ACADEMIC STUDIES IN ARCHITECTURE, PLANNING AND DESIGN - I

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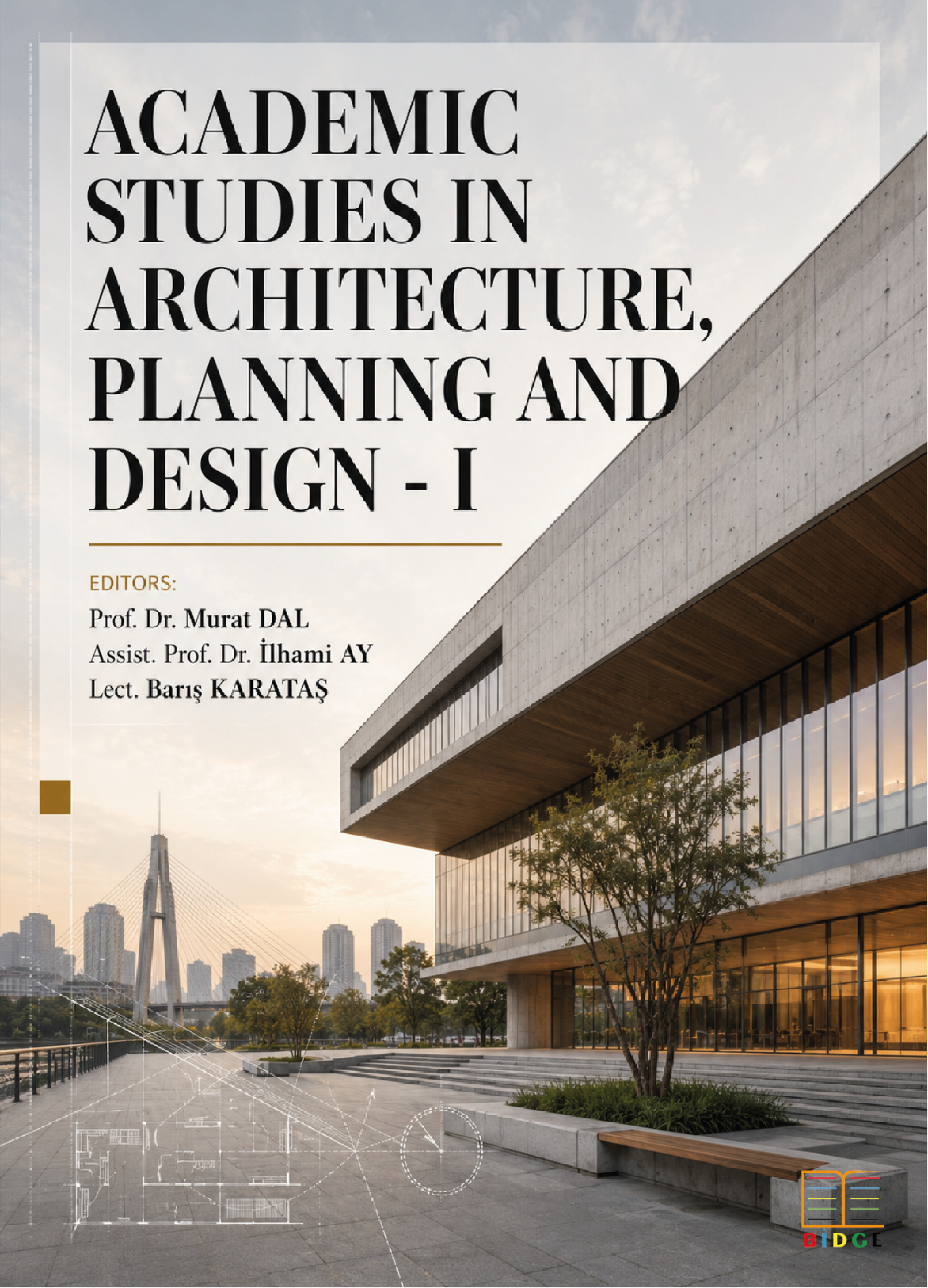

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CHAPTER 1

HOUSING UTOPIAS OF THE FUTURE

Zübeyde ÇİÇEK[1]
Halil SEVİM[2]

Introduction

Housing has been in a state of constant change and transformation over the centuries. Utopias, which emerged in antiquity as a reflection of the quest for an ideal society and a perfect life, have been reimagined in various forms over time, shaped by the socio-economic, cultural, and technological conditions of their respective eras. In this context, utopias are not merely imaginary depictions; they are also evaluated as critical and guiding systems of thought that seek answers to social needs and problems. The transformation of utopias within the historical process and the conceptual approaches that have developed as a result have been examined. Utopias, examined within a chronological framework starting from the Ancient Era, were analyzed through the conceptual

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This study is based on Zübeyde ÇİÇEK's master's thesis titled "UTOPIAS OF FUTURE HOUSING."

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framework of digitality, adaptation, mobility, and flexibility based on the results of a literature review. In this regard, the presence of these concepts was examined through the utopias under consideration, and a comparative evaluation was conducted. The analysis demonstrates that the concepts emerging in utopias are in a state of mutual interaction. It has been observed that the utopias developed by the utopists of their time possess the potential to offer alternative housing models for society in the future. It has been concluded that housing is not merely a structure; rather, it serves as both a reflection of social and technological transformations and a mechanism that directs these transformations.

Definition of Utopia

The human quest for a better and happier life has led to the emergence of ideal societal designs for the future, which have been expressed in works known as utopias. The concept of utopia is generally defined as intellectual constructs that depict ideal social orders considered difficult or impossible to achieve (Balı & Uğur, 2013). Utopias are narratives of non-existent "good places" that critique the existing order and envision an alternative ideal social order (Canbaz Yumuşak, 2012). While some views in the literature argue that utopias possess an unchanging structure, other approaches contend that they represent a timeless ideal order independent of historical context. The emergence of utopias is often associated with periods of social conflict and disorder; therefore, they serve as a critical response to existing systems (Çavuşoğlu, 2025). The concept of 'Utopia' first appeared in the Libellus vere aureus nec minus salutaris quam festivus de optimo reipublicae statu (1516), written by Thomas More in his 1516 work, Libellus vere aureus nec minus salutaris quam festivus de optimo reipublicae statu, deque nova insula Utopia (short for On the Best State of the Republic and the New Island of Utopia), which describes an "ideal" city-state named Utopia located on an island. The work was written in Latin, and since

the Latin letter ‘u’ in the title was written as ‘V,’ the work was initially known as ‘Vtopia.’ Although the word ‘Utopia’ does not appear in ancient Greek dictionaries, it is derived from words of ancient Greek origin. More combined the negative prefix ou (οὐ) with the word topos (τόπος), meaning “place,” to create the concept of outopia, meaning “no place,” and pronounced it as utopia. Additionally, he referenced the term “eutopia” (meaning “good place”), derived from the combination of “eu” (εὖ), meaning “good,” and “topos.” Thus, the concept of “utopia” introduced by More encompasses both the meanings of “non-existent place” (outopia) and “good place” (eutopia) (Omay, 2012). The concept of utopia is still used in two senses, beyond the Turkish Language Association’s definition of “an impossible design.”

The concept of utopia (utopia) has two fundamental meanings because, in Thomas More’s work Utopia, it serves both as the title of the book and the name of the ideal state described within it. In its first sense, utopia is the title of the literary work written by More. In its second sense, utopia refers to a fictional city-state or societal construct—one that does not currently exist but is imagined, carrying the claim of an unfulfilled ideal where everyone lives together in happiness. In this work, More reimagined the political, economic, and social order through a fictional island society; thus presenting utopia as an intellectual tool that critiques the existing social structure (More, 1516/2006). This second meaning has expanded over time as similar works written both before and after More were also evaluated under the “utopia” heading. The characteristics of More’s utopia—such as its non-existence yet possibility, its ideal nature, its being established by human hands, its island form, and its status as a city-state—have diverged in form and content in subsequent works. For example, Bensalem in Bacon’s New Atlantis argues that idealism can be achieved through science; Swift’s Land of the Houyhnhnms, however, eliminates the utopia’s

quality of being human-made and possible. While Platon's Republic adds the dimension of justifying idealism to the utopia, the communist/classless society utopia carries this ideal into the future. Examples such as Atlantis, Eden, and the Golden Age, however, situate utopia in the past, the future, or a timeless realm of belief. Ideality is generally adopted as a fundamental characteristic; in More's work, the primary emphasis is also on the "ideal state." In line with these characteristics, the concept of utopia can be defined; it can be used to encompass depictions of an ideal society within mythological, philosophical, fictional, or historical contexts. The concept of utopia is closely related to the concepts of cacotopia, dystopia, and counter-utopia. These concepts generally serve as the antithesis of utopia, expressing depictions of societies and spaces that are bad, oppressive, or non-ideal. Thus, utopia has acquired different layers of meaning over the course of history and has become one of the central concepts of the idea of an ideal society (Omay, 2012).

The historical origins of utopia vary depending on how the concept is defined. When a broad definition is adopted, the roots of utopian thought extend far back in time, to the visions of a "golden age" and an "ideal life" found in nearly every society. Examples of these early utopian visions include the Krita Yuga in the Mahabharata, the Age of Perfect Virtue in Taoism, and the Garden of Eden in the Old Testament. The first utopian narrative with a known author is generally considered to be the land of the Phaeacians in Homer's Odyssey. In the Ancient World, utopian thought developed through mythological narratives and philosophical constructs of ideal societies. Prominent examples from this period include Hesiod's depiction of the Golden Age, Platon's ideal state and the city of Magnesia, Aristotle's conception of the ideal state, the myth of Atlantis, the Spartan system, and Aristophanes' social satires. Additionally, Al-Farabi's El-

Medinetü'l-Fazıla, depictions of paradise in Christianity and Islam, and the sacred and happy islands featured in medieval travel narratives also represent different forms of utopian thought. In the modern sense, utopia began with Thomas More's 1516 work Utopia. This work established utopia as an independent literary and intellectual genre and laid the groundwork for an intense production of utopian works, particularly in the 16th and 17th centuries. Thinkers such as Rabelais, Campanella's The City of the Sun, Bacon's New Atlantis, Harrington, and Andreae developed designs for ideal societies during this period. In the 18th and 19th centuries, utopian thought took on a new dimension alongside the Enlightenment, the Industrial Revolution, and social transformations. Swift's Gulliver's Travels, Voltaire's depiction of Eldorado, Rousseau's Social Contract, and the utopian socialist approaches of Owen, Fourier, and Saint-Simon are prominent examples of this era. In the same century, writers such as Bellamy, Morris, and Hertzka produced fictional depictions of egalitarian societies of the future. In the 20th century, it is generally accepted that the tradition of utopia was largely supplanted by anti-utopian (dystopian) works. Nevertheless, significant utopias were also written in this century. Authors such as H. G. Wells, Aldous Huxley, Ursula K. Le Guin, Italo Calvino, and B. F. Skinner reinterpreted utopia; themes such as ecology, gender, science, and technology came to the fore. Utopias are classified into different types based on the intellectual foundations they rest upon. Political utopias, as exemplified by Plato's ideal state, explore the social conditions under which an ideal political order might be possible. Historical utopias, as seen in Marx and Engels' vision of a Communist Society, describe ideal social orders believed to emerge as the inevitable result of historical development. Philosophical–anthropological utopias, on the other hand, aim for the realization of humanity's full potential, as in Schiller's On the Aesthetic Education of Man. Ernst Bloch and Herbert Marcuse divide utopias into abstract and concrete

utopias. While abstract utopias are fantastical and detached from reality, concrete utopias are grounded in critical social theory and possess a transformative quality (Omay, 2012).

Utopias encompass many fields. Utopias are not limited to merely spatial or architectural constructs; they are regarded as conceptual designs that address a wide range of areas—from social structure to politics, from economics to technology, and from culture to daily life—through a holistic approach.

Utopias can be classified into artistic/literary, philosophical–scientific/ideological, and mythological–religious categories. While artistic/literary utopias do not provide detailed justifications for the ideal order, philosophical–ideological utopias explain why and how the ideal is to be realized. Mythological–religious utopias, on the other hand, are based on the belief that the ideal society existed in the past or will exist in the future. Utopia and utopianism have been criticized on three main points. The first criticism, articulated since Aristotle, argues that depictions of the ideal state constitute a flawed method from the perspective of political science. The second criticism, pioneered by Marx and Engels, maintains that utopian thought is based on a naive, unrealistic, and erroneous understanding of human nature. The third criticism, developed by Popper, argues that utopian societal designs would lead to oppressive and violence-based systems in practice. In contrast, defenders of utopia point out that utopias are not blueprints for flawless societies to be established in the future, but rather intellectual tools that critique the existing society and make social transformation possible. According to Mannheim, utopian thought aims for social change, while according to Bloch, utopias carry the potential for hope and progress. In the 21st century, discussions about utopia and utopian thought continue to persist (Omay, 2012).

Utopia and Architecture

Throughout history, the city has been not only a settlement but also the spatial expression of political authority and social order. Utopian thought has also largely conceived of ideal societal designs through the lens of the city, thereby making the relationship between space and power visible. The quest for an ideal order developed within the framework of the polis concept in Ancient Greece demonstrates that urban organization was considered alongside ethical and political principles. In this approach, the city was evaluated not merely as a physical environment but as a regulatory framework in which a conceptual ideal was embodied (Ertan, 2012).

In his work The Republic, Platon defines the ideal social order through the division of labor among classes and a hierarchical structure, while also conceptualizing the spatial counterpart of this social organization; the city's layout is treated as the physical reflection of a rational system under the rule of philosopher-kings (Platon, 2016). Thomas More, on the other hand, concretizes the principle of equality through spatial standardization in Utopia; dwellings with similar floor plans and a concept of communal ownership aim to eliminate social differences through spatial means (More, 1516/2006). In Tommaso Campanella's The City of the Sun, the city is designed with concentric circular walls and a layered settlement pattern; this scheme presents a symbolic spatial organization representing both a defensive mechanism and an understanding of universal-cosmic order (Campanella, 1602/2020). In Francis Bacon's New Atlantis, the spatial framework is built upon a system where scientific knowledge serves as the fundamental driving force of social progress; specifically, through the House of Solomon, architecture is defined as a tool for producing experimental knowledge aimed at understanding and controlling nature (Bacon, 1627/2021). When evaluated together, these works reveal that utopian thought is not merely a design of a social ideal; it

is also a field of production where ideological, scientific, and philosophical approaches are materialized through spatial organization.

The rapid transformation in the structure of cities brought about by the Industrial Revolution shifted the direction of utopian thought. The intensification of industrial production, population growth, and environmental degradation led to criticism of the existing urban order. With the rise in fossil fuel use, environmental impacts have reached a global scale; cities have largely lost their holistic relationship with nature. The utopian proposals developed during this process aimed to create alternative spatial models in response to the inequalities and unhealthy living conditions created by the industrial city (Yüksel, 2012).

Approaches such as the Garden City and Broadacre City, which emerged in the early 20th century, can be regarded as spatial expressions of the desire to repair the rupture between the city and nature. However, within the same century, dystopian narratives focusing on the risks created by technological progress also gained traction; they laid the groundwork for questioning the progress promised by modernity. In the 1960s, an optimistic utopian vision based on high technology emerged; it was believed that spatial problems could be solved through megastructures and dynamic urban systems (Sekman, 2017).

The Evolution of Utopia

The concept of utopia has continually evolved throughout history as a response to social crises and spatial constraints. This evolution spans a broad spectrum, ranging from the mythological and philosophical quests of antiquity to the technical and ecological solutions of the modern era. The origins of utopia lie in humanity's quest for an "earthly paradise" and a "golden age." In Ancient Greek

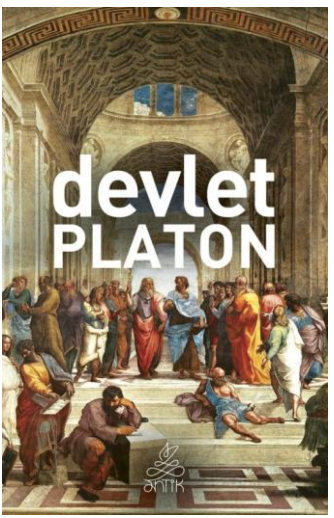
thought, utopia was primarily a search for an ideal political and moral society. Platon's works The Republic and Critias are the most significant references of this period. In particular, the depiction of Atlantis—with its central sacred spaces and the circular water channels surrounding them—is a spatial reflection of a rigid hierarchy and geometric order. Utopias of this period position urban design as a vehicle for social virtue. Following the Middle Ages, with the Renaissance, utopia became institutionalized as a literary genre. Thomas More's 1516 work Utopia presents a disciplined island order where property is held in common and every city is built according to the same plan. Campanella's The City of the Sun, meanwhile, transforms the city itself into an educational tool by surrounding it with walls symbolizing the seven planets. During this period, "Ideal City" designs took concrete form in star-shaped (such as Palmanova) radial plan schemes that combined military defense needs with aesthetic perfection. The environmental pollution and unhealthy living conditions created by the Industrial Revolution brought about a radical break in the history of utopia. Utopias of this period took on a character focused on health and hygiene. Robert Owen's small-scale cooperative villages and Charles Fourier's collective housing blocks, known as "Phalansteries," advocated for communal living over private property. These models aimed to rescue the city from the chaos created by factories, scale it down to a human scale, and reintegrate it with nature. In the early 20th century, Ebenezer Howard's "Garden City" model emerged as one of the first viable utopian projects to combine the advantages of the city and the countryside. With Modernism, utopia transformed into massive-scale projects under the influence of technology and speed (Yüksel, 2012).

Platon – The Republic

The Republic, written by the ancient Greek philosopher Platon, is one of the most important philosophical texts discussing the concept of justice, the ideal social order, and what a state should be like. In The Republic, Platon asks the questions: “What should an ideal state be like?” and “What is justice?” Figure 1 shows the book. Written in the form of a dialogue, the work examines the meaning of justice at both the individual and societal levels, particularly through the character of Socrates. According to Platon, people come together to form society and the state because they cannot meet their needs on their own. In this process, a division of labor emerges within society, and individuals take on roles suited to their abilities. The state is an enlarged reflection of the human soul. The human soul consists of three fundamental parts: reason (logos), will or passion (thymos), and desire (epithymia). Reason is associated with wisdom and thought, will with courage, and desire with physical needs and pleasures. A virtuous individual is one in whom these three parts function in harmony. This spiritual structure is also reflected in the ideal state order. Platon divides the state into three fundamental classes: rulers (philosophers), guardians (soldiers), and producers (farmers, artisans, merchants). Each class corresponds to a part of the soul and fulfills a function appropriate to its nature. Justice is achieved when each class performs its own duty and does not interfere with the domain of other classes. The governance of the ideal state is grounded in a principle based on knowledge and virtue. Through the concept of philosopher-kings, Platon argues that the state should be governed only by those capable of grasping true knowledge. Philosophers are individuals oriented toward the world of unchanging and universal Ideas, rather than the variable and deceptive sensory world. In this context, the Idea of the Good holds a central position as the source of all knowledge and virtue. According to Platon, the sustainability of the ideal state is directly

linked to the educational system. Education ensures that individuals' talents are identified at an early age and that they are directed toward appropriate social roles. In particular, rulers must undergo a long and gradual educational process; mathematics, dialectic, and philosophy are regarded as the highest realms of knowledge. Education also serves as a tool for preserving the moral structure of society, and for this reason, the influence of art and poetry on society must be regulated. The theory of knowledge occupies an important place in The Republic. Platon argues that the world perceived through the senses is insufficient for attaining true knowledge. This idea is concretized in the famous "Allegory of the Cave." In the allegory, people, chained in a cave, mistake the shadows projected on the wall for reality. The individual who emerges from the cave discovers the truth—that is, the world of ideas. However, upon returning, he is misunderstood and ostracized by the others. This allegory symbolizes the philosopher's position within society and the transformative yet challenging nature of knowledge (Platon, 2016).

Figure 1: Platon – The Republic



Reference: Platon, 2017

Platon also addresses corrupted forms of government while explaining the ideal state order. While aristocracy represents the ideal order, timocracy, oligarchy, democracy, and tyranny are defined as increasingly corrupted regimes. This analysis demonstrates that Platon evaluates political orders through ethical values and that the loss of justice leads to political collapse. The Republic presents a comprehensive philosophical framework that addresses justice within a holistic understanding of the order established among the individual, society, and the state. By arguing that a virtuous individual can only be nurtured within a just state order, Platon presents the concept of the ideal state as a normative and theoretical model. In this regard, the work is recognized as one of the early and foundational examples of utopian thought and lays the groundwork for the ideal society designs of later thinkers such as Thomas More, Campanella, and Bacon (Platon, 2016).

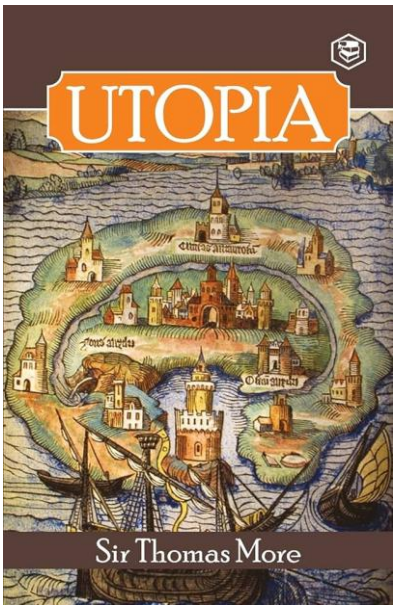
Thomas More – Utopia

Thomas More's work Utopia is regarded as one of the foundational texts of modern utopian thought and examines the design of an ideal society within a holistic system that encompasses its political, economic, and spatial dimensions. Through a dialogue structured in two parts, the work offers both a critical assessment of 16th-century England's social structure and presents a model of order based on an alternative island society. While describing an ideal societal model through the lens of a fictional island, the book opens up discussions on topics such as social inequality, justice, and the relationship between the individual and society. The word "Utopia" is of Greek origin; while it originally meant "no place," over time it came to signify the concept of an "ideal society." The work consists of two parts: In the first part, Thomas More discusses governance issues in various countries with his friends and the traveling philosopher Raphael Hythloday, offering a critical perspective on the political mindset of the era. In the second part,

Hythloday provides a detailed account of the geographical, social, economic, and political order of the island of Utopia; the islanders' way of life, system of government, and social values are presented as a model of an ideal society. The economy on the island is based on the common welfare of all. Money is not used in Utopia, and precious metals such as gold and silver are devalued in the eyes of society. By crafting utensils from gold or placing gold chains on criminals, the greed people feel toward these metals is eliminated through a psychological method. Work is mandatory for everyone, but the workday lasts only six hours. In their remaining time, people devote themselves to science, art, and philosophy. Agricultural knowledge is mandatory for every citizen; city dwellers take turns visiting the villages to participate in the production process. This prevents the formation of class divisions. The social structure is built around the family unit, and hierarchy is based on age. Young people show respect to the elderly, and there is a division of labor between women and men. Interesting rules are applied to ensure that partners get to know each other before marriage, and divorce can only occur in cases of serious fault, by a decision of the council. Urban planning follows a mathematical order; all 54 cities share the same architectural style, language, and laws (More, 1516/2006). Thomas More's Utopia Island: a crescent-shaped island measuring 500 miles by 200 miles, with a large bay at its center; the distance between the two ends of the crescent is 11 miles; it comprises 54 cities, each divided into four equal sections, featuring walls, stone bridges, and hygienic streets, three-story structures made of stone or brick have replaced the single-story mud-brick houses of the old Utopia; every home has gardens where fruits and vegetables are grown; and in a society where private property is prohibited, a system exists where homes are rotated every ten years to eliminate the sense of ownership (Balı & Uğur, 2013). Utopia presents an ideal societal design within a systematic framework by establishing a holistic relationship between the economic order, political organization, and spatial

planning. The abolition of private property, the collective organization of production, and the establishment of spatial equality emerge as fundamental components of the concept of justice. In this regard, the work constitutes a comprehensive utopian design that encompasses both a critique of the existing order and the theoretical framework of an alternative social model (More, 1516/2006).

Figure 2: Thomas More – Utopia



Reference: More, 1516/2021

The laws are so simple and few in number that there is no need for complex legal systems or lawyers. In Utopia, there is widespread tolerance regarding religion. People may believe in different gods or forces of nature, but they avoid fanatical debates that would disrupt social harmony. They are united under a single belief in a "Supreme Being." Only those who do not believe in the immortality of the soul are partially deprived of their civil rights on the grounds that they have severed the spiritual bonds that hold society together. War is a repulsive act for the Utopians; however, if

the defense of the homeland is necessary, they strive to end the war using intelligence and cunning, without shedding the blood of their own citizens. Within this entire system, the institution of slavery also exists; however, these slaves are generally citizens who have committed serious crimes or prisoners brought from other countries. These individuals perform the heaviest and dirtiest tasks. With this comprehensive portrayal, Thomas More actually presents the reader with a paradox: he prompts us to question whether some individual freedoms must be sacrificed to fully ensure justice and prosperity. The work remains one of the most comprehensive thought experiments on how humanity might live better, spanning from five hundred years ago to the present day (More, 1516/2006).

Tommaso Campanella – The City of the Sun

Tommaso Campanella was born on September 5, 1568, in Stilo, in the Calabria region of southern Italy. He was an Italian poet, writer, and philosopher who sought to reconcile Roman Catholic theology with Renaissance humanism. The City of the Sun depicts an ideal state governed by reason and wisdom, much like Plato's Republic. The city, built atop a large hill, rises in concentric circles. The city's diameter is 2 miles, and its circumference is 7 miles. The city, composed of seven circles, is named after the planets. Architecturally and in terms of urban structure, the City of the Sun is a circular city composed of seven large, interlocking circles (walls). Between each circle are mansions, spacious courtyards, and walkways supported by columns. At the very top of the city, in the center of a vast plain, stands a massive, circular, double-domed temple. Inside the temple's dome is a special flag indicating wind direction and used to predict weather, along with a book with gold-lettered text that is constantly updated. The city's most striking feature is its "educational walls" and culture of knowledge, where the walls themselves serve as sources of information. The inner and outer surfaces of the walls feature numerous visuals and

explanations ranging from celestial bodies to mathematical symbols, and from minerals to all branches of science. As the people explore the city, they simultaneously learn the secrets of the universe and the sciences. There is a single foundational book called “Reason,” and all sciences are shaped in the light of this book (Campanella, 2020).

System of Governance The city is governed by a hierarchy based on merit and wisdom:

- Hoh (Metaphysics): The supreme ruler; holds absolute authority over both spiritual and worldly matters.
- Pon (Power): Responsible for war, peace, and military strategy.
- Sin (Reason): Manages all scientific activities and schools, from the natural sciences to education.
- Mor (Love): Deals with social order and production.

Thanks to this structure, the city represents a perfect order governed by science and discipline, where every individual is deeply integrated with education (Campanella, 2020).

The Sun City represents an order where individual interests are replaced by the common good, based on the shared use of everything. In this system, the prohibition of private property has resolved issues such as selfishness, greed, and class division. In the governance of society, the highest ruler, known as the Hoh, is accompanied by three assistants who represent Power, Wisdom, and Love. Rulers attain these positions not through their lineage, but through their expertise in science, philosophy, and the practical arts, as well as their moral superiority (Campanella, 2020).

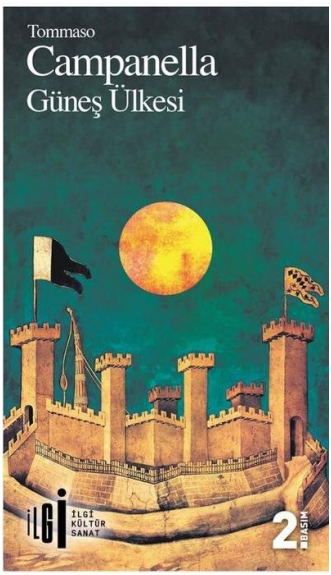
Education is the cornerstone of this system. Children begin learning through play and observation from a very young age; the knowledge inscribed on the city’s walls makes education a natural

part of life. The work schedule is quite light thanks to everyone's collective effort; the people, who work only four hours a day, devote the rest of their time to mental and physical development. Relationships between men and women, as well as reproductive processes, are not left to chance but are subject to the scientific oversight of physicians and administrators. The goal is to raise the healthiest generations, both physically and mentally. In this system, which replaces the traditional family structure, children are raised collectively by the state and guided toward professions based on their talents (Campanella, 2020).

In the Sun Country, individual life is intertwined with social discipline and scientific rationality. Nutrition and clothing are regulated not by personal taste but by health and seasonal needs under the supervision of physicians. The military structure is a defense-oriented, merit-based system in which both women and men are educated from a young age. The division of labor in society is based on individuals' natural talents, and every profession (agriculture, craftsmanship, science) is considered equally honorable. The justice system aims not so much to punish as to reintegrate the individual into society and eradicate vices such as selfishness. The fundamental philosophy is to establish a welfare system that is free from ostentation, based on collective work, and meticulously planned in every detail. There are no prisons in the traditional sense; criminals are held in places called the Tower. Executions are carried out by the people. This symbolizes a collective rejection of crime and social purification. For the inhabitants of the Sun City, religion is a structure integrated with the laws of nature and astrology. God is symbolized by the Sun; the Sun is the source of life, heat, and light. The movements of the planets and the stars are decisive in determining the timing of social events (wars, reforms, births). A quest for a natural religion in which all faiths converge at a single point is observed (Campanella, 2020).

The Sun City presents an ideal societal model centered on the fundamental concepts of utopian thought, such as equality, communal property, justice, and solidarity. Campanella's work is regarded as one of the key theoretical texts of the early utopian tradition, alongside Plato's concept of the ideal state and Thomas More's Utopia (Campanella, 2020).

Figure 3: Tommaso Campanella – The City of the Sun



Reference: Campanella, 2020

Francis Bacon – New Atlantis

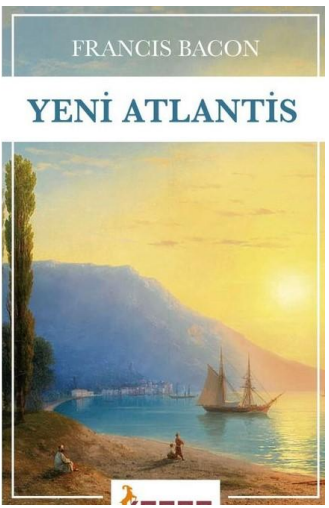
Francis Bacon's work New Atlantis is a significant text that reshapes the classical utopian tradition from a scientific perspective. The island of Bensalem depicted in the work not only presents a model of a moral and orderly society but also outlines a vision of a civilization where knowledge is systematically produced and institutionalized. In this regard, the work offers a theoretical framework regarding the position of science within the social structure during the early modern period (Bacon, 1627/2021). Figure 4 shows an illustration from the book. New Atlantis*begins with a

European ship's crew, having lost their way during a sea voyage, reaching an unknown island. Starving and sick, the sailors seek refuge in Bensalem. The islanders are initially cautious; the strangers' identities and beliefs are questioned. Once it is understood that they are Christians, however, a measured hospitality is extended, and the sailors are housed in a special guesthouse (Bacon, 1627/2021).

Bensalem's most distinctive feature is its adoption of a deliberate policy of isolation from the outside world. The island's leaders state that while they had previously interacted with other societies, they eventually limited external influences to preserve their own social order (Bacon, 1627/2021). However, this isolation does not imply an intellectual disconnect. Individuals appointed at regular intervals are tasked with traveling to foreign countries to gather scientific advancements and new discoveries. The primary aim here is not economic gain, but rather to acquire knowledge and use it for the benefit of humanity. Bacon thus conceives the flow of knowledge as a controlled yet continuous process. The House of Solomon (Salomon's House), central to the work, is the foundational institution representing Bensalem's scientific power. This structure was established to investigate the hidden causes of nature and develop applications to improve human life. A systematic division of labor exists within the institution. Some officials gather scientific knowledge from the outside world, some organize and classify experiments, some conduct new experiments, and others derive general principles from the findings. This organization demonstrates that knowledge has been transformed from an individual pursuit into an institutional and collective endeavor. The experimental areas clearly illustrate Bacon's understanding of experimental science. Studies conducted in underground caves, tall towers built to examine atmospheric phenomena, grafting and hybridization experiments on plants, observations conducted on animals, and various mechanical

devices all demonstrate that nature is viewed as a field that can be transformed through human intervention. The organization of Salomon's House, divided into underground and above-ground spaces, reflects the layered and hierarchical nature of knowledge. While the underground experimental areas represent a controlled imitation of nature, the high towers symbolize the idea of dominating nature from above through celestial observations (Bacon, 1627/2021).

Figure 4: Francis Bacon – New Atlantis



Reference: Bacon, 1627/2021

In Bensalem's society, there is no conflict between religion and science. The islanders' adoption of Christianity is grounded in the arrival of sacred texts on the island. Scientific activity, meanwhile, is viewed as an effort to understand the order created by God. Thus, Bacon addresses the religion–science relationship—which was contentious in the early modern period—on a conciliatory basis. Science is legitimized as the discovery of the divine order and its use for the benefit of humanity. The institution of the family also holds a significant place in the social structure. The honoring of multigenerational families and the respected status granted to family

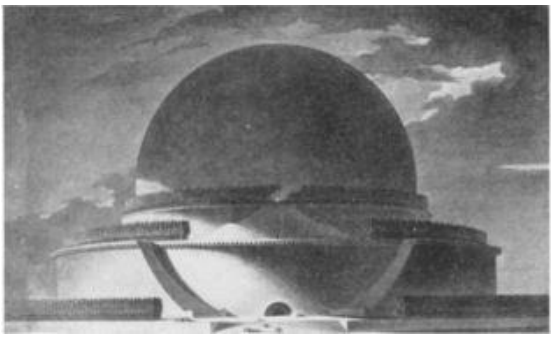
heads function as a mechanism for maintaining social stability (Bacon, 1627/2021). Moral discipline and order are presented as prerequisites for scientific progress.

Étienne-Louis Boullée, Cenotaph for Newton

Étienne-Louis Boullée, who brought about a significant shift in architectural thought in the late 18th century, opposed the Vitruvian view that defined architecture solely as the "art of building." According to him, architecture is first and foremost a mental creative process; construction, meanwhile, is a subsidiary field representing the scientific and technical aspects of architecture. For this reason, architecture should be defined as "the art of designing and perfecting any building." For Boullée, architecture is rooted in poetry. In his view, public buildings in particular should be, in a sense, poetry; they must evoke emotions in harmony with the building's function (Boullée, 1794/2019). The power of architecture lies in the effect of volumes on the senses and in the interplay of light and shadow. This approach forms the basis of his conceptualization of "architecture des ombres" (architecture of shadows). Through the arrangement of masses, the use of light, and deep shadows, a sublime effect must be created in the viewer (Kaufmann, 1939). According to Boullée, the principles of architecture must derive from nature. He opposes views advocating for "pure invention" or arbitrary interpretations. Regularity, symmetry, and simple geometric forms are aesthetic categories. Therefore, pure geometric forms such as the sphere, pyramid, and cube are architecture's most natural and powerful tools. The sphere, in particular, is regarded as the "perfect form" due to the regular transitions of light and shadow it produces. Boullée's critiques of the development of architecture are also noteworthy. Architects' preoccupation with technical details and contracts in public projects hinders their ability to engage in theoretical production. Science progresses more rapidly because it is verifiable; yet the beauty of art lacks mathematical precision and

requires the ability to interpret nature. For this reason, artistic progress is rarer and more fragile (Boullée, 1794/2019).

Figure 5: Étienne-Louis Boullée, Cenotaph for Newton



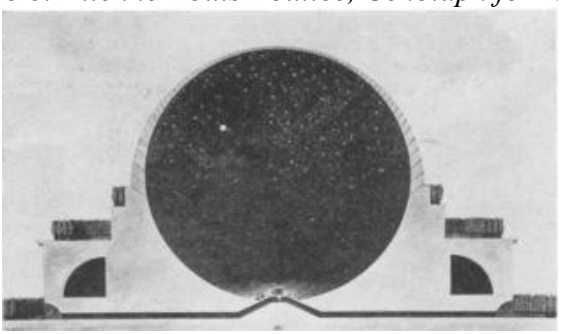
Reference: Kaufmann, 1939

Boullée's most striking unbuilt project is the Cenotaph for Newton. This monument was designed as a massive sphere. Boullée viewed Newton as a genius who "encompassed the universe with his mind"; for this reason, he placed him inside the sphere, a symbol of the universe. Designed to be approximately 150 meters tall, this massive structure creates a monumental presence on a colossal scale. The sphere rises from a wide platform surrounded by trees, a direct reference to the relationship between nature and science. Access to the sphere is provided via a single, expansive main platform; the monument's grandeur is emphasized through massive columns and wide staircases. The building's design is composed of large, massive volumes brought together, an approach that distinctly diverges from the architectural philosophy of the era (Boullée, 1794/2019). The structure is shown in Figures 5 and 6.

The lower part of the structure gives the impression of being buried in the ground; this emphasizes the tomb's character in line with Boullée's concept of "architecture ensevelie" (buried architecture) (Kaufmann, 1939). This sense of being buried expresses the theme of death through architectural form. The lighting

design created within the interior, however, represents Boullée's most radical design move. Daylight entering through small openings in the spherical surface creates the effect of a starry night sky inside the space during the day. At night, a massive light source suspended at the center creates a daytime effect like an artificial sun. Thus, it creates an illusionary effect in the space. Boullée defines this effect as "immensity" and prompts the viewer to contemplate the Creator. Boullée aimed to reflect the idea of boundlessness in nature into architecture by associating architectural forms with natural elements (Boullée, 1794/2019). The Newton Monument is regarded not only as a symbol of respect for science and nature but also as a powerful symbol of the concept of immortality. Throughout his life, Boullée constructed only a few buildings; his primary legacy consists of his drawings and an unpublished treatise. His death (1799) went almost unnoticed. However, he was rediscovered in the 20th century by Emil Kaufmann and recognized as one of the pioneers of modern architecture (Kaufmann, 1939).

Figure 6: Étienne-Louis Boullée, Cenotaph for Newton



Reference: Kaufmann, 1939

Claude-Nicolas Ledoux, Plan of Chaux

Claude-Nicolas Ledoux (1736–1806) was an architect and urban planner who lived in France during the 18th century (Kaufmann, 1952). Known for his utopian approach to architecture, Ledoux worked both before and after the French Revolution,

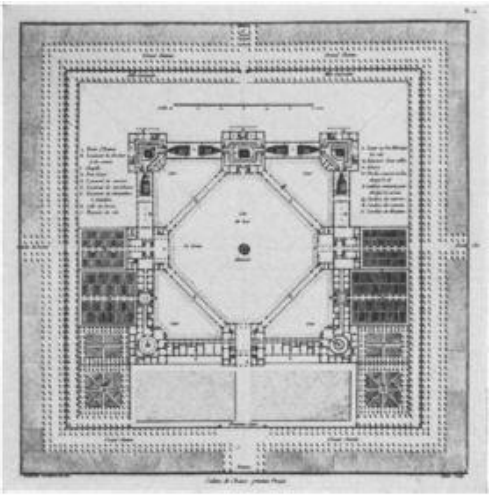
developing idealistic, symmetrical, and rational designs in architecture. Ledoux developed the theory of "Speaking Architecture" (Architecture Parlante), examining the role of architecture within society and the values represented by a building. "Speaking Architecture," which emerged in the late 18th century, is based on the idea that a building's form must directly convey its function; it proposes establishing a unity between the aesthetic appearance of architectural structures and their functions and social meanings. In line with this approach, Ledoux began to emphasize pure and powerful geometric forms. By setting aside traditional architectural understanding, he created a significant turning point in the development of architecture through creative and striking forms (Kaufmann, 1952). Ledoux received his architectural education from Jacques-François Blondel, one of the era's leading architectural theorists. In the early stages of his professional career, he designed public structures such as bridges, schools, and churches; later, he produced hotel projects and residential developments targeting high socio-economic groups in cities (Kaya & Örmecioğlu, 2023).

The salt tax reaching a level the public could not afford led to an increase in certain health issues, outbreaks of infectious diseases, and the spoilage of food due to inability to preserve it. To address these issues, two salt works were established at the Saline Royale. The salt operations aimed to meet the community's salt needs while also providing a solution to tax-related issues (Kaya & Örmecioğlu, 2023).

Workers' housing was conceived not merely as a means of shelter but also as a tool for economic, political, and cultural organization. The author questioned why workers' housing was designed specifically as workers' settlements rather than simply as low-income housing areas. It concerns how urban planning is shaped by the interplay of social needs, investor demands, legislation, and economic conditions (Zupančič, 2012). After the French Revolution,

the architect Ledoux, who was imprisoned, developed architectural plans for a saltworks during this period and completed the La Chaux Plan (Yusufoğlu, 2019).

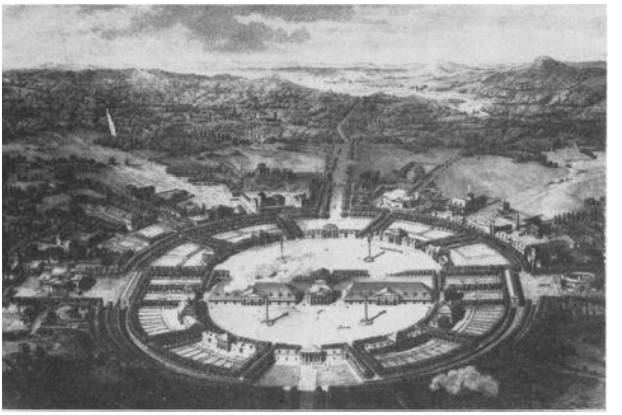
Figure 7: Claude-Nicolas Ledoux, Plan of Chaux



Reference: Kaufmann, 1952

La Chaux (Saline Royale) is a workers' settlement and industrial complex built in France between 1775 and 1779. The design integrates production facilities and workers' housing into a single plan and emphasizes open spaces. There are two distinct projects he developed for the Chaux Saltworks. In the first project, Ledoux designed only the production buildings and workers' housing; this design utilized rubble stone, as shown in Figure 8. In the second project, he expanded the design by adding an ideal town plan surrounding this industrial complex. This town, inspired by the nearby forest, takes the name "Chaux" and was partially implemented in Arc-et-Senans. As shown in Figure 8. However, some of the structures fell into disrepair over time, and in 1926, the owner of the site demolished certain sections. In his first project, the buildings were arranged in a geometric pattern around a square courtyard (Kaufmann, 1952).

Figure 8: Claude Nicolas Ledoux – La Chaux



Reference: Kaufmann, 1952

Diagonal corridors have strengthened the connection with the central pavilions. Although the floor plan is rational and geometric, the façade is Baroque in form: the two-story central volume dominates, the side wings are lower, and the main entrance is highlighted by a four-column portico. A fountain is located in the center of the courtyard. The complex comprises a chapel, a bakery, workers' quarters, and production areas. However, the whole remains faithful to the central principle of Baroque design (Kaufmann, 1952).

Finding the initial plan inadequate, Ledoux developed a second design. This time, he created an elliptical plan instead of a square one. The major axis of the ellipse aligns with the main road axis. The director's residence is situated at the center; production buildings are arranged on the sides, and workers' housing is arranged around the entrance. The city's other public buildings (city hall, courthouse, parsonage, bathhouse) are situated around the ellipse (Kaufmann, 1952).

Ledoux speaks of the quest for pure form and highlights the ellipse by likening it to the sun's orbit. The idea of a circle within a square illustrates his pursuit of geometric purity and abstract order.

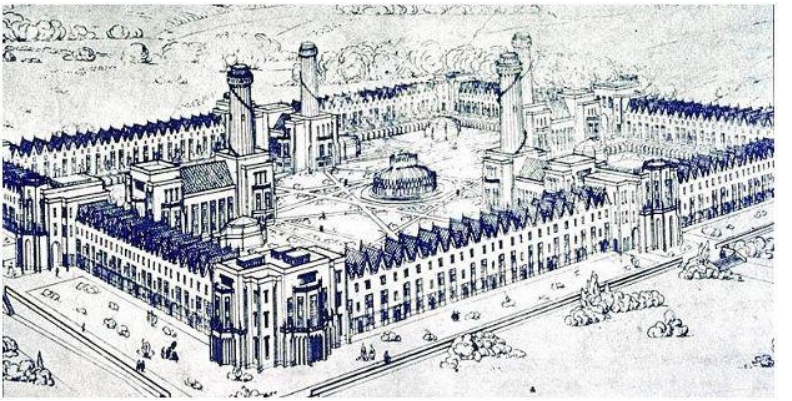
The second project breaks away from the hierarchical unity of the Baroque, featuring independent, equal architectural elements. Each structure is designed to stand on its own. Ledoux proposes vegetable gardens for workers, south-facing bedrooms, and healthy living conditions. The aim is not merely production, but the establishment of a new form of social life. Ledoux embraces the garden-city ideal and views architecture as a tool for social transformation (Kaufmann, 1952).

Robert Owen – New Harmony

In his work A New View of Society, written between 1813 and 1816, Robert Owen proposes a radical solution to the social problems created by industrialization. At the core of Owen's theory lies a deterministic approach—unlike the prevailing views of the time—that the individual's character is not under their own control; rather, it is shaped by the external environment and education. According to Owen, the individual's character is not formed by the individual themselves, but by the external environment and education. This environmental determinism seeks the solution to social problems not in punishing the individual, but in improving the environment. Viewing ignorance as the source of evil, Owen proposes a rational education system. This system aims to prevent crime by instilling proper habits from childhood onward, rather than intervening after a crime has been committed. It is argued that individual happiness is only possible through the general well-being of society. The collective consciousness instilled in individuals through education establishes social peace by eliminating sectarian and class conflicts. Defining workers as living machines, Owen emphasizes that the care shown to them and the provision of good living conditions are both a humanitarian duty and a fundamental condition for economic efficiency. These ideas, embodied in the New Lanark experiment, assert that an ideal society can only be built

through rational planning, quality housing, and collective living spaces (Owen, 1816).

Figure 9: Robert Owen – New Harmony



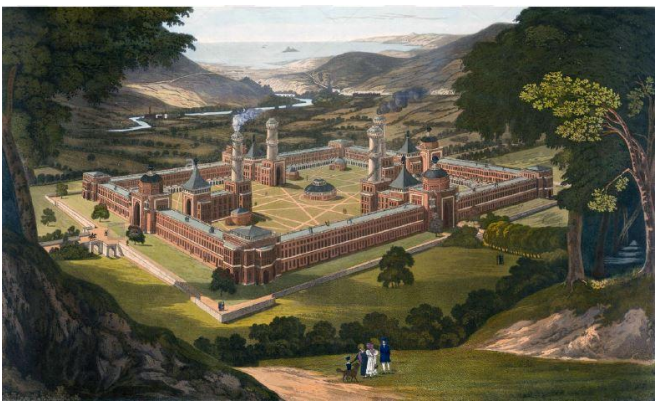
Reference: Ertürk, 2020

The person who pioneered the first utopian industrial settlement was the English industrialist and politician Robert Owen. The utopian communities founded by Owen are known as two ideal village settlements: New Lanark (1817, Scotland) and New Harmony (1825, Indiana). Owen designed New Harmony as a communal ideal community settlement for individuals working both in the countryside and in factories (Ak, 2006).

He proposed planned cooperative settlements where agriculture and crafts were organized together. He envisioned them as shown in Figures 9 and 10. The settlement design was organized into square-plan units, each capable of housing approximately 1,200 people, on a plot of land spanning roughly 100–150 hectares. The perimeter of the settlement area is planned to include private residences for adults, with bedrooms and living rooms; communal dormitories for children; storage facilities for various materials; a hotel; and an infirmary providing healthcare services. The central area is intended to include places of worship, schools, kitchens, and dining halls (Gürel Üçer & Yılmaz, 2004).

This spatial layout is considered one of the earliest examples of modern planning. The settlement was designed with Owen's political and economic planning principles, as well as the details of its financing, in mind. The project was intended to be supported by wealthy capitalists and large corporations; however, no institution ever financed the design. In 1825, Owen purchased approximately 30,000 acres of land in Indiana and, with the support of about 800 people, established the New Harmony settlement. However, the project ultimately failed due to economic problems and internal conflicts within the settlement (Gürel Üçer & Yılmaz, 2004).

Figure 10: Robert Owen – New Harmony



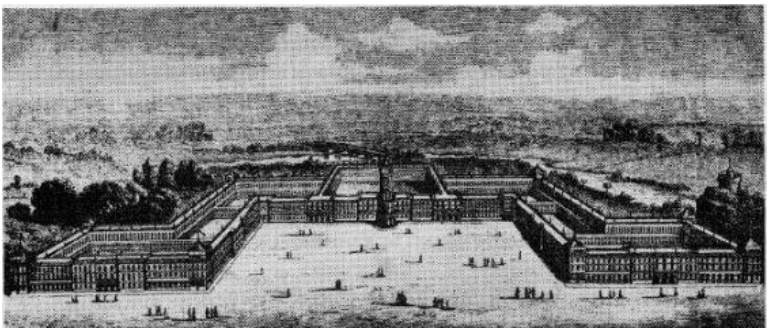
Reference: Gürel Üçer & Yılmaz, 2004

Charles Fourier—The Phalanstère

Fourier was opposed to centralization and dictatorship. He advocated for a communist system because he argued that the capitalist system enslaved humanity. In response to the adverse conditions of the industrial city, Fourier proposed the phalanster as a hygienic, livable unit. In this utopia, the streets are 18 meters wide, and the city is divided into three zones: the first zone contains the city center, the second zone includes neighborhoods and factories, and the third zone features wide avenues and suburbs (Ertürk, 2020). To implement the phalansteries, a plot of land was required that was

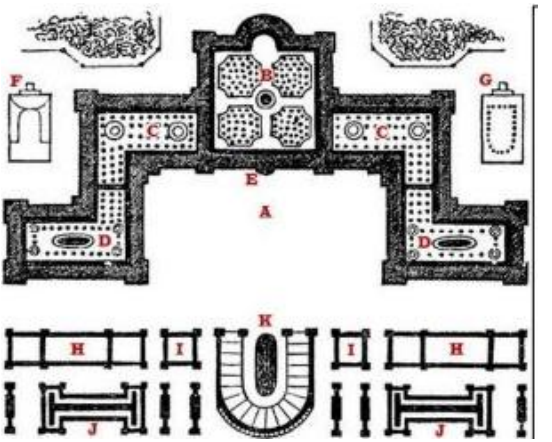
close to the city and possessed arable and fertile soil (Gürel Üçer & Yılmaz, 2004). The phalansterie was planned as a two-winged, three-story structure. It is shown in Figures 11 and 12.

Figure 11: Charles Fourier-Falanster



Reference: Ertürk, 2020

Figure 12: Charles Fourier-Falanster



Reference: Ertürk, 2020

One wing of the building houses communal spaces, a dining area, a chapel, an observatory, and a library, as well as carpentry workshops and living quarters for the workers. The other wing contains guest rooms, lounges, a ballroom, and meeting rooms. A different layout was created for each floor. The ground floor accommodated the elderly, the middle floor the children, and the top

floor the adults. The Phalanstère structure was equipped with street galleries to provide natural ventilation during both summer and winter months. Internal and inter-building transportation is facilitated through streets and tunnels. This project has been evaluated as a utopian settlement model aimed at creating an ideal living environment (Gürel Üçer & Yılmaz, 2004).

Jean-Baptiste André Godin – Familistère

The Familistère in Guise is a utopian living community founded in 1857 by the socialist thinker and industrialist Jean-Baptiste Godin with the aim of improving workers' lives. Inspired by the socialist ideas of Charles Fourier, the project consisted of three rectangular apartment blocks designed to provide living conditions for workers and their families. The key feature distinguishing the Familistère from traditional paternalistic worker housing was the gradual transfer of ownership and management to the workers over time. It introduced a significant innovation by defining private residential areas where each family could maintain its autonomy. In this vein, Godin housed approximately 900 families on an 18-hectare site near the factory to strengthen the families' sense of belonging (McBride, 1981; Gürel Üçer & Yılmaz, 2004; Yusufoğlu, 2019). It maintained its existence for 110 years before losing its collective ownership structure in 1968. The Familistère's architectural design incorporated innovative features for its time, such as glass-roofed inner courtyards, a ventilation system, water distribution to the floors, modern waste management systems, a daycare center, a co-educational school, and sports facilities. The facades were arranged to maximize sunlight exposure, and as shown in Figure 13-14, approximately 300 residential units are located in the right and left wings (Yusufoğlu, 2019; Gürel Üçer & Yılmaz, 2004).

The Familistère aimed to provide comfortable living spaces tailored to residents' needs and to ensure that workers could live in

healthy, high-quality environments. The lighting and acoustic elements Godin designed for the "gallery streets" added unique architectural details to the structure. Drawing on Fourier's emphasis on the importance of communication in social structure, Godin aimed to strengthen neighborly relationships—as seen in Figures 15 and 16—by creating spacious, well-lit spaces protected from external threats (Yusufoğlu, 2019).

Figure 13-14: Jean-Baptiste André Godin – Familistère

Reference: URL-1

Godin viewed hygiene, light, and spatial openness as fundamental human rights and linked the moral and social development of the working class to their living environment. However, the project also faced some criticism. The collective dining and shared service systems were not fully adopted, and due to the limited private life, thinkers such as Émile Zola described it as a "glass house" that suppressed individuality. The Familistère is regarded as one of the utopian experiments aiming to achieve social reform through architecture and daily life (McBride, 1981).

The Familistère is separated from the factory by a green belt and a river; the connection between the workplace and residential areas is provided by footbridges. The settlement was not limited to residential buildings alone (Yusufoğlu, 2019; Gürel Üçer & Yılmaz, 2004). The structure is not merely a social experiment; it can also be

regarded as one of the early examples of modern housing typologies (Fishman, 2002)

Figure 15: Jean-Baptiste André Godin – Familistère

Reference: URL-1

Figure 16: Jean-Baptiste André Godin – Familistère

Reference: URL-1

Ebenezer Howard and the Garden City

Howard developed the Garden City theory by analyzing the contrasting characteristics of the modern industrial city and rural life through the metaphor of the "three magnets." While the city offers advantages such as high wages, job opportunities, prospects for advancement, and social and cultural diversity, it also creates serious

problems such as high rent, overcrowding, polluted air, long working hours, and social alienation. In particular, using the phrase “isolation of the masses,” Howard argues that physical density in large cities does not equate to social closeness. Rural areas, on the other hand, while possessing advantages such as clean air, natural landscapes, an aesthetic environment, and low density, are characterized by problems such as limited economic opportunities, low wages, social isolation, and inadequate infrastructure. Howard’s solution is the “Town–Country” model—the integration of city and countryside. According to him, society (the city) and nature (the countryside) are complementary concepts, and the union of these two poles will mark the beginning of a new civilization. This approach is not merely a spatial synthesis; it is also an ideal of moral, economic, and social unity. The economic foundation of the Garden City model is based on collective land ownership. Howard advocates for the purchase of a 6,000-acre tract of land through a public trust system and for directing the increase in land value toward social benefit rather than individual gain. In his view, the increase in land value is a collectively earned gain. Therefore, after interest expenses are covered, the resulting rental income should be channeled into the municipality’s public investments. In this way, roads, schools, parks, and infrastructure services can be financed without the burden of taxation (Howard, 1902)

Figure 17: Bahçekent Konutu ve Tarım Diyagramı

Reference: Howard, 1902

Garden City was designed as a settlement with a population of approximately 30,000, featuring a circular layout and bordered by an agricultural belt. It is shown in Figures 17 and 18. Public buildings and a park area are located in the city center; residential areas are situated around this center. Industrial zones, meanwhile, are separated from residential areas and planned to be accessible via the railway. The surrounding agricultural land both meets the city's food needs and prevents uncontrolled urban sprawl.

Figure 18: Bahçekent Konutu ve Tarım Diyagramı

Reference: Howard, 1902

When the city reaches a certain population threshold, it does not expand; instead, a new Garden City is established. (Howard, 1902).

End of Chapter

This chapter examines utopian ideas spanning from antiquity to the 20th century and their reflections in architecture and urban design. The ideal social order outlined by Platon in his work The Republic is considered one of the earliest examples of utopian thought, linking the concepts of order, justice, and social harmony to spatial organization. During the Renaissance, Thomas More's Utopia and Tommaso Campanella's works The City of the Sun and New Atlantis played a significant role in the development of utopian

thought by presenting fictional yet systematic models of the ideal society and urban order.

In the 18th century, under the influence of Enlightenment thought, the search for ideal spaces gained momentum in the field of architecture; architects such as Étienne-Louis Boullée expressed the idea of an ideal order through architectural forms with monumental and symbolic projects. During this period, projects such as the Newton Monument, in particular, reflect the effort to integrate the concepts of scientific order and cosmic harmony with spatial design.

In the 19th century, in the search for solutions to the social and spatial problems created by the Industrial Revolution, utopian thought evolved into more concrete models of settlement. Robert Owen's New Harmony settlement, Charles Fourier's Phalanster model, and Jean-Baptiste André Godin's Familistere project stand out as significant examples that integrated the ideas of social equality and collective living with spatial organization. These projects treated housing not merely as a unit of shelter but as a tool for organizing social life.

By the 20th century, utopian thought had evolved into concrete design models within modern urban planning and architectural practice. Ebenezer Howard's Garden City model presented a balanced settlement concept that harmonizes with nature by combining the advantages of urban and rural life.

Concepts Emerging in Utopias

The concepts influencing housing design that emerge in utopias are outlined in this thesis. These include digitalization, mobility, flexibility, and adaptability, and are examined in detail in the final chapter of the thesis.

Digitality

Digitality refers to the new forms of production, communication, and lifestyles that emerge as a result of the conversion of information into digital data and the processing of this data through network systems. With the advancement of digital technologies, space has ceased to be merely a physical phenomenon; it has transformed into a hybrid structure integrated with data flows, network connections, and smart systems. This transformation is redefining the ways residential spaces are used, the user-space relationship, and design processes.

With the Baroque period of the 17th century, traditional notions of beauty and proportion based on the Cartesian grid system began to be questioned in architecture. Today, the Baroque concept is described as a style characterized by irregular, complex, ornate, and non-linear forms. Projects featuring fluid and organic forms have been interpreted as Baroque in style. At the beginning of the 20th century, architects produced non-linear, fluid forms rather than the box-like forms typical of modern architecture. These designs have served as an aesthetic guide for forms developed with digital technologies today. Currently, in the digital age, architecture is being redefined through new formal typologies known as “fold” and “blob” (Onbay, 2006).

The machine has become one of the fundamental references of modern architecture; housing has taken on the form of an industrial product. This approach can be observed in the work of architects such as Le Corbusier and Buckminster Fuller, who integrated industrial and mechanical technologies with architecture. Technological advancements have not been limited to mechanical systems alone; computer technology has also begun to play a role. Developments in materials, construction technology, and computer and design technology led to the emergence of the concepts of “digitality” and “intelligence” in the 1980s, and their application in

buildings in the 1990s. The concept of digitality, along with terms such as interface, virtual, cyber, and hyper, has been incorporated into architectural literature; computer-aided design tools have begun to be used not only in public buildings but also in residential construction. The primary reason for the prominence of digital technologies in residential design is that these technologies offer extensive possibilities in terms of flexibility, continuity, and creativity. Thanks to digital systems, housing is designed to meet user needs. Spatial atmospheres, environmental conditions, and visual perceptions can be achieved through digital tools (Tekin, 2007).

Flexibility

Flexible housing refers to dwellings that offer design options for both social use and structural aspects and remain open to change throughout their lifespan. This concept is critical to ensuring that housing is socially, economically, and environmentally sustainable. Flexibility can be considered in two fundamental dimensions: first, adaptability, which refers to suitability for different social uses; second, physical flexibility, which allows for different physical layouts. This approach aims to prevent housing from being designed to fit a specific family structure or usage pattern and takes into account the uncertainties surrounding future housing needs. Modernist architecture contributed to the emergence of flexibility. In the 1920s, Ludwig Mies van der Rohe and other architects designed housing as spaces open to change and transformation, creating volumes tailored to diverse user needs. This approach allowed users to shape their lifestyles according to their own needs and was supported by technologies such as prefabrication. However, in some projects, architects defined flexibility solely as a progressive indicator of modernism and relegated the building's actual flexibility to the background (Schneider & Till, 2005).

At the turn of the century, flexibility was associated with the mobility of partitioning elements, whereas in 19th-century utopias, the concept of flexibility aimed to create comfortable spaces. The concept of flexibility played a significant role in architectural design in the 20th century and earlier (Ak, 2006).

Mobility

Mobile: Something that is movable or portable (TDK, 2026). (Mobility, on the other hand, is the concept of movement that refers to the transition of individuals or communities from one location or social status to another. Mobility, which has existed throughout human history, has not been limited to physical transportation due to technological advancements; rather, it has evolved into a necessity that enables working, communicating, and accessing information from anywhere thanks to the internet and communication technologies. Mobile spaces are defined as structures that are portable, capable of movement, and not fixed to a specific location. In the 21st century, these spaces are designed not only for portability but also with ergonomic and functional interior solutions that meet users' living needs. Mobile housing provides comfortable spaces that meet housing, storage, and work needs. Examples of mobile living spaces include RVs, small homes, and prefabricated structures. Beginning with the concept of nomadism, mobile living has become more widespread alongside the pace and demands of modern life. It offers advantages such as freedom of movement, easy portability, flexible spatial arrangements, and the ability to live in different locations. Mobile living encompasses not only physical movement but also technological and social transformations. Thanks to evolving systems, flexible work arrangements and free-spirited lifestyles have become possible. By being reconfigured according to user needs, mobile spaces offer sustainable and flexible housing alternatives while enabling individuals on the move to experience their changing surroundings (Gül & Kavut, 2025).

Adaptation

Adaptation refers to an approach based on planning and organization, focusing more on elements such as room dimensions, spatial relationships, floor areas, wide doorways, and the absence of strictly defined spatial functions, rather than construction techniques. The primary aim of adaptation is to create home layouts with no predefined purpose or minimal preliminary design; this allows for a wide range of interpretations capable of addressing the diverse needs of different users. This approach enables the versatile use of spaces without being bound by predetermined functions and enhances freedom of choice in design. Adaptation has been developed through the study of existing structures and traditional housing types, and technical advancements have overcome the limitations of the past. This has made it possible to offer spaces in modern housing that are more flexible yet adaptable to the user's changing needs (Rabeneck, Sheppard, & Town, 1974). The social, technological, and cultural changes of the 20th century gave rise to the concept of adaptation in architecture. Wars, transportation and communication systems, and changing family structures necessitated that the home cease to be a uniform and static space. Particularly between 1945 and 1965, people rejected the notion of standard housing and demanded spaces tailored to living conditions, economic circumstances, and individual preferences. This expectation paved the way for housing designs that were customizable, expandable, and adaptable to technological changes. The idea of adaptation gained particular significance in utopian architectural approaches. The plug-in concept is a significant design approach that envisions spaces where components can be added or removed as needed. Subsequently, architects such as Gropius, Wachsmann, and Buckminster Fuller developed housing systems that offered users choices and the ability to expand. Fuller's Dymaxion houses presented an adaptable model characterized by

interchangeable service elements and the ability to expand the living space. While homes in the new century may not be mobile, opportunities for adaptation at the interior level have increased. Thanks to smart systems, interchangeable interior elements, and user-supported design approaches, housing is becoming more flexible. Modern housing maintains its significance through concepts of adaptation, personalization, technological compatibility, and flexibility in its design (Arslan, 2006).

Chapter Conclusion

An examination of utopian approaches reveals that this mode of thought is not merely a depiction of an ideal society, but is directly linked to the environmental, social, and technological conditions of the era in which it emerged. Industrialization, urbanization processes, and changing lifestyles have been decisive in shaping utopian thought; these processes have brought with them a search for the reconfiguration of architectural space. In this context, the concepts emerging in utopias can be evaluated as spatial and social responses to the problems of the era. Concepts such as digitality, flexibility, mobility, and adaptability present alternative ways of thinking about future living environments. Thus, utopias provide a crucial intellectual foundation that forms the conceptual framework for housing approaches to be developed in the coming periods.

FACTORS INFLUENCING FUTURE HOUSING DESIGNS

Throughout the development process from the Industrial Revolution to the 20th century, technological advancements, social and cultural factors, economic and political factors, and environmental factors have played a significant role. Future housing designs continue to evolve through the multidimensional and complex interaction of social, environmental, technological, and economic dynamics. Increasing urbanization, population density, and demographic shifts are creating a greater need for sustainable

and flexible living spaces. New design criteria in areas such as remote work, digitalization, security, comfort, and energy management, coupled with the expanding scope of residential functionality driven by digitalization and smart home technologies, along with economic uncertainties and rising housing costs, have made cost-effective and modular multi-purpose building systems increasingly important. For all these reasons, a multidisciplinary approach is required to produce innovative solutions that enhance individual quality of life while aligning with global sustainability goals. This section of the thesis examines the technological, social, and environmental factors influencing residential design.

Social and Cultural Factors

Housing is more than just a structure providing physical shelter; it is a spatial element that reflects individuals' lifestyles, sociocultural values, and economic circumstances. The housing environment, neighborhood relationships, and interactions with social spaces shape individuals' social identities. Spatial arrangements such as gated communities or shared open spaces can either strengthen social bonds or foster spatial segregation. A sustainable housing approach integrates environmental, social, and economic components to both enhance quality of life and foster social solidarity. Housing preferences, family structure, and cultural values influence the determination of housing types. Traditional and nuclear family models give rise to different housing needs; extended family structures lead to variations in housing choices regarding access to services and preferences for independence (Eken, 2025). The socio-economic and cultural changes experienced in the years following World War II have caused shifts in family structures. Traditional nuclear families, childless families, individuals living alone, and alternative lifestyles have begun to increase. In the U.S., a high density and diversity in the population have been observed. It

is projected that the number of individuals living alone and childless families will continue to rise in the future. This transformation has given rise to two approaches in housing design;

- Designing housing types suitable for various family structures,
- The development of flexible spaces that cater to diverse user profiles,

This is linked to privacy, the protection of private spaces, and their separation from public areas. In multi-unit housing, sound insulation, window sizes, and common areas increase the need to protect individuals' private living spaces. Certain cultural norms require physical arrangements such as spaces designated for women. At the same time, the increasing rate of women entering the workforce, the rising age of marriage, the growing priority placed on individual lifestyles, and the rising rate of childlessness have all increased. These demographic transformations have led to the development of designs that prioritize flexibility and adapt to the user's level of individuality in future housing designs (Ak, 2006).

In the 20th century, the World Wars physically and psychologically impacted people's lives. Addressing the housing need became the primary objective. Governments began constructing housing that was both rapid and economical. In Europe, housing evolved according to pre-war, post-war, and contemporary changes (Tekin, 2007).

In housing preferences, security encompasses the protection of the individual and their family. Depending on economic status, secure gated communities or central yet risky areas may be preferred. Security, aesthetics, and social harmony ensure that individuals feel comfortable

Housing shortages can limit individuals' sociocultural preferences. The need for privacy is supported by sound insulation and security measures in modern housing. Housing design is linked to socioeconomic well-being as a marker of social connections and status. Social solidarity and social capital are linked to the spatial organization of housing. Sociocultural elements are key factors determining the quality of life in the city and individuals' satisfaction with their surroundings; however, economic constraints emerge as the decisive precondition for this process (Eken, 2025).

The industrialization and urbanization processes that began with the Industrial Revolution have brought about a fundamental transformation in housing alongside the social structure. With the rapid advancement of technology in the post-World War II era, housing has become not merely a living space but also a space for production, communication, and individuality. With the transition to the information society, the concept of the home-office has proliferated, and digitalization has blurred the boundaries between private and public spaces. Housing design has been reimagined to incorporate technological infrastructure, flexibility, and responses to user needs (Ak, 2006). Demography is a field concerned with the size, structure, and development of the population. In the 20th century, industrialization, wars, and migration movements influenced urbanization. The growing population led to housing shortages in metropolitan areas, promoting the widespread adoption of vertical living (Tekin, 2007).

Economic and Political Factors

The 19 th century was a period in which the economic and social structure underwent significant changes due to the impact of the Industrial Revolution. With the development of industrial production, there were massive migration movements from rural

areas to cities, leading to rapid population growth in urban centers. This situation resulted in an increased need for housing and the emergence of new residential areas in cities. The worker neighborhoods that formed around industrial facilities demonstrate that the economic production system directly influenced the urban landscape. During this period, housing production was largely determined by industrial activities and economic conditions. Indeed, Friedrich Engels, in his examination of living conditions in industrial cities, noted that the working class had concentrated in large cities and that the urban landscape was shaped in accordance with economic production relations (Engels, 1887/1995).

Transitions in economic systems and state policies during the 20 th century significantly influenced the development of cities. In particular, the housing need that emerged following the two world wars led many countries to intervene directly in housing production. During this process, social housing projects were developed, and modern planning principles played a key role in the reorganization of cities. At the same time, transformations in the capitalist production system altered the economic and spatial organization of cities. In this context, David Harvey argues that the transformation in the production system also affected the spatial structure of cities, and that the transition from the Fordist production model to a flexible accumulation system reshaped both the economic and spatial organization (Harvey, 1989).

In the 21st century, globalization, digitalization, and the development of financial systems have subjected the economic and political structures of cities to a new process of transformation. With the development of global economic networks, housing markets have established a stronger connection with international investment processes, and housing has increasingly become an economic investment vehicle. This situation has particularly led to rising

housing prices and the emergence of housing affordability issues in major cities. In today's cities, housing is no longer merely a space that meets the need for shelter; it has also become a key component of economic competition and global investment processes. Richard Florida, explaining this situation, notes that housing lies at the center of the new urban crisis in contemporary cities (Florida, 2017).

Environmental Factors

One of the key factors shaping the future of architecture in the 21st century is the need to redefine the relationship between humans and nature and to provide solutions to environmental problems. The rapid technological development and consumer culture that began with the Industrial Revolution have led to the depletion of natural resources and the emergence of environmental problems. Air pollution, global warming, the thinning of the ozone layer, and the disruption of ecological balance have brought about various environmental problems today. Efforts to find solutions to these problems have begun (Ülkebaş, 2004).

Environmental issues in cities have been classified as follows:

1. Continental-Global scale
2. Regional scale
3. Metropolitan scale
4. Community-city scale
5. Residential-workplace scale

Architecture takes these impacts into account when addressing the built environment. While traditional architecture in local contexts relies on traditional materials and climate-based

design, post-industrial methods based on energy consumption have begun to be adopted. However, the recognition of the destructive damage caused to the natural environment has led to the emergence of sustainable designs in architecture. In the design of the "House of the Future" in the 21st century, sustainability, the use of renewable energy, and ecological architecture have emerged (Ülkebaş, 2004).

Environmental pollution consists of structural damages caused by human activity. Environmental pollution, which results in the negative impact on both living and non-living elements, is divided into three categories: water, air, and soil pollution. Since the Industrial Revolution, greenhouse gases caused by the use of fossil fuels have led to air pollution in the atmosphere. To minimize environmental pollution, the use of recycled materials in housing has come to the forefront. The Centre for Alternative Technologies (Machynlleth, Wales) is developing sustainable building technologies and low-cost housing designs. Examples of such designs include Segal's use of wooden frames and straw bales (Ülkebaş, 2004). In developing countries, the increase in consumption has led to an increase in waste, making the reuse, recycling, and efficient use of resources a priority.

Technological Advances and Residential Design

Throughout history, architecture has generated solutions for the future by critiquing existing living conditions, using the scientific and technological advancements of the era as a fundamental tool in this process. In the utopian visions of future housing, technology has transcended its role as a mere construction tool; it has become a force that fundamentally transforms the representation of space, the role of the designer, and the relationship between people and space (Şensoy & Özaslan, 2020). Stone tools used by hunter-gatherer societies in prehistoric times are considered the technology of that

era. This demonstrates that technology was an integral part of human life even before the systematization of scientific knowledge. Technology is not static; it is a dynamic phenomenon that evolves in response to societal needs over the course of history. Before the Industrial Revolution, technology evolved through developments such as tools made from natural materials, agricultural implements, the domestication of animals, the invention of the wheel, and the discovery of writing. With the Agricultural Revolution, settled life began, giving rise to new technological solutions driven by the need for production and storage. The discovery of writing, in turn, accelerated the transmission of knowledge, thereby spurring technological development.

Technology has been presented as a rational and aesthetic solution to problems such as uncontrolled population growth and excessive urbanization (Şensoy & Özaslan, 2020). Starting in the 1960s, confidence in technology led to the concept of fixed housing being replaced by dynamic, user-centered systems. Groups like With the incorporation of plastic and chemical advancements into architecture, lightweight, portable, and even wearable housing units in the form of spacesuits were designed. During this period, technology served as a tool for liberation, enabling individuals to manage their space according to their own needs and lead a "nomadic" lifestyle (Şensoy & Özaslan, 2020). In the 21st century, technology has given architecture a new identity by intertwining with information technology and the genetic sciences. It is anticipated that buildings will interact with their surroundings and repair their own damage by being governed by their own DNA. For example, Molecularly Designed House project depicts a residence growing from a seed over the course of nine days. Thanks to digital computing and nanotechnology, spaces have evolved into systems capable of generating light and sound effects that sense the user's mood or changing shape through electromagnetic forces. At this

stage, technology is no longer a force that dominates nature, but rather a tool that ensures harmony with ecological systems and the sustainability of life (Şensoy & Özaslan, 2020).

20th-century technology is one of the most significant factors that transformed residential design. In 20th-century homes of the future, advanced technology was utilized in materials, construction methods, and interior equipment. In the 21st century, the digital transformation and the revolution in information flow have paved the way for flexible design and prefabricated construction technology. Along with virtual space design, it has been predicted that the home and the user will become one, with an intertwined relationship between rooms. Technological advancements in the fields of computing, communications, microelectronics, robotics, materials, and biotechnology have sparked the Third Industrial Revolution. This transformation has influenced both lifestyles and architectural forms (Ak, 2006). Following the Industrial Revolution, changes in materials and construction techniques led to the onset of mass production, and modern housing construction evolved. The new design possibilities brought about by the use of glass had a significant impact worldwide, particularly in Europe. By the 1980s, a quality-focused approach had emerged in housing policy. Innovative materials such as aluminum and cast concrete have enabled modern architecture to present fluid and organic forms. Changes and transformations in material technology have also led to transformations in the concept of housing; concepts such as ‘flexibility’ and ‘dynamism’ have been observed to develop. Today, building elements take the form of digital, smart walls, while building envelopes are more flexible, permeable, conductive, and fluid. (Tekin, 2007).

In the 20th century, technology brought about a radical transformation in the housing sector. Advances in nanotechnology

and polymer technology have shaped the homes of the future. While nanotechnology enables the exploration of the atomic and molecular properties of materials, polymer technology involves high-molecular-weight compounds. Changes in polymer technology and nanotechnology have facilitated the creation of smart, lightweight, flexible, and adaptable materials. In housing, these changes have led to advancements in the use of photovoltaic panels, smart skin systems, “AMLCDs” (active liquid crystals), and thermal glass and advanced plastics—all of which contribute to computer technology in the homes of the future. These technologies, along with liquid crystal materials, have introduced transparency into window and wall details in residential buildings. These building materials have shed light on the concept of future housing. Owen, on the other hand, views nanotechnology as the culmination of the modern industrial revolution and argues that smart materials will offer infinite design possibilities. In the Illinois Institute of Technology’s study titled “Nanoplastics: A Home System,” it is emphasized that the homes of the future will utilize nanotechnology products in both their structure and interior spaces. Currently, computer systems and skin structures are used in building design. In the future, it is expected that natural materials will be produced using biotechnology. It is predicted that the concept of “smart homes” will emerge through the development of self-transforming materials enabled by nanotechnology. Photovoltaic cells are among the advanced technologies that have been used for years in the aerospace and defense industries. Currently, they are also being utilized in homes to meet ecological energy needs. Photovoltaic cells are becoming structural components that form the building envelope, roof, and facade. Changes in electronic technology have led to the emergence of certain concepts in future residential design. One such concept, the “skin structure,” is defined as an epidermal layer that covers the exterior surface of the building, integrating or separating the

dwelling from the external environment, while also controlling the flow of sound, light, and information (Ak, 2006).

After the 1950s, communication devices such as radios, televisions, and telephones began to appear in homes. In the 1980s, the demand for computers led to the creation of home computer and communication networks, giving rise to the concept of the "smart home." By the end of the 20th century, advancements in computer technology and communication and information systems had paved the way for the emergence of the smart home utopia. The smart home has been regarded as a harbinger of a new era marking the end of the industrial revolution and the beginning of the digital revolution. The "home of the future" designs developed throughout the 20th century incorporated security and automation systems found in smart homes. The Smithsons' "HOF" project is an initiative that explored in-home communication and information technologies. The project shed light on the concept of smart homes. In the information age, the transmission, storage, and sharing of information have become increasingly important. The development of electronic devices has marked a major turning point in communication. Today, as communication technologies evolve, homes are transforming into multifunctional living spaces that serve various purposes—such as work, shopping, and leisure—beyond mere shelter. An interaction has begun between the digital environment and the physical environment; with the advent of technology, buildings have become interactive, and structures have transformed into user-centric entities by connecting to digital networks. Consequently, residential spaces have begun to gain mobility and flexibility (Ak, 2006). Toward the end of the 20th century, the advent of digital technology blurred the boundaries between public and private spaces, and the private sphere entered into public interaction through media and communication tools. This transformation has brought innovations to architectural theory and practice. (Tekin, 2007).

From the Renaissance to the present day, the fundamental design tools in architecture—sketching and drawing methods—have undergone a radical transformation with the development of computer technologies in the late 20th century. Computer-aided design (CAD) has restructured not only the drawing process but also the entire field of architecture, including construction, operations, and maintenance. In particular, the "diagram technique" has had a significant impact on the design process. Möbius House project is an example of this technique in practice. The project features a fluid spatiality that blurs the boundary between interior and exterior spaces through a double-helix diagram structure. Users can design their own structures using programs like "3D Home Architect" and actively participate in the residential design process. Thanks to these developments, architectural forms have also undergone a transformation. Computer programs have replaced traditional rectangular forms with topology-based, fluid, and organic "blob" forms. The Raybould House and the Ost/Kuttner Apartment Building reflect this new approach. These forms have become projects that can be both designed and produced using computer technology. Toward the end of the 20th century, the role of digital technologies in daily life became increasingly prominent, adding a new dimension to the relationship between space and the user. Media and communication tools have come to play an influential role in residential spatial design. In projects such as the Lipschutz/Jones Apartment and the Kramlich Residence, digital screens are observed on surfaces within the interior spaces, displaying financial data, works of art, and more. Thanks to communication and information technologies, the spatial identity of the home is also transforming. The rise of information and communication technologies has led to the home's abstraction from its physical surroundings and its ability to generate its own climatic and social information; it has been observed that the space has evolved into a distinct structure through concepts such as "virtual neighborhood" and "virtual gathering."

Today, the home has transformed into a structure that processes and transmits images, information, and sounds, moving away from its physical surroundings to become more flexible, fluid, and open to communication (Ak, 2006).

CONCLUSION

Life is constantly changing and evolving. This change is reshaping not only the individual's way of life but also the organization, function, and meaning of the spaces in which they live. However, in line with the evolving aspects of modern life, housing has undergone transformations that increasingly shape the individual's life. At this juncture, future housing projects developed by modern architects and utopian thinkers, alongside alternative living models, have played a significant role in the transformation of housing. By examining the transformation of housing through the concept of utopia, a perspective on the future of architecture has been established. Historically, utopias—which have shaped societies' quests for an ideal life—have not remained merely theoretical; they have guided architectural thought across different eras, redefining the meaning, form, and function of housing. In antiquity, housing reflected a fixed social order through a standardized spatial organization, with collective order taking precedence over individual preferences. The concept of utopia, which began with Plato's The Republic, initially emerged as a search for an ideal system that structured social order through spatial organization. In Thomas More's Utopia, the concept of an egalitarian society was embodied through standardized housing types and a communal way of life, while in Campanella's The City of the Sun and Bacon's New Atlantis, the ideals of knowledge, science, and collective living became the defining elements of spatial order. In the 18th century, Boullée's Newton Monument and Ledoux's La Chaux Plan shifted utopia from a social model to an architectural representation and the

conception of an ideal city, thereby highlighting the symbolic and theoretical power of space. In the 19th century, Owen's New Harmony, Fourier's Phalansterie, and Godin's Familistère projects transformed utopia into viable models of social housing; the relationship between production, daily life, and collective spaces was redefined. With Howard's Garden City approach, utopia evolved into the concept of sustainable settlement through a balance between nature and the city. At the beginning of the 19th century, Le Corbusier's modern city proposals from 1922 to 1935 and Frank Lloyd Wright's Broadacre City project reinterpreted utopia within the context of industrial production, technology, and individual lifestyles. In this process, utopias have shifted from a search for a fixed and ideal order to a more adaptable, user-centered, and system-based understanding of space. When we examine utopian thought within the historical process through the lenses of digitality, flexibility, adaptation, and mobility, we observe that early-period utopias lacked digitality, with spaces predominantly static and hierarchical; flexibility was limited, and mobility was virtually nonexistent. With post-industrial approaches, adaptation developed through environmental and social harmony; in modernist projects, partial flexibility emerged alongside standardization. Thus, utopias have laid the conceptual foundation for a residential philosophy that is transformable, adaptable, and open to future digital systems, moving away from the ideal and unchanging conception of space.

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CHAPTER 2

PRELIMINARY DESIGN OF FLOOD PROTECTION STRUCTURES IN SMALL UNGAUGED CATCHMENTS: THE CASE OF ALTINTAŞ STREAM

ÇAĞLA ÇOLAK[1]

Giriş

Floods are among the most significant natural disasters causing loss of life and property in many regions of the world. Climate change, unplanned urbanization, and land use changes have increased flood risks. Therefore, effective management of floods and the planning of flood protection structures are of great importance.

Various approaches have been developed worldwide for flood management. In Europe, process management oriented approaches are prominent (T.C. Sayıştay Başkanlığı, 2002), while in the United States, hydrological hydraulic models such as HEC-HMS and HEC-RAS are widely used (Devlet Su İşleri [DSİ], 2017a). In Turkey, flood projects are primarily carried out by the General Directorate of State Hydraulic Works (DSİ), based on reconnaissance and final design phases. However, a review of

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existing studies in Turkey indicates that the focus has generally been on the engineering dimension, with insufficient emphasis placed on process management and the relationship between project phases. A study closest to the subject in terms of covering flood protection project design is the article by Korkmaz, entitled *Estimation of Flood Return Flow Rates and Flood Risk Assessment in Rivers*. In that study, flood return flows were calculated using the Rational and Mocus methods, and a flood protection structure capable of safely passing Q500 and Q100 floods was designed, independent of the overall project process (Özan, 2021).

The present study on Altıntaş Stream differs from previous works by not only addressing flood analysis and engineering aspects, but also by examining the relationship between process management and flood protection project design. This article highlights the critical role of the reconnaissance phase in the design process and contributes to the literature in four main aspects:

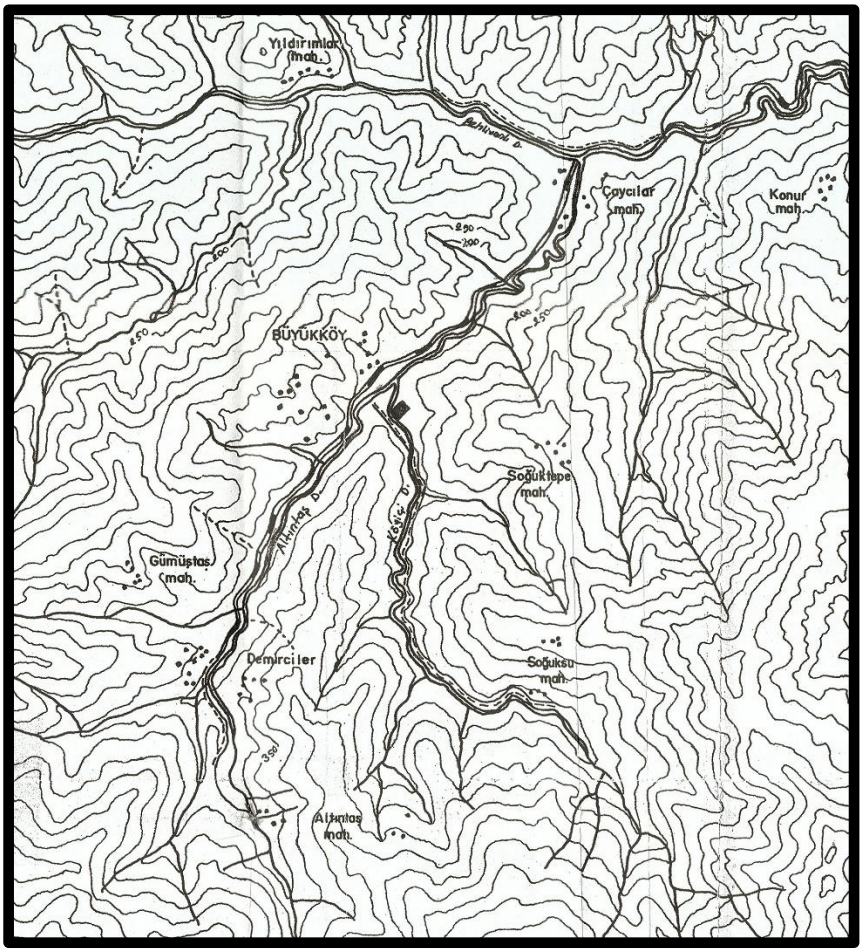
1. By emphasizing the integration of process management with technical studies, it proposes a process oriented approach to project optimization.
2. It develops a practical process based methodology for medium-sized catchments without flow gauging stations.
3. It provides process improvement recommendations aimed at reducing uncertainties in the planning phase of flood projects in Turkey.
4. It demonstrates the importance of modeling for different catchment parameters and flood data in improving processes.

Materials and Methods

This study was conducted in the Altıntaş Stream catchment, located within the provincial boundaries of Rize, Turkey. The total

catchment area is 7.4 km², with a main channel length of 5.5 km. The maximum and minimum elevations are 960 m and 210 m, respectively, and the mean slope of the basin is 0.174. The 1/25,000 scale map of Altıntaş Stream is presented in the figure 1.

Figure 1 1:25,000 scale map of Altıntaş Stream



The study area was defined based on the reconnaissance report titled “Flood Protection of Pehlivanlı Stream, Büyükköy Stream, Altıntaş District and Derecik Village Köyiçi Stream in Çayeli,Büyükköy Town, Rize Province”, which was included in

DSİ's survey program in 2005 and prepared in 2006. The construction phase of the project has already been completed.

The fundamental catchment parameters used in hydrograph calculations are as follows:

- Catchment area (A): 7.4 km² (from 1/25,000 Topographic map)
- Main channel length (L): 5.5 km (from 1/25,000 Topographic map)
- Length to centroid (Lc): 2.5 km (from 1/25,000 Topographic map)
- Elevation difference (ΔH): 750 m (from 1/25,000 Topographic map)
- Slope (S): 0.174 (from 1/25,000 Topographic map)
- Curve Number (CN): 75 (derived from land use and hydrological soil group tables (Al-Ansari et al., n.d.).

The research was conducted through several steps, including the evaluation of local community petitions, field surveys, flood analysis, hydraulic calculations, flood cross section proposals, and the preparation of a general layout plan.

Meteorological data were obtained from the Çayeli Meteorological Station. In Turkey, flood hydrology calculations for ungauged catchments are generally carried out using synthetic unit hydrograph methods developed by DSİ. These include the Mocus method, the DSİ Synthetic method, and the Snyder method. The parameters, units, and formulas used in these three methods are presented in Table 1. For the Mocus method, Equations (1)–(4) are used; for the DSİ Synthetic method, Equations (5)–(8) are applied; and for the Snyder method, Equations (9)–(14) are utilized.

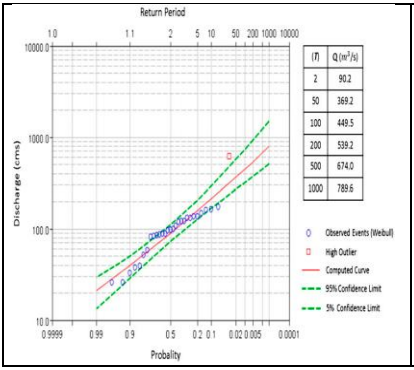
Table 1 Synthetic Unit Hydrograph Calculation Methods

MOCUS Method	DSİ Synthetic Method	Synder Method
Tc= 0,00032.(L^0,77 / S^0,385) (h) (1)	E=[(L.Lc)/√S] (5)	tp=752. Ct. (L.LC) T^3 (Sa) (9)
D = 2√Tc (Sa) (2)	qp = [414/(A^0,225 . E^0,16)] (lt/s/km2/mm) (6)	Tr=tp/5,5 (h) (10)
Tp = 0,5.D + 0,6.Tc (h) (3)	Tp = 20,78 / qp (Sa) (7)	Qp=2760.Cp/tp (lt/s/km2/mm) (11)
Qp = (K .A .ha) / Tp (m3/s/mm) (4)	Qp = A * qp * 10^{-3} (m3/s/mm) (8)	Qp=A.qp.10^.4 (m3/s/mm) (12)
		Tp=tr/2+tp (Sa) (13)

Using the selected methods, unit hydrographs were generated and flood discharges corresponding to different recurrence intervals were determined. The obtained hydrographs were compared to evaluate the flood potential of the catchment, and the suitability of each method was discussed in terms of method selection and its contribution to process management. For the determination of the most appropriate probability distribution, the Kolmogorov–Smirnov (K-S) test was applied, and the Log-Pearson Type III (LPT3) distribution was found to be the best fit. The formulas related to the LPT3 distribution and the Kolmogorov–Smirnov (K-S) test used in the calculations are presented in Table 2 as Equations (14), (15), and (16).

Table 2 Formulas for the LPT3 Distribution and the Kolmogorov–Smirnov (K-S) Tes

LPT3 distribution function	Kolmogorov-Smirnov (K-S) test F*(xi); values for each observed data
QT = log x + K (CsT)* log x (14)	$F(x_i)$: Values obtained from the statistical distribution used for the given dataset. Δ: The difference between the two corresponding values. Δα: The Probability Plot Correlation Test (PPCC) value, determined according to the sample size and significance level (α)



as presented in statistical reference tables.
F(x): The non-exceedance probability of each element. For the selected distribution to be accepted, the condition $\Delta < \Delta\alpha$ must be satisfied.
QT = log x + K (CsT)* log x (14)
$F(x) = (i - a) /N + 1- 2a$ (15)
F Max Δ= |F*(xi)-F(xi)| (16)
$\Delta<\Delta\alpha$ (xi) =i/N

For the calculation of flood return discharges, first the potential maximum retention (S) is determined based on the Curve Number (CN) using Equation (17). Subsequently, the runoff depth (mm) is calculated as a function of S using Equation (18), and the flood return discharge is obtained using Equation (19). In the final step, the unit discharge and runoff depth are multiplied, and the flood return discharges are derived using Equation (20).

S =((1000/CN-10).25,4) (17)

Ht= (P-0.2. S) 0,2 / (Pt+0.8. S) (18)

Q Flood return=Qp.Ht (19)

The base flow determined by DSİ is 2 m³/s. As shown in Equation (20) below, the total discharge is calculated by adding the base flow to the flood return discharge

Total Discharge = Qt + baseflow (5 m³/sn) (20)

The dimensions of the cross-section are calculated using Equation (21) given below. Here, the Manning's roughness coefficient (n) is selected according to the relevant tables (Jesna & Bhallamudi, 2023). If the cross section is found to be inadequate based on the flood discharge calculations, energy dissipating structures are proposed.

$$J = \left(\frac{Q \times n}{A \times R^{\frac{2}{3}}}\right)^{\frac{1}{2}} \quad (21)$$

- A: Wetted area (m^2)
- R: Hydraulic radius (m)
- Q: Discharge (m^3/s)
- N; Manning's roughness coefficient

Results and Discussions

Two important neighborhoods are located along the Altıntaş Stream: Gümüştaş and Demirciler. Between 2002 and 2004, the Büyükköy Municipality submitted reports to the Ministry of Public Works and Settlement regarding the magnitude of flood damages in the study area and its surroundings. These reports, along with attached petitions from local residents, were forwarded to DSİ 22nd Regional Directorate.

As shown in Figure 2, petitions originating from Gümüştaş and Demirciler neighborhoods constitute 58% of the total number of petitions submitted for the entire region. The main issues reported were the damage to agricultural lands and the disruption of road connections between neighborhoods. Considering that agricultural lands and residential houses are generally located in close proximity in the Eastern Black Sea Region, it was decided to conduct a detailed investigation of floods occurring in the Altıntaş catchment.

Figure 2 Comparison of the number of petitions from Demirciler and Gümüştaş Neighborhoods with the surrounding areas

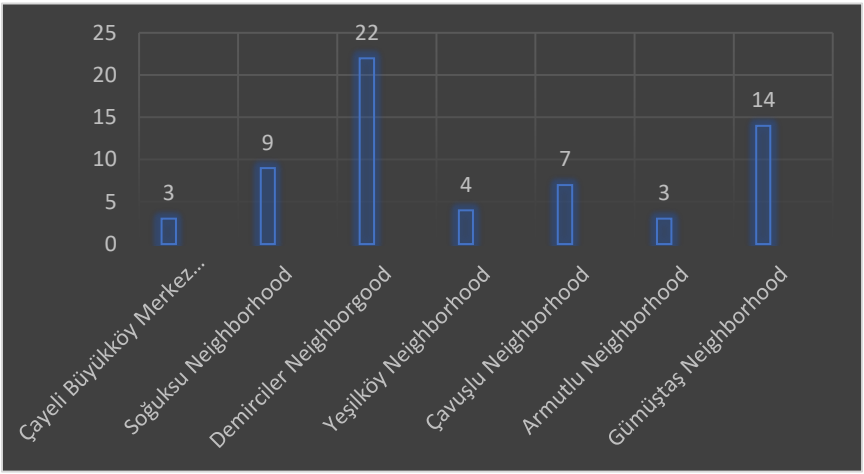


Table 3 summarizes the topics and details of the field investigations carried out in the study area.

Table 3 Field Studies

Study area	The Pehlivanlı and Altıntaş streams join the Büyükköy Stream, covering an approximately 2700-meter section that includes the Altıntaş, Demirciler, and Gümüştaş neighborhoods.
General Land Slope	Approximately 80% of the catchment area has slopes exceeding 25%.
Critical Sections	1. (Right bank 0+000 -0+080),2.(Sol bank 0+090-0+145) 3.(Left Bank 0+165-0+265),4.(Right bank 0+190 -0+270) 5.(Left bank 0+165-0+265),6.(Right bank 0+700-1+010) 7.(Right Bank 2+480 -2+573),8.(Left Bank 2+538-2+570) 9.(Right Bank 2+580 -2+650),10.(Left Bank 0+090-0+145) 11.(Raigt Bank 2+590-2+683),12.Left Bank(3+000 -3+015) m
Flood Causes	Section narowwing and coastal scour as aresult of sediment accumulation during rainy periods

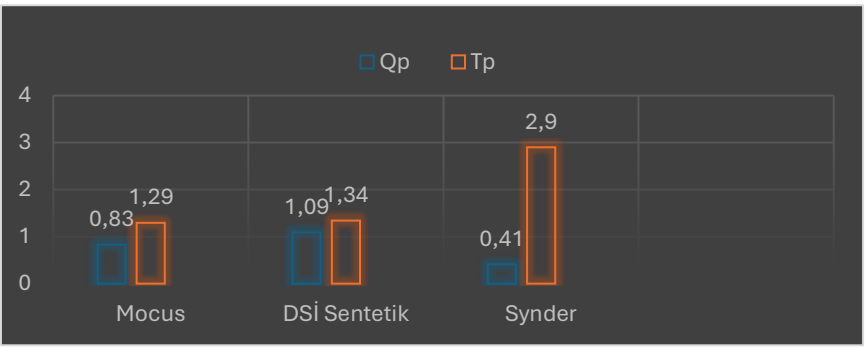
Assessment of Flood Damage Types and Validation of Problems Reported by Residents Along the Stream	House + Farmland (2)+(3)+(5)+(6),tea factory and production place (7),Mosque(4),Farmland (Tea garden),School+ House(1),Settlement(12),House (8) (9) (10)(11)
Natural stream bad sections km	(2+590) m ve (2+660) m
Stream bad soil properties	Sand and Gravel
Existing flood protection structure	Double sided stacked fortifications in the down stream section of the stream,(0+500)-(0+700) m
Streams connecting to Altıntaş stream	Right bank Çukur and Demirciler streams between (1+000) m ve (2+000) m
Sections along the stream bank with slope debris, inclined terrain, and geological problems.	(0+080)-(0+190)m,(2+573)-(2+590)m
Pedestrian bridges and potential issues that may cause flooding problems.	8 Bridges and floods anh fillings due to sedimentation under the bridges
Relationship between the highway and the stream	Parallel to the stream
Determination of Floodplain Boundaries in the Field	In the field, the following studies are conducted to support the delineation of flood boundaries on the general layout plan: investigations in flood prone areas, examination of previous flood traces, review of official records, and correlation of these data with eyewitness accounts of past flood events (DSİ, 1975).

Office studies included flood analysis, hydraulic calculations, determination of improvement types and cross sections, and preparation of the general layout plan. In Turkey, synthetic unit hydrograph parameter estimation methods used by DSİ for streams include the Mocus, DSİ Synthetic, and Snyder methods. Table 4 presents the synthetic unit hydrograph parameters calculated according to these three methods.

Table 4 Unit Hydrograph Parameters of the Altıntaş Stream According to the Mocus, DSİ Synthetic, and Snyder Methods

Mocus	Results	DSİ Sentetik	Results	Synder	Results
Tc	0,48	Hp	33,14	tp	2,90
D	1,38 (2 h)				
Tp	1,29	qp	151,65	tr	0,53
Qp (m^3/sn/mm)	0,83	Tp	1,34	qp	517,1
T R(h)	2,15	Qp	1,09	Qp	0,41
T	3,43			Tp	3

Figure 3. Comparison of synthetic unit hydrograph parameters



In Figure 3, the parameters obtained from the Synthetic Unit Hydrograph Method are compared. In the Snyder method, values of Qp = 0.41 and Tp = 2.90 were obtained. The low peak discharge and relatively long time to peak produced by the Snyder method indicate that this approach does not yield reliable results for small to medium sized and steep catchments such as the Altıntaş Stream. Although the hydrograph derived from the DSİ Synthetic Method provides more balanced results in terms of both peak discharge and time to peak, as shown in the table, the findings reveal that parameters determined according to the Mocus method should be taken into account in the calculations, particularly considering catchment area and concentration time characteristics.

Table 5 Synthetic Methods and Related Parameters

Drainage Area (km^2)	Method	Concentration and Rise Time
A<1	Rasyonel	-
1<A<10	Mockus	*Tc < 30 h*
10-1000	DSİ Sentetik	*Tp ≥ 2 h*
A>1000	Synder	-

Kaynak: Nagy, L. (2008). Hydraulic failure probability of a dike cross section. Periodica Polytechnica Civil Engineering, 52(2), 83-89.

Flood Recurrence Discharges

The CN runoff coefficient for the Altıntaş Stream catchment was calculated as 75 by DSİ 22nd Regional Directorate. Based on the relevant formula, the potential maximum retention (S) coefficient was determined as 84.67. Table 6 presents the flood recurrence discharges for the Altıntaş Stream according to the Mocus method, while Figure 3 shows the flood recurrence discharge graph derived from the Mocus unit hydrograph method.

An examination of Figure 3 clearly reveals the effect of increasing recurrence intervals on flood discharge. For shorter recurrence periods such as Q2–Q5, the hydrographs are narrower with lower peak discharges, whereas for longer recurrence periods (Q50–Q100), peak discharges increase rapidly. Moreover, the widening of the hydrograph curves indicates that the flood duration also becomes longer.

This finding demonstrates that in the Altıntaş Stream catchment, flood risk reaches significant levels at higher recurrence intervals, and this must be carefully considered in engineering design and flood protection planning.

Figure 4 Flood Recurrence Discharge Graph According to the Mocus Unit Hydrograph Method

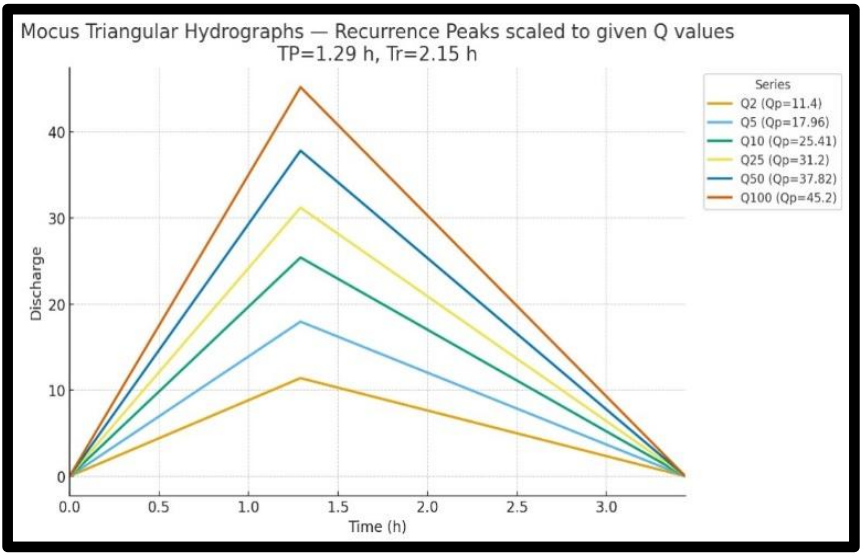


Table 6 Flood Recurrence Discharges of the Altıntaş Stream According to the Mocus Method

Return Period	Rainfall Values for 2 Hours (mm)	Mocus (Runoff Values for 2 Hours – mm)	Mocus Method (Discharge Values) Qt = Qp * Ht	Discharge Values Including Base Flow Total Discharge = Qt + Base Flow (2 m³/s)
2	54,91	11,76	9,4	11,4
5	69,20	19,95	15,96	17,96
10	79,54	26,61	23,41	25,41
25	93,62	36,44	29,2	31,2
50	104,84	44,78	35,82	37,82
100	116,74	54,00	43,20	45,20

Along the stream, the sections identified as being susceptible to flooding were determined to include agricultural lands and residential areas. Therefore, the Q500 discharge was selected as the design discharge for hydraulic calculations.

Q500=Q10+1,692*(Q100-Q10)=25,41+1,692*(45,20-25,41) = 58,90 m3/s

Figure 5 and Figure 6 shows the section up to the confluence point of the Çukur Stream; Figure 5 also presents the section up to this confluence; Figure 6 illustrates the reach from Çukur Stream to the pedestrian bridge; Figure 7 shows the 2+800 m section extending from the pedestrian bridge; and Figure 8 displays the residential areas and the section where existing flood protection structures are located.

By plotting the stream profile on a 1:25,000 or smaller scale topographic map and determining the water surface elevations in the field, the discharge causing the flood can be calculated (Sepetçioğlu, 2013). When the water surface elevations obtained from hydraulic calculations are plotted on 1:25,000 maps, the flood prone areas shown in the sketches below and the potential damages associated with these areas can be clearly identified.

Figure 5 Section Up to the Confluence Point of the Çukur Stream (Proposed stacked fortification, recommended concrete wall, existing flood protection structure, recommended base belt, flood limit)

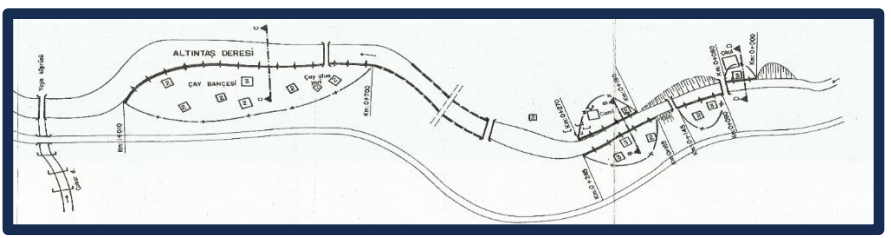
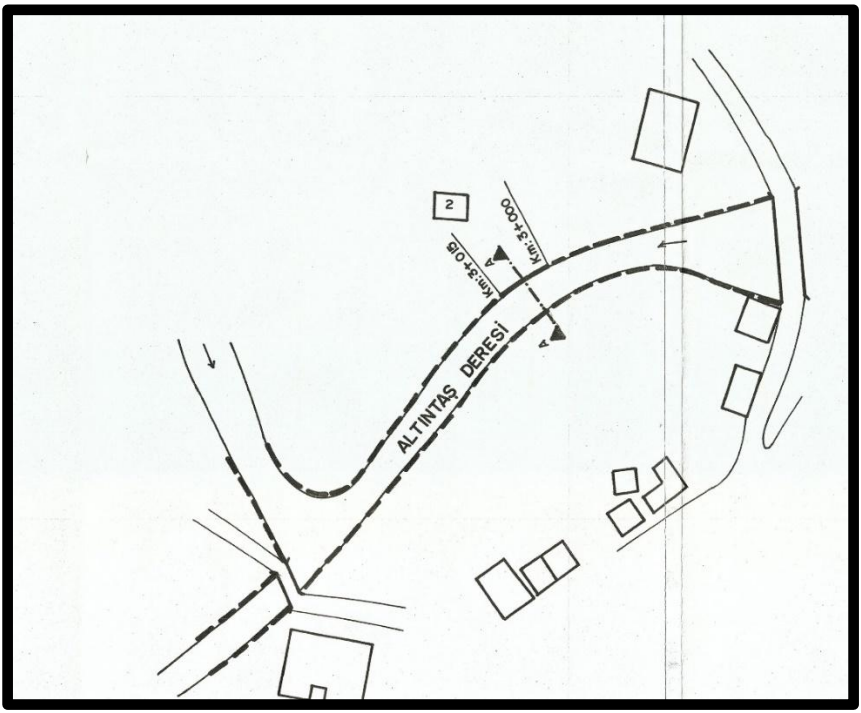


Figure 6 Layout Plan of the Downstream Section of Çukur Stream and Proposed Cross-Section Locations



The proposed longitudinal structures are shown as follows: the C–C cross-section in Figure 7, the D–D cross section in Figure 8, the B–B cross section as a riprap protection structure in Figure 9, and the A–A cross section as a concrete wall, presented in Figure 10. Table 7 provides the hydraulic calculation table for the sections designed with stacked stone riprap protection.

Table 7 Hydraulic Calculation Table for the Sections with Stacked Stone Riprap Protection

h	n	j	J^1/2	A	Ç	R	R32/3	Qh
2,0	0,035	0,03	0,173	14,77	10,86	1,36	1,22	90
1,5	0,035	0,03	0,173	10,61	9,65	1,10	1,07	56

Figure 7 C–C Cross-section (1/100 Scale)

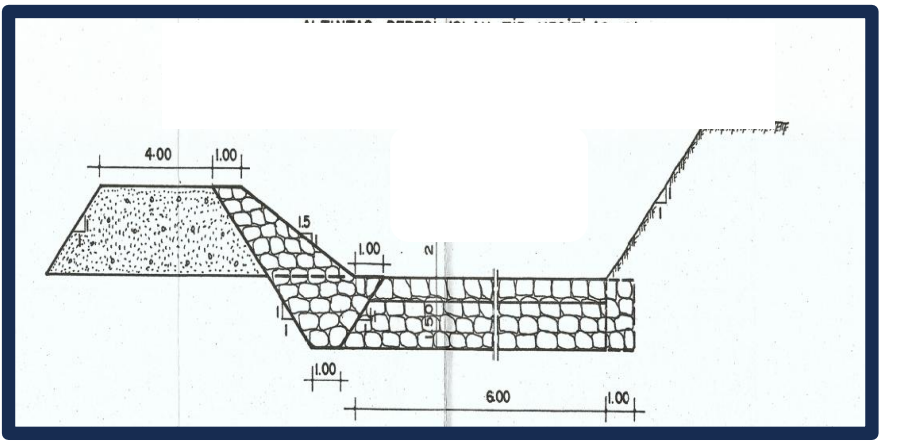


Figure 8 D-D Section (1/100 Scale)

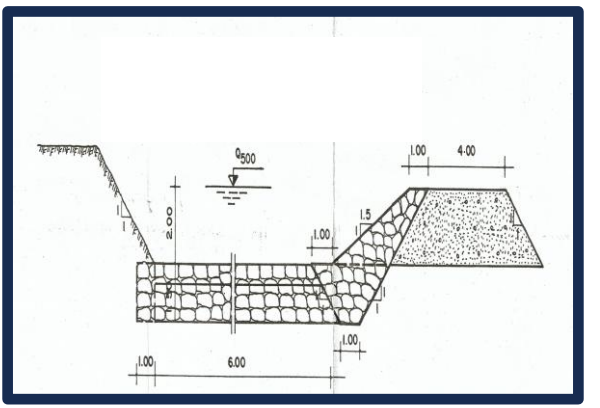
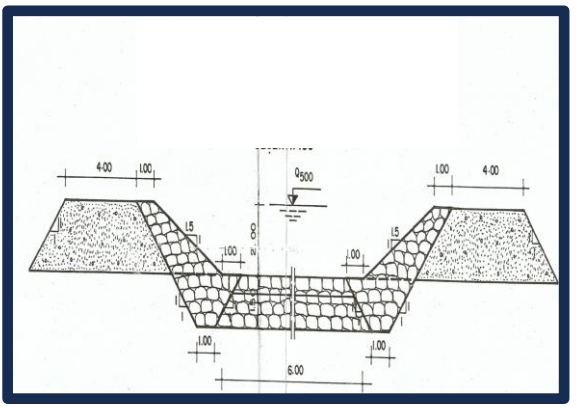


Figure 9 B-B Section (1/100 Scale)



The discharge value of Qh = 90 m³/s corresponds to the cross-section that accommodates Q500 = 58.90 m³/s, which represents the combined discharge of residential and agricultural areas. Since the natural ground slope is J = 0.049 and the design slope is j = 0.03, the use of a chute structure is recommended to reduce the slope.

Table 8 presents the hydraulic calculation table for the concrete wall rehabilitation cross section designed for residential areas, while Table 9 provides the corresponding static calculation table. Figure 11 shows the proposed chute cross section for the sections with stacked stone riprap and concrete wall structure

Figure 10 Proposed and Existing Concrete Wall in Residential Areas (1/50 Scale)

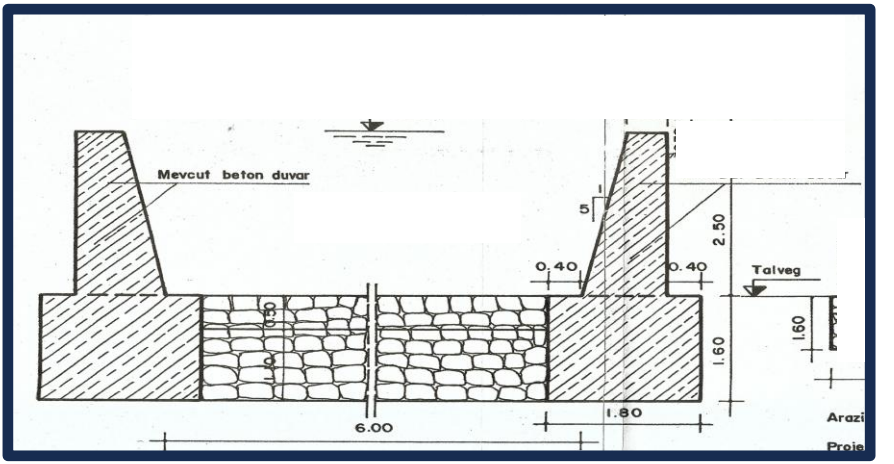


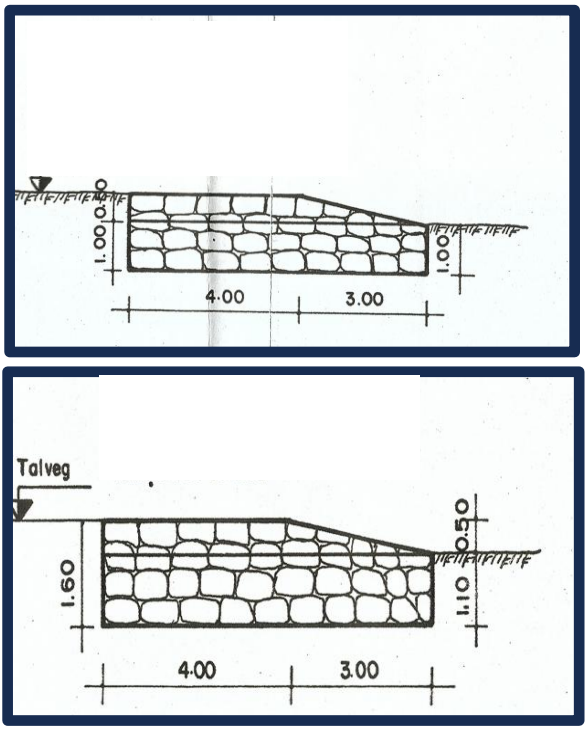
Table 8 Hydraulic Calculation Table

h	n	j	J^1/2	A	Ç	R	R32/3	Qh
2,5	0,035	0,03	0,173	16,17	11,07	1,46	1,29	103
2,00	0,035	0,03	0,173	12,99	10,14	1,28	1,18	76

Table 9 Static Calculation Results of the Concrete Wall

İnvestigations	Results	Limit Value
Slip	0,37	0,5
Rollover	2,27	2,00
Max.Stress Tolerance	10,08	20
Min. Stress Tolerance	7,78	0

Figure 11 Proposed Chute Cross-Section for Stacked Riprap and Concrete Wall Sections (1/100 Scale)



Slope Reducing Chute=0,049*3000-0,03*3000/0,50=90 (Number of Chutes)

Chute distance =3000/90=33,33 m

The natural stream bed cross-sections for the proposed structure locations are shown in Figure 12 as sections A–A, C–C, and D–D.

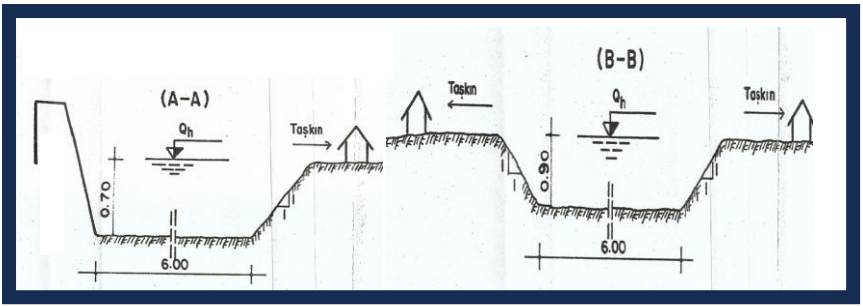
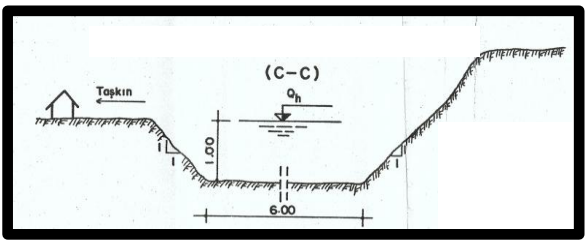
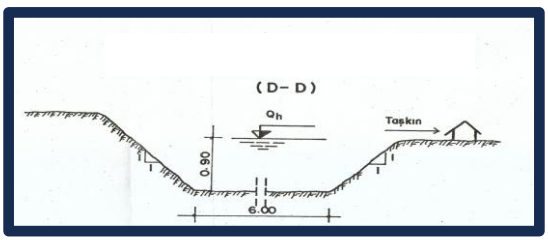


Figure 12 Natural Stream Bed Cross-Sections in Flood-Prone Sections



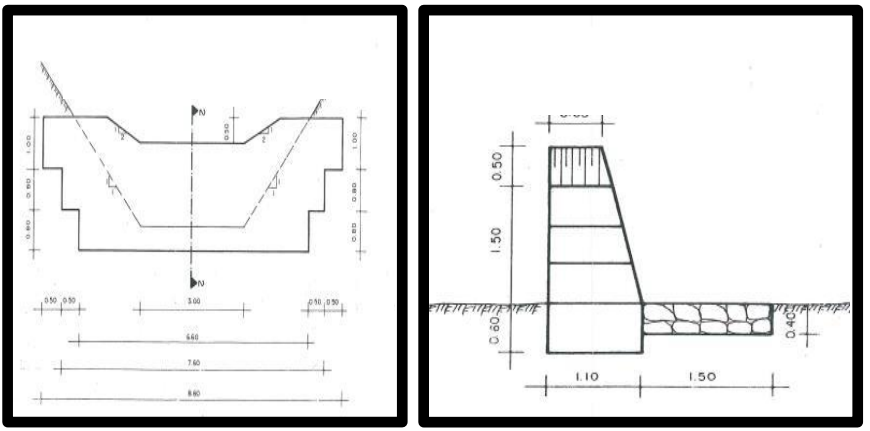


If the materials accumulated on the streambed are likely to be mobilized during flood events, or if there is evidence of bed scouring, bed sills (energy dissipation structures) should be constructed to prevent sediment movement and further erosion. Figure 13 presents Bed Sill Type 1, as implemented by DSİ. These structures not only prevent bank erosion but also help maintain uniform flow conditions in wide channel sections. Designed with moderate heights and similar to rehabilitation steps, these transverse

structures are constructed as masonry or concrete, depending on the availability of local materials (Binici & Aksoy, 2022).

As shown in Figure 13, three bed sill structures are proposed in total one for each of the Demirciler and Çukur tributaries to control slope erosion and sediment transport along the streambeds.

Figure 13 Proposed type 1 Bed Sill Structures for the Çukur and Demirciler Tributaries – Sections 1–1 and 2–2 (DSİ Standard Cross-Section)



Conclusions

In this study, the role of the reconnaissance (preliminary investigation) phase in the design of flood protection structures was evaluated through a comprehensive approach for a medium sized ungauged catchment. The findings demonstrate that flood protection projects should not be based solely on hydraulic calculations, but also on an integrated process management framework supported by field observations and multidisciplinary analyses.

The comparison of synthetic unit hydrograph methods revealed that the Mocus method produces more realistic peak discharge and concentration time values for small and steep

catchments such as the Altıntaş Stream. In contrast, the Snyder method yielded lower peak discharges and longer times to peak, indicating that its use in similar catchments may lead to underestimation of flood risk and consequently inadequate hydraulic design. This finding highlights that the selection of the hydrological method directly affects engineering safety and design reliability.

The analysis of flood recurrence discharges showed a significant increase in peak discharges between Q50 and Q100 return periods, accompanied by a noticeable widening of hydrograph duration. This result indicates that not only peak discharge but also flood duration should be considered in the design of flood protection structures. In this context, the selection of Q500 = 58.90 m^3/s as the design discharge was found to be appropriate in terms of ensuring safety for both residential and agricultural areas within the catchment.

Hydraulic calculations demonstrated that the proposed cross sections are capable of safely conveying the design discharge, with section capacities reaching up to 90–103 m^3/s. However, due to the high natural slope of the stream, the implementation of energy dissipation structures such as chutes and bed sills was found to be necessary to control flow velocity and prevent structural damage.

Field investigations revealed that flood problems are not solely caused by insufficient channel capacity but are also strongly influenced by sediment accumulation, cross section narrowing, bridge blockages, bank erosion, and slope instability. In particular, the presence of geological formations such as slope debris along the riverbanks plays a critical role in both flow behavior and structural stability. These findings emphasize that flood management requires a multidisciplinary approach integrating hydrology, hydraulics, geomorphology, and geotechnical considerations.

This study clearly demonstrates that the reconnaissance phase is not merely a data collection stage but a critical decision-making process that directly shapes the final project design. Within this phase, not only hydrological parameters but also flood water levels, flood boundaries, and the spatial extent of flood inundation are determined. In addition, the impacts of transverse structures on flow regime, slope stability conditions, geological characteristics along the riverbanks, sediment transport processes, and riverbed erosion are evaluated in detail.

The technical reports prepared during this phase play a crucial role not only in identifying current conditions but also in determining the most appropriate types of flood protection structures such as riprap protection, concrete walls, bed sills, and energy dissipation systems for different sections of the stream. Furthermore, this process highlights the necessity of preparing additional reports in later stages, including detailed geological investigations, sediment transport analyses, hydraulic modeling studies, and structural assessments.

Through the proposed process oriented modeling approach, these diverse datasets can be integrated systematically, allowing design decisions to be made at an earlier stage and with greater confidence. As a result, engineering uncertainties are significantly reduced, and potential risks that may arise during the implementation phase are minimized.

In conclusion, the success of flood protection projects depends not only on accurate hydraulic calculations but also on the effective integration of these calculations within a well defined process framework supported by field data and engineering judgment. Therefore, the development and application of adaptable, process based modeling approaches tailored to different catchment characteristics and flood conditions are essential for improving both the reliability and efficiency of flood protection planning and design.

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CHAPTER 3

FROM SENSORS TO SENSES: A HUMAN-CENTRED FRAMEWORK FOR ENVIRONMENTAL PERCEPTION IN LANDSCAPE ARCHITECTURE

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Introduction

Conceptual Orientation

Landscape architecture has increasingly moved beyond the description of land cover, spatial form and ecological performance toward a more experience-based understanding of place. Environmental perception, in this sense, refers to the ways in which people notice, interpret, evaluate and emotionally respond to natural and built settings. It is not simply a visual reaction to scenery; it is a cognitive, sensory, cultural and behavioural process through which space becomes meaningful. For this reason, the same street, park or waterfront may be judged as attractive, unsafe, restorative or

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confusing depending on the observer, the social situation and the moment of encounter.

The present chapter argues that environmental quality cannot be understood adequately through physical indicators alone. Sensor networks, remote sensing platforms, street-level imagery and artificial intelligence can record numerous environmental variables at high spatial and temporal resolution. Yet these measurements do not automatically explain how a user feels in a place or why a particular landscape supports attachment, stress reduction, social interaction or avoidance. The central aim is therefore to reframe landscape assessment as an integrated process in which objective environmental data are interpreted together with participatory perception data, local knowledge and sensory experience.

Within this perspective, environmental perception becomes a practical input for design rather than a secondary outcome measured after implementation. The chapter discusses the theoretical roots of perception studies, the limitations of purely physical criteria, variations among user groups and contexts, and the methodological value of tools such as PPGIS, photovoice, geotagged imagery, expert evaluation, mobile sensing and AI-assisted visual analysis. The overall purpose is to outline a landscape-intelligence approach that combines environmental measurement with human interpretation.

Theoretical Lineage of Environmental Perception

The study of environmental perception in landscape architecture draws on several intellectual traditions developed during the second half of the twentieth century. Kevin Lynch's work on urban imageability shifted attention to how people mentally organize the city through paths, edges, districts, nodes and landmarks (Lynch, 1960). This contribution remains important because it shows that spatial success depends not only on physical

arrangement but also on the clarity with which environments can be read and remembered.

A second theoretical stream concerns landscape preference and evolutionary interpretation. Appleton's prospect-refuge theory proposed that people often favour places that provide both visual command and a sense of shelter (Appleton, 1975). In parallel, Rachel and Stephen Kaplan developed an information-processing account of landscape preference. Their concepts of coherence, complexity, legibility and mystery explain why environments that are understandable but still invite exploration tend to be valued positively (Kaplan & Kaplan, 1978; Kaplan & Kaplan, 1989; Kaplan, 1995; Kaplan & Kaplan, 2005). These ideas later informed attention restoration theory and the broader discussion on nature's role in mental recovery.

Humanistic geography added another layer to this discussion. Tuan's concept of place emphasized that space is transformed into place through memory, attachment and lived experience (Tuan, 1977). This view is particularly relevant for landscape architecture because it positions landscape as a cultural and emotional construct, not merely a material surface. Recent studies reinterpret these classic approaches through environmental psychology, cognitive neuroscience, social media analytics and restorative environment research (Crossan & Salmoni, 2021; Burn & Passmore, 2022; Koprivec et al., 2022; Su et al., 2023; Yan et al., 2023; Bai et al., 2024; Ivaldi, 2024; Wu et al., 2024; Lothian, 2025).

Taken together, these theories suggest that environmental perception is produced at the intersection of form, meaning, emotion and behaviour. Contemporary landscape research therefore benefits from reading older conceptual models together with new digital and participatory methods. What changes today is not the importance of perception, but the methodological possibility of recording it more systematically and linking it with spatial data.

Why Physical Indicators Are Not Enough

Urban and landscape quality has often been evaluated through measurable variables such as the quantity of green space, street width, building height, density, accessibility scores or microclimatic performance. These criteria remain necessary, but they describe only one side of spatial experience. A park may satisfy area-based green-space standards and still be avoided because it feels unsafe, poorly maintained or socially disconnected. Conversely, a small square with modest physical dimensions may be highly valued because it supports familiarity, comfort, visibility and everyday social interaction.

The distinction between the measured environment and the experienced environment has been emphasized in urban environmental quality studies. Pacione (2003) noted that physical data describe the city as it exists on the ground, whereas residents' evaluations reveal the city as it is held in mind. Similar arguments appear in studies that relate perceived environmental quality to satisfaction, well-being, place attachment and quality of life (Van Kamp et al., 2003; Li et al., 2022; Tang et al., 2024). This means that objective variables are incomplete unless they are connected to the user's interpretation of those variables.

Several recent studies question assessment models that privilege physical features while overlooking socio-cultural experience (Zhang et al., 2021; Wang et al., 2023; Veckalne et al., 2025). For example, visible greenery may contribute to perceived safety or aesthetic appreciation, but the relationship is shaped by maintenance, lighting, social use, cultural expectations and previous experience. Likewise, a high noise level may signal liveliness in a festival square but disturbance in a residential street. The same measured exposure can therefore produce different meanings.

For planning and design, the implication is clear: numerical indicators should not be discarded, but they must be interpreted through perception. Landscape evaluation should ask not only how much green, shade, openness or accessibility exists, but also how these qualities are experienced, by whom, under what conditions and with what behavioural consequences.

Cognitive, Neurological and Behavioural Dimensions

Cognitive organisation of space

Environmental perception begins with the organisation of sensory information. People form mental maps, recognize spatial patterns and rely on previous knowledge to interpret new environments. Lynch's concept of legibility and Tolman's cognitive-map theory both show that people navigate more confidently when spatial information is coherent and memorable (Tolman, 1948; Lynch, 1960). Visual cues are especially influential because human perception gives strong priority to vision; nevertheless, visual information is filtered through memory, culture, age, education and personal experience (Downs & Stea, 1973; Kandel, 2012).

Cognitive interpretation also involves curiosity and exploration. The Kaplan framework explains why people tend to prefer places that balance order with discovery: too much complexity can feel chaotic, while too little may become monotonous. In landscape design, this balance can be achieved through readable circulation, framed views, partial concealment, diverse planting structure and sequences of spatial experience.

Neurophysiological responses to place

Environmental perception also has a neurological basis. Contemporary environmental neuroscience and neuroarchitecture examine how spatial settings influence attention, stress, emotion and brain activity (Higuera-Trujillo et al., 2021; Fitzgerald, 2024).

Studies using VR, EEG and related techniques suggest that natural components, window views and biophilic spatial features can contribute to relaxation and positive affect (Grassini, 2024; Taherysayah et al., 2024; Binarti et al., 2025). These findings do not reduce design to brain signals, but they strengthen the argument that landscape form has measurable consequences for human well-being.

Memory is also central. Places that are repeatedly experienced, socially important or emotionally intense may become strongly encoded through associations. This helps explain why local landscapes, childhood environments, culturally familiar vegetation or everyday routes may evoke attachment beyond their measurable physical characteristics.

Behavioural effects of perception

The way a setting is perceived influences how it is used. A public space experienced as inviting and safe is more likely to support staying, walking, play and social interaction. A space perceived as neglected or threatening may produce avoidance, shortened visits or restricted use. Perceived safety is especially consequential. Studies show that women often evaluate public-space risks differently from men, and these differences can shape routes, times of use and access to urban opportunities (Valera-Pertegas & Guàrdia-Olmos, 2017; Cui et al., 2023; Chen et al., 2024).

Behavioural responses also relate to comfort, visibility, refuge and social density. Appleton's refuge concept is visible in the tendency to choose sheltered edges, corners or shaded resting points. Likewise, clear layouts support exploration because users feel less risk of disorientation. Thus, perception functions as a bridge between landscape form and spatial behaviour.

Differences Among Users and Contexts

Age, ability and life stage

Environmental perception is not uniform across the population. Children, adults and older people often evaluate the same setting through different priorities. For children, the perceptual value of a landscape may lie in play opportunities, hiding places, sensory richness and imaginative affordances. As children gain independence, their attention increasingly includes accessibility, traffic safety and social permission to move through public space (Özgece et al., 2015; Lambert et al., 2019; Kim & Carlson, 2024; Friesen et al., 2025).

Older adults generally place greater importance on comfort, familiarity, lighting, seating, cleanliness, smooth movement and wayfinding. Environments that are ambiguous, poorly maintained or physically demanding may increase anxiety or reduce use. For this reason, participatory perception studies should deliberately include different age and mobility groups rather than assuming an average user.

Gendered perception of safety

Gender is one of the most visible dimensions of perceptual difference in public space. Perceived safety is influenced by lighting, visibility, escape routes, maintenance, crowding and social norms. Studies on gender and urban safety show that women may experience the same physical environment as more insecure than men, which can lead to avoidance or altered mobility patterns (Cozens & Love, 2015; Valera-Pertegas & Guàrdia-Olmos, 2017; Cui et al., 2023; Chen et al., 2024; Arteaga Albarello & Gomez Gomez, 2025). Therefore, inclusive landscape design must examine whose perception is being represented and whose experience is being neglected.

Cultural background and landscape meaning

Cultural background also shapes landscape interpretation. Preferences for wilderness, order, social recreation, privacy or

openness vary among communities. Research on immigrant and multicultural contexts has shown that landscapes considered natural or beautiful by one group may be seen as unmanaged, unsafe or unfamiliar by another (Buijs et al., 2009; Höglhammer et al., 2015; Kamičaitytė et al., 2020). Public-space elements such as picnic areas, barbecue facilities, shaded group seating or open lawns may carry different meanings depending on cultural habits and social practices.

These differences show that perception is not a simple reaction to physical form. It is mediated by collective memory, everyday practice and learned expectations. Participatory design is therefore essential for revealing the plurality of perception maps within a community.

Climatic and Geographical Mediation of Perception

Landscape perception is also conditioned by climate and geography. In hot and dry regions, shade, water, air movement and cool materials may be perceived as central components of environmental quality. In cooler or humid climates, the same elements may have a different priority. People develop perceptual preferences in relation to the environments in which they live, and these preferences are reinforced through daily adaptation (Matijošaitienė et al., 2014; Bennett, 2019; Yan et al., 2023).

Weather and season further modify perception. A green corridor may be experienced as restorative during a bright spring day but as exposed or uncomfortable during a cold, grey winter afternoon. Eye-tracking research indicates that visual attention changes according to seasonality and weather, with favourable conditions often expanding visual exploration and unfavourable conditions narrowing attention to selected elements (Półrolniczak & Kolendowicz, 2023).

Climate and culture should therefore not be separated mechanically. Many cultural landscape preferences have developed through long-term adaptation to local geography. A context-sensitive landscape assessment must ask how local climate, seasonal rhythms and cultural memory interact in the production of perception. Universal design principles are useful, but they must be translated through local experience.

From Environmental Sensors to Human Sensing

The promise and limitation of sensorised environments

Smart-city technologies have made it possible to monitor air quality, noise, temperature, pedestrian flow, light and other environmental variables continuously through IoT devices, remote sensing systems and mobile sensors (Husni et al., 2022; Singh et al., 2022; Zeng et al., 2024; Anjum et al., 2025). These tools support risk detection, infrastructure management and quantitative mapping of environmental exposure. However, measurement capacity should not be confused with understanding.

A structural gap remains between what sensors record and what people experience. Decibel values, heat maps or vegetation indices provide essential descriptions, but they do not indicate whether a place feels lively, oppressive, restorative, safe or alienating. Scholars of smart urbanism have warned that data-driven systems can become technocratic when they remove human experience from the analytical frame (Allam & Newman, 2018; Han & Hawken, 2018; Kitchin, 2021; Veloso et al., 2024). For landscape architecture, this critique is especially important because the discipline is grounded in the relationship between people, place and ecological systems.

Citizens as interpreters of environmental information

The human-as-a-sensor approach reframes citizens as active producers and interpreters of environmental knowledge. Concepts such as citizen sensing, participatory sensing and community-based monitoring highlight that local experience can make environmental data more meaningful and actionable (Stepenuck & Green, 2015; Coulson et al., 2021; Gabrys, 2021; Graça et al., 2021; Muhamad Khair et al., 2020). In this view, people do not merely receive environmental impacts; they register, contextualize and communicate them through perception, emotion and behaviour.

For landscape planning, this approach enables the systematic use of perceived safety, calmness, beauty, stress, attachment and discomfort as design inputs. Mobile devices, wearable technologies and ecological momentary assessment methods can connect self-reported feelings with location, time and exposure. Geographically explicit EMA is particularly valuable because it records perception in situ rather than relying only on retrospective evaluation (Fancello et al., 2023; Kingsbury et al., 2024).

Methods for Capturing Participatory Environmental Perception

Participatory perception data can be collected through different methods. Each method captures a different layer of experience and has distinct strengths and limitations. The most useful research designs therefore combine methods instead of treating one source as sufficient.

Surveys and PPGIS

Surveys allow participants to report evaluations such as safety, beauty, comfort, tranquillity, accessibility, satisfaction and attachment. Their limitation is that conventional questionnaires are often detached from spatial context. Participatory GIS addresses this weakness by allowing users to mark positive and negative perceptions directly on maps. Through this approach, feelings of stress, pleasure, insecurity or belonging can be linked to precise

locations and analysed spatially (Barroso et al., 2012; Ribeiro et al., 2013; Palacio Buendia et al., 2021; Fagerholm et al., 2022; Mohamed, 2025; Zaldo-Aubanell et al., 2024).

However, PPGIS is not free from bias. Digital literacy, access to devices and willingness to participate can affect representativeness. Careful sampling, complementary face-to-face methods and transparent interpretation are therefore required.

Photovoice and geotagged visual material

Photovoice enables participants to photograph places that matter to them and explain why those scenes are meaningful. It is especially useful for revealing attachment, discomfort, vulnerability and everyday environmental knowledge that may not appear in technical datasets (Berbés-Blázquez, 2012; Bagge-Petersen et al., 2025; San-Juan-Escudero et al., 2025). Social media photographs, by contrast, can provide large-scale traces of visual preference and spatial use, especially when images include geolocation metadata (Tieskens et al., 2018; Liu et al., 2025).

Visual data must be interpreted carefully. Social media users are not demographically representative, and photographs are shaped by platform culture, tourism behaviour and privacy constraints. Nevertheless, when used ethically, visual material helps connect perception with spatial evidence.

Expert assessment and community comparison

Landscape architects, planners and environmental psychologists can evaluate visual quality, walkability, landscape character, comfort and design coherence through structured criteria. Expert assessment provides technical consistency and links perception to ecological or spatial indicators. Landscape character assessment and visual quality indices are examples of this tradition

(Butler & Herlin, 2021; Misthos et al., 2023; Schüpbach & Kay, 2024; Chatziioannou et al., 2025).

The limitation is that expert judgement may not fully match local priorities. Recent comparative studies therefore aim to bring professional evaluation into dialogue with public perception rather than treating experts as substitutes for users.

AI-assisted visual analysis

Street-view imagery and computer vision now allow large-scale estimation of visual exposure, greenness, enclosure, openness, facade texture and other urban form variables. Measures such as the Green View Index and semantic segmentation provide pedestrian-level information that aerial data cannot capture (Biljecki & Ito, 2021; Sun et al., 2023; Tang et al., 2024; Ma et al., 2025; Huang et al., 2025; Yu et al., 2025). Deep learning models can also predict perceived safety, beauty or vibrancy when trained with human-labelled data.

These approaches are powerful but should not be treated as a replacement for human interpretation. Algorithms usually infer perception from visible elements and training labels; they may miss cultural meaning, sound, smell, memory, social tension and temporal atmosphere. Their best use is complementary: they help map patterns at scale, while participatory methods explain what those patterns mean.

Table 1. Reframed comparison of methods for environmental perception research

Method family	Main perception layer	Typical outputs	Analytical tools	Strength	Key limitation
Participant surveys / PPGIS	Safety, comfort, aesthetic value,	Questionnaire files, mapped points/poly	Qualtrics, Maptionnaire, Google Forms,	Directly records users' stated	Sampling bias, digital access

	satisfaction, attachment	gons, GIS layers	QGIS/ArcGIS, SPSS/R	evaluations and locates them spatially	and self-report limitations
Photovoice and geotagged images	Narrative meaning, visual preference, belonging, discomfort	Photographs, captions, interview text, image-density maps	Smartphones, photo platforms, GIS, qualitative coding, image APIs	Reveals situated and often hidden meanings of everyday places	Small samples or platform bias; privacy and consent concerns
Expert assessment	Landscape character, visual quality, walkability, design performance	Checklists, index scores, annotated maps, technical reports	LCA frameworks, audit tools, AHP/MCA, GIS	Provides structured professional interpretation and comparability	May not reflect local experience or vulnerable groups
AI-assisted visual analysis	Visible greenness, enclosure, streetscape qualities, predicted safety/beauty	Street-view datasets, segmentation maps, prediction surfaces	TensorFlow/PyTorch, CNNs, semantic segmentation, GIS	Scalable assessment across large urban areas	Infers perception indirectly and may miss cultural or sensory context

Integrating Perception into Planning and Design

The smart-city paradigm has often emphasized technological infrastructure, automation and big data. These capacities are useful, but they may produce narrow solutions when they ignore historical, cultural and psycho-social dimensions of urban life. A more human-centred alternative may be described as a wise-city or landscape-

intelligence approach: technology remains important, but it supports participatory judgement, local well-being and democratic decision-making rather than replacing them.

For landscape architecture, integrating perception data means involving users before, during and after design decisions. Early-stage perception mapping can reveal where people feel unsafe, where they seek shade, which routes they avoid, which views they value and which elements support attachment. These findings can guide the placement of vegetation, seating, lighting, water features, circulation routes, thresholds and social programmes. Post-occupancy perception studies can then test whether design interventions actually improve experience.

Landscape architects are well positioned to mediate between technical data and lived experience. They can translate sensor outputs into spatial design questions and translate user narratives into measurable planning priorities. For example, a heat map can identify thermal stress, while participatory reports can explain which shaded areas are socially acceptable, accessible or perceived as safe. Similarly, AI-derived greenness scores can be checked against users' evaluations of maintenance, visibility and comfort.

This integrated process also promotes equity. When perception data are collected from different age, gender, cultural and mobility groups, design is less likely to serve only an abstract average user. Instead, it can address diverse needs and reduce exclusion from public space. The goal is not to replace professional judgement with public opinion, but to create a dialogue between technical expertise, environmental measurement and everyday experience.

Conclusion and Future Direction

The main argument of this chapter is that landscape quality is produced through both measurable environmental conditions and

lived sensory experience. Sensors, remote sensing, IoT systems, street-view analytics and artificial intelligence can describe environmental variables such as air quality, heat, noise, vegetation visibility, pedestrian density and spatial openness. Yet these tools alone cannot explain whether a place feels restorative, stressful, safe, tiring, beautiful or meaningful.

Participatory perception methods fill this gap by documenting how people interpret and use space. Surveys, PPGIS, photovoice, geotagged photographs, expert assessments, ecological momentary assessment and AI-assisted image analysis should be considered complementary layers of evidence. Used together, they can reduce the distance between objective environmental indicators and subjective user experience.

Several cautions are necessary. Participatory data are context-specific and may be affected by sampling, digital access, age, income, culture and privacy concerns. Social media imagery and mobile location data require explicit ethical attention, including consent, anonymisation and careful interpretation. Perception data should therefore not be treated as an absolute truth, but as situated evidence that must be read alongside physical, ecological and social information.

Future research in landscape architecture should develop hybrid models that combine sensor-based environmental indicators with human-centred perception data. The integration of eye tracking, physiological measures, mobile self-reports, PPGIS, semantic segmentation and street-view analysis can support a new form of landscape intelligence. Such an approach would not only map what the environment is, but also clarify how it is experienced and what behaviours it encourages. In this way, landscape architecture can help balance the data-driven structure of smart cities with the sensory, emotional and democratic dimensions of human life.

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CHAPTER 4

ARCHITECTURAL DOCUMENTATION, EVIDENCE-BASED ASSESSMENT, AND CONSERVATION APPROACH IN EDIRNE YAHYA BEY MOSQUE

MEHMET FATİH AYDIN[1]

Introduction

In studies on historic building conservation, restitution decisions are often made under conditions of limited documentation and incomplete physical evidence. This is especially true for small-scale Ottoman mosques, where entrance spaces integrated into the main architectural scheme are poorly documented, placing restitution inevitably within a zone of uncertainty. Restitution should therefore be understood not only as a formal architectural task, but as a decision-making process involving interpretation and ethical responsibility.

The restitution problem of the last prayer hall (son cemaat yeri) of Yahya Bey Mosque exemplifies this condition, as existing physical traces, historical photographs, and typological comparisons do not allow a definitive definition of its original form or roofing system.

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Accordingly, this study does not seek a single “correct” restitution, but instead focuses on how uncertainty can be addressed and represented (Kaymaz & Şenkal Sezer, 2016).

Restitution, Uncertainty, and the Problem of Ethical Representation

In architectural conservation, restitution is not a direct depiction of a past state but a process of decision-making based on incomplete, fragmentary, and often contradictory data. The development of conservation theory has long acknowledged that historic buildings belong to layered temporal processes rather than a single design moment. Jokilehto emphasizes that historic structures contain interventions from different periods and therefore cannot be approached through a fixed assumption of an “original state” (Jokilehto, 1999). In this context, restitution drawings function not merely as visualizations, but as interpretive representations that shape both historical identity and future intervention limits (Letellier, Schmid & LeBlanc, 2007).

Accordingly, documentation should not be treated as a technical record produced at the end of restoration, but as an integrated system operating alongside knowledge production, evaluation, and decision-making. Letellier et al. warn that when documentation is reduced to measurement and drawing, it ceases to support conservation decisions and instead becomes a retrospective instrument that legitimizes intervention (Letellier et al., 2007).

This interpretive nature becomes particularly visible in reconstruction and partial completion practices. Ahunbay argues that as documentary support weakens, reconstruction rapidly loses its claim to authenticity and shifts from historical testimony to contemporary interpretation (Ahunbay, 2017). Similarly, Gökbilgin notes that limited archival data in Ottoman architectural history

renders the reproduction of architectural elements with formal certainty methodologically problematic (Gökbilgin, 1997).

Under such conditions, restitution exceeds a technical documentation issue and becomes an ethical problem of representation. Muñoz Viñas highlights that conservation decisions are shaped less by scientific certainty than by values and user perception, making ethics an inherent dimension of conservation practice (Muñoz Viñas, 2002). Arnóth further emphasizes that the ethical quality of reconstruction depends not on the resulting form, but on how uncertainties are defined and how transparent the decision process remains (Arnóth, 2019).

From this perspective, restitution should be understood not as a closed outcome representing a single “correct” solution, but as an open representational system that exposes evidence levels, assumptions, and alternatives. Riegl’s theory of monument values demonstrates that conservation decisions engage not only historical accuracy but also contemporary perception and use (Riegl, 1982). This view aligns with the principles of the Burra Charter, which emphasize the articulation of justifications and assumptions within conservation processes (Australia ICOMOS, 2013). Lowenthal likewise underlines that the past cannot be reconstructed as a fixed reality, framing restitution as an inherently ethical representational act (Lowenthal, 2015).

Accordingly, this article approaches uncertainty not as a deficiency to be eliminated, but as a condition to be defined and managed through restitution. The simultaneous representation of alternatives offers an analytical framework for rendering threshold spaces legible within conservation decision-making processes (Şuta & Zencirkıran, 2024).

Typological and Documentary Fragility of the Last Prayer Hall in Ottoman Mosques

In Ottoman mosque architecture, the *son cemaat yeri* functions as an intermediate threshold between the prayer hall and the exterior, carrying both functional and representational roles. At the same time, its semi-open character renders it typologically diverse yet documentarily fragile. Compared to the main prayer hall, its lighter construction, frequent use of timber elements, and openness to later addition or removal have made it one of the most altered components over time (Ayverdi, 1989).

Typological studies of mosques in Edirne and its surroundings demonstrate that last prayer halls do not follow a fixed scheme, but instead range from domed porticoes to timber-roofed and hybrid solutions, shaped by period and region (Ayverdi, 1989). While this diversity makes typological analogy indispensable in restitution, it simultaneously undermines formal certainty. The Venice Charter explicitly warns that hypothetical completions lacking documentary support risk producing historical illusion, emphasizing the clear articulation of evidence limits and distinguishability of additions (ICOMOS, 1964).

Bayrakal similarly notes that although the last prayer hall defines the public face of the mosque, it is often omitted or vaguely described in inscriptions and waqf documents, widening the interpretive field in restitution (Bayrakal, 2008). Documentary fragility is further intensified by irregularly recorded repair interventions. Yüksel observes that secondary spaces such as the *son cemaat yeri* were frequently altered or removed during repairs, complicating the dating of surviving physical traces (Yüksel, 2002). Later functional adaptations have likewise obscured original spatial configurations, particularly in transitional zones (Tapkı, 2018).

From a conservation-theoretical perspective, such uncertainty should be treated not as a deficiency to be filled, but as data to be managed (ICOMOS, 2003). Ahunbay cautions that closing uncertain areas with singular and definitive forms often weakens

historical legibility rather than strengthening it, especially in representational spaces like the last prayer hall (Ahunbay, 2017). This position aligns with the Nara Document on Authenticity, which rejects fixed criteria of originality in favor of contextual evaluation of evidence reliability (ICOMOS, 1994).

Accordingly, the *son cemaat yeri* should not be regarded as a secondary appendage, but as a critical testing ground for interpretive restitution, where typological diversity, documentary gaps, and intervention history intersect. The Seville Principles define the explicit differentiation of assumptions, interpretive levels, and evidence boundaries as an ethical requirement (ICOMOS, 2017), while the London Charter similarly mandates transparency between evidence and hypothesis in visual restitution (Denard, 2009). Archaeological and material culture theory further reinforces that objects do not convey singular historical truths, but generate knowledge through interpretation and representation (O'Brien, 2005; López-Menchero & Grande, 2011).

Within this framework, the present study contextualizes these typological and documentary vulnerabilities through the case of Yahya Bey Mosque, examining how uncertainty in the restitution of the last prayer hall can be read and ethically represented.

Context of Yahya Bey Mosque, Documentary Gaps, and Scope of the Study

Located in Edirne, Yahya Bey Mosque represents a modest yet typologically significant example of Ottoman provincial mosque architecture. Although it belongs to the group of single-domed mosques, interruptions in documentary continuity—particularly regarding the entrance façade and the last prayer hall—render the building a problematic case for restitution. The scarcity of written sources on its construction phase, the absence of early visual documentation, and the fragmentary recording of later repair

interventions hinder a definitive reading of the original configuration of the *son cemaat yeri* (Ayverdi, 1989; Gökbilgin, 1997).

This uncertainty should be understood not merely as a historical deficiency, but as a data-related problem that directly shapes conservation decisions. Later interventions at Yahya Bey Mosque reconfigured the last prayer hall using contemporary materials and structural systems, obscuring original traces and producing a new perception of the "existing condition." As Yüksel notes, repair practices in Ottoman buildings were often carried out without systematic documentation, blurring the distinction between evidence and interpretation (Yüksel, 2002).

Accordingly, the central issue is not how the last prayer hall should be reconstructed, but which evidence can be used, within what limits, and through what degree of representational transparency. As emphasized by Ahunbay, in cases of weak documentary support, singular and definitive restitution proposals are difficult to justify; instead, the reasoning and presentation of the decision-making process become decisive (Ahunbay, 2017).

This position aligns with the principles articulated by Letellier et al., who argue that documentation should aim not to eliminate uncertainty but to define and manage it (Letellier et al., 2007). Similar concerns are raised in archaeological modeling and chronology studies, where the explicit articulation of uncertainty is considered an ethical requirement (Bayliss, 2015). As Sørensen observes, uncertainty is not a flaw in knowledge production, but an epistemological condition that enables interpretation and plural meaning (Sørensen, 2016).

Within this framework, the present study treats uncertainty regarding the last prayer hall of Yahya Bey Mosque not as a deficit to be resolved, but as an opportunity to test an interpretive restitution approach. The study is structured around three objectives: (i)

identifying physical, documentary, and typological evidence and classifying their levels of reliability; (ii) evaluating two restitution alternatives together with their respective degrees of assumption; and (iii) discussing how these alternatives can be presented through an ethical and transparent representational language under conditions of high uncertainty. In doing so, the article proposes a traceable and pluralistic framework for restitution in small-scale Ottoman mosques facing documentary gaps.

Data Set and Method

The restitution problem of Yahya Bey Mosque is addressed through a multi-layered methodological framework that evaluates physical evidence, typological comparisons, and contextual readings in relation to one another, rather than relying on a single source of documentation.

Dataset and Source Types

The restitution problem of the last prayer hall of Yahya Bey Mosque cannot be grounded in a single, direct document and therefore requires the combined evaluation of data with different types and levels of reliability. Accordingly, the dataset is structured through the parallel reading of primary, secondary, and interpretive sources, as proposed in conservation literature (Letellier, Schmid & LeBlanc, 2007).

Primary data consist of physical traces directly observed on the building and existing architectural documentation. Wall traces, level relationships, and structural indications are treated not as absolute evidence, but as physical indicators requiring interpretation (Ahunbay, 2017).

Secondary data include archival records, historical photographs, foundation deeds, and previous studies. In the case of Yahya Bey Mosque, these sources remain limited and fragmentary,

offering no explicit description of the last prayer hall, a condition consistent with the frequent lack of detailed documentation for entrance spaces in Ottoman architecture (Gökbilgin, 1997).

The third group comprises interpretive data based on typological and comparative analysis. Examples of last prayer halls in contemporaneous single-domed Ottoman mosques define a range of plausible solutions rather than a direct model (Ayverdi, 1989; Bayrakal, 2008).

Within this framework, the study evaluates all data through a balanced evidence–assumption relationship, without treating any single source as determinative.

Evidence Hierarchy Approach

In this study, restitution decisions are evaluated through an evidence-based hierarchical approach rather than a horizontal model that treats all data types as equally reliable. As emphasized by Letellier et al., assigning equal weight to data with different reliability levels may create a misleading sense of certainty instead of reducing uncertainty (Letellier et al., 2007).

Accordingly, the evidence is classified into three levels:

- **High reliability:** Physical traces directly observable on the building with clearly readable spatial relationships.
- **Medium reliability:** Data supported by written or visual documents and typological analogies, but not directly verifiable.
- **Low reliability:** Interpretations with limited documentary support and largely based on assumption.

This classification does not aim to label restitution alternatives as “correct” or “incorrect,” but to clarify where each proposal relies on evidence and where it involves assumption. As

noted by Arnóth, the primary ethical problem in conservation is not the existence of uncertainty, but its concealment through claims of singular certainty (Arnóth, 2019).

Through this approach, restitution is reframed as an open evaluative process in which evidence–assumption relationships remain traceable, rather than a closed, result-driven decision mechanism.

Interpretive Restitution and Representation Strategy

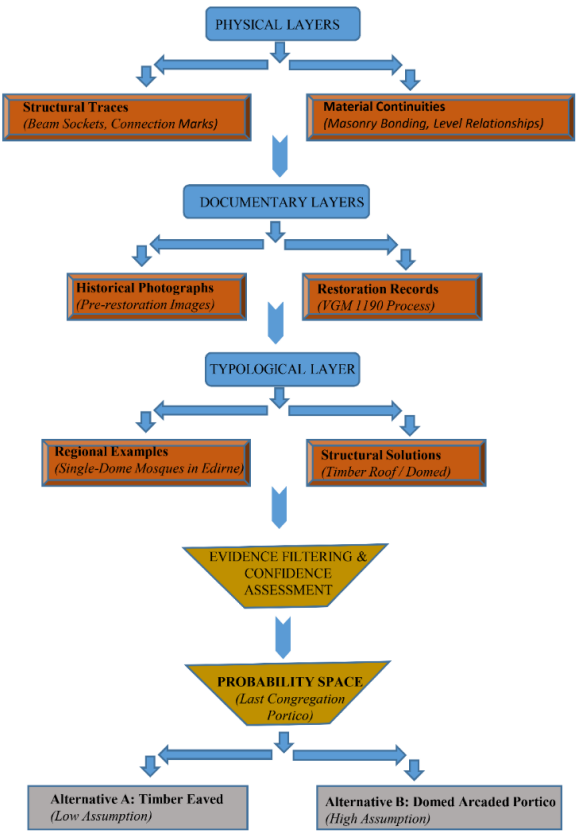
In this study, restitution is approached not as a design act aimed at producing a single definitive outcome, but as an interpretive representation process operating under documentary uncertainty. Interpretive restitution prioritizes making the limits of available evidence visible and representing multiple plausible alternatives rather than forcibly completing missing data. As emphasized by Ahunbay, this approach grounds restitution in knowledge and ethics rather than aesthetic preference (Ahunbay, 2017).

Accordingly, the restitution proposals for the last prayer hall of Yahya Bey Mosque are not presented as final solutions, but as two alternatives with explicitly defined evidence bases and assumption points. This allows not only the outcomes, but also the underlying decision logic to remain readable. Recent studies in the Turkish context similarly highlight that such representation strategies enhance ethical transparency and scientific traceability in restitution practices (Tupal Yeke, 2023).

This approach aligns with Riegl's theory of monument values, which argues that restitution should reveal the multi-layered history of a building rather than absolutizing a single historical moment (Riegl, 1982). In this sense, interpretive restitution in the Yahya Bey Mosque case offers a methodological framework for ethical representation under conditions of uncertainty rather than a purely formal proposal.

Within this framework, the probability field for the last prayer hall is defined through the combined reading of physical traces, documentary evidence, and typological comparisons as mutually controlling data layers. The conceptual structure and decision logic of this process are presented schematically (Figure 1).

Figure 1. Conceptual framework of the interpretive restitution process adopted in this study, illustrating the layered evaluation of physical evidence, documentary sources, and typological comparisons, and their transformation through evidence filtering and confidence assessment into alternative probability-based restitution scenarios for the last congregation portico of the Yahya Bey Mosque.



Findings

This section presents the findings derived from the analysis of physical, documentary, and typological evidence, with emphasis on the physical traces observed on the building.

Physical Evidence Related to the Last Prayer Hall at Yahya Bey Mosque

The most reliable data regarding the last prayer hall of Yahya Bey Mosque consist of physical traces observed directly on the building. Wall continuities, level relationships, and partially readable connection traces on the north wall indicate that the last prayer hall was related to the original spatial scheme rather than a later, incidental addition. However, these traces alone are insufficient to define a specific form or roofing system.

These physical indicators have been significantly disrupted by later interventions. Contemporary structural additions on the north façade interrupt the continuity of original traces, and the present condition reflects a secondary layer shaped by twentieth-century interventions rather than the original state. As noted by Yüksel, entrance spaces in Ottoman buildings were often altered without systematic documentation, complicating subsequent restitution interpretations (Yüksel, 2002).

Accordingly, the current condition is treated not as direct evidence of the original state, but as an intervention layer that defines evidential limits and areas of uncertainty. As emphasized by Ahunbay, failure to distinguish contemporary interventions from original traces risks producing misleading certainties in restitution (Ahunbay, 2017). In this study, physical data are therefore approached as interpretive indicators rather than absolute evidence.

Current Condition and Issues Of Legibility

Yahya Bey Mosque is located on parcel 432/1 in the Sarıcapaşa neighbourhood, with the last prayer hall positioned on the north façade in relation to the main entrance (Figure 2a). Today, this area is enclosed by a steel-framed roof structure resting on cut-stone paving, with wooden cladding concealing the structural elements and aluminium joinery enclosing three sides (Figure 2a–2c).

These interventions have removed the original open character of the last prayer hall and significantly weakened the legibility of its historical function and spatial configuration (Figure 2b–2d). Although the cut-stone paving differs in level and material from the surrounding garden surface, suggesting an originally defined spatial unit, current enclosure decisions obscure these original boundaries.

Figure 2. Current condition of the last congregation portico of the Yahya Bey Mosque, showing a roof system supported by steel posts clad in timber, partially leaning against the northern wall of the prayer hall, and enclosed with aluminum joinery, representing a late-period intervention layer that obscures the reading of the original spatial and structural configuration.

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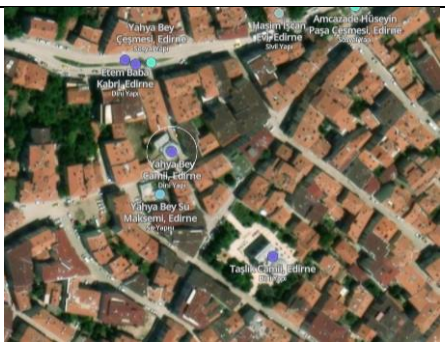
<td> 
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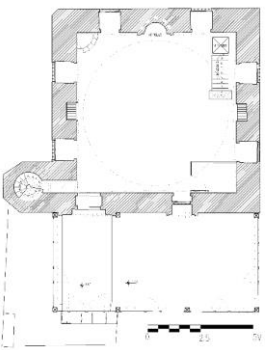
<td>  </td>
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<tr>
<td>a) Location of Yahya Bey Mosque (kulturenvanteri.com)</td>
<td>b) Survey drawing of Yahya Bey Mosque, prayer hall plan (Author’s personal archive)</td>
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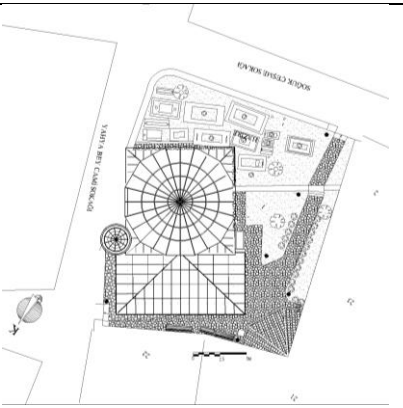	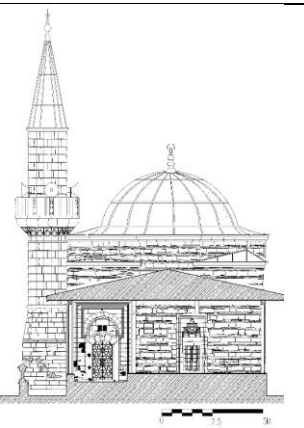
c) Survey drawing of Yahya Bey Mosque, site plan (Author's personal archive)	d) Survey drawing of Yahya Bey Mosque, section looking from the last prayer hall toward the north wall (Author's personal archive)

The existing last prayer hall is covered by a roof system supported by steel columns clad in timber, some of which bear directly against the north wall of the prayer hall. The placement of one column in front of architectural elements on the north façade disrupts the perception of the original façade composition and creates a misleading impression regarding the historic structural system (Figure 3).

The enclosure of three sides of the last prayer hall with aluminium joinery causes the space to be perceived as a late-added annex, obscuring its relationship with the original architecture. These interventions conceal potential clues regarding the open or semi-open character of the space and do not provide clear data that can be directly referenced in the restitution process.

Accordingly, the current condition should be regarded not as a reliable representation of the original state, but as an intervention layer that complicates the reading of evidence and expands the field of uncertainty.

Figure 3. Selected measured drawings and photographic views of the Yahya Bey Mosque, including sectional drawings and façade images, illustrating the absence of explicit documentary evidence regarding the original configuration of the last congregation portico and highlighting the limitations of visual and written sources in defining its historical form.

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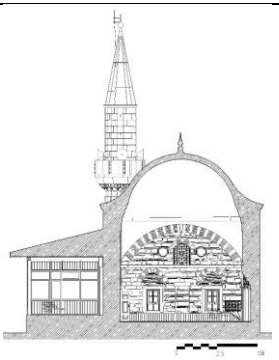
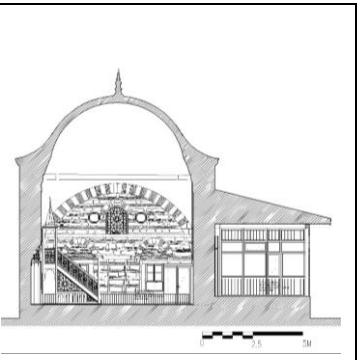
<tr><td>  </td><td>  </td></tr>
<tr><td>d) Survey drawing of Yahya Bey Mosque, section facing the east perimeter wall (Author’s personal archive)</td><td>b) Survey drawing of Yahya Bey Mosque, section facing the west perimeter wall (Author’s personal archive)</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>c) Yahya Bey Mosque, west and south façades (kulturportali.gov.tr)</td><td>d) Yahya Bey Mosque, north and east façades (mustafacambaz.com)</td></tr>
</table>

Limits of Documentary and Written Sources

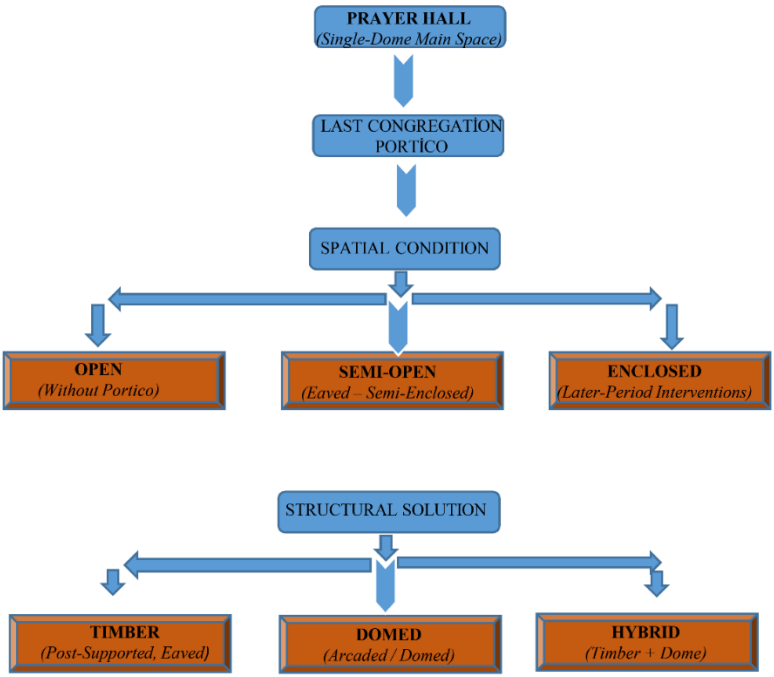
Written and visual sources related to Yahya Bey Mosque lack the level of detail required to directly define the original form of the

last prayer hall. Archival records and early descriptions of the building mainly focus on the main prayer space, while the entrance arrangement and the last prayer hall are either not mentioned or addressed only in general terms. Gökbilgin's studies on Ottoman buildings in Edirne and its surroundings demonstrate that architectural details were often not systematically recorded, particularly in small-scale mosques (Gökbilgin, 1997).

Similarly, Ayverdi's typological assessments show that last prayer halls were frequently treated as secondary elements in building descriptions, a condition that limits the production of documentary certainty in restitution studies (Ayverdi, 1989). For this reason, written and visual sources remain supportive but cannot assume a form-defining role in the restitution process.

As emphasized by Letellier et al., this documentary deficiency should not be concealed but addressed as an explicit ethical decision field (Letellier et al., 2007). Accordingly, this study positions written and visual sources at a medium level within the evidence hierarchy and develops a decision framework based on typological comparisons where physical and documentary data remain insufficient (Figure 4).

Figure 4. Typological decision framework illustrating the possible spatial conditions and structural solutions of the last congregation portico in relation to the prayer hall, outlining an open, semi-open, or enclosed spatial configuration and corresponding timber, domed, or hybrid structural alternatives as a basis for defining the probability space.



Typological Comparisons and the Definition of the Possibility Space

Given the limitations of documentary and physical evidence, typological comparisons are used to define the range of possible configurations for the last prayer hall of Yahya Bey Mosque. These comparisons do not offer a direct model but indicate which solutions are historically and regionally plausible.

Ayverdi's classifications of single-domed mosques in Edirne and its surroundings identify two main tendencies in last prayer hall roofing systems: domed porticoes and wooden-supported roofs with hipped or mono-pitched forms (Ayverdi, 1989). Bayrakal similarly emphasizes that the last prayer hall does not conform to a fixed typology (Bayrakal, 2008).

This diversity requires the consideration of multiple alternatives rather than a single solution. As Ahunbay notes, typological analogy is useful under documentary deficiency but cannot produce certainty on its own and must be evaluated together with physical and documentary evidence (Ahunbay, 2017). Accordingly, typological data are used here to define the legitimacy limits of the proposed restitution alternatives, without imposing any example as a direct model (Table 1, Table 3).

Interpretation of Historical Photographs And Documentary Evidence

Historical photographs and restoration records related to the original last prayer hall of Yahya Bey Mosque are limited. No early interior photographs were identified; only façade images and visuals from the period before and during the 1990 restoration are available (Figure 5). These materials require interpretive reading rather than enabling a direct formal restitution.

Pre-restoration photographs show no continuous roofing system over the last prayer hall but reveal timber beam traces embedded along the northern wall of the prayer hall (Figures 3a–3d, 8a). While these traces suggest a former wooden structure, it cannot be determined whether they belong to the original construction phase or to later interventions.

Restoration records from 1990 indicate that temporary protection and support measures were applied along the northern façade due to structural damage (Kılıççöte, 1993). Photographs from this process show that canopy-like wooden arrangements were temporary interventions rather than a permanent architectural scheme (Figures 3, 5).

Overall, the visual evidence indicates that the last prayer hall functioned as an open, roofed transition space rather than an enclosed volume. While these documents do not define the original

form with certainty, they provide critical clues that limit the range of plausible solutions. For this reason, historical photographs and restoration records are treated as complementary evidence that excludes certain forms rather than determining a single restitution outcome.

Figure 5. Photographs of the Yahya Bey Mosque in Edirne during the restoration process.

a) Yahya Bey Mosque, north and east façades (kulturenvanteri.com)

b) Yahya Bey Mosque, north and west façades (VGM Archive, 1990)

c) Yahya Bey Mosque, north and east façades (VGM Archive, 1990)

f) Yahya Bey Mosque, north and west façades (VGM Archive, 1990)

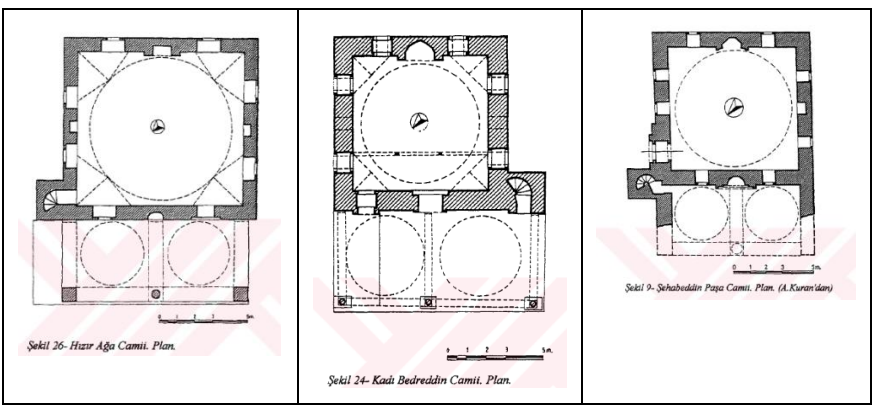
Defining the Possibility Space For the Last Prayer Hall Through Typological Comparisons

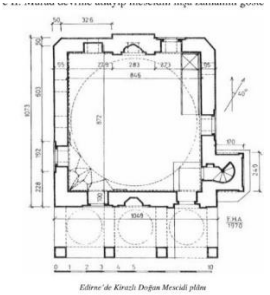
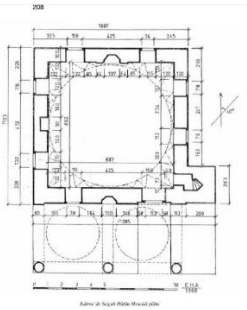
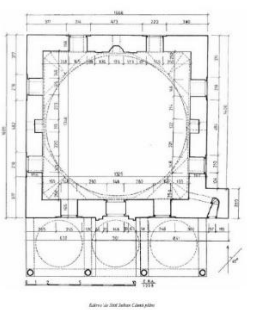
In the case of Yahya Bey Mosque, where documentary and physical evidence is limited, the assessment of the original configuration of the last prayer hall relies on typological comparisons. These comparisons do not propose a direct model but define a possibility space indicating which solutions can be considered plausible within the historical and regional context.

An examination of single-domed mosques in Edirne and its surroundings with comparable plan schemes reveals two main tendencies in the roofing of last prayer halls: domed portico arrangements (Figure 6) and wooden-supported, mono-pitched roof solutions (Figure 7). The coexistence of both typologies within the same period and geography demonstrates that the last prayer hall cannot be reduced to a single, obligatory form.

Accordingly, typological data are used to delineate the legitimacy limits of the proposed restitution alternatives, without treating any example as a directly replicable scheme. In this framework, typology functions not as a means of producing a definitive result, but as a supportive data layer that frames the possibility space within the interpretive restitution process.

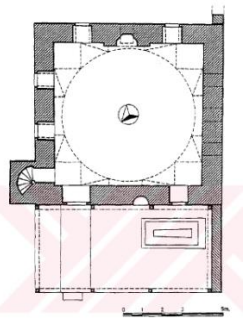
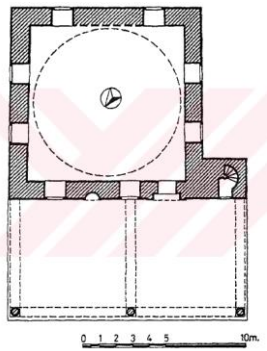
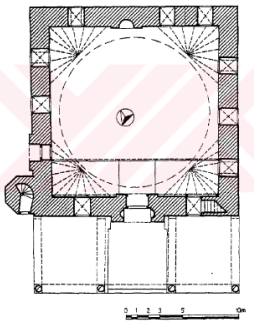
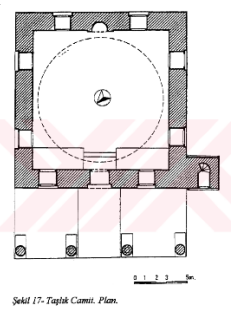
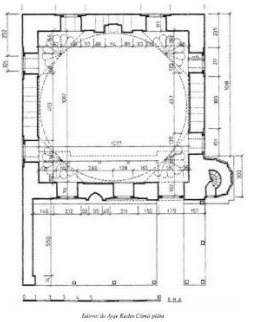
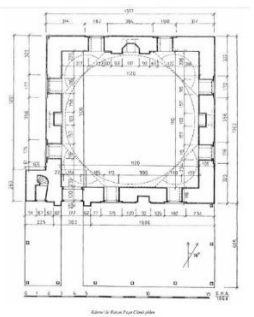
Figure 6. Single-Domed Mosques in Edirne with a Domed Portico (Son Cemaat Yeri) Configuration



a) Plan of Hızır Ağa Mosque, Edirne (Bayrakal, 1998)	b) Plan of Kadı Bedrettin Mosque, Edirne (Bayrakal, 1998)	c) Plan of Şehabettin Paşa Mosque, Edirne (Bayrakal, 1998)
		
d) Plan of Kirazlı Doğan Masjid, Edirne (Yüksel et al., 2014)	e) Plan of Selçuk Hatun Masjid, Edirne (Yüksel et al., 2014)	f) Plan of Sitti Sultan Mosque, Edirne (Yüksel et al., 2014)

When considered together, these examples show that in single-domed mosques in Edirne and its surroundings, the last prayer hall was articulated through diverse spatial and structural solutions, even in buildings with largely similar plan schemes. The widespread use of wooden-supported and eaved arrangements alongside domed porticoes demonstrates that the last prayer hall cannot be treated as a single or obligatory typological model. Rather, it could be configured as an open, semi-open, or non-porticoed space, indicating that its spatial organization varied in direct relation to the roofing system and structural solution (Figures 6–7).

Figure 7. Mosques in Edirne Featuring a Wooden-Roofed Son Cemaat Yeri within the Typology of Single-Domed Mosques

		
a) Plan of Edirne İsmail Ağa Mosque (Bayrakal, 1998: 48)	b) Plan of Edirne Süle Çelebi Mosque (Bayrakal, 1998: 100)	c) Plan of Edirne Süleyman Paşa Mosque (Bayrakal, 1998: 79)
		
d) Plan of Edirne Taşlık Mosque (Bayrakal, 1998: 56)	e) Plan of Edirne Ayşe Kadın Mosque (Ayverdi, 1953: 51)	f) Plan of Edirne Kasım Paşa Mosque (Ayverdi, 1953: 60)

This assessment demonstrates that the last prayer hall in single-domed mosques in Edirne and its surroundings cannot be reduced to a single or obligatory solution. In buildings with comparable plan schemes, both domed porticoes and wooden-supported, eaved arrangements were employed, and the space could be configured as open, semi-open, or without a portico. Such diversity makes the direct adoption of a single typological model for Yahya Bey Mosque methodologically problematic. Accordingly,

typological data were used not to validate a specific form, but to define a field of possibilities indicating which solutions may be considered plausible within their historical and regional context. The table below comparatively summarizes this field of possibilities and the legitimacy limits of the proposed restitution alternatives (Table 1).

Table 1. Typological characteristics of the last prayer hall in single-domed Ottoman mosques comparable to Yahya Bey Mosque in terms of scale and plan scheme

Case study (Edirne)	Last prayer hall configuration	Roofing character	Spatial condition	Relationship to Yahya Bey Mosque	Supported alternative
Hızır Ağa Mosque (Plan: Bayrakal, 1998)	Domed scheme	Domed (implies arcaded layout)	Open / semi-open transitional space	Demonstrates that a domed solution is possible in the region; however, weak documentary support for Yahya Bey increases the level of assumption	B
Kadı Bedrettin Mosque (Bayrakal, 1998)	Domed scheme	Domed	Open / semi-open	Part of the same plan family, showing a repertory of domed entrance solutions	B

Case study (Edirne)	Last prayer hall configuration	Roofing character	Spatial condition	Relationship to Yahya Bey Mosque	Supported alternative
Şehabettin Paşa Mosque (Bayrakal, 1998)	Domed scheme	Domed	Open / semi-open	Defines the typological legitimacy limits of Alternative B	B
Kirazlı Doğan Masjid (Yüksel et al., 2014)	Domed scheme	Domed	Open / semi-open	Small-scale example showing that Alternative B is not entirely speculative	B
Selçuk Hatun Masjid (Yüksel et al., 2014)	Domed scheme	Domed	Open / semi-open	Represents a typological threshold for Alternative B	B
Sitti Sultan Mosque (Yüksel et al., 2014)	Domed scheme	Domed	Open / semi-open	Expands the typological repertory supporting Alternative B	B
İsmail Ağa Mosque (Bayrakal, 1998)	Timber-roofed scheme	Single-slope timber roof	Open (revakless / eaved)	If physical traces and photographs at Yahya Bey indicate a "light system," this represents the lowest-assumption option	A

Case study (Edirne)	Last prayer hall configuration	Roofing character	Spatial condition	Relationship to Yahya Bey Mosque	Supported alternative
Süle Çelebi Mosque (Bayrakal, 1998)	Timber-roofed scheme	Single-slope timber roof	Open / semi-open	Reinforces the regional ordinariness (thus plausibility) of Alternative A	A
Süleyman Paşa Mosque (Bayrakal, 1998)	Timber-roofed scheme	Single-slope timber roof	Open / semi-open	Forms the typological backbone of Alternative A	A
Taşlık Mosque (Bayrakal, 1998)	Timber-roofed scheme	Single-slope timber roof	Open / semi-open	Provides additional support for Alternative A	A
Ayşe Kadın Mosque (Ayverdi, 1953)	Timber-roofed scheme	Single-slope timber roof	Open / semi-open	Expands the probability range of Alternative A	A
Kasım Paşa Mosque (Ayverdi, 1953)	Timber-roofed scheme	Single-slope timber roof	Open / semi-open	Confirms the typological continuity of Alternative A	A

The comparative table presented above demonstrates that typological data do not yield a single or definitive restitution solution for Yahya Bey Mosque, but instead indicate which spatial and structural options may be considered plausible within their historical and regional context. However, this typological continuity does not constitute decisive evidence on its own; rather, it defines a field of

possibilities that must be read together with physical traces, documentary data, and existing intervention layers. Accordingly, in the following stage, the reliability levels of data derived from different source types and their implications for restitution decisions are systematically evaluated in a manner that makes the evidence–assumption relationship explicit (Table 2).

Table 2. Evidence types, sources, and confidence levels used in the assessment of the last congregation portico of the Yahya Bey Mosque, showing their respective roles and limitations in shaping restitution decisions and defining the boundaries of the probability space.

Evidence type	Source / data set	Description and content	Reliability level	Impact on restitution
Physical architectural traces	North façade of the prayer hall wall	Embedded timber beam traces, connection voids, and construction continuities	High	Supports the interpretation that the last prayer hall was attached to the main prayer hall and covered by a light, open structure
Current condition analysis	Current survey drawings and on-site observation	Enclosed aluminium joinery, steel supports, and contemporary additions	Low	Does not provide direct evidence of the original condition; assessed as an intervention layer
Historical photographs	Pre-1990 and restoration-phase photographs	Traces of temporary timber canopies and roofing remains	Medium	Excludes a fully enclosed volume; supports an open, roofed transitional space

Evidence type	Source / data set	Description and content	Reliability level	Impact on restitution
Restoration documents	General Directorate of Foundations restoration records (1990)	Intervention data related to the dome, minaret, and entrance zone	Medium	Indicates that the present form of the last prayer hall is not original
Written historical sources	Ayverdi, Bayrakal, Kılıççöte, Onur	Regional typology, restoration history, and historical context	Medium	Defines the probability range; does not propose a definite form
Typological comparisons	Single-domed mosques in Edirne and its surroundings	Timber-roofed and domed arcaded examples	Medium	Supports the legitimacy of multiple restitution alternatives
Negative evidence	Absence of written and visual records	Lack of a direct description of the original last prayer hall	High	Methodologically limits the production of a single, definitive restitution solution

Restitution Alternatives

In this study, restitution is not treated as a result-oriented reconstruction in which documentary gaps are filled with a single form, but as a decision-making process that defines and represents multiple possibilities within the limits of available evidence. While physical traces, historical photographs, and typological comparisons provide strong indications regarding the existence and general character of the last prayer hall, they are insufficient to determine its original spatial configuration with certainty. Accordingly, this section does not impose a single restitution solution, but comparatively discusses alternatives based on different levels of evidence and assumption.

Logic of Constructing Restitution Alternatives and Principles of Representation

The restitution of the last prayer hall of Yahya Bey Mosque cannot rely on a body of evidence that allows the production of a single and definitive form. Physical traces on the northern façade (Figure 2), limited written and visual sources (Figure 3), and typological comparisons (Figures 6–7) indicate that the space functioned as an open transition area connected to the prayer hall, yet they do not define its original roofing system or spatial configuration. This condition renders the claim of a single "correct" restitution methodologically and ethically problematic.

The approach adopted here prioritizes the explicit representation of uncertainty rather than its suppression. As noted by Letellier et al., single and definitive restitutions produced under documentary gaps risk creating a misleading sense of certainty (Letellier et al., 2007). Restitution is therefore addressed as an interpretive representation process that makes evidence–assumption relationships visible.

Within this framework, the possibility space is defined through the combined reading of three data sets: physical traces on the northern façade (Figure 2), indirect information derived from written and visual sources (Figure 3), and typological diversity observed in contemporaneous single-domed mosques in Edirne and its surroundings (Figures 6–7). As this assessment does not allow a definitive conclusion regarding the roofing system, two restitution alternatives based on different levels of evidence have been developed and presented comparatively (Figure 8).

Alternative A: Timber-Supported / Eaved Last Prayer Hall

The first restitution alternative proposes a timber-supported and eaved configuration for the last prayer hall and represents the

option with the lowest level of assumption permitted by available evidence.

Wall continuities and connection traces on the northern façade suggest that the space was attached to the main prayer hall but constructed with a lighter structural system (Figure 2). In Ottoman mosque architecture, timber elements were commonly used in entrance spaces; however, their vulnerability over time has resulted in limited documentary survival (Ayverdi, 1989).

Typological comparisons show that timber-supported and eaved last prayer halls were widespread in single-domed mosques in Edirne and its surroundings (Figure 7). As noted by Bayrakal, such solutions were often preferred in small-scale mosques due to economic and construction-related considerations (Bayrakal, 2008). Accordingly, Alternative A offers a historically plausible but non-deterministic restitution proposal (Figures 8d–8f).

The main strength of Alternative A lies in its evidence-oriented balance between evidence and assumption. As emphasized by Ahunbay, under limited documentary conditions, solutions that do not contradict physical traces and remain plausible within their historical context are methodologically more defensible (Ahunbay, 2017). Nevertheless, since parameters such as support number, span proportions, and eave depth cannot be determined with certainty, points of assumption are explicitly indicated in the representation.

Alternative B: Domed Portico Last Prayer Hall

The second restitution alternative proposes a domed portico configuration for the last prayer hall. While this alternative is grounded in a typology observed primarily in monumental Ottoman mosques centered in Edirne, it represents a possibility with a higher level of assumption when applied to the scale of Yahya Bey Mosque.

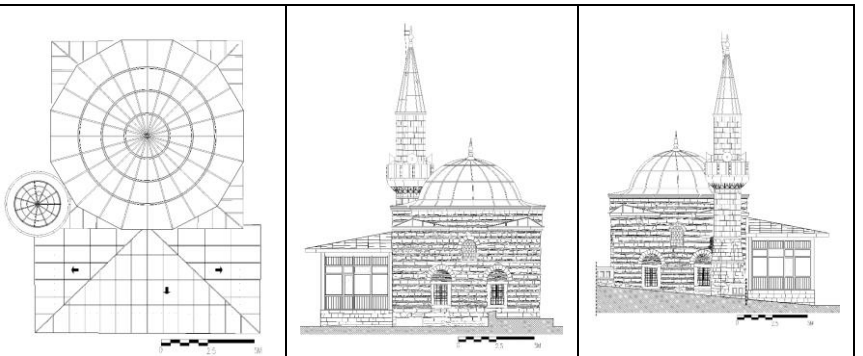
Ayverdi’s classifications indicate that domed portico last prayer halls became more prominent in Edirne from the second half of the

fifteenth century onward (Ayverdi, 1989). Such solutions, however, are generally associated with a building's scale, patronage, and representative role within the urban context, and are only sparsely encountered in small-scale neighborhood mosques (Figure 6).

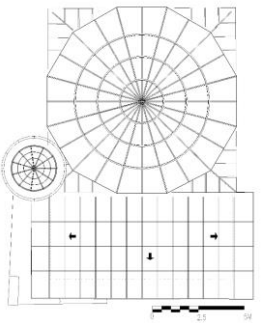
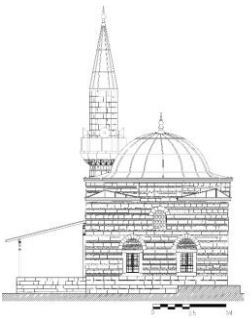
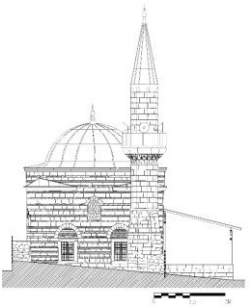
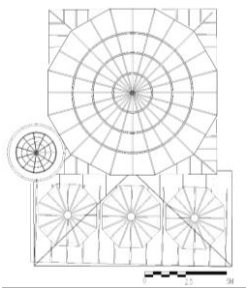
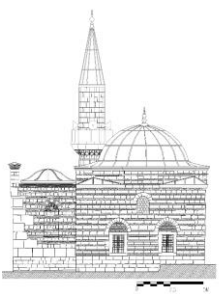
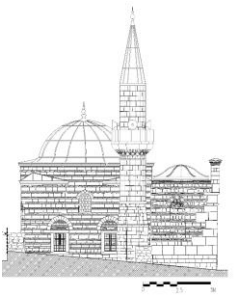
In the case of Yahya Bey Mosque, a domed portico last prayer hall is typologically possible, yet there is no direct written or visual evidence indicating such an arrangement. Alternative B is therefore treated not as a solution supported by physical or documentary evidence, but as an interpretation based primarily on comparative typology and a higher degree of assumption (Figures 8g–8i).

Although this alternative has the potential to confer a stronger architectural expression on the entrance façade, the visual strength of a solution with limited documentary support clearly entails an ethical risk. As emphasized by Letellier et al., representational strategies in such cases should make uncertainty visible rather than conceal it (Letellier et al., 2007). Accordingly, Alternative B is presented not as a preferred solution, but as one possible configuration illustrating how the last prayer hall may have been resolved in different ways within its historical context.

Figure 8. Measured drawings and alternative restitution schemes for the last congregation portico of the Yahya Bey Mosque, comparing an open timber-eaved option and a domed arcaded alternative derived from the evaluated evidence.



a) Roof Plan of Yahya Bey Mosque (Measured	b) West Elevation of Yahya Bey Mosque	c) East Elevation of Yahya Bey Mosque

Survey) (Author's personal archive)	(Measured Survey) (Author's personal archive)	(Measured Survey) (Author's personal archive)
		
d) Restitution Proposal with Timber-Roofed Last Prayer Hall: Roof Plan (Author's personal archive)	e) Restitution Proposal with Timber-Roofed Last Prayer Hall: West Elevation (Author's personal archive)	f) Restitution Proposal with Timber-Roofed Last Prayer Hall: East Elevation (Author's personal archive)
		
g) Restitution Proposal with Domed Last Prayer Hall: Roof Plan (Author's personal archive)	h) Restitution Proposal with Domed Last Prayer Hall: West Elevation (Author's personal archive)	i) Restitution Proposal with Domed Last Prayer Hall: East Elevation (Author's personal archive)

Comparative Evaluation of the Alternatives

The two restitution alternatives developed for Yahya Bey Mosque do not aim to eliminate uncertainty regarding the last prayer

hall, but to render it manageable and representable. Alternative A offers a more cautious approach due to its lower level of assumption and its direct relationship with the existing physical traces, whereas Alternative B produces a stronger spatial expression through typological continuity but entails a higher level of assumption due to its limited documentary support. In this context, the critical issue is not which alternative is "correct," but how clearly each proposal reveals the evidence it relies on and the points at which assumptions are introduced. As emphasized by Arnóth, the fundamental ethical problem in conservation lies not in proposing an incorrect solution, but in concealing levels of assumption and creating an illusion of certainty (Arnóth, 2019). Accordingly, rather than selecting one alternative, both solutions are presented as equivalent representations with explicitly defined evidence–assumption relationships.

Table 3. Comparative assessment of the two restitution alternatives for the last congregation portico of the Yahya Bey Mosque, based on evidence, assumptions, and ethical implications.

Evaluation criterion	**Alternative A: Timber-Supported / Eaved Last Prayer Hall**	**Alternative B: Domed Arcaded Last Prayer Hall**
Primary evidence basis	Physical architectural traces + historical photographs	Typological comparisons
Level of documentary support	Medium	Low–Medium
Consistency with physical traces	High	Medium
Typological compatibility	Medium	High

Evaluation criterion	Alternative A: Timber-Supported / Eaved Last Prayer Hall	Alternative B: Domed Arcaded Last Prayer Hall
Level of assumption	Low	High
Claim to authenticity	Within the limits of "could have existed"	"Plausible but unverified"
Representational strength	Limited and cautious	High and visually strong
Risk of misleading certainty	Low	High
Position in terms of ethical representation	Strong alignment with conservation ethics	Involves ethical risk; requires explicit clarification
Restitution approach	Interpretive, evidence-oriented	Interpretive, typology-driven
Suitability for conservation practice	High	Conditional
Rationale for consideration	Evidence–assumption balance	Making typological continuity visible

Table 3 compares the two restitution alternatives proposed for Yahya Bey Mosque not in terms of formal differences, but with respect to their evidential basis, levels of assumption, and ethical risks of representation. The table shows that Alternative A offers a more cautious approach with a lower degree of assumption, whereas Alternative B, while making typological continuity more visible, involves a higher level of assumption and a greater risk of producing an illusion of certainty. Rather than seeking a single "correct solution," this comparison aims to clarify under which conditions each proposal can be considered defensible.

Ethical Representation and Discussion

This section discusses the restitution approach developed for Yahya Bey Mosque not through the alternatives themselves, but through the ethical responsibility of how these alternatives are represented.

Making Uncertainty Visible Rather than Concealing It

The case of Yahya Bey Mosque clearly demonstrates that the central issue in architectural restitution is not *which* solution is chosen, but *how* uncertainty is represented. In most cases, the ethical problem arises not from producing an incorrect solution, but from covering documentary gaps with a single and definitive form.

The documentation principles proposed by Letellier et al. emphasize not the elimination of uncertainty, but its identification, classification, and integration into the decision-making process. Documentation aligns with conservation ethics insofar as it clarifies which information is missing and which interpretations are based on assumptions, rather than producing a false sense of certainty (Letellier et al., 2007). This perspective requires restitution to be understood not merely as a physical outcome, but as a knowledge-based narrative. As Kamacı also notes, conservation practice should not suppress the tension between old and new, but render it legible and open to discussion; otherwise, documentation risks becoming a tool that merely legitimizes intervention rather than producing knowledge (Kamacı, 2014).

Accordingly, the two restitution alternatives proposed for Yahya Bey Mosque are presented as equivalent representations that make the limits of evidence explicit, rather than suppressing uncertainty within a single visual narrative. As Arnóth emphasizes, the fundamental ethical issue in conservation is not the existence of uncertainty, but its concealment (Arnóth, 2019).

Representational Power and the Risk of False Certainty

While restitution drawings possess strong persuasive power, they also carry the risk of generating a misleading sense of certainty when documentary support is limited. Visually powerful schemes, such as a domed portico, may create the impression of a definitive historical reality, even when they are only one of several plausible possibilities.

Riegl's theory of monument values offers an important warning in this regard: conservation interventions do not only represent the past, but also shape contemporary perception. Restitution must therefore maintain an ethical balance between historical value and present-day interpretation (Riegl, 1982).

The representational strategy adopted in this study seeks to counteract the effect of visual certainty by explicitly indicating the types of evidence and points of assumption underlying each alternative. In this way, restitution is transformed from a tool that claims to show "what was" into a representational system that opens up discussion on "what may have been."

The Contribution of Interpretive Restitution to Conservation Practice

The interpretive restitution approach offers a significant contribution to conservation practice, particularly for small-scale buildings with fragile documentary bases. Rather than relying on aesthetic preferences or typological generalizations, it restructures the conservation process around the relationship between evidence, ethics, and representation.

As Ahunbay emphasizes, when documentary support is weak, the primary responsibility of conservation practice is not to reconstruct authenticity through imitation, but to safeguard knowledge production and legibility (Ahunbay, 2017). The

alternative-based approach developed for Yahya Bey Mosque fulfills this responsibility by articulating uncertainty through representation instead of imposing a single solution.

In this respect, interpretive restitution should be understood not as a method specific to Yahya Bey Mosque alone, but as a transferable methodological framework applicable to other Ottoman mosques and historic structures characterized by similar documentary gaps.

Conclusion

This study addresses the restitution problem of the last prayer hall of Yahya Bey Mosque not as a search for a single "correct form," but as a question of how uncertainty should be represented within the limits of available evidence. The combined reading of physical traces on the building (Figure 2), written and visual documentary sources (Figure 3), and typological comparisons (Figures 6–7) indicates that the last prayer hall was an open, covered transitional space related to the original spatial scheme of the mosque. At the same time, the same dataset does not allow a single and definitive conclusion regarding the roofing system or structural configuration, thereby clearly revealing the epistemic limits of restitution.

Under these conditions, covering documentary gaps with a single drawing risks producing not scientific certainty, but an ethically misleading sense of certainty. As emphasized by Letellier et al., the appropriate response to uncertainty is not its elimination, but its identification, classification, and integration into the decision-making process (Letellier et al., 2007). The two restitution alternatives developed in this study (Figure 8) respond to this ethical framework by making the evidence–assumption relationship explicit while rendering possible solutions open to discussion within their historical context. This approach aligns with Arnóth's assertion that

the fundamental ethical problem in conservation is not the existence of uncertainty, but its concealment (Arnóth, 2019).

Alternative A (the timber-supported/eaved scheme) is evaluated as a cautious solution with a lower level of assumption, as it does not contradict the physical traces and is consistent with regional examples (Ayverdi, 1989; Bayrakal, 2008). Alternative B (the domed portico scheme), while offering a stronger architectural expression through typological continuity, represents a possibility with a higher level of assumption due to its limited documentary and physical support (Ayverdi, 1989). Rather than selecting one alternative as a "final truth," the study presents both as equivalent representations and treats the management of uncertainty as a more valuable conservation outcome than the production of a single result.

In conclusion, the case of Yahya Bey Mosque demonstrates that restitution in small-scale historic buildings with fragile documentary bases is not merely a matter of form-making, but a decision-making process grounded in knowledge production, ethical transparency, and representational responsibility. In this sense, interpretive restitution should be understood not as a solution specific to this building alone, but as a methodological framework applicable to other Ottoman mosques and historic structures characterized by similar documentary gaps. As Ahunbay emphasizes, where documentary support is weak, the primary task of conservation practice is not to complete authenticity through imitation, but to safeguard legibility and knowledge production by respecting the limits of evidence (Ahunbay, 2017).

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CHAPTER 5

FROM CAPTIVITY TO THE SKIES: TRANSFORMING THE FORMER KEÇİBORLU PRISON INTO AN AVIATION MUSEUM WITHIN THE CONTEXT OF DIFFICULT HERITAGE

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Introduction

Architecture should be understood not merely as the production of the physical environment, but also as a practice actively involved in the construction, reproduction, and transformation of collective memory. Particularly in cases involving spaces with traumatic pasts, architecture transcends the boundaries of an objective design discipline and becomes a field of ethical, political, and representational intervention. Prison buildings are not simply functional accommodation units; they are spatial organizations of surveillance, discipline, and control mechanisms. Therefore, prison architecture can be interpreted as the physical manifestation of power relations that regulate bodily movement and behavior. For this reason, such structures have increasingly been discussed within the literature of architecture and heritage studies under the concept of "difficult heritage" or "dark heritage."

Difficult heritage refers to structures and sites that bear the spatial traces of experiences such as death, trauma, violence, and oppression embedded in collective memory. Unlike conventional heritage approaches that prioritize aesthetic, monumental, or artistic value, difficult heritage derives its significance from the historical and ethical burden it carries. Consequently, the preservation and adaptive reuse of difficult heritage constitute not only a physical conservation problem but also a critical issue regarding how the past should be represented. Turner and Peters argue that in the transformation of prisons into museums, the past is not merely exhibited but reproduced through performative tools,

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spatial narratives, and experiential strategies (Turner & Peters, 2015). This demonstrates that architecture does not simply provide a background for representation; rather, it directly shapes the form of the relationship established with the past.

However, the adaptive reuse of such structures also introduces a significant contradiction. Winstanley emphasizes the tension inherent in the reuse of negatively charged spaces: on one hand lies the ethical responsibility to preserve the past, while on the other exists the tendency to eliminate the traumatic associations produced by that past (Winstanley, 2018). This tension reveals that architectural interventions inevitably generate selective forms of memory production. Similarly, Morin argues that in the musealization of prison structures, a "usable past" is produced through specific narratives (Morin, 2013). Adaptive reuse, therefore, is not only a physical transformation but also a rewriting of history.

Within this context, the transformation of prison buildings into museums entails two primary risks. First, there is the risk that the historical burden of the structure may be aestheticized and neutralized, thereby silencing memory. Second, there is the danger that such spaces may become objects of touristic consumption, commodifying traumatic histories. Therefore, the adaptive reuse of difficult heritage requires architecture to assume responsibility not only for physical preservation but also for the production of critical representation.

This study focuses on the transformation of the former prison building located in the Keçiborlu district of Isparta, Türkiye. The building was allocated to Süleyman Demirel University and reconsidered within the framework of a proposal to convert it into an aviation museum. Programmatically, this transformation embodies a strong contradiction: on one side stands the prison, founded upon closure, control, and introversion; on the other stands

the aviation museum, representing freedom, movement, and ascension toward the sky. This contradiction generates a field of tension that must be reconstructed not only functionally but also spatially, symbolically, and experientially.

The central research question of the study is formulated as follows: “How can a former prison building be transformed into an aviation museum centered on the theme of freedom while preserving its spatial memory without completely erasing its difficult past?” This question focuses not merely on a functional transformation problem, but also on the relationship architecture establishes with memory, representation, and experiential production. The study argues that prison structures should be preserved as carriers of spatial memory; that contemporary architectural strategies such as transparency, subtraction, and addition have the potential to establish a critical relationship between past and present functions; and that architecture functions not only as a tool of preservation but also as a mechanism for producing new narratives in the representation of difficult heritage.

Theoretical Framework

Difficult Heritage and the Construction of Spatial Memory

The concept of difficult heritage has recently emerged as a critical approach within heritage studies that challenges conventional paradigms of conservation. Whereas traditional heritage discourse has largely privileged structures associated with aesthetics, monumentality, and national identity formation, difficult heritage foregrounds the spatial traces of suppressed, marginalized, or deliberately overlooked pasts. Within this framework, prison buildings should be understood not merely as architectural artifacts, but as spatial manifestations of social order, disciplinary mechanisms, and power relations.

In their discussion of “uncomfortable heritage,” Pendlebury et al. argue that the primary challenge in the adaptive reuse of such structures lies not in their physical preservation (Pendlebury, Wang, & Law, 2024), but rather in determining “which narrative is to be carried forward.” This perspective demonstrates that architecture functions not only as a medium of material conservation, but also as a practice that produces meaning and representation. Accordingly, the conservation of a prison building entails more than preserving its walls or spatial configuration; it involves negotiating how the historical experiences embedded within the site will be rearticulated and transmitted.

Morin’s notion of the “usable past” is particularly significant for understanding the selective conservation strategy developed in the Keçiborlu case (Morin, 2013). Rather than freezing the entirety of the building’s historical identity, the Keçiborlu Aviation Museum project selectively reinterprets specific spatial codes within a new narrative framework. Characteristic features of prison architecture, such as cells, narrow corridors, courtyards, and surveillance points, function not merely as utilitarian elements, but also as spatial codifications of a particular social order. Consequently, preserving this spatial organization plays a critical role in preventing the erasure of the past.

An examination of visual documentation related to the former Keçiborlu prison reveals that this disciplinary spatial organization remains legible, particularly through the survey and measured drawing phases. The linear continuity of the narrow corridors, the repetitive modular arrangement of the cells, and the circulation system organized around the courtyard collectively expose the disciplinary spatial logic of the structure. This spatial configuration constitutes not merely a remnant of the past, but also a mnemonic mechanism transmitted into the present.

At this point, Treib characterizes architecture as a "mnemonic device," emphasizing that spaces function as structures that store and reproduce cultural memory (Treib, 2009). In this sense, the Keçiborlu prison should be understood not simply as an abandoned building, but as a spatialized form of memory itself. Therefore, the central issue in its adaptive reuse is not whether this memory should be preserved, but rather how it should be transformed.

Adaptive Reuse: Tensions between Preservation, Erasure, and Transformation

The adaptive reuse of structures categorized as negative or difficult heritage constitutes one of the most contested issues within architectural discourse. At its core, this debate revolves around three principal approaches: complete demolition or obliteration, static preservation, and transformation through adaptive reuse.

Winstanley argues that each of these approaches entails distinct risks (Winstanley, 2018). The total removal of a structure eliminates the physical traces of a traumatic past, yet simultaneously risks erasing collective memory itself. Conversely, preserving a structure in its original state may reduce it to a static and functionless object detached from everyday life. Adaptive reuse therefore emerges as an intermediary strategy capable of both preserving the past and reconnecting the structure with contemporary social life. Nevertheless, adaptive reuse itself embodies inherent tensions. Logan and Reeves describe this process as "a site of negotiation between preservation and reinterpretation." Such negotiation involves decisions concerning which spatial elements should be retained, transformed, or entirely removed (Logan & Reeves, 2008).

Polat and Hersek, in their critical examination of the conversion of prison buildings into luxury hotels and similar

functions, argue that such transformations may lead to the "silencing of memory." In this context, traumatic histories risk being aestheticized and consequently neutralized (Polat & Hersek, 2025). Accordingly, the role of architecture within adaptive reuse processes should not be to conceal the past, but rather to construct a narrative that renders it visible.

The Keçiborlu Aviation Museum project proposes a hybrid model situated between these three approaches. While the principal massing and spatial organization of the structure are preserved, the structurally weakened administrative front block has been removed and replaced with a contemporary entrance volume. This intervention may be interpreted, following Winstanley's framework positioned between obliteration and preservation (Winstanley, 2018), as a form of "critical subtraction."

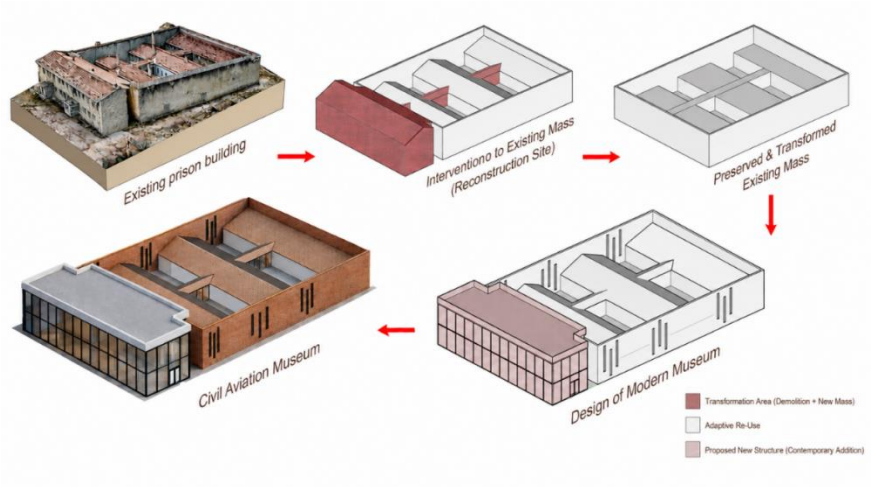
Transparency and Architectural Counter-Narrative

By its very nature, prison architecture produces a spatial order founded upon opacity, enclosure, and control. Within this framework, walls, bars, and limited openings operate not merely as physical boundaries, but also as ideological instruments. Consequently, transparency in the transformation of prison structures should be understood not simply as a material choice, but as a powerful mechanism for generating a counter-narrative.

Whereas transparency in architecture is conventionally associated with visibility, openness, and publicness, opacity is linked to control, concealment, and isolation. In this regard, the glass entrance volume proposed in the Keçiborlu Aviation Museum project should be interpreted as a deliberate intervention against the opaque character of the existing structure. The design decisions presented in the project documentation demonstrate that this new entrance volume functions not only as a circulation element, but

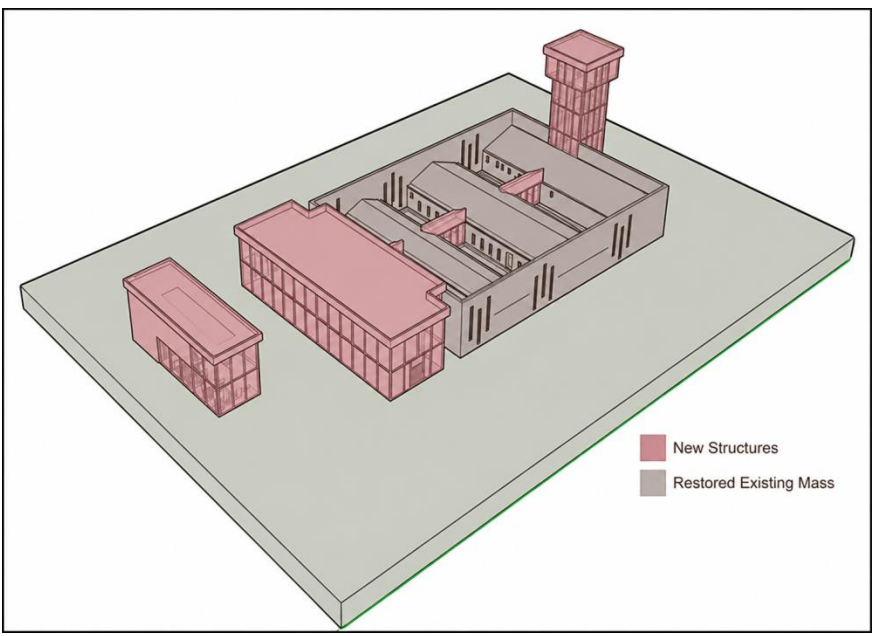
also as a threshold space that redefines the public interface of the building (Figures 1 and 2).

Figure 1 Design Process



Source: Authors' design project archive for Keçiborlu Aviation Museum

Figure 2. Design Decisions



Source: Authors' design project archive for Keçiborlu Aviation Museum

Draper argues that the erasure of spatial traces in the transformation of prison structures may also result in the erasure of political memory (Draper, 2012). In this context, transparency gains significance as a strategy that renders the past visible rather than concealing it. Within the Keçiborlu Aviation Museum project, the transparent entrance volume does not eliminate the building's past; instead, it generates a field of tension between the historical narrative and the new function. This condition may be interpreted through the following spatial oppositions (Table 1).

Table 1 Spatial oppositions

Prison Space	New Intervention
Opaque	Transparent
Closed	Open
Isolated	Public
Control	Visibility

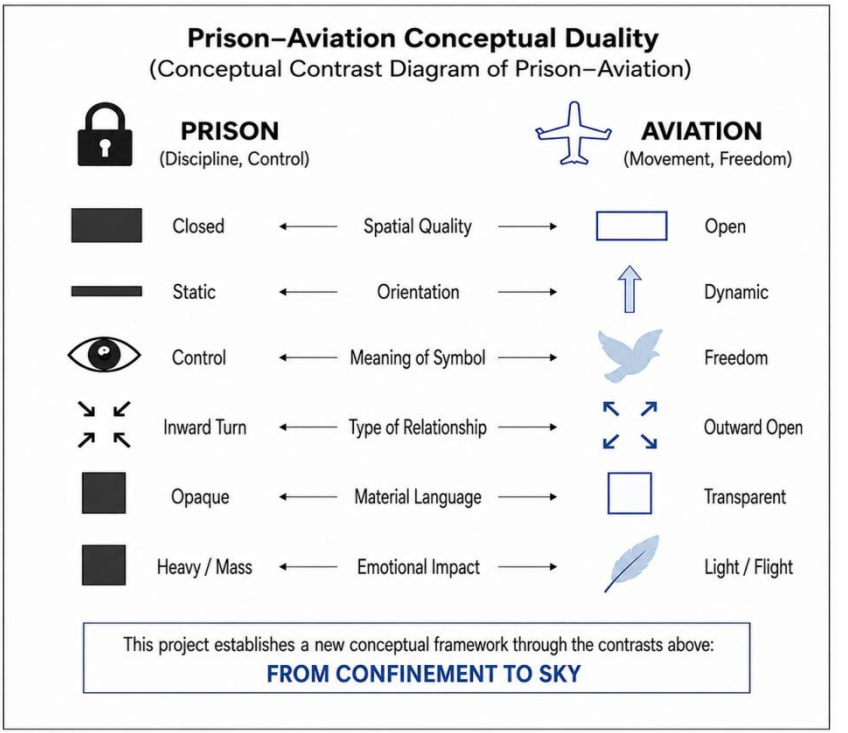
Source: Authors' design project archive for Keçiborlu Aviation Museum

This opposition demonstrates that architecture constitutes not merely a process of physical transformation, but also an ideological act of rewriting.

Aviation, Freedom, and the Metaphor of Verticality

Within this project, the theme of aviation extends beyond the content to be exhibited and is instead conceptualized as a fundamental metaphor shaping the spatial organization of the design itself. The horizontal, restrictive, and enclosed spatial configuration of the prison structure is deliberately juxtaposed with the vertical, dynamic, and boundless nature of aviation (Figure 3).

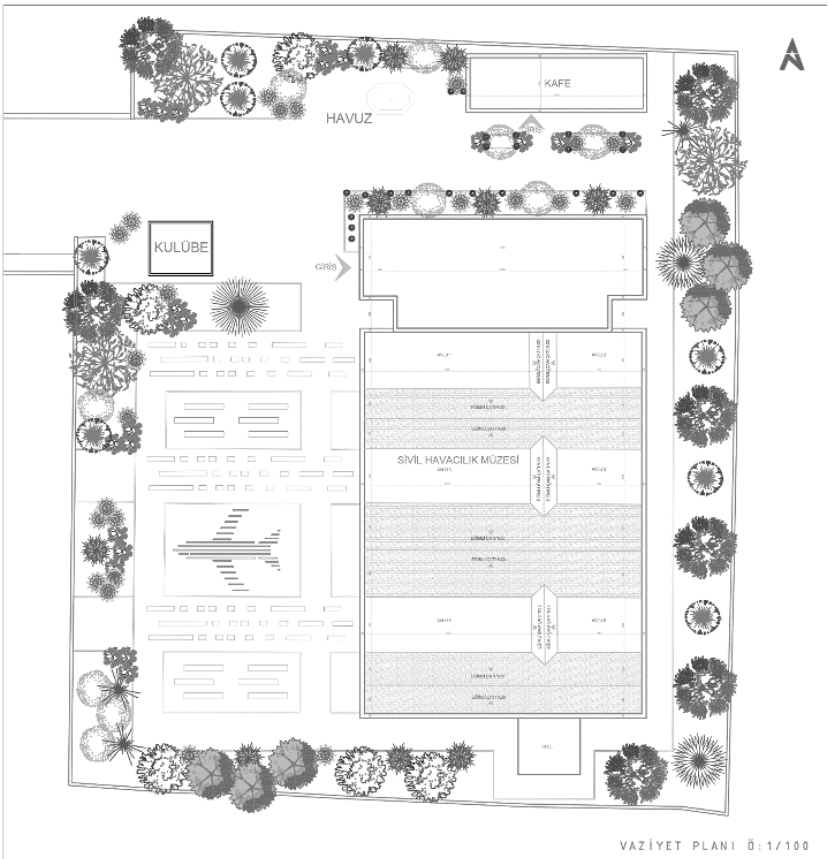
Figure 3 Concept Diagram



Source: Authors' design project archive for Keçiborlu Aviation Museum

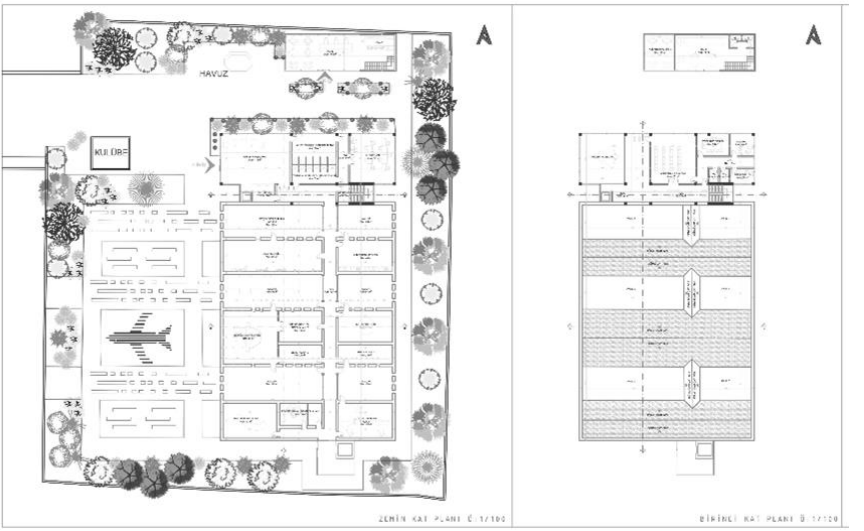
Simpson argues that prison museums reconstruct the notion of freedom and that this concept is primarily produced through spatial experience (Simpson, 2025). In this context, the tower element in the Keçiborlu Aviation Museum project emerges as the spatial embodiment of this metaphor. The tower functions not merely as an observation point, but also as a spatial device that transforms the visitor's bodily experience (Figures 4 and 5).

Figure 4 Ground Floor Plan



Source: Authors' design project archive for Keçiborlu Aviation Museum

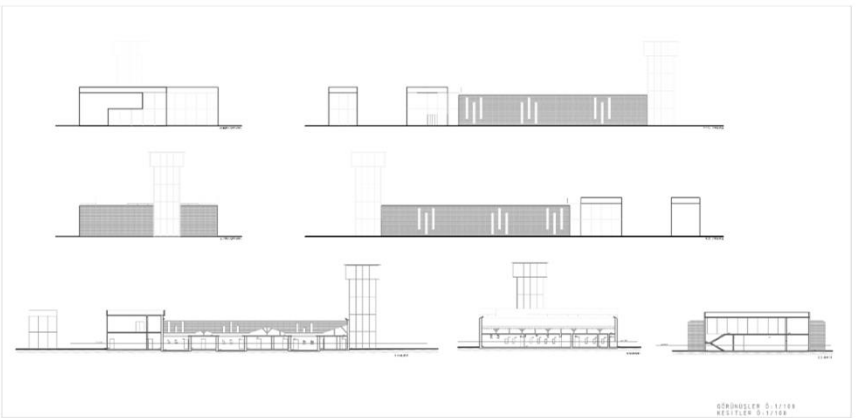
Figure 5 First and Second Floor Plans



Source: Authors' design project archive for Keçiborlu Aviation Museum

Sectional and perspective drawings demonstrate that the circulation directed toward the tower disrupts the building's predominantly horizontal organization and generates a vertical movement. This movement may be interpreted not only as a physical ascent, but also as a symbolic act of liberation (Figure 6).

Figure 6 Facades and Sections



Source: Authors' design project archive for Keçiborlu Aviation Museum

In this context, the spatial experience is constructed through the following set of oppositions (Table 2).

Table 2 Comparison of Spatial Experience

Prison Experience	Museum Experience
Horizontal movement	Vertical ascent
Enclosed vision	Open horizon
Restricted space	Expanded perspective

Source: Authors' design project archive for Keçiborlu Aviation Museum

This transformation enables visitors not only to observe the space, but also to engage with it through embodied experience. Such experiential strategies reinforce the visitor's relationship with the past by fostering a more immersive and affective engagement with the spatial environment (Turner & Peters, 2015).

Materials and Methods: Research by Design and Case Study Analysis

Research Approach: Research by Design

This study adopts the Research by Design approach as its primary methodological framework. Within this approach, architectural design is understood not merely as a practice of producing an end product, but also as one of the epistemological instruments through which spatial knowledge is generated. Accordingly, the design process is transformed into an iterative research mechanism encompassing stages of analysis, interpretation, spatial decision-making, and continuous re-evaluation.

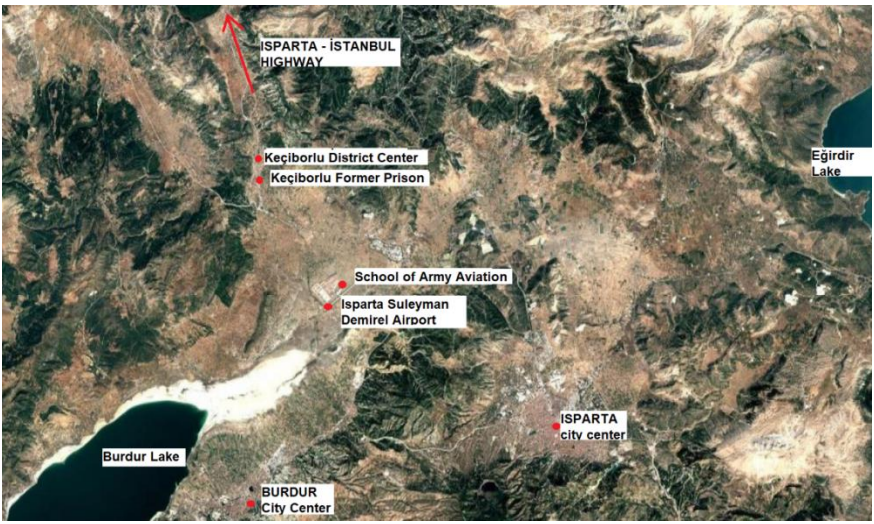
In this context, the proposed aviation museum should be understood not simply as a functional adaptive reuse project, but as a research platform through which theoretical discussions concerning the representation of difficult heritage, the preservation of spatial memory, and the production of spatial experience are critically tested through design.

The design process was conceived not as a linear problem-solving model, but rather as an iterative process characterized by continuous feedback loops in which analytical investigations and design decisions mutually transformed one another. The measured drawings, photographic surveys, laser scanning data, spatial analyses, and design sketches produced throughout the research were evaluated not merely as technical documentation, but also as analytical tools enabling the interpretation of the building's memory layers, disciplinary spatiality, and transformative potentials. Consequently, the study positions itself not simply as an architectural presentation representing a final product, but as a research-oriented architectural inquiry in which design decisions are critically examined through theoretical references, spatial analyses, and representational strategies.

The Former Keçiborlu Prison Structure

The structure forming the focus of this study is located on the campus of the Civil Aviation Vocational School along the Isparta–Istanbul highway corridor. This heavily trafficked route also provides access to Süleyman Demirel Airport, which serves the provinces of Isparta and Burdur. In addition, the site is situated in close proximity to Lake Eğirdir and Lake Burdur, as well as to several tourism destinations characteristic of the region (Figure 7).

Figure 7 Satellite Location of the Former Keçiborlu Prison



Source: Google Earth Pro

The building is the former prison structure located on Block 259, Parcel 267, within the Keçiborlu district of Isparta Province. The structure has been allocated to Süleyman Demirel University and is situated on a 5,861 m^2 site to the west of the Civil Aviation School campus. The project proposes the transformation of the structure into an aviation museum associated with the Civil Aviation School (Figure 8).

Figure 8 Location of the Former Keçiborlu Prison

Source: Google Earth Pro

In this respect, the building occupies the intersection of two distinct contextual frameworks:

- Past Context: Prison → discipline, confinement, control
- New Context: Aviation museum → movement, freedom, technology

The strong opposition between these two contexts transforms the building's conversion from a merely technical adaptive reuse problem into a process of conceptual and spatial rewriting.

Documentation Process and Data Production

The design process progressed according to a systematic timeline that clearly demonstrates the sequential stages of the project:

- 17 October 2025: Site survey and preliminary field studies

- 28 October – 25 November 2025: Preparation of measured drawings
- 15 December 2025: Design investigations and precedent analyze
- February 2026: Preparation of implementation drawing
- March–April 2026: Design development, landscape design, and revision processes
- April 2026: Preparation of the final project presentation (Figure 9).

Figure 9 Timeline of Process

Source: Authors' design project archive for Keçiborlu Aviation Museum

Rather than following a strictly linear progression, the process exhibited an iterative structure shaped through continuous feedback mechanisms. In particular, the stages of design development and revision constituted critical phases during which the collected data were reinterpreted and reintegrated into subsequent design decisions.

Analysis of the Existing Condition: Visual and Spatial Reading

One of the principal sources of data concerning the structure consists of the visual documentation obtained during the site survey and measured drawing processes. These documents enable the analysis of the building's existing condition not only at a technical level, but also from a phenomenological perspective (Figure 10).

Figure 10 Documentation Studies

Source: Authors' design project archive for Keçiborlu Aviation Museum

Exterior Space and Facade Analysis

Significant deterioration is observable on the exterior facades of the structure. Surface cracks, peeling paint, and uncontrolled vegetation growth reveal the prolonged lack of maintenance and the condition of abandonment affecting the building. This situation demonstrates that the structure has become obsolete not only physically, but also socially.

Although such surface deterioration is frequently interpreted within architectural discourse merely as "decay," within the context of difficult heritage these traces should instead be understood as significant memory layers that render visible the building's historical patterns of use and eventual abandonment (Figure 11).

Figure 11 North and South Facades of the Former Building

Source: Authors' design project archive for Keçiborlu Aviation Museum

Interior Analysis: Corridors and Cells

The interior images clearly reveal the spatial character of the prison typology. Narrow, linear corridors and the cell units opening onto these corridors produce an organizational system that directs and restricts user movement (Figure 12). This spatial configuration is characterized by the following features:

- Unidirectional circulation
- Restricted fields of vision
- Spatial repetition (cell modules)
- Possibility of centralized control

These characteristics demonstrate that prison space functions not merely as a physical environment, but also as a behavioral control mechanism.

Figure 12 Interior Photographs

Source: Authors' design project archive for Keçiborlu Aviation Museum

Memory Traces: Material Remnants and Spatial Markers

The "visitor instruction sign" constitutes a significant element directly representing the memory of the structure (Figure 13). Beyond providing tangible evidence regarding the building's former use, such markers also offer insights into the ideological functioning of the space. Similarly:

- Barred openings
- Emptied cells
- Surface abrasions

Collectively reveal how the space was previously occupied and the kinds of effects it produced upon its users. In this sense, the existing structure should be understood not merely as a physical shell requiring preservation, but also as a spatial archive demanding interpretation.

Figure 13 Visitor Signage and Visitation Booths

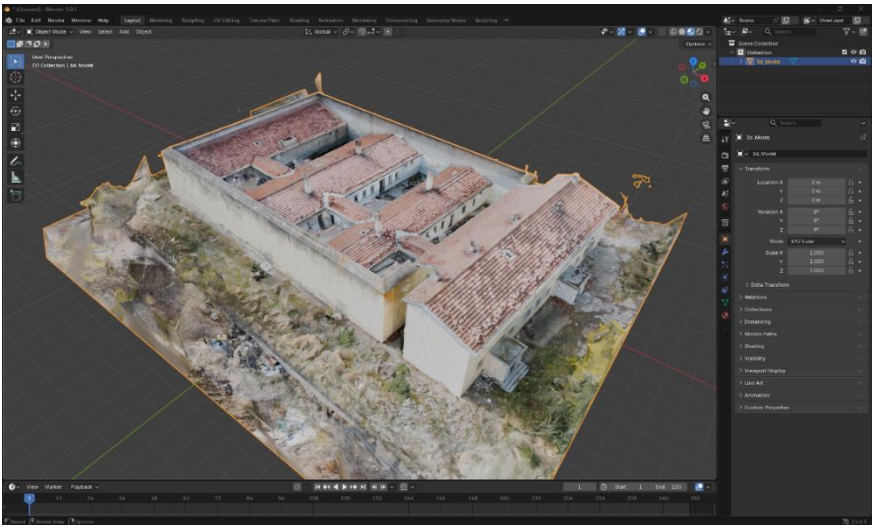
Source: Authors' design project archive for Keçiborlu Aviation Museum

Digital Documentation and Modeling Process

The 3D modeling and orthophoto production stages presented within the project documentation enabled the digital reconstruction of the structure. During this process, techniques

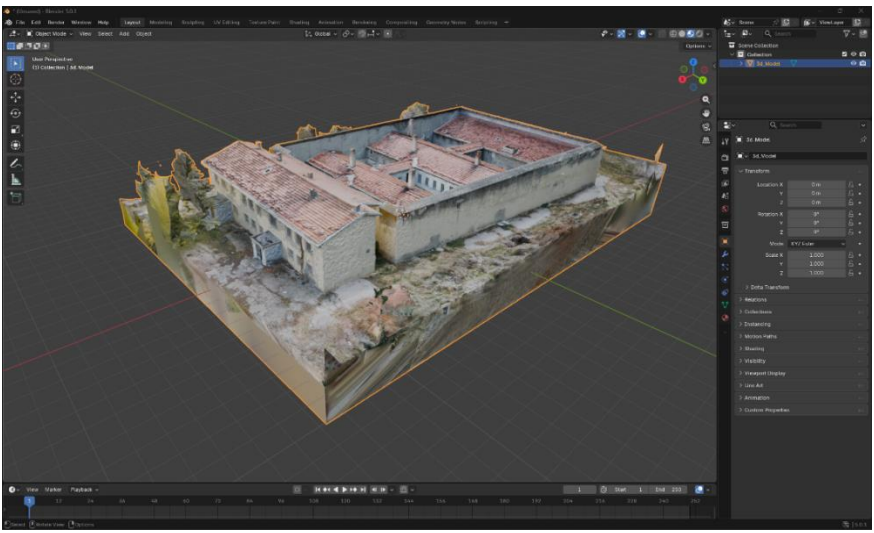
including drone-assisted imaging, laser scanning, and orthographic image production were employed to create the digital twin of the building (Figures 14 and 15).

Figure 14 Laser Scanning for 3D Model South



Source: Authors' design project archive for Keçiborlu Aviation Museum

Figure 15 Through Laser Scanning for 3D Model North



Source: Authors' design project archive for Keçiborlu Aviation Museum

This digital model served two principal functions throughout the design process:

- Analytical Tool: Reading and interpreting the spatial organization of the structure
- Design Tool: Testing the relationship between new interventions and the existing building fabric

Accordingly, the digital model functioned not merely as a representational medium, but as an active component of the decision-making process itself (Figures 16 and 17).

Figure 16 Orthographic Image Through Laser Scanning

Source: Authors' design project archive for Keçiborlu Aviation Museum

Figure 17 Orthographic Façades through Laser Scanning

Source: Authors' design project archive for Keçiborlu Aviation Museum

Design Analysis Method: Post-Rationalized Reading

Within the scope of this study, the completed design was analytically re-examined and reinterpreted through three principal thematic strategies. This approach may be described in the literature as a "post-rationalized design analysis." The analysis is structured around three primary strategies (Table 3).

Table 3 Spatial Decisions According to Design Strategies

Strategy	Description	Spatial Correspondence
Preservation	Continuation of the existing spatial organization	Courtyard, wards, corridors
Subtraction	Removal of problematic structural components	Front administrative block
Re-addition	Contemporary intervention for the new function	Glass entrance, tower

Source: Authors' design project archive for Keçiborlu Aviation Museum

This method enables design decisions to be interpreted not solely as intuitive acts, but also through a coherent theoretical framework.

Contribution of the Methodology

The methodological framework employed in this study offers three significant contributions to the adaptive reuse of difficult heritage:

- It treats spatial memory as a form of data.
- It positions design as a research instrument.
- It evaluates architectural intervention as an ethical decision-making process.

In this respect, the proposed methodology constitutes not only a model specific to the Keçiborlu case, but also a transferable framework applicable to the transformation of comparable structures.

Spatial Memory of the Existing Structure: Reading Plan, Circulation, and Experience

The design approach developed for the adaptive reuse of the former Keçiborlu prison structure is fundamentally grounded in interpreting the existing spatial organization not merely as physical data, but as a multilayered system of memory. In this context, the building should be understood not as an abandoned architectural object, but as a spatialized record of past modes of occupation, behavioral patterns, and power relations. Consequently, the first and most critical stage of the design process involved a detailed analysis of the building's plan organization, circulation system, and spatial hierarchy.

Plan Organization: The Structural Logic of Disciplinary Space

The plan scheme of prison architecture is not a random spatial arrangement, but rather the spatial manifestation of a particular disciplinary logic. An examination of the Keçiborlu prison plan clearly reveals this disciplinary framework. The

building exhibits a systematic organization structured around a central courtyard and developed through linear corridors connected to this courtyard. This plan organization may be interpreted through three principal spatial components (Table 4).

Table 4 Functions and Spatial Effects of Spatial Components

Spatial Component	Function	Spatial Effect
Courtyard	Shared area / control point	Centralized surveillance
Corridor	Circulation route	Direction and restriction
Cells	Individual spaces	Isolation

Source: Authors' design project archive for Keçiborlu Aviation Museum

This tripartite system constitutes not merely a spatial arrangement, but also a control mechanism regulating individual movement, visual perception, and spatial interaction. As Morin emphasizes (Morin, 2013), such plan schemes operate as "spatial codes of discipline." Accordingly, preserving this organization represents not only a physical preference, but also the preservation of the historical experiences embodied within the structure.

Corridor System: Mechanism of Direction and Restriction

One of the most prominent spatial elements of the building is its linear and narrow corridor system. The interior images included in the presentation file clearly demonstrate both the physical characteristics of these corridors and their effects on users. The corridors generate a unidirectional movement pattern while preventing users from developing alternative routes. This spatial configuration exhibits the following characteristics (Figure 18):

- Linear continuity: corridors form uninterrupted spatial lines
- Narrow sections: user movement is spatially constrained
- Restricted visibility: the entirety of the space cannot be perceived simultaneously

- Singular directionality: users proceed along predetermined routes

Figure 18 Corridors and Cells

Source: Authors' design project archive for Keçiborlu Aviation Museum

These characteristics transform the corridor from a mere circulation element into a spatial instrument directing behavior. Winstanley argues that circulation systems within prison environments operate as "invisible disciplinary mechanisms" that regulate users through spatial control (Winstanley, 2018). In this regard, the corridors of the Keçiborlu prison function not simply as transitional spaces, but as control lines shaping the individual's relationship with the environment.

Cell Spaces: The Spatialization of Isolation

The cells opening onto the corridors constitute the most characteristic elements of prison typology. These spaces were designed to minimize the individual's relationship both with other occupants and with the outside world. The cell images included in the presentation file reveal the extent to which these spaces are restrictive in terms of scale, light, and material conditions. The

principal characteristics of the cell spaces may be summarized as follows (Figure 19):

- Small-scale volumes
- Limited natural lighting
- Minimal openings
- Singular occupancy

Figure 19 Views from the Cells

Source: Authors' design project archive for Keçiborlu Aviation Museum

These characteristics demonstrate that the space generates not only physical, but also psychological effects. Simpson argues that isolation within prison environments is not solely a physical condition, but also an experiential one, producing oppressive atmospheres that affect users psychologically (Simpson, 2025). In this context, the cells should be understood not merely as spaces of confinement, but as components of a broader system regulating and restricting spatial experience.

Courtyard: Controlled Openness and Surveillance Space

Although the courtyard in prison architecture may initially be perceived as an "open" space, this openness is fundamentally defined through control and surveillance. In the Keçiborlu prison plan, the courtyard occupies the center of the entire circulation system and establishes strong visual relationships with the surrounding spaces. The spatial role of the courtyard may be interpreted as follows:

- Central location → access to all spaces
- Visual openness → potential for surveillance
- Restricted boundaries → absence of genuine freedom

This condition reveals the courtyard as a paradoxical space: although open, it is not free. Such a characteristic reflects one of the fundamental contradictions inherent in prison architecture. Turner and Peters describe these types of spaces as "controlled experiential zones" within prison environments (Turner & Peters, 2015). In this context, the Keçiborlu courtyard offers users a limited field of movement while simultaneously generating a persistent sense of surveillance.

Spatial Hierarchy and the Construction of Experience

The building's plan organization establishes a distinct hierarchy among its spaces. This hierarchy may be interpreted through the size, location, and accessibility of each spatial component (Table 5).

Table 5 Experiential Effects According to Spatial Hierarchy

Space	**Hierarchical Level**	**Experience**
Cell	Lowest	Isolation
Corridor	Intermediate	Directionality
Courtyard	Highest	Controlled openness

Source: Authors' design project archive for Keçiborlu Aviation Museum

This hierarchy determines the user's spatial experience within the structure. As users move from the cell to the corridor and from the corridor to the courtyard, spatial openness gradually increases; however, this openness never transforms into complete freedom. Accordingly, the building produces an experience fundamentally structured around control and restriction from beginning to end.

Memory Layers: Reading Material Traces

The physical deterioration and traces of use observable within the existing structure should be interpreted not merely as technical problems, but also as layers of memory. The images presented in the project documentation reveal elements such as surface abrasions, wall cracks, peeling paint, signage, and inscriptions, which provide tangible evidence regarding the building's former use. In particular, the "visitor instruction sign" (Figure 13) generates a direct narrative concerning the operation of the space. Such elements demonstrate that the building functioned not only as a physical structure, but also as part of an ideological system. Treib defines such traces as "material carriers of architectural memory" (Treib, 2009). In this respect, the Keçiborlu prison should be understood not merely as a structure requiring preservation, but also as a spatial archive demanding interpretation.

The Significance of Spatial Memory for Design

The analyses presented above demonstrate that the spatial organization of the structure constitutes not merely physical data, but also one of the primary inputs informing the design process itself. Accordingly, the design process adopted the principle that: "Spatial memory is not a remnant to be preserved, but a potential to be transformed." This approach necessitates preserving the existing spatial configuration of the building while simultaneously

reinterpreting that configuration in order to generate a new narrative.

Design Strategies: From Spatial Memory to a New Narrative

The design approach developed for the transformation of the former Keçiborlu prison into an aviation museum has been shaped in accordance with the theoretical discussions and spatial analyses presented in the preceding sections. In this context, design is understood not merely as an act of intervening in the physical characteristics of the existing structure, but rather as a process of reinterpreting its embedded spatial memory and constructing a new narrative through that memory.

The design strategies developed within this framework may be systematically interpreted through three principal modes of intervention: preservation, subtraction, and re-articulation (addition). These three strategies are not conceived as isolated operations; rather, they function as interrelated and mutually complementary components of coherent design logic. Consequently, the project moves beyond the conventional binary frequently encountered in the difficult heritage literature, namely "either preserve or demolish", and instead proposes a hybrid model of intervention.

Preservation Strategy: Sustaining Spatial Continuity

The primary decision underpinning the design process was the preservation of the building's original spatial organization to the greatest extent possible. This decision should be understood not solely as an act of physical conservation, but also as a deliberate attempt to sustain the structure's capacity to generate memory. The principal preserved spatial components include the courtyard system, the corridor organization, the cell spaces (wards), and the overall plan scheme.

Preserving these elements maintains the legibility of the building's disciplinary and control-oriented spatial logic. Interpreted through Morin's concept of the "usable past" (Morin, 2013), this approach does not eliminate the historical meaning of the structure; rather, it rearticulates that meaning within a new contextual framework (Figure 20).

Figure 20 Preserved Components for Spatial Continuity

Source: Authors' design project archive for Keçiborlu Aviation Museum

In particular, the corridor–cell relationship was treated as a critical spatial code requiring preservation throughout the design process. Maintaining this relationship enables visitors to directly experience the spatiality of the prison while moving through the building. This condition aligns closely with the experiential representation approach emphasized by Turner and Peters (2015), insofar as visitors do not merely acquire information, but also physically and emotionally experience the spatial memory of the site.

Subtraction Strategy: Removal as Critical Intervention

The second intervention strategy, developed as a complement to preservation, is the subtraction strategy, which is based upon the deliberate removal of specific parts of the structure. This strategy should not be interpreted as demolition in the

conventional sense, but rather as a design instrument grounded in critical selectivity.

As a result of the structural and spatial analyses, the front administrative block was identified as both structurally problematic and incompatible with the proposed new function. Consequently, its removal was deemed necessary. However, this intervention should not be interpreted as an act that disrupts the building's historical continuity; rather, it constitutes an opening required for the establishment of a new spatial narrative.

Winstanley's concept of "obliteration" generally interprets such interventions as acts of erasing memory (Winstanley, 2018). In this project, however, subtraction is understood not as absolute erasure, but as a selective and controlled voiding process that creates space for new intervention. Accordingly, this approach transcends the conventional preservation–erasure dichotomy in the literature and may instead be described as "critical subtraction." The spatial effects of the subtraction strategy may be interpreted on three levels (Table 6):

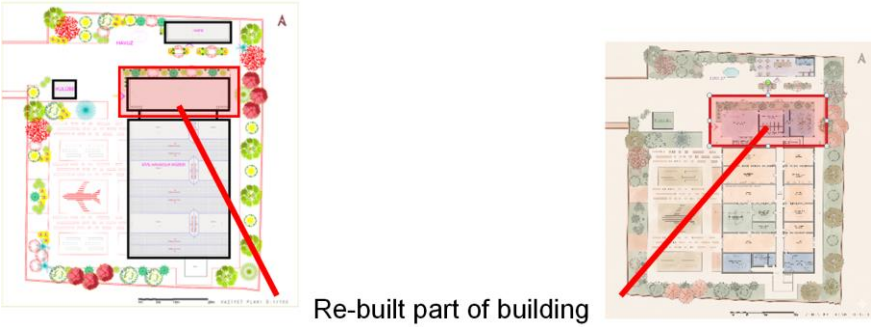
Table 6 Spatial Effects of the Subtraction Strategy

Effect	**Description**
Physical	Elimination of structural problems
Spatial	Creation of new intervention zones
Conceptual	Production of a void between past and new function

Source: Authors' design project archive for Keçiborlu Aviation Museum

This void operates not merely as a physical absence, but also as an intermediate field open to the production of meaning (Figure 21).

Figure 21 Removed and Reconstructed Components



Source: Authors' design project archive for Keçiborlu Aviation Museum

Re-Articulation: Producing Transparency and Publicness

The void generated through subtraction is subsequently occupied by the project's third and most prominent intervention strategy: re-articulation. The most significant element proposed within this framework is the new entrance volume composed of transparent glass surfaces. This contemporary insertion establishes a strong contrast with the opaque and enclosed character of the existing structure.

One of the defining characteristics of prison architecture, concealment and enclosure, is replaced through this intervention by transparency and visibility. Draper (2012) argues that the erasure of spatial traces in prison transformations may also result in the erasure of political memory. Within this context, transparency gains significance as a strategy that renders the past visible rather than concealing it. The new entrance volume performs several functions (Figure 20):

- Defining the public face of the structure
- Directing visitors into the interior spaces
- Establishing a threshold between old and new

This threshold space functions not merely as a point of physical transition, but also as a field of tension between two

distinct narratives. The closed, horizontal, and control-oriented spatial organization of the prison structure is juxtaposed against the aviation museum's new narrative of openness, movement, and verticality. This opposition clearly demonstrates that architecture produces not only space, but also meaning.

Transparent Circulation Axis: Experiential Continuity

Another significant intervention within the project is the reinterpretation of the existing corridor system as a transparent circulation axis (Figure 22). This intervention both preserves the existing spatial organization and introduces a new experiential layer. Through this intervention:

- The existing circulation system is maintained
- Visual continuity is enhanced
- Spatial perception is expanded

This transformation directly affects the visitor's mode of spatial perception. Whereas users previously experienced highly restricted visual fields, they are now able to perceive multiple spatial layers simultaneously. This approach corresponds closely with Gregory and Witcomb's concept of "multilayered experience" within heritage environments (Gregory & Witcomb, 2007).

Figure 22 New Addition with Transparent Surfaces

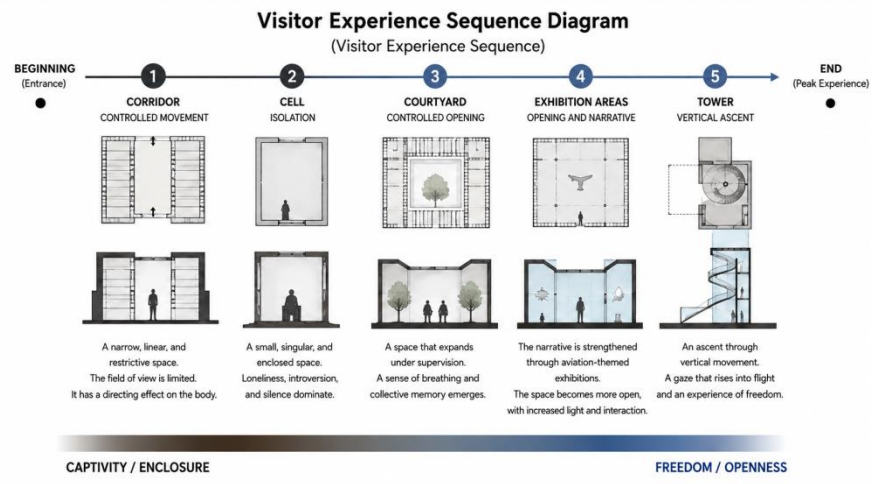
Source: Authors' design project archive for Keçiborlu Aviation Museum

Vertical Intervention: Tower and the Metaphor of Freedom

The project's most powerful symbolic intervention is the tower element attached to the structure. The tower functions not merely as an observation point or technical element, but as the spatial manifestation of the freedom metaphor constituting the conceptual backbone of the design. The prison's horizontal, restrictive, and enclosed spatial organization is transformed through the tower into a vertical movement. This transformation signifies not only a physical shift, but also an experiential one.

Simpson argues that prison museums reconstruct the concept of freedom through spatial experience (Simpson, 2025). The circulation directed toward the tower produces precisely such a transformation. Enclosed corridors give way to open vistas, restricted vision expands into broad horizons, and horizontal movement evolves into vertical ascent (Figure 23). This transformation enables visitors to experience not only the space itself, but also the conceptual meanings embodied within that space (Figure 24).

Figure 23 Visitor Experience Diagram



Source: Authors' design project archive for Keçiborlu Aviation Museum

Figure 24 New Interior Visualizations Representing Freedom

Source: Authors' design project archive for Keçiborlu Aviation Museum

Landscape and Open Space: A New Public Layer

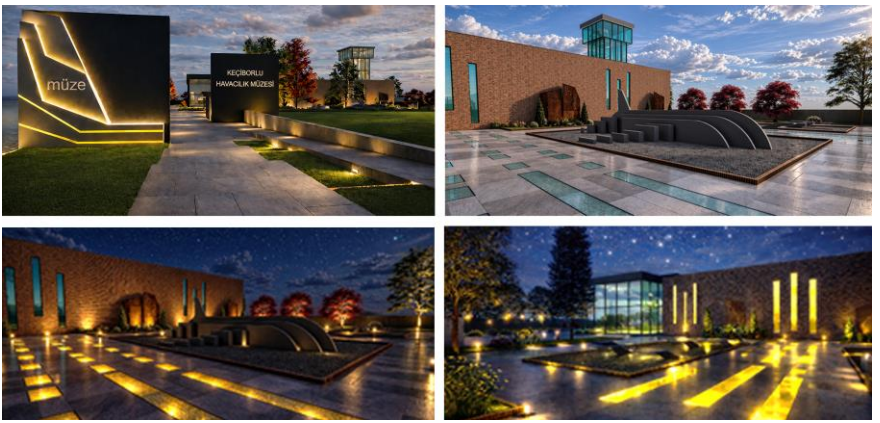
The final layer of the design consists of the proposed landscape intervention surrounding the structure. This area demonstrates that the museum is not merely an enclosed building, but also functions as a public open space. Through this intervention:

- The structure establishes a relationship with the urban environment

- The visitor experience is expanded
- Outdoor exhibitions become possible

This approach allows the museum to function not solely as a structure representing the past, but also as a contemporary public space (Figure 25).

Figure 25 Landscape Design Establishing Continuity with the Building Mass and the New Public Layer

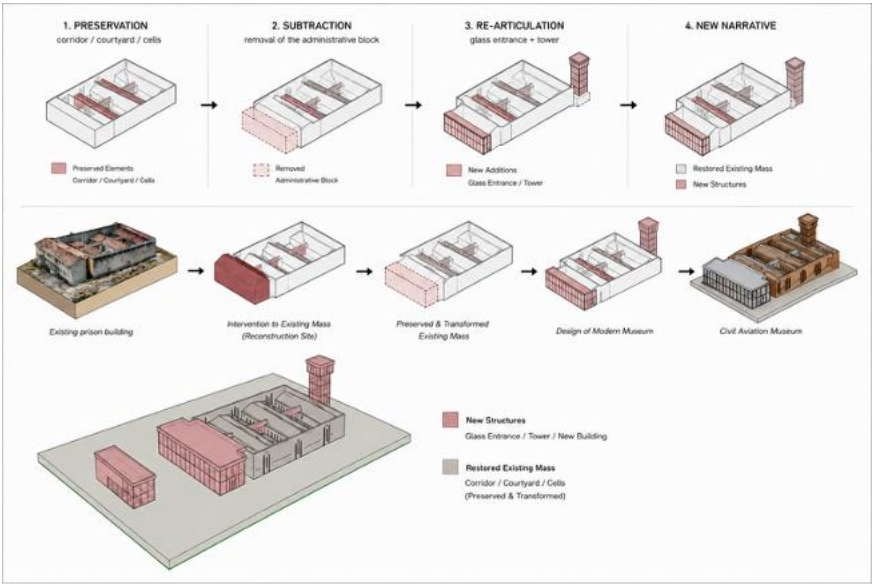


Source: Authors' design project archive for Keçiborlu Aviation Museum

Holistic Interpretation of the Strategies

When evaluated collectively, these interventions reveal that the design proposes a three-stage transformation model (Figure 26). This model offers an applicable methodological framework for the transformation of difficult heritage.

Figure 26 Model of transformation



Source: Authors' design project archive for Keçiborlu Aviation Museum

Architectural Narrative and Experiential Construction: A Spatial Journey from Confinement to the Sky

The design approach developed for the transformation of the former Keçiborlu prison into an aviation museum should be understood not merely as a functional adaptive reuse proposal, but as a multilayered process of spatial narrative production directing visitor experience. This spatial narrative is constructed through the opposition between the concepts of confinement, control, and restriction represented by the existing structure, and the notions of movement, openness, and freedom associated with aviation.

Accordingly, visitor experience is generated not only through exhibition content, but directly through the spatial organization and circulation system itself. Within this framework, architecture ceases to function as a neutral exhibition surface and instead operates as an active representational mechanism that determines how the past is interpreted and experienced.

This section analyzes the design through visitor experience, circulation routes, spatial transitions, and phenomenological effects, while elaborating the project's narrative trajectory "from confinement to freedom."

Foundations of the Narrative: Spatial Construction Through Opposition

The strongest conceptual structure underpinning the design is the opposition established between the prison and the aviation museum. This opposition is produced not only programmatically, but also spatially, perceptually, and experientially (Table 7).

Table 7 Programs of the Past and the Present

Prison (Past)	Aviation Museum (New)
Enclosure	Openness
Surveillance	Movement
Restriction	Freedom
Inwardness	Outward orientation
Horizontality	Verticality

Source: Authors' design project archive for Keçiborlu Aviation Museum

These oppositions are rendered perceptible at every scale of the design. As Simpson (2025) suggests, concepts of freedom and restriction within prison museums are reproduced through spatial experience. In this project, freedom is experienced not merely through exhibited content, but directly through the spatial configuration itself.

Visitor Route: Spatial Scenario and Sequential Stages

The visitor experience is structured through a linear circulation system established by preserving the existing prison plan organization. However, this linearity functions not merely as directional guidance, but also as an experiential sequence generating progressive spatial awareness for the user.

The circulation system confronts visitors directly with the historical spatiality of the prison while gradually directing them toward the notions of freedom and openness represented by the new function. The spatial route may be summarized as follows: Entrance → Transparent Threshold → Corridor → Cell Spaces → Courtyard → Exhibition Spaces → Tower → Landscape. In this respect, the circulation route transcends its role as a functional movement scheme and instead produces a phenomenological framework intended to reactivate the disciplinary spatiality of the building through embodied experience.

Entrance and Threshold Space: Encounter and Transition

The visitor experience begins with the newly proposed transparent entrance volume. This space constitutes the first point of contact between the historic structure and the contemporary intervention. Through its glass surfaces, the threshold does not immediately immerse the visitor into the building; instead, it first confronts the user with this spatial and conceptual opposition. This spatial condition may be interpreted on three levels:

- Perceptual level: transparency renders the building visually legible from the exterior
- Conceptual level: the opposition between the enclosed prison and the open museum becomes visible
- Experiential level: the user begins to "sense" the space prior to entering it

As Gregory and Witcomb (2007) emphasize, entrance points within heritage environments define the beginning of the narrative itself. In the Keçiborlu project, the entrance therefore functions not merely as a physical transition, but also as a space of mental preparation.

Corridor Experience: Direction, Restriction, and Awareness

Following entry, visitors are directed into the existing prison corridor system. At this stage, the design intentionally preserves the original spatial configuration. The narrow and linear structure of the corridors constrains movement and produces a controlled spatial experience. The gradual opening of visual perspectives causes visitors to perceive the environment in fragments, thereby rendering visible the disciplinary spatiality inherent to prison typology. This experience includes restricted movement areas, unidirectional progression, and gradual expansion of visual perception.

By directing not only visual perception but also bodily movement, this spatial configuration reproduces the effects of disciplinary space at an experiential level. As Turner and Peters (2015) note, experience within prison museums is not merely visual, but also corporeal. Consequently, the corridors should be interpreted not solely as preserved historical elements, but as active representational spaces that reproduce the spatial logic of the past through contemporary user experience.

Cell Spaces: Experiencing Isolation

The transition from the corridors into the cell spaces represents one of the most intense moments within the visitor experience. Through their limited scale, minimal openings, and enclosed character, these spaces directly confront visitors with the sensation of isolation. At this stage, the user experiences spatial compression, encounters restricted visual fields, and perceives individual isolation.

Simpson (2025) argues that such spaces possess the capacity to generate empathy and critical awareness among visitors. In this context, the cells function not merely as exhibition areas, but also as experiential environments.

Courtyard: Reinterpreting Controlled Openness

The transition from the cells into the courtyard marks a significant rupture within the spatial experience. While the courtyard originally provided only a limited sense of openness within the prison structure, the design process reinterprets this area as a semi-public environment.

Isolation gives way to relative openness, enclosed volumes transition into open space, and individual experience evolves into collective encounter. Nevertheless, this openness does not constitute absolute freedom; rather, it remains a controlled openness. In this way, the courtyard preserves one of the fundamental contradictions of prison architecture and allows visitors to perceive that contradiction directly.

Exhibition Spaces: Constructing the Narrative

After the courtyard, visitors are directed toward the aviation museum exhibition spaces. These areas function as transitional layers between the prison spatiality and the new institutional program. At this stage the spatial openness increases, visual connections become stronger, and movement becomes less restricted. This transformation indicates the gradual dissolution of the prison experience. Gregory and Witcomb (2007) argue that such transitions strengthen narrative continuity within heritage environments.

Tower: Vertical Liberation and the Summit Experience

The most powerful moment within the visitor experience emerges upon reaching the tower. The tower functions as the spatial manifestation of the freedom metaphor constituting the conceptual core of the design. At this point, the visitor ascends vertically, gains access to an expanded perspective, and establishes a relationship with the horizon.

Narrow corridors give way to open panoramas, enclosed vision transforms into expansive horizons, and horizontal movement evolves into vertical ascent. This upward movement from corridor to tower generates a spatial experience fundamentally opposed to the building's existing horizontal and restrictive organization, thereby physically materializing the project's narrative of "from confinement to freedom."

Upon reaching the tower, visitors move beyond the restricted visual fields experienced in earlier spaces and encounter panoramic perspectives, intensifying the opposition between the disciplinary spatiality of the prison and the openness represented by the new function.

Landscape and Exit: Re-Socialization

Following the tower experience, visitors are directed toward the landscape zone. This area constitutes the final stage of the experience and reintegrates the user into public life. At this stage:

- Spatial permeability increases and directional pressure diminishes
- The circulation system produces a more open spatial experience compared to earlier controlled movement patterns
- The structure establishes relationships with the urban environment and becomes a platform for diverse forms of public engagement

This condition demonstrates that the experience is completed not only within the building itself, but also at the urban scale.

Holistic Interpretation of the Experience

When evaluated collectively, the visitor experience may be interpreted through the following transformation sequence (Table 8).

Table 8 Experiential Effects of Spatial Stages

Stage	Experience
Entrance	Encounter
Corridor	Restriction
Cell	Isolation
Courtyard	Controlled openness
Exhibition	Transition
Tower	Freedom
Landscape	Reintegration

Source: Authors' design project archive for Keçiborlu Aviation Museum

This structure clearly demonstrates that architecture produces not only space, but also experience and meaning.

Discussion: Architecture, Memory, and Representation in the Transformation of Difficult Heritage

When evaluated within the broader international literature on the adaptive reuse of difficult heritage, the approach developed for the transformation of the former Keçiborlu prison into an aviation museum reopens discussions concerning the role of architecture in the production of memory, representation, and experience. Particularly when compared with projects in which prison structures have been transformed into museums, cultural centers, or tourist facilities, the Keçiborlu project proposes an approach aimed not at obscuring the past, but at rendering it spatially legible once again.

At the international scale, adaptive reuse projects involving prison structures generally tend to follow two principal trajectories. The first is based upon the direct preservation of the building's historical identity through museumification, as observed in examples such as Alcatraz Island, Eastern State Penitentiary,

Kilmainham Gaol, and Robben Island. Within Türkiye, Ulucanlar Prison Museum and Sinop Historical Prison constitute important national counterparts to this approach. In such examples, the existing spatial organization is largely preserved, while cells, corridors, and courtyard systems continue to structure visitor experience. The spatial atmosphere and material traces of the past operate as the primary mechanisms through which memory is communicated, transforming the structure into a site of remembrance.

The second trajectory, visible particularly in several European conversion projects, involves the transformation of prison structures into hotels, cultural centers, or mixed-use developments. Projects such as Het Arresthuis and Malmaison Oxford exemplify this tendency. Although the historical identity of the structures is formally preserved, traumatic histories are often aestheticized and neutralized, integrating the buildings into contemporary consumption practices. Prison spatiality becomes an atmospheric decorative element, while historical concepts such as discipline, surveillance, and confinement recede into the background.

The Keçiborlu project proposes a third position situated between these two approaches. While preserving the spatial memory of the structure, it simultaneously constructs a new narrative through contemporary interventions. In doing so, it neither freezes the past nor neutralizes it through aestheticization, but instead critically reinterprets it.

In this respect, the study contributes not merely a design proposal, but also a theoretical framework concerning how architecture may renegotiate its relationship with traumatic pasts. This discussion is structured around three principal axes:

- The tension between preservation, erasure, and transformation
- The representation of memory and the risk of silencing
- The ethical and critical role of architecture

The Triple Tension between Preservation, Erasure, and Transformation

Within the literature concerning the future of structures categorized as difficult heritage, three principal approaches emerge: complete removal of the structure (obliteration), preservation in its existing state (static preservation), and transformation through a new function (adaptive reuse). Whereas the obliteration approach eliminates the physical traces of the past and thereby disrupts the relationship with collective memory (Winstanley, 2018), static preservation isolates the structure from everyday life, transforming it into a passive representational object resistant to change (Logan & Reeves, 2009). Adaptive reuse occupies an intermediate position between these two extremes, aiming to preserve historical traces while simultaneously integrating the structure into contemporary patterns of use. Nevertheless, because this process inevitably involves selective decisions regarding how memory is to be represented, it also constitutes a critical field of intervention.

These three approaches should be understood not merely as technical alternatives, but also as distinct memory politics. Their characteristics may be comparatively summarized as follows (Table 9):

Table 9 Approaches and Their Associated Risks

Approach	**Primary Characteristic**	**Risk**	**Corresponding Literature**
Obliteration	Complete removal of the	Erasure of memory	Winstanley (2018)

	structure		
Static Preservation	Preservation without alteration	Dysfunctionality and disconnection	Logan & Reeves (2009)
Adaptive Reuse	Reuse through a new function	Selective memory production	Morin (2013)

Source: Authors' design project archive for Keçiborlu Aviation Museum

Although the Keçiborlu project is positioned primarily within the third category—adaptive reuse—it simultaneously redefines this approach internally. The combined strategies of preservation, subtraction, and re-articulation employed within the project enable the structure to be both preserved and critically transformed. In this respect, the project transcends the tripartite distinction established in the literature and instead proposes the following hybrid model (Table 10):

Table 10 Project Interventions and Their Objectives

Type of Intervention	**Project Correspondence**	**Objective**
Preservation	Courtyard, corridors, cells	Sustaining memory
Subtraction	Removal of the administrative block	Producing a critical void
Re-articulation	Glass entrance and tower	Constructing a new narrative

Source: Authors' design project archive for Keçiborlu Aviation Museum

This model demonstrates the necessity of multilayered intervention strategies rather than singular methodologies in the transformation of difficult heritage.

Representation of Memory and the Problem of "Silencing"

One of the most significant debates concerning the adaptive reuse of difficult heritage involves the manner in which memory is represented. A recurring problem within such transformations is the

aestheticization and neutralization of traumatic histories, resulting in what may be described as the “silencing” of memory.

Polat and Hersek (2025), in their critique of prison conversions into luxury hotels, argue that such transformations render traces of the past invisible and weaken the political content of the space. Similarly, Draper (2012) emphasizes that when architectural interventions eliminate spatial traces, the political memory embedded within those traces is also erased.

Within this context, the Keçiborlu Civil Aviation Museum Project adopts an approach aimed not at erasing or aestheticizing memory, but at rendering it visible. This approach operates through three principal strategies:

1. Preservation of spatial organization → continuity of the corridor, cell, and courtyard systems
2. Legibility of new interventions → the glass volume does not imitate the historical structure
3. Meaning production through contrast → the distinction between old and new remains visible

Accordingly, the project does not neutralize the past, but instead generates a field of tension between the historical structure and its new function. This tension enables visitors to perceive the space not merely as an aesthetic object, but also as a historical experience.

Ethical Intervention and Critical Representation in Architecture

The transformation of difficult heritage inevitably positions architecture within an ethical framework. In such projects, architecture does not merely produce technical solutions; it also determines how the past will be remembered. Every intervention therefore constitutes an ethical choice.

Gregory and Witcomb (2007) argue that heritage environments should not offer visitors fixed narratives, but rather encourage questioning and critical awareness. In this respect, the role of architecture is not to stabilize the past, but to render it open to discussion. The Keçiborlu project adopts this approach by employing architecture as an instrument of critical representation. This condition is particularly evident in the following interventions:

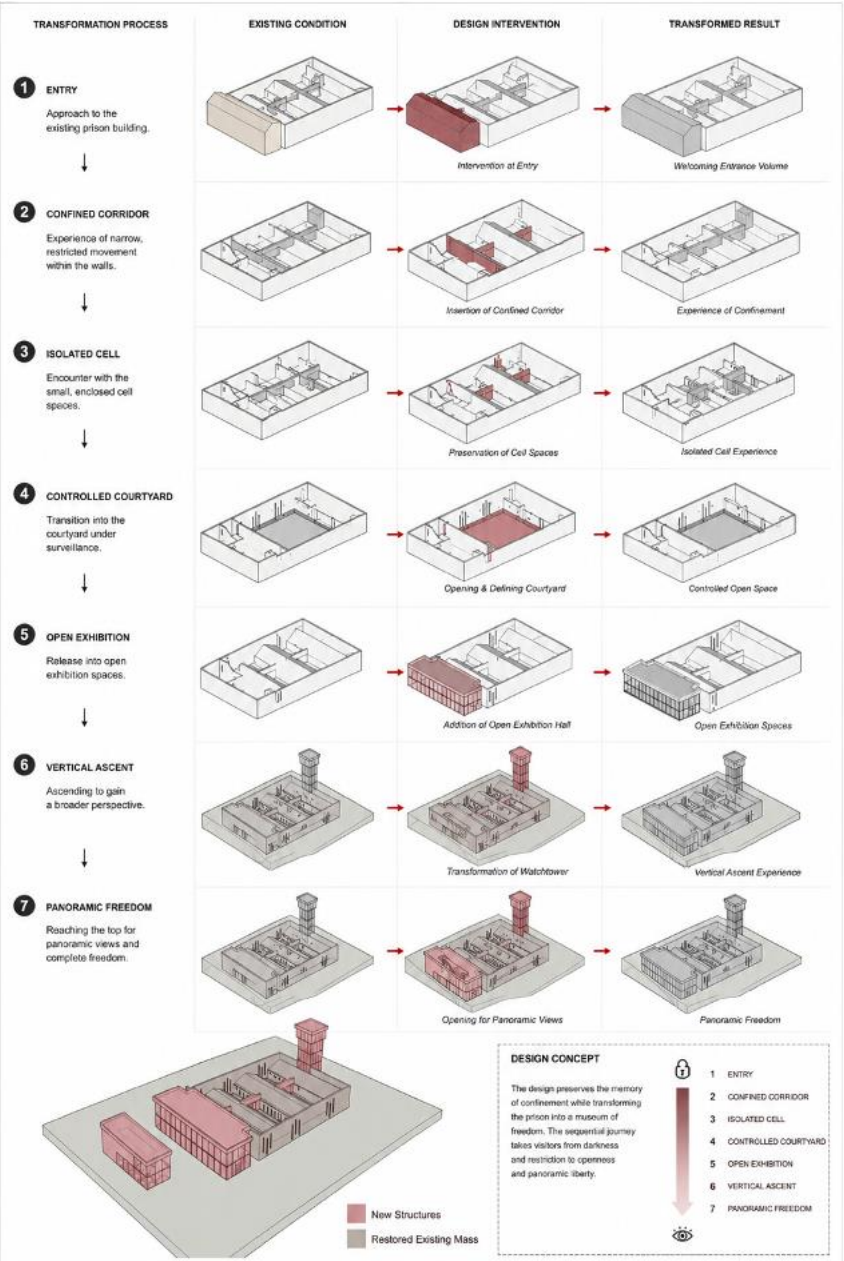
- Transparent entrance volume → renders visible the distinction between past and new function
- Preservation of the corridors → experientially communicates disciplinary spatiality
- Tower element → symbolically and physically produces the concept of freedom

These interventions demonstrate that architecture functions not merely as a "covering," but also as a mechanism for narrative production.

Producing Memory through Experience

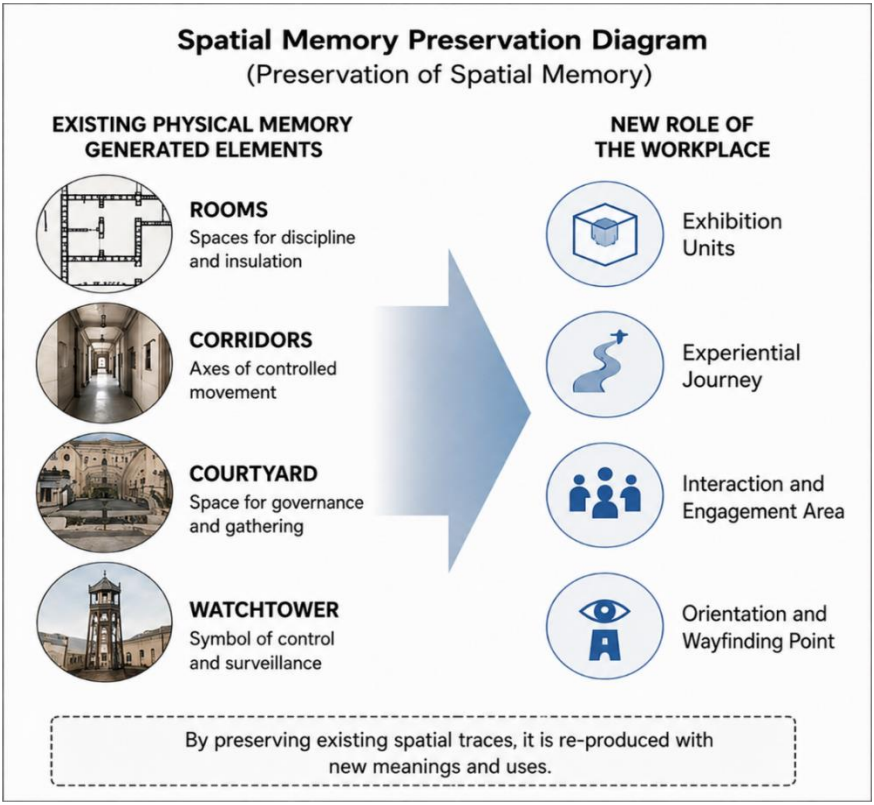
One of the study's most significant contributions to the literature lies in its proposition that memory is not only represented, but also reproduced through experience. Turner and Peters (2015) argue that visitor experience constitutes one of the primary determinants shaping the relationship between the public and the past within prison museums. In the Keçiborlu project, this approach is concretized through the visitor route (Figure 26, 27).

Figure 26 Spatial Memory Preservation Diagram



Source: Authors' design project archive for Keçiborlu Aviation Museum

Figure 27 Visitor Experience Sequance



Source: Authors' design project archive for Keçiborlu Aviation Museum

Within this sequence, visitors do not merely learn about the past; they experience it bodily and phenomenologically. This condition demonstrates that architecture operates less as a medium of information transfer and more as an environment that produces experience.

Contribution of the Study to the Literature

This study contributes to the existing literature on the adaptive reuse of difficult heritage at three principal levels. First, it conceptualizes spatial memory not as passive historical data requiring preservation, but as a dynamic potential capable of being reproduced through contemporary interventions. Second, the

project defines adaptive reuse not merely as a process of physical adaptation, but as a multilayered intervention model in which preservation, subtraction, and re-articulation operates simultaneously. Third, the study repositions architecture from being a tool that merely represents the past to an active spatial mechanism that produces memory through user experience. These contributions extend beyond the specific case of Keçiborlu and propose a broader methodological framework applicable to the transformation of comparable structures.

Conclusion

Through the transformation of the former Keçiborlu prison into an aviation museum, this study has examined the critical role that architecture can assume in the adaptive reuse of difficult heritage. When the theoretical framework, spatial analyses, and design interventions are evaluated collectively, it becomes evident that the transformation of structures associated with traumatic pasts (such as prisons) constitutes not merely a physical intervention, but also a process of meaning production and ethical positioning.

The central problem identified at the outset of the study revolved around how memory might be preserved and reproduced in the transformation of prison structures categorized as difficult heritage. Within this framework, the dominant approaches identified in the literature—obliteration, static preservation, and adaptive reuse—were critically examined, revealing that each approach entails specific advantages and limitations. While obliteration severs connections with the past through the elimination of physical traces, static preservation isolates the structure from everyday life and transforms it into a passive monument. Adaptive reuse, positioned between these two extremes, nevertheless remains a complex process through which memory is selectively reproduced.

The design approach developed for the former Keçiborlu prison transcends this tripartite distinction by proposing a hybrid model combining preservation, subtraction, and re-articulation strategies. Within this model, the principal spatial components carrying the building's memory—the courtyard, corridor system, and cell organization—have been preserved; the structurally and functionally problematic administrative block has been removed through a strategy of critical subtraction; and the resulting void has been occupied through the insertion of a contemporary transparent entrance volume and tower element. Rather than erasing the building's past, these interventions produce a field of tension that renders the historical narrative visible through its coexistence with the new function.

One of the study's most important findings is that spatial memory should be understood not merely as a remnant to be preserved, but as a transformable potential. In this respect, the Keçiborlu project maintains the physical traces of the past by preserving the spatial organization, while simultaneously reinterpreting these traces in order to construct a new narrative. In particular, the preservation of the corridor and cell spaces enables the experiential transmission of prison spatiality, while contemporary interventions such as the transparent entrance volume and tower introduce a new experiential layer associated with the concept of freedom.

At this point, the role of architecture extends beyond the mere preservation of the existing structure; it becomes a mechanism for constructing relationships between past and present. In the Keçiborlu case, this narrative is articulated through a spatial scenario extending "from confinement to freedom." The visitor experience is designed as a gradual transformation process beginning within narrow and restrictive corridors, intensifying through the sense of isolation experienced in the cells, opening into

the controlled openness of the courtyard, and culminating in the vertical liberation achieved within the tower. This sequence enables users not only to observe the space, but also to physically experience it and reconsider their relationship with the past.

The study demonstrates the determining role of experiential spatiality in the representation of difficult heritage. In parallel with the experience-based heritage approaches proposed by Turner and Peters (2015) and Gregory and Witcomb (2007), architecture in this project is conceptualized not as a medium for transmitting information, but as an environment that produces experience. This condition reveals that memory is not merely exhibited content, but a process continually reproduced through spatial experience.

Another important contribution of the study lies in its emphasis on the ethical dimension of architecture within adaptive reuse processes. In the transformation of difficult heritage, the aestheticization, neutralization, or commodification of traumatic pasts constitutes a significant risk. In response to this risk, the study adopts a design approach that renders the past visible rather than concealing it and openly exposes the distinction between old and new. Within this context, transparency is understood not merely as a material choice, but also as an ideological position.

Ultimately, the transformation of the former Keçiborlu prison into an aviation museum may be regarded as a significant contribution to the literature on the adaptive reuse of difficult heritage. The project demonstrates that architecture functions not only as an instrument for transforming the physical environment, but also as a discipline capable of producing memory, representation, and ethical responsibility. The study further argues that the preservation of spatial memory and the construction of new narratives are not contradictory processes, but complementary ones, thereby emphasizing architecture’s capacity to establish a critical dialogue between past and present.

Within this framework, the study proposes three principal recommendations for future research and practice concerning the transformation of difficult heritage. First, preserving the spatial organization of such structures is essential for maintaining the continuity of memory. Second, contemporary interventions should establish a clear contrast with the historical structure rather than imitate it, thereby rendering visible the relationship between past and present. Third, architecture within these processes should be understood not merely as a technical instrument, but also as a critical representational practice. Accordingly, the Keçiborlu case offers a transferable model for the transformation of difficult heritage and redefines the role architecture may assume within such processes.

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