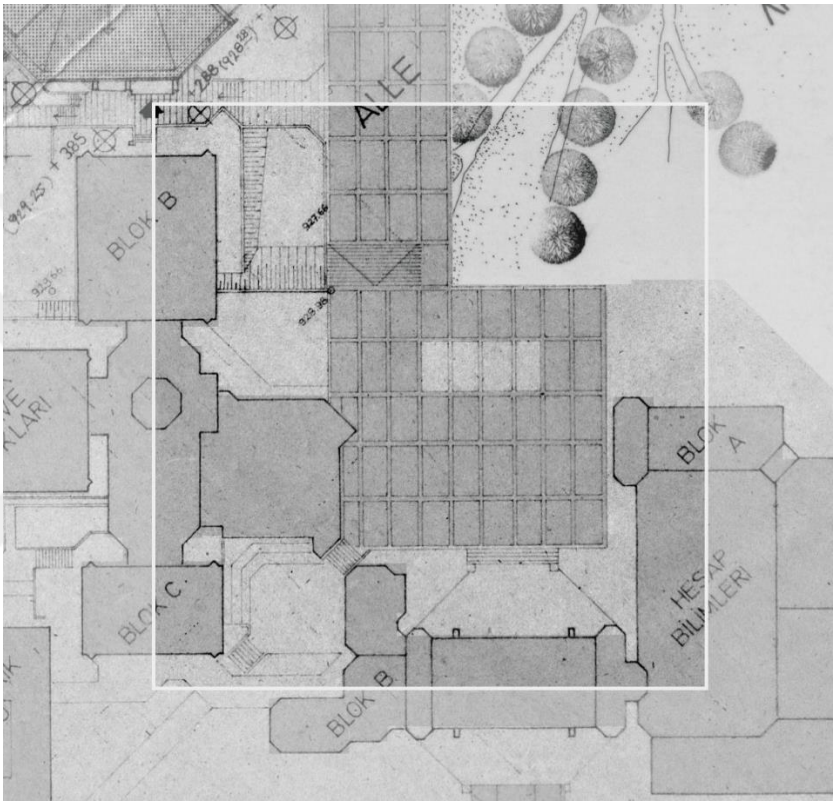


Figure 39. Partial site plan focusing on the Electrical Engineering Faculty Buildings, Information Processing Department Building and Alle

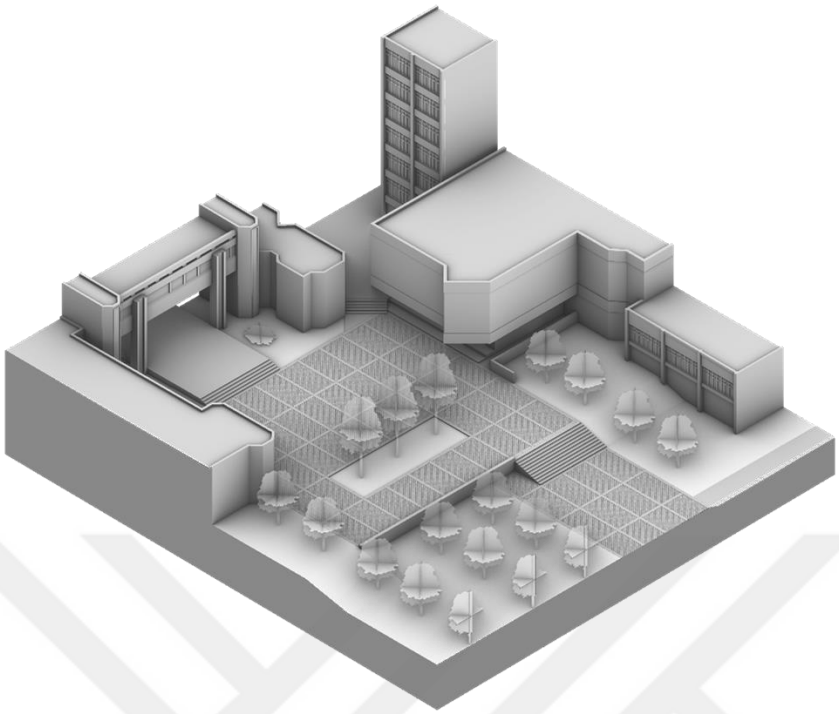


Figure 40. Axonometric model of the Electrical Engineering Faculty Buildings, Information Processing Department Building and Alle by the author



Figure 41. Photograph of the Electrical Engineering Faculty Buildings, Information Processing Department Building and Alle by the author



Figure 42. Photograph of the Electrical Engineering Faculty Buildings, Information Processing Department Building and Alle by the author

In these figures, large scale enclosures are indicated. The largest horizontal enclosure is the *alle* segment. The vertical enclosures surrounding the major horizontal enclosure, the *alle* segment, are indicated in red translucent surfaces. They consist of facades of the buildings, an area of dense vegetation and a retaining wall supporting a significant level change, illustrated below. (Figure 43, Figure 44)

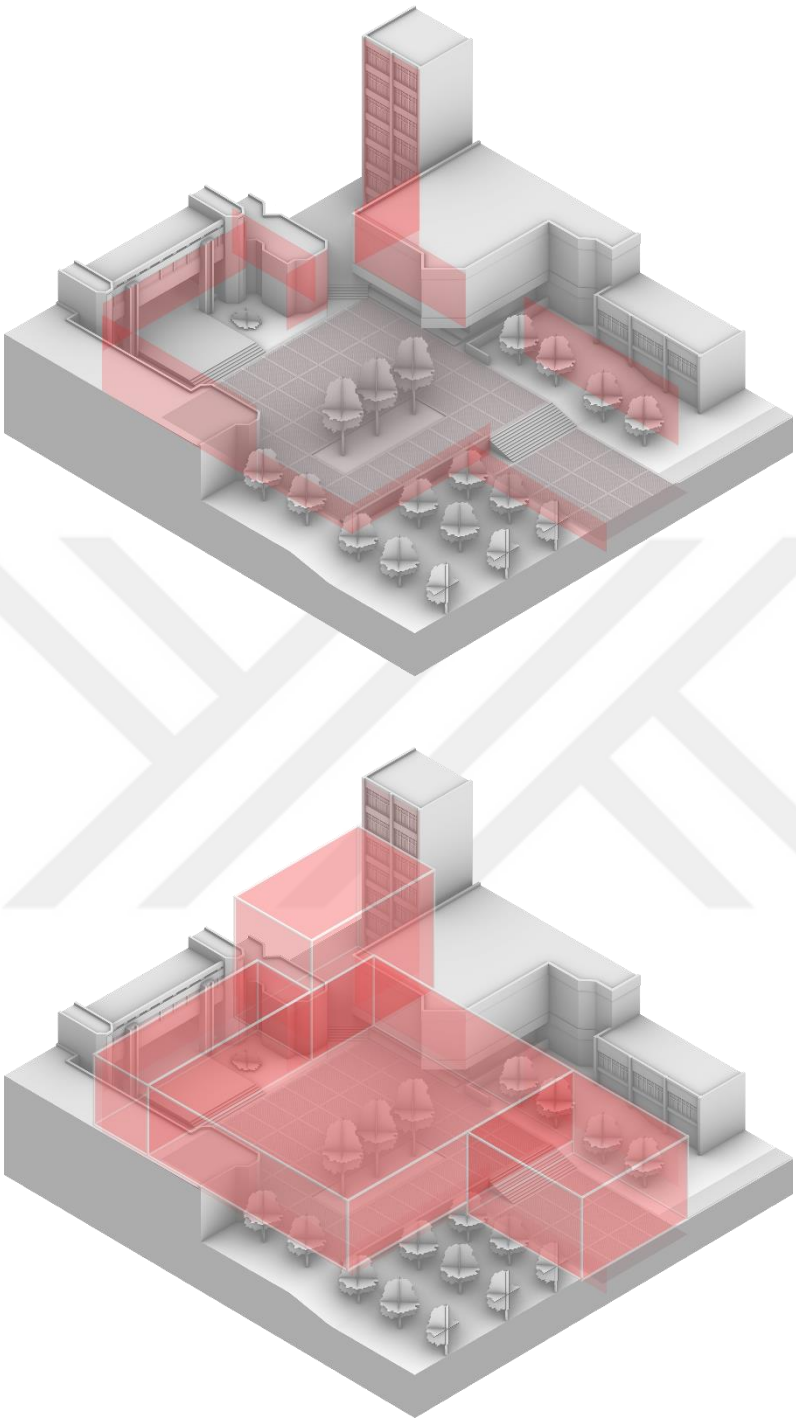


Figure 43. Axonometric model of the Electrical Engineering Faculty Buildings, Information Processing Department Building and Alle, displaying large scale enclosures and their volume counterparts, produced by the author

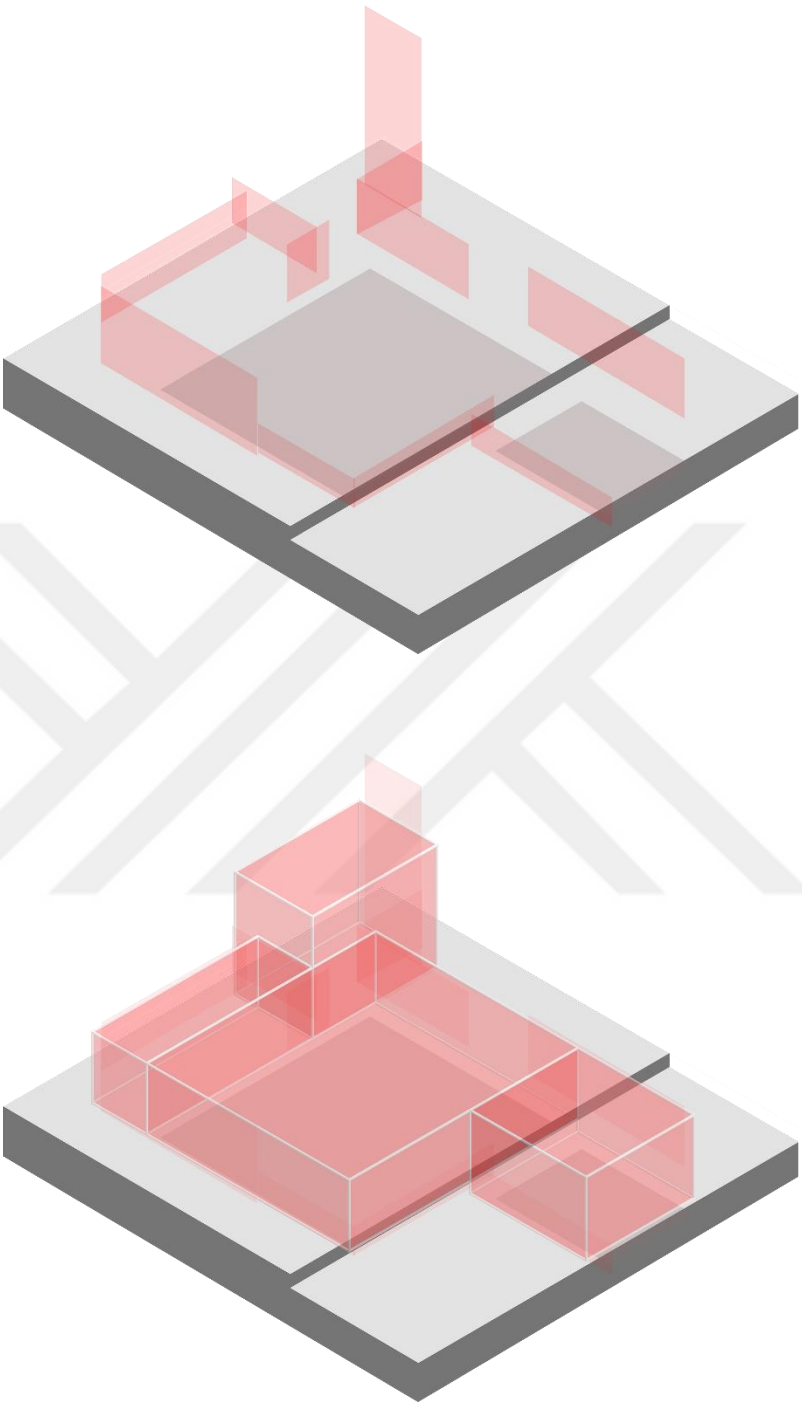


Figure 44. Axonometric model of the Electrical Engineering Faculty Buildings, Information Processing Department Building and Alle, displaying large scale enclosures and their volume counterparts, produced by the author

The next figures show the medium scale enclosures in addition to large scale enclosures. Medium scale horizontal enclosures are the raised platforms emerging from the *alle*. This section of the *alle* is unusual as it is the only bridge building on the campus, resulting in a unique enclosure arrangement that serves as the building's entrance. The most significant medium scale enclosure is the tall row of trees that divide the large scale volume into smaller ones, which is a crucial pattern of enclosure arrangement that consistently appears throughout the *alle*. (Figure 45, Figure 46)

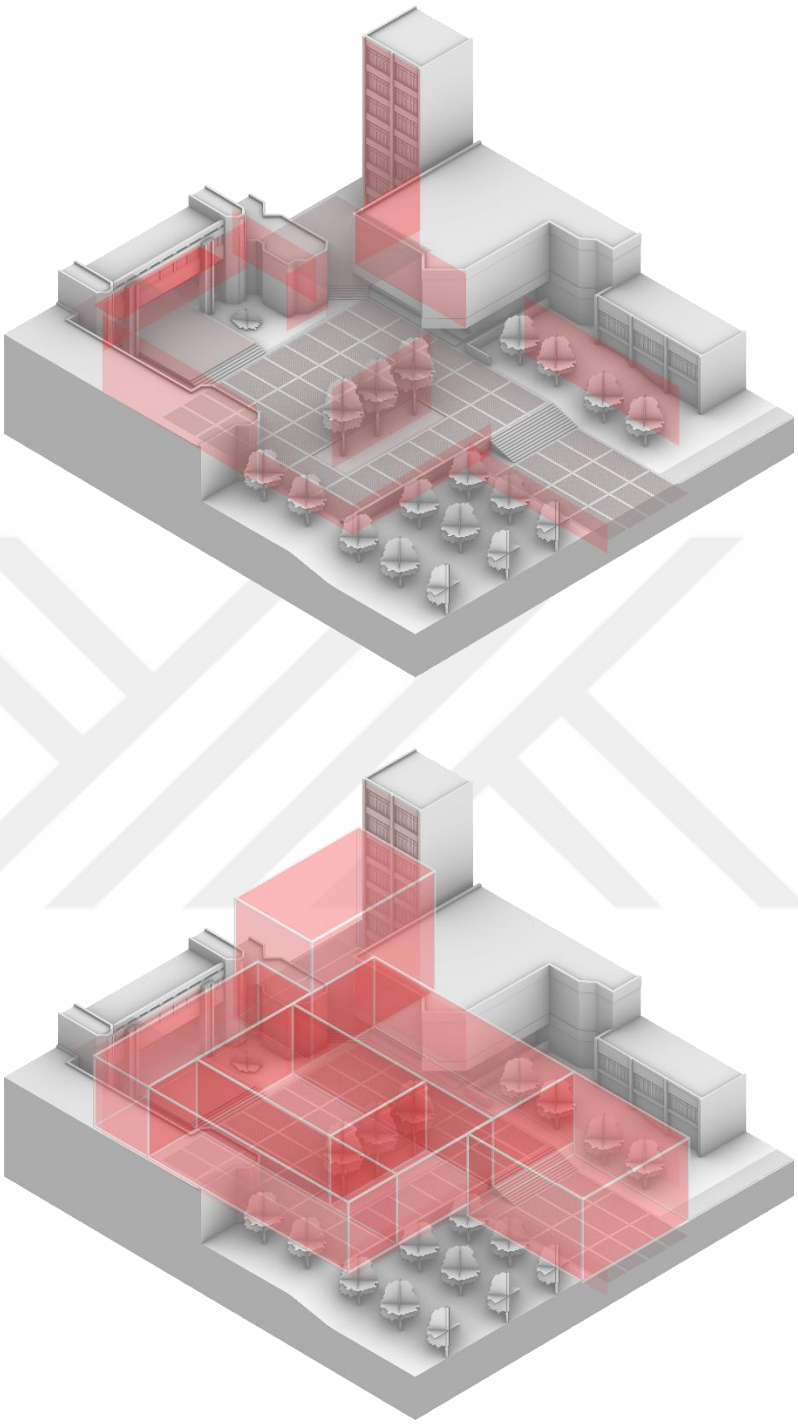


Figure 45. Axonometric model of the Electrical Engineering Faculty Buildings, Information Processing Department Building and Alle, displaying large and medium scale enclosures and their volume counterparts, produced by the author

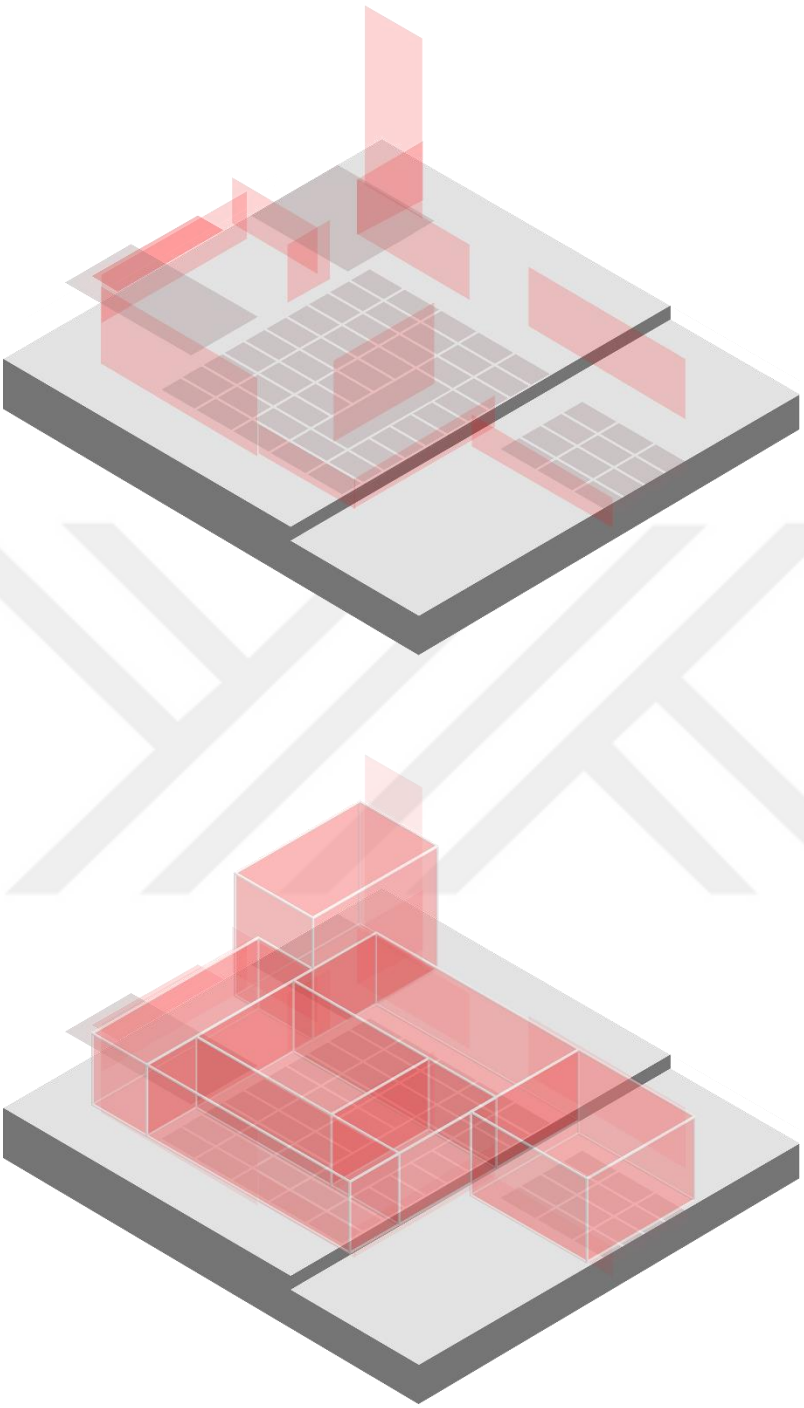


Figure 46. Axonometric model of the Electrical Engineering Faculty Buildings, Information Processing Department Building and Alle, displaying large and medium scale enclosures and their volume counterparts, produced by the author

The last two figures show the small scale enclosures in addition to others. These enclosures are arranged around the entrances of the buildings, defining smaller scale volumes. (Figure 47, Figure 48)

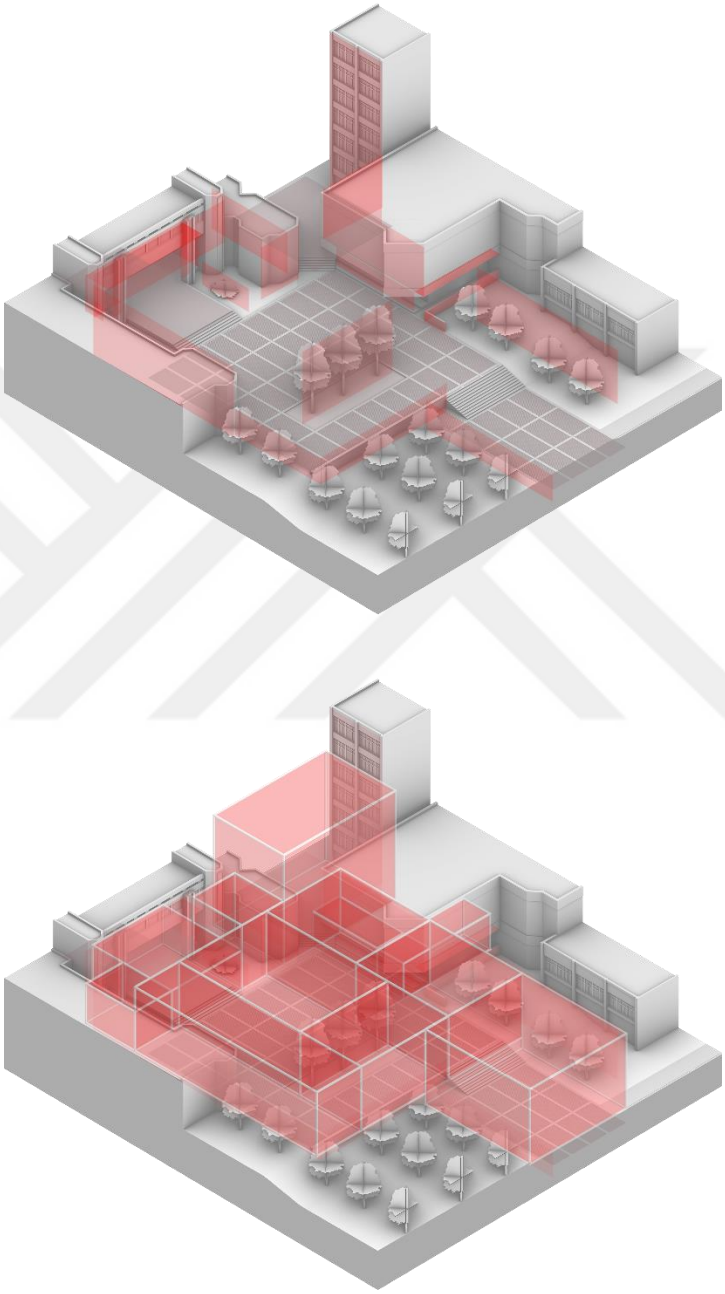


Figure 47. Axonometric model of the Electrical Engineering Faculty Buildings, Information Processing Department Building and Alle, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

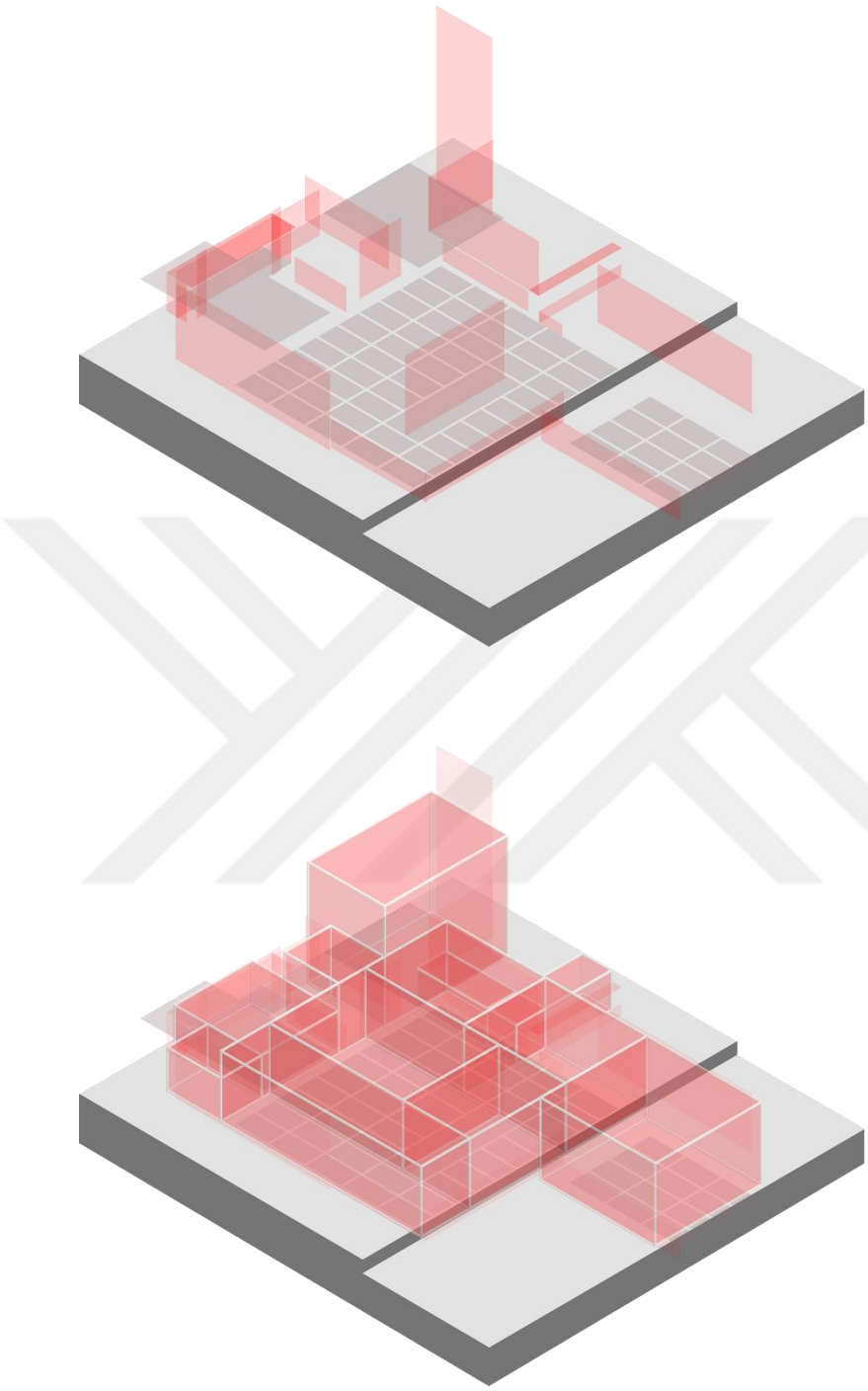


Figure 48. Axonometric model of the Electrical Engineering Faculty Buildings, Information Processing Department Building and Alle, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

3.2.3 The Refectory Building, Central Engineering Building, Chemistry Faculty Building and the Alle

This part is indicated as number 2 in the unified site plan. (Figure 26) A focused partial site plan and the axonometric model depicting the indicated area can be seen in the following figures. This case study depicts a larger area compared to the others, containing two segments of the *alle* and three buildings. (Figure 49, Figure 50)

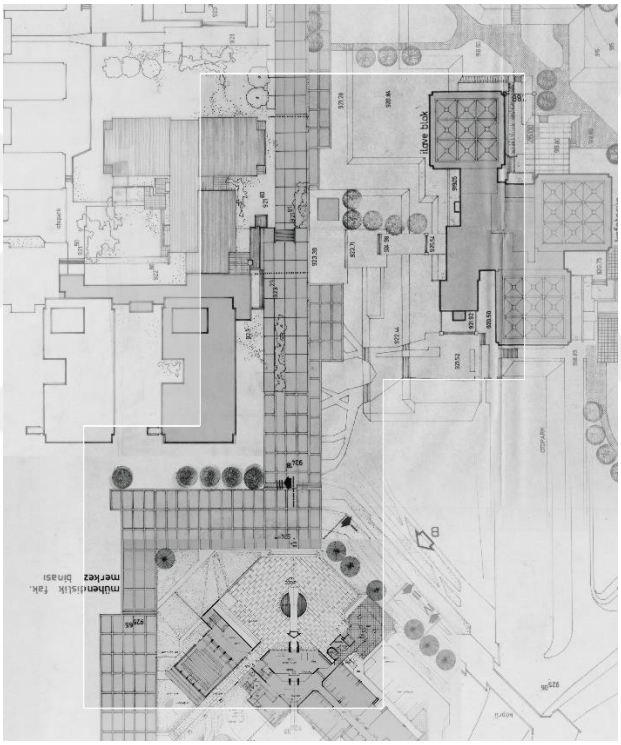


Figure 49. Partial site plan focusing on Refectory Building, Central Engineering Building, Chemistry Faculty Building and Alle

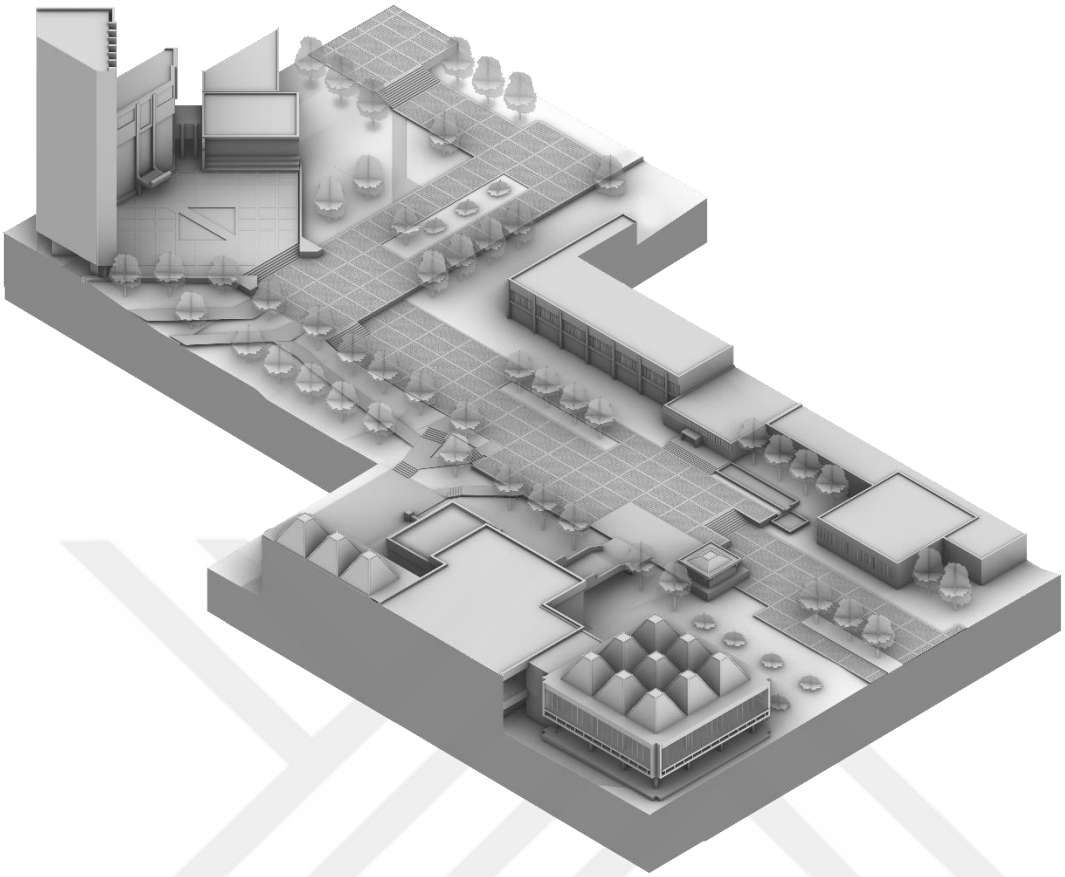


Figure 50. Axonometric model of the Refectory Building, Central Engineering Building, Chemistry Faculty Building and Alle by the author and Uzay Doğan, with contributions from Ibrahim Ekici



Figure 51. Photograph of Refectory Building, Central Engineering Building, Chemistry Faculty Building and Alle by the author



Figure 52. Photograph focusing onv Chemistry Faculty Building and Central Engineering Building the author



Figure 53. Photograph focusing on Central Engineering Building by the author

The largest horizontal enclosures are the *alle* segments. The vertical enclosures surrounding the major horizontal enclosures consist of facades of the buildings and rows of trees parallel to the facades. Unlike the former two case studies, level change

between the *alle* segments does not define a large-scale enclosure and the multiple segments of the *alle* are perceived as a single volume. (Figure 54, Figure 55)

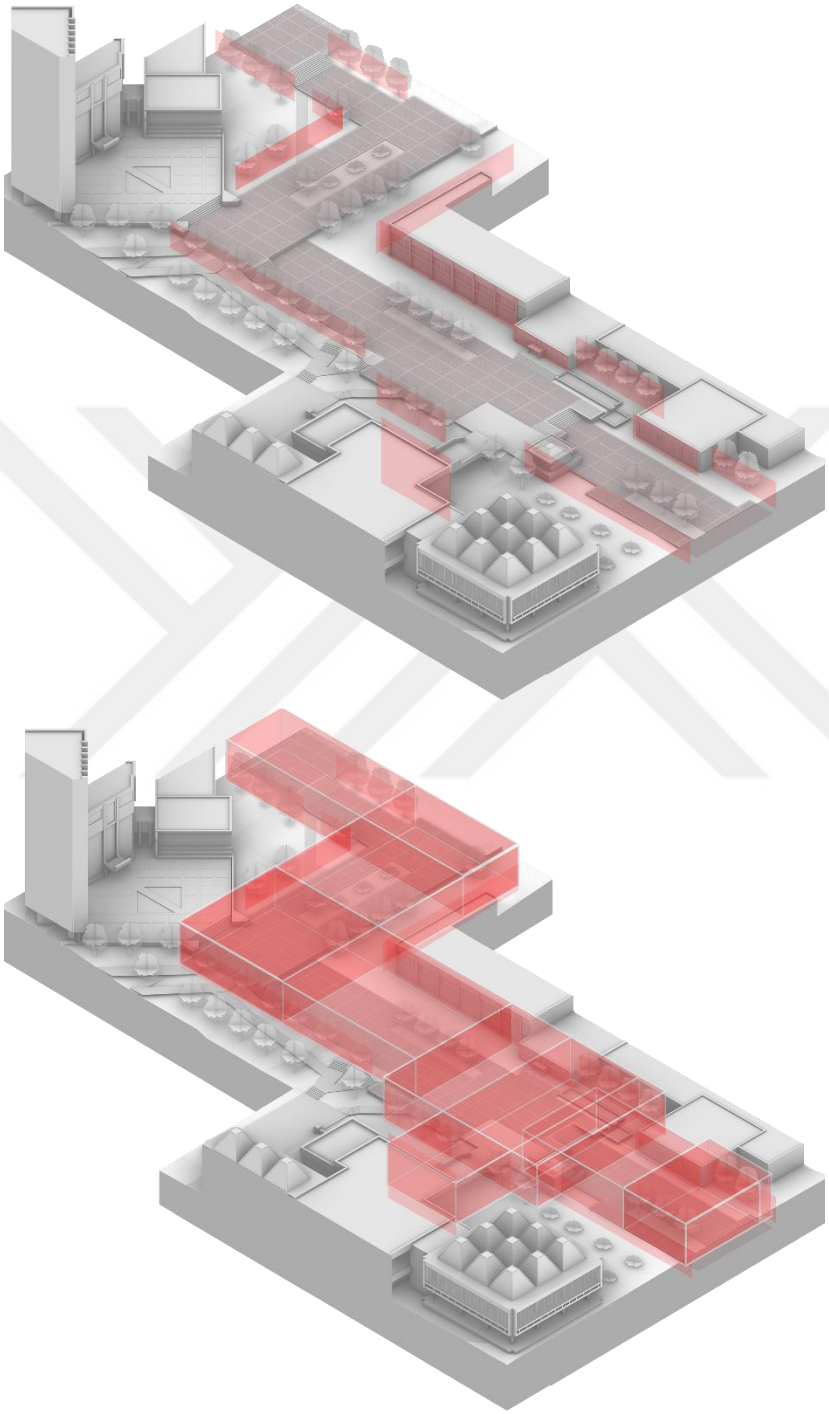


Figure 54. Axonometric model of the the Refectory Building, Central Engineering Building, Chemistry Faculty Building and Alle, displaying large scale enclosures and their volume counterparts, produced by the author

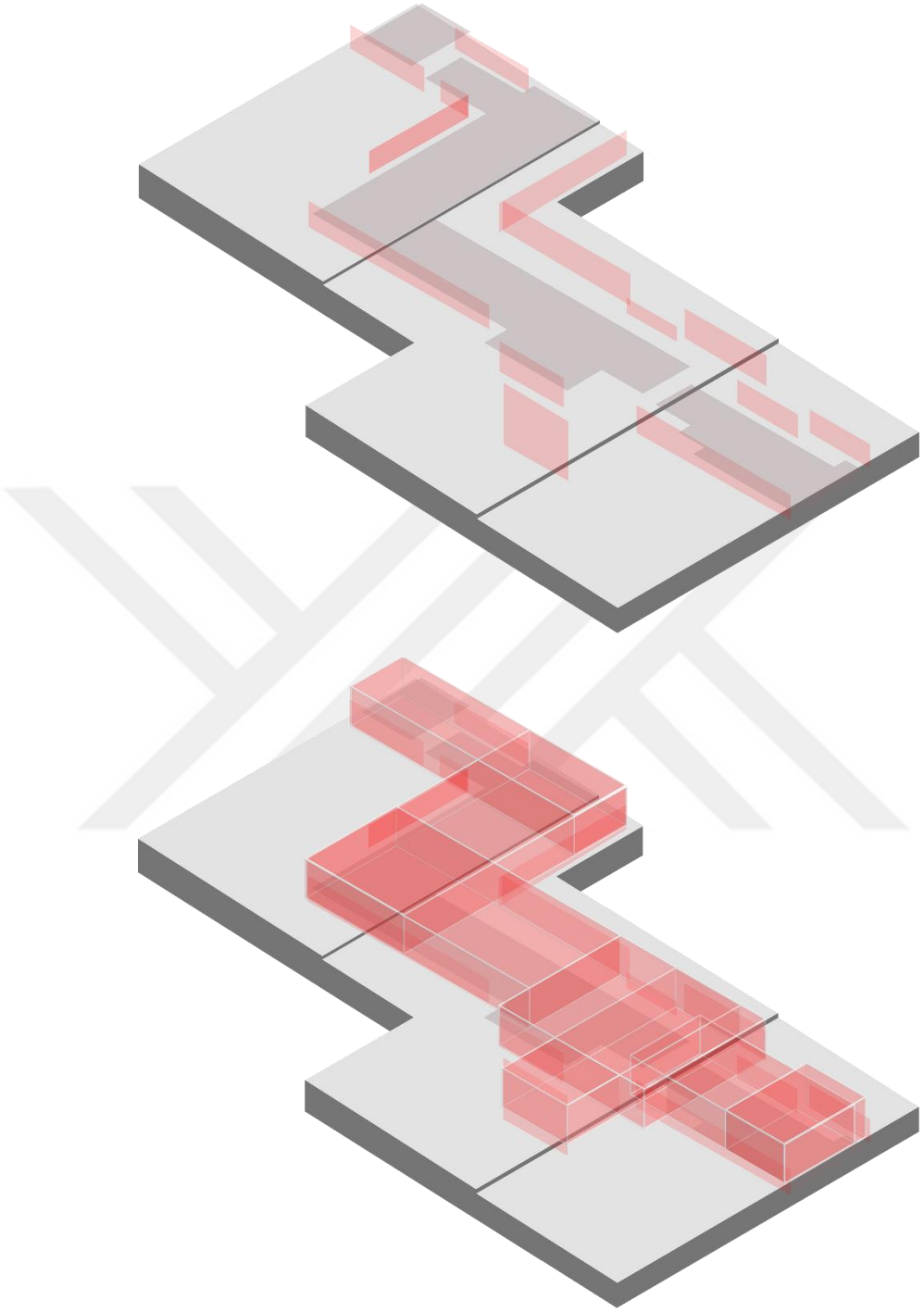


Figure 55. Axonometric model of the the Refectory Building, Central Engineering Building, Chemistry Faculty Building and Alle, displaying large scale enclosures and their volume counterparts, produced by the author

The next figures show the medium scale enclosures in addition to large-scale enclosures. Identical to former case studies, rows of trees divide the large-scale volume into smaller ones. An exception to the pattern is the entrance of the Central Engineering Building entrance which seemingly attaches itself to the *alle* as an autonomous arrangement of enclosures. The raised platform and three facades enclosing it define separate volumes, rather than detailing the existing large-scale volume. (Figure 56, Figure 57)

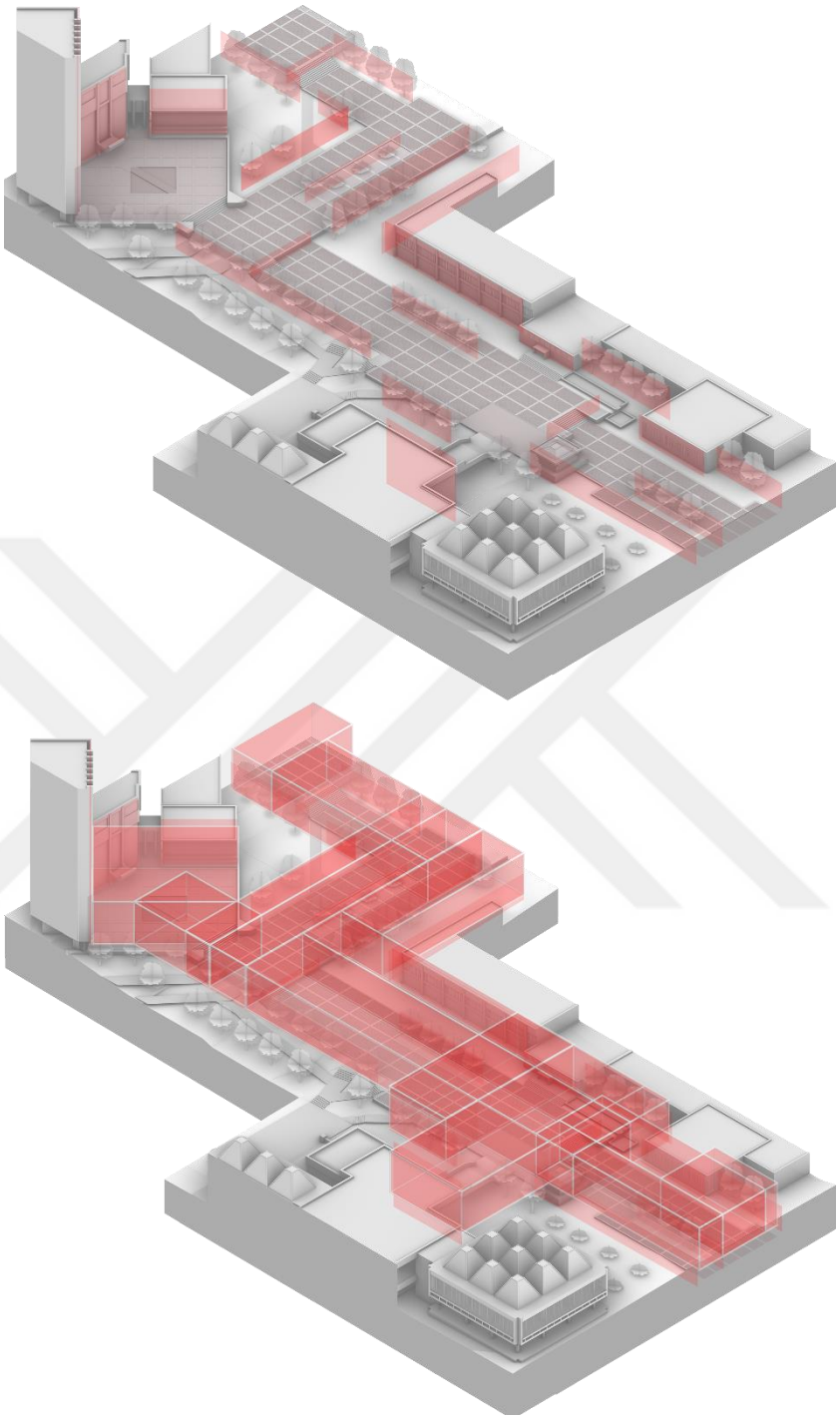


Figure 56. Axonometric model of the the Refectory Building, Central Engineering Building, Chemistry Faculty Building and Alle, displaying large and medium scale enclosures and their volume counterparts, produced by the author

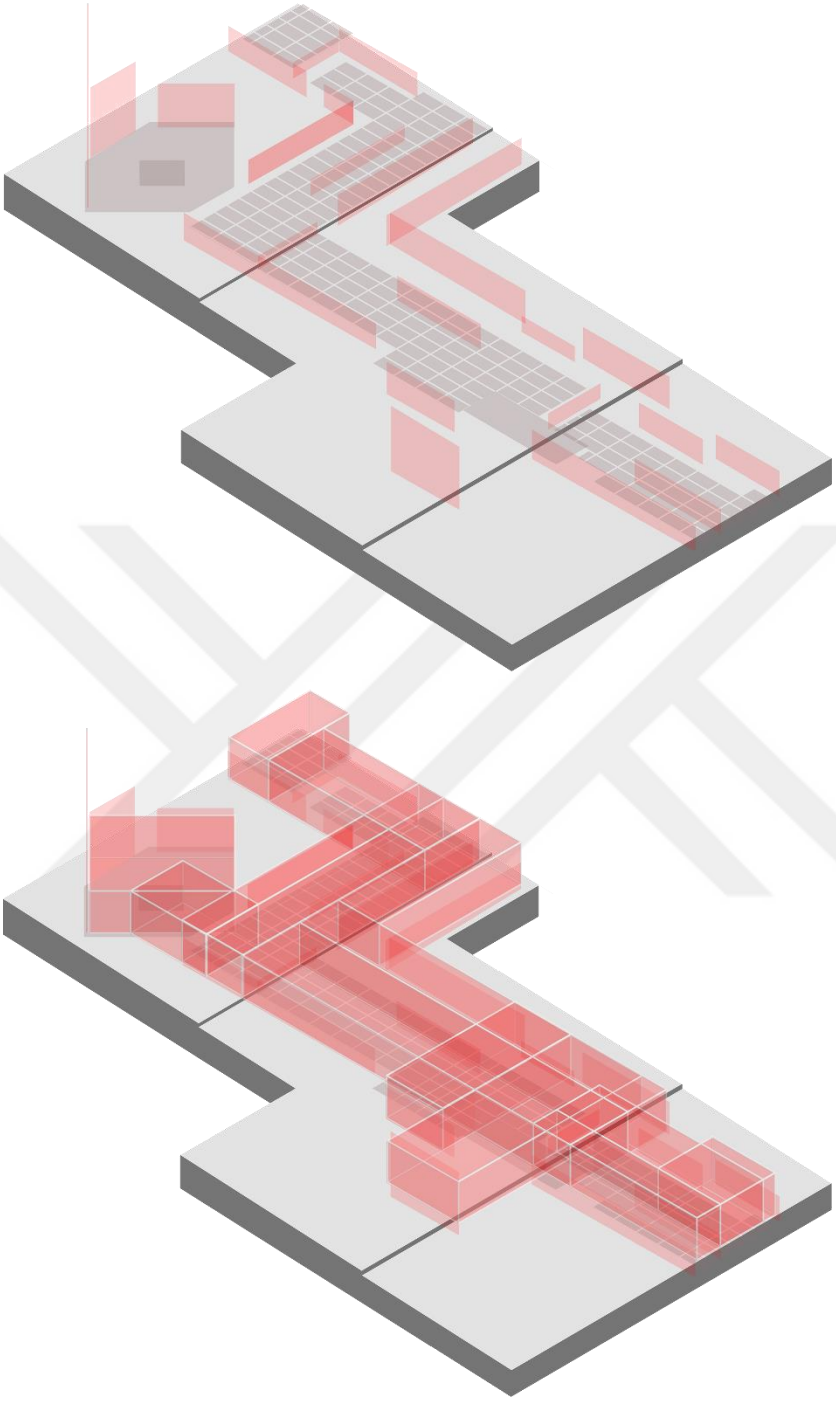


Figure 57. Axonometric model of the the Refectory Building, Central Engineering Building, Chemistry Faculty Building and Alle, displaying large and medium scale enclosures and their volume counterparts, produced by the author

The last two figures show the small scale enclosures in addition to others. These enclosures are arranged around the entrances of the buildings; raised platforms leading to the refectory building and chemistry faculty building entrance and the sculptural retaining walls surrounding the central engineering building raised platform as well as the sculptural entrance of the central engineering building. (Figure 58, Figure 59)

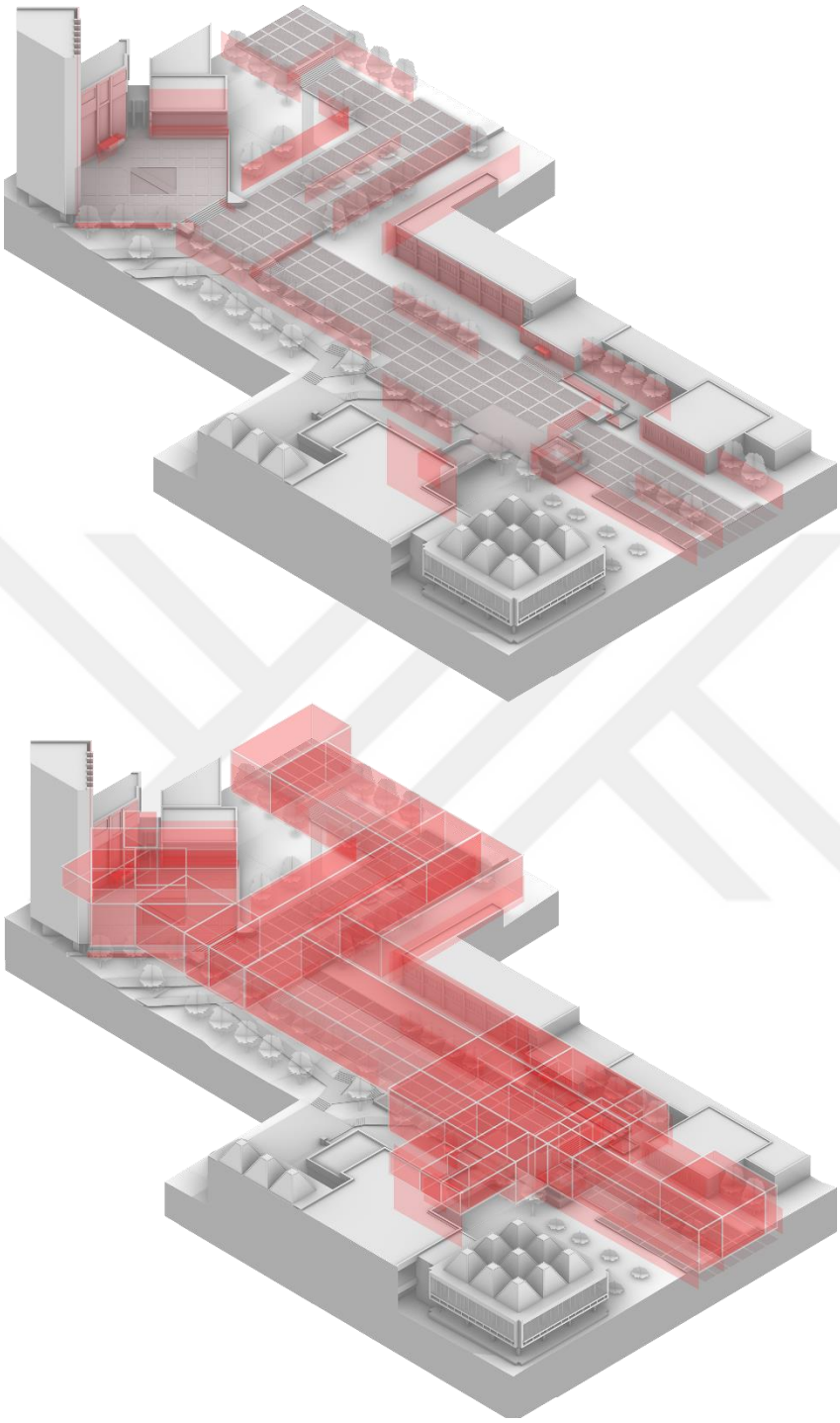


Figure 58. Axonometric model of the the Refectory Building, Central Engineering Building, Chemistry Faculty Building and Alle, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

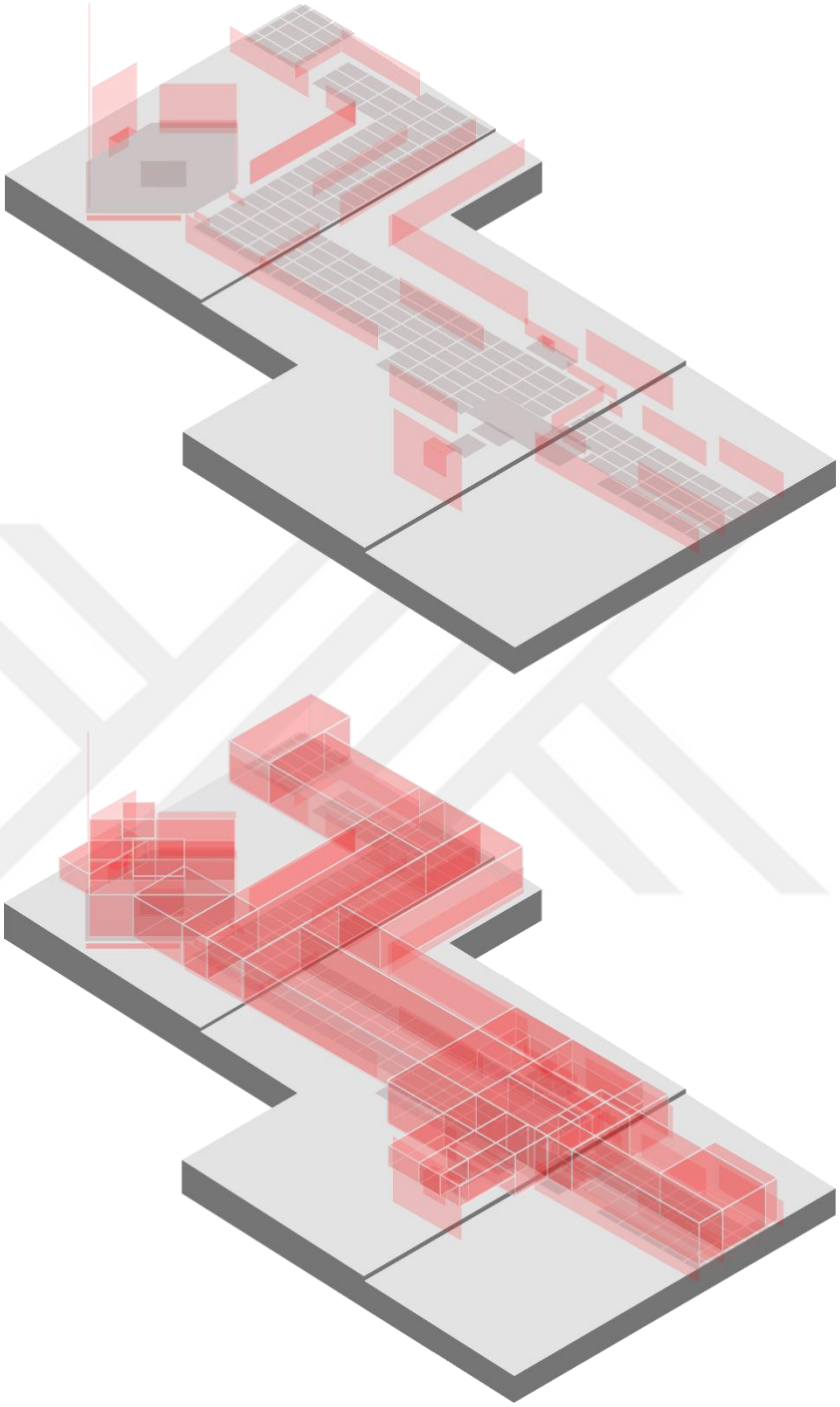


Figure 59. Axonometric model of the the Refectory Building, Central Engineering Building, Chemistry Faculty Building and Alle, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

3.2.4 The Physics Faculty Building and the Alle

This part is indicated as number 3 in the unified site plan. (Figure 26) A focused partial site plan and the axonometric model depicting the indicated area can be seen in the following figures.(Figure 60, Figure 61) This case study depicts a larger area compared to the others, extending well beyond the *alle*.

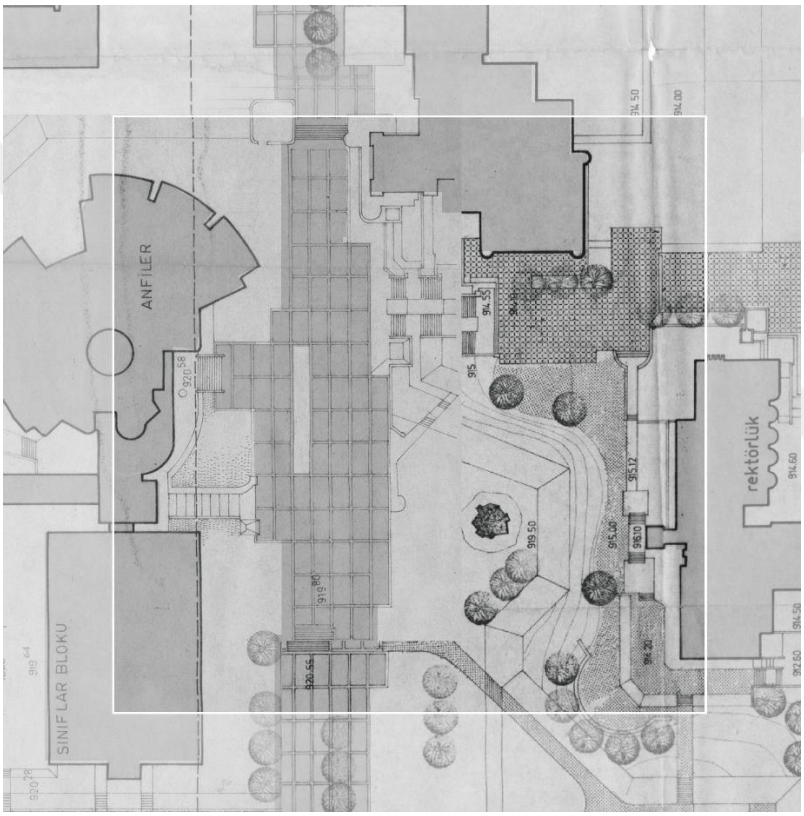


Figure 60. Partial site plan focusing on the Physics Faculty Building and Alle

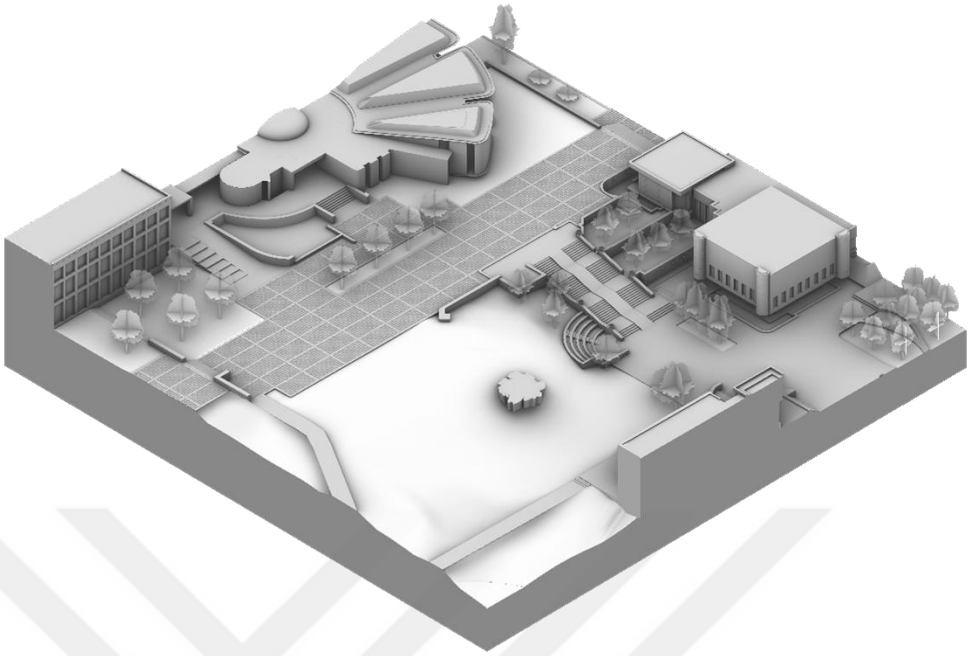


Figure 61. Axonometric model of the Physics Faculty Building and Alle by the author, with contributions from Ömer Faruk Ağırsoy



Figure 62. Photograph taken positioned from Physics Faculty Building entrance to the Rectorate Building by the author



Figure 63. Photograph taken positioned from the stairs leading to Rectorate Building

This case study explores an exception to the pattern, in other studies, the *alle* is enveloped by enclosures closely following the border of the *alle*. However, in this case, a large open area is present adjacent to the *alle* with very little architectural intervention. Another unusual arrangement is the stairs connecting the two large horizontal surfaces. (Figure 64, Figure 65)

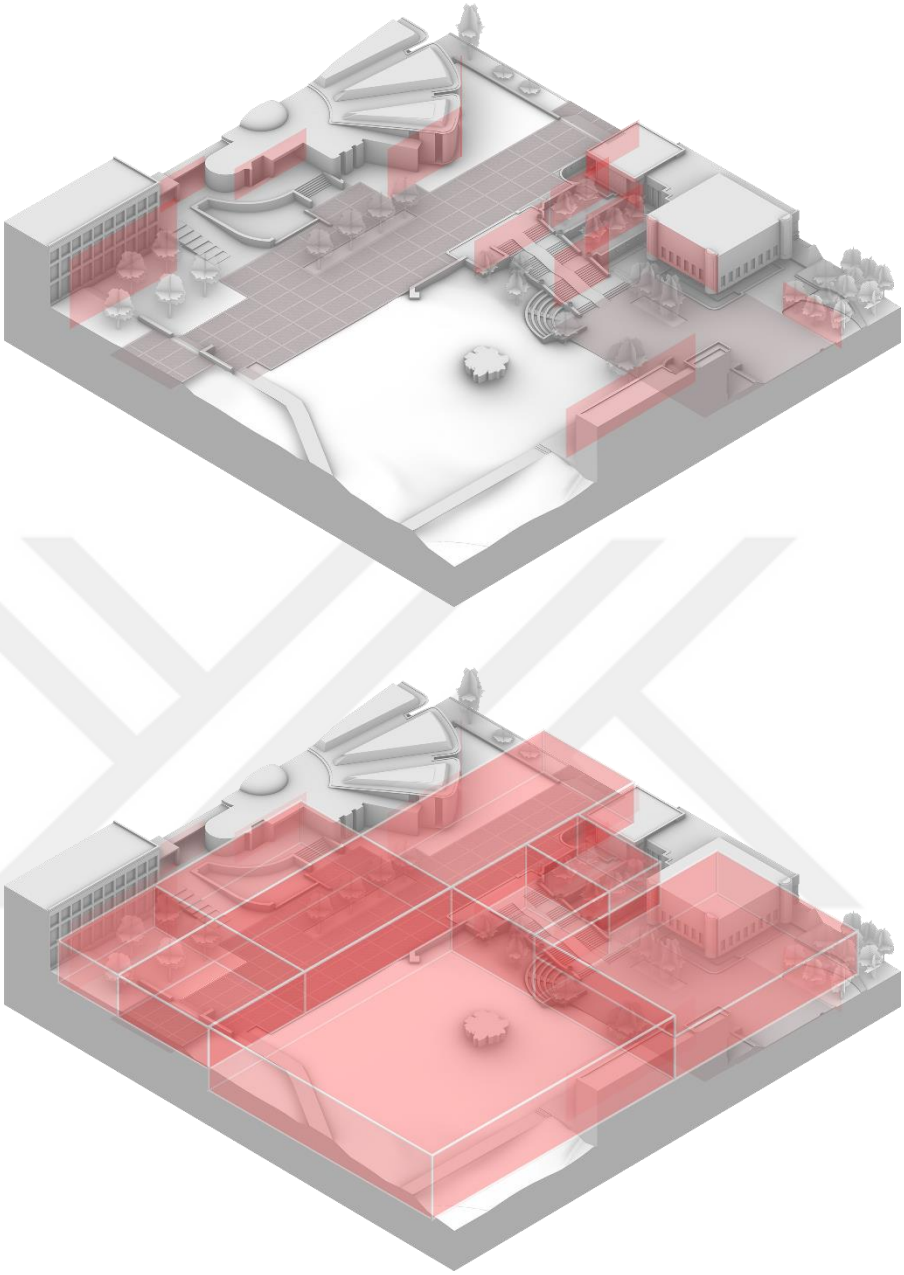


Figure 64. Axonometric model of Physics Faculty Building and Alle, displaying large scale enclosures and their volume counterparts, produced by the author

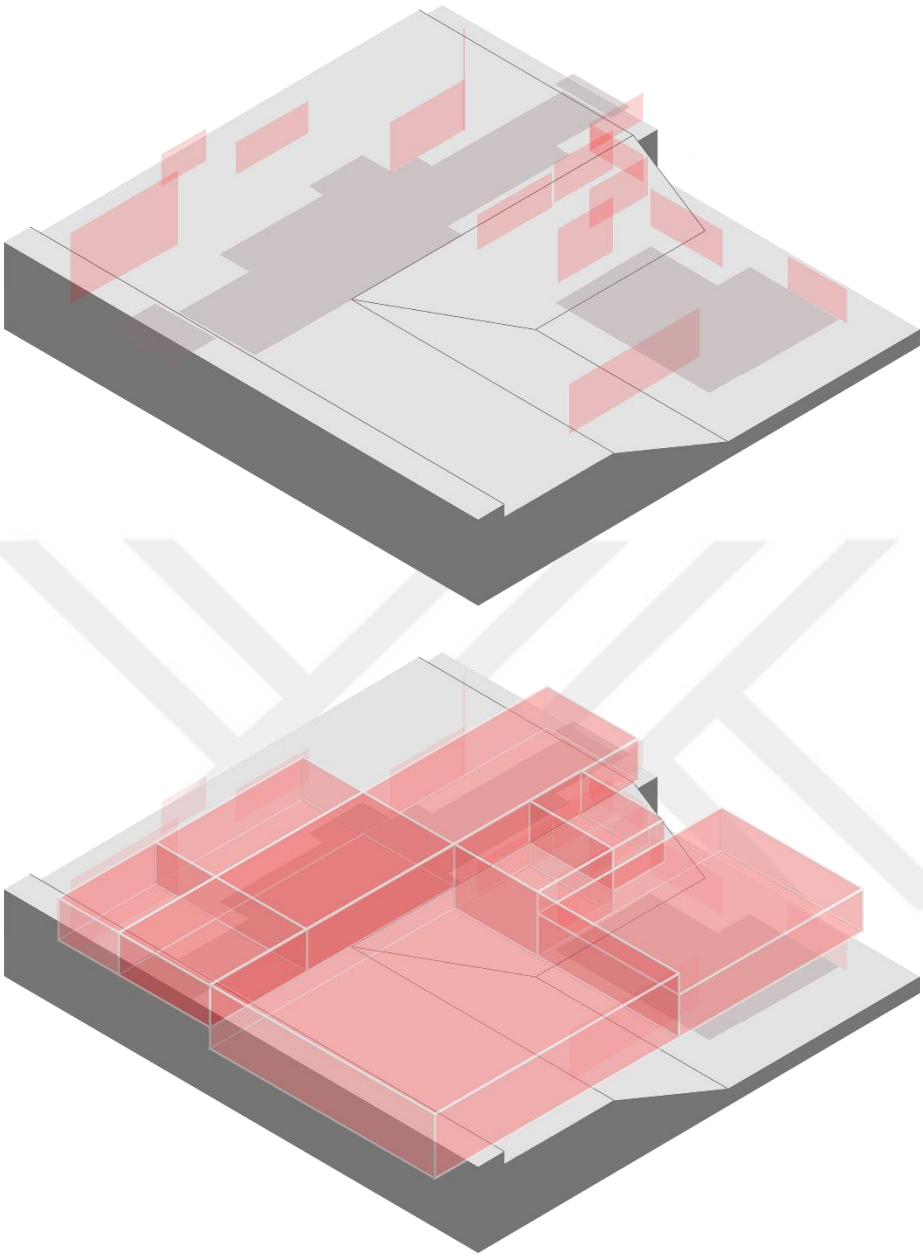


Figure 65. Axonometric model of Physics Faculty Building and Alle, displaying large and medium scale enclosures and their volume counterparts, produced by the author

The next figures show the medium scale enclosures in addition to large scale enclosures. Similar to former case studies, rows of trees divide the large scale volume

into smaller ones. The sculpture situated at the center of the large open area loosely defines an enclosure. (Figure 66, Figure 67)

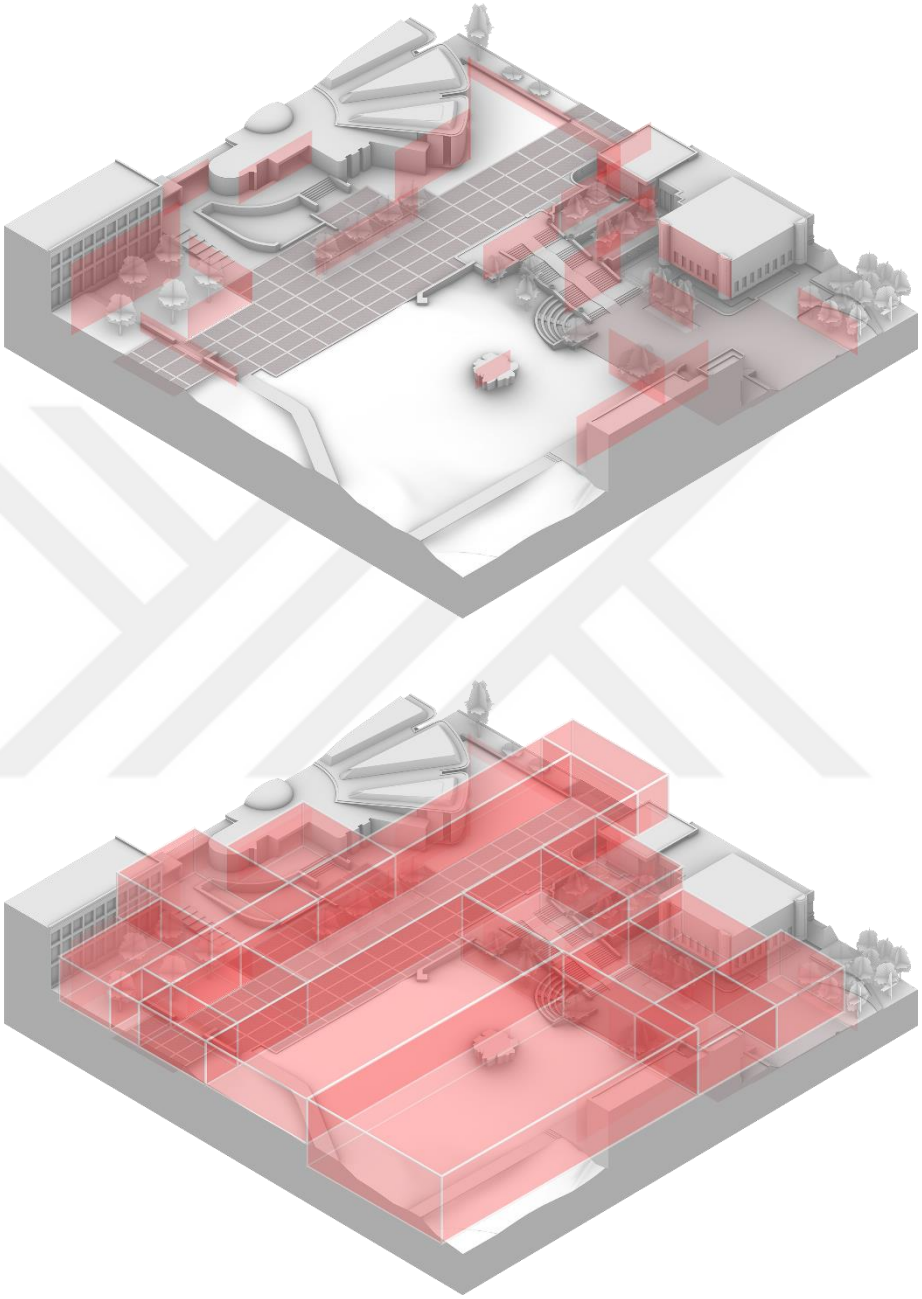


Figure 66. Axonometric model of Physics Faculty Building and Alle, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

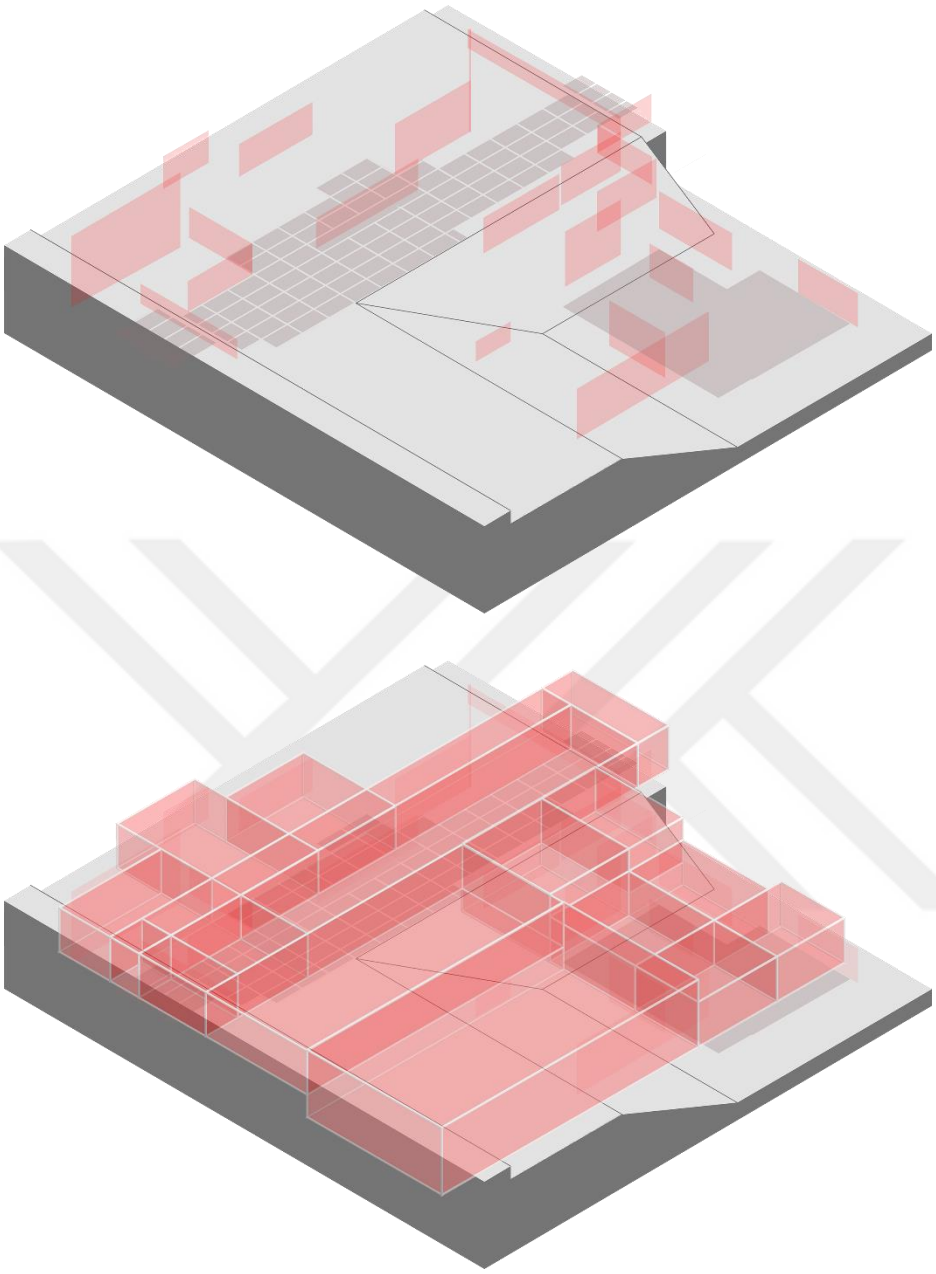


Figure 67. Axonometric model of Physics Faculty Building and Alle, displaying large and medium scale enclosures and their volume counterparts, produced by the author

The last two figures show the small scale enclosures in addition to others. These enclosures are arranged around the entrances of the buildings; raised platforms, retaining walls and sculptural pools. The stairs connecting two horizontal surfaces

are further developed which seems comparable to building entrances in terms of the sculptural detail of the enclosing elements surrounding it. (Figure 68, Figure 69)

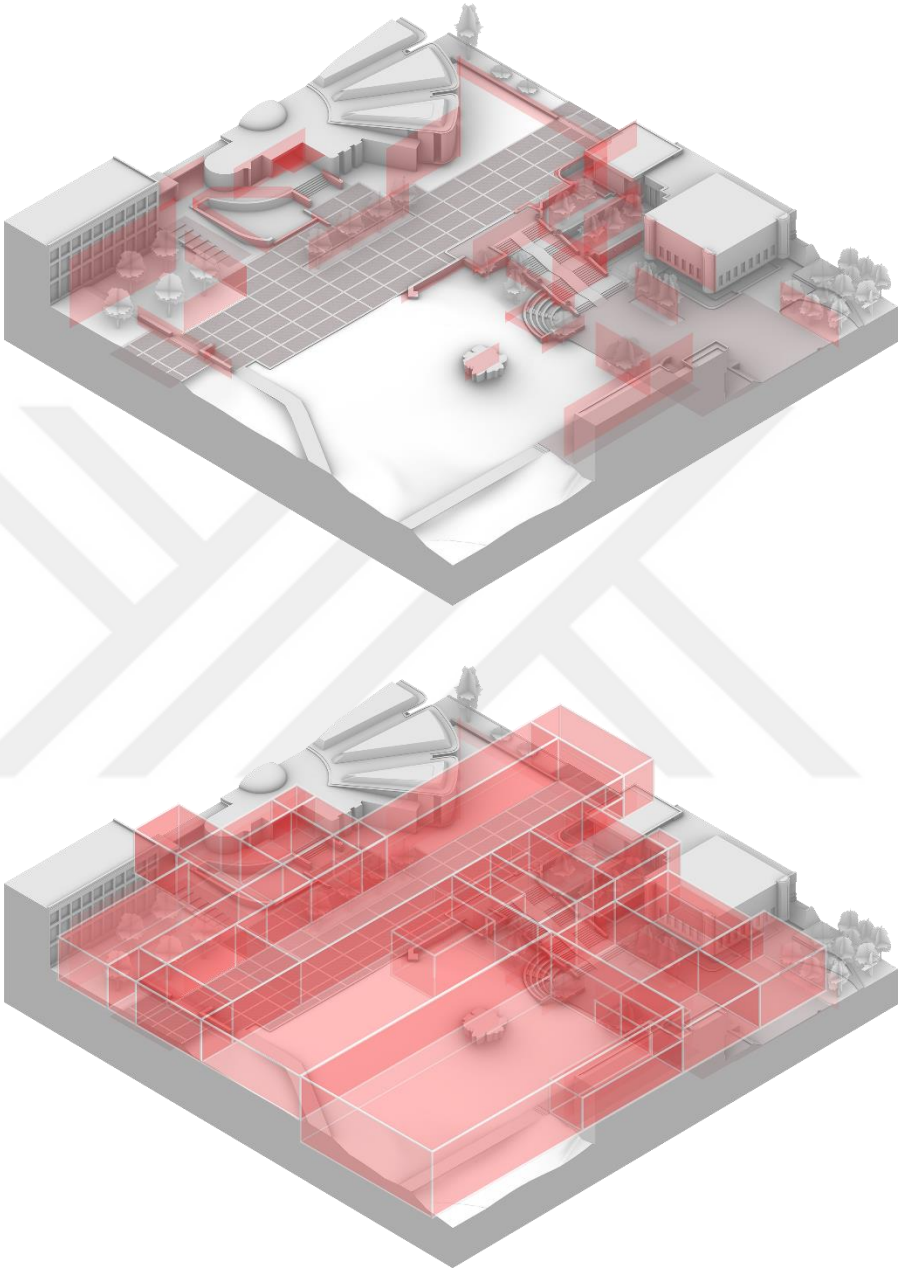


Figure 68. Axonometric model of Physics Faculty Building and Alle, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

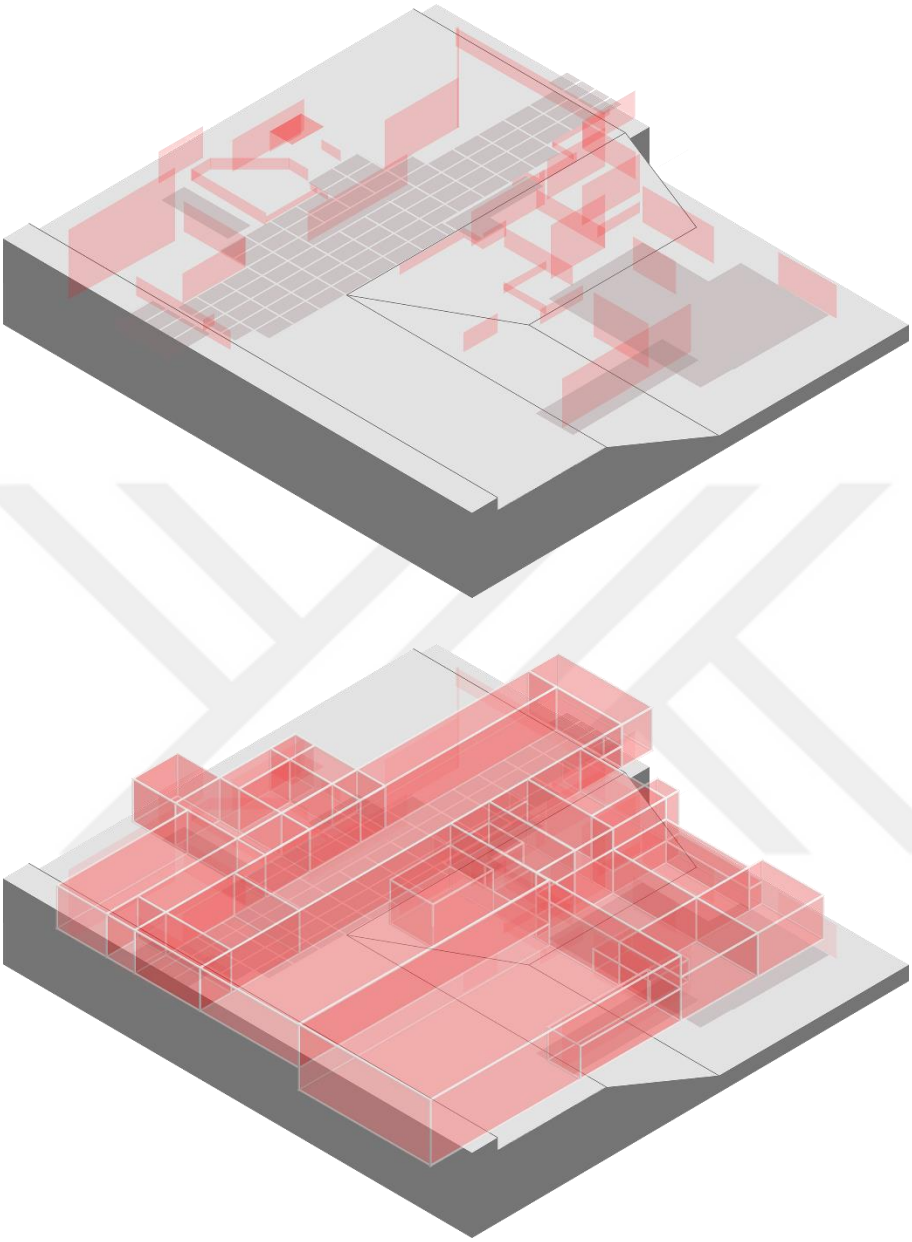


Figure 69. Axonometric model of Physics Faculty Building and Alle, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

3.2.5 The Library Building and the Rectorate Building

This part is indicated as number 4 in the unified site plan. (Figure 26) A focused partial site plan and the axonometric model depicting the indicated area can be seen in the following figures. (Figure 70, Figure 71) This case study is unique, result of its position as not being a direct part of the *alle* but rather an extension of it.

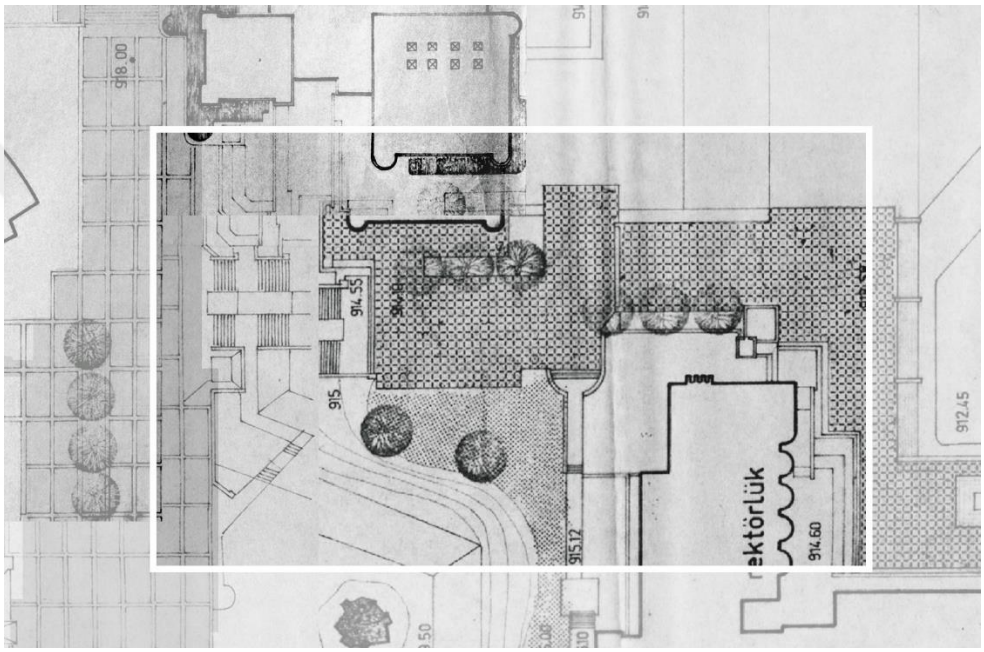


Figure 70. Partial site plan focusing on the space between Library and Rectorate Building

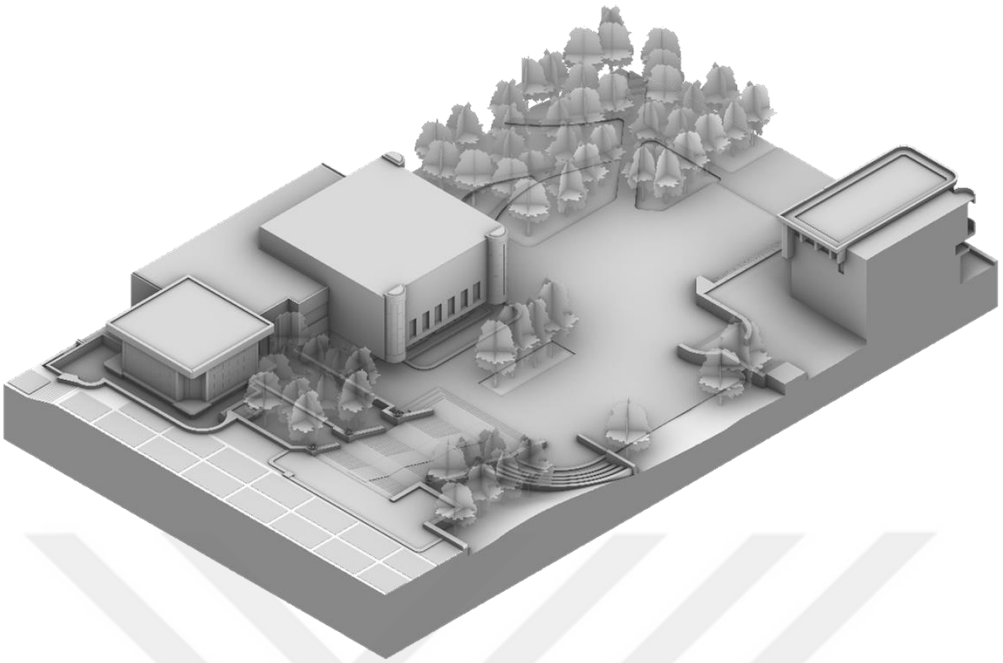


Figure 71. Axonometric Model of the space between Library and Rectorate Building



Figure 72. Photograph of the space between Library and Rectorate Building by the author



Figure 73. Photograph of the space between Library and Rectorate Building by the author

Large enclosures are similar to other case studies and consists of facades of buildings and dense flora surrounding a ground plane. (Figure 74, Figure 75)

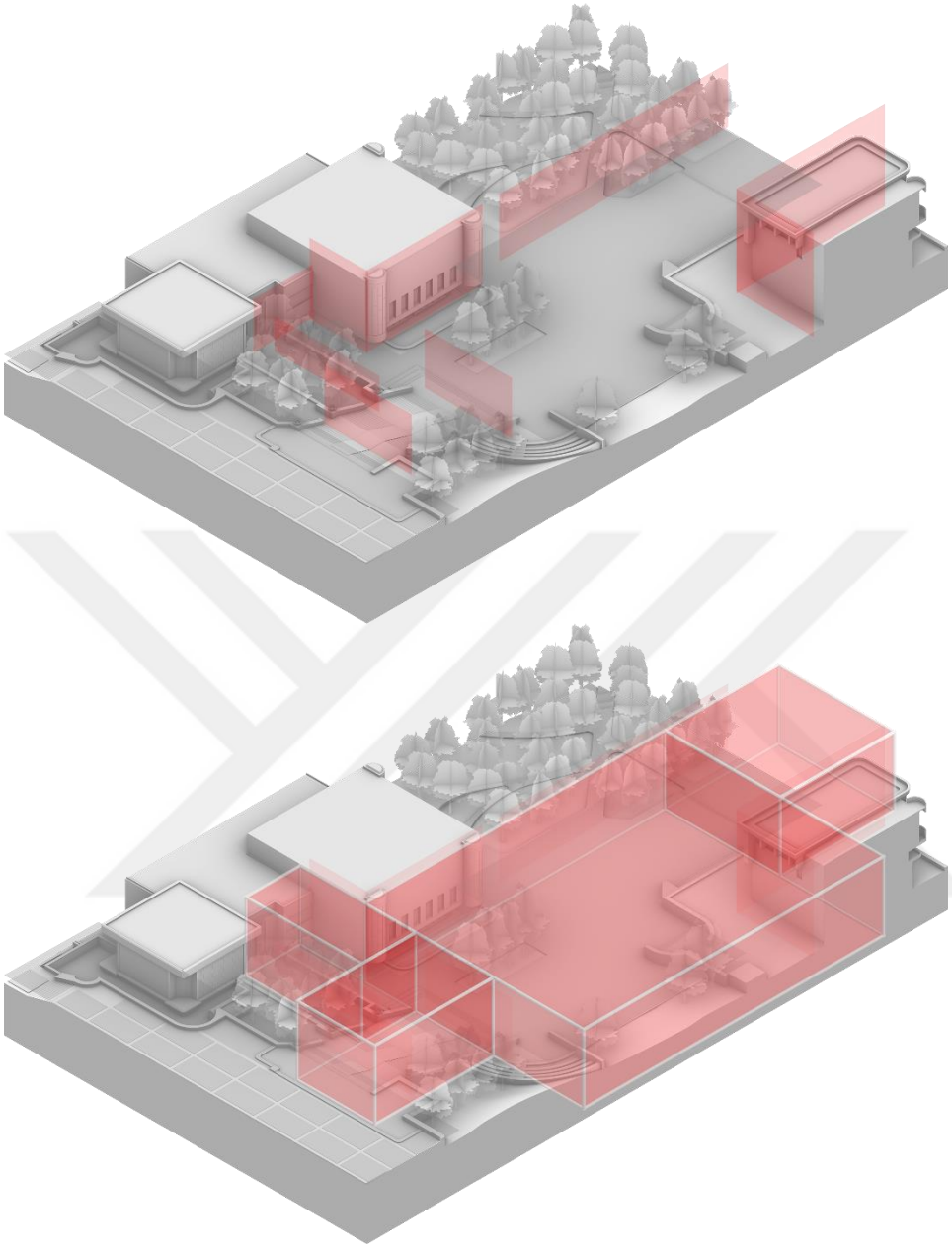


Figure 74. Axonometric model of the space between Library and Rectorate Building, displaying large scale enclosures and their volume counterparts, produced by the author

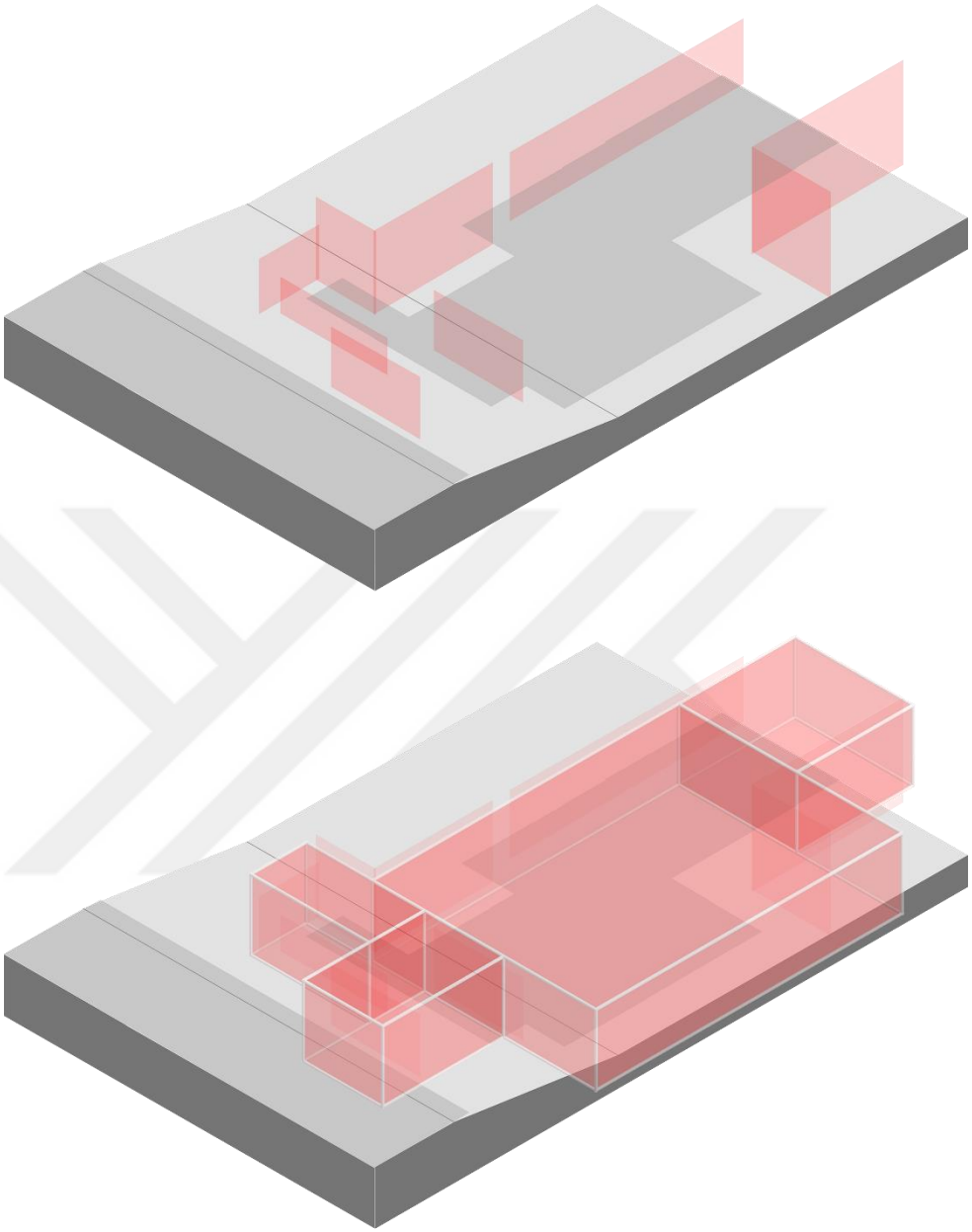


Figure 75. Axonometric model of the space between Library and Rectorate Building, displaying large scale enclosures and their volume counterparts, produced by the author

The next figures show the medium scale enclosures in addition to large scale enclosures. Similar to former case studies, rows of trees and raised platforms divide

the larger scale volume. An exceptional design is the diagonal retaining wall supporting the raised platform, which is a unique enclosure element on the campus. (Figure 76, Figure 77)

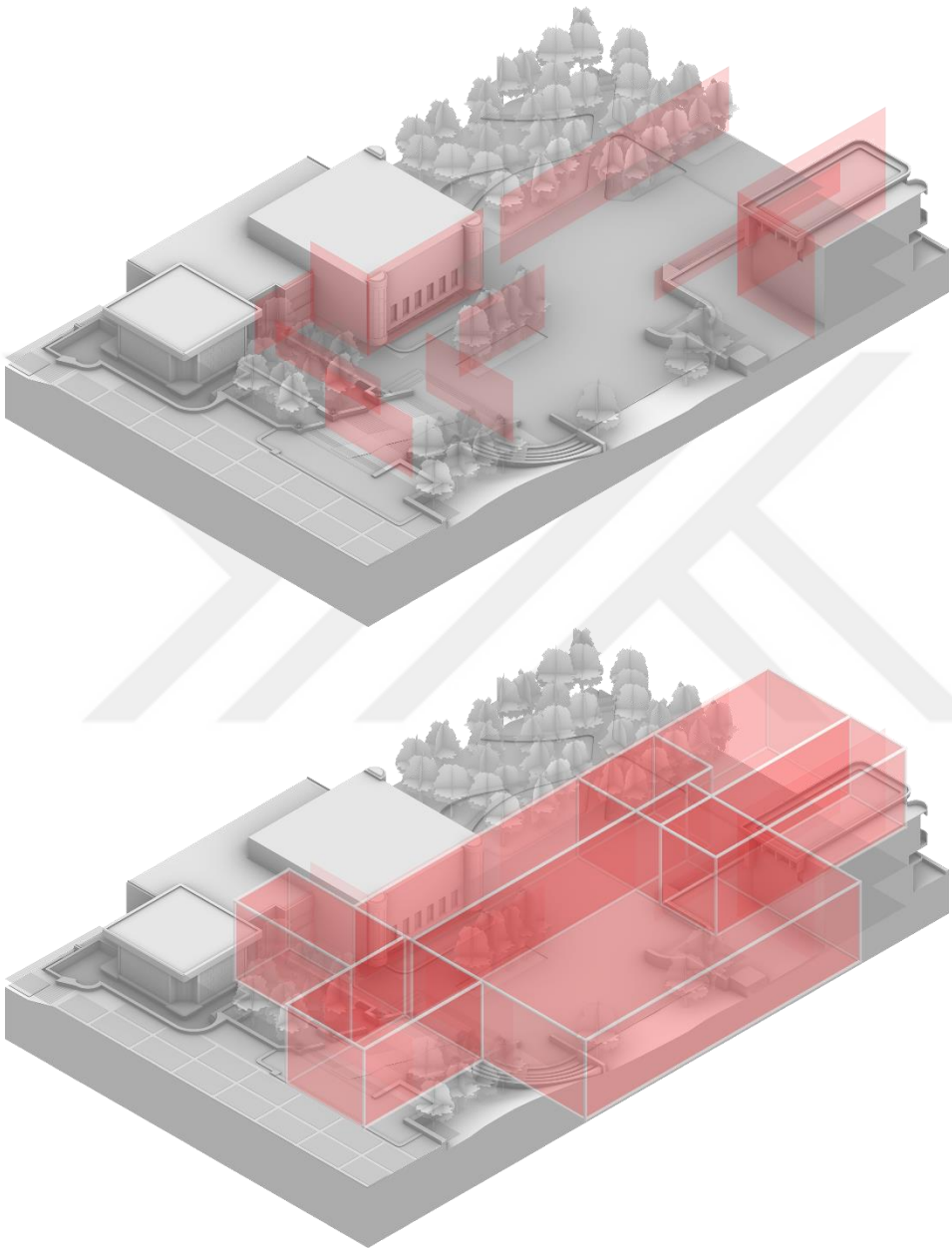


Figure 76. Axonometric model of the space between Library and Rectorate Building, displaying large and medium scale enclosures and their volume counterparts, produced by the author

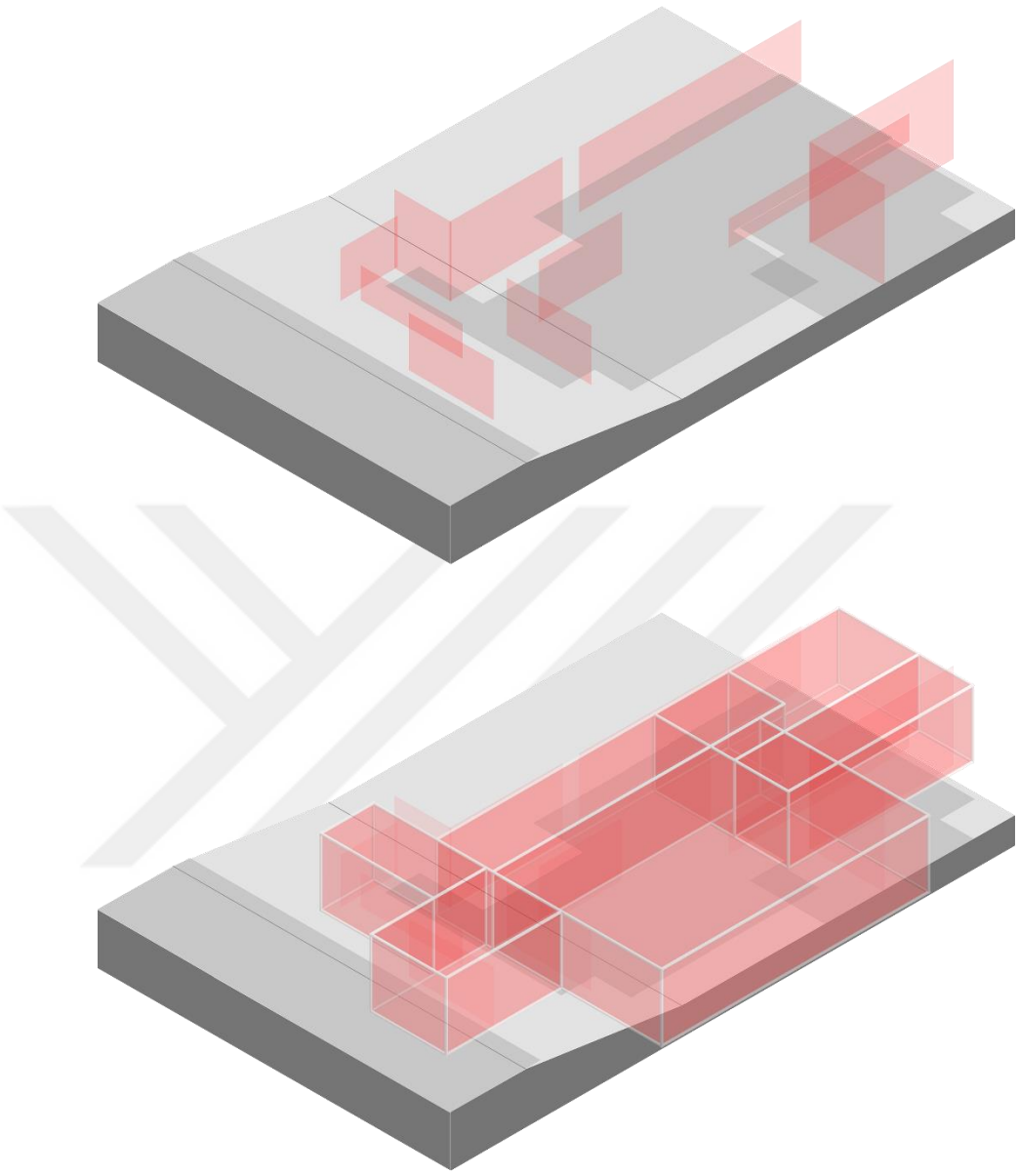


Figure 77. Axonometric model of the space between Library and Rectorate Building, displaying large and medium scale enclosures and their volume counterparts, produced by the author

The last two figures show the small scale enclosures in addition to others. These enclosures are arranged around the entrances of the buildings and the stairs connecting to the *alle*. (Figure 78, Figure 79)

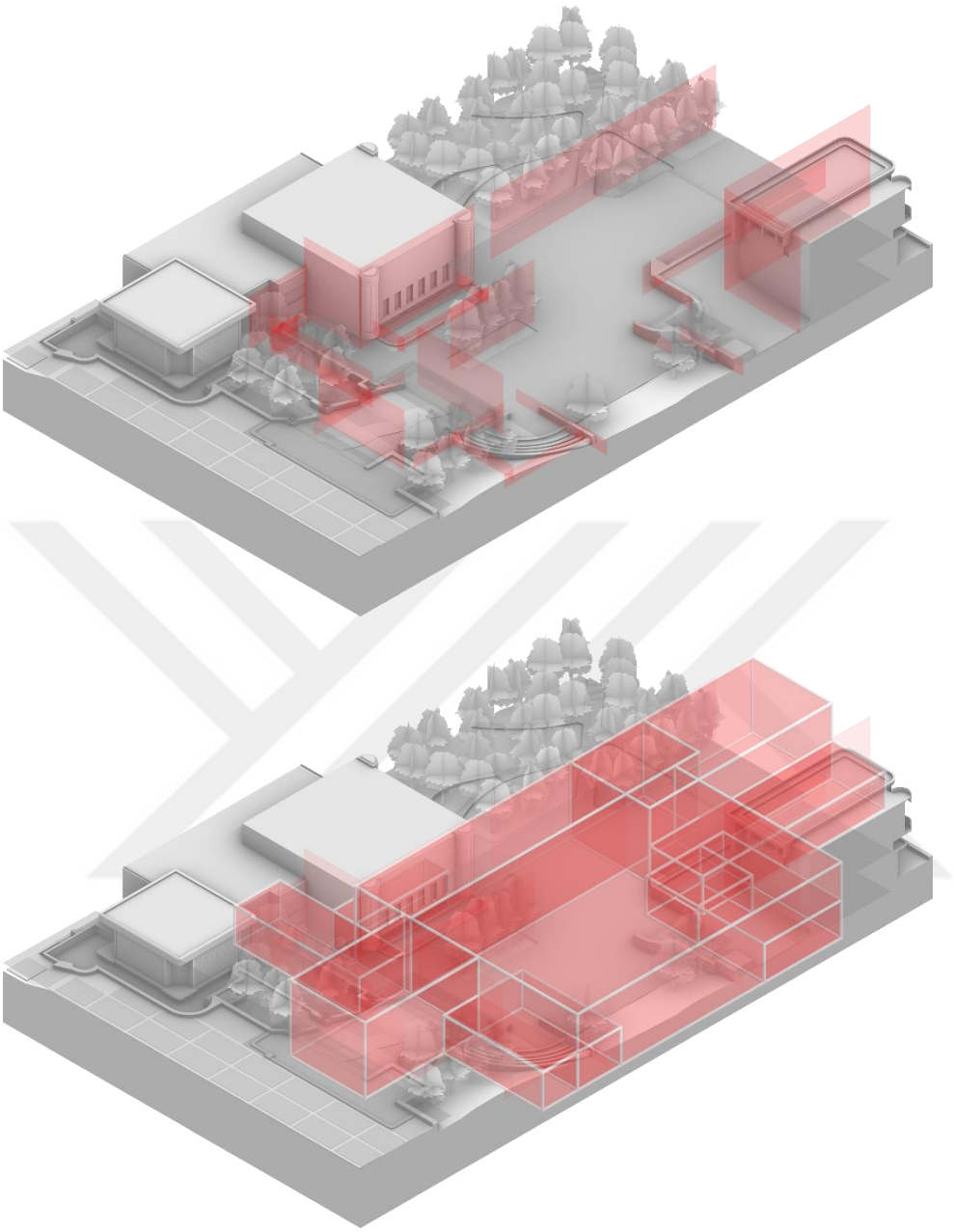


Figure 78. Axonometric model of the space between Library and Rectorate Building, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

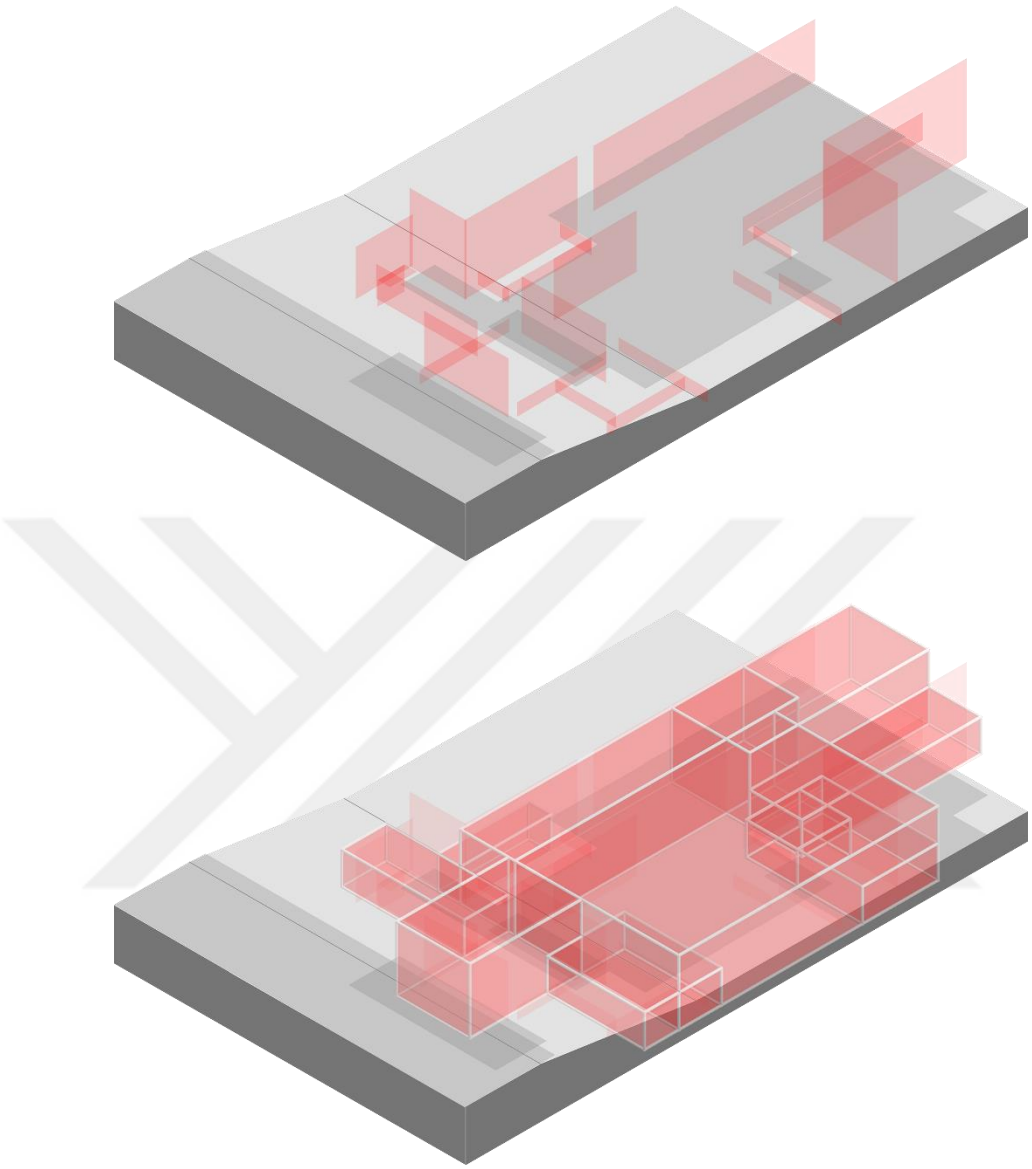


Figure 79. Axonometric model of the space between Library and Rectorate Building, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

3.2.6 The Architecture Faculty Building and the Alle

This part is indicated as number 6 in the unified site plan. (Figure 26) A focused partial site plan and the axonometric model depicting the indicated area can be seen in the following figures. (Figure 80, Figure 81) This case study is unique, result of its position as being the first building of the campus, the building and its surroundings were the first to be designed. It is possible to observe the experimentation in this case study.

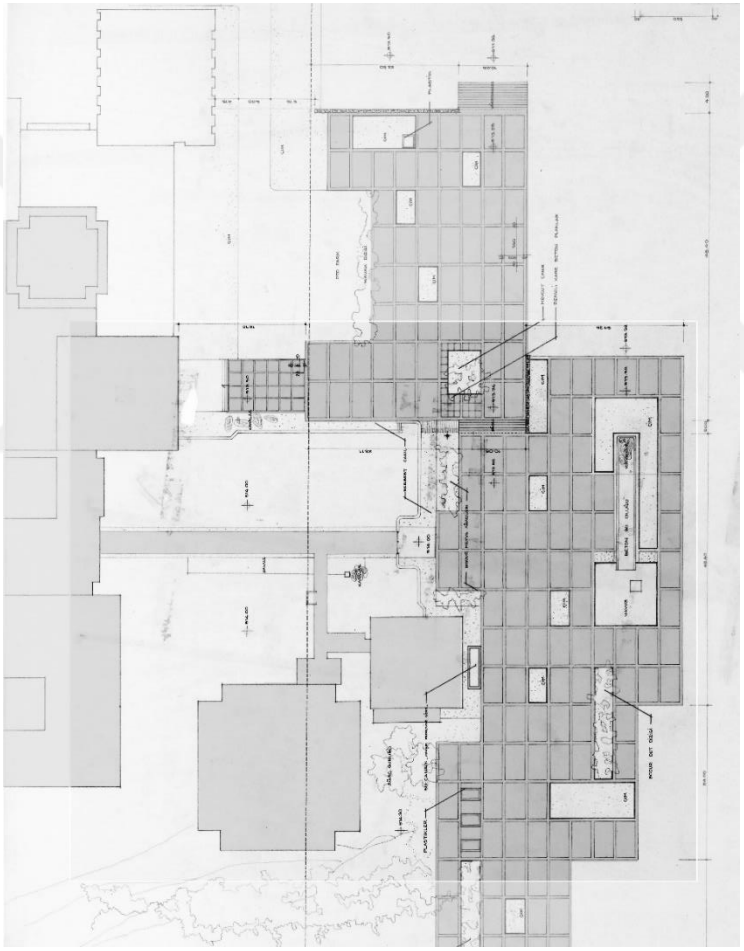


Figure 80. Partial site plan focusing on Architecture Faculty Building

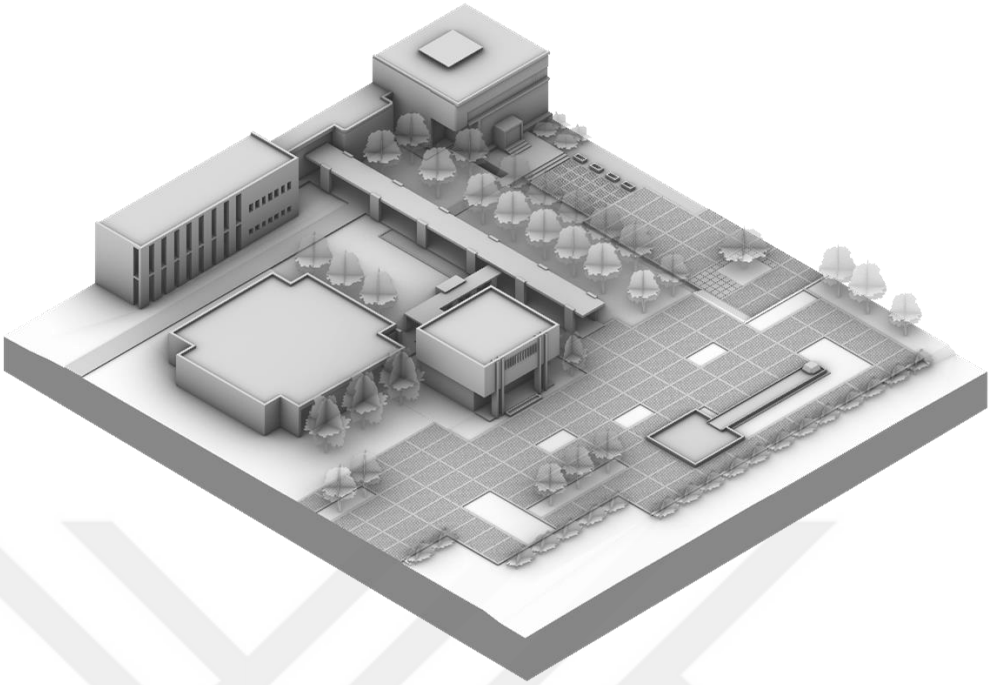


Figure 81. Axonometric model of Architecture Faculty Building and Alle by the author and Uzay Doğan







Figure 82. Various photographs focusing on Archtiecture Faculty Building and the Alle

Large enclosures are similar to other case studies and consist of facades of the buildings and rows of trees and bushes. It also features an area of alternative *alle* ano tile, defining an enclosure leading to the Architecture Faculty building dean's entrance, implying an enclosure. (Figure 83, Figure 84, Figure 85, Figure 86)



Figure 83. Alternative Ano Tile depiction in Architecture Faculty Building site plan



Figure 84. Alternative Ano Tile photograph by the author

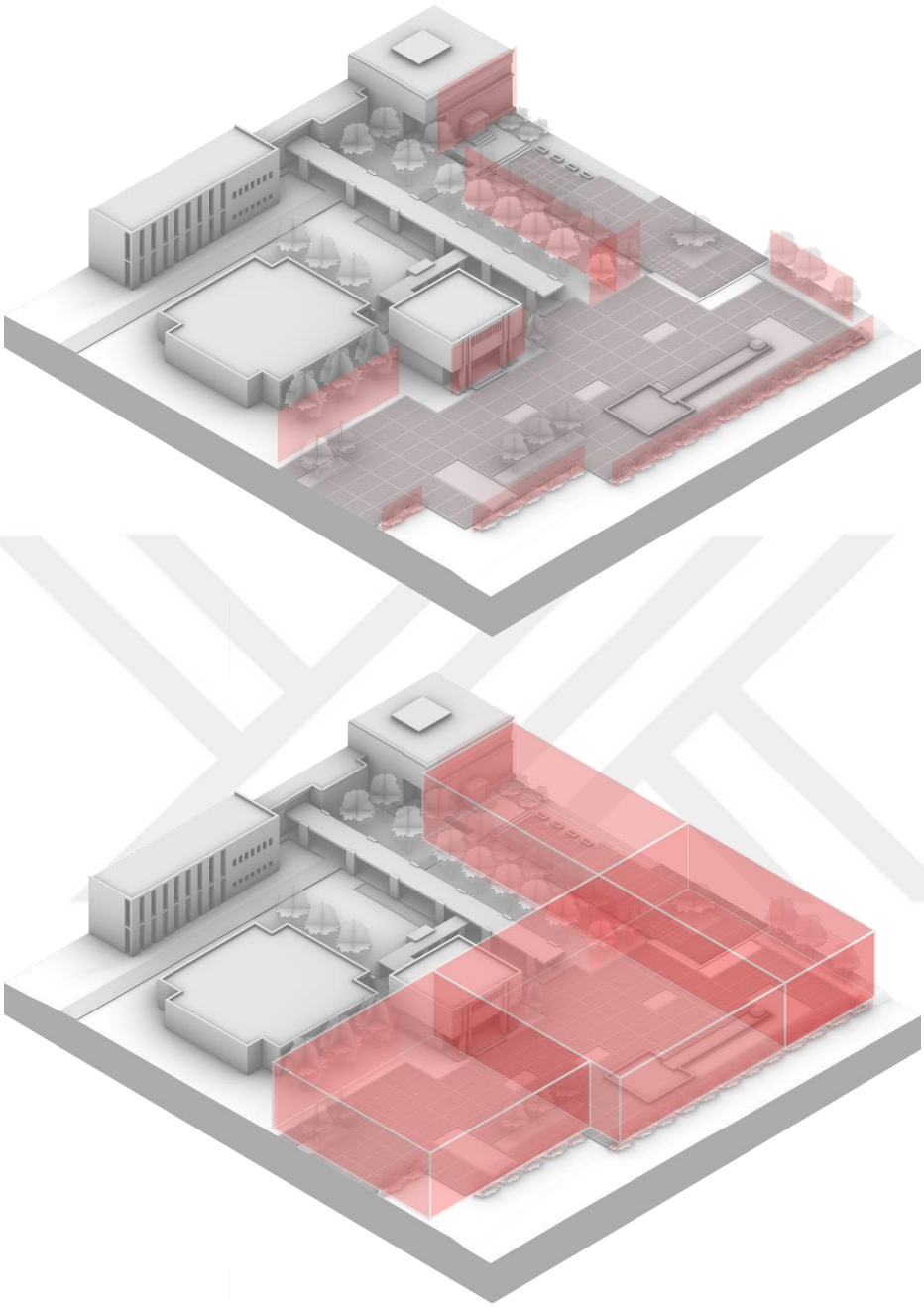


Figure 85. Axonometric model of Architecture Faculty Building and Alle, displaying large scale enclosures and their volume counterparts, produced by the author

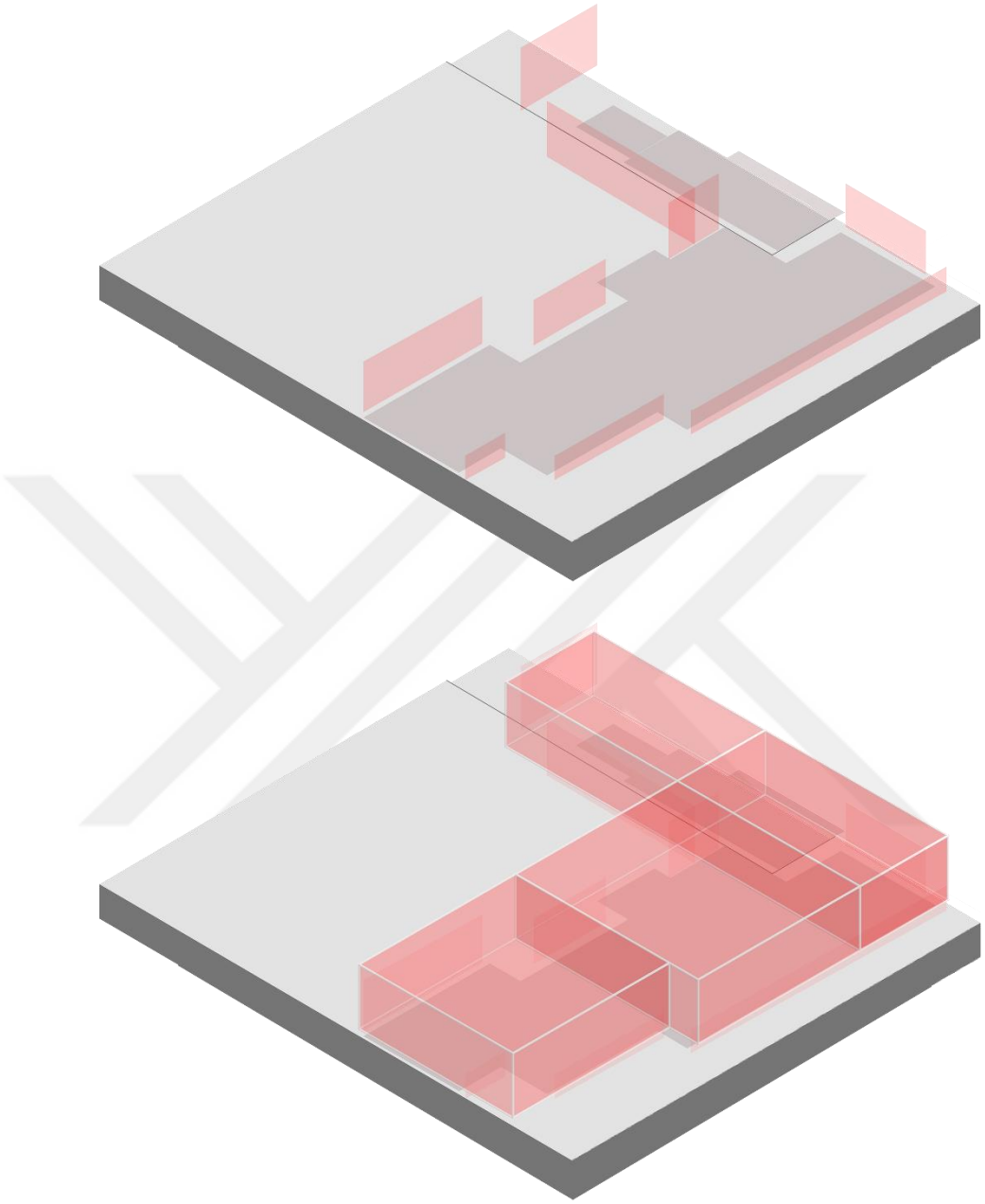


Figure 86. Axonometric model of Architecture Faculty Building and Alle, displaying large scale enclosures and their volume counterparts, produced by the author

The next figures show the medium scale enclosures in addition to large scale enclosures. Similar to former case studies, rows of trees divide the large scale

volume, however additionally feature patches of grass and a 30-meter pool as alternatives. Both designs were later abandoned, nonetheless it provides a glimpse into the design process. (Figure 87, Figure 88)

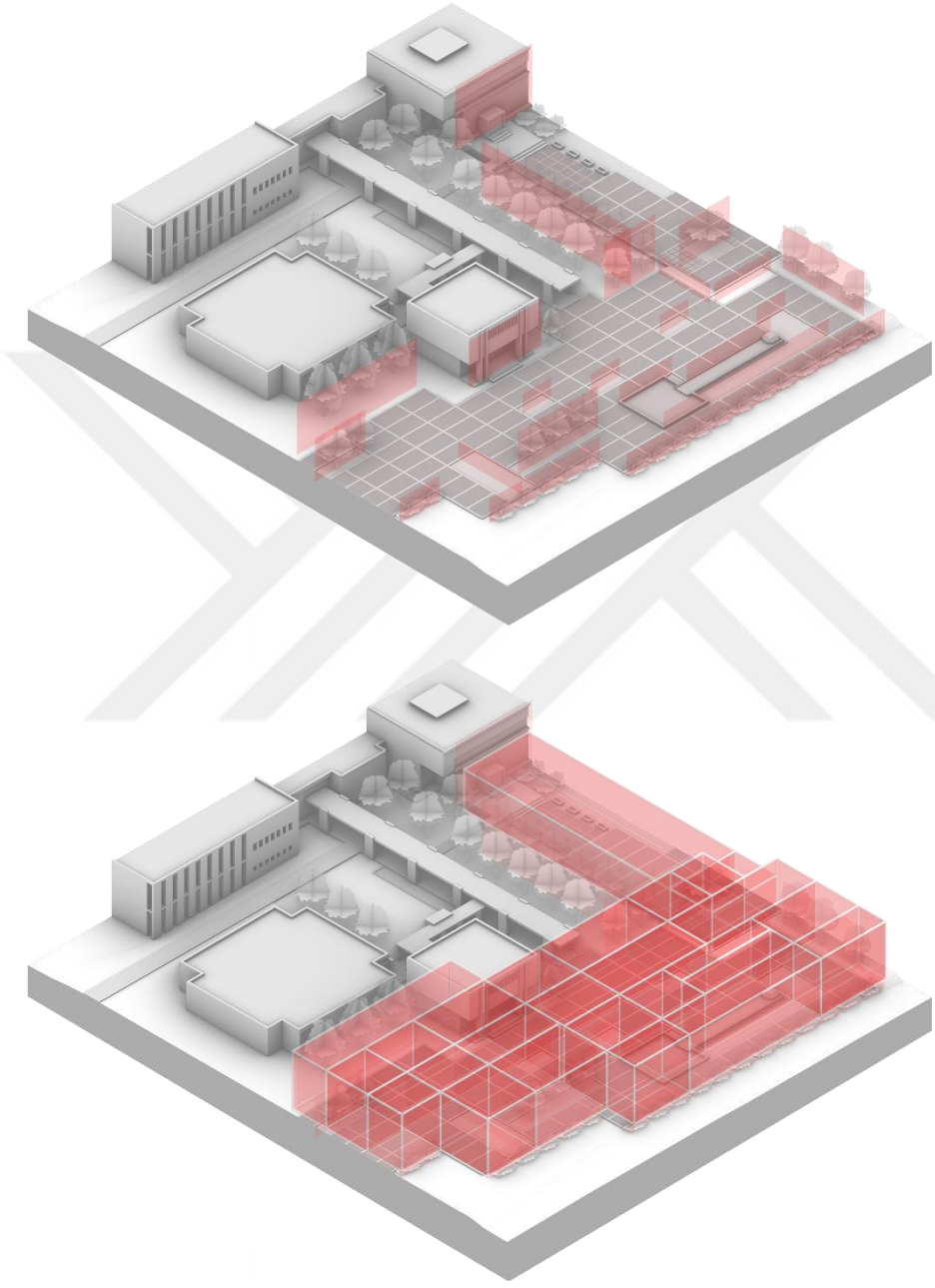


Figure 87. Axonometric model of Architecture Faculty Building and Alle, displaying large and medium scale enclosures and their volume counterparts, produced by the author

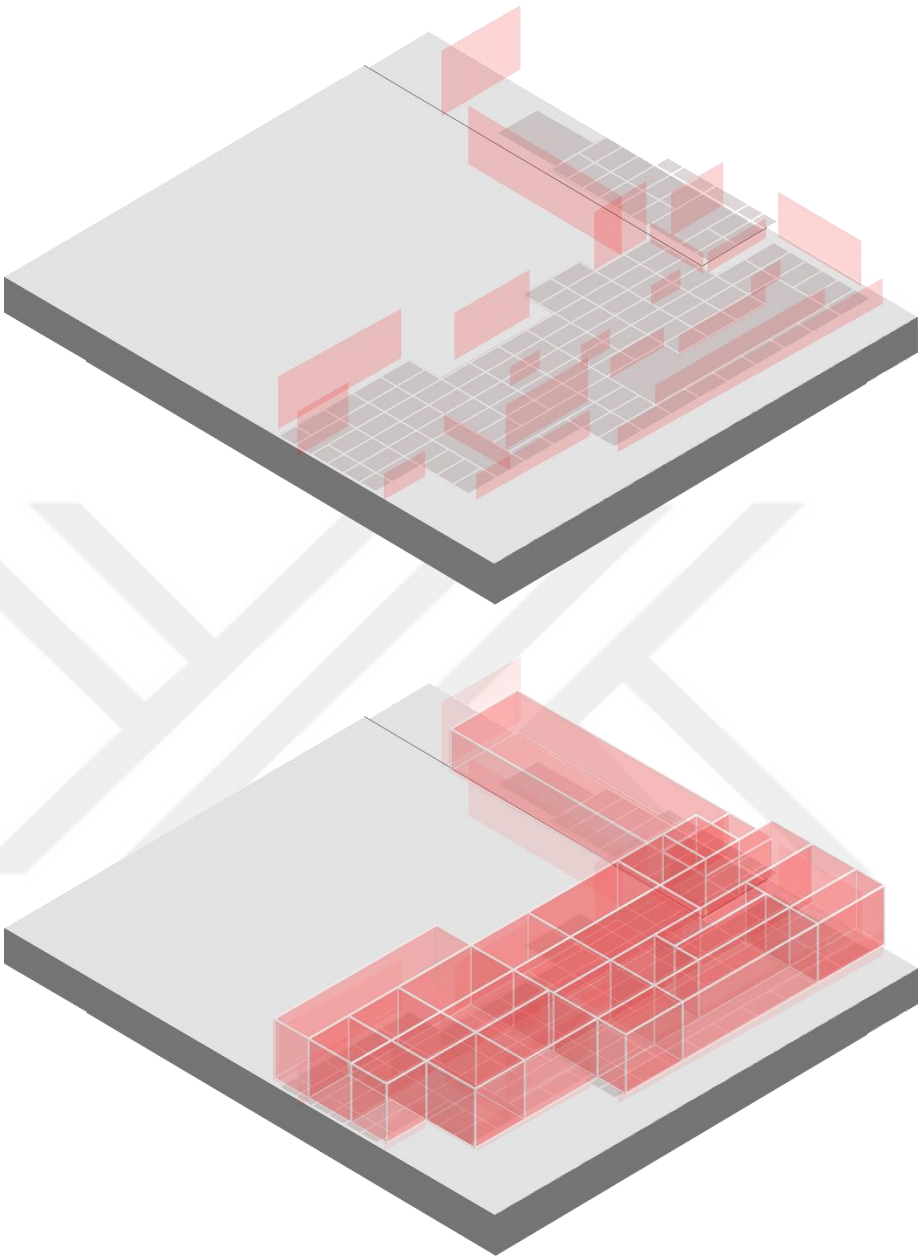


Figure 88. Axonometric model of Architecture Faculty Building and Alle, displaying large and medium scale enclosures and their volume counterparts, produced by the author

The last two figures show the small scale enclosures in addition to others. These enclosures are arranged around the elaborate entrances of the building. A notable

arrangement of enclosures is the main entrance connecting the *alle* and the faculty building, which is exceptionally elaborate with platforms, arcades, pools and fountains. (Figure 89, Figure 90)

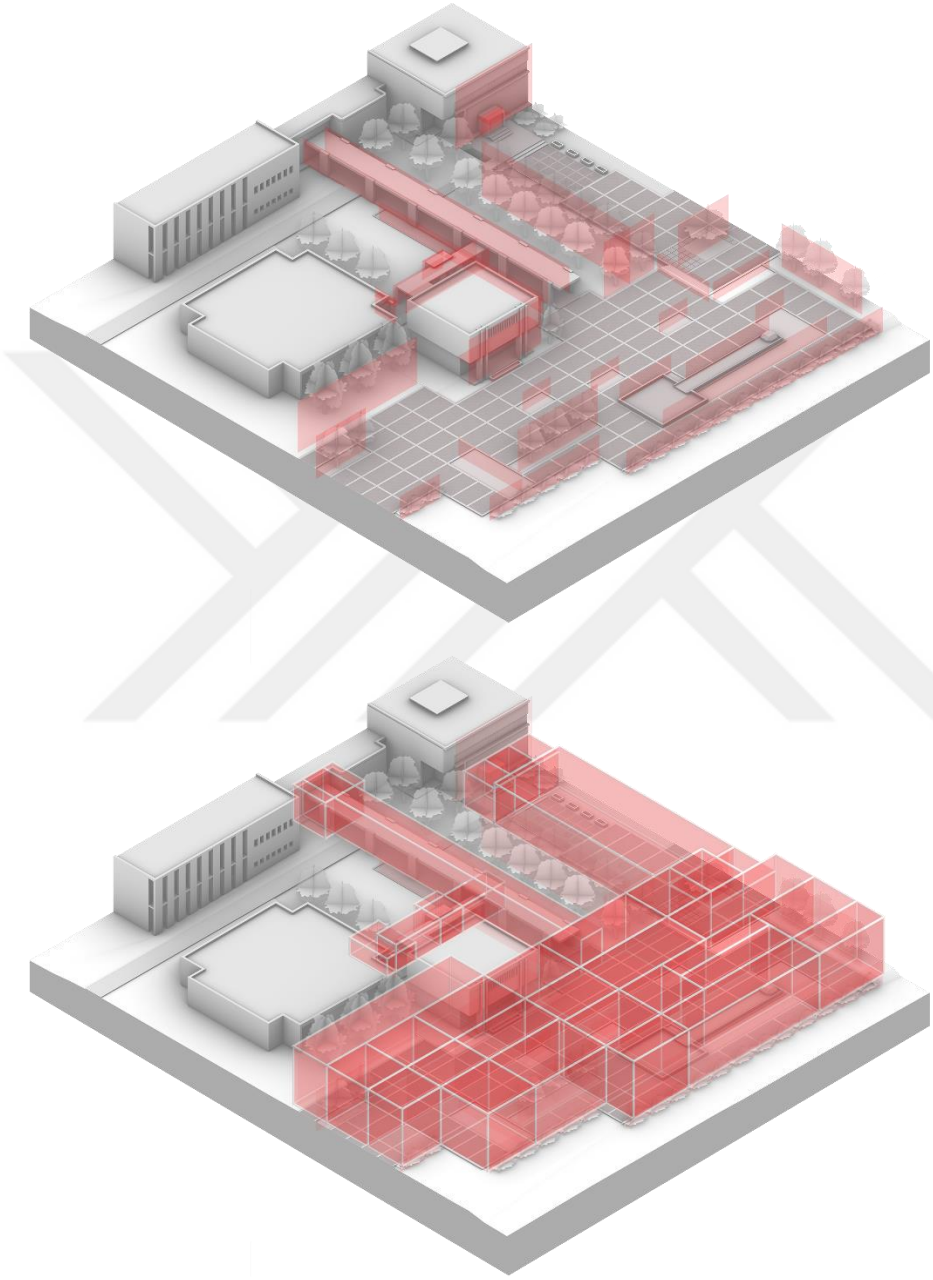


Figure 89. Axonometric model of Architecture Faculty Building and Alle, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

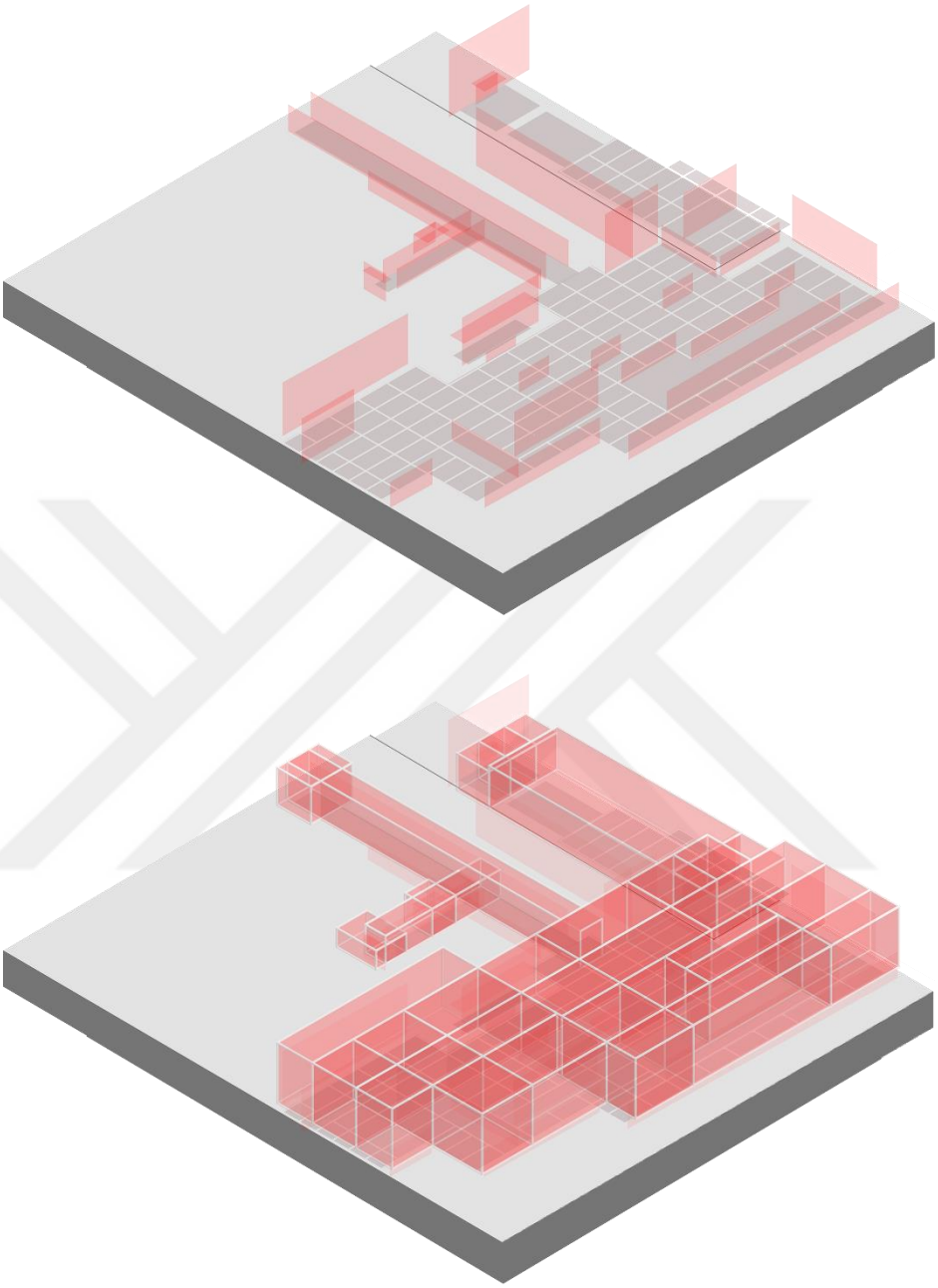


Figure 90. Axonometric model of Architecture Faculty Building and Alle, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author



Figure 91. Architecture Faculty building main entrance ground platform photograph by the author

3.2.7 The Administrative Sciences Faculty Building, Architecture Faculty Building and The Alle

This part is indicated as number 7 in the unified site plan. (Figure 26) A focused partial site plan and the axonometric model depicting the indicated area can be seen in the following figures. (Figure 92, Figure 93). This case study depicts the end of *alle*. A result of its position at the end of the *alle* is its connection with the vehicle road and parking lots.

Merging the current and former chapter into a singular case study was considered but was decided against it; the addition of parking lots, the presence of two elaborate entrances and incompatible view orientation were thought to compromise its readability.

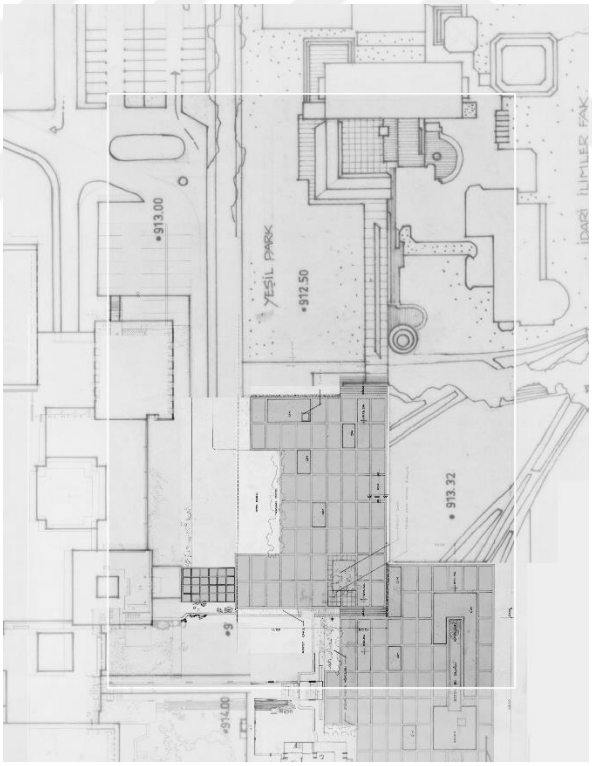


Figure 92. Partial site plan focusing on Administrative Sciences Faculty Building

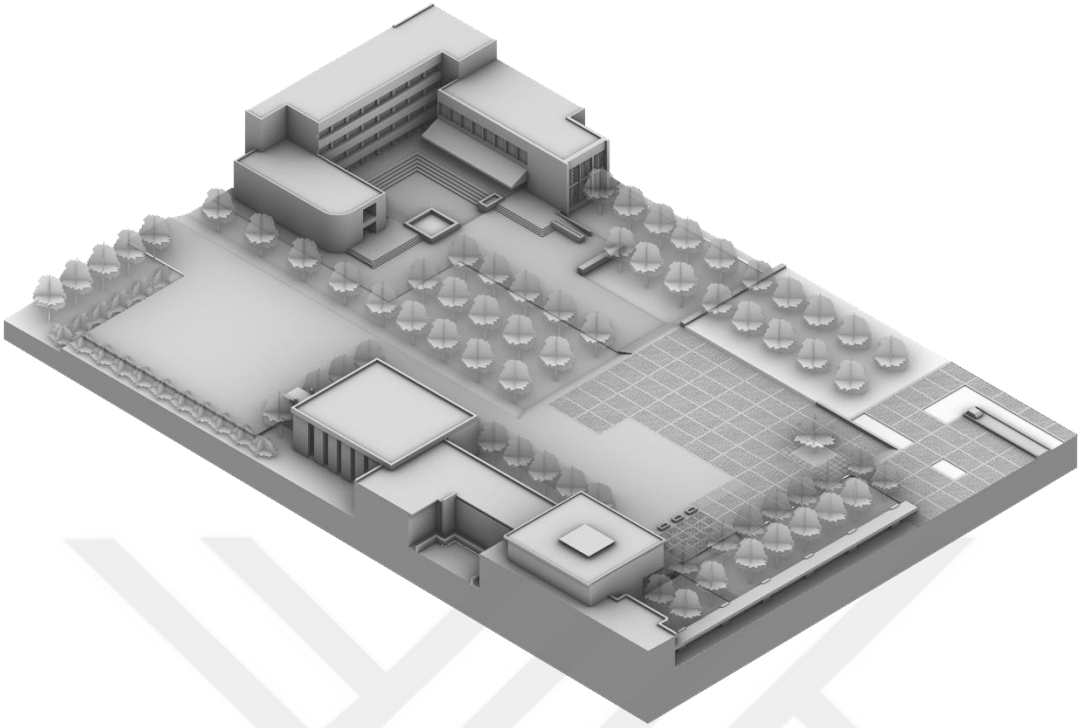


Figure 93. Axonometric model of Administrative Sciences Faculty Building, Architecture Faculty Building and Alle by the author



Figure 94. Photograph of Administrative Sciences Faculty Building, source: salt archives



Figure 95. Photograph of Adminsitrative Sciences Faculty Building by the author



Figure 96. Photograph of Administrative Sciences Faculty Building, source: salt archives

Similar to previous examples, large scale enclosures are the facades of the buildings, rows of trees, and dense flora. (Figure 97, Figure 98)

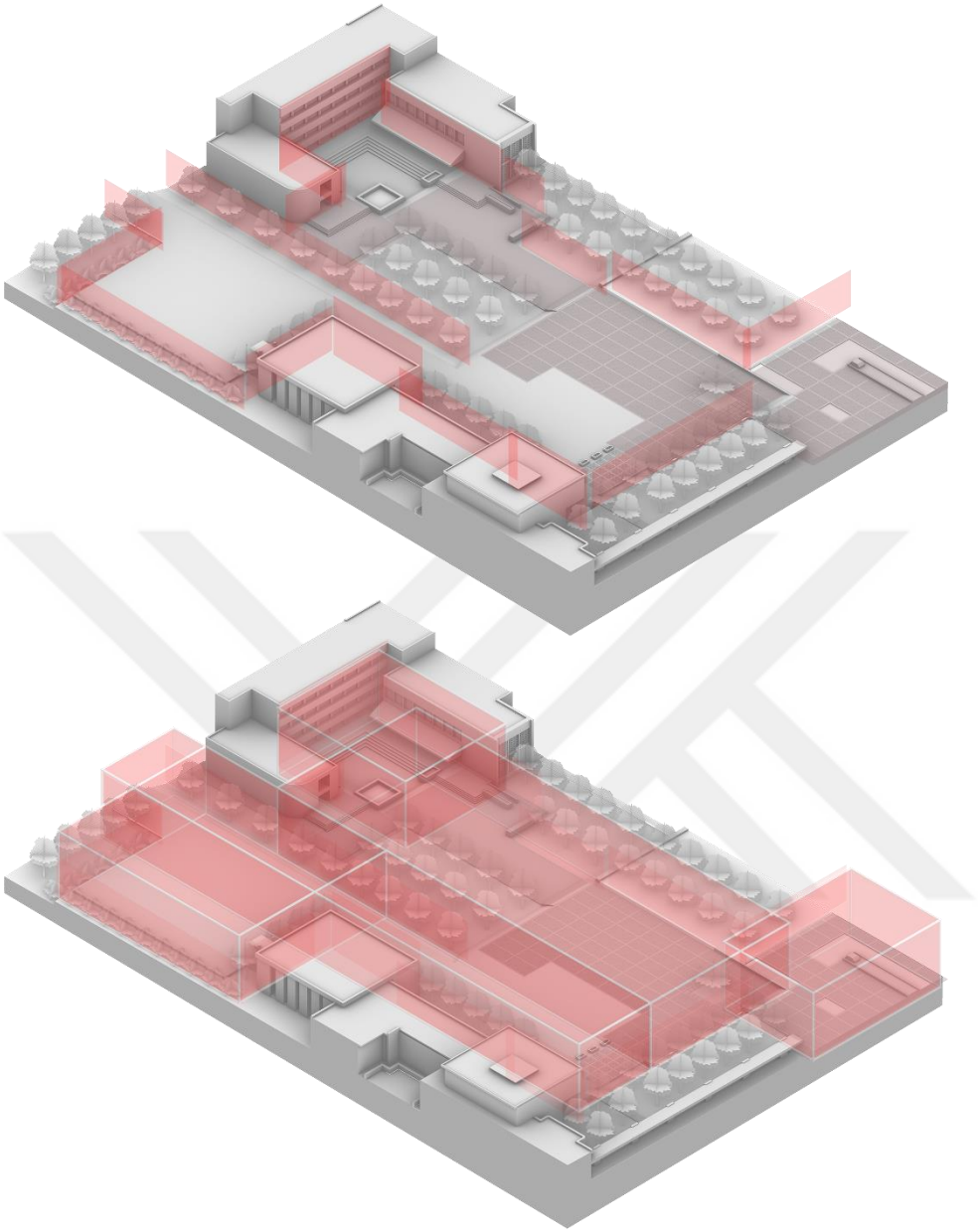


Figure 97. Axonometric model of Administrative Sciences Faculty Building, Architecture Faculty Building and Alle, displaying large scale enclosures and their volume counterparts, produced by the author

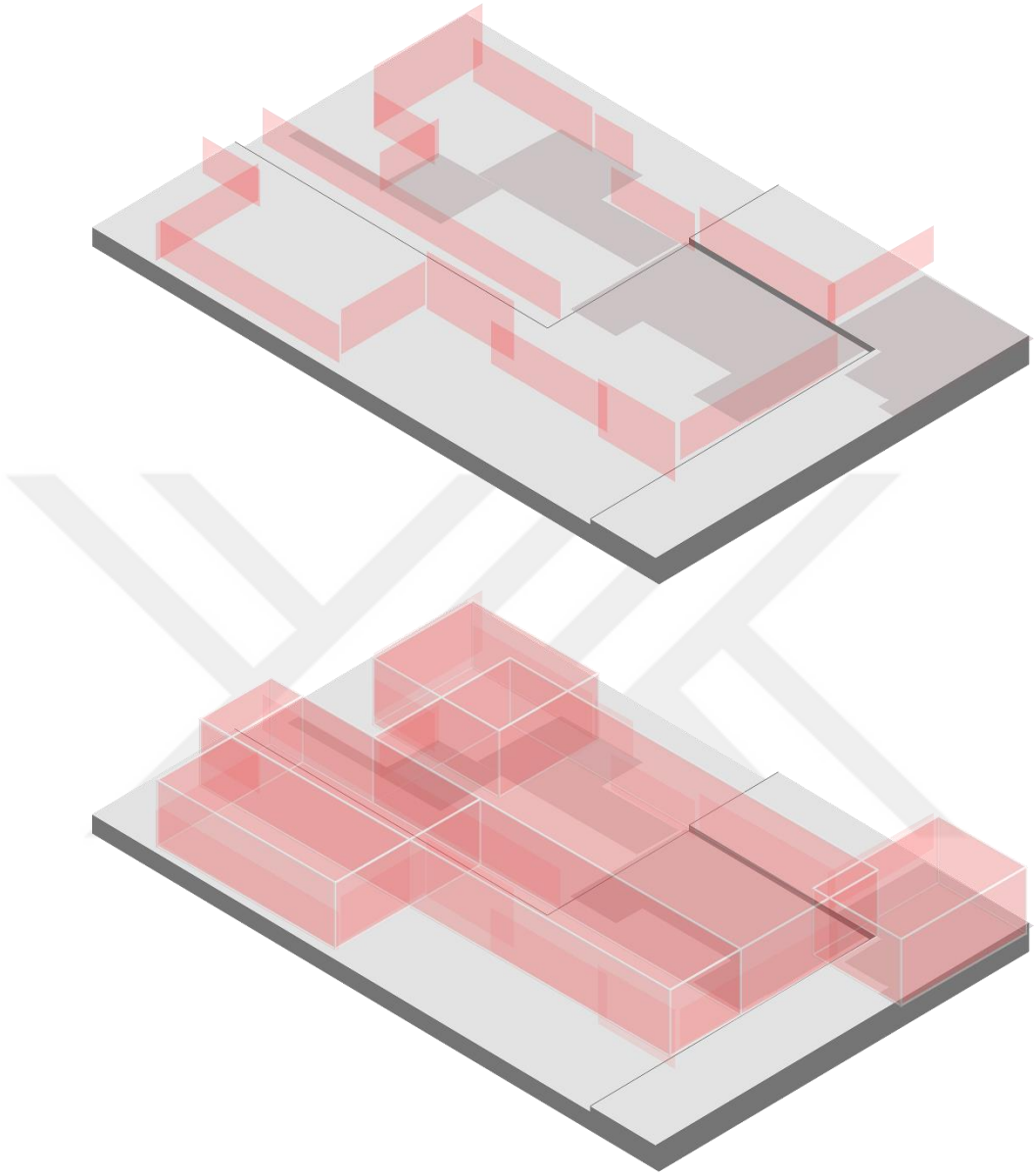


Figure 98. Axonometric model of Administrative Sciences Faculty Building, Architecture Faculty Building and Alle, displaying large scale enclosures and their volume counterparts, produced by the author

The next figures show the medium scale enclosures in addition to large scale enclosures. Large patch of trees divide the large scale volume, differentiating

between the parking lots and the elaborate entrance of the administrative sciences building. (Figure 99, Figure 100)

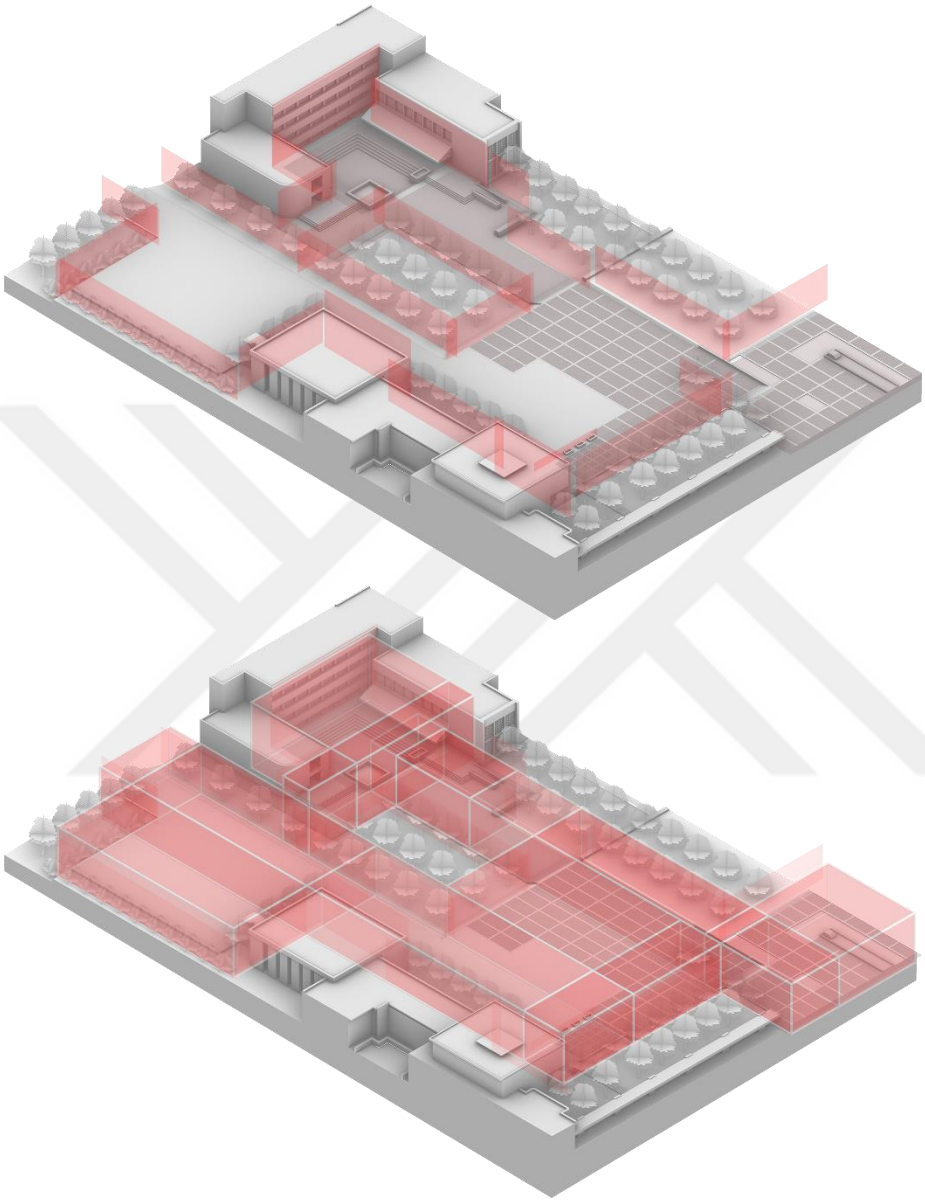


Figure 99. Axonometric model of Administrative Sciences Faculty Building, Architecture Faculty Building and Alle, displaying large and medium scale enclosures and their volume counterparts, produced by the author

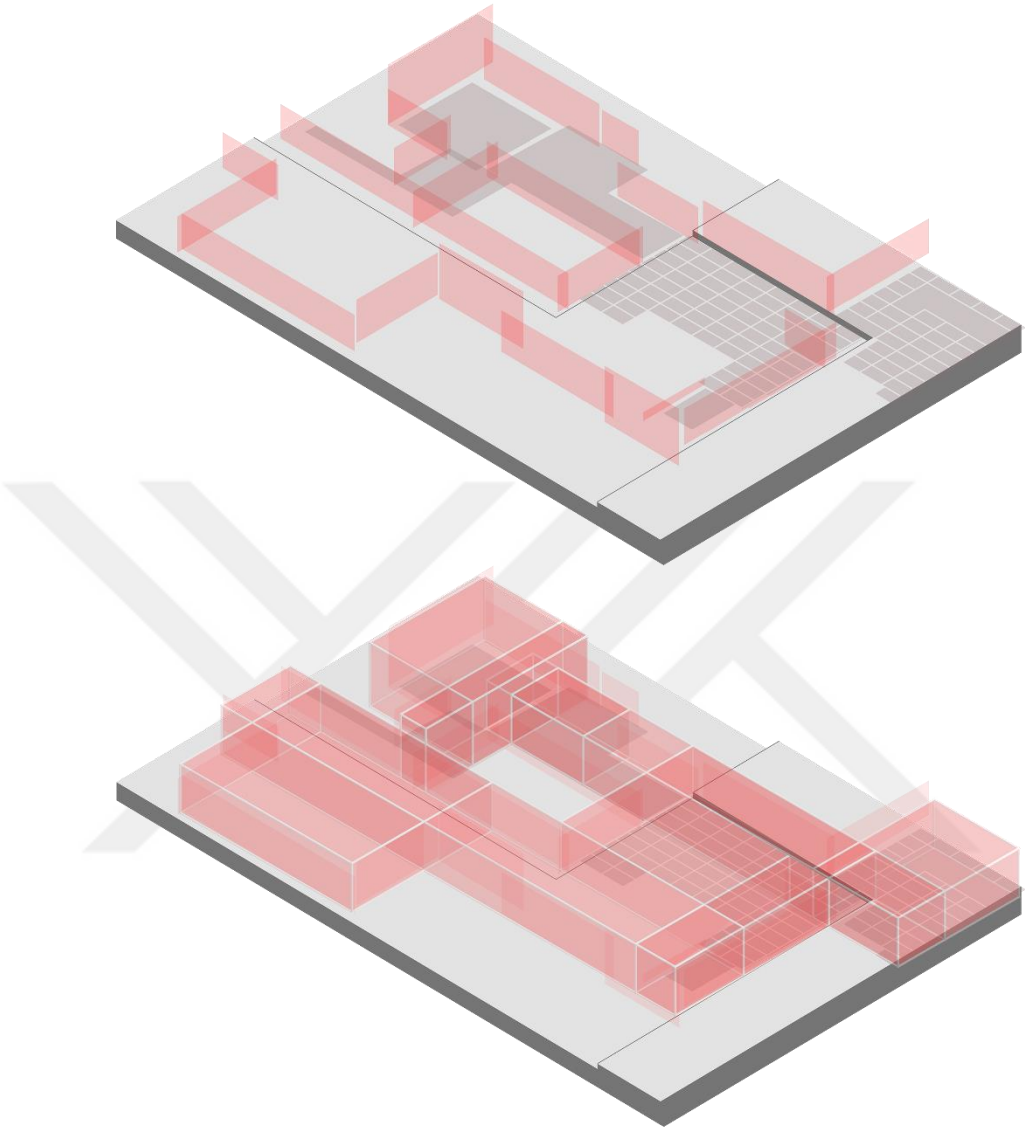


Figure 100. Axonometric model of Administrative Sciences Faculty Building, Architecture Faculty Building and Alle, displaying large and medium scale enclosures and their volume counterparts, produced by the author

The last two figures show the small scale enclosures in addition to others. These enclosures are arranged around the elaborate entrance of the administrative sciences faculty building which resembles a courtyard. Raised platforms, retaining walls,

level changes, pools come together to create a complex arrangement of enclosures. (Figure 101, Figure 102)

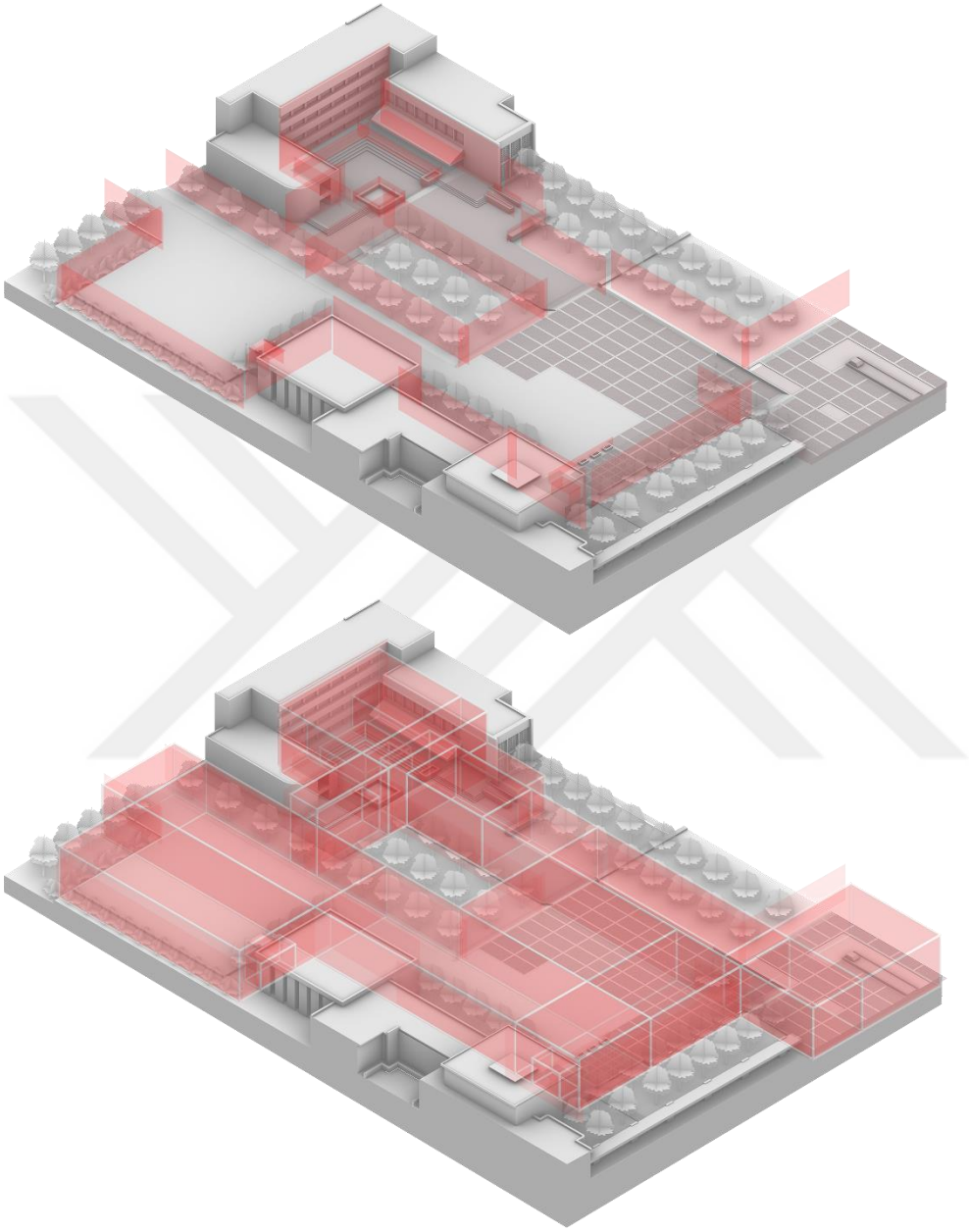


Figure 101. Axonometric model of Administrative Sciences Faculty Building, Architecture Faculty Building and Alle, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

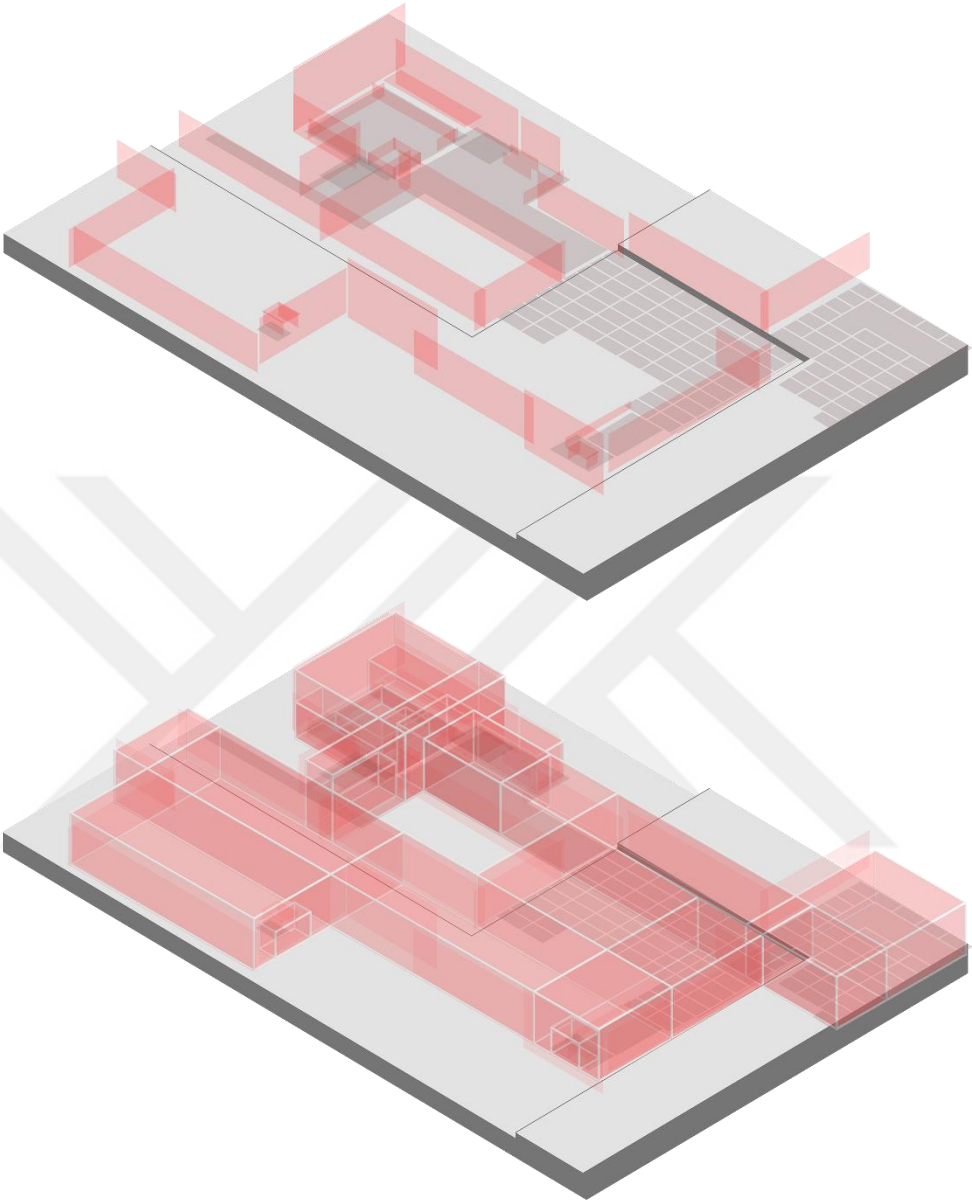


Figure 102. Axonometric model of Administrative Sciences Faculty Building, Architecture Faculty Building and Alle, displaying large, medium and small scale enclosures and their volume counterparts, produced by the author

3.2.8 Unified Volume Model

A unified volume model was developed by merging the individual case studies' volume models. This model aims to display volumes flowing into each other and changing in scale throughout the *alle*. (Figure 103, Figure 104, Figure 105)

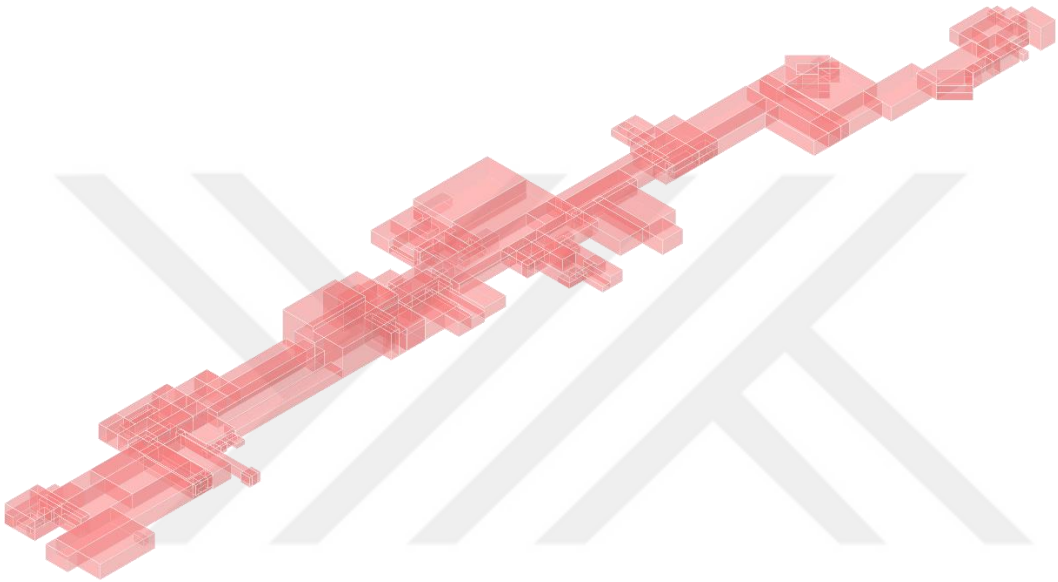


Figure 103. Unified Volume Model

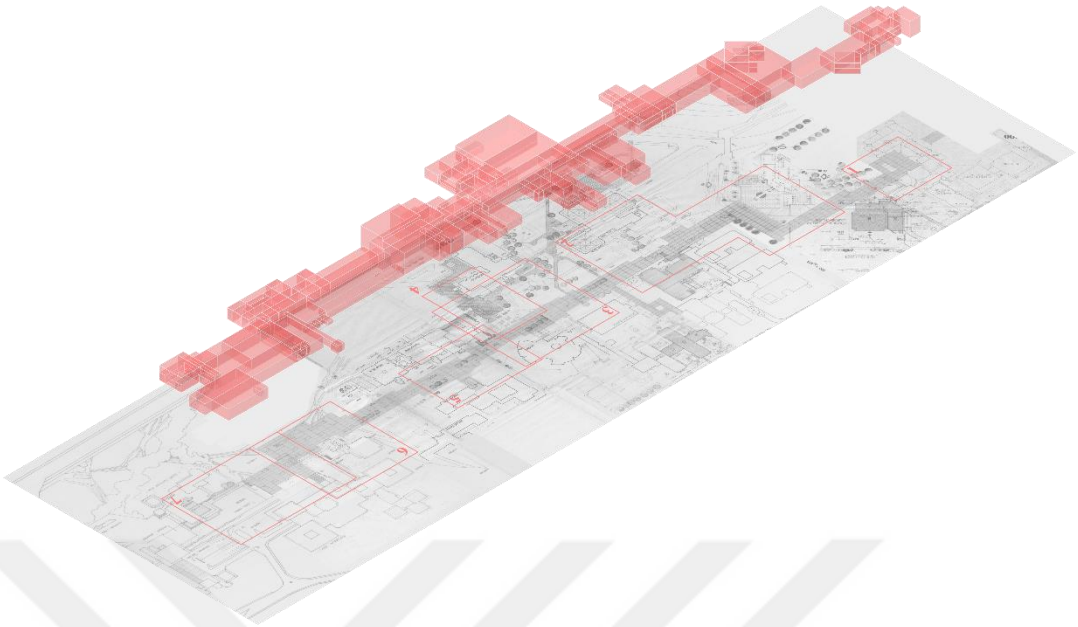


Figure 104. Unified Volume Model and Merged Site Plan

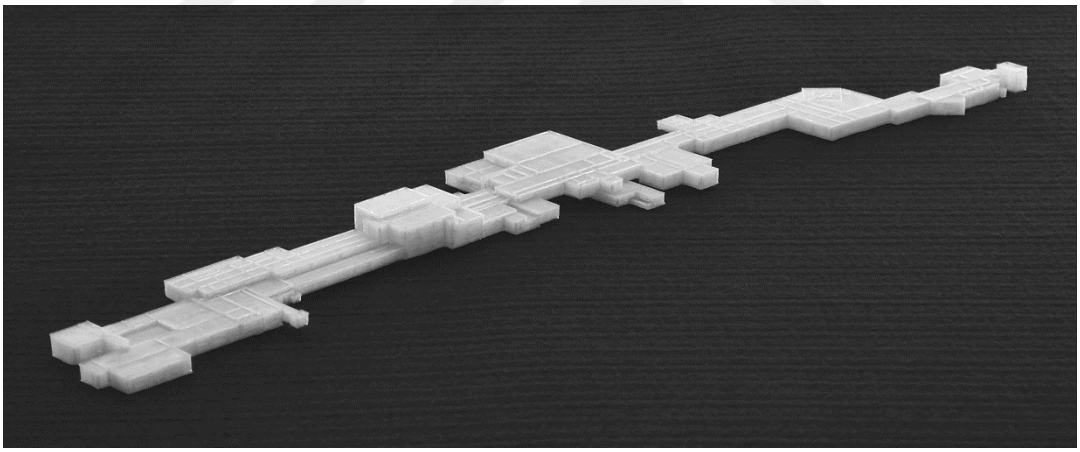


Figure 105. Unified Volume Physical Model, 1/2000

CONCLUSION

This research attempts an alternative reading and the documentation of the METU campus by introducing the notion of "volume as opposed to mass." A major discovery that inspired this approach was the mention of the term in two distinct sources. First source is an interview excerpt by Behruz Çinici regarding the design process of the exterior spaces of the METU Campus, explaining them as being conceived as "positive shapes".[53] The other source was "The International Style", initially produced as the catalog of a 1932 MOMA exhibition, written by Philip Johnson and Henry Russell Hitchcock. This book features a chapter on Volume titled "A First Principle: Architecture as Volume," which argues "volume" is a fundamental element in the design process of the modern architect.[54]

If identification of a mass relies on definite borders, as indicated by Savaş, "there are no borders at the METU Campus." Strong interrelation of courtyards, raised entrance platforms, arcades, entrance gates, and other landscape and architectural elements blur the boundaries.[55] Volumes, as opposed to masses, do not rely on definitive borders, but rely on "enclosures." Although volume implies a three-dimensional space, it does not require concrete visual or material borders, but rather the implications emerging from the arrangement of architectural and landscape elements. This research attempts to explore and systematically represent those

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[53] "The art of creating spaces between buildings is lost today. We see the building as a positive shape used volume. The 'outdoor' established by this volume with the other masses around is generally neglected. I wanted to do this in the forum (the alle). I saw a positive shape in these empty spaces and worked on it by using the tension in the volumes…"
Retrived from Salt Araştrma archives:
https://archives.saltresearch.org/handle/123456789/133?locale=tr

[54] Henry Russell Hitchcock and Philip Johnson, Modern Architecture: International Style, (New York: Museum of Modern Art, 1932), 40-49.

[55] Quote from the initial research paper, first published in Uzay's master's thesis, Uzay Doğan, "Volume Defining Architectural Elements in the Middle East Technical University Campus." Master's Thesis, Middle East Technical University, 2022

implications, understood as “enclosures.” Rather than focusing on individual elements, it proposes that focusing on the arrangement of enclosures provides better insight for uncovering the initial design principles of the METU Campus in the context of “volume.”

The initial research was conducted within the framework of the graduate courses Arch 505 and Arch571 that were given at the METU Architecture Department in the spring term of 2019-2020. This study aims to avoid major shortcomings of the initial research which were the ambiguity of volumetric representation and the intention to develop a comprehensive representative model.

Moving forward from the initial research, rather than attempting a singular, comprehensive representative model, an approach of multiple case studies is proposed. This study argues that it offers a more appropriate visual representation technique. Moreover, as opposed to attempting to represent “volume” directly, this research focuses on the volume defining “enclosures” and their arrangements, as well as the architectural and landscape elements implying those enclosures. After an extensive study on the volume defining enclosures, volumetric representation is attempted again, with clearer results. Another divergence from the initial modeling technique is that this study focuses solely on the *alle* and surrounding exterior volumes, excluding the interior spaces. Lastly, another approach aimed to solve the visual shortcomings is the use of a metaphor: the brush strokes. In the context of architectural representation, the metaphor of brush strokes was interpreted to provide a process for organizing the amount of detail displayed by categorizing enclosures in each iteration of representative models.

The outcome of this research is a series of case studies in the form of axonometric models paired with architects’ original drawings and photographs. These case studies aim to represent volume defining “enclosures” -implied by architectural and landscape elements- and their arrangements throughout the *alle*. This approach is

thought to be able to present the "dream of the architects"[56] as well as the visual condition experienced by residents of the campus.

An important condition of the campus' competition was that the design of the landscape as a whole was to be prioritized over the planning of individual buildings.[57] "Treatment of spaces between buildings" is a significant element in the design of the METU Campus. Mentioned as "positive shapes"[58] by Behruz Çinici, the most prominent example of these spaces is the "*Alle*." The design and arrangement of architectural and landscape elements -arcades, gates, retaining walls, pools, rows of trees, raised platforms, etc.- in the *alle* is presented in a systemic manner. This study argues to have provided a glimpse of the design process behind the exterior volumes in the *alle*.

Alle is described as "the main classroom of the campus" by Behruz Çinici; it is more than a circulation space. This thesis argues that the volumetric arrangement of the *alle* plays a significant role in how the campus is experienced. A crucial factor in the volumetric arrangement of the *alle* is the use of scale; the whole *alle* is divided into segments with level changes, each segment is further divided by rows of trees and other landscape elements, and an arrangement of architectural elements around the building entrances further details those divided volumes. Volumes flow into each other as their scale changes gradually. This carefully designed arrangement of the *alle* allows the campus to be perceived as a unified whole.

To conclude, motivated by the mottos of "research by design" and "conversation by documentation," this research focuses on the subject "volume," volume defining

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[56] A.Savaş, B.Derebaşı, İ.Gürsel Dino, S.Sarıca, S.İnan, Ş.Akın, "Research and Conservation Planning for the METU Faculty of Architecture Building Complex by Altuğ-Behruz Çinici, Ankara, Turkey", Keeping It Modern Project Report, (Getty Foundation, 2018), p. 91-95

[57] Report to the Board of Trustees on the Campus Plan of METU, December 1959, approved by Trustees in January 1960 (METU Archive).

[58] Behruz Çinici's interview, Salt Research, https://archives.saltresearch.org/handle/123456789/133?locale=tr, retrieved 23.07.2022

“enclosures” and the *alle* -which is one subject among many- and contributes to the ongoing collective archival effort regarding the METU Campus.

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