



**Master's Degree Thesis**

**Architecture of Transformation;  
Design for Human Composting Complex**

**Study Area: Cimitero Parco of Turin**

Supervisor: Professor Giovanni Corbellini  
Co-supervisor: Dr. Sarah Becchio  
Student: Saman Fatehi  
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**Architecture Construction City**  
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Abstract

EN

Death constitutes a foundational theme of humanity and culture which, since forever, poses challenges related to the use of space and the safeguarding of the health of the living. In recent years, concerns regarding the environmental impact of body treatment practices have been increasing. Cremation, which is spreading as an alternative method to traditional earth burial, is less burdensome in economic and environmental terms, but is still responsible for polluting emissions and contributes 400 kg of CO<sub>2</sub> per body to the accumulation of greenhouse gases. This Master’s thesis aims to study, from an architectural perspective, a new method of body treatment, named Human Composting Complex, already under experimentation in the United States and capable, through Natural Organic Reduction (NOR), of offering evident advantages in terms of environmental impact and an attractive symbolic framework for people most interested in safeguarding our planet. The European demographic evolution makes this theme extremely urgent. Turin is a rapidly aging city and, here as elsewhere, the coming years will witness a surge in the number of deaths, fueled by the large post-World War II generation. The thesis project concerns an experimental facility within the Cimitero Parco di Torino, which is currently underutilized and could obtain its long-awaited relaunch from a facility of this kind. The exploration of this specific theme is preceded by a comparative analysis of various funerary typologies developed in different historical, regional, and cultural contexts, and provides some benchmark parameters both regarding the relationships between space and rituals and from the perspective of environmental impacts. The project is dimensioned on the hypothesis of treating approximately 1,500 bodies per year (around 15% of the current total in Turin). Each body generates about 0.80 m<sup>3</sup> of soil, which can be returned to the family, even if only in part, or scattered in a dedicated garden of remembrance within the cemetery: a living legacy that introduces our existences back into the natural cycle. In ad-

dition to the spaces dedicated to body treatment, the program includes: two farewell halls (particularly necessary in the current Torinese condition, both in quantitative terms and in the quality of the spaces); other rooms dedicated to family members and possible viewing chambers (camere ardenti); offices for the management of the complex; additional spaces to receive those attending the ceremonies and offer eventual refreshments. Particular attention was paid to separating the flows of logistical operations and personnel from those of the mourners, following the example of recent cremation facilities built in Belgium. Regarding the architectural solution, on one hand, it takes into account the industrial tradition of the city, felt above all in this southern part, with the large Fiat Mirafiori plant and the nearby working-class neighborhoods, to which the Cimitero Parco was initially addressed. The building thus seeks a horizontal continuity, which recalls that of the large nearby factories, held together by an extensive prefabricated concrete roof. The large roof is supported by 1-meter-thick SIREwall (Structural Insulated Rammed Earth) walls, with an evident reference to the earth—the local one excavated on-site and used in the mixture, and that to which the bodies treated in the facility will return. A historic chapel, a fragment of a villa once present within the cemetery area, becomes part of the complex. The containers in which the composting process takes place are arranged nearby. Each body requires about forty days to become soil again. During this period, grieving relatives and friends can visit the complex and ritually accompany the process, until the day when the remains will be returned to them to scatter them on-site or take them wherever they deem most appropriate. The project proposes a spatial and material organization aimed at accompanying a passage as inevitable as it is crucial, addressing emerging sensibilities on one hand, and seeking, on the other, to connect with the treatment of elements such as light and thresholds that have been part of the relationship between architecture and ritual for millennia.

Abstract

IT

La morte costituisce un tema fondativo dell’umanità e della cultura che, da sempre, pone sfide relative all’uso dello spazio e alla salvaguardia della salute dei vivi. Negli ultimi anni stanno aumentando le preoccupazioni relative all’impatto ambientale delle pratiche di trattamento dei corpi. La cremazione, che si sta diffondendo come metodo alternativo alla tradizionale inumazione, è meno onerosa in termini economici e ambientali, ma è pur sempre responsabile di emissioni inquinanti e contribuisce con 400 kg di CO<sub>2</sub> per ogni corpo all’accumulo di gas serra. Questa tesi di laurea magistrale si propone di studiare dal punto di vista architettonico un nuovo metodo di trattamento dei corpi, denominato Human composting complex, già in sperimentazione negli Stati Uniti e in grado, attraverso la Riduzione organica naturale (NOR), di offrire vantaggi evidenti sotto il profilo dell’impatto ambientale e un quadro simbolico attrattivo per le persone più interessate alla salvaguardia del nostro pianeta. L’evoluzione demografica europea rende questo tema estremamente urgente. Torino è una città che invecchia rapidamente e, qui come altrove, i prossimi anni assisteranno a un’impennata del numero di decessi, alimentati dalla numerosa generazione dei nati nel secondo dopoguerra. Il progetto di tesi riguarda una struttura sperimentale all’interno del Cimitero Parco di Torino, oggi sottoutilizzato, che potrebbe ottenere da una struttura di questo genere l’atteso rilancio. L’esplorazione di questo tema specifico è preceduta da un’analisi comparativa di varie tipologie funerarie sviluppate in diversi contesti storici, regionali e culturali, e fornisce alcuni parametri di riferimento sia relativi ai rapporti tra spazio e rituali che dal punto di vista degli impatti ambientali. Il progetto è dimensionato sull’ipotesi di trattare circa 1500 corpi all’anno (intorno al 15% del totale attuale a Torino). Ogni corpo genera circa 0,80 mc di terriccio, che potrà essere riconsegnato alla famiglia, anche solo in parte, o sparso in un apposito giardino della memoria all’interno del cimitero: un’eredità vivente che reimmette le nostre esistenze all’interno del ciclo naturale. Il pro-

gramma include, oltre agli spazi dedicati al trattamento dei corpi: due sale del commiato (particolarmente necessarie nella condizione torinese attuale, sia in termini quantitativi che di qualità degli spazi); altre sale dedicate ai familiari e ad eventuali camere ardenti; gli uffici per la gestione del complesso; spazi agiuntivi per ricevere gli intervenuti alle cerimonie e offrire eventuali rinfreschi. Si è posta particolare attenzione a separare i flussi delle operazioni logistiche e del personale da quelli dei partecipanti al lutto, seguendo l’esempio di recenti impianti di cremazione realizzati in Belgio. Per quanto riguarda la soluzione architettonica, da un lato essa tiene conto della tradizione industriale della città, sentita soprattutto in questa sua parte meridionale, con il grande stabilimento Fiat Mirafiori e i vicini quartieri operai, cui il Cimitero Parco era inizialmente rivolto. L’edificio cerca così una continuità orizzontale, che richiama quella delle grandi fabbriche lì vicino, tenuta insieme da un’estesa copertura prefabbricata in calcestruzzo. Il grande tetto è sorretto da muri in SIREwall (Structural Insulated Rammed Earth) spessi un metro, con un evidente riferimento alla terra, quella locale scavata in loco e utilizzata nell’impasto, e quella a cui torneranno i corpi che verranno trattati nell’impianto. Una cappella storica, lacerto di una villa un tempo presente all’interno dell’area del cimitero entra a far parte del complesso. Lì vicino sono sistemati i contenitori nei quali avviene il processo di compostaggio. Ogni corpo richiede circa quaranta giorni per ridiventare suolo. In questo periodo, parenti e amici in lutto possono visitare il complesso e accompagnare ritualmente il processo, fino al giorno in cui gli verranno riconsegnati i resti per spargerli in loco o portarli dove riterranno più consono. Il progetto propone un’organizzazione spaziale e materiale tesa ad accompagnare un passaggio tanto inevitabile quanto cruciale, rivolgendosi da un lato a sensibilità emergenti e cercando, dall’altro, di connettersi al trattamento di elementi come la luce e le soglie che fanno parte da millenni del rapporto tra architettura e rito.

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Introduction

The Spatial and Ecological Imperative of Death Care

Indeed, since the very dawn of humanity, the architecture of the cemetery has been a symbolizing reminder of the prevailing society, religion, and geography. From the early burial of deads in caves to the development of churchyards in medieval cities, from the burial mounds to mausoleums, the management of death has developed in tandem with the evolution of human civilizations. The nineteenth-century emergence of the rural and “garden” cemeteries, such as the famous Pere Lachaise Cemetery in Paris, was an important shift from religion to public, sanitary, and environmental concerns.

Modern 21st century cities have created unprecedented conflict on traditional burial typologies by increasing urban sprawl and creating significant population increase.

This has caused reduced availability of land for burial, which has made cemeteries transform into locked, static, saturated burial spaces.

As a result of this, Western societies have adopted a mass production method of cremation using fossil fuels produced industrially in large facilities as a temporary solution to using a less space-efficient method for the death of a loved one from the mid 20th century to date.

However, beneath the modernist use of non-denominational minimalist architectural designs of crematories lies a serious ecological conflict.

To put it plainly, cremation is an energy-intensive process that requires the burning of fossil fuels at extremely high temperatures, producing of large amounts of carbon dioxide (CO<sub>2</sub>), heavy metals, and other toxic chemicals which contribute to the global climate crisis. While these pollutants are emitted into the atmosphere during combustion, alternative biological reduction methods such as composting incorporate strict pathogen and heavy metal testing to ensure the safety of the final organic matter before environmental reintegration.

Due to this reality, the death care industry can no longer be seen only as a cultural or ritualistic necessity; it has become an urgent ecological and urban design problem.

Turin’s Silent Crisis: Saturation and Environmental Cost

The city of Turin, which lies in northwestern Italy within the region of Piedmont, serves as a classic example of the contemporary phenomenon of the modern funeral crisis. Being heavily influenced by rapid industrial development during the first half of the twentieth century and substantial migration due to the development of the FIAT motor company, Turin is characterized by the existence of strong demographic imbalance within its borders, where those aged 65 years old and older constitute about 26% of the overall population of the city and lead to a consistently high number of deaths between 9,500-10,000 per year.

The trend of ever-increasing natural deaths and burials in Turin’s traditional flat cemeteries has pushed the Cimitero Monumentale in Turin into a zero-capacity space, thereby shifting the city’s operational reliance upon the Cimitero Parco di Torino, a 72-hectare, grid-structured cemetery park model developed in the late 1950s within a proper modern city environment, as opposed to the older burial method of interment on private property within one of Turin’s original cemeteries. However, the modern surge of cremation has recently triggered a severe management and financial crisis for this facility, as the declining demand for traditional land plots compromises its real-estate-based economy. The growing reliance on the use of cremation and decreasing reliance on the use of earth interment

for the interment of the deceased in ordinary cemeteries has caused a significant and permanent change in the public’s behaviour within the past twenty (20) years. While traditional earth interment used to account for eighty-five percent (85%) of all burials in Turin, they now comprise only twenty-five percent (25%) of total burials in Turin; whereas, flame cremation has increased to approximately seventy-five percent (75%) of the total burial market share in Turin. The overreliance on cremation has contributed to substantial atmospheric and environmental pollution within the region, creating a clear contradiction to the cultural values of many residents of Turin that espouse to achieve carbon neutrality as well as utilise sustainable urban green infrastructure systems in cities. Turin is in urgent need of an infrastructural transition towards zero-emission, biologically generating alternatives to the existing burial interment systems in each city’s cemetery systems in order to relieve urban spatial congestion and also to contribute to the repair of the urban ecosystem.



**Natural Organic Reduction: Death as Urban Regeneration**

This Master’s thesis proposes a Human Composting Complex integrated within the pre-existing fabric of the Cimitero Parco di Torino. By utilizing Natural Organic Reduction (NOR) - a controlled, microclimatic aerobic decay process that turns a human body into rich, organic soil within a 30 to 45 day biological cycle - this system re-imagines death not as a termination or a source of pollution; instead, it serves as a vehicle for urban regeneration.

With an estimated conservative goal of acquiring 15% of the annual funerary market in Turin, the facility is quantified to process 1,500 bodies in one year, resulting in an ecological yield of 1,140 m3 of nutrient-rich organic soil amendment. The biological surplus is being transformed, to ensure social acceptance and to honor the sacred process of grief, by implementing a structured, micro-local circular strategy of care and support:

1. Nourishing the on-site “Memory Garden” to directly reintegrate the memory of the deceased into the facility’s landscape.
2. Providing personal Living Legacies for bereaved families who wish to reclaim the organic matter for private remembrance.

**The Architectural Problem: A Dual Generative Strategy**

From the architectural perspective, the design is intended to create a contemporary, secular shrine that blends the functionality of the biological cycle with the gravity of collective memories. To resolve the conflict between industrial scale and human sorrow, the following dual design approach is utilized:

Inside-Out Approach: This design concept organizes the layout of the interior based on the feelings of grief felt through the process of grief and provides maximum efficiency of functionality. The project builds on successful examples of contemporary, lay-based experiences of grief from previously built Belgian crematoria (Heimolen, Hofheide, and Sie-segem) while using the same types of spatial planning principles for the creation of a contemporary experience of grief in a traditionally Catholic area. In addition to providing for the absolute functional separation of mourners, staff and logistic functions, these examples serve as guides for the spatial arrangement of light, intimacy and spiritual comfort.

Outside-In Approach: The structure’s site characteristics; material attributes; and historical attributes anchor the building to its present commercial site. The low, horizontal form integrates the industrial layout and mat-building configuration of the adjacent Fiat-Stellantis Mirafiori facility to translate the serial regularity of the existing bureaucracy into a rhythmical

structural pattern without being governed by a strict geometric grid. In addition, the primary structural system consists of 1-metre-thick SIREwall (Structural Insulated Rammed Earth) systems that authentically reflect the conceptual qualities of the composting process. By using excavated site materials and local Po River aggregates, these rammed earth walls are firmly imprinted into the land base below. The layout of the complex incorporates the currently existing historic chapel as an “objet trouvé” and extends in a non-intrusive, non-interfering linear direction away from the historic structure. Redefining the spatial vernacular of funerary architecture—through monumental transition thresholds, a calculated interplay of light and shadow via a zenithal oculus in the Farewell Hall, and the material transition from earth to live soil—the complex establishes an active, closed-loop infrastructure for civic and landscape regeneration.



Evolution of Death and Burial Practices

- The Evolution of Death Practices and Their Transformation Over Time
- Particular Design Elements
- Burial Traditions as Shaped by Religion
- Cremation
- Regional Variations in the Design of European Cemeteries
- Challenges Nowadays for Conventional Burial Sites

The Evolution of Death Practices and Their Transformation Over Time

Before the establishment of formal burial grounds, human societies developed different practices of dealing with the dead, founded since long on spiritual beliefs, geo-environmental conditions, and social structures. Changes in these practices can be correlated to changes in cultural attitudes toward death, advances in technology, and growing urbanization. To understand what came before current burial practices gives background for appreciating the transition from early death rituals to contemporary cemetery prospecting.

Prehistoric & Ancient Funerary Practices

+ 100,000 Years Ago

40,000 - 10,000 BCE

10,000 - 3000 BCE

40,000 - 10,000 BCE

First Intentional Burials

Early humans (Neanderthals and Homo sapiens) began intentionally burying their dead. Discoveries in Shanidar Cave (Iraq) and Qafzeh Cave (Israel) reveal grave offerings like floral pollen and stone tools, marking the earliest evidence of spiritual beliefs. (Solecki, 1971; Gargett, 1999, Pet-titt, 2011).



Dolni Vestonice, including the triple burial

Rise of Symbolic Rituals

Funerary practices became more formal and complex. Skeletons were smeared with red ochre symbolizing blood, life or rebirth, and sites like Dolní Věstonice (Czech Republic) and Sungir (Russia) showcased multiple burials adorned with personal ornaments and mammoth ivory. (Vanhaeren & d’Errico, 2005, Svoboda et al., 2011)



Dolni Vestonice, including the triple burial

Megalithic Architecture

The dawn of agriculture shifted societies toward permanent settlements, leading to collective monumental graves and ancestor veneration at landmark ritual sites like Göbekli Tepe (Turkey), the Hypogeum of Hal-Saflieni (Malta), and Newgrange (Ireland). (Hodder, 2012).



Göbekli Tepe - Turkey

The Bronze and Iron Age

Civilizations like the Egyptians, Mesopotamians, Greeks, and Romans going even further in perfecting their burial customs. The Egyptians practiced mummification with the aim of preserving bodies for afterlife, while the Romans popularized columbaria which were collective storage sites for the ashes-aftercremation, being an early precursor to modern cremation facilities (Taylor, 2001; Morris, 1992).



pyramid-tombs of Pharaohs

Middle Ages & Early Modern

5th–15th Century

9th–10th Century

16th–18th Century

1780 - 1803./

Middle Ages Churchyard Burials

Burials mainly took place in churchyards connected to religious institutions. Wealthy individuals were buried inside churches, while ordinary people were buried in surrounding graveyards. Churchyard burials typically reflected the belief in a resurrection and divine judgment, with gravestones inscribed in religious symbols and epitaphs. (Rothstein & Staudt, 2021).



Chris Newman / Kirkconnel Church & Cemetery, Springkell.

The Govan Stones, Scotland

The Old Parish Churchyard of Govan in Scotland is a repository of early medieval sculpted stones, including that of the Govan Sarcophagus. Dated to about the 9th or the 10th century, this highly ornamented stone coffin depicts burial practices and expressions of art during that age.



The Goven Stones - Scotland

Early Modern Period

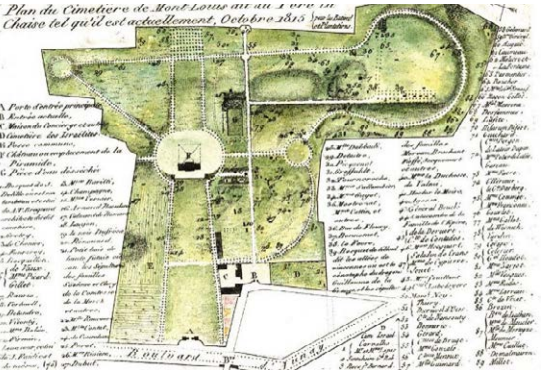
Overcrowding is one of the degrading sanitary conditions in most major cities in Europe due to decomposition, which can pose a danger to public health. Therefore, secular authorities intervened to regulate burial activities, which eventually instituted specific cemeteries and placed them outside urban centers (Johnson, 2008).



The Goven Stones - Scotland

Closure of Inner-City Cemeteries

In 1780, finally, all cemeteries within the city walls were closed in Paris. As Consul Napoleon decreed that cemeteries should be open to all faiths and to the poor as well as the rich. This reform paved the way for modern cemetery planning. The land was acquired by the Prefect of the Seine department on the hill in 1803, and the design of the cemetery was entrusted to Alexandre-Theodore Brongniart.



Père Lachaise Cemetery, Paris



Garden Cemeteries



Opening of Père Lachaise in Paris

Père Lachaise Cemetery opened as one of the first garden cemeteries. It was designed as a landscaped park, with meandering paths, shaded trees, and ornate tombs, serving as a model cemetery to its further development across Europe and North America (Design Council, n.d.).



Père Lachaise Cemetery, Paris

Expansion of Père Lachaise

There were only 13 tombs in that year. It was really only around 2,000 in 1815. In 1830, it became 33,000 and after several expansions 70,000 in 2014.



Père Lachaise Cemetery, Paris

Highgate Cemetery, London

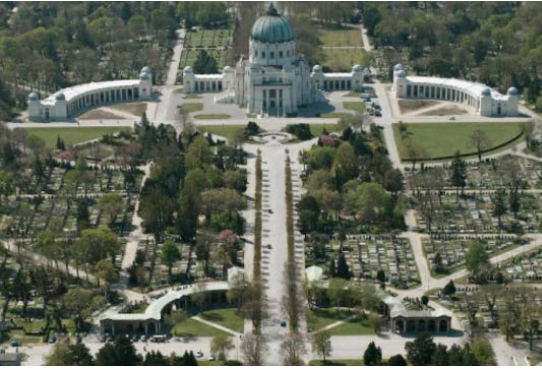
The garden cemetery movement gathered steam throughout the whole of the 19th century, with the creation of projects such as Highgate Cemetery in London in 1839. Featured winding paths, greenery, and monumental architecture. (Tarlow, 1999).



Highgate Cemetery, London

Zentralfriedhof, Vienna

Following The garden cemetery movement, Zentralfriedhof embraced nature, art, and urban planning, creating places not only for burial but also for public reflection and recreation. The movement captured the changing attitudes toward death, with an emphasis on memorialization and the aesthetic value of cemeteries as green spaces.



pyramid-tombs of Pharaohs

Cemetery Reforms and 20th-Century Developments

Monumental Cemetery Art

Monumental gravestones, tombs, and mausoleums are some of the most striking characteristics of traditional cemeteries. These structures often reflect social status, artistic vagaries, and religious symbolism. Some European cemeteries, are noted for their elaborate sculptural monuments with intricate carving, classical motifs, and angelic figures (Rothstein & Staudt, 2021).



Monumental Cemetery, Milan

Military Cemetery Design

The devastation caused by World War I and II incited the creation of military cemeteries with uniform headstones and symmetrical layout to symbolize collective mourning and national remembrance. The Commonwealth War Graves Commission played a key role in the design standardization of war cemeteries, ensuring that fallen soldiers were afforded dignity in their burial (NPS.gov, n.d.).



Gommecourt British Cemeteries

Cremation and Space Management

In many European countries, policies were implemented for the restriction of grave reuse after a period (often of 20-30 years) in an attempt to solve space issues while respecting the historical integrity of burial sites (Allam, 2019). the archival development of cremation, became an influence on layouts of cemeteries, incorporating columbariums and memorial gardens (Rae, 2021).



Arlington National Cemetery

Ecological Awareness Cemetery

most of the studies emphasize placement of cemeteries within urban green infrastructure whereby cities have an opportunity to enjoy environmental services like carbon sequestration and biodiversity protection (McClymont & Sinnett, 2021). Thus, contemporary designs of cemeteries strive to integrate sustainable practices, mirroring the changing attitude of society towards ecological sensitivity and land conservation.



Example of a green burial ground



Particular Design Elements

1. Monumental Tombstones and Mausoleums

Monumental gravestones, tombs, and mausoleums are some of the most striking characteristics of traditional cemeteries. Serving as the permanent monuments of the dead, these structures often reflect social status, artistic vagaries, and religious symbolism. Some European cemeteries, especially in the 19th and early 20th centuries, are noted for their elaborate sculptural monuments with intricate carving, classical motifs, and angelic figures (Rothstein & Staudt, 2021).

Design of gravestones varies from one culture to another. For example, the gravestones in the Catholic and Orthodox tradition have iconography that relates to religion, such as crosses, saints, or biblical texts. Jewish cemeteries can include inscriptions in Hebrew along with symbolic expressions such as the Star of David, while Islamic cemeteries lean toward a minimalist disposition with simple headstones in line with their religious teachings (Sepulchralkultur Museum, 2022).



Grid-Based Design), Arlington National Cemetery Layout (USA).

2. Orderly Layouts and Pathways

Traditional designs of cemeteries are characteristically divided into two primary systems of layout:

- Grid design: Sparse grid scheme, as found in a number of western cemeteries, aims to ensure orderly placing of graves and management of land. Most widely used in war cemeteries and modern burial grounds, where uniformity and accessibility matter (NPS.gov, n.d.).
- Garden cemetery design: Based upon a 19th-century approach, this design scheme involves winding paths, tree-sheltered walkways, and open lawn areas. This will allow cemetery visitors to experience them as places of calm and tranquility instead of only sites of mourning (Clayden et al., 2018).



Garden Cemetery Design, Père Lachaise Cemetery (Paris, France)

3. Religious and Cultural Symbolism

Cemetery design employs the power of symbolism heavily as gravestones, sculptures and inscriptions bear messages of faith, remembrance and eternal rest. Some of these symbols are:

- Angels and Cherubs: Signifying the protection and guidance conferred to the departed soul.
- Willow Trees and Ivy: Western funerary art considers these two symbols as mourning and immortality.
- Obelisks and Columns: Also having aspects of classicism, these structures symbolize strength and legacy (Tarlow, 1999).



Weeping Angel Genoa's Staglieno (Italy); Crown Hill Cemetery, Salem, Indiana; Green-Wood Cemetery (New York)

4. Integration of Green Spaces

Gravesites were previously created, leaving spaces for trees and gardens and arranging features of water within the ground-all ways contributing to stillness. This gardening aspect in cemeteries lives again today because it can be discussed in a contemporary context around urban sustainable development. Studies show the ecological worth of cemeteries, providing environments for wildlife, reducing heat islands, and offering recreational areas for urban dwellers in cities (McClymont & Sinnett, 2021; Dickinson & Hobbs, 2017). Some burial sites, particularly in Scandinavia, are becoming increasingly treated as urban green spaces and accommodate both ecological and cultural needs (Nordh & Evensen, 2018).



Woodland Cemetery (Skogskyrkogården, Sweden)



## Burial Traditions as Shaped by Religion

Religious beliefs have influenced burial traditions very profoundly, not only with regard to the forms but also with regard to the sites of burial and attitudes towards the afterlife. Across cultures, these religious doctrines have enjoined the treatment of the dead by promoting a general set of spiritual, ethical and social values.

Religion was central in the ancient Egyptian funerary practices. Egyptians believed in a world after death whereby, to travel, the soul had to have a body preserved. This belief invented the elaborate mummification intended to affect a successful transference of the dead into the afterlife. Tombs, from simple mastabas to enormous pyramids, would be filled with grave goods, food, and sacred texts, such as the Book of the Dead, which instructed the dead how to navigate the Afterworld (Taylor, 2001). Grave goods like these were also extended to burials, with offerings in efforts to placate gods for a peaceful afterlife, as attested to in ruins of the royal cemetery of Ur (Pollock, 1999).

It is while the burial practices were that generally adopted by the adherents of monotheism that tended to be more or less uniform. Judaism stressed burial over cremation because the body was accepted to return to the earth organically in accordance with biblical teachings. The deceased were buried in simple shrouds, without embalming, following the tenet of equality in death and respect for the body (Neusner, 1993). Christianity, which inherited Jewish burial practices, again favored inhumation compared to cremation, with early Christians frequently buried in catacombs outside the Roman cities. Burial within churchyards became the norm as Christia-

nity continued to spread and become the dominant religion in Europe, emphasizing thereby the relationship formed between death and sacred ground (Morris, 1992).

Islamic funeral customs, too, are to some extent regulated by the Qur’an and the Hadith, according to which the deceased are to be given a speedy burial without embalming in simple graves facing Mecca. Cremation is absolutely forbidden because Islamic eschatology relates it to the fact that the physical body takes part in resurrection (Peters, 2003). Contrarily, Hinduism and Buddhism in most cases favor cremation, believing the soul is released from the body through fire, facilitating reincarnation or enlightenment (Oestigaard, 2011). Such premises show the influence of religious ideologies as to both the form and the rationale for burial practices. The effects of religion extended into the design of cemeteries as well. Most Christian burials took place within churches, or they’d sit aside of graveyards during that time period in other places-the holy ground-within church. Over time, because of overcrowding and health concerns, municipal cemeteries were established outside city walls, a trend that gained momentum at the 18th and into the 19th centuries (Ariès, 1981). Even in modern times, one would still find religious traditions influencing funeral customs to date, and, hence, most contemporary arguments on green burials, cremation, and various alternative funeral practices.

## Cremation

### The Industrial Solution and Its Contemporary Crisis

The technological shift from traditional earth burials to industrial cremation represents a major infrastructural transition. Although modern cremation technologies actually emerged in Italy during the last quarter of the nineteenth century, the practice faced initial cultural resistance domestically and achieved its earliest widespread institutional success in Great Britain. It was not until the mid-to-late twentieth century, however, that industrial cremation gained global momentum as a primary response to acute land shortages and rapid urbanization. Although an old practice used by ancient civilizations including the Romans who used communal ash storage buildings called columbariums, the practice of cremation was revolutionized in terms of efficiency, industrialization, and secularization to avoid the territorial limitations of earth burials (Morris, 1992). Architecturally speaking, this transformation required drastic changes of spatial and typological characteristics. According to the analysis carried out by Valentijn & Verhoeven (2018), the crematorium architecture underwent a change from the gloomy machine-like building into the very sophisticated minimalist and non-denominational structure. Modern crematoria in Europe, especially in northern and western parts, are characterized by the presence of exposed concrete and strict geometrical shapes combined with careful use of daylight to create secular spirituality and a well-plan-

ned “ritual of farewell” for the people that lack religious dogmatic signs (Valentijn & Verhoeven, 2018).

But, underlying this elegant structure is an ecological problem of serious proportions. Modern cremations are energy-consuming processes that involve large amounts of burning fossil fuel, most commonly natural gas, at high temperatures between 760°C and 980°C. Therefore, each cremation process causes serious pollution of the atmosphere, emitting about 400 kg of carbon dioxide (CO<sub>2</sub>) into the surrounding environment (Robinson, 2021). Moreover, according to the findings of a seminal study of life-cycle analysis conducted by Keijzer, Kok, and BV (2011), in addition to the release of greenhouse gases, the process of high-temperature burning causes the emission of hazardous chemicals, such as dioxins, nitrogen oxides, and heavy metals like mercury from the amalgam used for filling teeth.

Even as cremation continues to maintain a very efficient use of space when viewed from a macro perspective by only occupying a small amount of space, which is about 0.25 square meters per urn niche in columbaria walls, the highly unsustainable nature of its high carbon footprint as well as dependence on non-renewable energy sources makes it incompatible

Regional Variations in the Design of European Cemeteries

1. Southern Europe: Ornate Mausoleums and Family Tombs

In Southern European countries such as Italy, Spain, and Greece, cemeteries tend to be highly elaborate with large ornamental mausoleums and extremely artistic family tombs. These structures stand out as a cultural representation of an extraordinary preoccupation with one’s ancestry or family lineage. Italian cemeteries offer some of the greatest examples of classical marble sculptures and neoclassical architecture of the highest order, with lifelike statues and incredibly detailed engravings at places like the Monumental Cemetery of Staglieno in Genoa (Nordh & Evensen, 2018). In Spain, examples include Montjuïc Cemetery in Barcelona, which juxtaposes Gothic, modernist, and classical styles occasionally arranged on terraced hillsides.

Southern European cemeteries abound in religious iconography portraying saints, angels, and biblical scenes in elaborate detail. Fresh flowers and candles are present at most grave sites and are indicative of a strong Catholic tradition in Southern Europe that stresses continuous requirements by the living for the deceased (Rothstein & Staudt, 2021).



Staglieno Cemetery, Genoa (Italy)

2. Northern Europe: Simplicity and Nature Integration

By clear contrast to their Southern counterparts, Northern European cemeteries predominantly pertain to simplicity and integration with the natural surroundings. Sweden, Denmark, and Norway are among those countries that value cemeteries essentially as peaceful green spaces rather than extravagant places of remembrance. Gravestones are often simple and minimalist, merging well into the landscape with rather discrete inscriptions and natural materials such as wood or untreated stone (Nordh & Evensen, 2018).

These very principles are exemplified in Woodland Cemetery (Skogskyrkogården), a UNESCO World Heritage Site built to exist within a harmony of pine forest. This cemetery, engendered by Scandinavian cultural values of nature and introspection, very much promotes the tranquillity and contemplation of thoughts (McClymont & Sinnett, 2021).



Assistens Cemetery, Denmark





3. Western Europe: A Balancing Act Between Tradition and Modernity

Western European countries such as France, Germany, and the Netherlands maintain a kind of balancing act between traditional and contemporary cemetery designs. French cemeteries, exemplified by Père Lachaise in Paris, are characterized by places of historical significance and artistic monuments, which often combine individual graves, family tombs, and columbaria for cremated remains (Johnson, 2008).

On the other hand, Germany and the Netherlands are gradually embracing the ecology and shortage of space paradigm of cemetery design. In fact, Berlin Keynes for Sustainable Land Use, which permits grave reuse after a certain time, is one posited solution within the paradigm (Allam, 2019). Green burials and woodland cemeteries are springing up in response to current environmental concerns (McClymont & Sinnett, 2021).

4. Eastern Europe: Orthodox Traditions and Unique Markers

In Eastern Europe, Orthodox Christian cemeteries have established their aesthetic and religious traditions. In many countries, such as Russia, Ukraine, and Romania, graves are adorned with ornate iron crosses, wooden markers, and painted headstones. These cemeteries often have a more natural layout, with winding paths and dense woodlands contributing to a spiritual and intimate atmosphere (Nordh & Evensen, 2018).

Generalizations can be made about the colorful and symbolic ornaments in the decoration of cemeteries in Eastern Europe. One famous example is the Merry Cemetery in Romania, where wooden crosses are painted in bright shades and inscribed with poetic epitaphs that celebrate the life of the deceased in a fun way (Tarlow, 1999).



5. British Isles: Churchyard Cemeteries and War Memorials

The United Kingdom and Ireland’s long tradition of churchyard cemeteries means that gravestones are closely associated with parish churches. These burial grounds often sport weathered stone markers, Celtic crosses, and inscriptions in Old English or Gaelic (Rae, 2021).

In addition, the UK holds a considerable number of war cemeteries sanctioned by the Commonwealth War Graves Commission. Compared to the design principles espoused by such war cemeteries like Tyne Cot Cemetery in Belgium, uniformity, symmetry, and dignity of fallen soldiers are maintained (NPS.gov, n.d.).

Furthermore, in recent years, the UK has given rise to natural burial grounds, which brings to the fore locations in wooded settings and biodegradable coffins for environmentally sustainable purposes (Clayden et al., 2018).



Assistens Cemetery, Denmark

Challenges Nowadays for Conventional Burial Sites

1. Land Shortage and Urban Sprawl

An emerging problem is the land scarcity for burial grounds in cities that are highly populated. As cities grow, available space for cemeteries declines, pushing communities to reconsider their practices of burial. Such countries include the United Kingdom and Germany, where many states allow reusing graves after certain periods to maximize space (Allam, 2019). However, introducing such a method meets strong cultural and religious revulses because of the concept of permanency of burial sites in such communities (McClymont & Sinnett, 2021).

2. Environmental Concerns

Conventional burials harm the environment in various ways, including space occupation, chemicals used in embalming methods, and non-biodegradable materials in coffins and in vaults. Conventional cemeteries also must be maintained every time through landscaping and consuming water, contributing to their ecological footprint. Consequently, alternative burial practices have emerged, including natural burials, composting, and biodegradable caskets, all meant to support environmentally sustainable practices (Clayden et al., 2018).

3. Cultural and Religious Changes

Modern societies are mega-diverse now and certain shifts in burial cultures may arise out of this diversity. Christian cemeteries have been hegemonic in Europe for centuries but now require the constructions of new cemeteries that will be suitable for the dominant trends of growing Muslim, Jewish, and secular populations (Rothstein & Staudt, 2021). Cremation has increased dramatically in many nations, with Sweden and the Netherlands leading the pack; the remains of the deceased are typically either scattered or stored in columbaria rather than placed in a plot of earth (Priestley, 2020).

4. Economic and Maintenance Probabilities

Another major problem faced by the graves is economically sustainable cemeteries. Most historical cemeteries require large spends on conservation homogenization, although funding is often not sufficient. In the current low-choice world of traditional burial, cemetery operators find it frustrating to cover costs incurred in landscape upkeep, infrastructure, and security (Rae, 2021). Some transformed burial spaces even serve as public parks or memorial gardens, justifying their existence while continuing to serve broader community functions (Nordh & Evensen, 2017).

5. Social Perceptions and Changing Attitudes

Conventional burials harm the environment in various ways, including space occupation, chemicals used in embalming methods, and non-biodegradable materials in coffins and in vaults. Conventional cemeteries also must be maintained every time through landscaping and consuming water, contributing to their ecological footprint. Consequently, alternative burial practices have emerged, including natural burials, composting, and biodegradable caskets, all meant to support environmentally sustainable practices (Clayden et al., 2018).



## Eco-Friendly Alternatives

- Human Composting
- Aquamation
- Green Burial
- Promession
- Mushroom Burial Suits
- Eternal Reefs
- Body Donation



### New Burial Methods: Eco-Friendly Alternatives to Traditional Burial

Alternative or green burial has emerged out of increasing concerns regarding environmental sustainability as well as land use. It is one such kind of burial in addition to human composting or natural organic reduction, aquamation, green burials, and so on. All forms pursue the cause of aiming burial practices at environmental conservation and sustainability.

Eco-Friendly Alternatives to Traditional Burial

1.

Human Composting (Natural Organic Reduction)

Human composting or natural organic reduction (NOR) is a new way of treating remains from an environmentally sustainable view, converting the human body into soil enriched with nutrients. The process accelerates natural decomposition within a controlled process that mimics natural organic breakdown. Increasingly, its validity as an option alternatives to traditional burial has come to the forefront due to its important benefits for the ecology.



The Process of Human Composting

The body of the deceased is placed inside a receptacle specially designed and filled with organic materials such as wood chips, straw, and alfalfa. This creates an optimum environment for the decomposition of the body by microorganisms and beneficial bacteria. The system is carefully monitored in terms of temperature, moisture content, and flow of oxygen to ensure complete decomposition while avoiding any odor or contamination (Rothstein & Staudt, 2021).

The body is left for aerobic decomposition by microorganisms and bacteria for about 30- to 45-day duration. That is, soft tissues will naturally break down into soil, and remaining bones will then be reduced mechanically into fine fragments and mixed with the composted material. The end product is a nutrient-rich soil amendment that can be returned for the family or used in conservation and land restoration projects (McClymont & Sennett, 2021).

Environmental Benefits of Human Composting

Human composting is significantly better than standard practices of burial and cremation from an environmental perspective. Unlike traditional burial, which comprises embalming chemicals, caskets, and concrete vaults, human composting allows a natural return to the soil without harmful additives (Kok, 2011). The process also produces far fewer carbon emissions than cremation, which spews its greenhouse gases and other pollutants such as mercury from dental fillings into the atmospheres (Robinson, 2021).

Another aspect of human composting concerns soil regeneration. The composted material can serve to enrich soils, grow trees, and ultimately facilitate re-greening efforts. This sustainable practice fosters efforts in ecological conservation and considerable meaning to an individual for providing back to earth at the end of life (Clayden et al., 2018).

Legal and Sociocultural Acceptance

Human composting was legalized in Washington State in 2019 and, thus, has been slowly gaining acceptance in other states of the U.S. and is experimenting in some parts of Europe. More and more, as societies beginning to recognize ecological concerns, alternative methods of burial such as human-embedded composting are considered feasible and ethical options

for end-of-life management (Allam, 2019). Views on this practice relate to what religions and cultures say about other body disposal techniques; some faiths are at odds regarding how this practice blends with spiritual beliefs about what happens to the body after death (Rae, 2021).

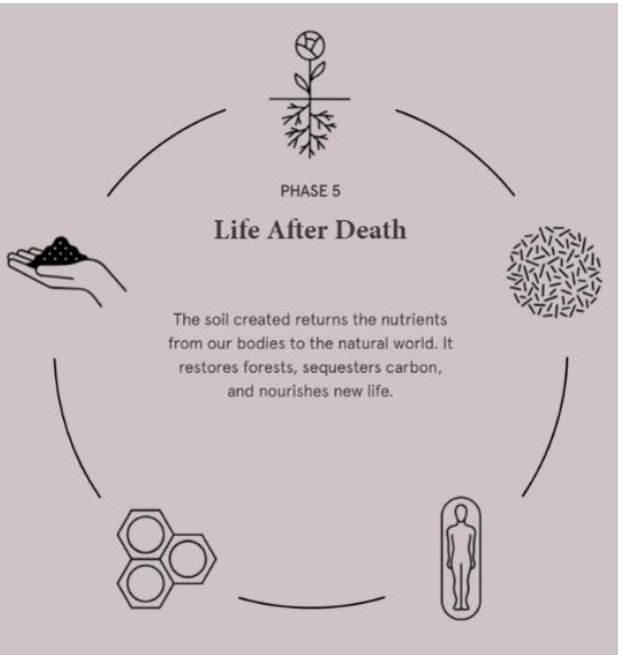
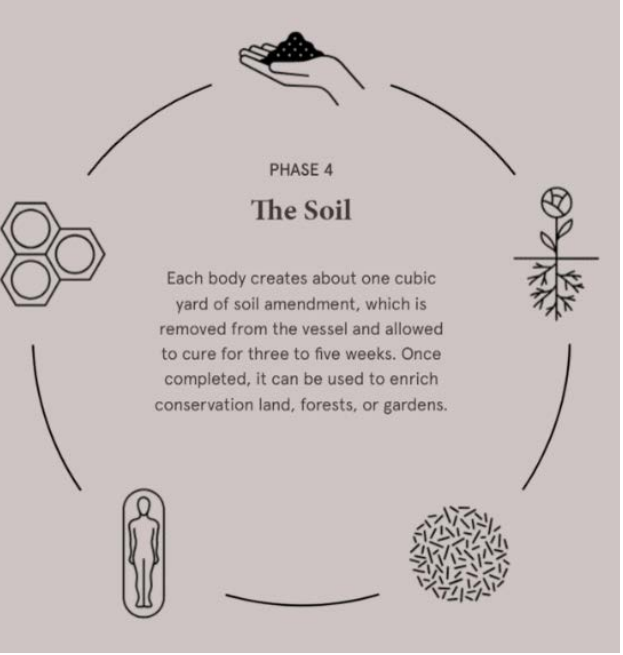
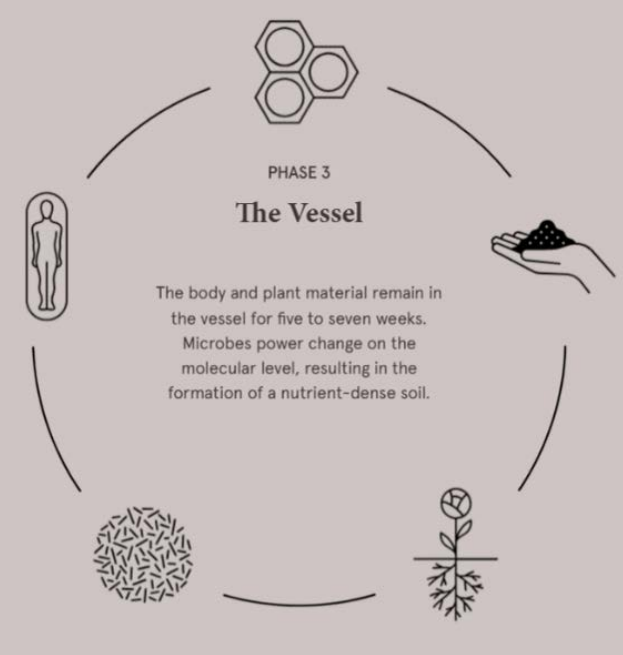
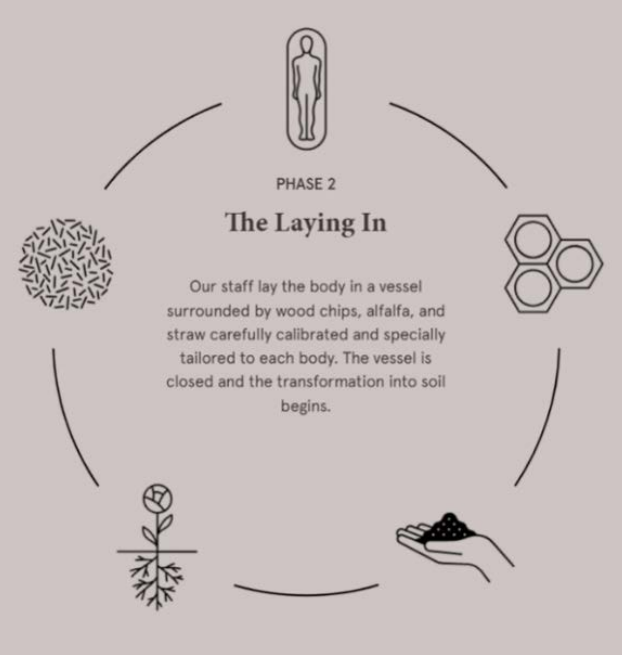
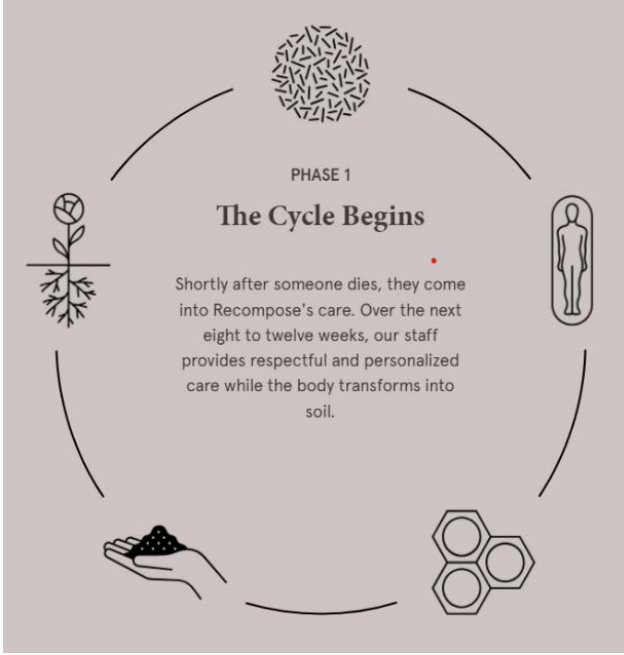
Challenges and Considerations

Despite its advantages, human composting still faces obstacles in the regulation and logistics required to implement such a process. Implementing this process requires complex constitutional amendments to national funerary legislations, meaning that legal access remains highly restricted globally depending on the specific country’s jurisdiction. Moreover, ethical and emotional issues arise because families will need time to accept the idea of transforming their beloved into compost rather than allowing burial or cremation (Nordh & Evensen, 2017).

Therefore, human composting has radically brought innovative changes in burial practices, presenting an eco-friendly sustainable alternative to the conventional burial method. It reduces environmental impact, enhances soil health, and conserves land resources, and thus, fits well with the current ecological and ethical values. As legislation changes, it will move human composure more into the mainstream for death care and design of cemeteries through action.



Human Composting Phases





## 2.

### Aquamation (Alkaline Hydrolysis)

Aquamation, or alkaline hydrolysis, or water cremation, is also an eco-friendly alternative to traditional cremation and burial. This process utilizes water, heat, and alkaline chemicals to hasten a body’s natural decomposition, thereby mimicking biological decay but in an drastically shorter time frame. Aquamation’s allures stem from its being low-impact on the environment and having significant potential for reducing the carbon footprint involved in conventional funeral practices.



### Aquamation Process

The technique consists of placing the body into a specially-designed stainless-steel chamber that contains a solution of water and potassium hydroxide or sodium hydroxide. The chamber is then elevated to a temperature of approximately 160 degrees Celcius (320 degrees Fahrenheit) and pressurized to prevent boiling, at which point the acute condition initiates the alkaline hydrolysis process within the body, culminating in a breakdown of soft tissues into chemical components after approximately 4 to 8 hours of treatment (Robinson, 2021).

Ultimately, there are only the bones left, along with a sterile liquid solution containing amino acids, peptides, salts, and sugars. The bones are then dried and processed into a fine white powder, which is almost indistinguishable from cremated ashes and could be returned to the family. The liquid remaining is freed from any harmful or other substances such as those found in chemotherapy and eventually released safely into the environment or for agricultural purposes.

### Environmental Benefits of Aquamation

The reasons that aquamation could serve as a very highly sustainable alternative for fire-based cremation or conventional burial are:

- **Reduced Emissions:** Unlike conventional cremation, which burns fossil fuels: releasing carbon dioxide, aquamation does not employ combustion that greatly reduces the emissions of greenhouse gases (McClymont & Sinnett, 2021).
- **Energy Efficient:** Aquamation consumes about 90% energy compared to flame-based cremation, making it a sustainable option (Rae, 2021).
- **No Air Pollution:** The process does not release toxic pollutants such as mercury from dental fillings, which is a major concern with traditional cremation (Allam, 2019).
- **Minimal Land:** Aquamation consumption is decreased due to no need for burial plots, embalming chemicals, or caskets; this clearly reduces land consumption and environmental burden associated with cemetery maintenance (Clayden et al., 2018).

### Legal and Cultural Acceptance

Aquamation is becoming an increasingly promising alternative to burial and cremation; however, its legal acceptance differs in regions. The process has become legal in some U.S. states and some provinces in Canada, while in others, it is still looking into regulations pertaining to this procedure. European countries, though, have seen aquamation enter in some such as the U.K. and the Netherlands, where demand for environmental concerns has promoted green funerals (Nordh & Evensen, 2017).

Diverse cultural and religious views characterize aquamation. There has been resistance to liquefying remains among some religious traditions that embody the sanctity of the body after death. On the other hand, some, especially those with strong environmental values, consider aquamation ethical and respectful in the disposition of bodies (Rothstein & Staudt, 2021).

### Challenges and Considerations

Although this is some of the advantages that aquamation has, it also bears some setbacks in making it desirable by majorities: **Limited Availability:** This process needs specialized facilities and equipment, which in many parts of the world, are still lacking.

**Regulatory Hurdles.** Although aquamation is not yet legally prohibited in many countries, there is no clear legal framework upon which many governments built their concept of aquamation, thereby delaying its acceptance and integration into the mainstream funeral services.  
**Public Awareness and Acceptance:** Because aquamation is new, many people know little about it and may not be persuaded to use it over more traditional options (Priestley, 2020).

A promising step toward sustainable burial practices, aquamation offers an alternative to cremation and burial that has low environmental impact. As awareness about climate change and resource conservation increases, aquamation may become common practice, thus changing modern funeral practices in an ecologically aware world. With expansion of legal recognition and evolution of societal attitudes, this method will play a key role in the redesign of cemetery and death care.





### 3.

#### Green Burial

Green burial (natural burial) represents an eco-friendly option to traditional burial and cremation. It allows for the natural decomposition of the body without the use of chemical preservatives, non-biodegradable coffin materials, or concrete vaults, permitting the body to return to the earth, as far as possible, in its natural state. As societies become more environmentally conscious, interest in minimizing the ecological footprint of traditional funeral rites has increased the popularity of green burials (McClymont & Sinnett, 2021).

#### Principles of Green Burials

The distinguishing features of green burials from old burial practices are guided by some principles:

- **No Embalming Chemicals:** Traditional embalming involves the use of formaldehyde and other toxic chemicals that can leach into the soil and groundwater, whereas green burials avoid it, thereby allowing natural decomposition of the body (Rothstein & Staudt, 2021).
- **Biodegradable Materials:** The body is buried in biodegradable caskets, shrouds, or urns made from materials like wicker, untreated wood, cardboard, or organic cloth. Some green burial sites also permit direct earth burials without a container (Clayden et al., 2018).
- **No Concrete Vaults or Liners:** Neutral burial and green burial environments avoid the use of vaults/ liners, thus allowing the body to decompose thoroughly. On the contrary, traditional burial environments inhibit natural decomposition (Nordh & Evensen, 2017).

- **Minimal Land Disturbance:** Many green cemeteries use native vegetation and minimize landscaping to limit environmental disturbance and promote biodiversity (Rae, 2021).



#### Environmental Benefits of Green Burials

Green burials offer multiple environmental benefits over traditional burial and cremation:

- **Preservation of Natural Landscapes:** Most green cemeteries are seen as areas for conservation, wherein burial plots also function as protected spaces that can preserve local ecosystems (McClymont & Sinnett, 2021).
- **Reduced Carbon Footprint:** On one hand, several pollutants and carbon dioxide are released during cremation; hence, green burials avoid such pollution by not necessitating fossil-fuel-intensive processes, making them ecologically sane (Allam, 2019).
- **Soil and Water Conservation:** As stated earlier, an environmentally friendly burial avoids embalming pollutants and concrete vaults, thus protecting soil from contamination and enabling nutrient absorption from decaying remains, thereby enriching the ambient environment (Clayden et al., 2018).

#### Challenges and Considerations

Although green burial has many advantages, there remain several challenges to its widespread acceptance:

- **Limited Availability:** Green cemeteries are not yet widely distributed, thus restricting access to certain areas (Allam, 2019).
- **Regulatory Barriers:** In certain jurisdictions, embalming or burial vaults are required by law, thus restricting green burial options (Robinson, 2021).
- **Public Awareness and Perception:** Green burials remain unfamiliar to numerous people, some of whom may shy away from them in favor of the more conventional due to cultural and religious diversity (McClymont & Sinnett, 2021).

Green burial represents an ecologically responsible approach to death care based on sustainability, natural decomposition, and land conservation. While other green burial ideals become potentially attractable to grow into a viable death option with growing environmental awareness, it will further cement the meaningfulness of green burials and their association with nature. With continuous advocacy and the establishment of legislative redress, green burial would take center stage as a competing model to traditional cemetery designs, thereby transforming the societal perspective on death and memorialization.

## 4.

### Promession (Freeze-Drying Burial)

Demonstrably the first innovative and eco-friendly form of burial developed in Sweden, promession, undergoes the process of converting the body to a brittle form using liquid nitrogen for freeze drying. The body is vibrated to convert it into small organic particles, dehydrated, and placed in a biodegradable coffin for natural soil decomposition (McClymont & Sinnett, 2021).

Advantages to the Environment:

- Free of poisonous emissions: Promession is not like cremation, where harmful pollutants are sent to the atmosphere.
- Fast decomposition: In shallow graves, the remains can decompose quite rapidly, enriching the soil, and not leaching harmful chemicals.
- Land impact: The procedure favors integration with the earth forges into existence limited green spaces (Allam, 2019).
- promote biodiversity (Rae, 2021).



## 5.

### Mushroom Burial Suits

A mushroom burial suit is a form of environmentally-friendly attire with fungal spores to benefit decomposition in the corpse. This process treats the body with detoxifying body material and adds to the neighbouring nutrient content, recognising the natural role fungi play in breaking down organic matter. What this is all about has been popularized by the artist, Jae Rhim Lee, as an attempt to reduce heavy metals and toxins accumulated in the soil (Clayden et al., 2018).

Environmental Benefits:

- Detoxification: Mushrooms intervene to neutralize body toxins so they cannot be released into the soil.
- Marginal environmental footprint: No embalming or vaults or other non-biodegradable materials are used.
- Nutrient recycling: A human being turns into fertile soil and enriches the ecosystem with human remains (Nordh & Evensen, 2017).







# 6.

## Eternal Reefs (Reef Ball Burial)

Eternal Reefs is a unique burial format that includes the remains of the deceased individuals mixed with the artificial reef structures, which are then released into the ocean for marine life. This burial format is especially attractive for strong advocates of ocean conservation because it actively participates in restoring coral reefs and improving underwater ecosystems (Rothstein & Staudt, 2021).

### Environmental Benefits:

- Marine habitat restoration: Reef balls are home to many fishes and other marine organisms.
- Liberated land: Unlike traditional burials, this does not enter into the use of land for cemetery space.
- Sustainable memorialization: Living legacies are visited and supervised by families that visit and supervise reef structures (Robinson, 2021).



# 7.

## Body Donation for Research and Save Science

This is a non-traditional alternative-burial practice that self borrows from death. A whole body may actually be donated at different schools and institutions. They then use this for educational as well as for research purposes. Body donation to such programs occurs at numerous institutions, such as the Body Farm in the United States, in which such bodies are used for forensic anthropology studies and as such provide strides in developing forensic science and ramifications for criminal investigations (Rae, 2021).

Educationally beneficial: Contributes toward training medical and forensic professionals.

Efficient environmentally: No resources are used for burial.

Cost effective: It does not cost money. Most programs associated with body donation cover the costs for transporting and handling the body. Thus, relieving families of much of the financial burden.

Because society is more focused on sustainable solutions and personalizing methods of disposal, alternative disposal sites are drawing more following. Each of these options has a meaning considering environmental, cultural, and ethical aspects, allowing a person to choose a method which falls inline with his or her values. As consciousness will increase and legislation adapt, these alternatives will be the future option actually to reduce ecological footprints while providing highly meaningful ways to honor the deceased.

## Comparative Analysis Burial Method; Human Composting as an Alternative

- CO2 emission
- land consumption
- eutrophication & water pollution
- sustainability

3



### Comparative Environmental Impact of Burial Methods

As societies move toward more sustainable funerary practices, it is essential to assess the environmental impacts of different burial methods. This section compares global warming potential (CO<sub>2</sub> emissions), land consumption, and eutrophication index for regular burial, cremation, green burial, and human composting (Natural Organic Reduction - NOR).



Comparative Environmental Impact of Burial Methods

Global Warming Potential (CO<sub>2</sub> Emissions) in Burial Practices

The attention given to the environmental impacts of funerary practices has been growing since concerns for climate change have arisen. Global warming potential (GWP) as one of the major determinants of ecological footprint imposed by burial processes is mostly assumed in CO<sub>2</sub> emissions. Each burial option, whether traditional, cremation, green burial, or human composting (Natural Organic Reduction, NOR), has a different amount of greenhouse gas emissions due to its energy consumption, material inputs, and decomposition processes.

Traditional burial methods were thought to contribute considerably towards carbon emissions. This scenario arose as a combination of coffin production, embalming, maintenance of the cemetery, and carbon sequestration through land occupation over an extended period. Coffins manufactured chiefly from hardwood or metals (or sometimes synthetic) are labour-intensive. The incorporated carbon cost of production and transportation could be put at about 50-100 kg of CO<sub>2</sub> emissions for each burial (Priestley, 2020). Besides, embalming fluids most frequently involve a mixture with formaldehyde, methanol, and ethanol, making them serious industrial synthesis avenues which itself heaps additional carbon emission into the coffin production system. Another long-term burden due to environmental issues is posed because of the prolonged maintenance of the cemeteries, where mowing, irrigating, and fertilizer usage contribute indirect emissions for years in the process.

Cremation, on the other hand, has enormous carbon emissions due to the massive energy consumption involved in the incineration of a human body and is often seen as a space-efficient alternative. Incineration is performed at temperature levels of 760-980°C, typically using fossil fuels such as na-

tural gas. Each cremation emits about 160-200 kg of CO<sub>2</sub> (Robinson, 2021). This is three-fold emissions of a typical burial. It should also be noted that the process contributes to the release of toxic pollutants-mercury from dental fillings, dioxins, nitrogen oxides, etc. which add to polluting the air and further exacerbate climate change. Though some of these emissions are captured by a modern-day filtration system, no doubt it shall go down as one of the least environmentally friendly options with respect to carbon output.

Green burials, on the other hand, do immensely lower carbon emissions by not using non-degradable coffins, embalming chemicals, or spending intensive amounts of land in maintenance. The body would then be buried in either a biodegradable shroud or casket, allowing for very little environmental impact through natural decomposition. Under this scheme, carbon emissions were primarily transportation and minor material production, taking about only 10-20 kg of CO<sub>2</sub> emissions for each burial (Nordh & Even- sen, 2018). These green cemeteries, unlike the traditional ones, are often set inside natural areas of conservation, thus stopping carbon emission wash-off from lawn nature maintenance and essentially restoring the earth back to her former natural state.

Currently, human composting (Natural Organic Reduction - NOR) is the most eco-friendly alternative with the lowest carbon footprint of any funeral alternative. The body is placed in an organic medium with wood chips, straw, and alfalfa, where decomposition is accelerated by the action of microbes under well-controlled conditions. This system thus encourages aerobic decomposition and prevents the formation of methane that occurs during anaerobic decomposition (which is a problem with traditional

burial). Human composting has been shown to generate around 15-20 kg of CO<sub>2</sub> emissions per body, approximately 1/8 that of cremation (Roth-stein & Staudt, 2021). Besides, the compost produced enhances the earth, hence providing an ecological return rather than contributing to the greenhouse gas regime.

The research findings suggested that, while cremation and traditional burial are among the most carbon-intensive burial options, green burial and composting offer a far more sustainable and climate-aware option. As society becomes increasingly aware of the adverse impact of burial practice on the environment, the shift towards least carbon-interactive, green alternatives for funerals has now become a key tenet of sustainable development.

Comparative Global Warming Potential (CO<sub>2</sub> Emissions) of the Burial Methods

| Burial Method      | CO <sub>2</sub> Emissions per Body | Primary Sources of Emissions                                               |
|--------------------|------------------------------------|----------------------------------------------------------------------------|
| Traditional Burial | 50 - 100 kg CO <sub>2</sub>        | Coffin production, embalming chemicals, cemetery maintenance               |
| Cremation          | 160 - 200 kg CO <sub>2</sub>       | High-temperature fossil fuel combustion, air pollutants (mercury, dioxins) |
| Green Burial       | 10 - 20 kg CO <sub>2</sub>         | Minimal emissions from biodegradable materials and transport               |
| Composting (NOR)   | ~ 15 - 20 kg CO <sub>2</sub>       | Controlled aerobic decomposition, negligible fossil fuel use               |



Space Consumption on Land in Burial Practices

Land use evaluation becomes particularly significant in assessing environmental impacts of burial methods. The areas occupied by cemeteries seem to occupy large tracts of land perpetually and cause constrained urban spaces and land-use conflicts. With growing populations and continuing urban expansion, the need has become increasingly obvious for sustainable alternatives to traditional burial. All methods of burial-traditional burial, cremation, green burial and human composting (Natural Organic Reduction, NOR)-have different spatial footprints such that they impact land consumption differently.

Traditional burials will require designated cemetery plots, which generally carry about casket, gravestone, and sometimes additional infrastructure, including pathways, irrigation systems, and landscaping. The usual burial area allocated to one grave in Europe is from 2.5 to 3.5 square meters (McClymont & Sinnett, 2021). Currently, there’s increasing demand for burial space, forcing many urban cemeteries into land scarcity. For instance, highly populated cities like London, Paris, or Berlin are crowded and thus full of cemeteries, making it possible for governments to think about allowing grave reuse policies for some or alternative solutions to burial. In Germany and the Netherlands, for instance, burial plots are leased for a set period, usually between 20-30 years, after which remains may be exhumed or moved to new graves (Priestley, 2020). On the contrary, in situ permanent rights are held (like in the United States) on burial space, rendering other uses of the land progressively less available and resulting in evergreen planning issues for the urban planning department.

It has greatly reduced the spatial footprint of burial sites, eliminating the need for full burial plots. Most times, the cremated remains may be put in

columbaria (urn storage structures), scattered in the natural environment, or, maybe kept in private home. Lead to about 0.25 square meters around each urn, making it more possible for high-density storage than traditional burials (Robinson, 2021). However, though not requiring dedicated cemetery land, a crematorium still requires space, mostly built in relatively remote areas outside the city. Furthermore, in many countries, the scattering of ash in protected environments is highly regulated, restrictive on this option.

Unlike conventional burials, green burials act as much more space-efficient and environmentally friendly alternatives to conventional burials. Because of the fact that no concrete vaults or elaborate headstones are being used and no embalming fluids are applied to the body, green cemeteries behave more like natural conservation areas rather than heavily structured graveyards. Green cemetery burial plots often exceed the conventional grave-sized area (approximately 3 to 4 square meters) to allow burial in such a way as to foster more fermentative decomposition with little disturbance of the soil (Nordh & Evensen, 2018). However, unlike the traditional cemetery, these sites are multi-purpose spaces that have walking paths, wildlife habitat areas, and recreational areas, allowing such spaces to contribute to biodiversity and ecosystem services, rather than land consumption for human remains.

Human composting (Natural Organic Reduction - NOR) is actually the most space-efficient burial method, requiring much less land than other traditional burial and green burial methods. A single composting facility processes a series of bodies in a vertical or modular manner, allowing for very high-density use of available space. A composting unit typically requires

an initial processing area of about 3-4 square meters per body, but, since organic remains can be processed into usable compost within 30-60 days, this area is continually put into use for new individuals (Rothstein & Staudt, 2021). Unlike traditional burials, where land is held permanently, NOR allows multiple repurposing of burial sites, thus eradicating long-term shortages of space. In addition, it can be used for soil restoration and tree planting or can be returned to families, further minimizing land occupation.

As such, the study has shown that while traditional burial occupies the most land, cremation, green burial, and composting provide more sustainable and less space-consuming options. With growing urban competition for land, we must rethink burial practices to avoid wasteful land use while respecting cultural traditions and personal choices.

| Comparison of land consumptions across burial methods |                                            |                                                                                         |
|-------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------------|
| Burial Method                                         | Land Consumption per Body                  | Land Use Consideration                                                                  |
| Traditional Burial                                    | 2.5 - 3.5 m² (permanent use)               | Long-term land occupation, urban space shortages, grave reuse policies in some regions  |
| Cremation                                             | 0.25 m² (columbarium) or none if scattered | Minimal land use but requires crematorium space and has scattering regulations          |
| Green Burial                                          | 3 - 4 m²                                   | Used as conservation space, supports biodiversity, avoids embalming and concrete vaults |
| Composting (NOR)                                      | 3 - 4 m² (temporary use, then reused)      | Space-efficient, facility-based, land continuously available for new burials            |





Eutrophication and Water Pollution from Burial Practices

Eutrophication and water pollution are critical environmental concerns in assessing different burial practices. The decomposition of human remains, together with burial-related materials and chemicals, can pollute watersheds by leaching nutrients, toxins, and other contaminants into groundwater and surface water systems. Such contamination can exacerbate the eutrophication process, whereby excessive nutrient loads—mainly nitrogen and phosphorus—lead to the overgrowth of aquatic plants and algae. These processes deplete oxygen in the water and are detrimental to aquatic life. The extent of this impact varies widely with burial practices, with traditional burials presenting the highest risk, whereas alternatives such as human composting (Natural Organic Reduction, NOR) or green burials are designed to ameliorate these problems.

**Traditional Burial: Groundwater Contamination and Nutrient Runoff**  
Conventional burial has long been associated with groundwater contamination due to embalming fluids, caskets, and burial vaults. Embalming fluids that contain formaldehyde, methanol, and phenol leach to the soil over time, posing risks to aquatic organisms and human health in the event of infiltrating drinking-water sources (Rae, 2021). The high density of burials in certain cemeteries could create zones of chemical concentration, specifically in porous soils or high water table settings (McClymont & Sinnett, 2021).

In addition to embalming chemicals, organic matter, nitrogen, and phosphorus are released through the natural decay of human remains into the soil. In cemeteries located near wetlands or rivers and lakes, these can cause nutrient overloads leading to excessive algal blooms possibly de-

pleting oxygen and destabilizing the aquatic ecosystem. These highly nutrient-laden decomposition fluids coupled with rainwater infiltration can channel these pollutants into the local waterways and increase the potential risks for eutrophication.

The very materials used in coffins and burial vaults worsen the situation. The majority of modern caskets degrade over time, releasing toxic materials and heavy metals like lead, copper, and zinc as metals, varnished wood, and synthetic fabric. Concrete burial vaults, designed to prevent ground collapse, degrade slowly and hinder natural water infiltration, which can interfere with hydrological patterns and, thus, may negatively impact surface runoff (Clayden et al., 2018).

**Cremation: Indirect Water Pollution via Airborne Contaminants**  
Although cremation does not directly affect groundwater contamination, it has indirect water pollution effects with airborne contaminants, which eventually settle in water bodies. Crematoria emit mercury from dental fillings, dioxins, sulfur dioxide, and nitrogen oxides, thereby aiding in the formation of acid rain and water acidification (Robinson, 2021). Mercury emissions will bioaccumulate in aquatic ecosystems with long-term risk to ecological integrity and human health via fish and other organisms.

Water cooling systems are often enforced in cremation facilities. Lesser but still significant for other industrial processes, this somewhat further increases the total water footprint of cremation and could augment issues of local water scarcity in regions experiencing drought.

**Green Burial: Minimal Contamination Possibility but Nutrient Leaching Possibility**  
The use of embalming chemicals and non-biodegradable caskets in green burials leads to dramatically reduced risks of groundwater contamination. Bodies are buried in biodegradable grave clothes or untreated wooden coffins so that they can be allowed to decompose naturally without synthetic pollutants. In stark contrast to traditional burials that rely on concrete vaults, green burials facilitate the infiltration of water through the soil, thus helping to maintain natural hydrological cycles and avoid water logging.

But still, in green burials, decomposition of organic matter will toy with the release of nitrogen and phosphorus to the soils. If poorly managed, green cemeteries with a high density of burials have the potential for nutrient runoff into adjoining water bodies and localized eutrophication (Nordh & Evensen, 2017). To mitigate this, green cemeteries utilize vegetative buffers and wetland filtration systems aiming at absorbing the excess nutrients before reaching the surface water courses.

**Composting (Natural Organic Reduction - NOR): Least Effect to Water Pollution**  
Human composting, or Natural Organic Reduction (NOR) has been created so that water contamination does not occur through a controlled and contained process of decomposition. In NOR facilities, human remains are placed in aerated vessels with organic materials like wood chips and straw, where the microbial process of decomposition carries on under conditions that prevent harmful leachate from being produced (Rothstein & Staudt, 2021).

In contrast to the traditional and green burial perspectives, within which the decomposition fluids can seep through into the soil and migrate to groundwater, composting takes place within sealed containers. This circumvents any potential for water contamination or leaching. Composting also includes ensuring that the final finished composting material is pathogen-tested and heavy metal-tested for environmental safety before being utilized in any reforestation, soil restoration, or conservation intervention projects. Furthermore, the composting process locks those nutrients in a beneficial form, converting them to stable organic matter that enriches the soil rather than contributing to water pollution. By sequestering carbon and stopping nitrogen runoff, NOR is the environmentally most competent process as compared to old ways of burial and cremation.

Conventional burial is considered to pose the highest risk of water pollution as a result of embalming chemicals, nutrient leaching, and heavy metal runoff from caskets. Cremation, less environmentally dangerous but still indirect, harms water bodies through mercury emissions as well as acid rain effects. With proper site management to avoid localized eutrophication, green burial really helps minimize pollution. In this regard, composting (NOR) seems to be the best option since it avoids any risk of

groundwater contamination and yields a useful soil amendment.

With deepening concerns over water quality and ecosystem health, moving toward well-regulated, sustainable burial options such as human composting and green burials can possibly save the environment, while at the same time, treating human remains and cultural practices with esteem and respect.

Comparison of Eutrophication & Water Pollution Across Burial Methods

| Burial Method      | Risk of Groundwater Contamination                                 | Potential for Eutrophication                      | Land Use Consideration                          |
|--------------------|-------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------|
| Traditional Burial | High (formaldehyde, heavy metals, casket varnishes)               | Moderate to High (nitrate and phosphate leaching) | Grave reuse policies, natural buffers           |
| Cremation          | Low direct impact, but contributes to acid rain                   | Minimal                                           | Emission filtration in crematoria               |
| Green Burial       | Minimal (no embalming chemicals, but nutrient runoff is possible) | Moderate (depending on burial density)            | Vegetative buffers, controlled site selection   |
| Composting (NOR)   | None (sealed composting system prevents runoff)                   | None                                              | Pathogen testing, composting vessel containment |

Conclusion

The Most Sustainable Burial Method

The environmental concerns of traditional funeral practices are now starkly apparent with the need of attention toward more sustainable burial alternatives finding a place in our consciousness. The choice of burial method is no longer just a cultural or religious issue; it is now an ecological issue with consequences for land use, carbon emissions, and water pollution. By con-

trasting various burial methods-traditional burial, cremation, green burial, and human composting (Natural Organic Reduction, NOR)-it is clear that human composting is by far the most sustainable answer to the pressing environmental concerns while still treating human remains in an ethical and dignified manner.

Comparison of Burial Methods in Terms of Sustainability

| Burial Method      | Carbon emission | Land Use | Water Pollution & Eutrophication | Land Use                 |
|--------------------|-----------------|----------|----------------------------------|--------------------------|
| Traditional Burial | High            | High     | High                             | Least Sustainable        |
| Cremation          | Very high       | Minimal  | Moderate                         | Moderately Unsustainable |
| Green Burial       | Low             | Moderate | Moderate                         | Sustainable              |
| Composting (NOR)   | Very low        | Minimal  | None                             | Most Sustainable         |



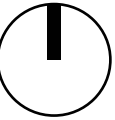
## Study Area; Cimitero Parco di Torino

- Territorial framework
- History of Turin
- History of parco Cimitero
- Why Human Composting?



Piedmont

Province and Borders



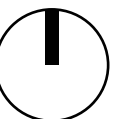
Piedmont, located in northwest Italy, is the country's second-largest region and a critical gateway to Europe, with Turin as its capital. It borders Switzerland to the north and France to the west, sharing regional borders with several other Italian regions: Valle d'Aosta and Lombardy to the north and east, Emilia-Romagna to the southeast, and Liguria to the south. Its strategic position at the foot of the Alps has made Piedmont a historic hub for industry, culture, and cross-border trade. Its provinces include Ales-sandria, Asti, Biella, Cuneo, Novara, Ver-bano-Cusio-Ossola, Vercelli, and the Metropolitan City of Turin.

Piedmont's highly developed infrastructure connects it internally and with neighboring European markets. Major highways, such as the A4 (connecting Turin to Milan, Venice, and Trieste) and the A6 (connecting to the Ligurian coast), facilitate rapid transport. The extensive railway network, including high-speed lines connecting Turin to Milan, Lyon, and Paris, makes intercity travel efficient and accessible. The region also boasts significant cultural landscapes, including the vineyard hills of Langhe-Roero and Monfer-rato, and alpine corridors that offer scenic routes for international transit and tourism.



Province of Turin

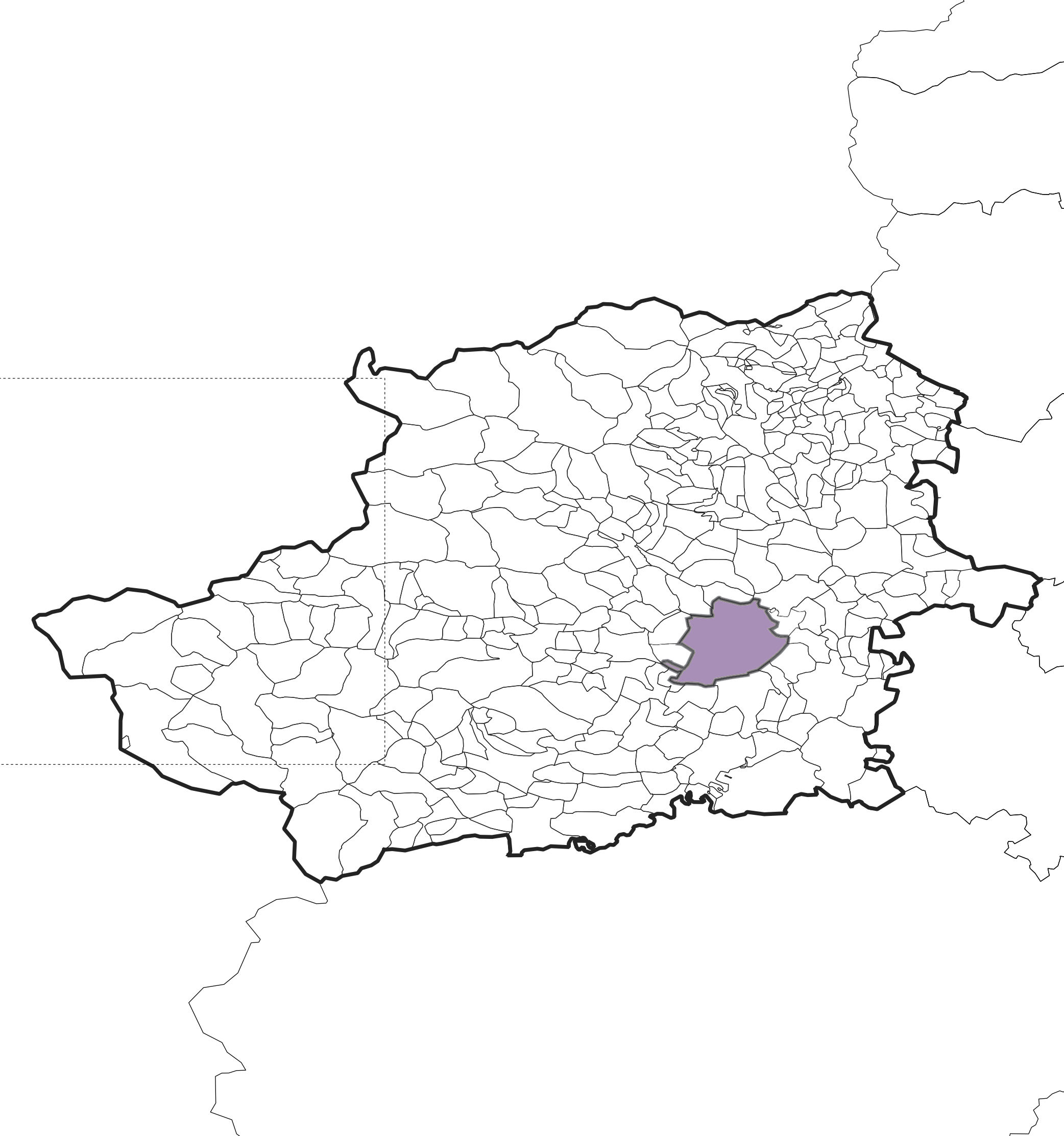
Municipality and Borders



Turin (Torino) is situated in the northwest of Italy and serves as the capital of the Piedmont region. The city is geographically defined by its location at the foot of the western Alps and its position on the banks of the Po River, near its confluence with the Stura di Lanzo, Sangone, and Dora Riparia rivers. This strategic river-front positioning has historically established the city as a primary center for trade and military defense between the Italian peninsula and Northern Europe.

The Metropolitan City of Turin covers an area of approximately 6,829 km², making it one of the largest provincial-level entities in Italy. It is composed of 312 municipalities (comuni), reflecting a complex urban and rural fabric that transitions from a dense industrial core to agricultural plains and high-mountain alpine valleys.

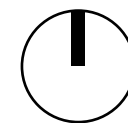
Modern Turin is a vital node in the Trans-European Transport Network (TEN-T). It is connected by major motorways—primarily the A4 (Turin-Trieste) and the A6 (Turin-Savona)—and serves as a hub for high-speed rail lines linking Italy to Lyon and Paris. This infrastructure ensures the city's continued relevance as a global industrial leader, particularly in the automotive and aerospace sectors, while maintaining high accessibility for its 2.2 million residents.





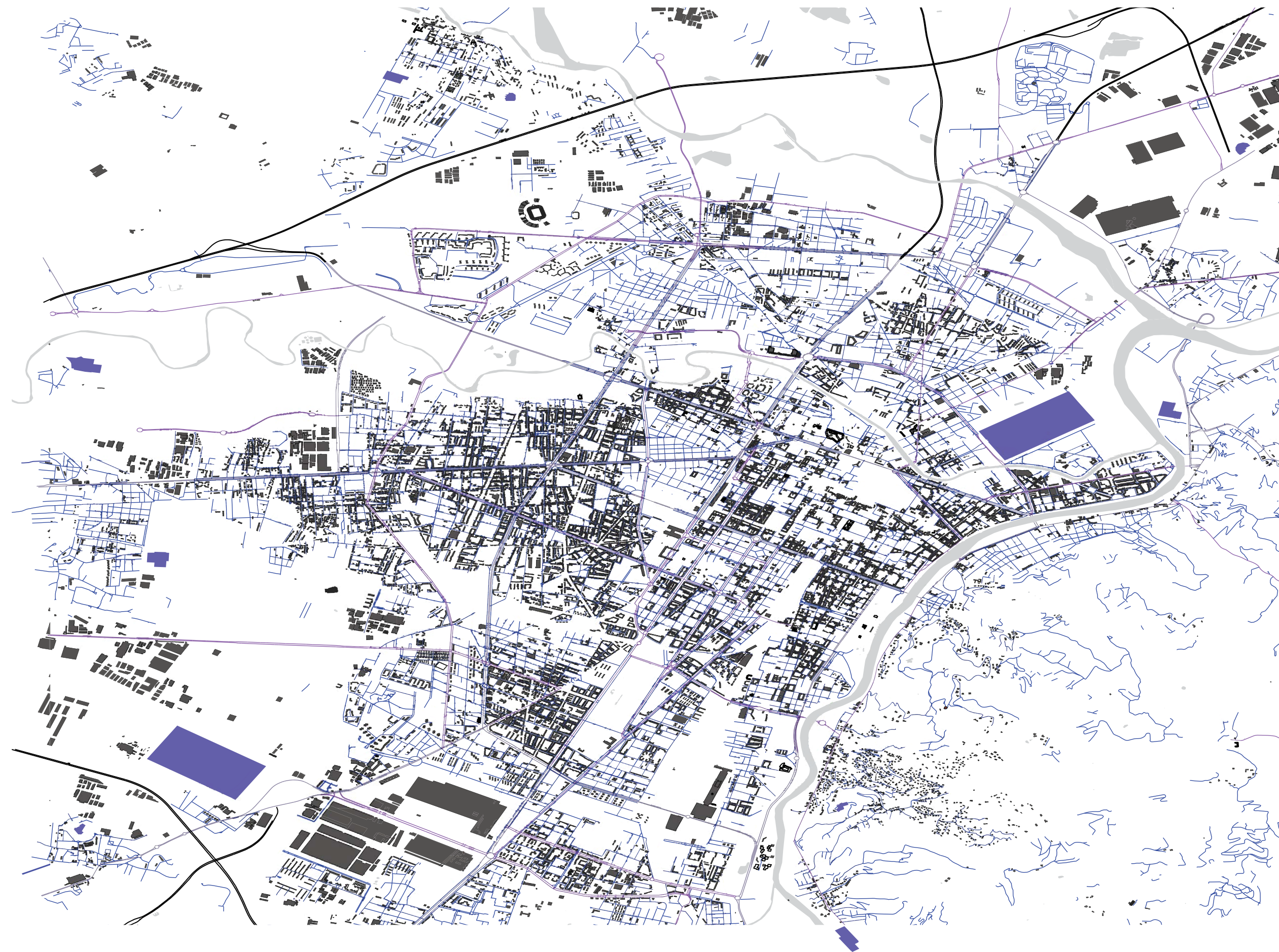
## Ground Drawings

### Building and Roads



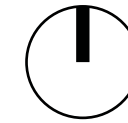
- Highway
- Primary Street
- Secondary Street
- Residential Street
- Buildings
- River
- Cemetery

0 500 1500 2500 m



## Urban Pattern

### Current Situation



Transportation



buildings



Green Areas

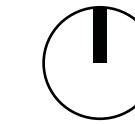


- Highway
- Primary Street
- Secondary Street
- Residential Street
- Buildings
- River

0 500 1500 2500 m

## Urban Aspect

### Circulation and buildings

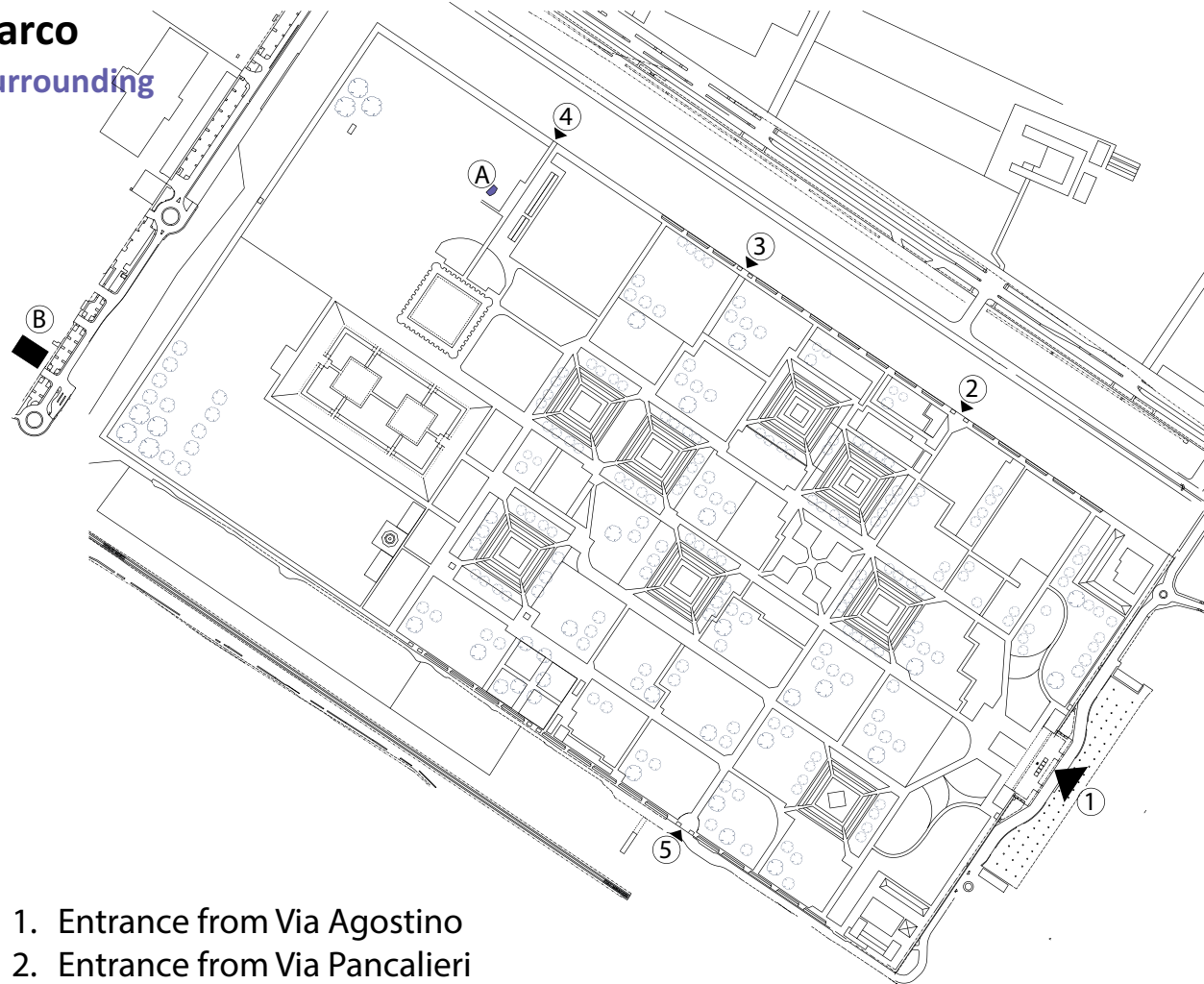
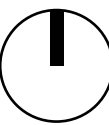


## Area A Close UP

The Cimitero Parco is a large 72-hectare urban space in southern Turin, defined by a strict 600 times 1200 meter rectangular shape. Designed in the late 1950s as a modern cemetery park, it integrates burial areas into a wide, green landscape instead of a crowded city cemetery. The site's current setting is shaped by several big objects that define the industrial scale of the area. Directly to the South-East is a primary landmark, the Stellantis Mirafiori Factory, a massive industrial complex that represents Turin's manufacturing history. To the South-West, the territory is used by the Cascina Barbera logistics zone and the Interporto SITO, which act as an industrial buffer along the city's edge. To the North-West, the horizon is dominated by the TRM Waste-to-Energy Plant, another major industrial protagonist in the landscape.

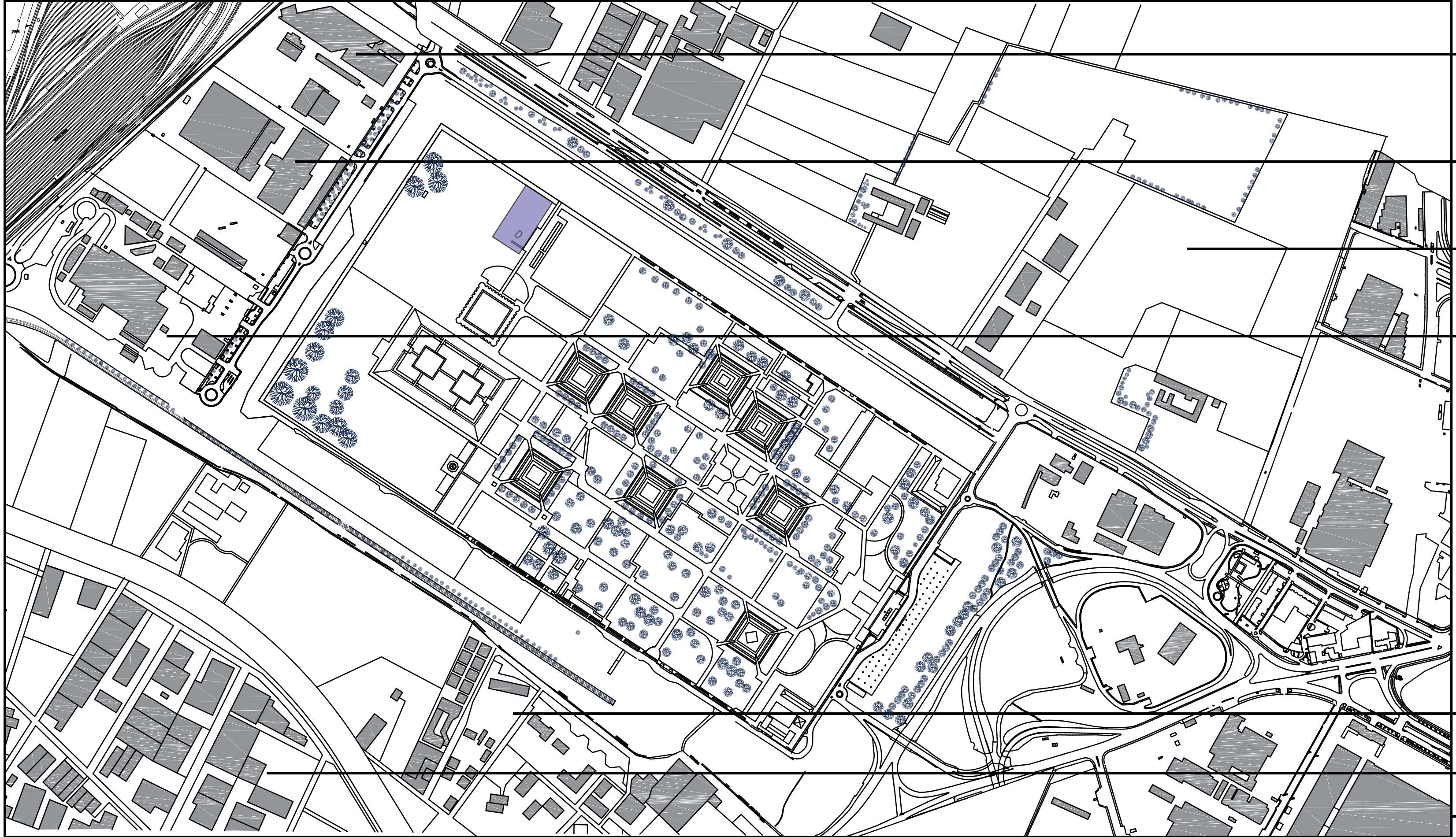


Cimitero Parco  
Access And Surrounding



- 1. Entrance from Via Agostino
- 2. Entrance from Via Pancalieri
- 3. Entrance from Via Pancalieri
- 4. Entrance from Via Pancalieri
- 5. Entrance from Via Ingeria

The internal layout of the cemetery is organized by a rigid grid of inhumation squares and modular columbarium walls. A primary administrative and service cluster is located at the southern gate, serving as the main entry for visitors from the city. Internal circulation is defined by wide, tree-lined avenues that allow for easy movement across the 72-hectare grounds. There is a small historic chapel inside the cemetery which allows for the new building to be designed around it. This existing structure features a slight rotation relative to the main grid, providing a specific architectural starting point for the project's layout. Access to the complex is managed via the Tangenziale Sud and Corso Orbassano, connecting this quiet green space to the rest of the city.



Amit Collection Centre

GTT Gerbido Deposit

Agricultural Area

The Waste to Energy Plant (TRM)

Residential Zone

Industrial Zone

Stellantis Plant Mirafiori



## History of Turin

### 3rd Century BCE

The area is inhabited by the Celtic-Ligurian Taurini tribe, from which Turin gets its name.

### 28 BCE

Romans found Julia Augusta Taurinorum, a military colony that becomes the basis for modern Turin.

### 5th Century

After the fall of the Western Roman Empire, Turin passes through Ostrogothic, Byzantine, and Lombard control.

### 11th–13th Centuries

The city develops into a commercial and religious center with growing fortifications.

### 1563

Duke Emanuele Filiberto moves the capital of Savoy from Chambéry to Turin.

### 1706 - 1713

Turin survives the famous Siege of Turin during the War of the Spanish Succession.

### 1848

King Charles Albert of Sardinia grants the Statuto Albertino, a constitution that later becomes the basis of unified Italy.

### 1861 - 1865

Turin serves as the first capital of unified Italy. Important figures include Camillo Benso, Count of Cavour and Giuseppe Garibaldi.

### Early 20th Century

Massive growth in automobile manufacturing and worker migration. Industrialization and population boost.

Ancient & Roman Era

Medieval Era

Capital of Savoy

Birthplace of Modern Italy

Industrial Era

### 218 BCE

During the Second Punic War, Hannibal attacks the Taurini settlement before crossing the Alps.

### 1st–4th centuries CE

Turin grows as a Roman town with walls, roads, baths, and a grid layout still visible today.

### 940 CE

Turin becomes an important seat of the March of Turin, a frontier territory of the Holy Roman Empire.

### 1280 CE

Control gradually shifts to the House of Savoy, which will shape Turin's future for centuries.

### 16th–17th Centuries

Turin is redesigned as a grand Baroque capital with palaces, squares, and straight avenues.

### 17th Century

Architects like Guarino Guarini and Filippo Juvarra transform the city.

### 19th Century

Turin becomes a center of liberal politics and industrial modernization.

### 1861

Italian Unification leads to the creation of the Kingdom of Italy.

### 1899

Fiat is founded in Turin, turning the city into Italy's industrial powerhouse.

### 1940 - 1945

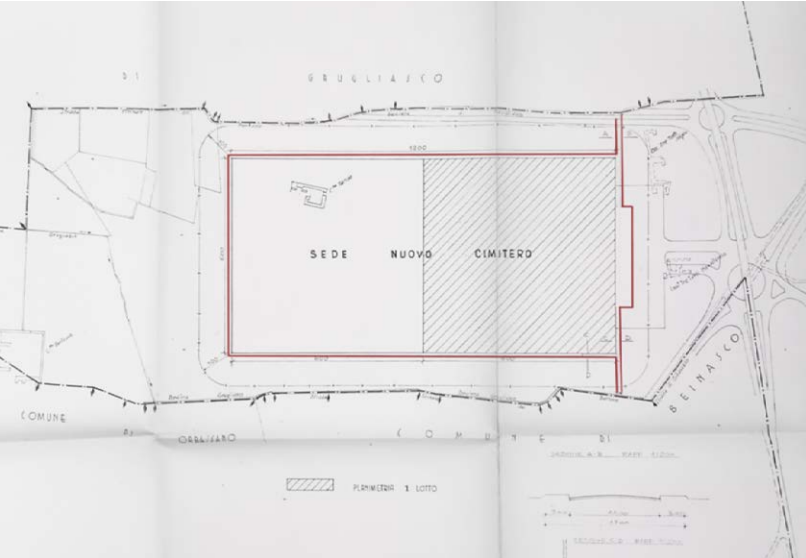
Turin suffers heavy bombing during World War II because of its industrial importance.



Summary of History of Cimitero Parco di Torino

Origins and Planning (1950s–1970s)

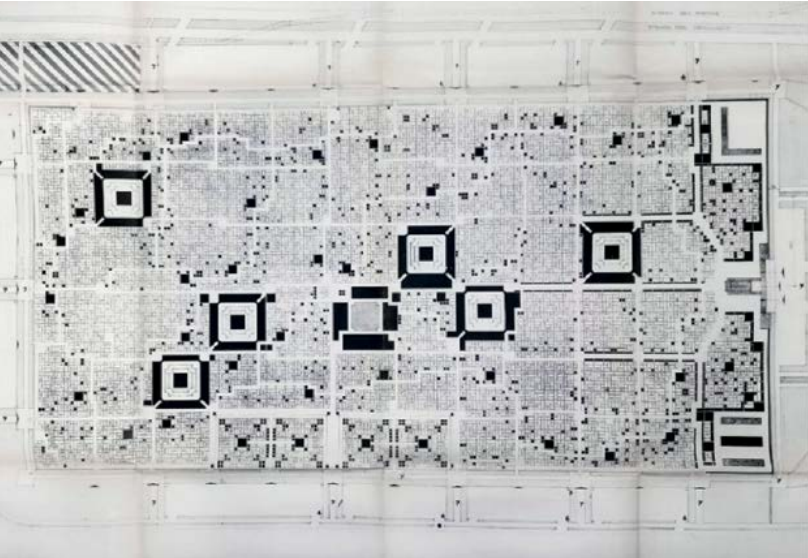
During the mid-20th century, Turin experienced an intense wave of industrialization and domestic migration, largely driven by the expansion of the automotive manufacturer FIAT. The city’s primary burial ground, the Cimitero Monumentale, ran out of space and could no longer be expanded. In response, the municipal administration commissioned a completely new, modern burial complex at the opposite end of the city.



Planimetria, recinto e lotti del nuovo cimitero in regione Gerbido ADTPT, fascicolo 3049, 1962-1969, Lotto I – Tessari

Construction and Inauguration (1970–1972)

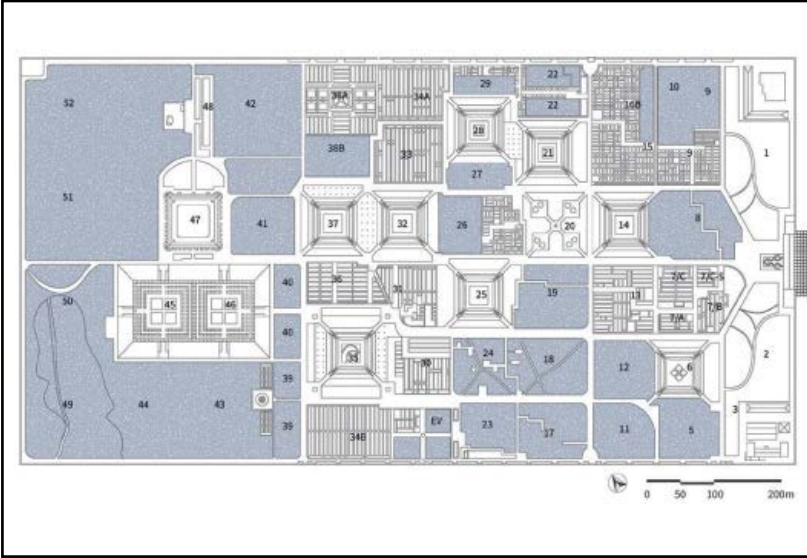
Construction began in the early 1970s. The cemetery officially opened in 1972. Its design followed the “park cemetery” model common in Northern Europe: large green areas, minimal monuments, landscape integrated with nature. Artificial hills were created to hide burial structures and maintain a peaceful park-like appearance.



Planimetria nuovo cimitero sud in regione Gerbido, progetto 1968, Archivio Divisione Tecnica Patrimonio Città di Torino, fascicolo 3049, 1962- 1969, Lotto I – Tessari.

Expansion (1980s–2000s)

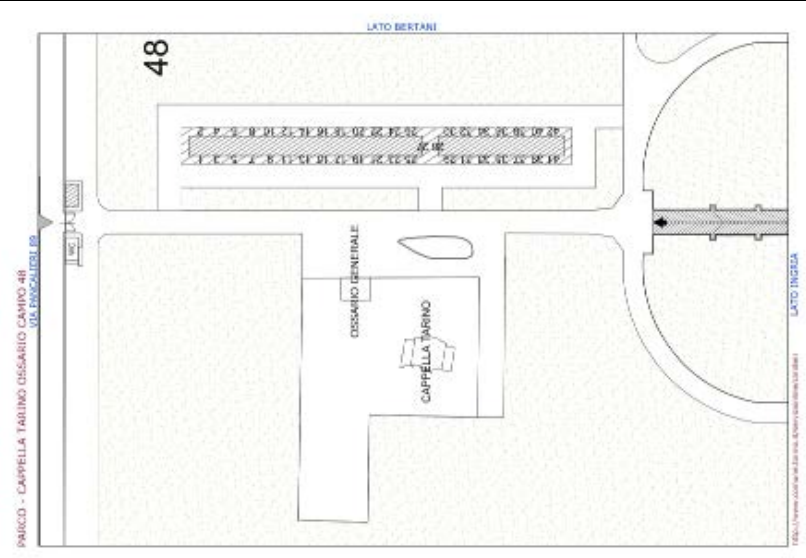
The cemetery became Turin’s second-largest cemetery after the Monumental Cemetery. New burial sections and garden areas were gradually added. Dedicated religious spaces were introduced, including: an Islamic burial area, a Romanian Orthodox section. Public transport and internal cemetery routes were improved for visitors.



Cimitero Parco, evidenziate le aree inutilizzate (N. Paganelli, 2023).

Modernization (2010s–2020s)

Maintenance and landscaping projects modernized the site. Turin expanded cemetery services to respond to changing funeral traditions. In 2019, nearby projects included plans for a pet cemetery area. In 2025, the first public “Sala del Commiato” (farewell hall) in Turin was inaugurated inside the cemetery complex to host secular and civil memorial ceremonies.



Parco cimitero , Turin, Tarino Chapel and ossary field 48. <http://www.cimiteritorino.it>

History of Cimitero Parco di Torino

Cimitero Parco di Torino was conceived in answer to the rapid urbanization and demographic transformations which were showing in the half of the 20th century. The upsurge of the megacity due to industrialization and migration greatly demanded burial space which shot up dramatically.. Under these circumstances, the Cimitero Monumentale, which had been the major burial site in Turin, would have been nearly full by the 1950s, indicating that traditional burials within the city limits loomed large as a long-term barbarity. The municipal authorities searched around for a large area to set a new cemetery and which also should feature a modern trend in cemetery planning, according to the international trend.

Inspired by the alternative Northern European cemetery park model, Cimitero Parco was framed for moving away from conventional Italian cemeteries, characterized by dense, grid-type burials. Instead, planners spoke of open green spaces, tree-lined paths, and other natural entries, blended into areas of burial that would express serenity and park-like ambiance. The concept was harmony between nature and remembrance, when visitors would come into a silent space for private recollection while further minimizing the rigid and structured ambiance that would characterize traditional graves. The selected site for this pioneering project was Gerbido, a peripheral area southwest of Turin, which was intended to be chosen for its spacious terrain along with potential integration into the surrounding landscape for such a project. Accordingly, the cemetery would thus be transformed into a pioneer institution for adopting a modern, nature-oriented burial model in Italy, which would set the future tone for development in the field of urban cemetery planning.



Cimitero Parco di Torino

Planning and Design of 1950s-1960s

The very establishment of Cimitero Parco di Torino dates back to the late 1950s, that is, a period characterized by rapid urban extension and growth of population in Turin. After World War II, Turin became highly industrialized and lured many workers and families. The rising population required more amount of burial space as most of the Cimitero Monumentale, which happened to be the city's most important cemetery, had been nearing capacity. As there was a need for additional burial ground within the city, discussions at the Turin City Council about an extension of the cemetery infrastructure were initiated that same year, that is, 1958. Subsequently, this was included within the comprehensive urban planning document that shaped city development strategies-Piano Regolatore Generale di Torino (1959) (AA. VV., 1960).

One of the major plans toward establishing a new cemetery concerned land availability and its format. The joined council decided on Gerbido, a peripheral area located southwest of Turin, for the cemetery site: The site possesses large expanses of area and well offers accessibility and distribution on landscape integration, making it ideal for cemetery park model rather than a densely structured burial ground. The cemetery park approach originated from Northern European designs of cemeteries: their emphasis is on soilings, common open spaces, and minimal grave markers. All of these were far from the densely packed mausoleums and massive tombstones often found in traditional Italian cemeteries. The intention was a serene, natural environment that could be used for reflection, remembrance, and harmony with nature.

Between 1962 and 1969, the project was architecturally and infrastructurally planned under the Fascicolo 3049 project, which was managed by

urban planners and municipal authorities. The planning process focused on several key elements:

1. Layout and Zoning - For this cemetery, terraced burial structures, columbariums for cremated remains, and expansive green areas were incorporated into the design; thus, options for the different types of burial within the park would be rich.
2. Paths and Accessibility - In the design, avenues shadowed by trees, walking paths, and layouts friendly for visitors would in effect give the cemetery the double function of place of rest for the deceased and of quiet public place.
3. Infrastructural Development - The development of administrative office buildings, chapels, and ceremonial halls were oriented toward providing funeral services, family gathering areas, and religious ceremonies.
4. Focusing on Environmental Aspects - Consistent with the cemetery park model, substantial importance was placed upon landscaping conservation and greenspace with an emphasis on native tree species and biodiversity support.

The combination of all these hints drew up a space that was very modern, spacious, and in harmony with the surroundings. With such finality to the plans by the late 1960s, it could now be said that construction of Cimitero Parco started officially in 1969. It was one of the first such initiatives to adopt a cemetery park model in Italy and set precedents for developing future burial grounds in this country.





Construction and Inauguration in the 1970s

In 1969, after the completion of architectural plans, construction work on Cimitero Parco di Torino officially began. The project was coordinated by municipal and urban planners who wanted to integrate the cemetery park model with the wider strategies for urban expansion in Turin. Three main areas of construction for the project arose: landscaping, burial infrastructure, and public facilities.

One of the very first processes of construction involved making the ground ready for larger-scale grading and soil stabilization, which would give the cemetery its characteristically terraced structure. Engineers ensured proper drainage systems in space void of soils eroded by water accumulation, especially in the areas planned for traditional burial. Once the area was properly leveled, landscaping began with such features as tree-lines walkways and open lawns with locally adaptive vegetation to complement the park-like impression of the cemetery.

The second part of the construction process included the building of columbariums, funeral locations, and fields of family tomb. The most typical feature of the cemetery system was a modular columbarium framework meant to meet up with growing trends toward cremation. This columbarium construction made use of robust concrete and stone, considering the harmonization with the natural setting within the cemetery. Simultaneously, the burial places were arranged in a grid with low-profile gravestones planted and made without any obvious separation from the green surroundings.

In parallel, public and ceremonial installations were constructed to accommodate funeral service and administrative works. The cemetery included a main entrance complex comprising administrative offices, waiting areas, and consultation areas for families. A large multi-purpose farewell hall was also built to provide dignified spaces for holding religious and secular ceremonies. Covered walkways and seating areas were provided to allow visitors to access the cemetery, whether it rained or shined.

Officially, Cimitero Parco was inaugurated after three years of development, in 1972. The opening ceremony gathered municipal officials, urban planners, and representatives from different religious communities to pledge the inclusive and non-denominational approach of the cemetery. It was immediately termed as modern with respect to burials in Italy, keeping it apart from traditional cemeteries, being the third, emphasized open landscapes and environmental harmony and provided for accessible visitor entry. Known as one of the primary cemeteries in Turin, it quickly became an alternative to an already overcrowded Cimitero Monumentale. For years after being inaugurated, Cimitero Parco started to bear the burials of different communities, which further contributed to its emerging identity as a modern and flexible cemetery. The careful planning of the layout together with the landscaping and environmental care has set a standard in cemetery design in Italy, matching the future development of burial sites across the country.



1980s-1990s: Expanding and Cultivating Cultural Importance

By the 1980s and 1990s, Cimitero Parco di Torino had expanded greatly to make room for the increasing number of burials and changing funeral practices. The cemetery actually grew in terms of infrastructure, services, and space of cultural significance as the population of Turin grew and societal norms toward burial methods changed.

One of the most remarkable changes during this period includes the increasing popularity of cremation and the need for construction of new structures for columbarium. While traditional in-ground burial still predominated in practice, cremation was increasingly gaining acceptance due to its lesser environmental impact and conservation of space. In view of this, the cemetery constructed new columbarium walls for compact urn storage with dignity, integrated into the landscape, without detracting from the open and natural features of the cemetery. This developed idea fits into much wider contexts across Italy and Europe, where cremation is slowly finding acceptance as an alternative to conventional burial.

The cemetery not only extended its cremation services but also expanded burial zones for the creation of new lines of individual and family plots. These expansions were planned to maintain the park-like atmosphere in a way that would not, in fact, compromise the original vision of the cemetery as a green and serene place to rest. Pathways were extended, and additional trees and shrubs were planted to enhance the cemetery’s biodiversity and reinforce its identity as an urban green space.

More than just physical growth, Cimitero Parco grew culturally and historically during this period. The cemetery became a final resting place for many prominent personalities from the political, artistic, and sporting circles of Turin, thus reinforcing its status as a landmark in the city. To preserve and celebrate its changing role, studies were commissioned by the Turin Department of Demographic Services on the historical and artistic significances of the cemetery, ultimately leading to the publication of “Il Parco delle Mezzelune” (1987) and “Le Nostre Radici” (1992). With the help of these publications, the cemetery’s design, significant burials, and standing in Turin’s cultural heritage were examined (Carella, & Murat, 1987; Lodi, 1992). These publications offered essential insights into the cemetery’s architectural and symbolic import, stressing how Cimitero Parco was distinct from traditional cemeteries in its modern layout and relation to nature.

In the 1990s, some discussion about sustainability and alternative burial methods started to develop, although they were far from being widely practiced. Cimitero Parco, with its extensive green fields and landscaped setting, was thus poised to become a candidate for implementing green burial practices in due course with the subsequent development of green burial/sustainable cemetery management dialogues in the 21st century. The Cimitero Parco is at this stage definitely one of the prime important burial sites in Turin by functionality and capacity in conjunction with cultural and historical significance by the end of the 1990s. The development of the above expansions and studies over the two decades served to buttress the current identity of Cimitero Park as a modern and evolving cemetery, weighted between the traditional funerary practices and changing needs of society.





2000s-Now: Modernization and Environmental Considerations

Entering the 21st century, Cimitero Parco di Torino continued to be one of the main burial sites of the city, enhancing adaptation to new social and environmental challenges. Urban sprawl and ecological concerns have sparked discussions about the future of burial practices and the role of cemeteries as green spaces.

One of the most notable developments during this period has been the continued rise of cremation rates. As a growing number of families choose to have their loved ones cremated instead of buried, the cemetery has added columbarium space, making more niches for urns while retaining the landscape’s open, natural aesthetic. This pattern of shifting burial practices reflects broader changes throughout Italy, where cremation is gaining acceptance as a low-impact, space-saving alternative to in-ground burial. Another milestone in modernization is that Cimitero Parco was recognized for its ecological importance, with studies stating that it represented urban green space with an assemblage of different trees and vegetation, thus contributing to the conservation of biodiversity and improvement of air quality throughout the metropolitan area of Turin. To better handle the environmental impact, recent years have seen the introduction of geo-referencing technology in mapping and analyzing the green heritage of the cemetery. These tools have improved public engagement and awareness of the cemetery’s ecological and cultural values.

Though conversations for sustainable burial practice are being held internationally, there are yet to be any confirmed conducts of green burials, human composting, or memorial reforestation in Cimitero Parco. Nevertheless, with its landscape-integrated design and naturalistic approach, it

appears well-suited for accommodating future sustainability endeavors, if municipal policies were to shift that way.

While the growing city of Turin still engages in lively discussions about the future of burial places with Cimitero Parco as the centerpiece, the site is evolving with the expectation that society may soon require urban biodiversity projects, improved cemetery management, and some sort of sustainable burial practice while still preserving its original goal as a space for quiet reflection.



The Artificial Mounds, hiding the graves from view, with the burial chambers located directly inside these green hills

Modern cemeteries are being reimagined as open, integrated urban spaces rather than isolated places solely dedicated to burial. Inspired by Northern European models, this vision promotes cemeteries that support emotional well-being, connect with the city, and adopt more sustainable burial practices while still respecting the sacredness of death and remembrance. The aim is to transform cemeteries into meaningful cultural and social environments that reflect contemporary society.

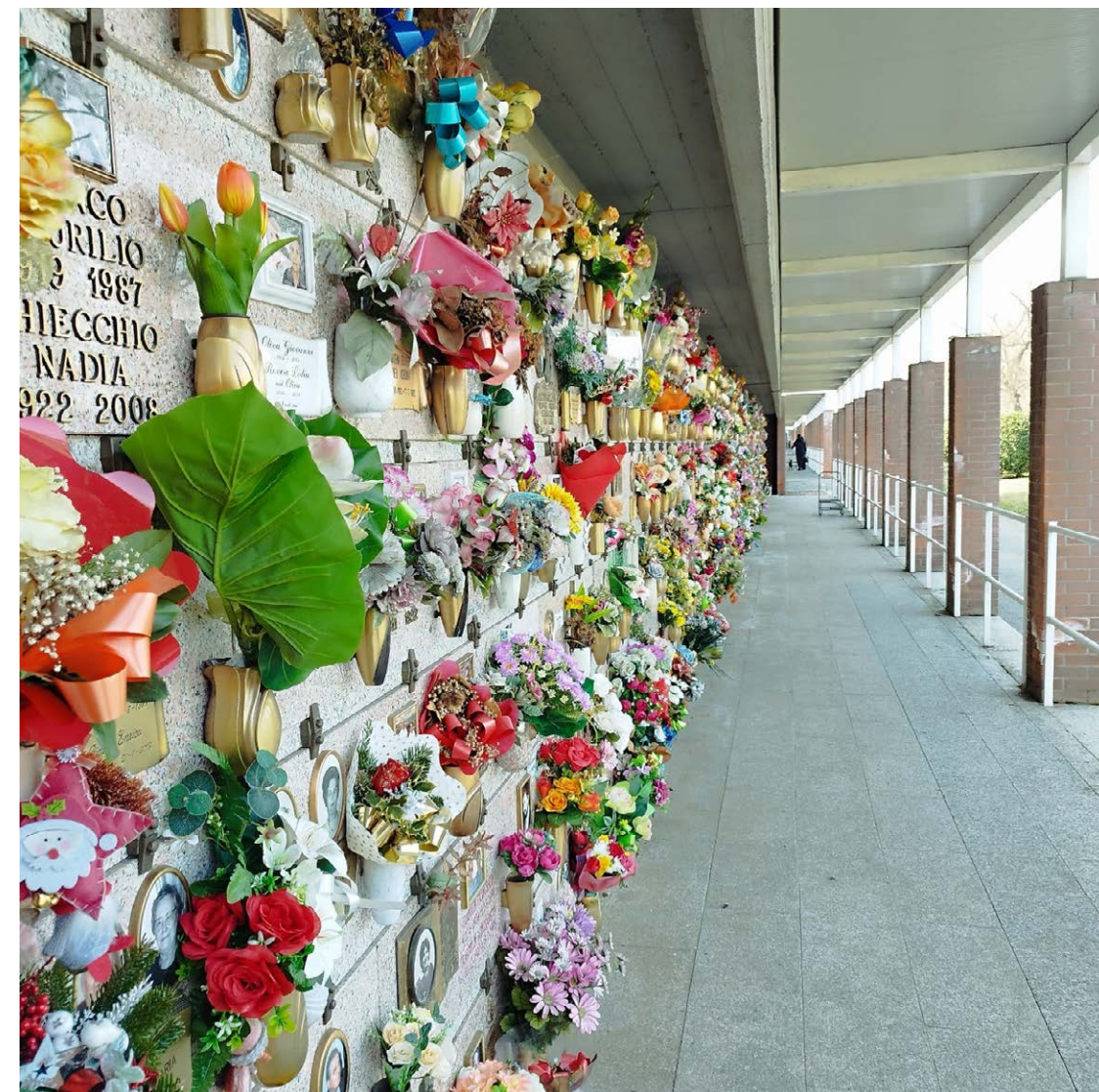
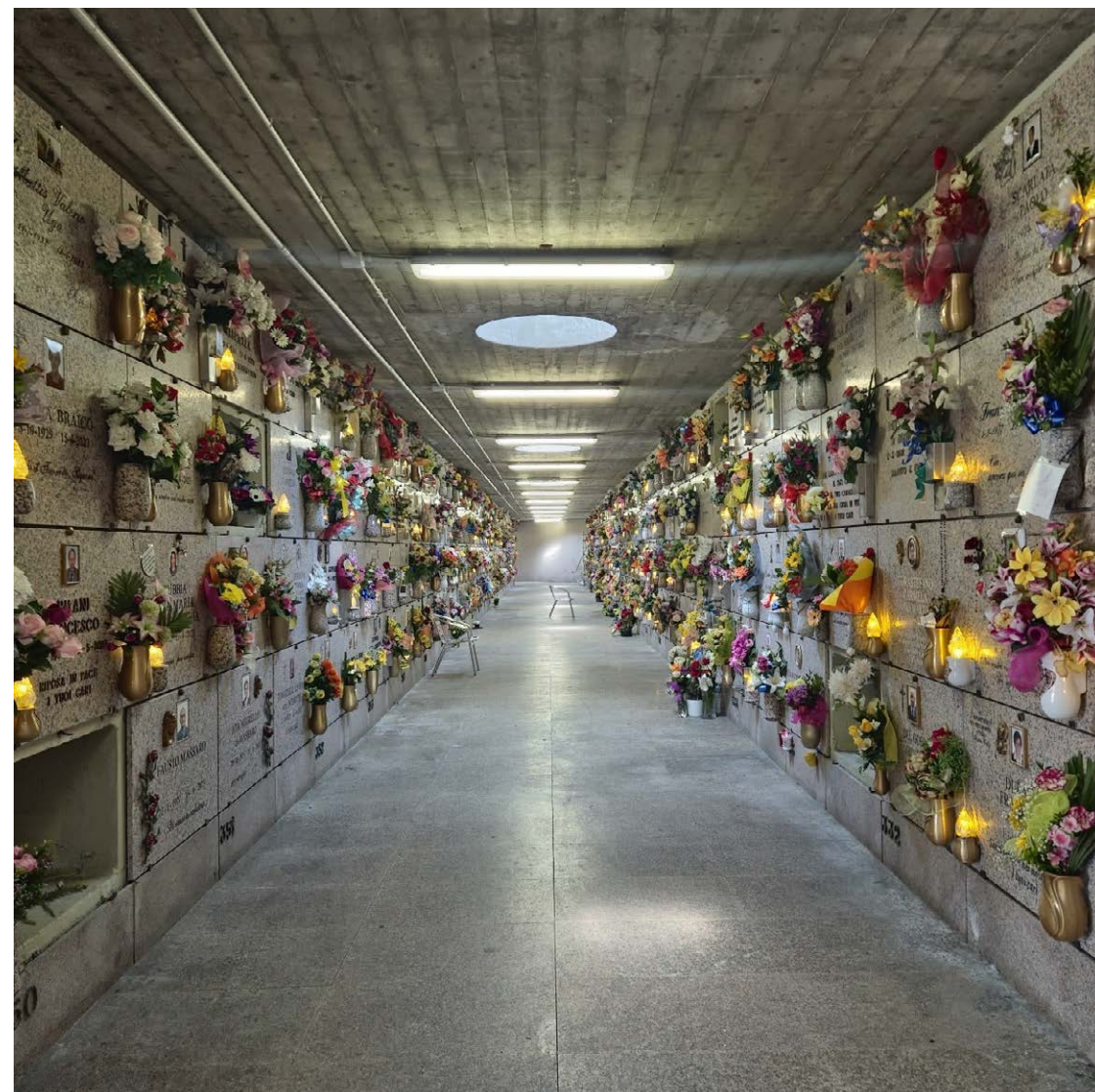


The change should not be imposed, since funeral traditions are deeply connected to history, culture, and religion. Instead, tradition should evolve gradually alongside society’s changing needs. The introduction of public, multireligious, and secular farewell spaces within cemeteries is presented as an important step toward greater inclusion and adaptability, helping cemeteries remain active places of memory, culture, and community. (Paganelli, F. 2024)





The Galleria structure, featuring burial niches integrated into the walls



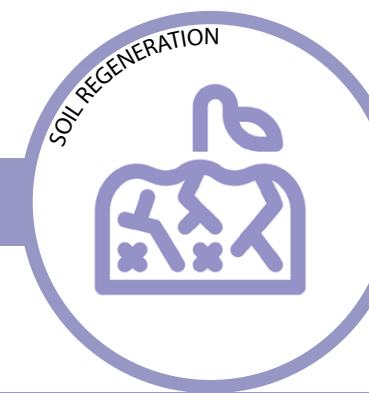
## Why Human Compositing?



THE MOURNERS



PUBLIC VISITORS



The Traditional funeral methods, like conventional earth burial and cremation (burning), create serious environmental problems. Traditional burials take up too much urban land and use toxic chemicals that pollute the soil. On the other hand, cremation releases large amounts of carbon dioxide (CO<sub>2</sub>) and harmful gases into the air, which increases global warming. Human composting offers a clean, green, and respectful alternative. This natural biological process gently turns the human body into rich, organic soil within one month. The main purposes of this project are: To Protect Nature: It uses very little energy, produces zero harmful emissions, and saves valuable city land. To Support Urban Ecology: Instead of wasting resources, the process creates nutrient-rich soil that actively helps new plants and trees grow. To Change the Meaning of Death: It transforms death from an end into a new beginning. The body does not disappear or pollute; instead, it returns to the earth to feed and sustain new life within the cemetery landscape.

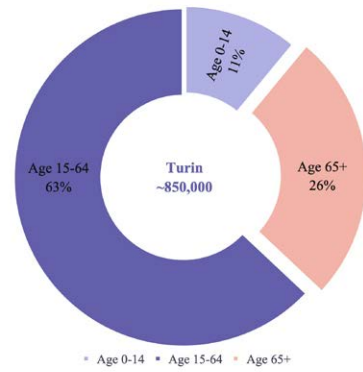


## Turin’s Demographic Crisis and The Funerary Perceptionn Shift

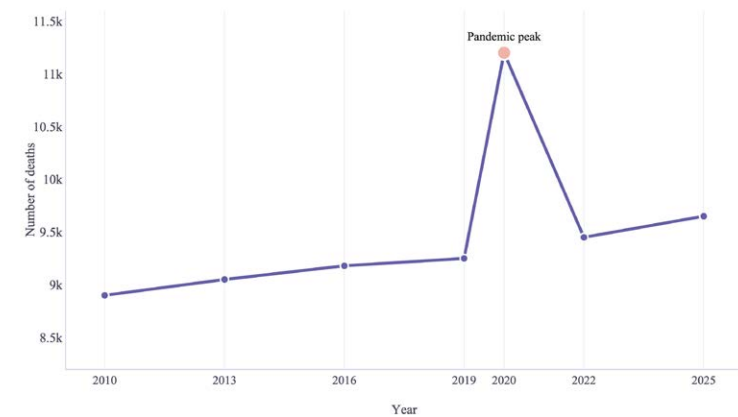
“The graphically-related demographic and quantitative realities in Turin provide compelling evidence for the urban requirement for a new death care facility architecture. The urban age distribution matrix indicates that the city of Turin has a unique silent demographic crisis; currently, individuals aged 65 years and older represent roughly 26% of the total municipal population (ISTAT, 2021). This aging index creates a longstanding, steady baseline of mortality, supported by data of the average number of registered deaths per year (9,500 – 10,000) over the past 15 years, with 2020 being an exceptionally high anomaly due to the impact of COVID-19 on the regional population (Città di Torino, 2022).

As a result of this continual accumulation of mortality events, the city’s traditional flat cemeteries are now at the threshold where nearly all of the space is occupied and have reached actual saturation of space. Thus, there has been a significant shift in behaviour by the public. Traditional burial practices have dropped significantly from 80% to 25% within the last 20-years and the vast growth of fire cremation (now comprising approximately 75% of the overall market share) has occurred (SEFIT-Utilitalia, 2025). Therefore, both of these historic datasets clearly demonstrate that the existing urban funerary framework is under continual, unsustainable physical and spatial pressure and that an urgent and significant opportunity exists for the establishment of zero-emission biological alternatives for future deaths.”

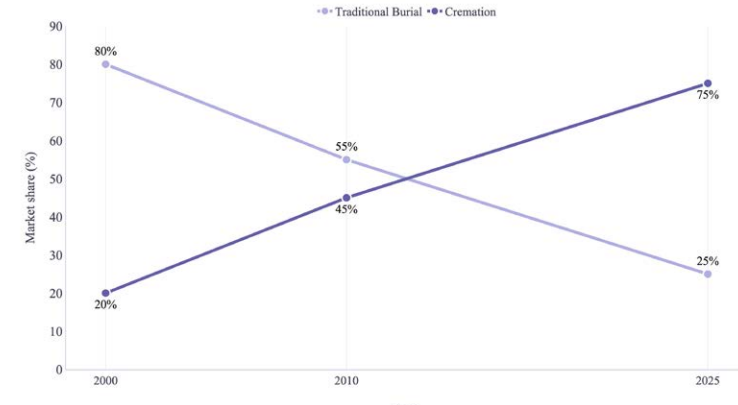
Aging Population in Turin



Death Rate Over Time in Turin



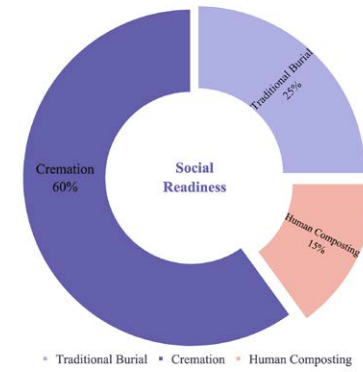
Cremation Growth vs. Traditional Burial Trend



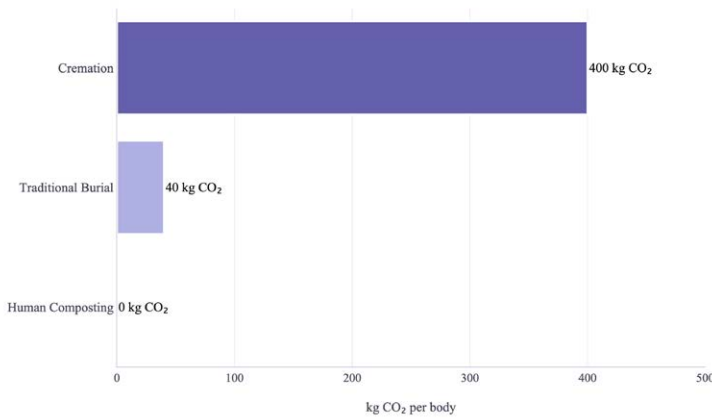
## The Ecological Matrix and Cycle Efficiency of Human Composting

In an effort to provide a sustainable solution within today’s urban funeral industry, the proposed facility has a target of obtaining a viable 15% of the market as a transition to a new social and physical structure. This proposal aims to create a direct solution to the severe ecological crisis created by the use of fire in modern funerals. According to the empirical life-cycle assessment data, cremation creates a significant atmospheric burden by using fossil fuels for high-temperature combustion, resulting in approximately 400 kg of CO<sub>2</sub> released into the atmosphere for every individual being cremated. (Keijzer et al., 2011; Robinson, 2021). Traditional earth burials, while not generating any immediate gaseous emissions, still represent an embedded cost for materials, ongoing maintenance of the turf, and operating machinery, amounting to 40 kg of CO<sub>2</sub> released into the atmosphere (Priestley, 2020). Beyond the chemical and carbon “footprints,” the time frame and physical manifestations of the project demonstrate its effectiveness. Land-based inhumation has an extended natural decomposition period of 10-15 years, using up limited municipal space that could be repurposed, while cremation offers a fast but highly destructive method of thermal reduction that consumes approximately two hours to convert an average body into ashes. In contrast, Natural Organic Reduction (Human Composting) uses a complete biological rhythm (Rothstein & Staudt, 2021). It stabilizes all organic material into rich soil within an optimal 30-day cycle while operating out of contained technical vessels, thereby preventing water pollution and resource consumption and transforming death care into a tool that maintains zero emissions and promotes urban regeneration (McClymont & Sinnett, 2021).

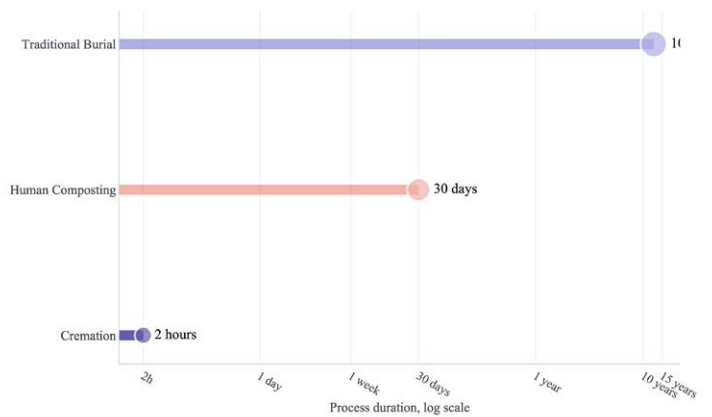
Funerary Methods Share



Carbon Emission Comparison

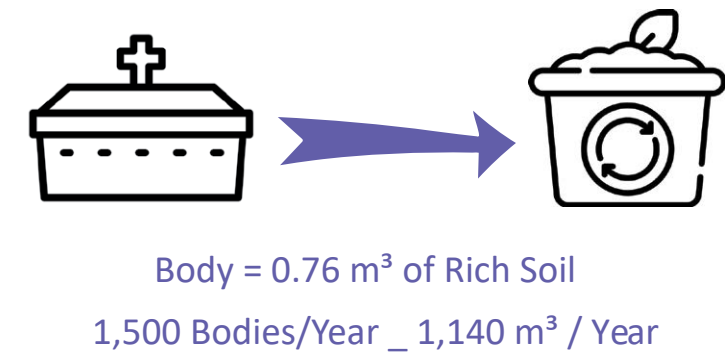
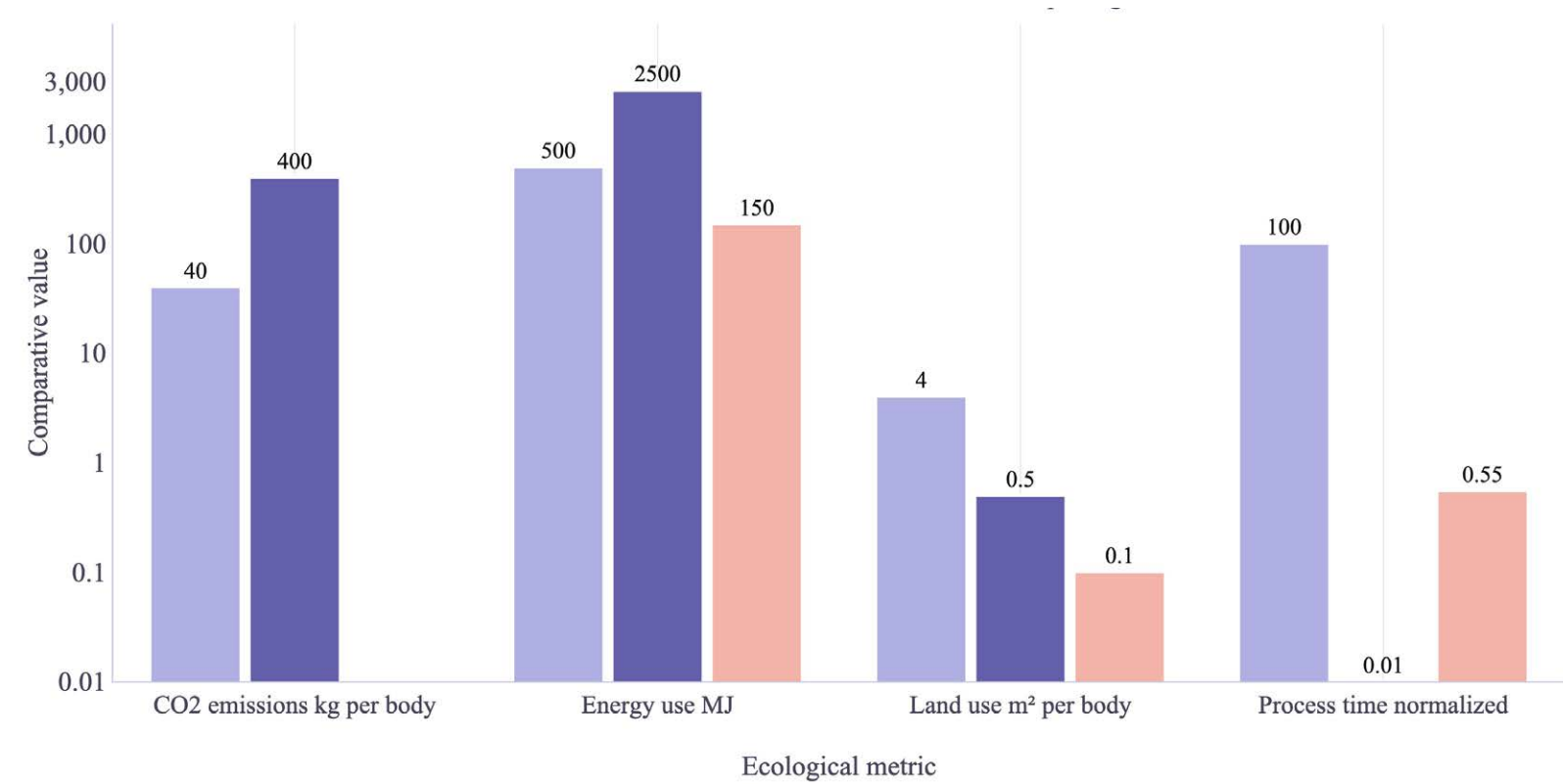


Process Duration Timeline





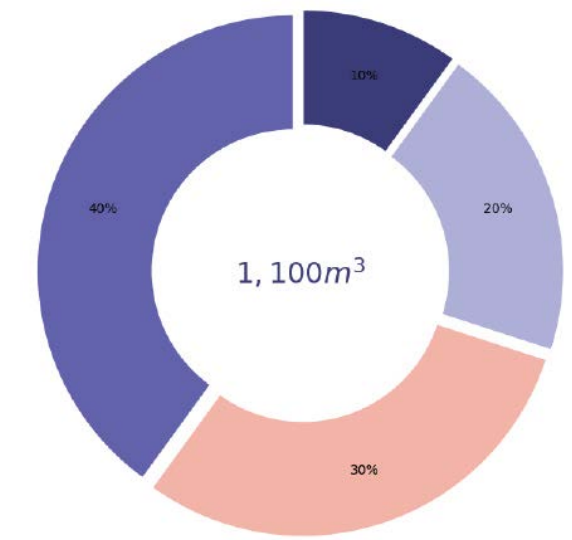
Funeral Methods Comparision



Soil Production Quantification and Ecological Output

The design of Human Composting Complex goes beyond the process of the ritual act itself to become an industrialized biologic machine which facilitates the process of urban regrowth in the surrounding area. With the help of NOR technique, it is possible to transform a living organism into a safe, nutritionally enriched organic material, without the need for incineration or anaerobic degradation processes. Quantitative Soil Production: In terms of the volume produced by one microclimatic transformation, it is 0.76 cubic meter (0.76 m3) of rich soil amendments. Having considered that on average there are 9,500 deaths per year in Turin, and assuming the facility would capture 15 percent of the market, then the number of transformed bodies will be 1,425 per year, resulting in an annual production rate of 1,083 cubic meters (1,083 m3). Biological Material Usage: This biological material will primarily be used on-site, within the territory of Cimitero Parco itself. Rich in nutrients, the organic material will fertilize the plants and ensure the sustainability of the newly created “Memory Garden.”

Off-Site Territorial Allocations (Surplus Strategy): As a result of the annual production being more than the absorptive capacity within the site due to the fact that the yield is 1,083 m3, the strategy involves the development of a municipal distribution process. The ecological surplus will be used to facilitate two major programs for urban infrastructural projects in Turin as follows:Industrial Soil Remediation: The nitrogen-rich soil will be employed to rejuvenate the soil in the areas around the Mirafiori districts which have been contaminated by the industries. Urban Forestry Infrastructure: The surplus soil will aid Turin’s afforestation initiatives such as the “Corona Verde” forestation program thus ensuring that Turin becomes an even greener environment.Private Remembrance: As per individual preference and emotions, a small fraction of the soil could be allotted to relatives of the deceased who might want to plant it on their property thus making the memory of the person live forever.



- Nourishing native flora & stabilizing the topsoil of the Memory Garden
- Reviving and detoxifying post-industrial soils in the former FIAT factory areas
- Feeding Turin's regional green belt project for carbon sequestration
- Domestic planting for families as a living legacy



Case Studies

- Heimolen
- Hofheide
- Siesegem

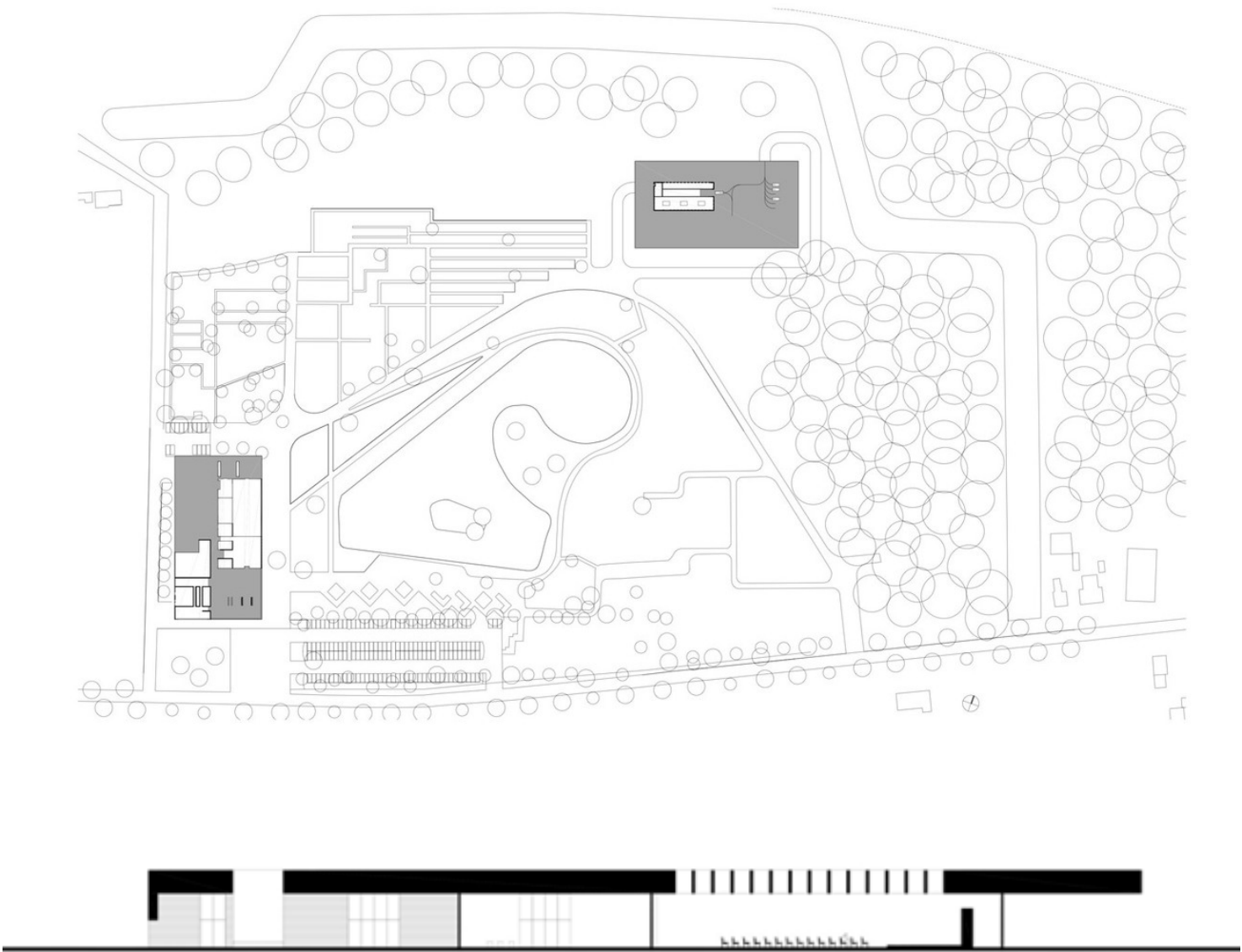
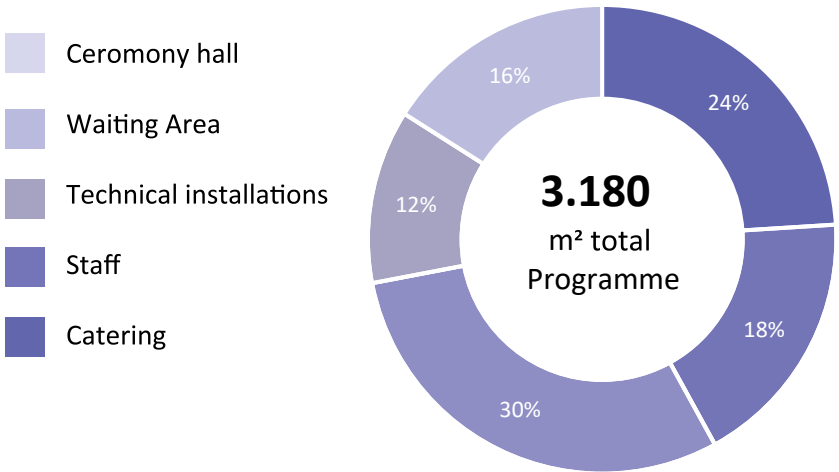
The Generative Logic of Form

The focus of this chapter is to compare three important and well-known European precedents -- Heimolen, Hofheide and Siesegem crematoria (all located in Belgium) -- through a rigorous typological analysis of their spatial types. All three case studies are structurally organized around flame cremation; however, they will be used as useful architectural references due to their typological lineage and spatial quality. As part of the analysis, this chapter will purposefully examine the spatial organization of user flows (mourners, employees and decomposing remains) and users’ experiences (the deceased) in the context of applying programmatic logic, facilitating functional zoning, choreographing usage conflicts between users and creating spirituality in place via natural light and landscape integration.

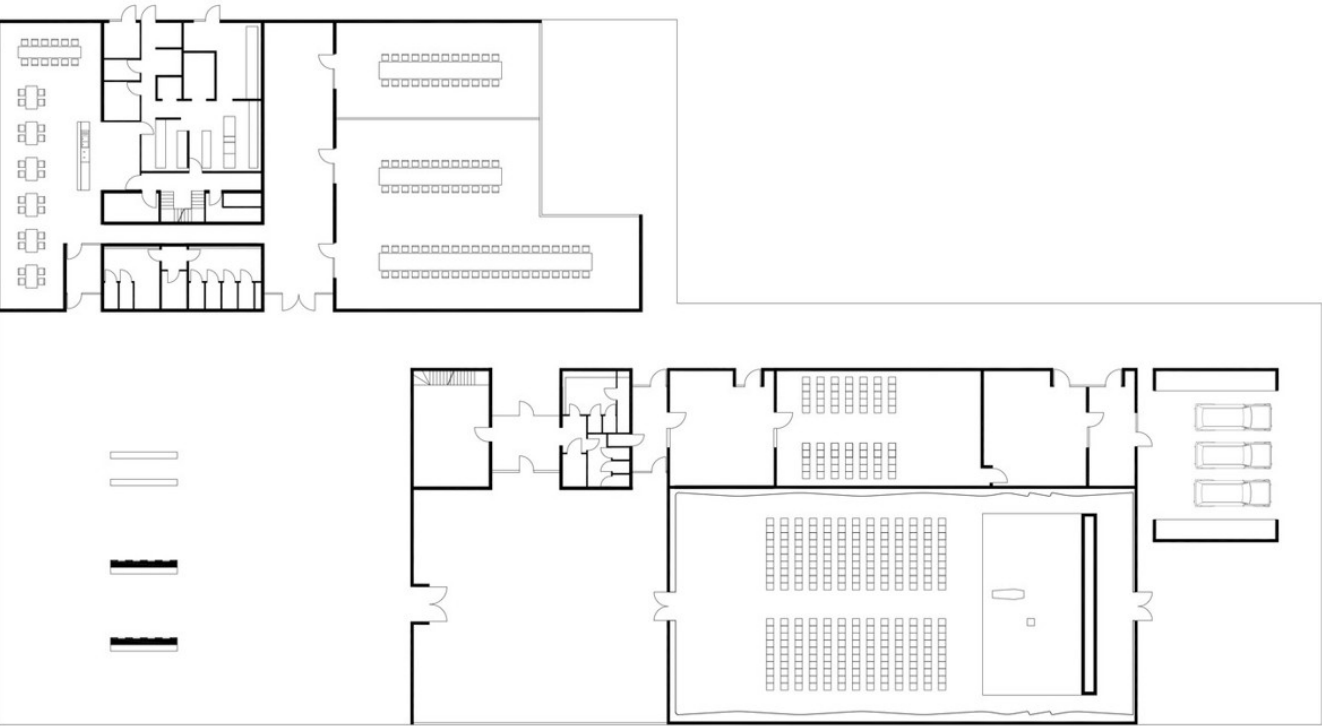
This chapter seeks to convert abstract theories into physical forms through the examination of actual built works and use these forms to provide the basis on how to develop a highly disciplined, respectful, and beautiful layout for the proposed Human Composting Complex in Turin.

Heimolen

The Heimolen Crematorium in Saint-Nicolas, Belgium, designed by the architecture firm Klaus-Ann Kahn, is conceived as a space where architecture respectfully supports the emotional and ritual experience of mourning. The access route to the building is carefully designed: visitors are guided through a path that is enclosed within a perimeter that ultimately introduces the architecture and creates a planned and symbolic representation of the everyday world in space. This path avoids confrontation and gives mourners time and space to be mentally prepared.



The program is divided into three main areas – reception and gathering spaces, ceremonial halls and cremation facilities – each of which is physically and spatially separate. This separation not only improves performance but also maintains the dignity of the ceremony. Technical operations and services are kept hidden from view, ensuring that the ceremony is uninterrupted and emotionally coherent.







There are no overt decorative gestures or symbols in the project, and architecturally, the project follows a language of reduction, but its design focuses on proportions, light and silence. The large ceremonial halls are set behind simple concrete facades and are lit from above through controlled skylights. This approach enhances the contemplative quality of the space, allowing light and materials to shape the space without being distracted.



A central water feature plays a vital role in the layout — it physically separates the main building from the cremation unit while also offering a reflective surface that contributes to the calm and introspective mood of the site. The presence of water and surrounding greenery reinforces the idea of returning to nature and supports the symbolic weight of the funeral process. What is clearly palpable in this project, and which guarantees the dignity and privacy of all parties, is that the flow of mourners and the movement of the deceased are kept completely separate.



While visitors follow a clear line from arrival to farewell, they are transported through hidden and imperceptible paths. This allows the ceremony to be held with emotional clarity and respect. Overall, Heimolen is a powerful example of how architecture can serve not only function but feeling — using light, space, and sequence to honor the complexity of grief and the significance of ritual.

**1. Arrival Sequence & Light Integration**

The entrance area is like a half-open space that smoothly connects the outside scenery with the inside of the building. This in-between spot lets in sunlight, which bounces off the nearby water, making the ceremony feel more peaceful and giving people a quiet moment to arrive.

**2. Waiting Room & Reflection**

The waiting rooms look out towards the cemetery through glass walls. This view of nature and the burial grounds helps people think quietly to themselves. The quietness of this space helps with contemplation, making it a place to pause between regular life and the ceremony itself.

**3. Café as Spatial and Emotional Transition**

The café is located in another part and apart from the main mourning path. This place acts as a place where people can relax. With its big windows looking out at the trees and the entrance, it helps visitors ease back into their normal routine after the ceremony. Even though it's separate, it still fits into the overall feel of the space, helping people manage their emotions without disrupting the main event.

**4. Linear and Hierarchical Circulation**

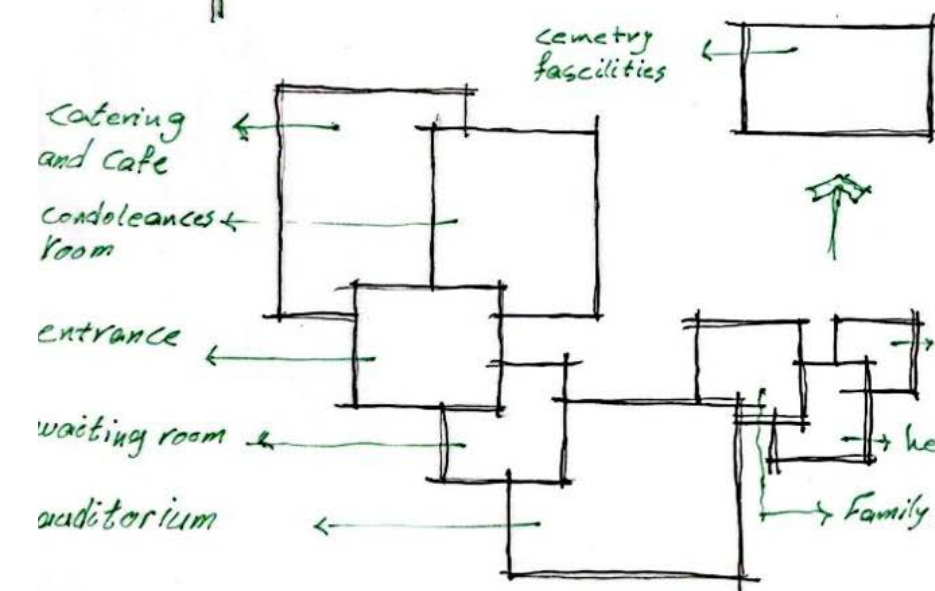
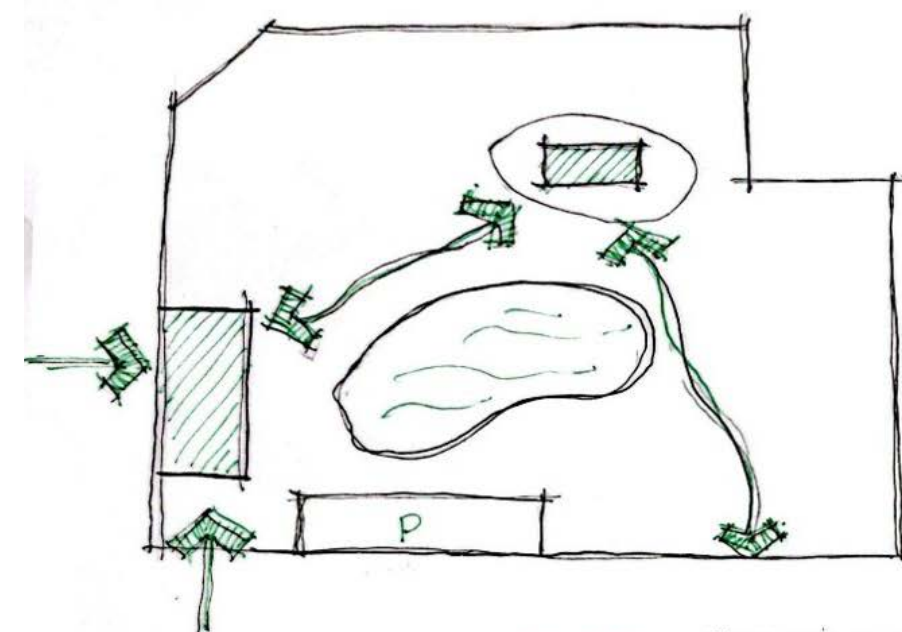
The building design is open and has a clear linear path. In Belgium, it is common for paths to include detours, which should add to the design's respect and openness. This simple path easily guides visitors from the moment they enter to the moment they leave, making the whole experience seem dignified.

**5. Functional Zoning - Cremation Separated from Ceremony**

The technical areas and cremation services are completely hidden from the public and ceremonial spaces. By keeping the 'machinery' out of sight, the facility runs efficiently behind the scenes, ensuring that the families' emotional experience remains completely undisturbed and focused purely on the ceremony.







#### water use:

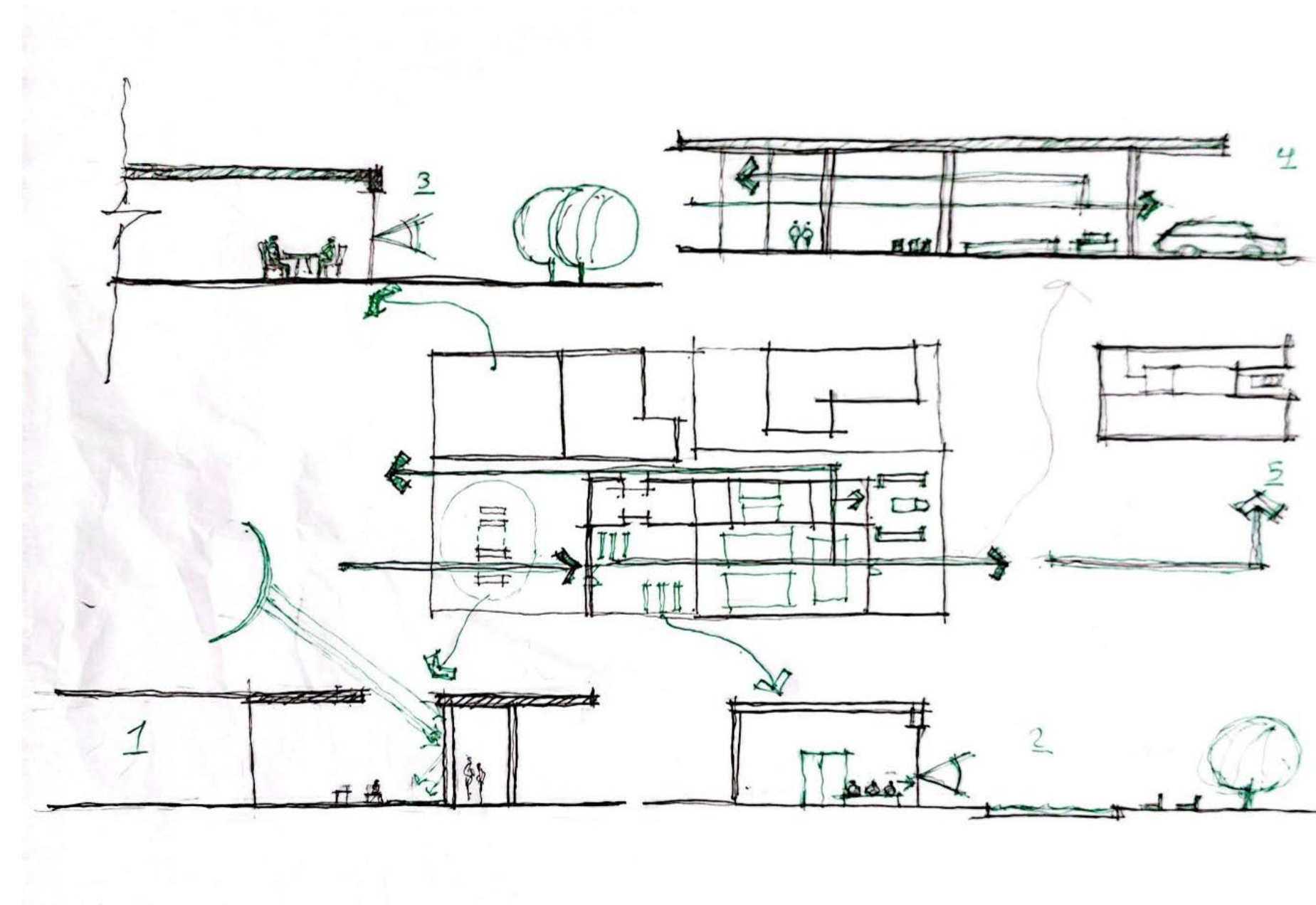
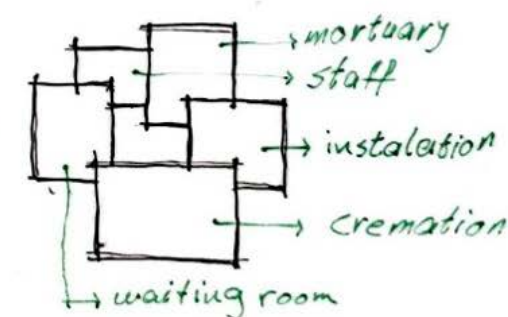
A reflecting pool is placed between the two building. It creates a peaceful atmosphere and separates the ceremonial and technical areas visually and emotionally.

#### Building Distance:

The ceremonial building and cremation building are clearly separated. This keeps the ritual space respectful and quiet, while allowing the technical part to work privately.

#### Site access:

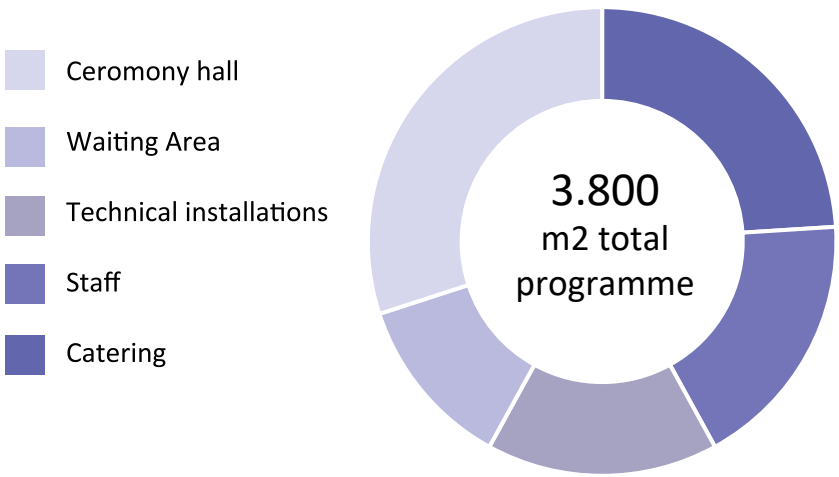
visitors and staff use different paths. Public access goes directly to the main entrance. Staff and technical services have a separate, hidden entrance to avoid crossing paths with mourners.





# 2 Hofheide

The Hofheide Crematorium in Holsbeek, Belgium, really fits in with its natural surroundings and its respectful purpose. RCR Architectes and Cousée & Goris Architecten designed it, seeing it as a calm, spiritual place that marks the transition between life and death. How the building looks and how you move through it were shaped by natural elements, very simple shapes, and a lot of thought given to light and reflections.



Visitors arrive via a long, linear path that slowly guides them through an open landscape before reaching the main building. The structure itself is placed above a reflective pool, which surrounds it like a mirror—emphasizing the floating presence of the architecture and creating a meditative atmosphere. Water here is not only a material or aesthetic element but a symbolic one, marking the moment of crossing from daily life into the ceremonial experience.







The crematorium is organized on two floors to completely separate the ceremony from the performance: all public functions – including the reception area, ceremony halls, family rooms and café – are located on the ground floor, while all technical operations and staff, including the crematorium and delivery, are located below ground. This zoning ensures that visitors experience a seamless and formal journey without interruption in service operations.



Natural light really changes how a place feels inside. Skylights and other openings are put in just the right spots to let soft light fall into the main halls. This makes the coffin glow in a way that feels symbolic, almost sacred. Even though the design doesn't use any religious pictures, the space still gives off a strong feeling of respect and spirituality. After the ceremony, you're welcome to stick around. The balconies and the cafe right next door are quiet spots if you want to think, chat with others, or just take a moment.



The building doesn't rush you back out; it gives you time to let your feelings settle and just relax in the space. The way people move is very clear. Visitors follow a direct, slow route. The hearse and any service vehicles go underground, completely out of sight. This helps maintain respect for the event and ensures that everything runs smoothly and without anything extraneous or intrusive.

## Light

### 1. Auditorium Lighting

Natural light comes into the auditorium from an opening overhead, shining directly on the coffin. This planned use of daylight creates a sacred, almost spiritual feeling. It makes the farewell ceremony more emotional and helps make the space feel respectful and good for quiet reflection.

### 2. Building on Water

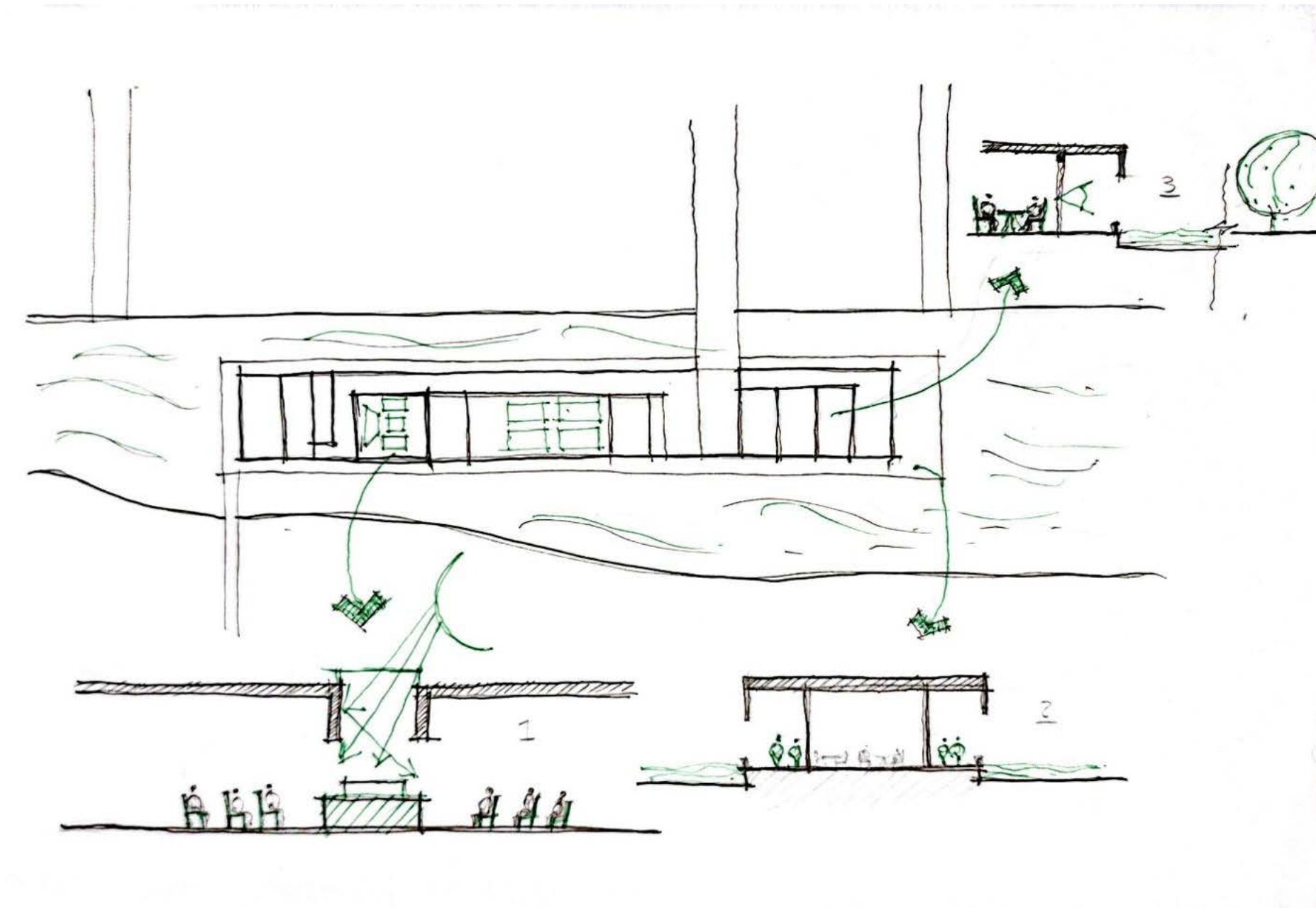
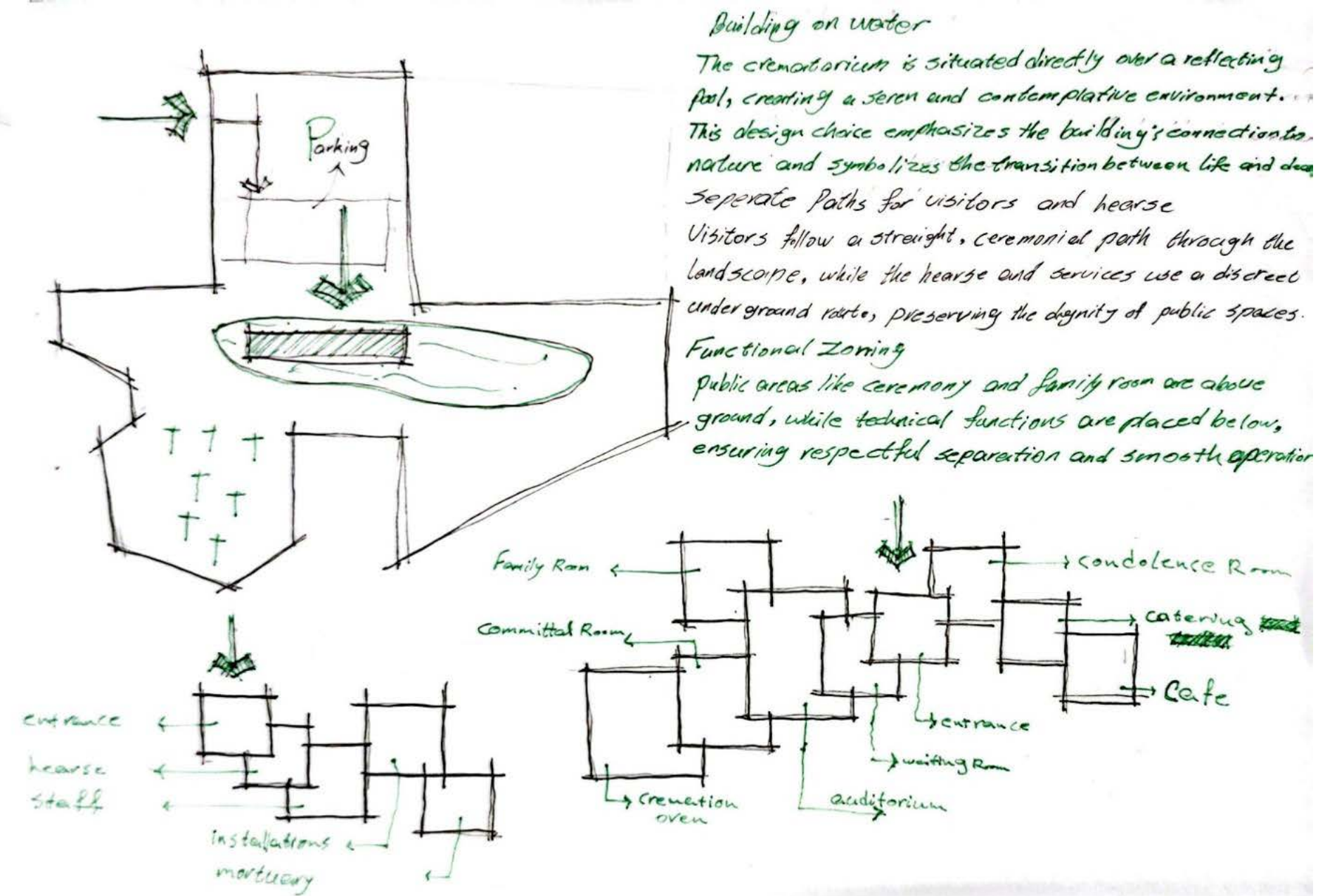
The building is placed right above a reflecting pool, with balconies around it where you can pause and think. The water makes you feel calm and stands for the journey between life and death. It gives visitors a peaceful place to process their thoughts and reflect after the ceremony.

### 3. Café Orientation

The café faces the pool and the surrounding landscape, providing a relaxing space. After the ceremony, people can let go of the intense emotions of the ceremony, spend some quiet moments outside, and slowly transition back into their daily lives.





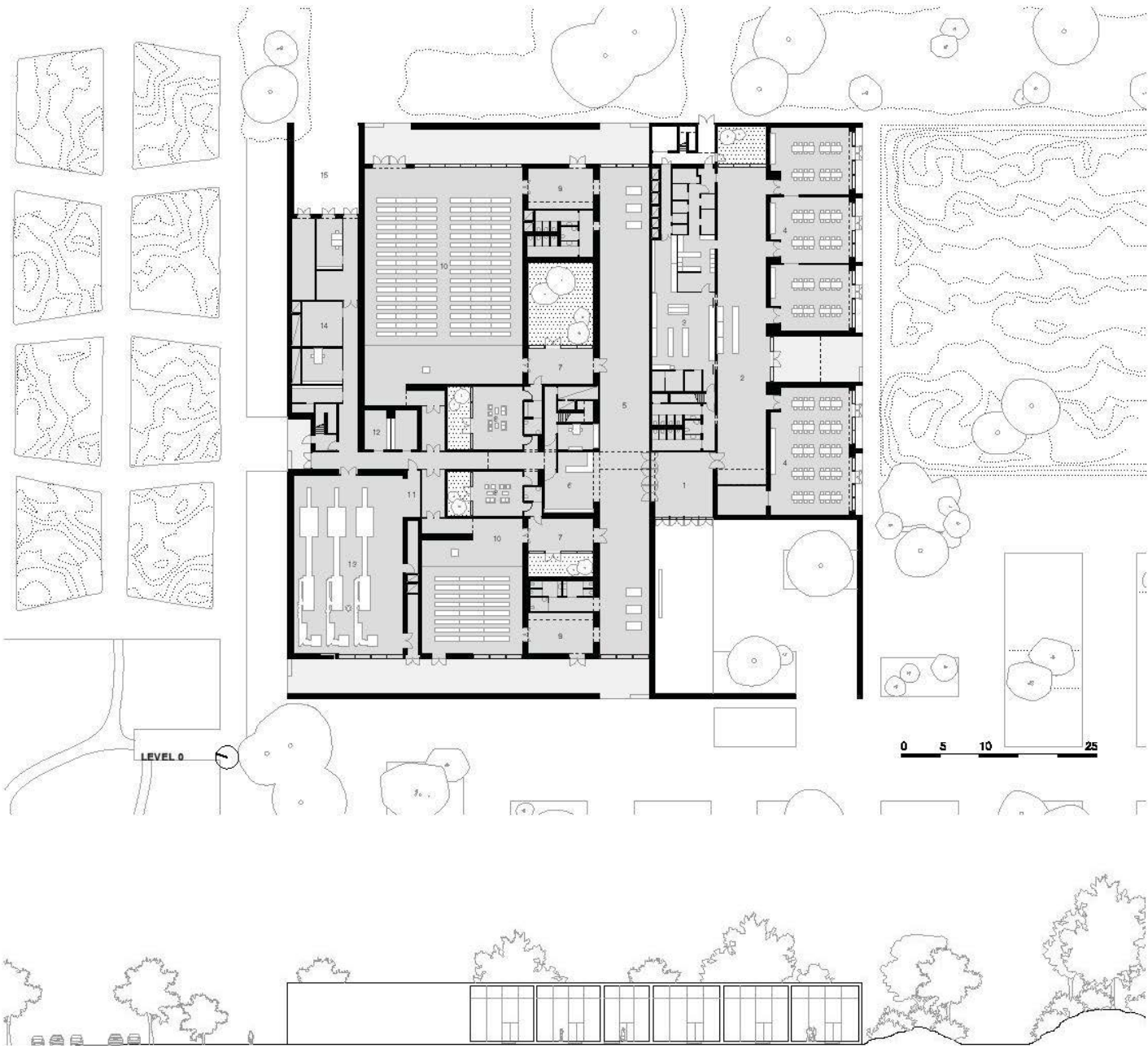
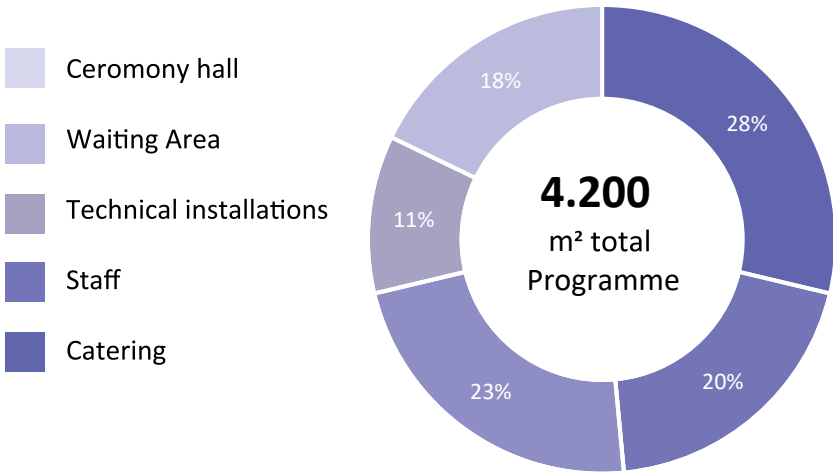




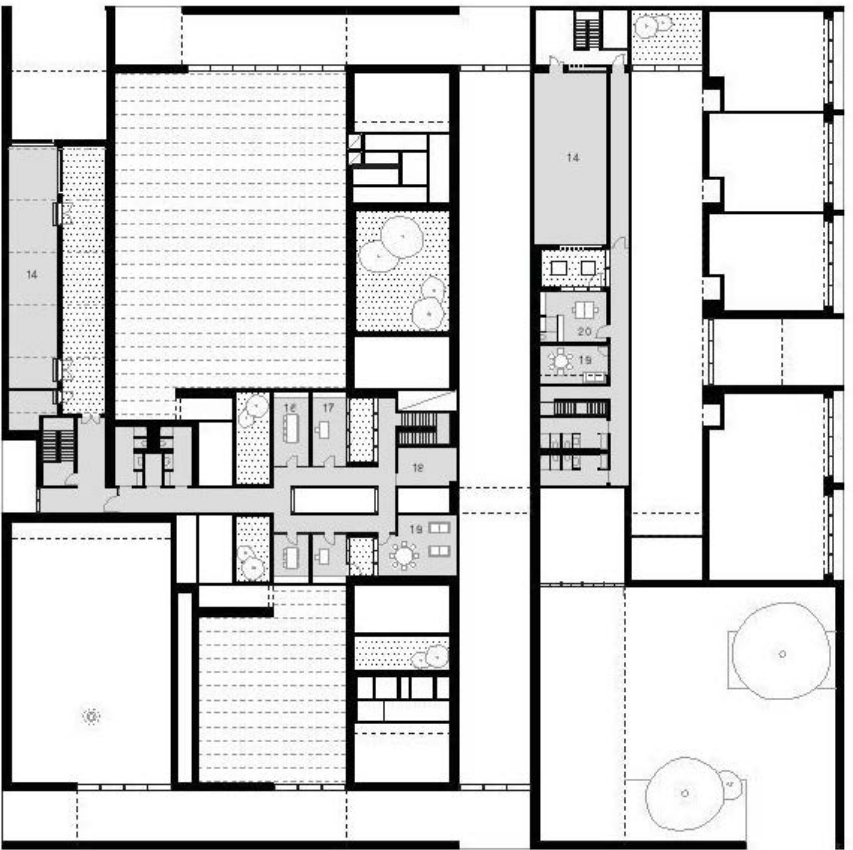
Siesegem

3

The Siesegem Crematorium in Aalst, Belgium, was designed by KAAAN Architecten. They wanted it to be a respectful and comforting place where the building itself helps guide people through the tough time of saying goodbye. The building blends right into the peaceful countryside around it, and the path leading up to it is very thoughtfully planned. People arrive on a special path that slowly takes them away from busy public roads and into a quiet, tree-lined setting. This carefully planned journey acts like a buffer, giving families the quiet time and space they need to mentally get ready before they go inside the building.



The place is set up very clearly and divided into three main areas: spaces for the public to gather and be received, formal halls for ceremonies, and the technical facilities for cremation. Each of these areas is physically separate. This helps everything work efficiently while making sure the funeral service stays very respectful.







A key part of the design is making sure all the technical operations are completely hidden. Service vehicles and other behind-the-scenes work are kept entirely out of sight from those attending, so people can have their private, emotional experience without seeing any of the site’s mechanical workings. The building doesn’t have any fancy decorations or religious symbols. Instead, it’s designed in a very simple and abstract way.



It’s a big, low, horizontal building, and its design is all about good proportions, nice materials, and a feeling of peace and quiet. Inside, you’ll find high ceilings and huge rooms. They used exposed concrete, warm oak wood, and elegant marble, all fitting together nicely. Light and the different textures really set the mood inside, but they don’t distract you. The big halls end up feeling like safe, comforting places where people can come together to grieve.



It’s easy to get around Siesegem, everything flows smoothly. Visitors walk through a series of spaces at a calm pace, designed so different funeral groups don’t accidentally run into each other. Big glass windows are placed just right, letting you see the outdoor areas and green fields around, which are peaceful views that can help calm your emotions. The building isn’t designed to make you leave quickly. Instead, there are large common areas and quiet spots where families can sit, talk, and let their feelings settle down before slowly getting back to their regular routines.



**1. Use trees and nature**

The main thing this design does is get rid of all the city noise to help people find mental peace. They tucked the low-profile building into a wide, unbroken meadow, using nature as the main building material. What teaches us about space is that you don’t need strong walls to feel separate from the outside world. Instead, a well-planned horizontal distance and a natural boundary can soak up your stress even before you walk through the door.

**2. Spaces with sequential**

It considers the tactical use of thresholds and volumetric apertures as a way of controlling the flow of people. The architectural layout pushes the side wall of the structure out to create a framed discrete backyard that creates a highly visible, protective arrival zone. Step over the threshold and the sudden vertical punctuation, a well-placed hole in the ceiling, floods the reception desk with natural light. This is a brilliant spatial guide, instead of signs the architecture uses a single light drop to instinctively orientate the visitor and define the direction of the journey.

**3. Inner Courtyards**

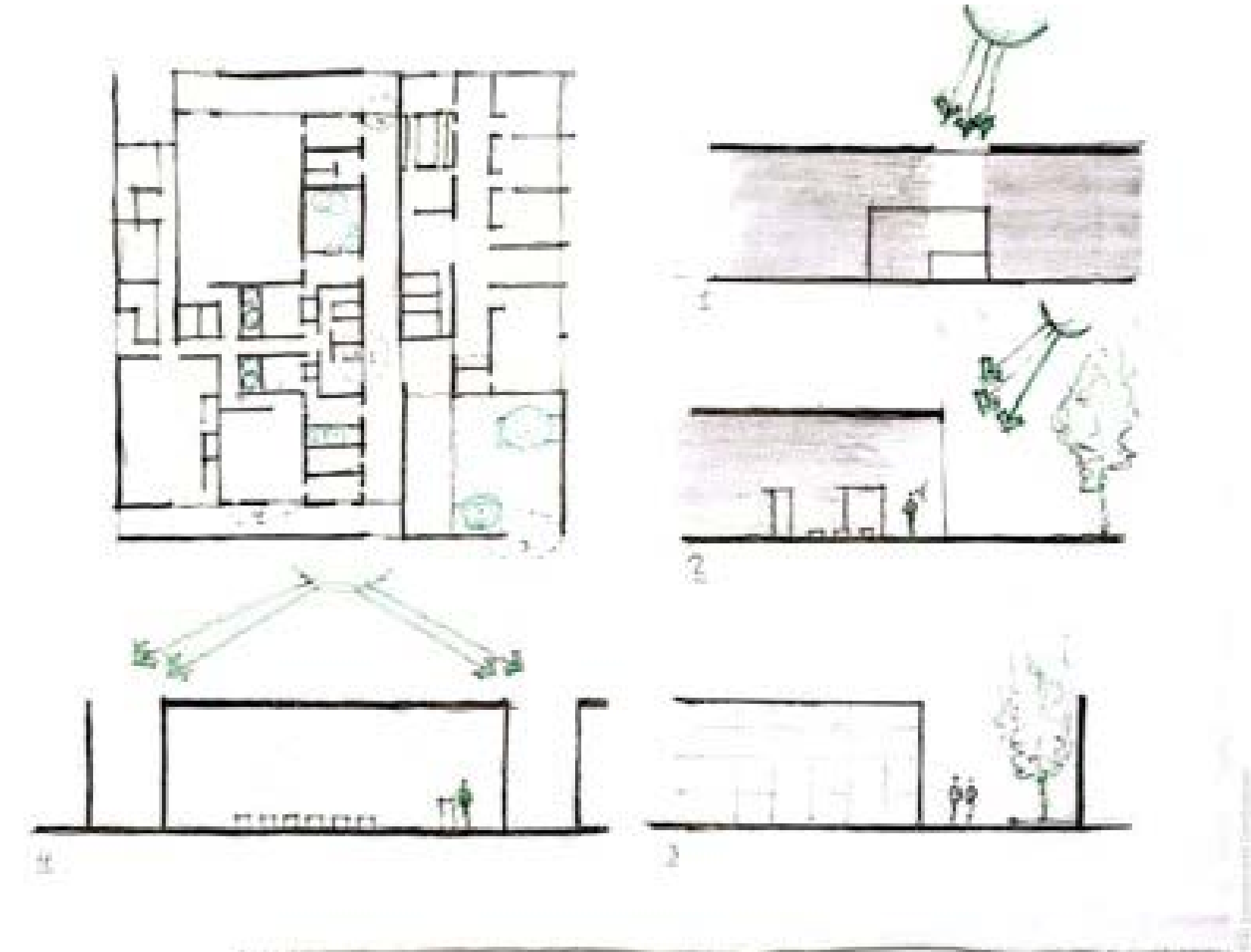
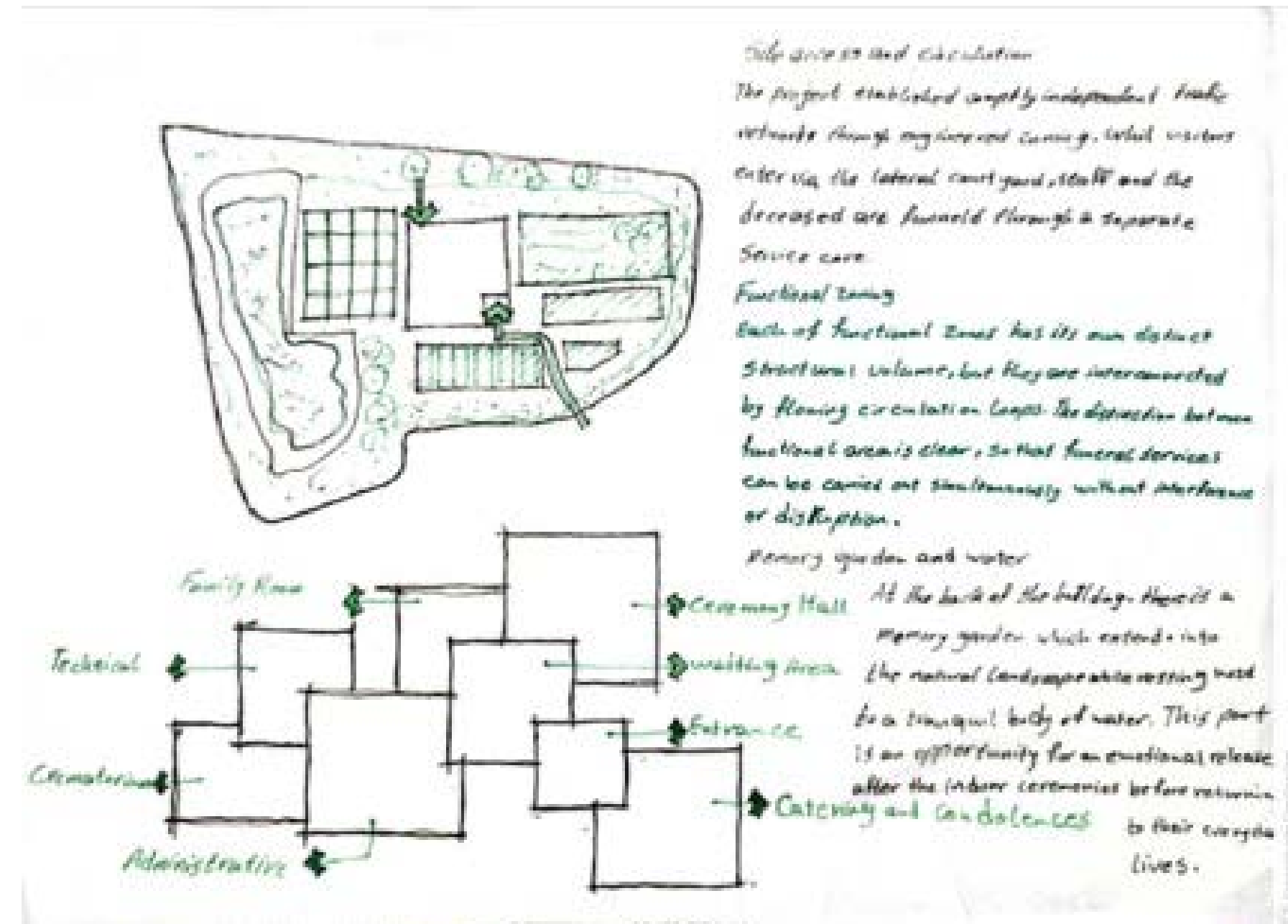
The courtyards are inward-looking pockets of nature that anchor the waiting spaces. These spaces are sandwiched between framed views of quiet greenery and native trees in the floor-to-ceiling high windows on both sides of the indoor waiting zones. The idea is to use these minimalist glass boundaries to help defuse emotional tension. The play of changing daylight and raw materials like Ceppo di Gré marble serve as a grounding, meditative focus for the families just before they enter the solemnity of the main hall.

**4. The Last Ceremony**

The final ceremony is all spatial introspection and atmospheric dignity. Rather than harsh direct light, the main auditorium is filled with diffuse indirect light that spills in from the high ceilings of adjacent architectural volumes. The calculated diffusion creates a perfect shadowed void, removing visual distraction from the room. The hall is then a silent container, respectful of the intimacy of the rite, and the community can concentrate solely on the act of farewell, based on this muted, indirect glow.









Design Concept

- Inside-out
- Outside-in
- Design; the architectural synthesis
- The final design; the chapel as an objet trouvé

The Generative Logic of Form

The architectural concept behind the Human Composting Complex is not based on arbitrary aesthetic choices but rather a rigorous double-sided generative logic. In designing a contemporary sanctuary for Natural Organic Reduction (NOR) within a complex site such as Turin, it is essential that there is a balanced dialogue between the internal biological effectiveness of the design and the external urban memory.

The creation of this structural harmony is achieved by separating the design methodology into two complementary movements that work together at the same time: inside-out and outside-in.

The inside-out approach defines the domestic order of the project through the intimacy of human grief, the technical programmatic requirements of the composting vessels, and the separation of functional flow from one another to produce a protected, peaceful interior environment.

The outside-in approach serves as the object anchoring the building to absorb all constraints, scales of industry and the material memory of the Mirafiori district and Cimitero Parco.

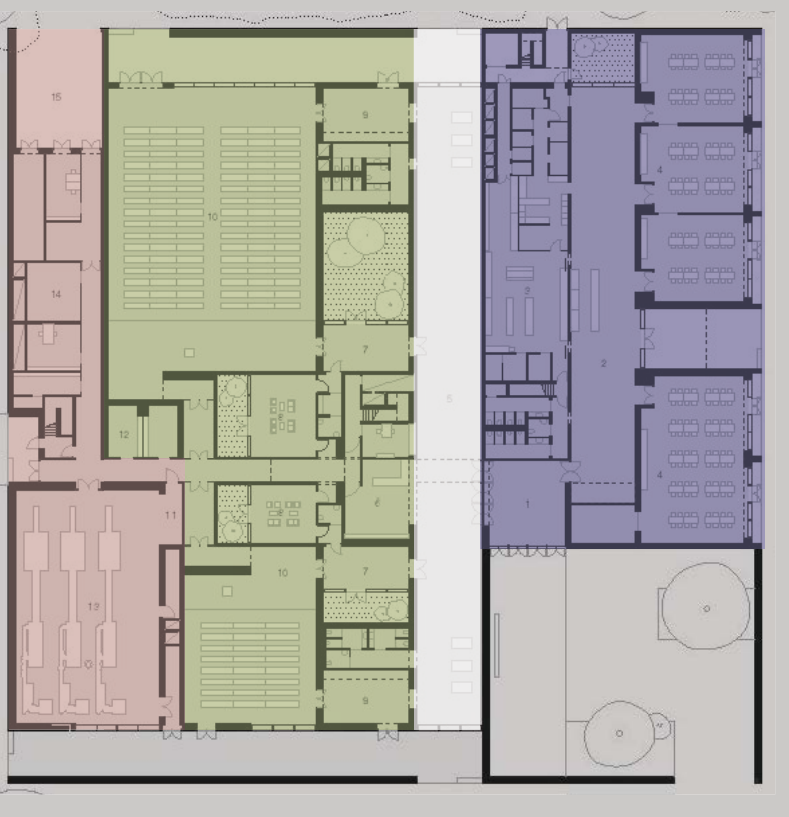
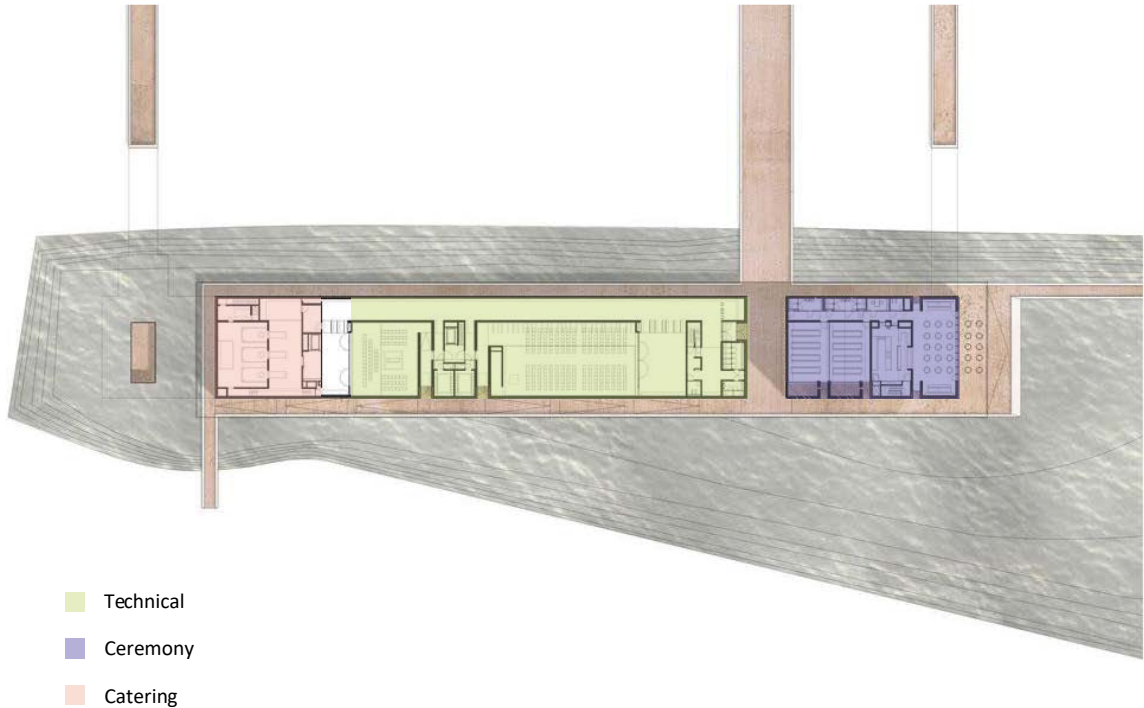
The final form of the built environment resulting from the collaboration of these two forces will be a living horizontal landscape architecture instead of a fixed monument to death; it will create an urban environment that has absorbed all industrial memory of Turin and provides for clean, respectful and self-sustaining cycles of urban rebirth.

# Inside-Out: Programmatic Strategy

The “Inside-Out” strategy means that our design starts from the inside of the project—specifically from the functional program and human experiences. Instead of drawing an exterior shape or facade first, we begin by analyzing and arranging the internal spaces. In this step, we take the functional lessons from the reference case studies (Heimolen and Siesegem). We break the entire project down into three main internal zones: the Public/Reception Area, the Main Ceremonial Hall, and the Technical Composting Core. By doing this, we create a strong, clean functional layout first. This internal order becomes the foundation that pushes outward to shape the final building.

## 1. Volumetric Autonomy and Programmatic Separation

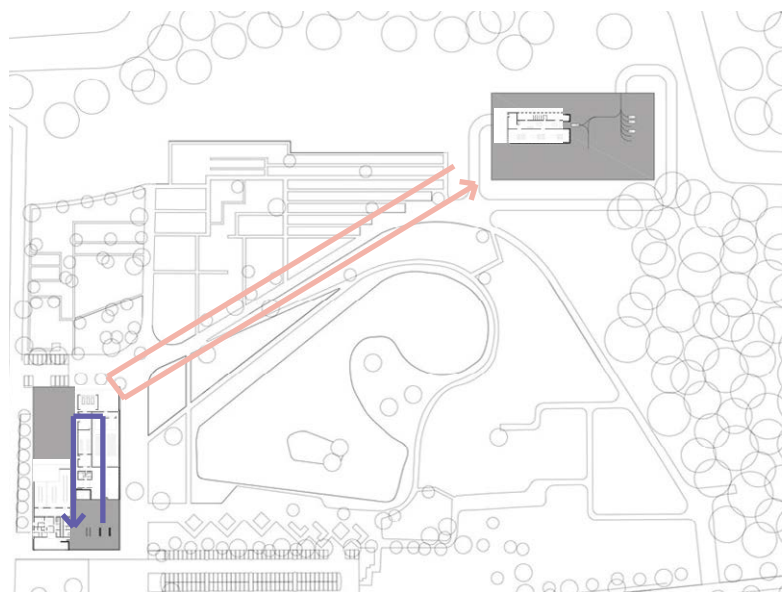
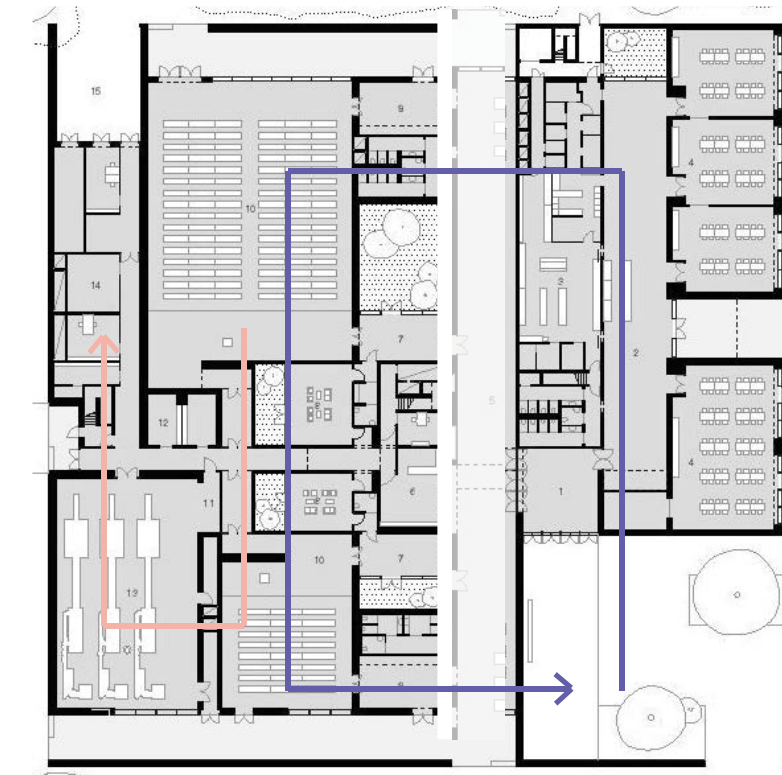
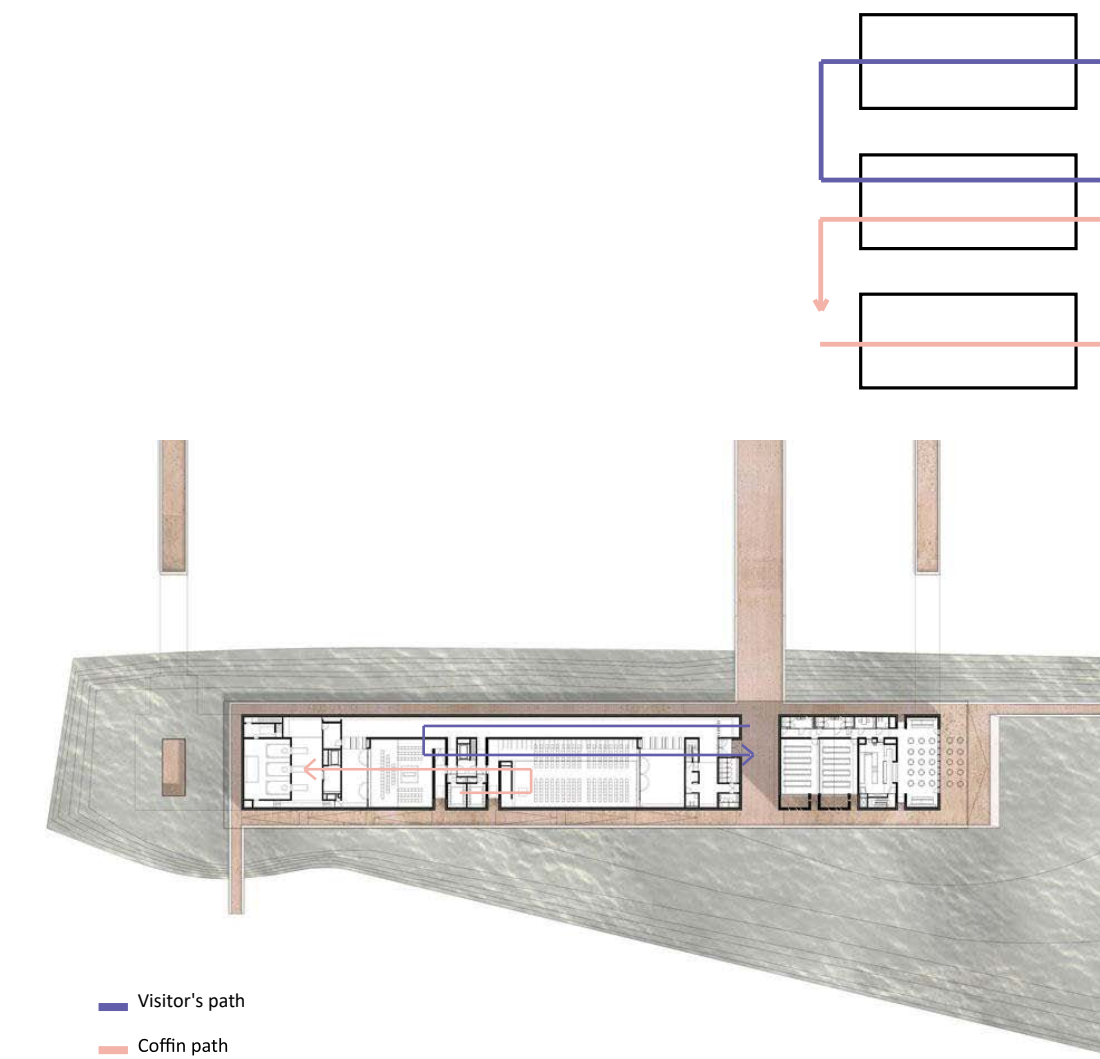
Those who have referenced similar projects have concluded that to create a spatial order while maintaining respect, the functional program must be broken down into three separate zones: the “Public and Reception Area,” the “Main Ceremonial Hall,” and the “Technical Biomatter Transformation Core.” This first separation will provide a primary framework for providing mass to your site without creating functional confusion in your design.





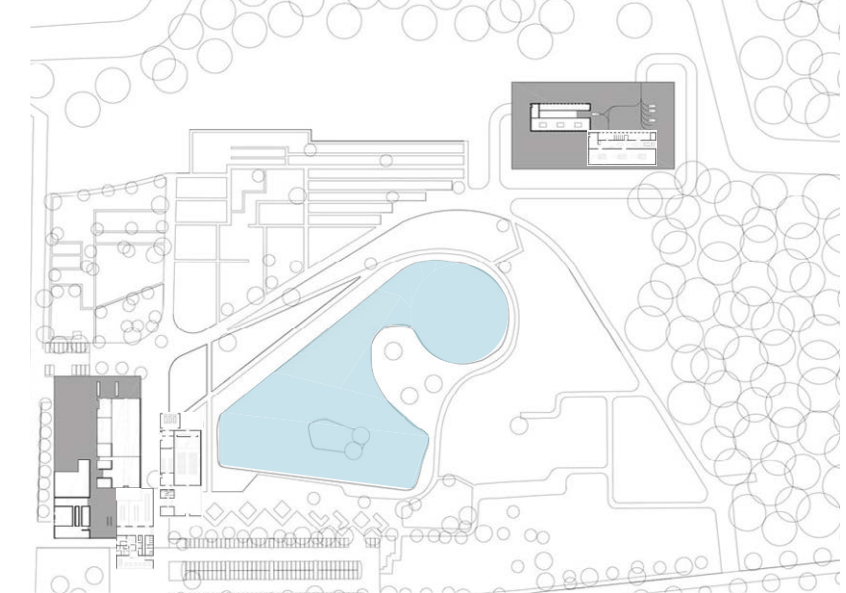
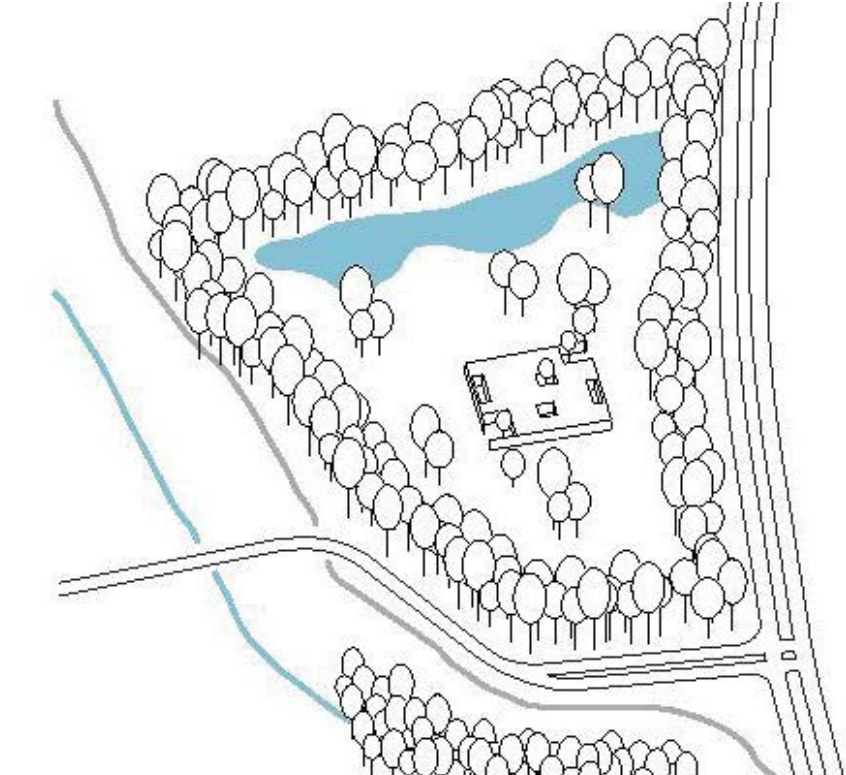
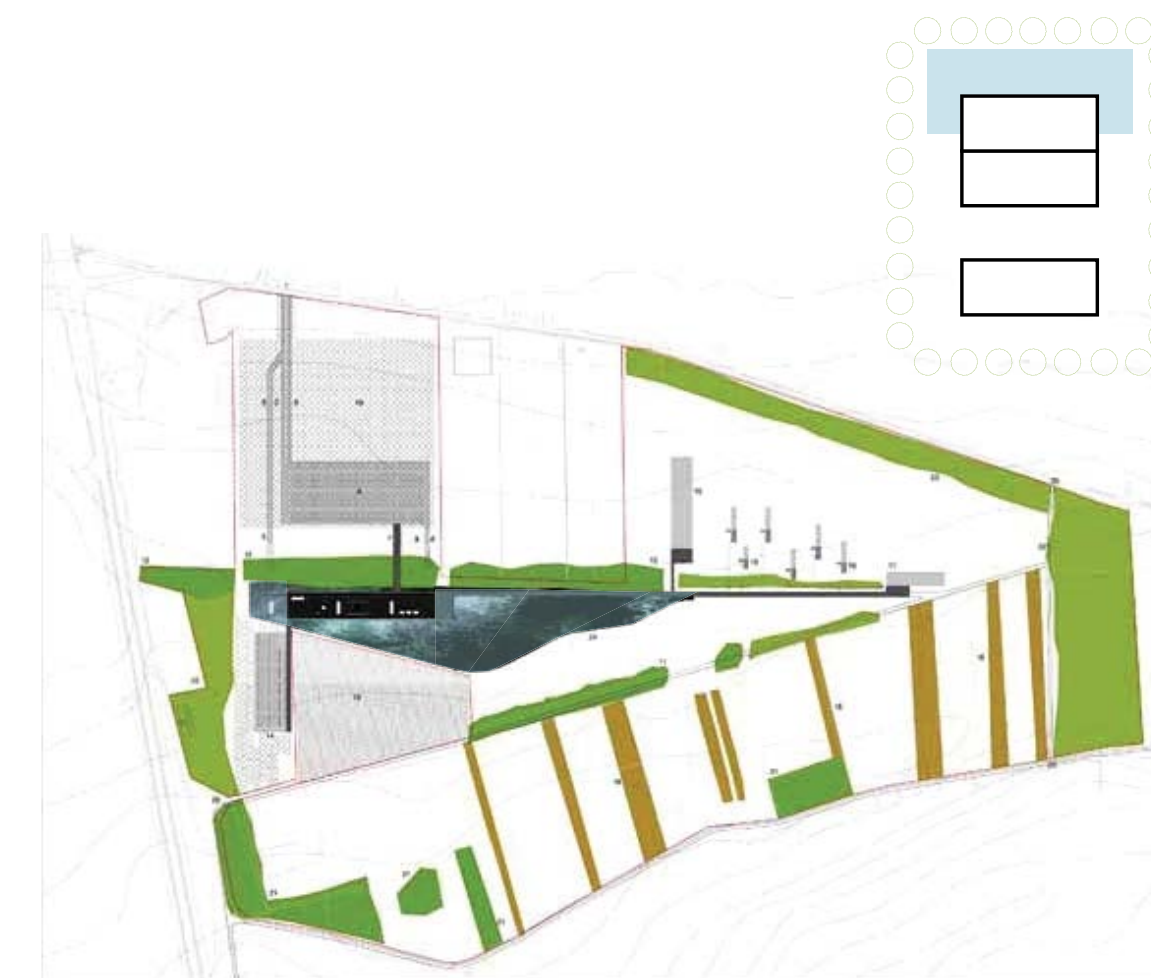
## 2. Choreography of Flows and Structural Proximity

Analyzing circulation paths in the case studies proves that privacy and emotional calm for the families depend entirely on separating traffic networks. By shifting these three volumes and changing the distances between them, the paths for “mourners,” “staff,” and “the deceased/logistics” are completely isolated so they never cross at any point.



## 3. Environmental Buffers and Atmospheric Sections

The other important point to make is that the architecture must connect with nature to produce an emotional filter; this has been accomplished by including green space, natural vegetation (trees) and water features surrounding the masses providing peaceful filters. This can also be seen in the design of architectural sections through deep openings in the roofs to create soft indirect light above while tall glass walls facing the landscape will help create an inviting environment.



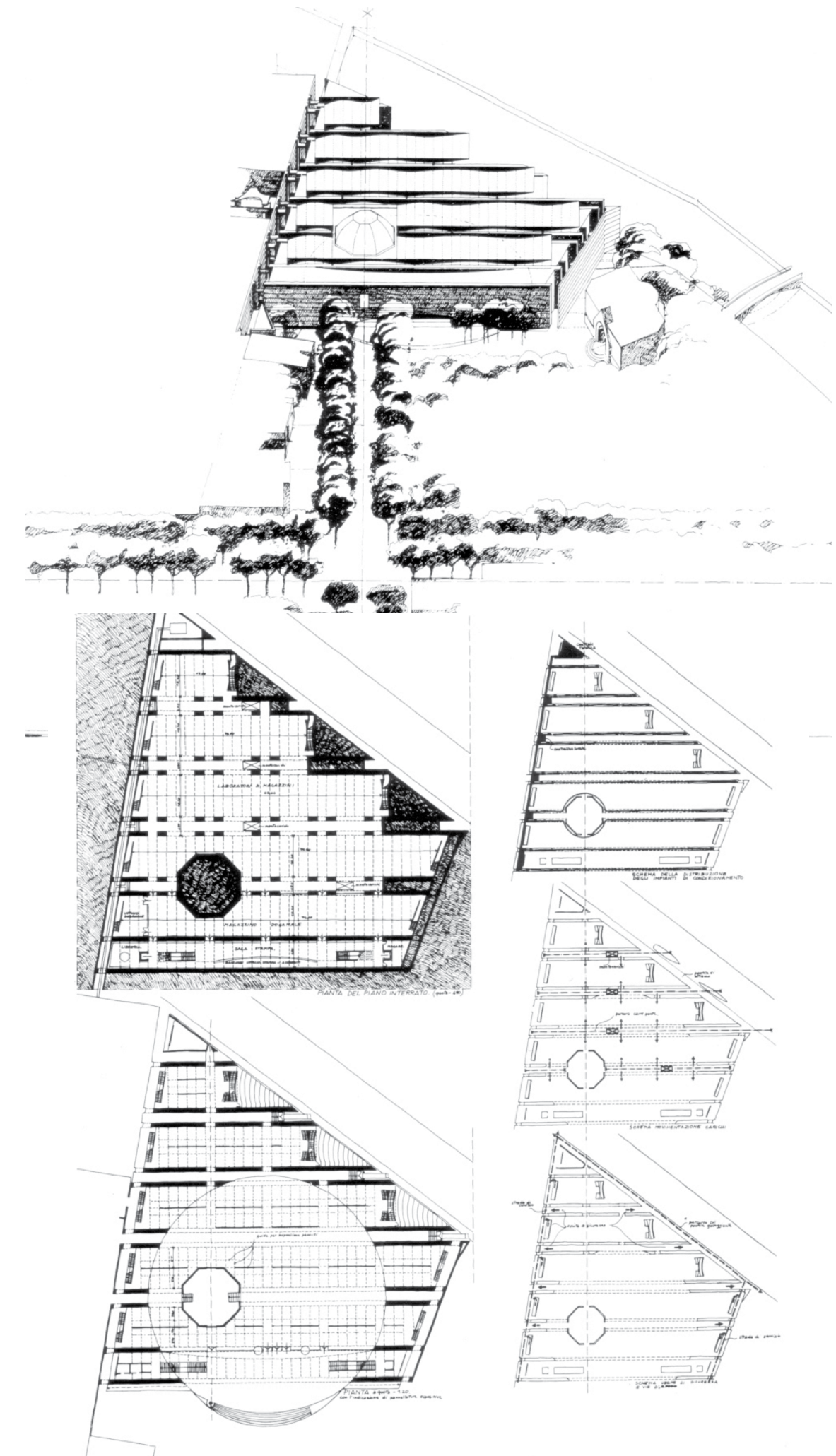
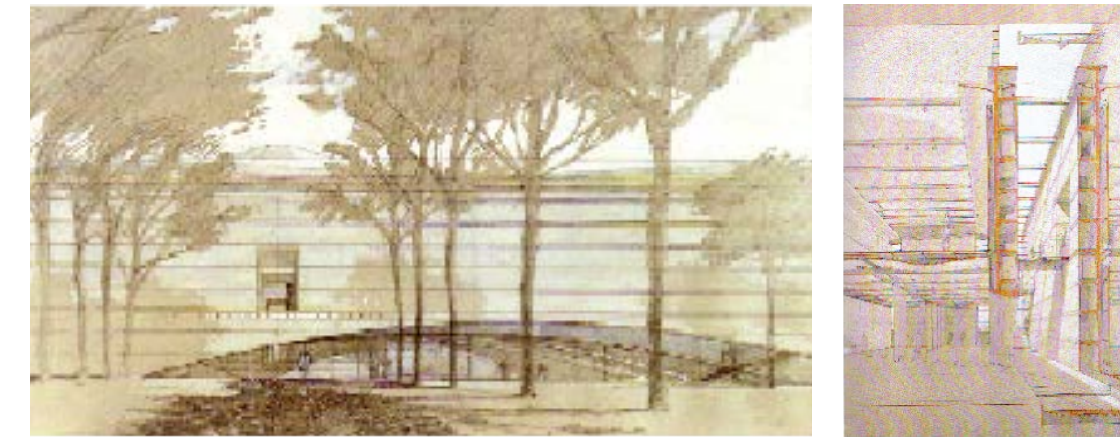


## 2 Outside-In: Contextual Strategy

The “Outside-In” strategy means that our design is shaped by the forces, history, and textures of the city surrounding the site. Instead of looking only at the internal functions, we collect evidence from the local area of Turin to define the building’s outer logic, materials, and rhythm. In this step, we bring the identity of the neighborhood into the project: The Historic Chapel: The presence of the old church guides our spatial layout, connecting the new design to the history of the site. Industrial Rhythm: We study the massive Fiat Miraori factory nearby. Its low, horizontal “mat-building” shape and its strict urban grid give our project its long, low profile and a clear structural order. Earth and Soil: The natural, earthy environment of the site tells us what materials to use, leading us to choose local aggregates and soil for the walls.

### 1. Site Selection and the Historical Context (The Church and Cellini)

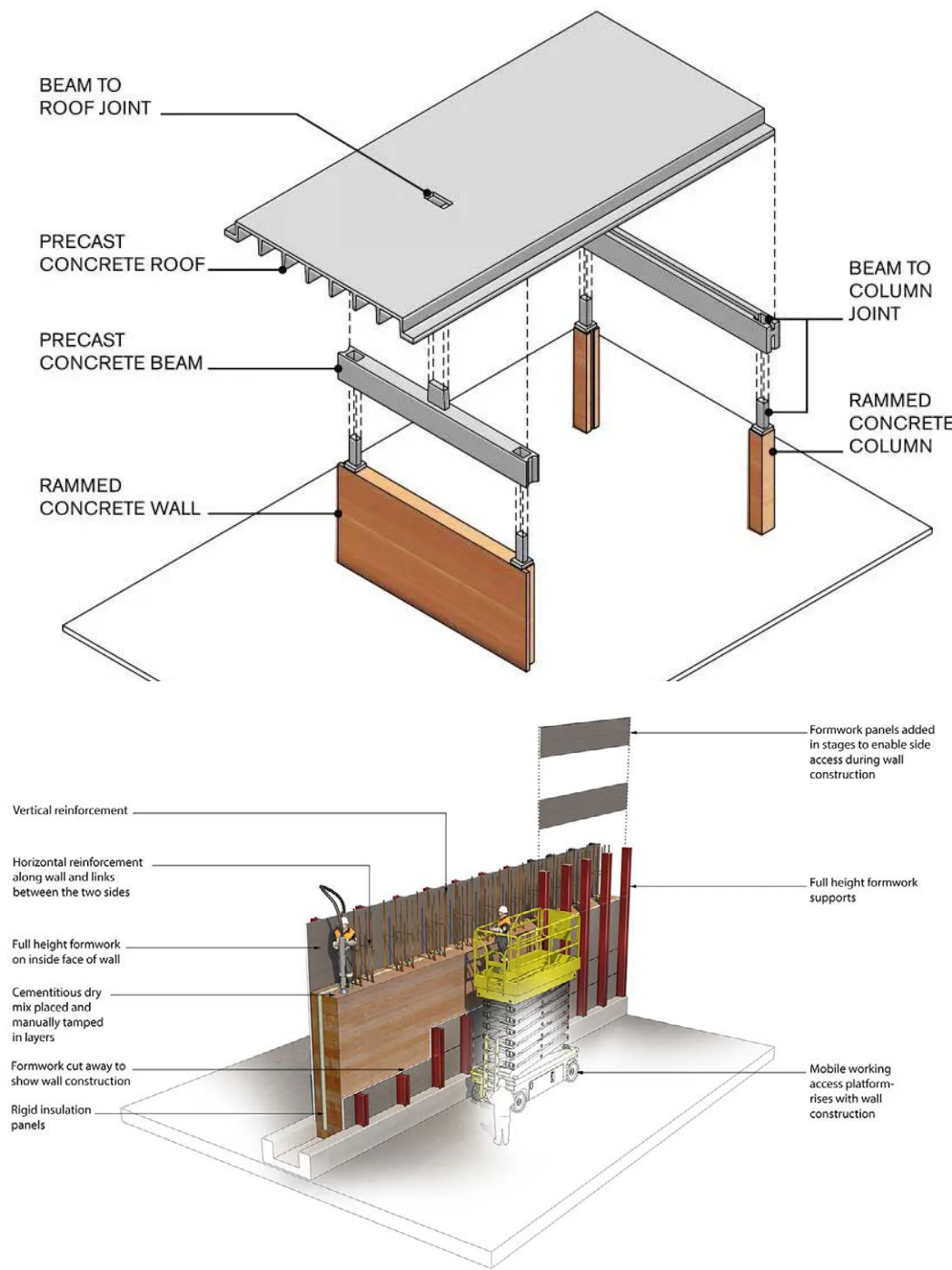
After analyzing the site and its surroundings, I selected the north-west area. This zone is close to the historic church, offers a large open space, and provides a great opportunity for design. The presence of this historic chapel immediately brings to mind the unbuilt Cellini project. In that project, strong parallel walls carefully framed and enclosed the church. I am using this exact parallel-wall strategy to respect and frame our site’s historical elements.





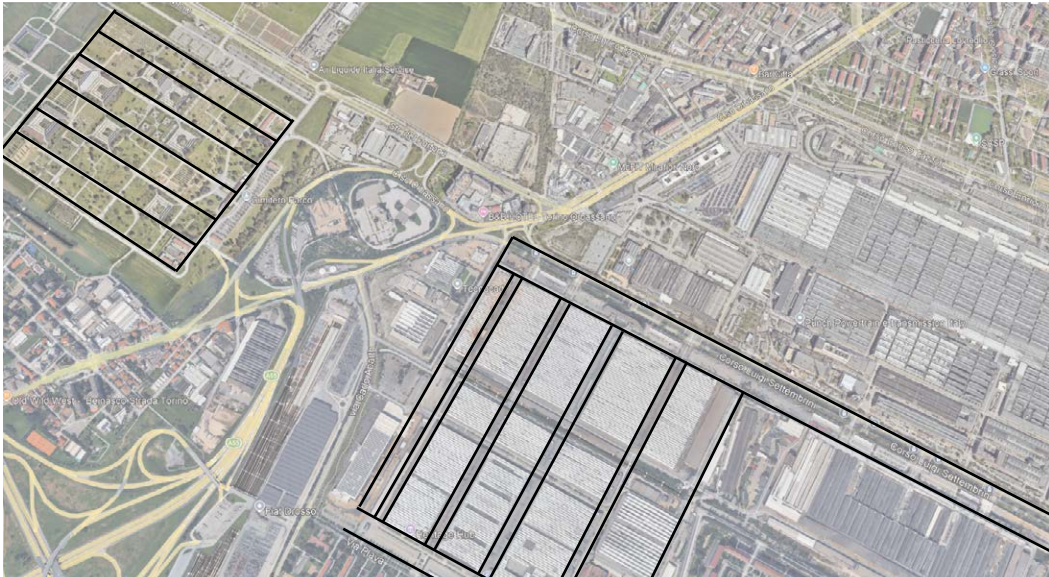
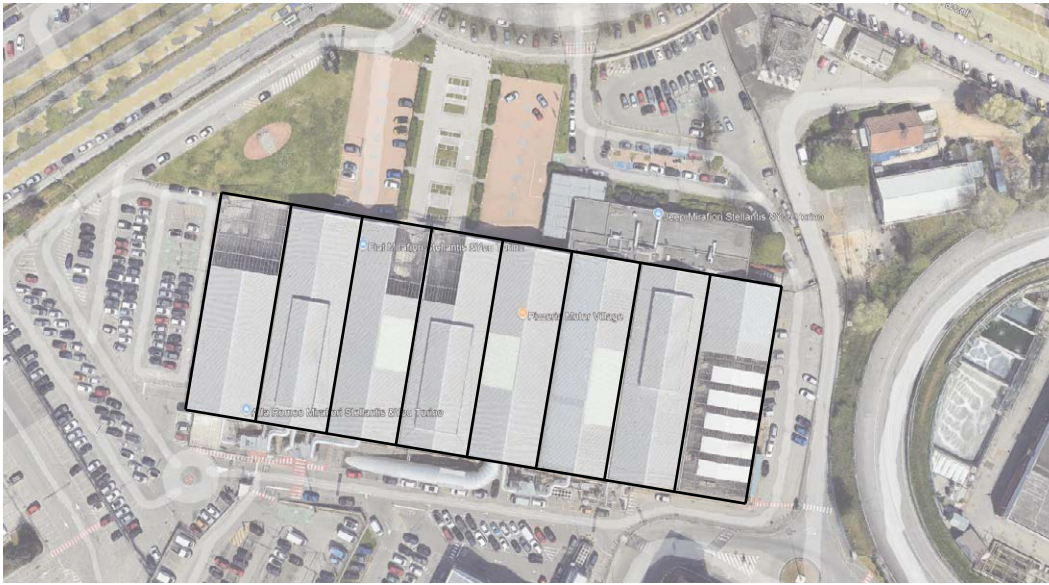
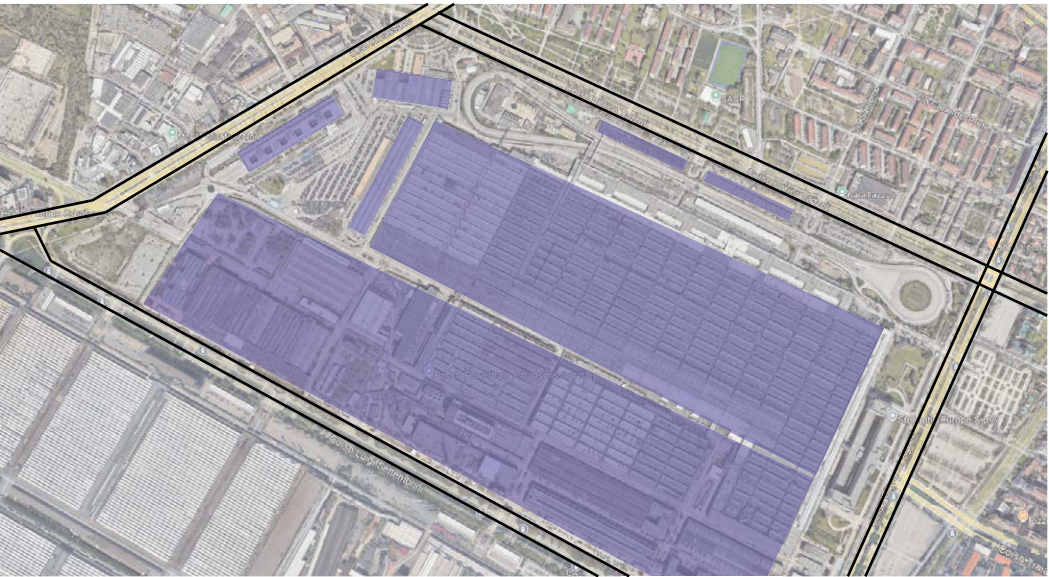
2. Materiality and Earth Textures (The Soil and Narbo Via)

The second key feature of the site is its natural, earthy environment. This texture led me to study Foster’s Narbo Via Museum. Following its material logic, I decided to use structural rammed earth made from soil and local aggregates excavated directly from the Turin site. This creates a textured, heavy wall system that feels permanently connected to the ground and matches the colors of the surroundings.



3. Industrial Rhythm and Horizontal Form (The Mirafiori Factory Model)

The site is deeply connected to the massive Fiat Mirafiori Factory nearby. The factory is a huge, mat-building that spreads across the ground like a carpet. Both the factory and the cemetery work like a large urban grid. Instead of designing a tall tower, I created a long, low horizontal building. This low profile matches the industrial mood and scale of the neighborhood. In addition, the factory has organized along a disciplined system of 20-meter parallel structural axes. I have used this same 20m of Seriality to create the roof canopy and the layout of my project as well. This will give the appearance and feel of being part of the historical industrial nature of the city of Turin.



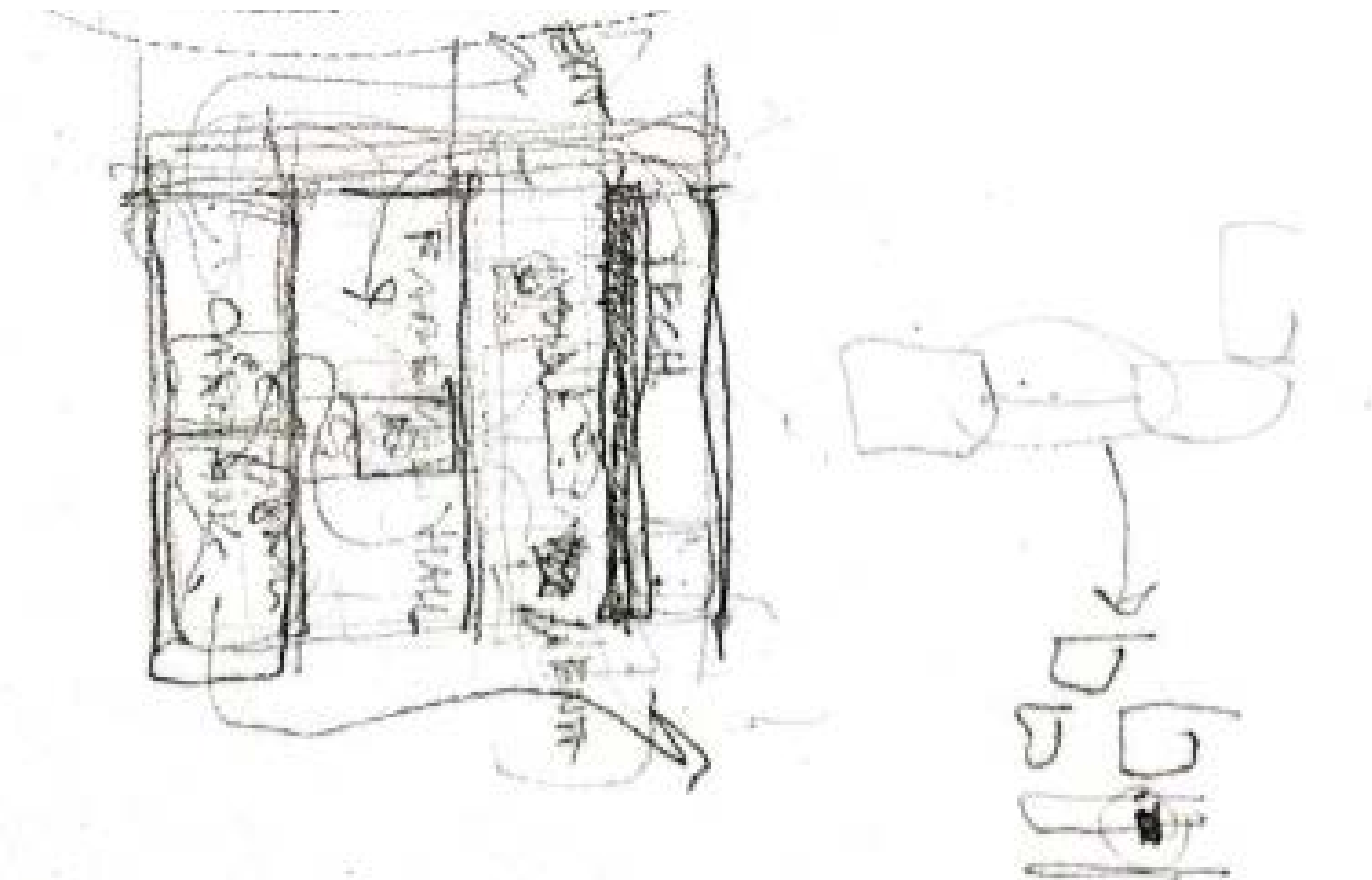
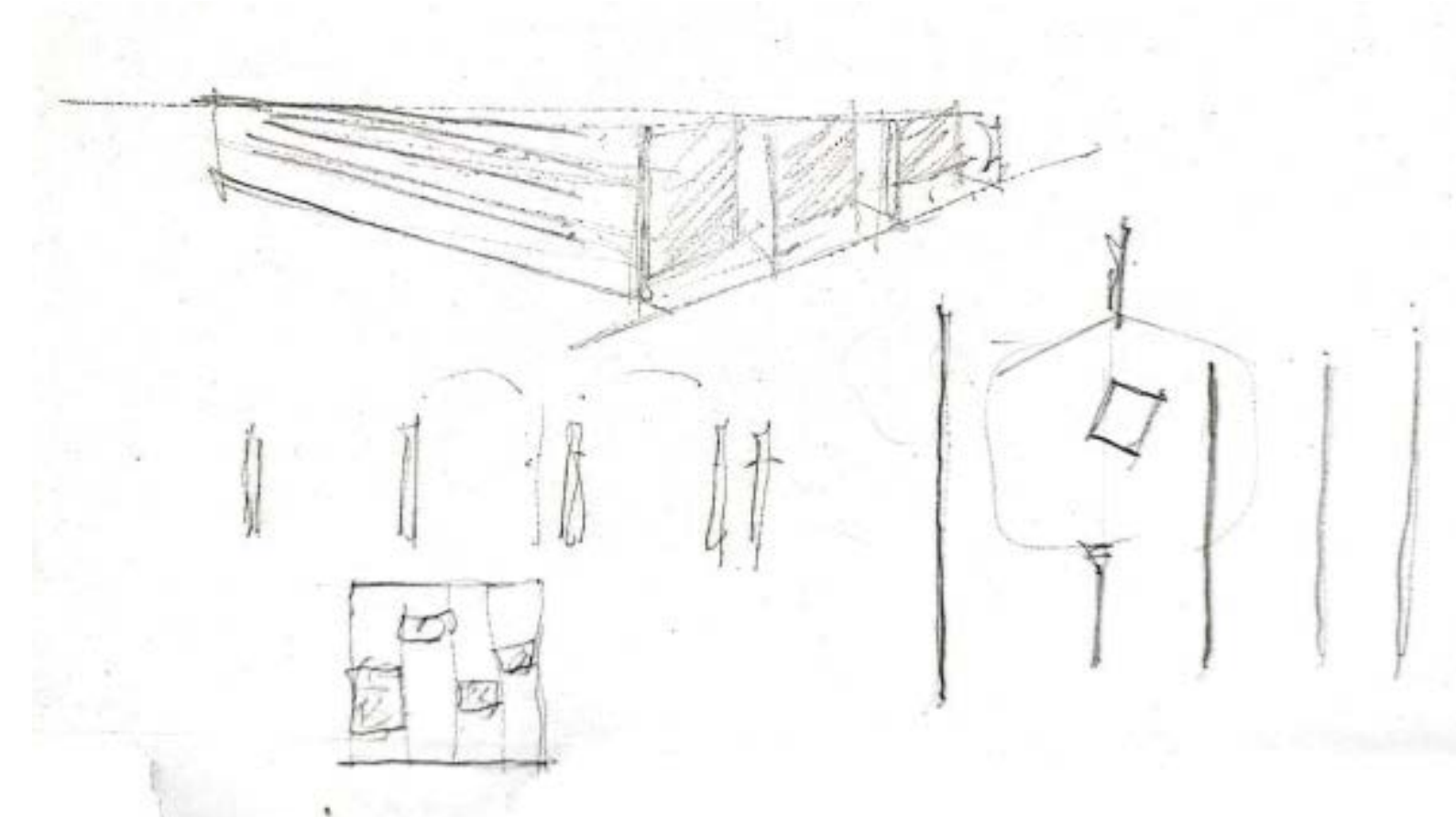
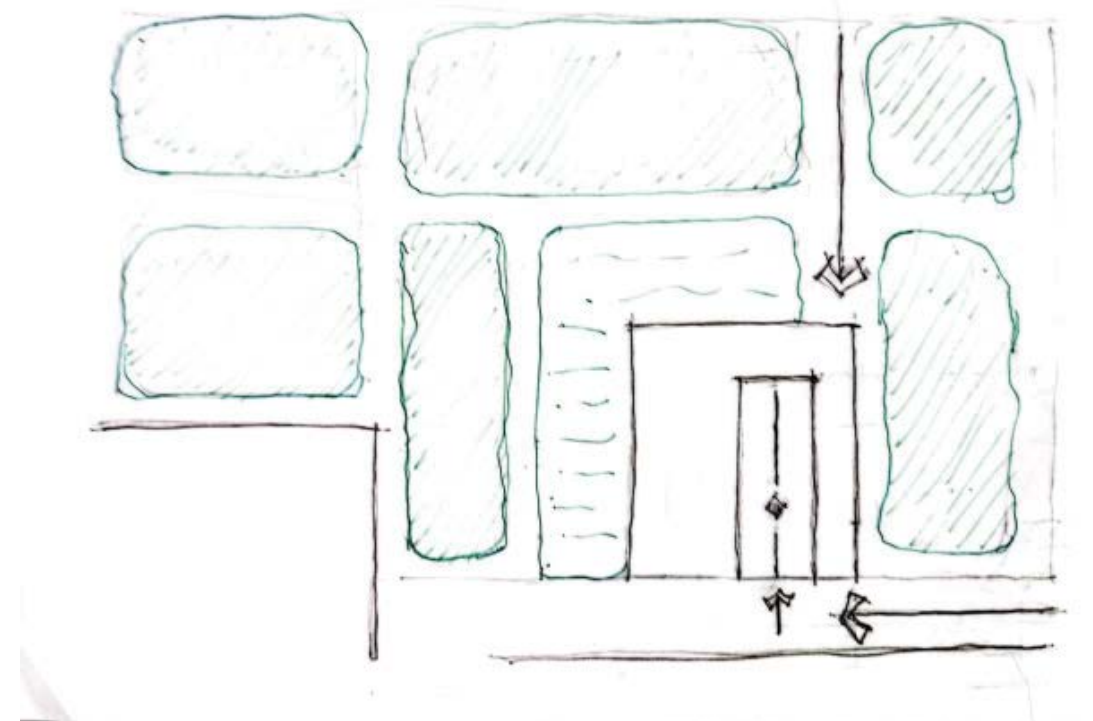
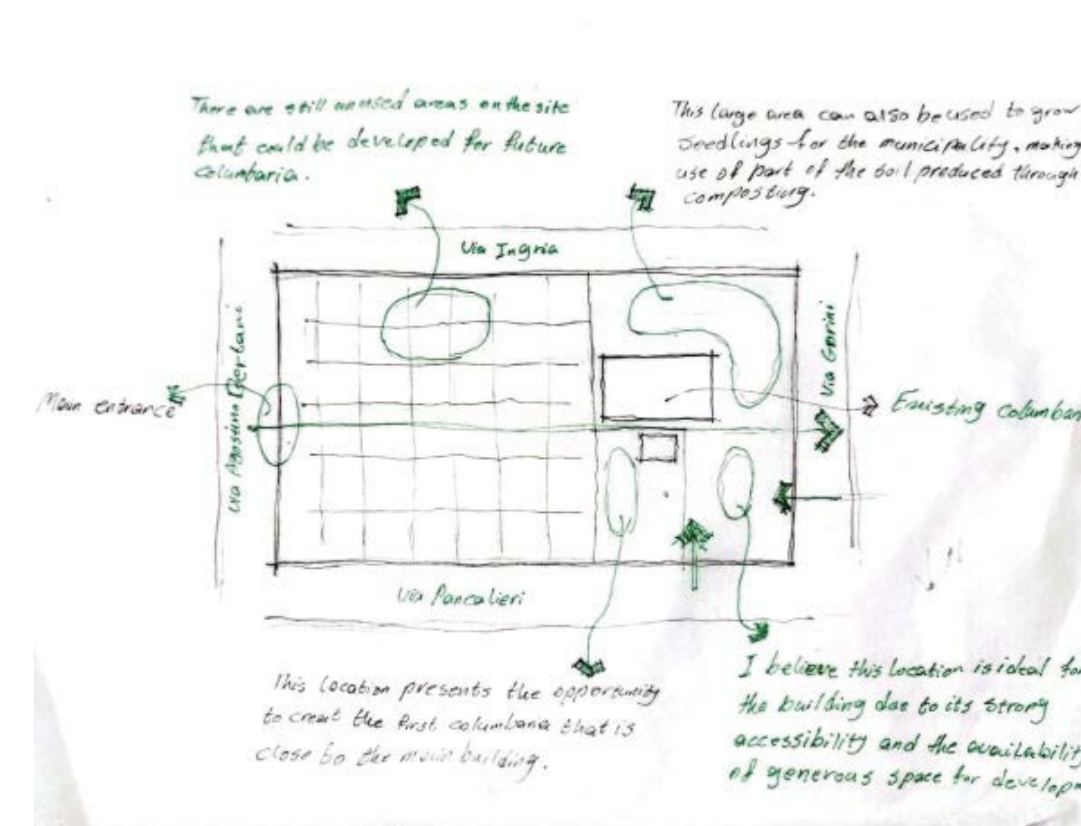


### Design: The Architectural Synthesis

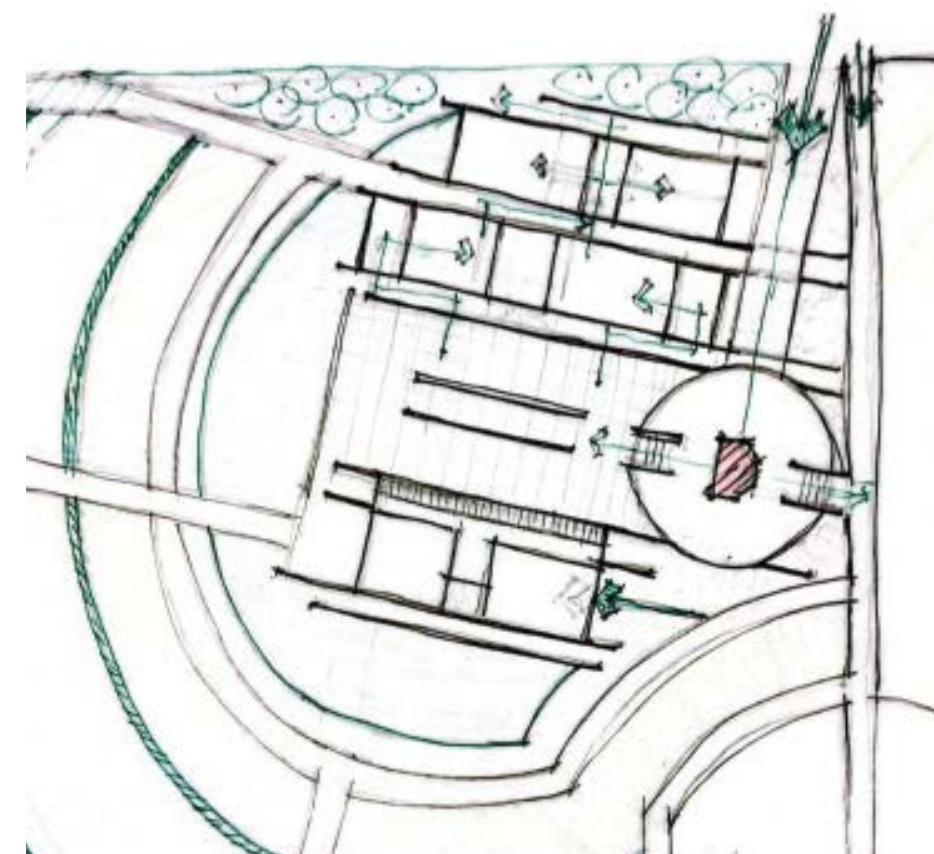
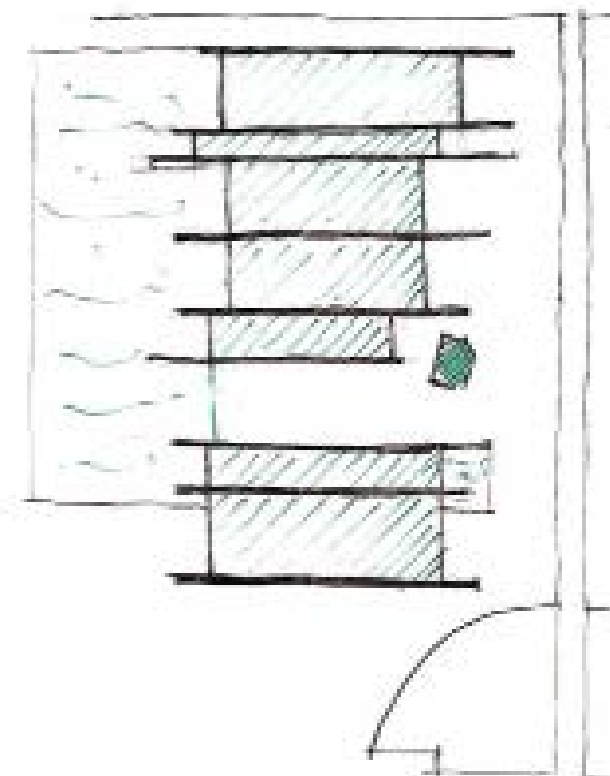
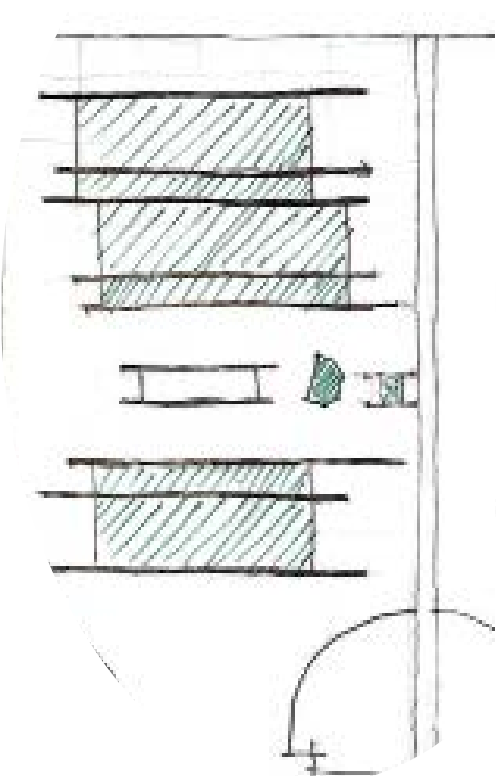
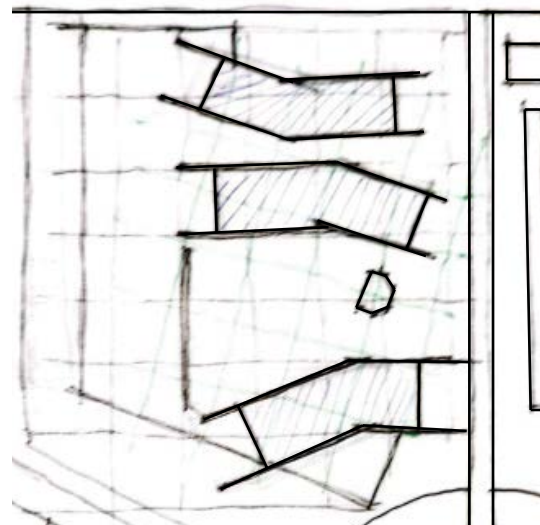
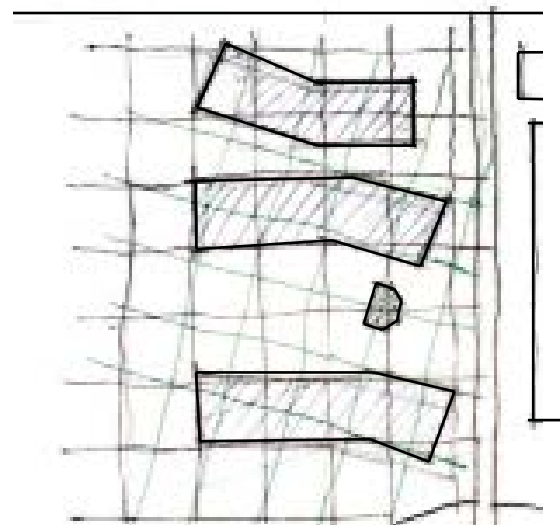
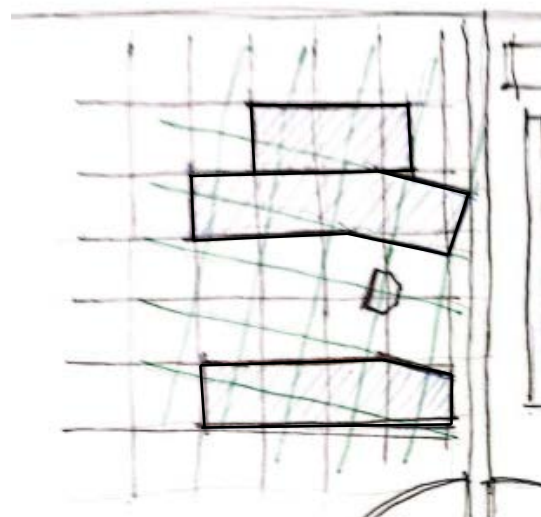
Establishing the typological lineage of this project is one of the key architectural elements necessary to expand on the spatial geometry of space (A). Although Goodbye Architecture has documented various systematic examples in researching modern precedents of death care through cremation, the core architectural principles of death care continue to be consistent from an architectural and phenomenological perspective. An existing crematorium and human composting facility do not possess different spatial attributes, and therefore both typologies must develop the same clear and sensitive spaces; dignified choreography of grief; secular spirituality; streaming user flows are; and, there should be a 'carry-the-body-out' experience. The only differentiation between the typologies is a technical and biological one (the only difference is that the fossil fuel-based thermal destruction of the body will now occur through the organic cycle of compost).

Therefore, combining the previous two design steps (i.e., Inside-Out and Outside-In) has produced the final form. Rather than drawing a random shape, we created an architectural solution from the merging of our internal functional program with our external urban context. Here is how these two steps shaped our design:

- From Inside-Out: We took the strict separation of functions and the clean choreography of flows. The public areas, ceremonial spaces, and the technical composting wall are organized so that their paths never cross, ensuring absolute privacy and respect. We also added the water feature and green buffers around these functions to create a peaceful atmosphere inside.
- From Outside-In: We applied the physical rules of the Turin site to these functions. We took the 20-meter structural grid from the Mirafiori factory and used it to organize the building's layout and roof canopy. We also adopted the heavy, rammed earth materiality inspired by Narbo Via to ground the building in its earthy context. By matching the internal needs of a contemporary composting facility with the industrial order of the neighborhood, the project naturally evolved into the long, horizontal, and deeply respectful architecture shown in these design sketches.





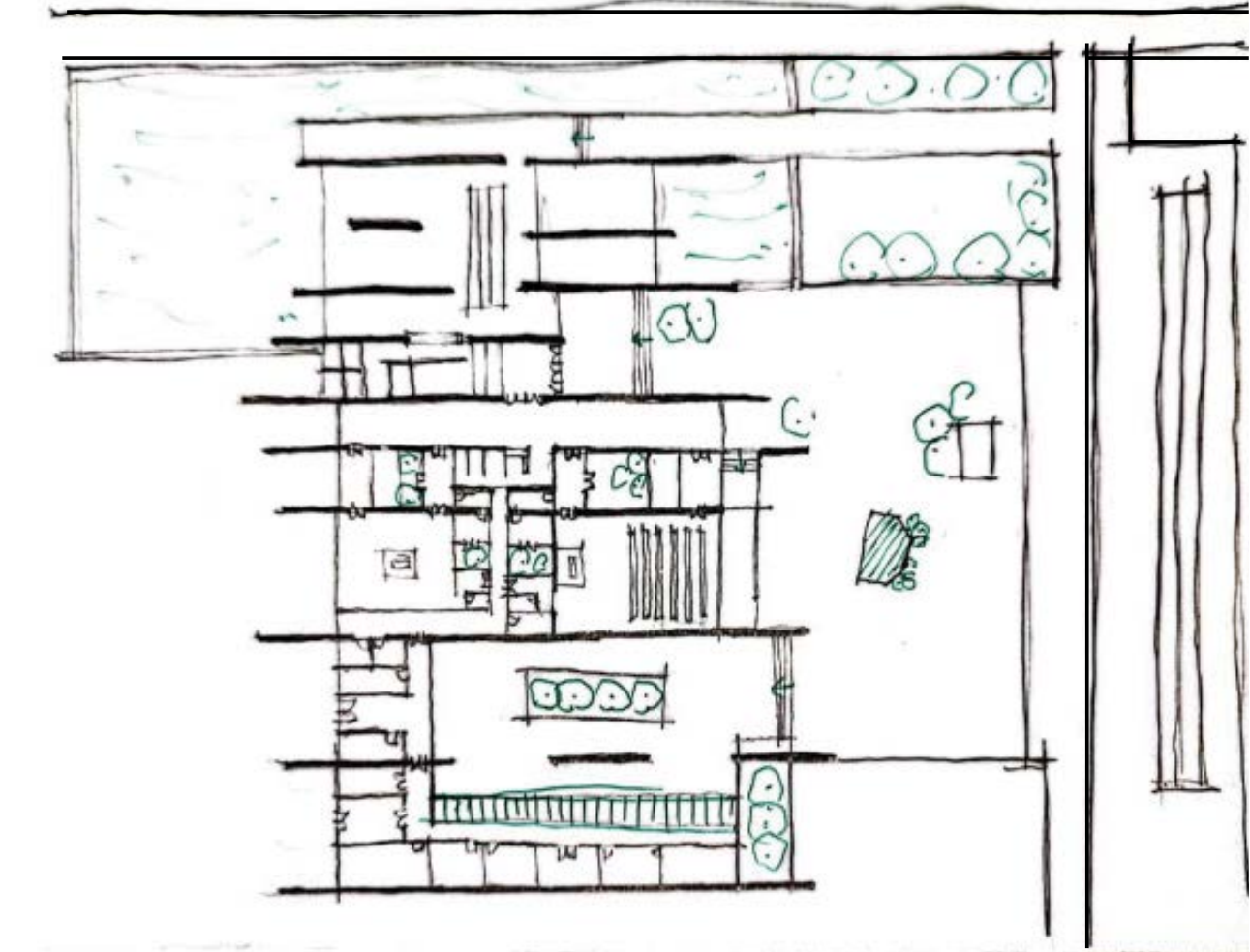
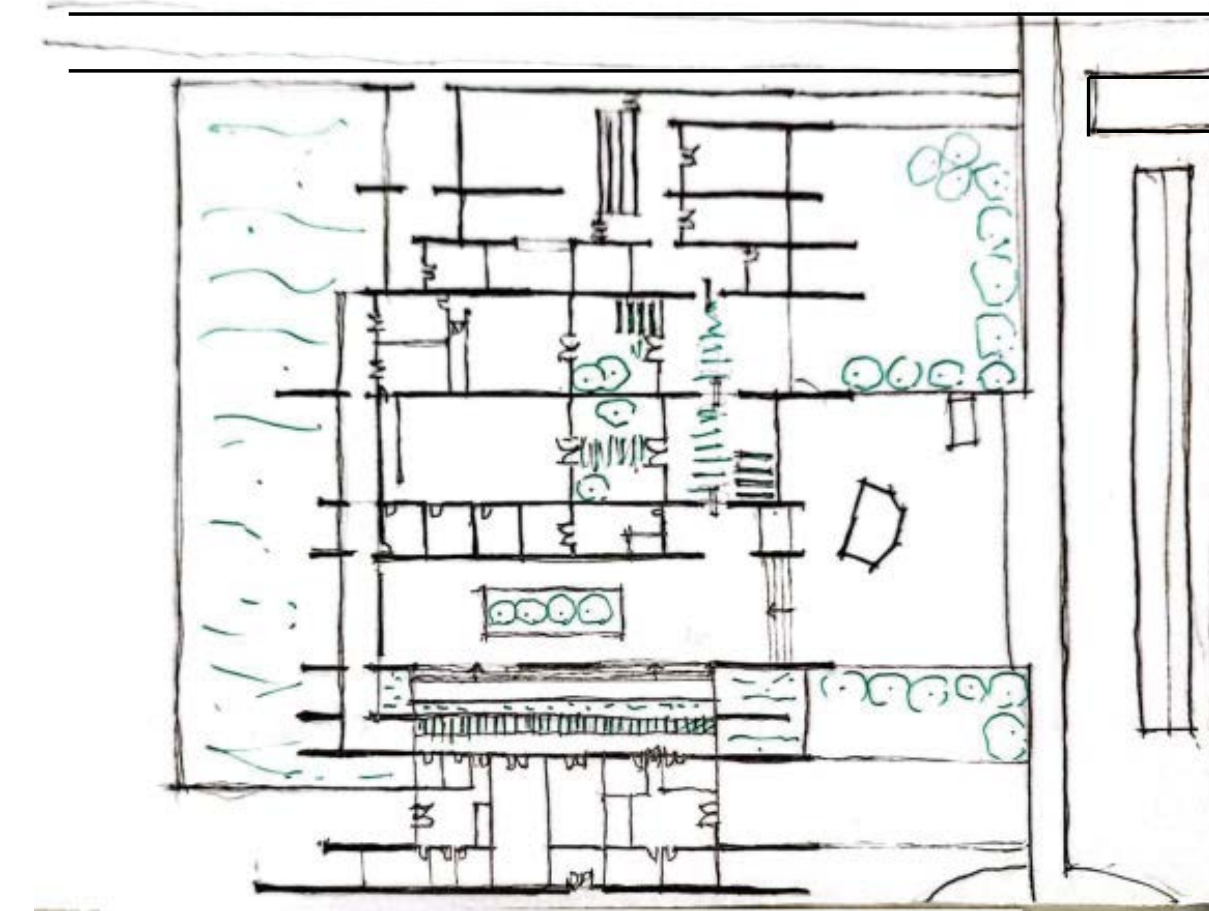
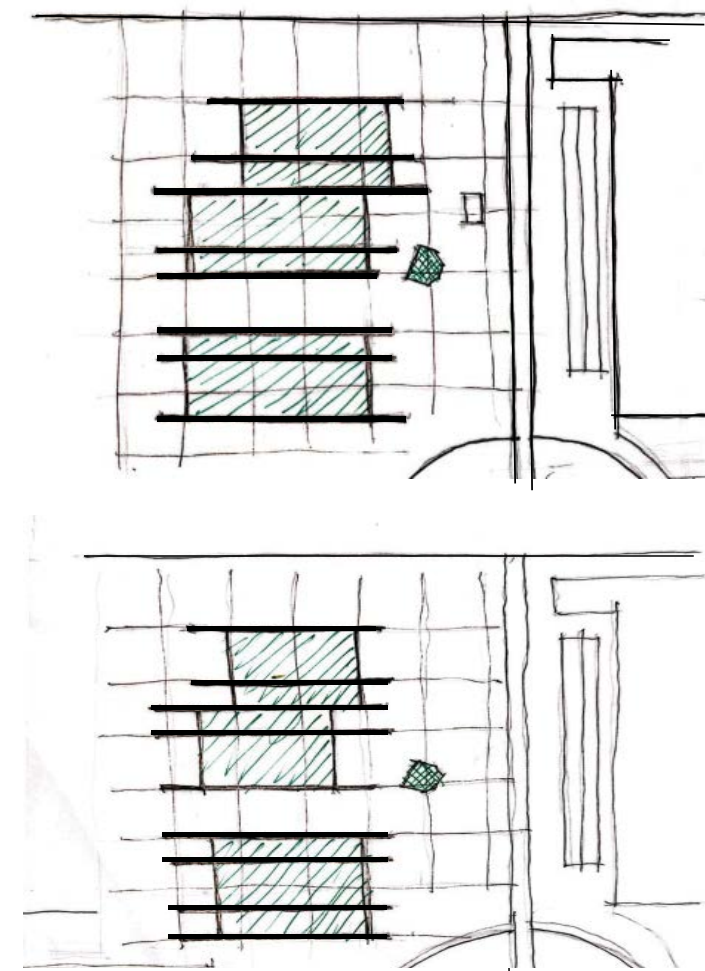




## 4

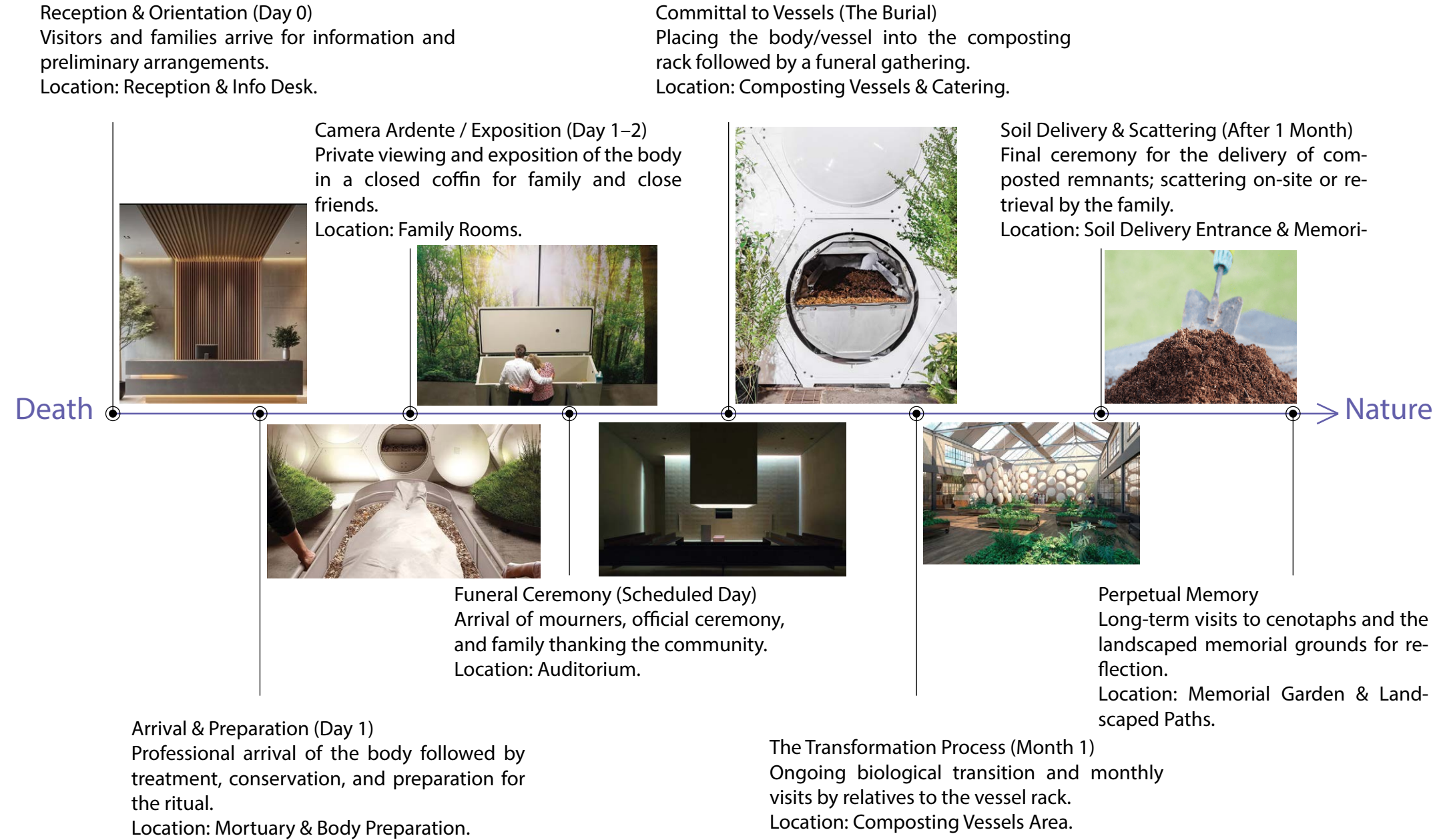
## The Final Design: The Chapel as an Objet Trouvé

- After exploring many sketches, options, and layout variations, we reached our final and most important architectural decision regarding the historic chapel on the site. Initially, following the Cellini strategy, the idea was to completely enclose the church with our parallel walls. However, after deeper analysis, we decided not to hide or imprison the historic church. Instead, we chose to treat it as an “Objet Trouvé” (a found object). In this final phase, we fully implement all the core ideas developed through our research: The Inside-Out flow system that separates the paths of mourners and technical staff. The composting wall that serves as a temporary grave landscape for visiting families. The Outside-In industrial order using the system of 20-meter parallel structural axes from the Mirafiori factory. The water reflecting pools and rammed earth materials. By treating the historic chapel as a free-standing, respected object, the new horizontal architecture wraps around it without touching it. The final design becomes a powerful dialogue between the industrial memory of Turin, the innovative composting process, and the permanent history of the site.

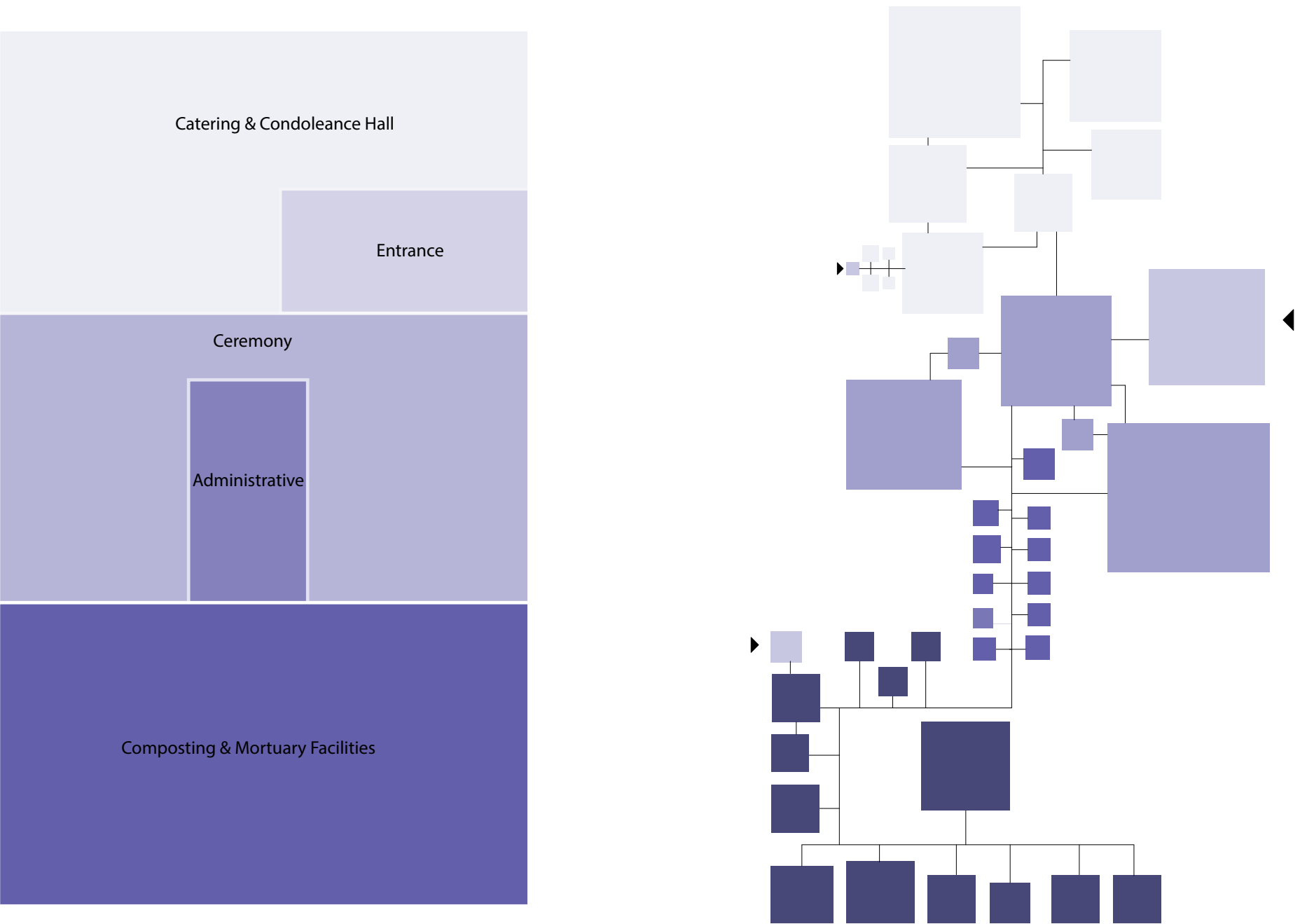




Compost Timeline

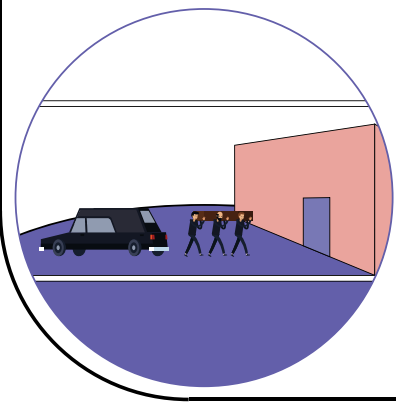
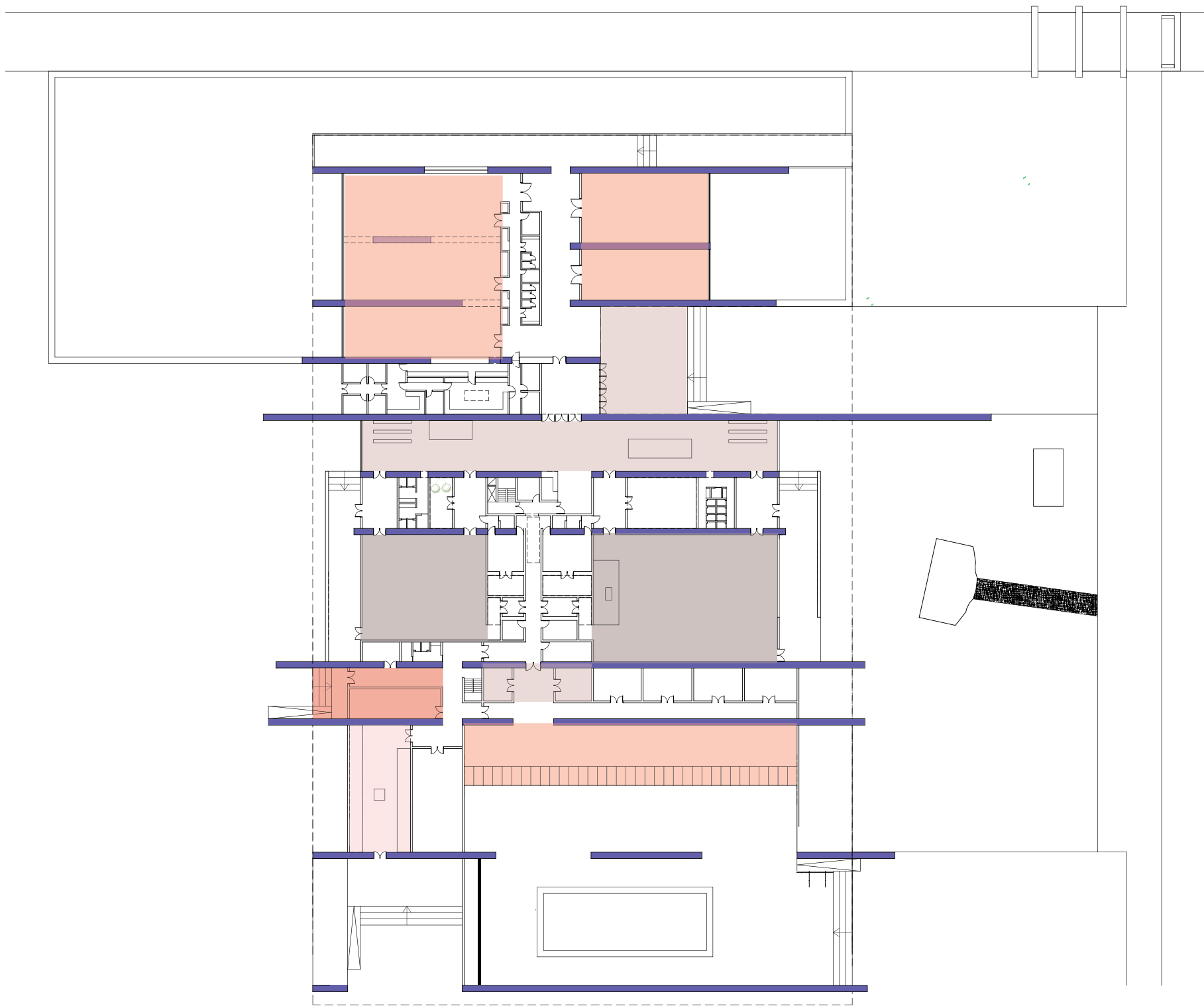


Program Diagram





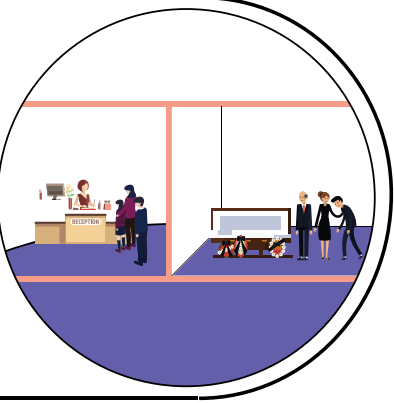
Ritual Sequence Diagram



**Step 1: Arrival & Intake (Hearse & Mortuary)**  
Description: The ritual sequence begins with the dignified arrival of the deceased via the south gateway entry threshold, directly adjacent to the administration and staff zone. The hearse enters through this rear building entrance, delivering the deceased to the mortuary core for preliminary preparation. This layout keeps the initial logistics completely hidden from public mourner paths ensuring immediate emotional calm and absolute privacy from the very start.

**Step 2: Dual Thresholds: Reception & Preparation**  
Part A (Mourners' Threshold): Positioned at the welcoming entryway, this space functions as the formal reception and waiting zone for relatives and guests. Guided by tectonic rammed walls and ambient skylights, it serves as a soft spatial transition into the sacred realm.

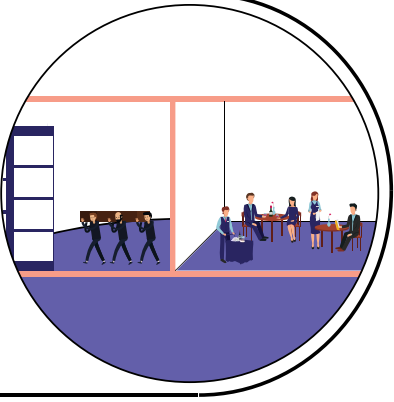
Part B (Private Viewing & Body Prep): Simultaneously, in the adjoining technical core, the body undergoes final preparation. The immediate family is guided into a private, intimate viewing room for a final, peaceful encounter with the deceased before the public ceremony begins.



**Step 3: The Ceremonial (Ceremony & Farewell)**  
Description: The collective core of the ritual takes place within two distinct Farewell Halls, each using massive rammed walls for total acoustic isolation. The design treats light differently in each hall to create secular spirituality: the small hall features a dramatic, zenithal, oculus skylight while the second hall completely lacks a roof sky light, relying instead on a massive architectural window that floods the space with soft, glare-free indirect daylight.

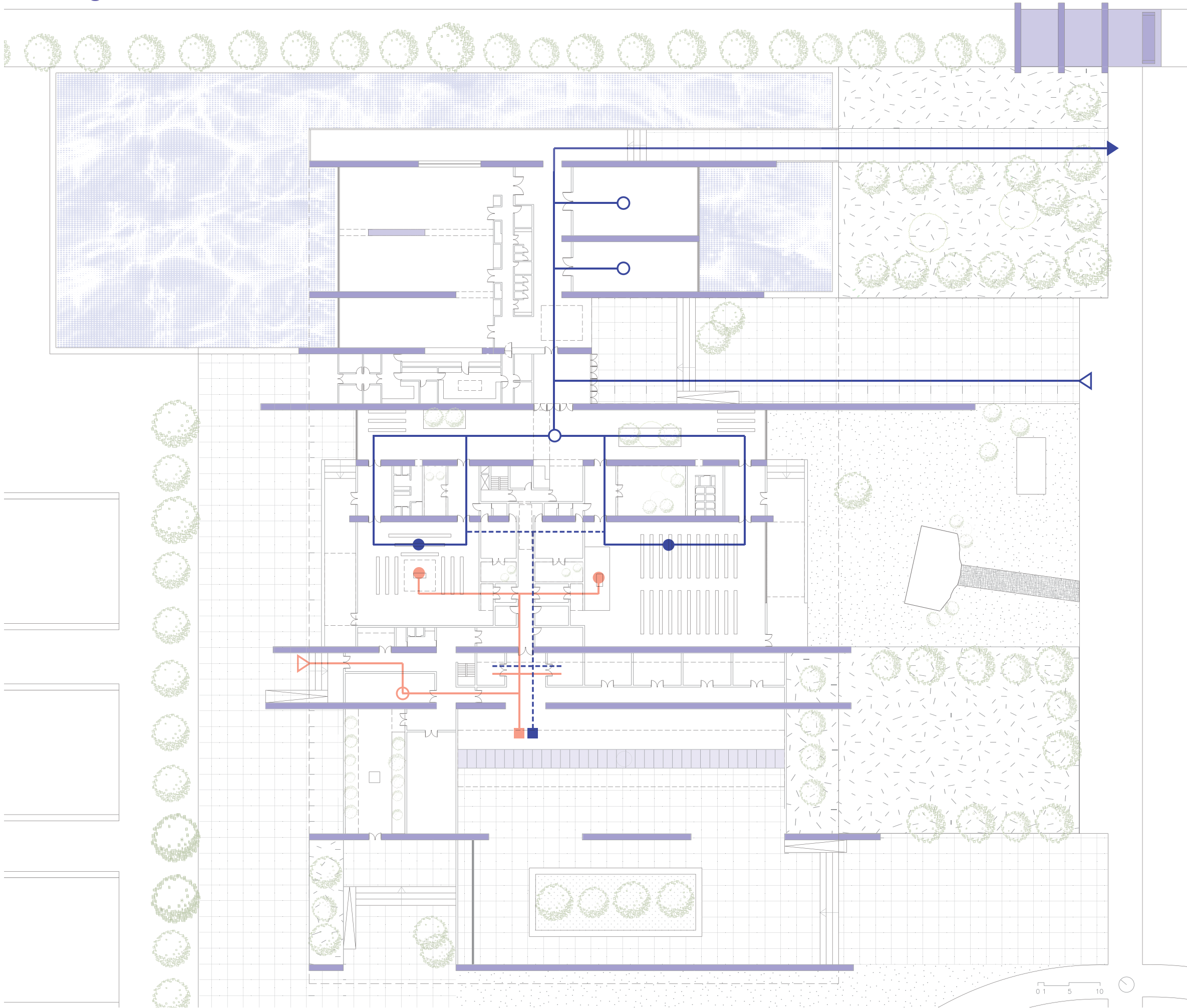
**Step 4: Transition & Final Sight (Catering & Composting)**  
Part A (Composting Core & Final Viewing): Concurrently, the deceased is formally moved into the contained Natural Organic Reduction (NOR) vessels. The immediate family is permitted to witness this transformative threshold, where the body is respectfully laid to rest within the biological composting matrix.

Part B (Condolence & Reflection): Following the ceremony, guests are transitionally guided into the Catering and Condolence Hall. This space features a direct visual dialogue with the adjacent reflecting pools, acting as a calming psychological bridge back to regular life.



**Step 5: Living Legacy (Soil Delivery & Biological Renewal)**  
Description: The final step completes the circular metabolic loop of the architecture, turning death into civic and biological rebirth. The nutrient-rich organic soil is delivered back to the bereaved family. The legacy is then physically fulfilled in two ways: either on-site through planting and topsoil stabilization within the sanctuary's Memoria Garden, or off-site, where families take the soil to cultivate new trees, flora, or living ecological memorials.

Flow Diagram



Flow of visitors

- Entrance for visitors
- Exit for visitors
- Waiting area
- Ceremony service
- Visitor route
- Relatives route

Coffin flow

- Coffin entrance
- Coffin route
- Mortuary
- Ceremony
- Composting area

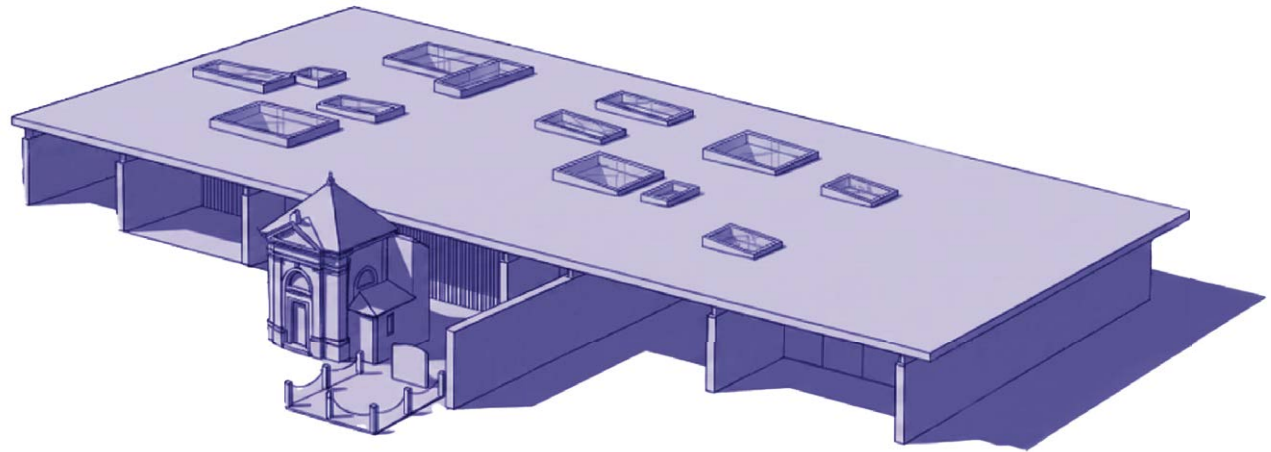


Design Proposal

- Concept Timeline
- Program Diagram
- Form and Flows
- Site Plan
- Floor Plans
- Elevation and Sections
- Details
- Renders



Design Proposal



This last chapter of the research provides a synthesis of the research and a philosophical conclusion to the research project. It presents a broader architectural and civic examination of the 40-day process of biological transformation of the cemetery from being a static monument to being a living component in the work of urban renewal. This chapter also examines how the project leverages ecological imperatives with respect to the mediation between cultural taboos associated with death that are conservative and the desire to promote sustainability through cemetery development. By placing the 40-day transition in the context of a landscape, this chapter discusses the long-term territorial consequences of the project and sets out new future horizons for death care architecture within the present metropolitan environment.



Form and Flow: Synchronizing Space with the Composting Process

This project translates the functional and biological sequence of human composting into a highly disciplined, linear spatial layout. Moving away from fragmented configurations, the building is organized beneath a single, repeating industrial roof canopy that directly references the structural grid and 20-meter seriality of the Mirafiori Factory.

Architecturally, the building operates through a distinct public-to-private gradient organized by a series of parallel, 1-meter-thick solid structural rammed earth walls. The plan is divided into explicit programmatic bands served by a clear, accessible public route that eliminates messy circulation:

Entrance & Administration

Positioned immediately at the north gateway, this zone functions as a clear threshold. Luserna Stone flooring replaces natural barriers to ensure full universal and wheelchair accessibility, with dedicated office spaces placed right at the entrance to manage visitor reception. Upon entering the building, a prominent skylight carves through the ceiling, casting a natural path of light that extends directly toward the reception area. This architectural gesture instinctively guides visitors forward, eliminating the need for graphic signage or written directions through pure spatial and visual intuition.

Catering & Condolence Hall

Following the layout of Crematorium Heimolen, these two facilities are

placed immediately adjacent to one another to serve as the final stage of the funeral ritual. In terms of service logistics, the catering space, utilizing a divisible layout that is served by a single public route to accommodate parallel funeral parties independently. Furthermore, following the environmental strategy of Crematorium Hofheide, this hall is designed in direct dialogue with the adjacent water feature, providing mourners with a sense of tranquility and a psychological transition as they prepare to return to their daily lives.

Ceremony & Family Rooms

Placed at the core of the plan, the ceremonial spaces utilize the monumentality and industrial straightforwardness seen in Crematorium Siesegem. By using heavy, unadorned rammed earth walls, these public spaces achieve maximum acoustical isolation and a sense of permanent stability, entirely uncompromised by the building’s technical operations.

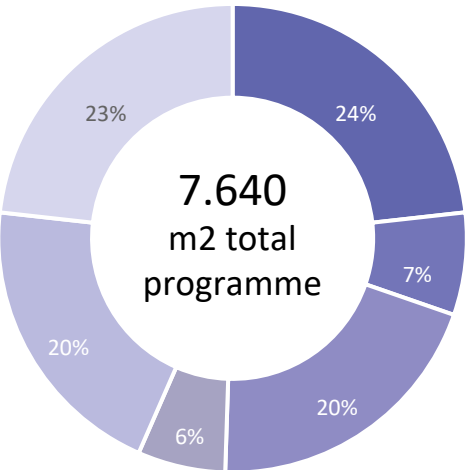
Composting & Mortuary Facilities

This part is fully aligning with the operational discipline of Crematorium Heimolen. To solve operational flaws regarding the flow of the ritual, the technical spine follows the functional layout of Crematorium Siesegem. The Mortuary and Body Preparation rooms slide north within this band , sharing a direct, private service wall with the Family Rooms. This layout allows staff to transfer the deceased discreetly into the viewing spaces without ever entering public paths or disrupting the families.

Structural & Material Logic

Tectonically, the building’s envelope and structural system combine distinct architectural precedents to resolve the conflict between mass and lightness. The spatial layout of the 1-meter-thick SIRE walls is deeply influenced by the unbuilt parallel-wall logic of Cellini project. To support this grid, the structural frame adopts the system of Foster’s Narbo Via Museum ; the primary double-beams rest directly on top of the walls via Bearing Pad. Secondary beams run perpendicularly, supporting precast panels and horizontal glass skylights that introduce overhead light without breaking the solid wall mass.

- Catering
- Waiting Area
- Ceromony hall
- Staff
- Composting area
- Courtyard



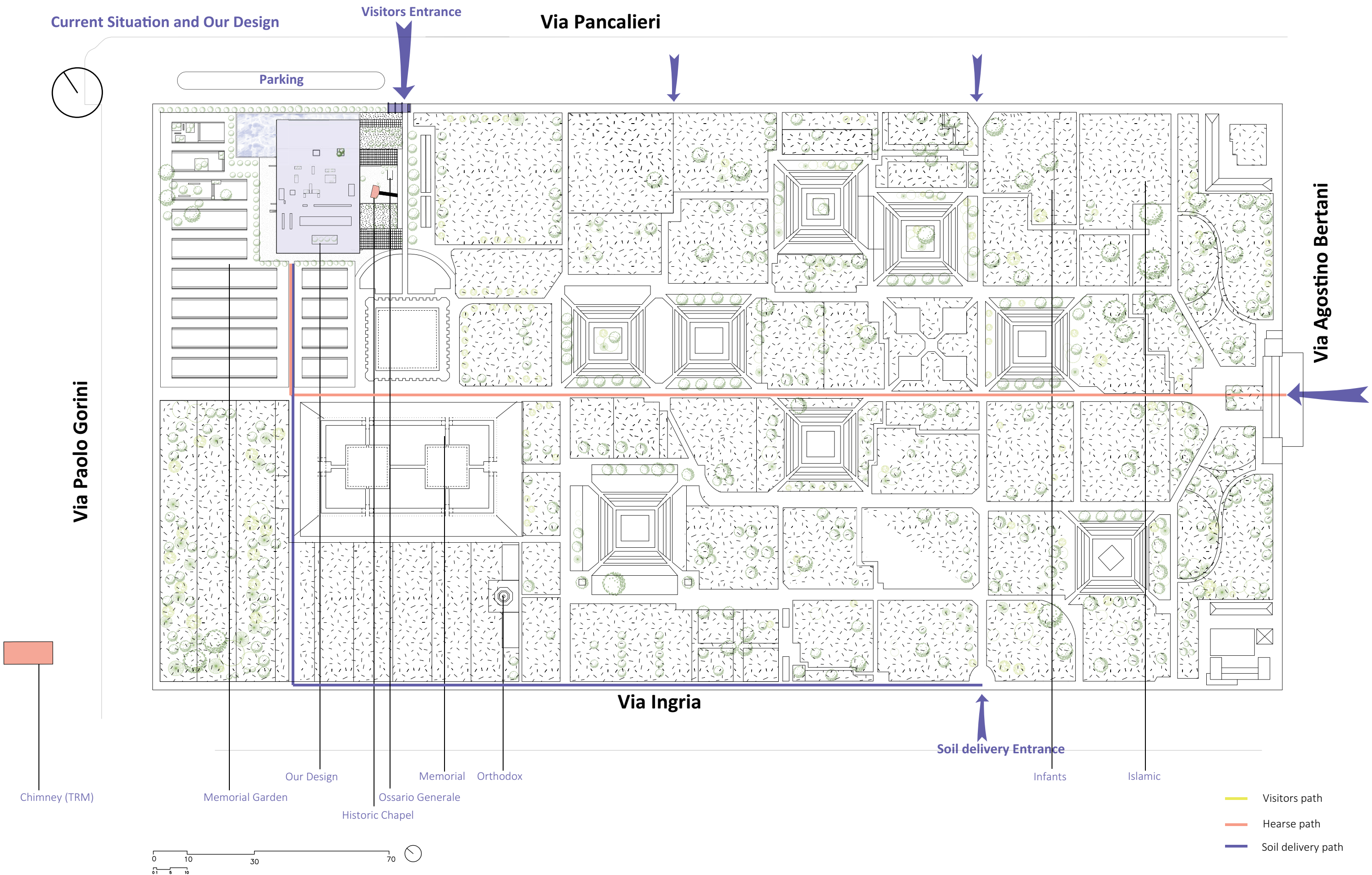


Landscape & Composting Sequence

The landscape design is generated directly from the building’s 20-meter parallel stripe logic derived from the Mirafiori Factory model, ensuring complete structural consistency across the site. The landscape is shaped throughout the project through dedicated planting zones and integrated flower boxes, which utilize the nutrient-rich soil obtained from the ongoing composting process to nourish new trees and vegetation. Furthermore, this spatial continuity directly facilitates the final ceremonial outcome of the funerary process; the landscape is carefully terraced to accommodate dedicated ritual scattering zones, allowing bereaved families to actively participate in returning the composted soil back to the earth, thus transforming the “Memory Garden” into a living, communal repository of civic memory.

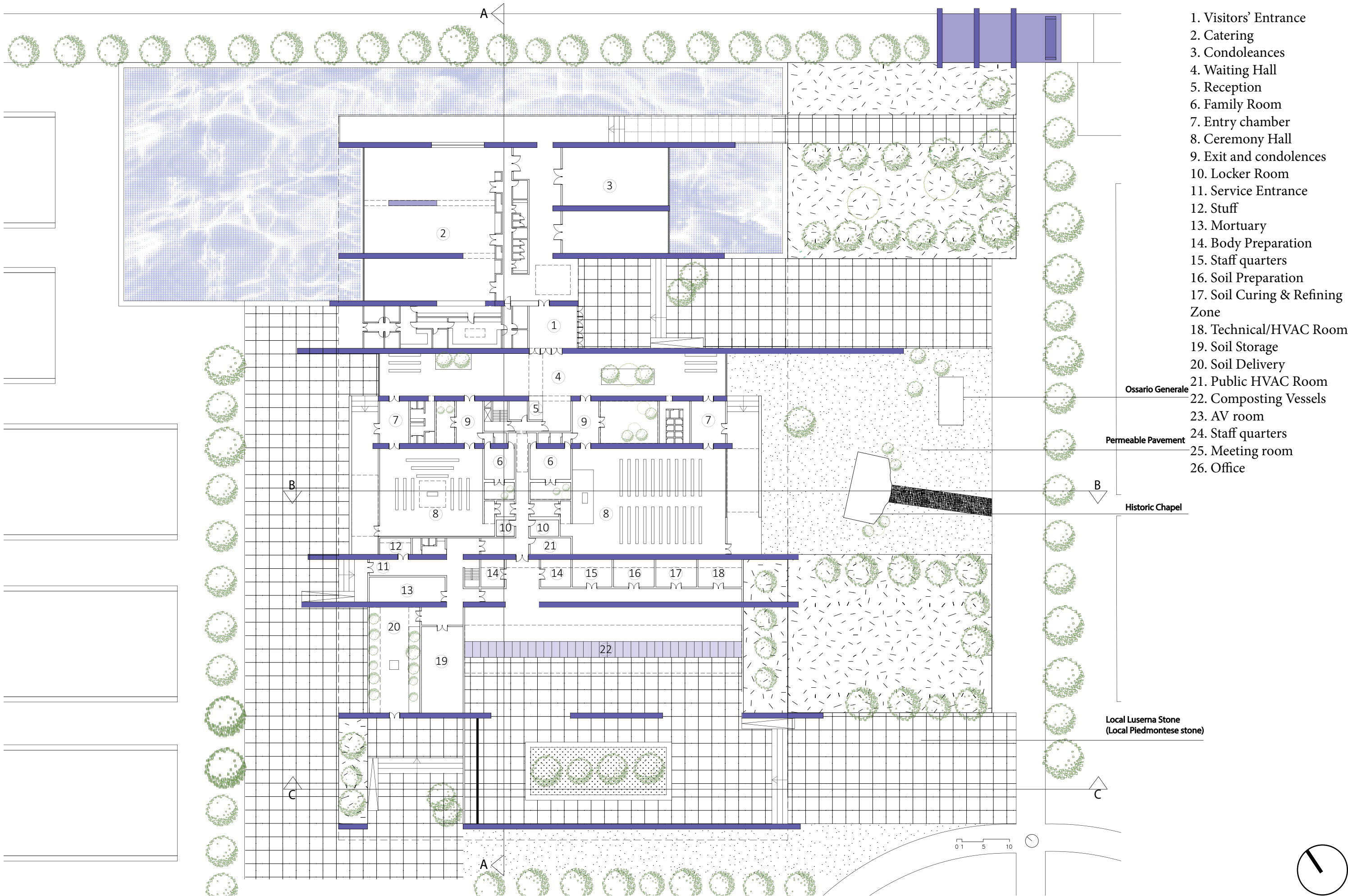
Within the composting vessel zone, the layout has been refined to optimize interior environmental quality and symbolic meaning: the area is crowned by a continuous linear skylight that channels natural light directly down onto the composting units. Positioned immediately across from these vessels, the central courtyard trees remain the primary visual focus. This architectural relationship preserves the core poetic concept of the project, creating a direct spatial connection where the biological transformation of the deceased under natural light actively sustains new life within the landscape.

Site Plan

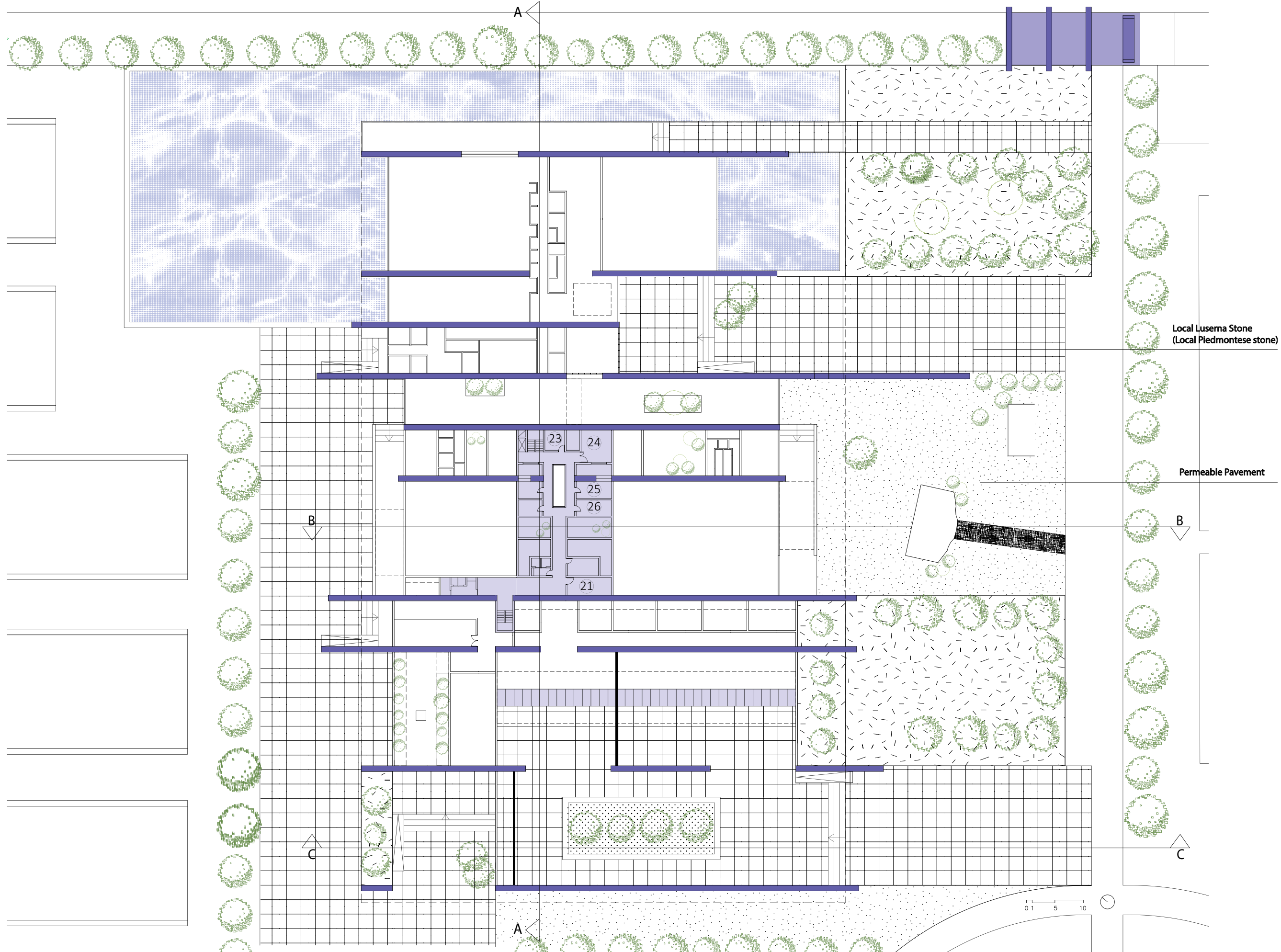




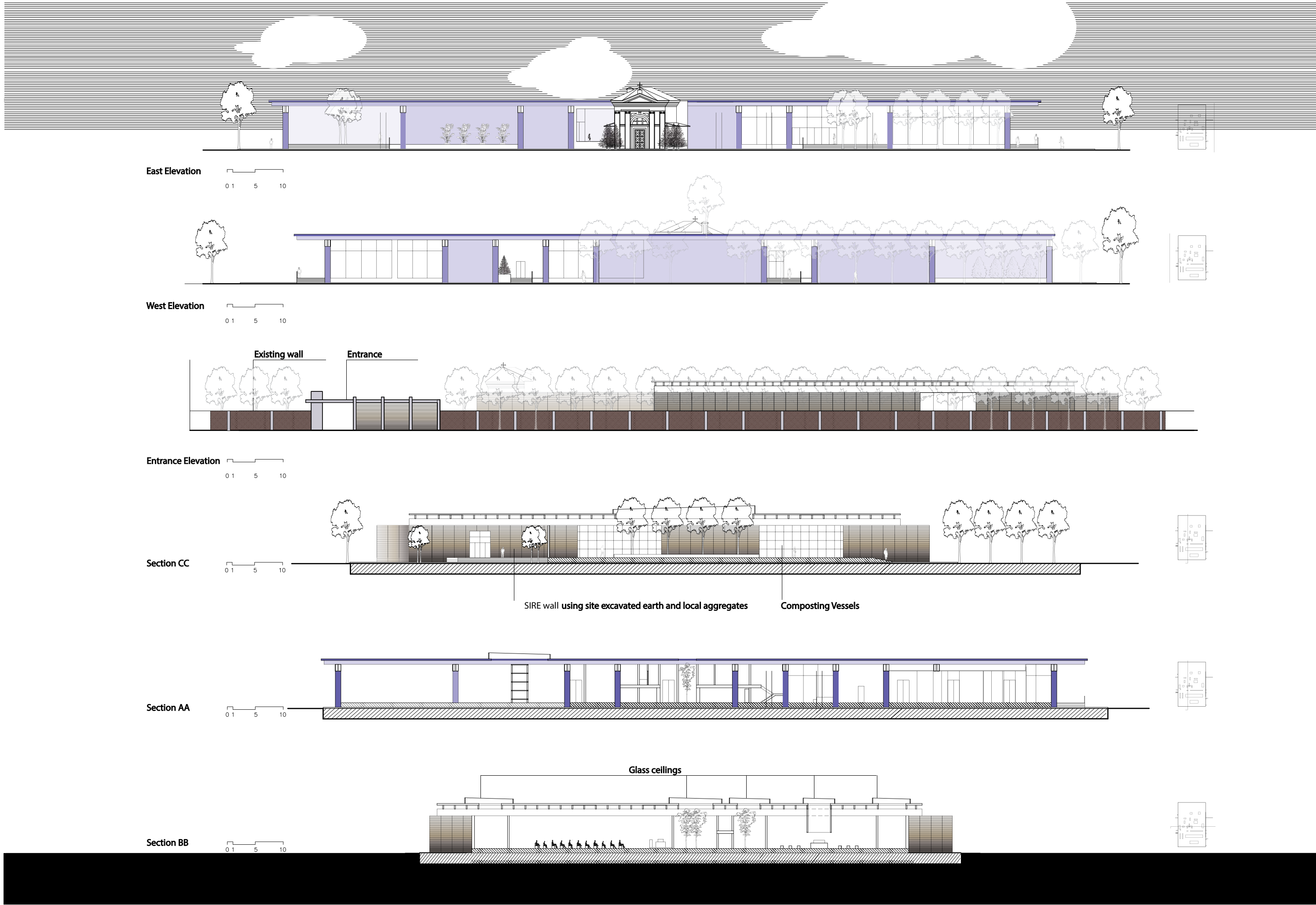
Ground Floor Plan



Mezzanine Floor Plan

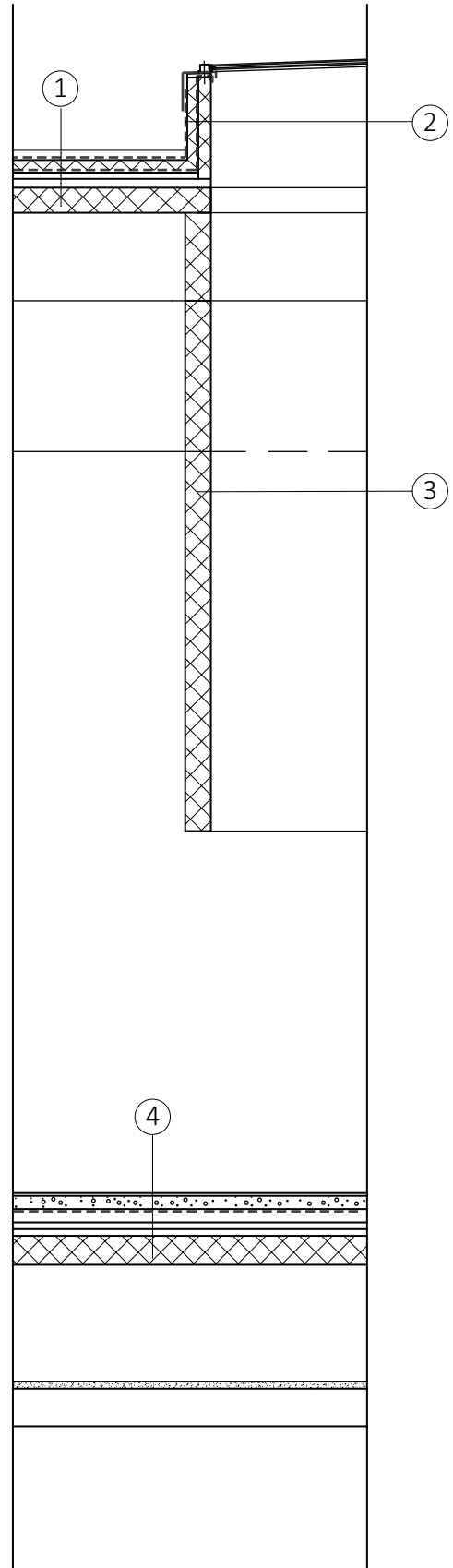
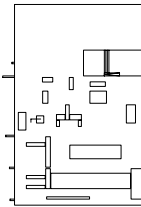




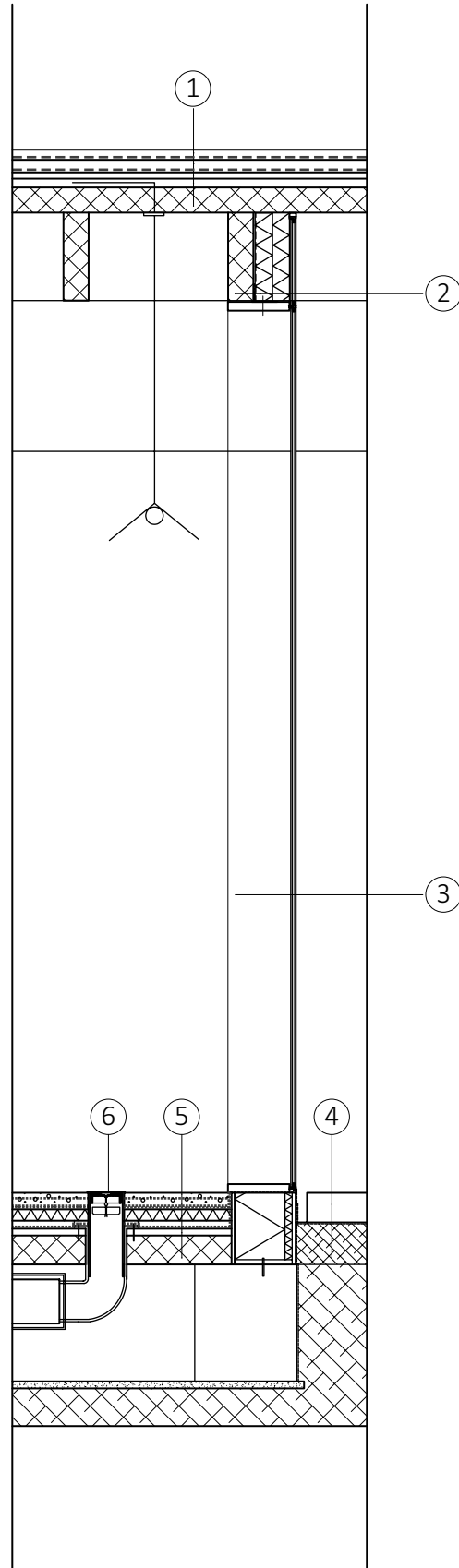
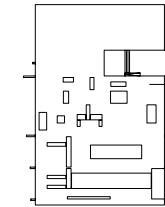


## Details

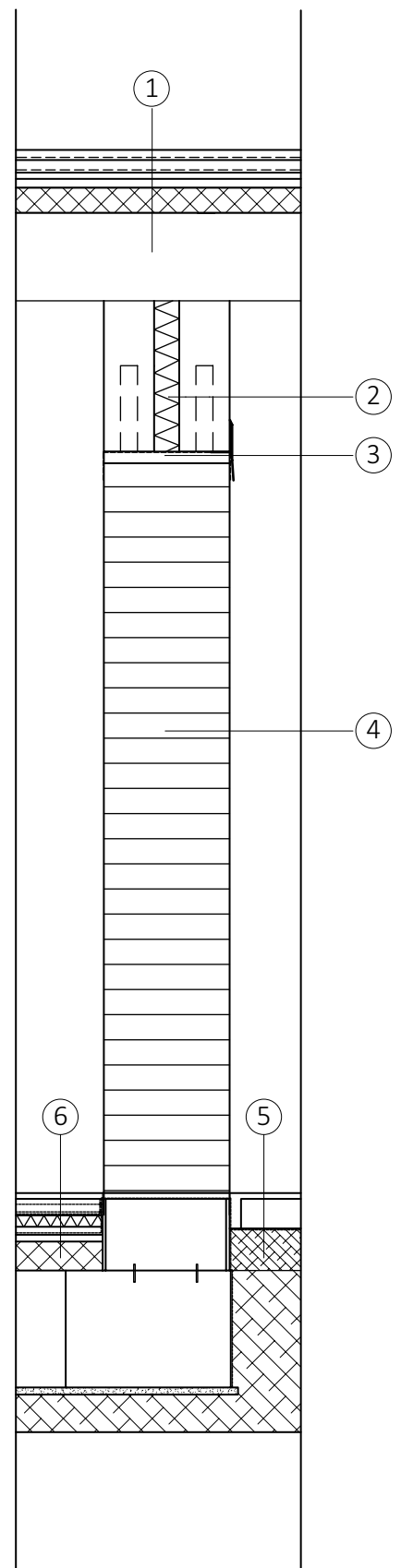
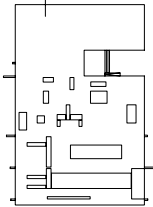
1. - Ballasted roof gravel, selected according to the color  
- PVC waterproof membrane  
- Insulation panel 120 mm  
- Bituminous membrane  
- Sloped screed realized in foam concrete  
- Concrete screedPrecast concrete panels
2. - PVC waterproof membrane 1.5 mm  
- Insulation panel 120 mm  
- Bituminous membrane  
- Skylight Concrete Curb panels  
- Hollow core slab 200 mm
3. - Concrete Panel
4. - Solid oak wood parquet flooring finished with natural oil, nailed and fixed over an oak wood supporting layer  
- Light concrete screed, underfloor heating and cooling system  
Insulation panels  
- Foam concrete screed 50 mm  
- Concrete screed  
- hollow core slab 200 mm



1. - Ballasted roof gravel, selected according to the color  
- PVC waterproof membrane  
- Insulation panel 120 mm  
- Bituminous membrane  
- Sloped screed realized in foam concrete  
- Concrete screedPrecast concrete panels
2. - Lintel (Secondary Beam)  
- Steel Angle for fixing curtain wall  
- Bituminous membrane  
- Insulation panel
3. - Curtain wall façade with structural glass panels, sealed seams, mullion and transoms in dark bronze anodized
4. - Reinforced brushed concrete slab  
- Bituminous waterproof me brane  
- Granular fill aluminium
5. - Polymer concrete 110mm, top layer of natural cement, injected with floor hardener, sealed with nano-silicate, with underfloor heating and cooling system  
- EPS insulation panels 80mm  
- Foam concrete screed  
- Concrete screed  
- Hollow core slab 200 mm
6. - Displacement grid, aluminum anodised  
- Filter  
- Welded aluminium pipe with baseplate  
- Sealant/insulation Armaflex  
- Ventilation duct



1. - Ballasted roof gravel, selected according to the color  
- PVC waterproof membrane  
- Insulation panel 120 mm  
- Bituminous membrane  
- Sloped screed realized in foam concrete  
- Concrete screedPrecast concrete panels  
- Secondary Beam
2. - Thermal Insolation  
- Primary Beam  
- Interlocking Joint
3. - Bearing Pad  
- Bituminous Membrane  
- Metal Flashings
4. - SIRE(Structural Insulated Rammed Earth) Wall
5. - Reinforced brushed concrete slab  
- Bituminous waterproof membrane  
- Granular fill
6. - Polymer concrete 110mm, top layer of natural cement, injected with floor hardener, sealed with nano-silicate, with underfloor heating and cooling system  
- EPS insulation panels 80mm  
- Foam concrete screed  
- Concrete screed  
- Hollow core slab 200 mm





**The Portal of Return:** Soil Delivery and Memorial Transition



The viewers in this viewpoint of the southern entry into the site can observe mourners getting soil that is nourished with nutrients. The built environment on the site shifts from solid rammed earth to a more accessible,

open landscape, allowing visitors to emotionally connect with their daily lifestyles as they return through a living memorial.



**The North Gateway:** Intuitive Threshold and Gathering Plaza

The primary entrance is located at the north along the front face of the building, creating an obvious architectural entry transition to the facility. The seamless Luserna Stone flooring and the guiding mass of the parallel

rammed walls create an accessible public plaza that instinctively welcomes visitors into the facility.



**Ascending to the Courtyard:** Temporary Vessels and the Living Canopy

The Memorial Path leads visitors up to an area at the top of the steps that culminates in a peaceful courtyard. The semi-covered roof structure allows for views of the sky above as well as provides shelter for the mature trees at the centre of the courtyard. The intimate courtyard also includes the

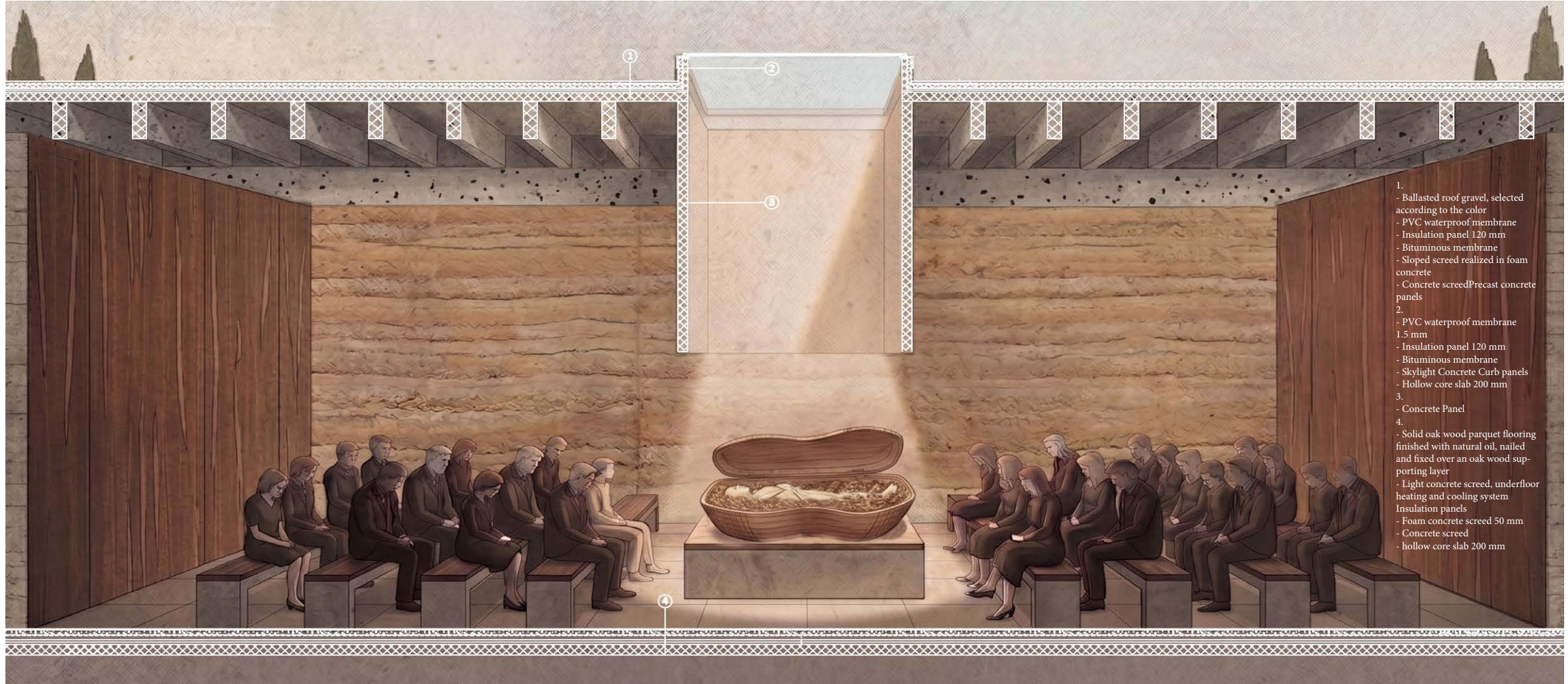
composting units which are incorporated into the right-hand side wall. The architectural design creates a strong poetic connection between families and their deceased loved ones during the 40 day biological decomposing process while having a direct connection to nature.



**Material Contrast in the Sacred Core:** Sectional Perspective of the Ceremony Hall

A 3D model showing what is inside the core ceremonial area, how it is set up and why it is arranged in this way. The focal front wall utilizes the raw texture of heavy rammed earth (SIRE wall) to convey permanent stability and structural mass. In contrast, the flanking side walls are clad in warm

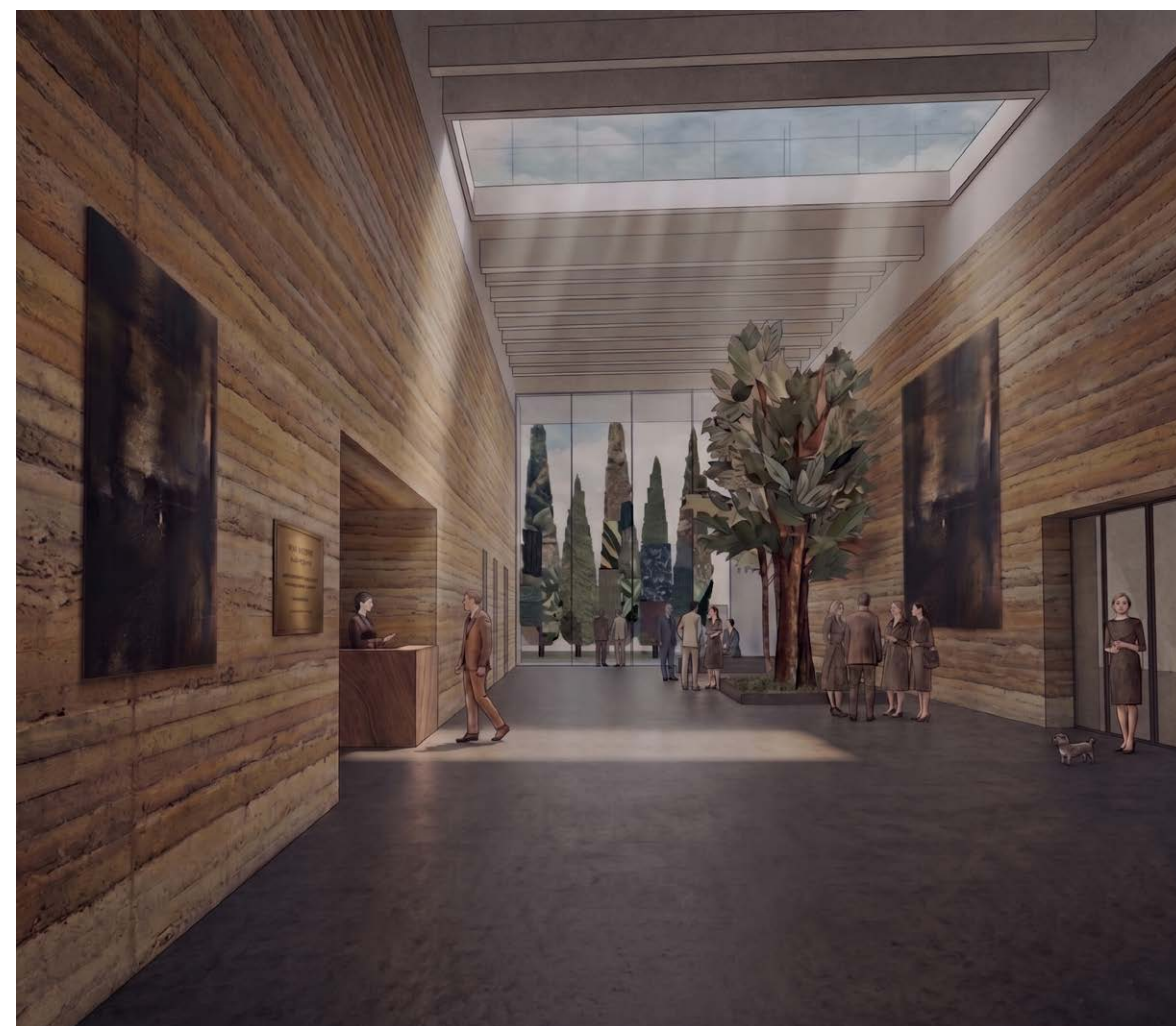
wood panels to enhance the room’s acoustical quality and create an intimate, comforting atmosphere for mourners under the natural light of the overhead skylight.





## The Atrium of Transition: Welcoming and Orientation Lobby

Visitors are greeted upon arrival in a vast atrium space that acts as the main orientation area of the building. The continuous rammed earth walls give this space great definition through their layered textural quality which provides an extraordinary feeling of enclosure and grounding. Architectural light aids in the orientation as a large skylight pierces through the ceiling providing overhead light to illuminate the reception desk for all guests, as well as to mark the central area for information. This strategic play of light and shadow instinctively guides mourners through the sequence of the building, while the indoor tree and the expansive glass facade at the end bridge the connection between the interior comforting shelter and the natural landscape outside.



## The Reflection Pool and Memory Garden: A Sanctuary for Coexistence

Located behind the primary building, the Memory Garden represents a tranquil outdoor space that emphasizes contemplation and emotional expression. A prominent feature of this space is a long, rectangular reflection pool (pool of silence) that reflects the sky, the vertical lines created by cypress trees, and the warm colors of the setting sun. Since the water in the pool is still, it provides an area to mentally and emotionally reflect and seek peace. The layout includes sculpted green terraces, stone pathways, and small, intimate seating areas that create opportunities for families to gather peacefully or explore. In this final scene, the distinction between architecture and nature disappears, creating a living memorial in which memory and nature are united in complete harmony.





Discussion

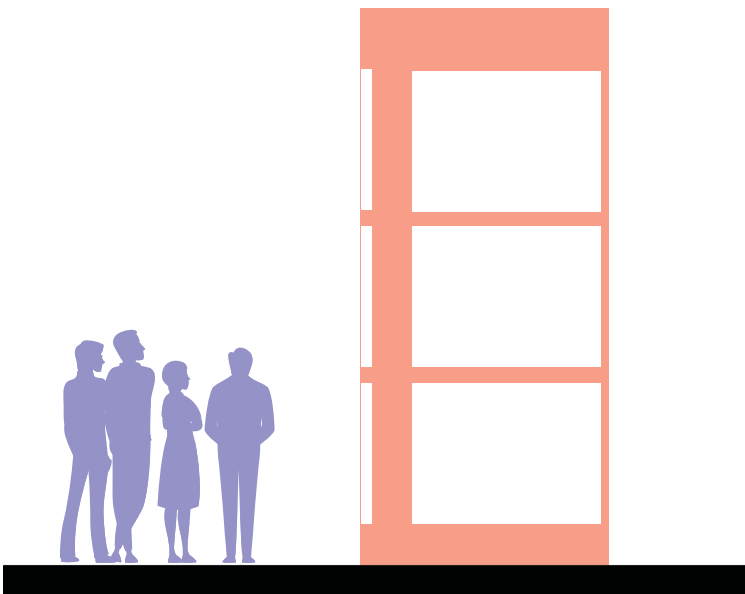
Time and Grief: Architecture and the 40-Day Ritual

Traditional death ceremonies either have a hyper-accelerated or stagnant concept of time. Cremation can take place in two hours or less, creating an instantaneous physical severance (aka. “disruption”) between body and spirit. In contrast, traditional burial can take decades to decompose the body after being buried in the ground with no direct physical relationship to the loss by the living. However, with Natural Organic Reduction (NOR), there is a different biological timeline—30 to 45 day biological cycle—that forces the architecture to transform from static monument-style architecture to a dynamic narrative-form architecture, which will measure, host and visualize the passage of time.

The 40 day period, rather than being treated as a standard technical waiting time, is developed as a structured narrative for the grieving process through the development of Composting Memory Walls. The external façade of the composting chamber will be used as the backbone of the pilgrimage (as if they are walking up a wall) to the deceased; and it will therefore represent the time of loss as a visual representation of that completed physical journey for those that visit the site.

In the 40 days leading up to this transformation, the family will not be suffering from a dramatic absence of the physical. Rather, they have a distinct

physical locus within the entire complex in which they may come visit, leave flowers, burn candles, and connect with their loved one who has passed on throughout this difficult period. Time is rendered here not as an abstract concept, but through the tangible means of architecture. Architecture becomes the bridge that allows the transformation from physical existence to ecological reincarnation within the Memory Garden.



Cultural Framework: The Catholic Taboo and the Architectural Search for Secular Spirituality in Italy

The cultural and spiritual background

Creating a Human Composting Complex in Italy (especially in Turin, where both traditional Catholic culture and industrial rationalism influence the people greatly), is going to be necessitate a very methodical approach to overcoming established cultural taboos related to death and burial practices.

The Christian-Catholic theology concerning human burial is very rigid, and based on the principal of the “Resurrection of the Flesh” (i.e., Risurrezione della carne) that has guided Christians in relation to how they should treat the dead for hundreds of years. The Vatican allowed for cremation in 1963, with the conditions of having to store the ashes in a specific way (not scattered or stored in a person’s home), but it only made this exemption to the historical prohibition on cremation via the recent document issued in 2016 (i.e., Ad resurgendum cum Christo), which encourages Catholics to avoid any activities related to the dispersal, liquefaction or commingling of human remains.

Natural Organic Reduction (NOR), or human composting, is now at a very complicated nexus since, to the conservative Catholic Church, the idea of speeding up the process by which one’s body decomposes and returns

to the earth as soil can constructively be viewed as a reductive, entirely utilitarian, or even profane/inappropriate act that once again takes away any semblance of the deceased person’s (i.e., the “worth” of the deceased body or their continuation of a “dignified” existence after death) value (solidity, dignity) and instead turns their remains into “garbage” (i.e., organic waste). Therefore, the main challenge to creating a Human Composting Complex in Turin will not be technical rather it will primarily be a cultural one in terms of addressing how architecture can mediate between a conservative Catholic taboo and an increasingly urgent need for implementation of modern design that results in ecologically efficient buildings/systems.

The Architectural Solution: Materializing Secular Spirituality

The project resolves Italy’s cultural taboo not by attempting to confront it or deny it through a confrontation with the religious aspects of Italy, but rather through an expression of sublimation; therefore the architecture expresses the existing/taboo phenomena through architectural form. The project is designed to represent the facility as a nonclinical, secular, and non-industrial waste processing plant but instead uses the spatial grammar (e.g.,”) of the architecture to create new archetypes for these secular/spiritualities from traditional Italian sacred architecture.



In order to address the concern over “material dissolution,” the Farewell

Finally, in the spatial embodiment of the process – the Memory Garden – one sees the ultimate theological synthesis. Within Christianity, one’s body reverts to the dust, while remaining in the grave. In this project, the ecological result of decomposition, which is rich with nitrogen soil, takes on the meaning of “Ecological Resurrection.” It does not lie lifelessly within the gravesite, but gets used as an instrument of revival: specifically, to restore contaminated soils in the nearby Mirafiori district and to support growth in the Corona Verde forestation belt.



Conclusion

This architectural report demonstrates how architecture can provide a new understanding of the nature of cemeteries; its explanation for the cemetery is not solely in terms of the design of a funeral facility, but also as a previously static, land-intensive, monument has changed to become a dynamic, metabolic facility for providing death care through the application of Natural Organic Reduction (NOR) within the rigid urban grid of Turin. The study found an acceptable means of addressing the two principal conflicts identified in the introduction (the conflict between Turin’s aging population and the environmental sustainability of traditional burial and cremation methods) and concluded that architecture could mediate both the biological requirement of decay and the civic obligation of remembering or memorialising.

The Inside-Out and Outside-In double logic of generativity led to a functional typology that is both clinically efficient and spiritually sacred. With the use of the Inside-Out design philosophy, the building has set a new level of dignity in terms of space for funeral services that would allow for

maximum industrial efficiency for handling 1,425 corpses per year without affecting the sacred experience of those mourning the dead. Meanwhile, the Outside-In strategy helped to establish this bold idea into the local context of Turin. In employing the structural unit of 20 meters of the neighboring Mirafiori industrial complex and using 1-meter-thick structural rammed earth constructed out of local aggregate materials, the building became a part of the geology of Piedmont soil.

The greatest value of this project is undoubtedly the environmental product of it. The process through which the remains of the dead turn into 1,083 cubic meters of fertile soil per year results in an environmental connection between the history and the future of the city. Such an “architecture machine” becomes a trigger for healing the city, supplying the soils with the necessary nutrients to revitalize the soils of Mirafiori and expand Turin’s Corona Verde belt. Under such conditions, the cemetery becomes not the “city of the dead,” closed off by walls, but rather becomes the city nursery that nourishes the living city.

Although the viability of the HUMCOMPCOM (the Human Compost Project/Complex) has been established, there are numerous legislative and cultural obstacles to it being implemented in Italy. Presently, under Italian funerary legislation, which is grounded in the traditions of the Catholic Church and the regulations enacted by the Napoleonic Code, there is currently no legal method of determining Natural Organic Reduction as legitimate. This thesis is thus not only a design proposal, but also a provocative argument for policy change.

Future research should be directed at understanding the psychological impact on the grieving process of soil-based mourning and investigating long-term monitoring of urban sites being remediated by using the organic products from HUMCOMPCOM. Ultimately, this project demonstrates that when architecture embraces the life cycles of nature, rather than resisting them, it has the potential to turn death—the most significant of all taboos—into a sustainable civic treasure.



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