
cosmos

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1. INTRODUCTION

The universe and its exploration have represented one of the fundamental impulses shaping man's relationship to the world, space, and nature since the dawn of civilization. Observing the sky has historically been connected not only with scientific research but also with philosophical reflection, orientation in the landscape, understanding time, and shaping the cultural identity of society. Astronomy has gradually become a discipline connecting science, technology, nature, and human perception of space. Contemporary forms of popularizing the universe do not represent only technical or scientific presentations of astronomical phenomena, but complex environmental and experiential spaces conveying to man a relationship with the universe through architecture, landscape, and multimedia technologies.

Planetariums, observatories, and scientific-educational centers play a significant role in mediating astronomical knowledge. Modern scientific-educational facilities increasingly work with the principles of immersive environments, interactivity, and the integration of the landscape into the architectural concept. The architecture of these facilities becomes an active medium conveying content, atmosphere, and the experience of exploring the universe. A significant aspect is also the ability of the architecture to respond to the natural environment and create a relationship between humans, the landscape, and cosmic phenomena.

The diploma thesis deals with the design of a scientific-educational planetarium complex situated in the High Tatras, in the vicinity of the Astronomical Institute of the Slovak Academy of Sciences. The location represents an exceptional environment with a distinct natural and scientific identity, where the high-mountain landscape meets a long-standing tradition of astronomical research. The existing SAS (Slovak Academy of Sciences) complex still fulfills an important scientific-research function today and represents one of the most important workplaces for astronomical research in Slovakia. The presence of scientific facilities, observatories, and technological objects creates a specific character of the territory, in which scientific knowledge is naturally intertwined with the environment of the Tatra landscape.

The territory is located in immediate contact with the forest environment and the panorama of the High Tatras, which creates an exceptionally strong spatial and atmospheric potential. The character of the landscape, the natural topography of the terrain, climatic conditions, and minimal light pollution simultaneously create ideal prerequisites for astronomical observation and the formation of an environment oriented towards the perception of the universe.

The goal of the diploma thesis is to create an architectural and urban concept for a planetarium and scientific-educational complex that will reflect the character of the territory, the existing scientific context, and at the same time convey the phenomenon of the universe through architectural space. The design does not focus only on the planetarium building itself, but works with the entire territory as a landscape-architectural organism connecting architecture, public space, the landscape, and the existing scientific facilities of the Astronomical Institute of the SAS.

An important part of the design is working with natural and cosmic principles as generators of architectural form and urban organization. The concept is based on the processes of the formation of cosmic structures, gravity, rotation, and orbital motion, which are subsequently transformed into the spatial solution of objects, the landscape, and movement relationships in the territory. Architecture thus does not arise as an autonomous form separated from the context, but as a result of the interpretation of natural and cosmic processes applied to the design process.

Part of the diploma thesis is also a conceptual verification of the possibilities of adaptation and utilization of the existing object of the Astronomical Institute of the SAS within the newly designed scientific-educational complex. The design deals with the possibilities of integrating exhibition and educational functions into the existing structure of the building with an emphasis on creating a flexible layout system capable of responding to various usage scenarios, changing technological requirements, and contemporary forms of presenting scientific content.

The work also examines the possibilities of integrating architecture into the natural environment with an emphasis on minimizing interventions in the landscape and creating a harmonious relationship between the object and the surrounding environment. In the design, the landscape becomes an active element shaping spatial relationships, atmosphere, and the functioning of the complex. The result is a concept of a scientific-educational environment that connects the popularization of science, architecture, and the natural environment into a unified spatial whole reflecting the character of the place and the very essence of exploring the universe.

2.1 TEXT PART

2.1.1 IDENTIFICATION DATA

Name of the building: COSMOS – Architecture of space presentation
Location of the building: Complex of the Astronomical Institute of the SAS, High Tatras
Cadastral territory: Tatranská Lomnica
Character of the building: new construction of a scientific-educational complex and conceptual adaptation of the exist - ing object of the Astronomical Institute of the SAS
Purpose of the building: planetarium, scientific-educational center, exhibition and popularization spa ces of astronomy and the universe

Documentation processor: Bc. Róbert Lipták

Level of project documentation: architectural study with elaboration
Type of land: forest areas, built-up areas and courtyards, other areas of landscape character

2.1.2 BUILDING BALANCES

Number of underground floors: 1
Number of above-ground floors: 1
Number of parking spaces: 50
Capacity of the complex: 300
Capacity of the planetarium: 130
Capacity of exhibition spaces: 70

2.1.1.3 INFORMATION ABOUT THE PROCESSOR

Project author: Bc. Róbert Lipták
Supervisor: doc. Mgr. art. Martin Uhrík, PhD.
Vertical studio: DATALAB
Consultants: Ing. arch. MArch. Roman Hajtmanek, PhD.
Ing. arch. Vladimír Hain, PhD.

2.1.2 SITE CHARACTERISTICS

The site in question is located in the High Tatras, within the premises of the Astronomical Institute of the Slovak Academy of Sciences. The location is situated in a natural environment with a distinct landscape character, in immediate contact with forest cover and the panorama of the Tatra mountain environment. The area represents a specific type of scientific-research complex, in which the natural environment merges with the function of astronomical research and space observation.

The premises of the Astronomical Institute of the SAS form a long-term functioning scientific workplace focused on the research of solar physics, astronomical phenomena, and cosmic processes. Part of the site includes existing observatories, technical facilities, research workplaces, and service infrastructure, which create a specific identity of the place based on the scientific character of the location. The character of the area is also significantly influenced by the quiet regime of the environment, minimal light pollution, and a close relationship with the surrounding landscape, which creates suitable conditions for astronomical observation as well as environmentally oriented architectural solutions.

The topography of the area is gently modeled with natural elevation differences and a dense vegetation structure. The existing forest environment forms a significant landscape-forming component of the location and simultaneously creates a natural spatial barrier from the surrounding environment. Vegetation, terrain modeling, and vistas towards the panorama of the High Tatras significantly influence the spatial perception of the area and become an important determinant of the design.

Traffic connection to the area is ensured by an existing access road leading to the SAS complex. Within the area, there are existing pedestrian and service paths connecting individual objects of the scientific complex. The character of movement in the area is predominantly pedestrian, while the perception of the landscape, vistas, and natural movement lines in the forest environment plays a significant role.

From an urban planning perspective, the area does not act as a compact urban structure, but as a loosely composed landscape complex with scattered objects set into the natural environment. This character creates space for the addition of new functions and the creation of a more complex scientific-educational environment that respects the existing natural and scientific context of the area.

A significant aspect of the location is its strong genius loci stemming from the connection of the natural environment, scientific research, and the phenomenon of space observation. The area therefore does not represent only the technical background of astronomical research, but a space with significant atmospheric and symbolic potential, which creates suitable conditions for the emergence of a contemporary scientific-educational complex oriented towards the popularization of space and astronomical knowledge.

2.1.3 LIBRETTO

The libretto of the design is based on human fascination with space, infinity, and the natural processes of forming cosmic structures. The space of the Astronomical Institute of the SAS in the High Tatras is understood as a place of silence, observation, and discovery, where scientific knowledge meets the atmosphere of the high-mountain landscape. The design does not perceive space only as a distant object of exploration, but as a phenomenon capable of shaping architecture, the landscape, and human movement in space itself.

The concept works with the metaphor of the birth of a star emerging from primordial chaos. The forest environment becomes an analogy for the infinite space of the universe, in which a gradual concentration of energy and the formation of a new core — the planetarium — occurs. Around it, other objects and spaces emerge, similar to celestial bodies moving in gravitational orbits. Architecture thus does not arise as an isolated object, but as a process of gradual ordering of space, light, movement, and landscape.

The design also reflects the idea of man as an observer located between the landscape of the Earth and the infinite space of the universe. The planetarium and the scientific-educational complex therefore do not create only a place for the presentation of astronomy, but an environment intended for the perception of space, light, time, and natural phenomena. Landscape, architecture, and space merge in the design into one whole, in which the visitor's movement becomes part of a symbolic journey from chaos to the formation of a new system.

2.1.4 CONCEPT

The main concept of the design is based on the interpretation of the processes of space formation and their transformation into an architectural, urban, and landscape solution for the scientific-educational complex. The design works with the principles of gravity, rotation, concentration of matter, and the birth of a star as the basic generators of the spatial organization of the area. Architecture is not understood as an autonomous object inserted into the landscape, but as the result of a natural process of space formation similar to the processes occurring in space.

The basic idea of the concept is the metaphorical transformation of chaos into an organized system. The original forest environment of the area represents an analogy of cosmic chaos — an infinite space full of freely moving particles and energies. In this environment, a new gravitational core gradually emerges, represented by the planetarium object, which becomes the central point of the entire complex. Similar to the birth of a star, a gradual concentration of space, movement, and functions towards one dominant center occurs. A significant aspect of the design is the transformation of abstract natural and astronomical principles into a concrete urban and landscape-architectural solution. Orbital trajectories are projected into the organization of movement paths, the layering of public spaces, and terrain modeling. Concentric lines of movement also create a natural gradation of space towards the central object of the planetarium, thereby strengthening the user's orientation in the area and creating a clear spatial hierarchy.

The planetarium is designed as the symbolic core of a forming star — a space where light, movement, energy, and knowledge meet. Its form is based on spherical geometry associating planetary bodies, while the dominant dome emerges from the modeled terrain as a natural landmark of the entire area. At the same time, the object does not act as an isolated landmark, but as part of a wider landscape system from which it naturally grows. The concept also reflects the existing scientific character of the area and integrates the functioning complex of the Astronomical Institute of the SAS into a new urban structure. The design does not create a separate, isolated planetarium object, but a complex scientific-educational organism connecting research, science popularization, landscape, and public space. Existing observatories and scientific objects remain a natural part of the area and are complemented by new spaces intended for education, interactive exhibitions, and experiential forms of space presentation.

An important part of the concept is also the creation of an immersive and variable spatial experience. The design works with the atmosphere of light and darkness, with projection, movement, and the gradual revealing of space, similar to discovering an unknown universe. The visitor's movement through the complex is understood as a symbolic journey from chaos to a stabilized system, from the landscape to the core of knowledge.

2.1.5 URBAN SOLUTION

The urban solution of the design stems from the effort to create a cohesive scientific-educational complex connecting the existing objects of the Astronomical Institute of the SAS with the newly proposed functions of the planetarium, thematic pavilions, and observatories. The design respects the existing structure of the complex and naturally builds upon it through new public spaces, communication routes, and landscape interventions. The goal of the urban solution is to create a legible and connected system of movement and stay, in which individual functions operate as mutually interconnected parts of a single scientific-research and popularization environment.

A significant urban moment of the design is the placement of the new planetarium object on the original site of the facility intended for solar observation. The new object naturally builds on the historical scientific significance of the location and preserves the continuity of the astronomical function of the territory. The planetarium also becomes a new orientation and social point of the complex, with its position creating a natural connection between the existing SAS object, observatories, and new educational spaces.

The urban composition works with a hierarchy of public and semi-private spaces. The main entrance axis connects the entrance to the complex with the planetarium object and continues towards individual thematic pavilions and observatories. This communication system is complemented by a network of pedestrian paths and natural connecting trails, which allow for free movement of visitors in the landscape environment of the complex. Movement lines also respect the existing vegetation and the natural morphology of the terrain.

An important part of the design is the creation of a residential atrium by the existing SAS object. This space serves as a social and relaxation center of the complex intended for meeting visitors, institute staff, and organizing smaller events or outdoor presentations. The atrium also creates a transition between the scientific-research part of the complex and the newly proposed public functions of the planetarium and pavilions.

The design works with a combination of paved and natural surfaces with the aim of preserving the natural character of the area and minimizing the environmental burden on the location. Main pedestrian routes and entrance spaces are designed as paved areas allowing for comfortable visitor movement, while secondary communication lines and connecting paths use natural surfaces sensitively integrated into the forest environment. Paved areas are complemented by vegetation strips, tree planting, and grassy areas supporting the natural character of the landscape.

Traffic in the area is organized through the existing access road complemented by new driveable paths ensuring service to individual objects of the complex. Automobile traffic is concentrated mainly in the entrance part of the area, where parking spaces for visitors and employees are located. The internal spaces of the complex are primarily oriented towards pedestrian movement and residential functions with the aim of minimizing traffic load and preserving the quiet character of the environment.

The urban solution also places emphasis on connecting architecture with the landscape and creating visual relationships between individual objects, the forest environment, and the panorama of the High Tatras. New objects are placed sensitively into the existing relief and respect both the scale of the landscape and the character of the scientific complex.

2.1.6 ARCHITECTURAL SOLUTION OF THE PLANETARIUM OBJECT

The architectural solution of the planetarium object stems from the effort to create a distinctive, yet naturally integrated object of a scientific-educational character, responding to the environment of the high-mountain landscape and the existing scientific context of the territory. The object is designed as a dominant spatial element of the entire complex, with its architectural expression based on the contrast between the simple spherical geometry of the planetarium and the organically modeled landscape relief, into which the object is partially embedded.

The basic mass of the object is formed by the central dome of the immersive planetarium emerging from the modeled terrain as a symbolic and orientation point of the complex. The spherical form is based on the principles of astronomical bodies and also reflects the functional character of the object. The planetarium dome is set into the horizontal volume of associated functions, which is mostly embedded below the terrain level with the aim of minimizing the mass impact of the building in the landscape and preserving the natural character of the area. The architecture of the object works with the principle of seamless connection between the exterior and interior through terrain modeling, glass surfaces, and a distinctive entrance space cutting through the mass of the object. The main entrance is designed as an open communication slot leading the visitor gradually from the landscape environment into the central space of the object. This principle supports the gradation of space and creates an experiential transition between the exterior and the immersive environment of the planetarium.

The layout solution of the object is organized around the central space of the immersive dome planetarium, which represents the main function of the object. Situated around it are associated operations, such as the entrance hall, exhibition spaces, café, facilities, and flexible multifunctional spaces. The operation of the building is divided into above-ground and underground parts, with the underground spaces serving primarily for variable exhibition and event functions.

A significant aspect of the design is the flexibility of the layout. Variable exhibition spaces in the underground part of the building allow the space to be adapted to various usage scenarios, from classic exhibitions to multimedia presentations and cultural or science-popularization events. The space is designed using mobile partitions and variable elements that allow the organization of the interior to be changed according to current operational requirements.

The material solution of the building is based on a combination of a perforated metal dome shell, glazed surfaces, and natural materials integrated into the landscaping solution. The perforated dome shell also allows for working with light and creates a changing visual character of the building during the day and night. A minimalist material solution is applied in the interior, supporting the atmosphere of the immersive space and directing the visitor's attention to light, projection, and the spatial experience itself.

2.1.7 CONSTRUCTION AND TECHNICAL SOLUTION

The load-bearing structure of the planetarium consists of a steel space frame creating the basic load-bearing system of the entire sphere. The structure is divided into a lower static hemisphere and an upper movable part allowing the dome to open. The lower part of the dome is firmly anchored to the building's load-bearing structure and also forms the basic stabilizing element of the entire sphere. The load-bearing steel frame is designed as a lightweight space structure capable of transferring the dead weight of the perimeter shell, technological layers, and the moving system of the upper part of the dome.

The upper hemisphere is designed as a mobile segment moving along a circular rail track integrated into the perimeter structure of the planetarium. The movement of the dome is ensured by a system of auxiliary sliding mechanisms and movement rails located around the perimeter of the sphere. This system allows for the smooth retraction of the upper part of the dome and the creation of an open space towards the sky. The structural design is conceived to maintain the stability of the entire structure during movement and even in the open position of the dome.

The perimeter shell of the planetarium consists of perforated expanded metal anchored to a secondary steel substructure. The perforated shell creates a light and technological character for the building and also allows for working with light, shading, and the visual transparency of the surface. Between the load-bearing frame and the exterior shell, there are layers of thermal insulation and a ventilated air gap ensuring the optimization of the building's internal climatic conditions.

The inner surface of the sphere consists of the projection surface of the immersive planetarium, anchored to a separate structural system separated from the perimeter shell. The projection dome is designed to create ideal conditions for fulldome projection while also allowing for the integration of the planetarium's technological equipment. The space between the perimeter structure and the inner projection layer serves for routing technical utilities, HVAC, and the building's technological systems.

Part of the structural solution also includes light-diffusing slots and glazed skylights integrated into the building's perimeter shell. These elements allow for the introduction of natural light into the entrance and communication spaces while also supporting the atmospheric character of the interior. The glazed parts are designed using insulating glass set into steel frame structures.

At the level of the 1st underground floor, the structural system is supplemented by a system of steel columns, which ensure the transfer of loads from the steel dome structure and also form a load-bearing element of the building's internal communication system. The steel columns are integrated into the layout of the underground part and naturally connect the technological character of the structure with the architectural expression of the interior.

Part of this structural system is also a central staircase anchored directly to the load-bearing system of columns. The staircase connects the individual operational levels of the building and also becomes a distinctive spatial element of the interior. The structural design of the staircase works with the lightness of the steel structure and supports the open character of the central space under the dome. The combination of steel columns, exposed structural elements, and the central staircase also visually reveals the technological principle of the building's operation and supports its scientific-technological character.

The planetarium building is founded on a reinforced concrete substructure combined with monolithic walls embedded into the terrain. This part ensures the stabilization of the building in the sloping environment and also creates a load-bearing base for the steel dome structure. The underground part of the building also serves as a stable environment for exhibition and multifunctional spaces with the required microclimatic conditions.

2.1.8 INTERIOR MATERIAL SOLUTION

The interior material solution stems from the effort to create an atmospherically clean and visually undisturbed space supporting the immersive character of the planetarium and scientific-educational spaces. The interior works with a minimalist material palette based on the contrast of dark surfaces, exposed structural elements, and accents of natural light. The goal of the design is to suppress visual smog and focus the visitor's attention on the space, the projection, and the experience of perceiving the universe itself.

The dominant material of the interior is exposed concrete, applied mainly in the underground exhibition and communication spaces. Concrete walls and ceilings create a compact and neutral spatial background supporting the atmosphere of a technical and scientific environment. Their raw character also contrasts with the delicacy of light projections and digital media used within the exhibition.

Structural elements of the interior, such as steel columns, staircases, and load-bearing details, remain exposed and form a natural part of the architectural expression of the building. Exposed steel supports the technological character of the planetarium and simultaneously visually refers to the principles of construction and functioning of the building. The material solution thus does not hide the technical system of the building, but integrates it into the resulting architectural concept.

In the central part of the planetarium, dark acoustic surfaces and projection layers are applied, ensuring optimal conditions for fulldome projection. The color scheme of the interior is deliberately muted into shades of black, dark gray, and anthracite, thereby minimizing light reflections and highlighting the dome projection itself. Soft textile and acoustic layers simultaneously improve the acoustic comfort of the space and support the immersive character of the projection.

2.1.9 VARIABILITY OF THE INTERIOR ATMOSPHERE THROUGH LIGHT AND PROJECTION

A significant part of the interior's architectural concept is the work with projection, light, and digital media as tools for shaping the atmosphere of the space. The planetarium interior is not designed as a static environment with a rigidly defined character, but as a flexible and changeable spatial scene capable of responding to various forms of presentation, thematic scenarios, and the intensity of the visitor experience. The projection of astronomical phenomena, space simulations, data structures, or abstract light scenes allows for changing the character of the space without the need for physical interventions in the architecture. The interior can thus transition from a completely dark and introverted environment to a dynamic immersive space creating an illusion of infinity and movement.

Working with light also supports the spatial dramaturgy of the building. Individual parts of the interior work with different lighting intensity, color, and atmospheric character according to the function of the space. Circulation and exhibition spaces use dimmed lines of indirect lighting, which highlight the direction of movement and support visitor orientation in the building. Conversely, the central projection spaces work with maximum suppression of natural light with the aim of creating optimal conditions for an immersive visual experience.

Dynamic projection systems also allow for connecting the architecture with the content of the exhibition. Surfaces of walls, ceilings, and circulation spaces can serve as active projection surfaces reacting to the specific theme of the exhibition or the movement of the visitor. The interior thus gains the ability to change its identity and atmosphere depending on the current scenario of space usage.

A significant aspect of the design is also the connection of digital projection with natural light and real observation of the sky. The openable dome of the planetarium allows physical contact of the visitor with the night sky and creates a contrast between the simulated digital environment and the authentic astronomical experience.

2.1.10 THEMATIC PAVILIONS AND EXTERIOR OBJECTS

Part of the design of the scientific-educational area are thematic pavilions and smaller architectural objects distributed in the landscape environment between the planetarium, the existing SAS building, and the observatories. The pavilions create a network of smaller educational and recreational points complementing the main planetarium building and extending the visitor's experience into the exterior environment of the area. Their role is not to compete with the dominant planetarium building, but to create smaller thematic stops connecting the landscape, science, and public space.

Individual pavilions are designed as simple architectural objects sensitively placed into the natural environment with an emphasis on minimizing interventions into the existing vegetation and terrain. Formally, they are based on circular and organic geometric principles following the architectural language of the entire area. Their scale is subordinate to the landscape and they function more as small landscape interventions than dominant buildings.

Thematically, the pavilions are oriented towards the presentation of basic astronomical and natural phenomena. Each object represents a certain phenomenon or principle related to space, light, gravity, movement, or observation of the sky. The content of individual pavilions is designed in the form of interactive exhibitions, light installations, multimedia elements or simple experimental devices allowing the visitor to actively perceive and discover the presented phenomena.

Part of the exterior solution are also observatories and spaces intended for direct observation of the sky. These objects are situated in quieter parts of the area with minimal light pollution and create a connection between the scientific function of the Astronomical Institute of the SAS and the publicly accessible activities of the planetarium. Observation platforms, open recreational areas, and smaller astronomical stations allow visitors authentic contact with the night sky and extend the educational character of the area into the exterior.

The pavilions also function as orientation and recreational points within the landscape concept of the area. They are connected by a system of pedestrian paths, natural trails, and recreational areas allowing for gradual discovery of the territory. Movement between individual objects becomes part of the experience and supports the perception of the landscape, light, sound, and atmosphere of the high-mountain environment.

2.1.11 CONCEPTUAL SOLUTION FOR THE RENOVATION OF THE SAS BUILDING

The design approaches the building with respect for its original scientific-research function and does not try to change its basic character, but complements it with new public, exhibition, and educational layers supporting the creation of a complex scientific-educational area.

The renovation of the building is based mainly on the reorganization of internal spaces and the creation of a flexible layout system allowing for variable use of individual parts of the building. Existing spaces are adapted for the needs of interactive exhibitions, lectures, workshops, multimedia presentations, and popularization activities connected with astronomy and space. The layout is designed to allow for simple transformation of the space according to current operational requirements and future technological development.

A significant intervention in the building is the creation of a new recreational atrium situated in contact with the main entrance and public functions of the building. The atrium functions as a social and relaxation space connecting the existing SAS building with the newly designed planetarium and exterior pavilions. The space is intended for visitors to meet, organizing smaller events, outdoor presentations, or informal scientific-popularization activities. At the same time, it creates a natural transition between the interior of the building and the landscape of the complex.

Part of the design is also the activation of the existing viewing platform oriented towards the panorama of the High Tatras. The platform is supplemented with recreational and educational functions allowing for the appreciation of the landscape, astronomical phenomena, and visual relationships between the Tatra environment and the scientific complex. The viewing space thus becomes another point connecting the landscape, architecture, and the phenomenon of observation.

However, the proposal for the renovation of the SAS building does not represent the primary topic of the diploma thesis, but rather a conceptual completion of the entire complex and its spatial relationships. The main emphasis of the design is focused on the new planetarium building and the formation of a scientific-educational environment, while the interventions in the existing building serve mainly to support the overall functionality, connectivity, and activation of the area.

2.1.12 CONCLUSION

The goal of the design was to create an environment that will not function only as a technical object intended for projection and sky observation, but as a complex experiential and educational area supporting the human relationship to science, nature, and the universe. An important part of the concept is the integration of architecture into the landscape, working with the atmosphere of the space, and creating a connection between scientific research, public space, and the natural environment.

The result of the work is a design of a flexible and environmentally sensitive scientific-educational complex, which builds on the identity of the place and at the same time creates a new space for the popularization of scientific knowledge and the perception of the universe through architecture and landscape.

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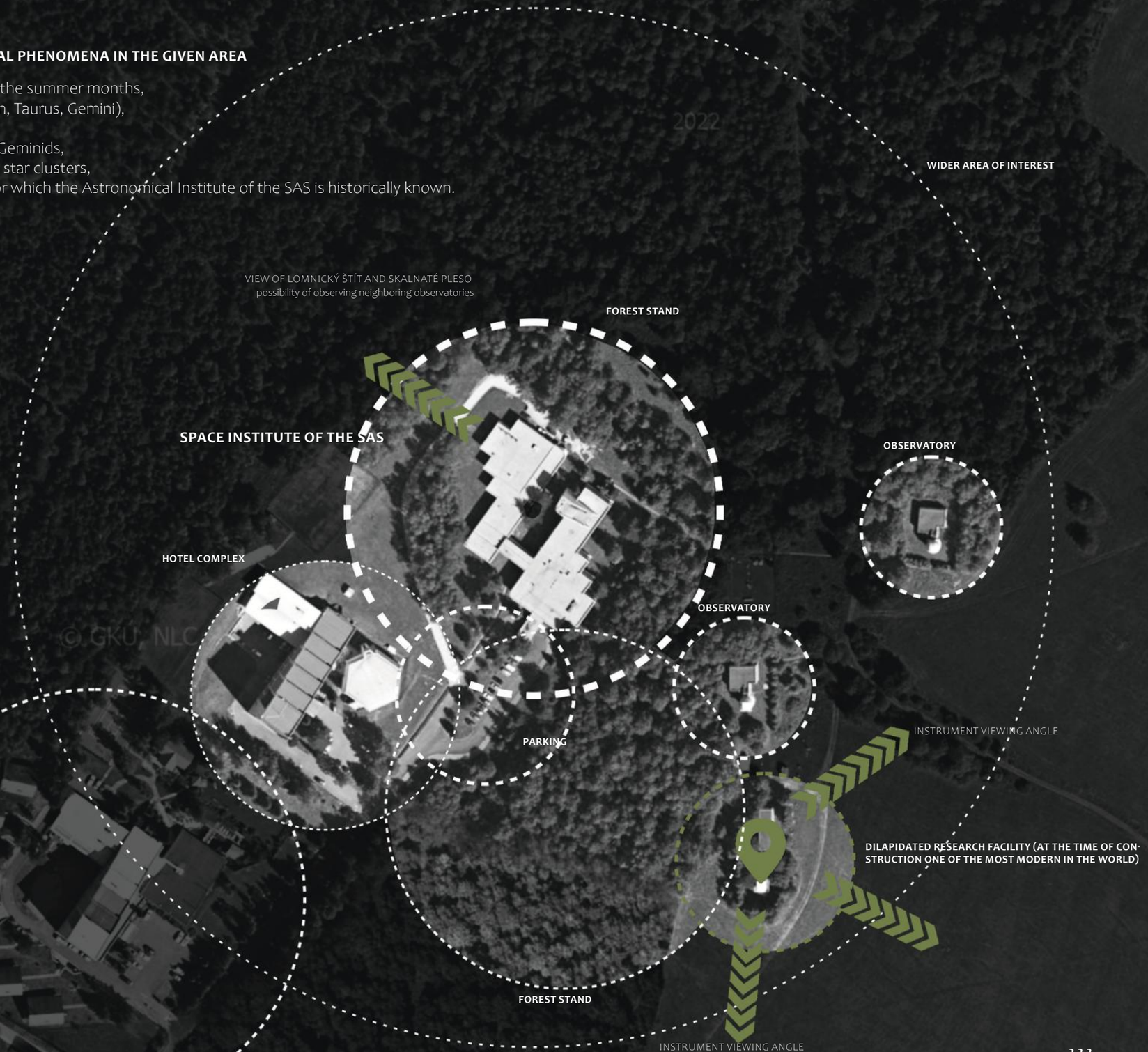
Subject: Diploma Thesis
Academic year: 2025/2026

2.2 DRAWING PART


LOMNICKÝ ŠTÍT
SKALNATÉ PLESO
2022
VIEW OF THE OBSERVATION STATIONS
PROJECT AREA
© GKÚ, NLC
© GKÚ, NLC
2022
2022

POSSIBILITIES OF OBSERVING COSMOLOGICAL PHENOMENA IN THE GIVEN AREA

- galactic core of the Milky Way during the summer months,
- constellations of the winter sky (Orion, Taurus, Gemini),
- planets Jupiter and Saturn,
- meteor showers of the Perseids and Geminids,
- deep space — galaxies, nebulae, and star clusters,
- very high-quality solar observation, for which the Astronomical Institute of the SAS is historically known.



OBSERVATORY BUILDING

SAS RESEARCH INSTITUTE

OBSERVATORY BUILDING

PANORAMA OF THE HIGH TATRAS IN THE AREA OF INTEREST

S

exceptional location in the high-mountain environment of the High Tatras
existing scientific base of the Astronomical Institute of the SAS
minimal light pollution suitable for astronomical observation
strong genius loci associated with science and space observation
preserved natural environment and high-quality vegetation structure
attractive views of the High Tatras panorama
peaceful character of the area and low traffic intensity
existing infrastructure and access roads

W

fragmented urban structure of the complex
insufficient activation of public and living spaces
weaker orientation and readability of movement in the area
limited offer of publicly accessible functions
insufficient connection of individual buildings in the complex
lack of quality living and community spaces
unutilized potential of existing exterior areas
partially outdated layout and operational solutions of the buildings

O

development of scientific-educational and popularization activities
activation of the area for the public and visitors
creation of a new cultural-educational center for the region
connecting landscape, architecture, and astronomy into one concept
adaptation of existing buildings for new forms of use
development of tourism oriented towards science and experiential education
utilization of the potential of views and the natural environment
strengthening the identity of the area as a center of astronomical research

T

risk of excessive intervention in the natural environment
climatic conditions of the high-mountain environment
limitations resulting from nature conservation
potential disruption of the peaceful character of the complex
light and environmental burden on the area in the future
economic difficulty of restoring and developing the complex

BIRTH OF A STAR

MOLECULAR CLOUD

GRAVITATIONAL CONTRACTION

PROTOSTAR

NUCLEAR FUSION

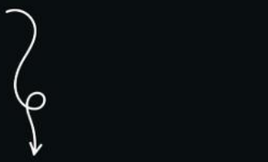
FORMATION OF A STABLE STAR

COSMIC CHAOS

PARTICLES FLOATING THROUGH SPACE IN NEBULAE AND SPACE

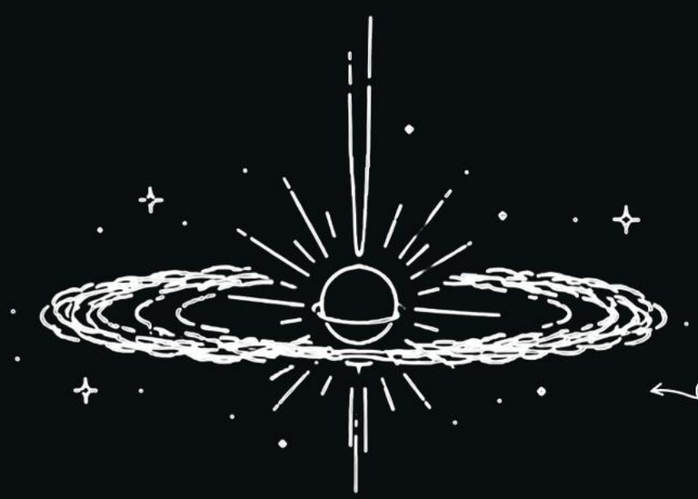
ROTATION AND BIRTH OF THE CORE

PARTICLES ATTRACTED BY GRAVITY AROUND THE FORMING CORE



NUCLEAR FUSION

STRONG EXPLOSION CAUSED BY THE ACCUMULATION OF PARTICLES AND ENERGY IN THE FORMING CORE



STABLE STAR

FORMATION OF A STABLE STAR AND ROTATING BODIES

2.2.6 STAR BIRTH SCHEME

COSMIC CHAOS

PARTICLES FLOATING THROUGH SPACE IN NEBULAE AND SPACE

ROTATION AND BIRTH OF A CORE

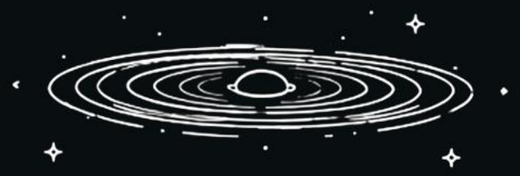
PARTICLES ATTRACTED BY GRAVITY AROUND A FORMING CORE

NUCLEAR FUSION

STRONG EXPLOSION CAUSED BY THE ACCUMULATION OF PARTICLES AND ENERGY IN THE FORMING CORE

STABLE STAR

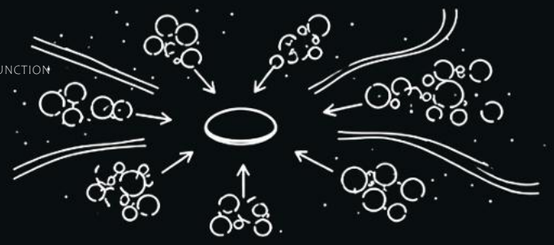
FORMATION OF A STABLE STAR AND ROTATING BODIES



NATURAL CHAOS

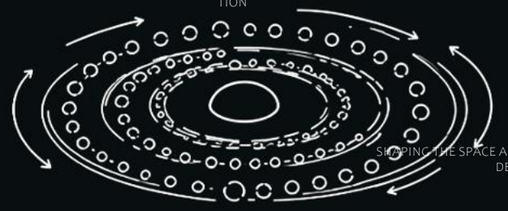
FREELY GROWING GREENERY AROUND A DEVASTATED OBJECT INTENDED FOR SUN RESEARCH

CONCENTRATION OF SPACE FOR A NEW FUNCTION



NEW ENERGY FROM AN OLD STRUCTURE

PLACING A NEW FUNCTION IN THE PLACE OF THE ORIGINAL ONE AND STARTING THE TRANSFORMATION



SHAPING THE SPACE AROUND THE CORE OF THE DESIGN

RADICAL CHANGE

TRANSFORMATION OF AN OVERGROWN AREA INTO A NEW EDUCATIONAL CENTER WITH NEW LIFE

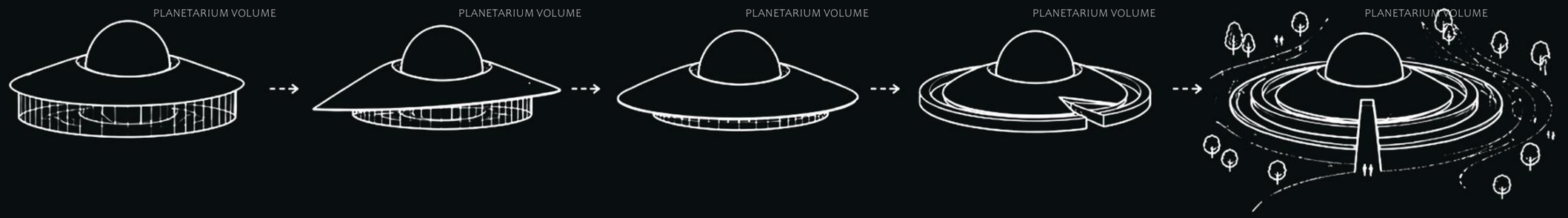
EMERGENCE OF THE MAIN FUNCTION FROM THE TERRAIN

BIRTH OF A NEW STRUCTURE

THE MOST PROMINENT NEW FUNCTION WITH ASSOCIATED FUNCTIONS IN HARMONY WITH THE SURROUNDING ENVIRONMENT

EMERGENCE OF A NEW URBAN - ARCHITECTURAL - LANDSCAPE STRUCTURE

2.2.7 TRANSFORMATION OF A NATURAL PHENOMENON INTO AN ARCHITECTURAL AND URBAN SOLUTION



VOLUME OF ASSOCIATED FUNCTIONS OF THE OBJECT AS A GLASS FACADE

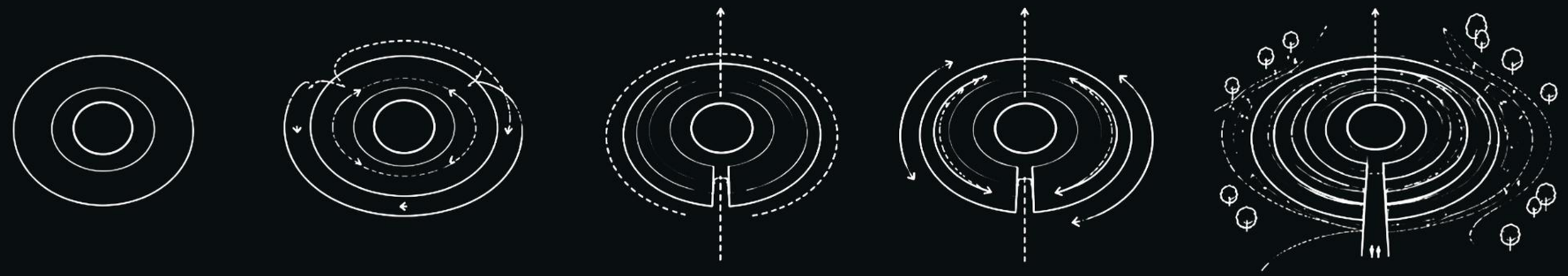
VOLUME OF ASSOCIATED FUNCTIONS OF THE OBJECT AS A GLASS FACADE WITH A RECESSED BACK SIDE

VOLUME OF ASSOCIATED FUNCTIONS SLOWLY SUBMERGING INTO THE TERRAIN

VOLUME OF ASSOCIATED FUNCTIONS UNDER THE TERRAIN VOLUME WITH AN ENTRANCE SLOT

VOLUME OF ASSOCIATED FUNCTIONS UNDER THE TERRAIN VOLUME WITH A PROMINENT ENTRANCE SPACE CUTTING THROUGH THE BUILDING VOLUME AT ONE POINT

CONCEPTUAL DEVELOPMENT OF THE DESIGN



RADIAL LAYOUT

RADIAL LAYOUT WITH ROTATING PARTITIONS IN THE INTERIOR

CREATION OF AN ENTRANCE AXIS AND MAIN VIEW FROM THE PLANETARIUM HEMISPHERE

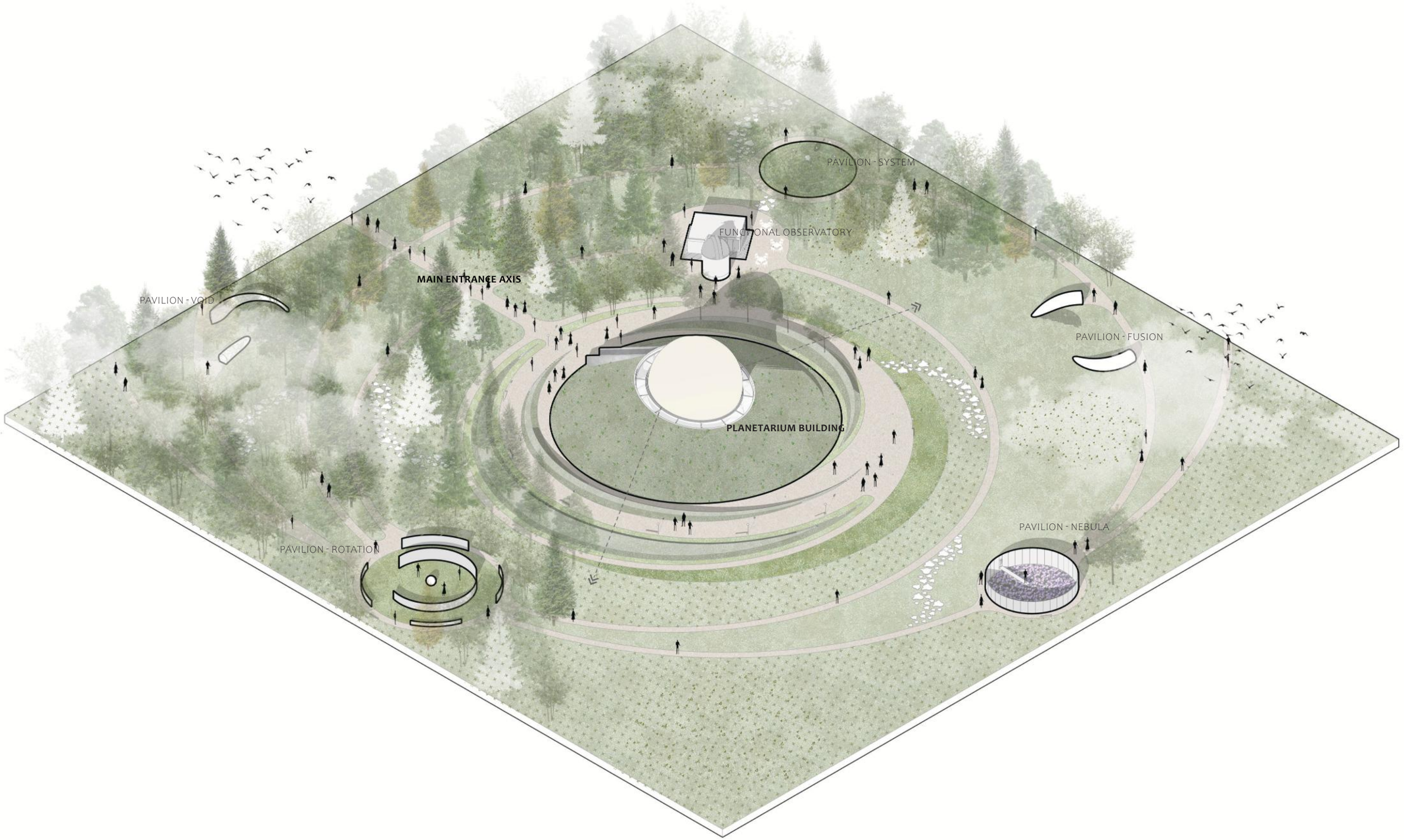
TERRAIN EMERGENCE

RESULTING STRUCTURE

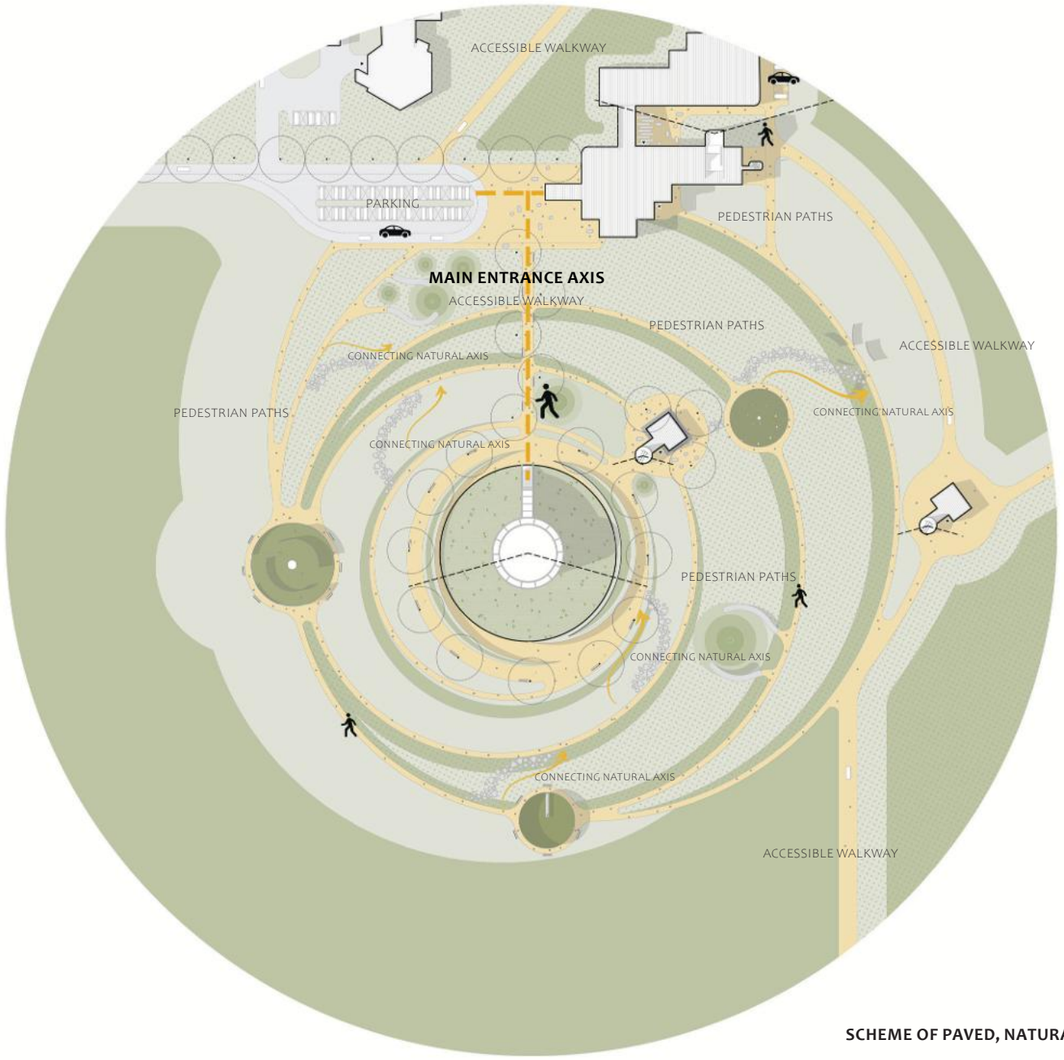
DEVELOPMENT OF VIEWS, VISTAS, AND MOBILE LAYOUT

2.2.8 DESIGN DEVELOPMENT

2.2.9 **SITE PLAN OF THE AREA**
M 1:1500

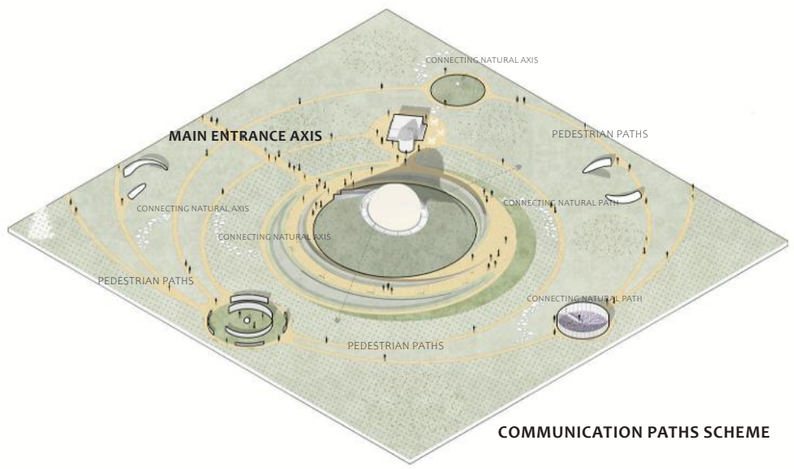


2.2.10 **AXONOMETRY OF THE AREA**

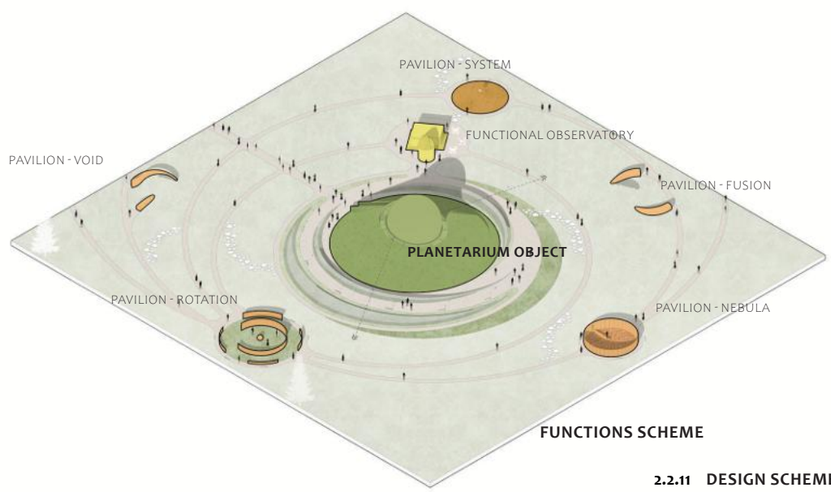


SCHEME OF PAVED, NATURAL AND GREEN AREAS

GREENERY AND PLANTING SCHEME



COMMUNICATION PATHS SCHEME



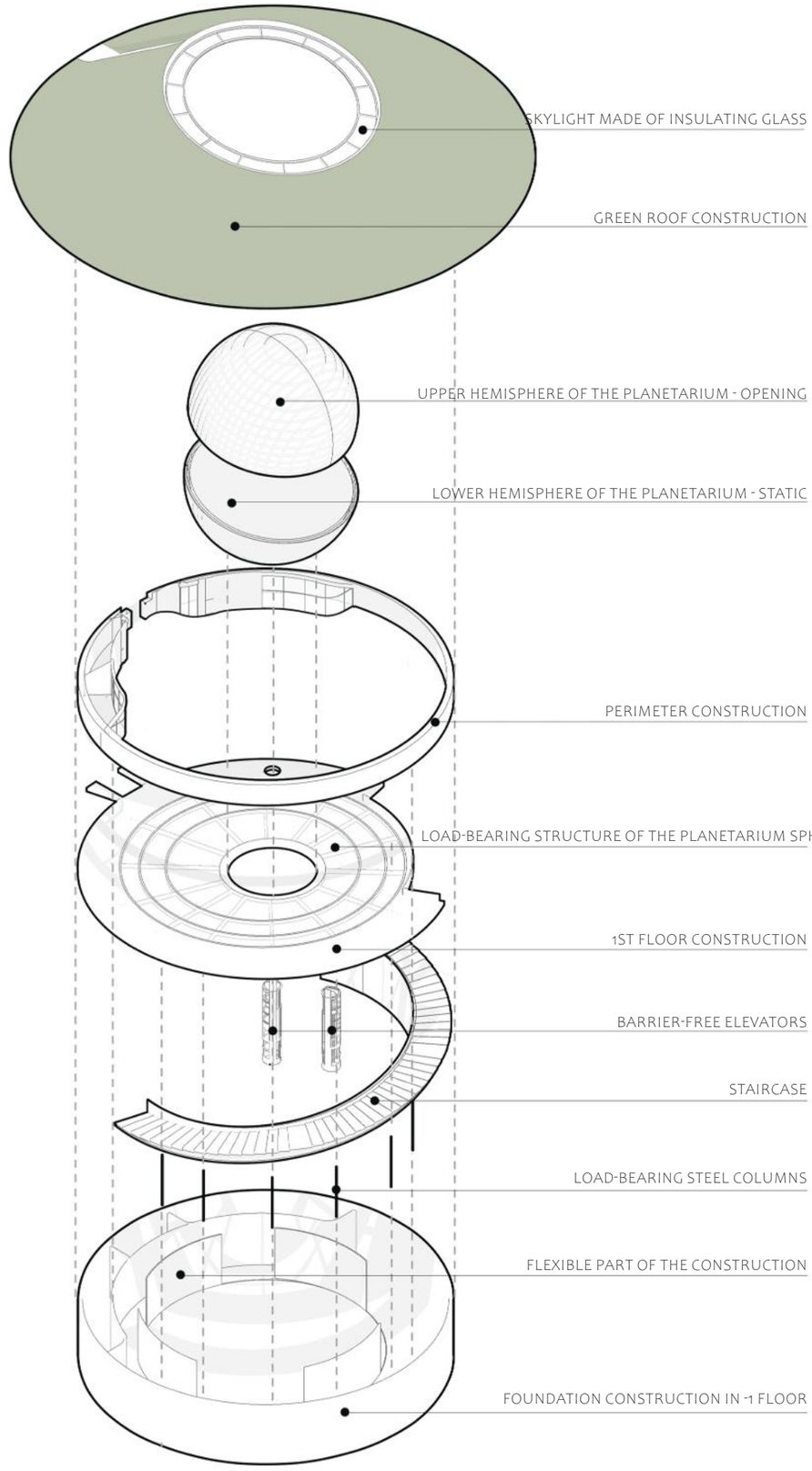
FUNCTIONS SCHEME

2.2.11 DESIGN SCHEMES

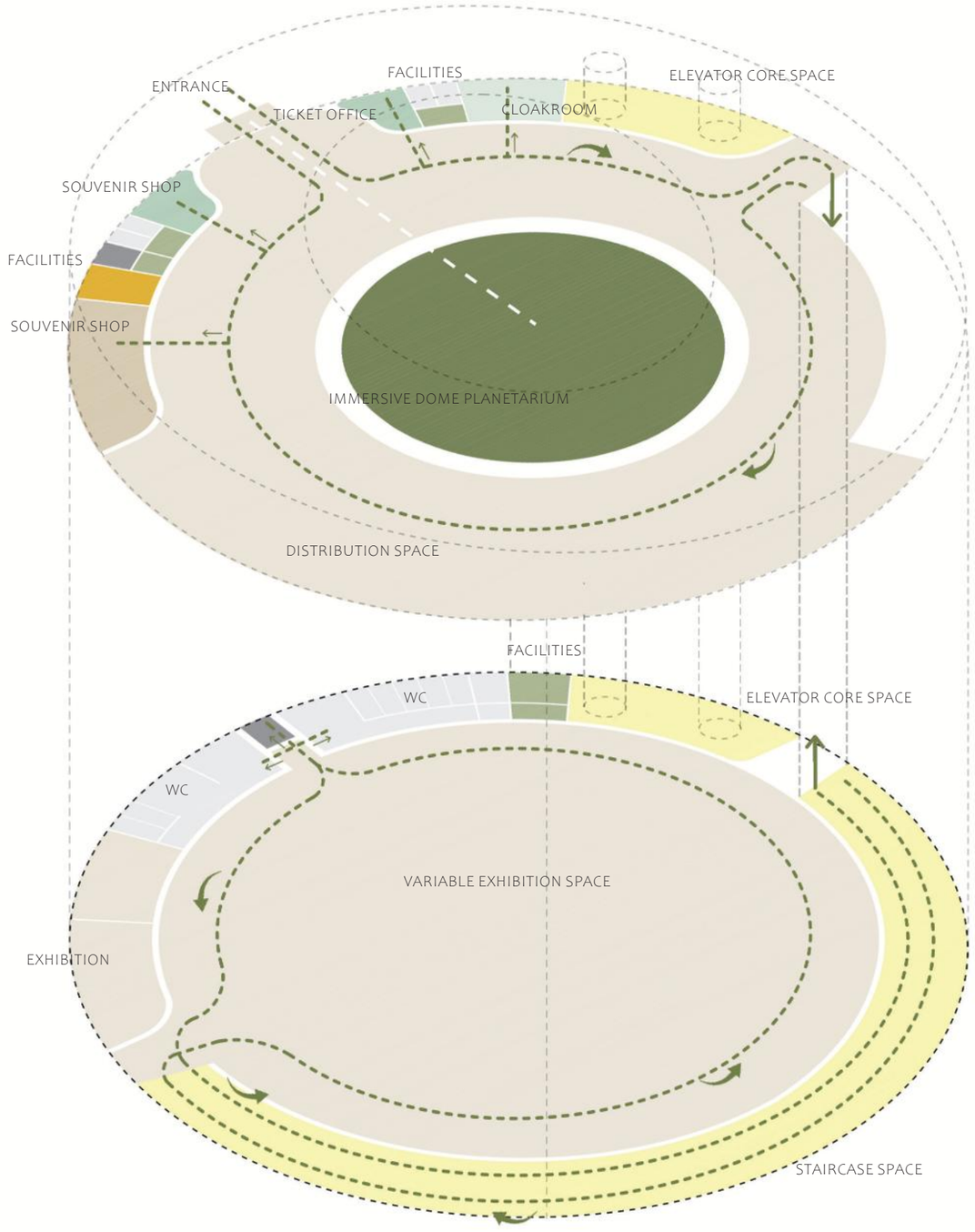
2.2.12 VISUALIZATION OF THE PROPOSED AREA

2.2.13 VISUALIZATION OF THE PLANETARIUM OBJECT - DAY

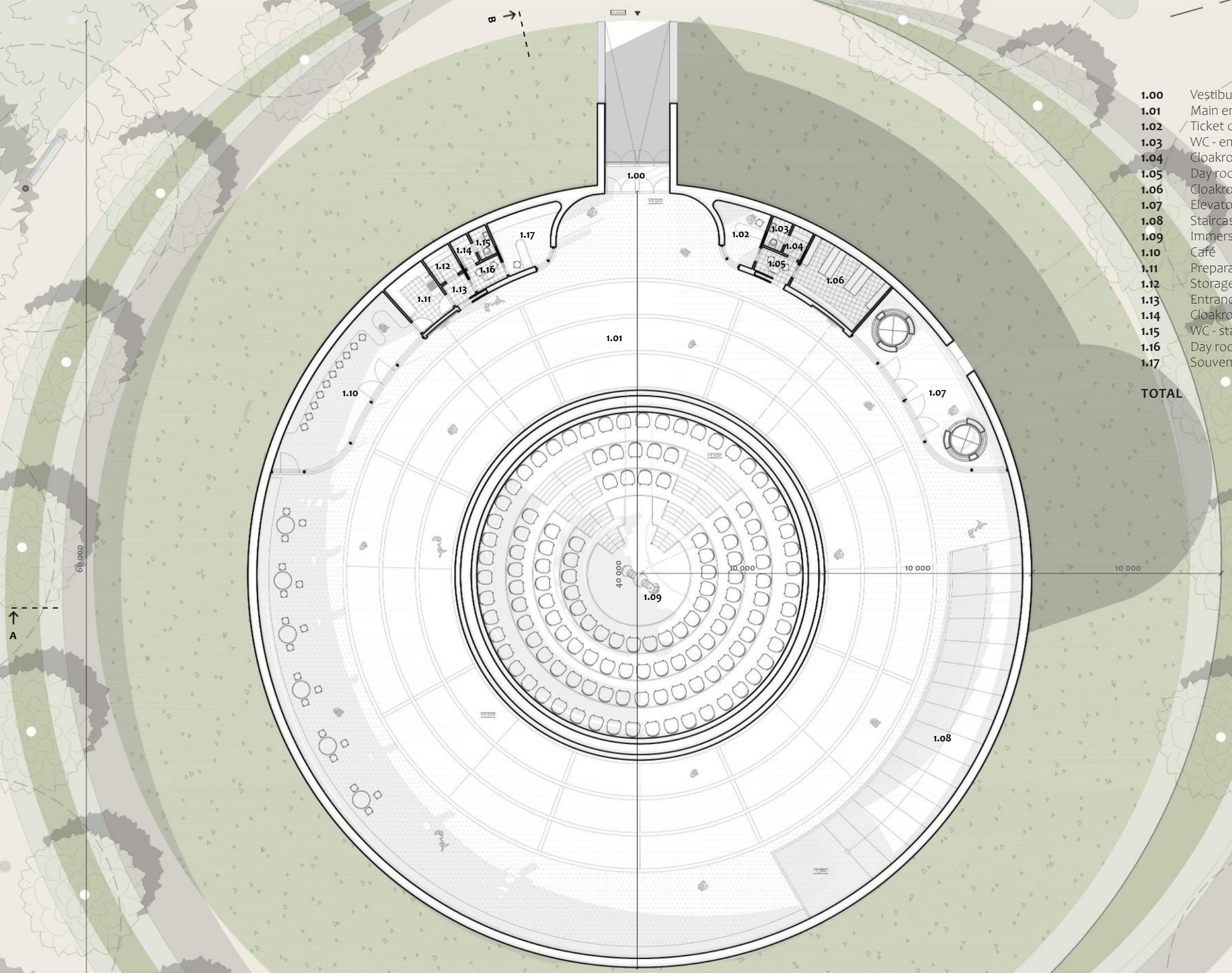
2.2.14 VISUALIZATION OF THE PLANETARIUM OBJECT - NIGHT



2.2.15 **STRUCTURAL SCHEME OF THE PLANETARIUM OBJECT**



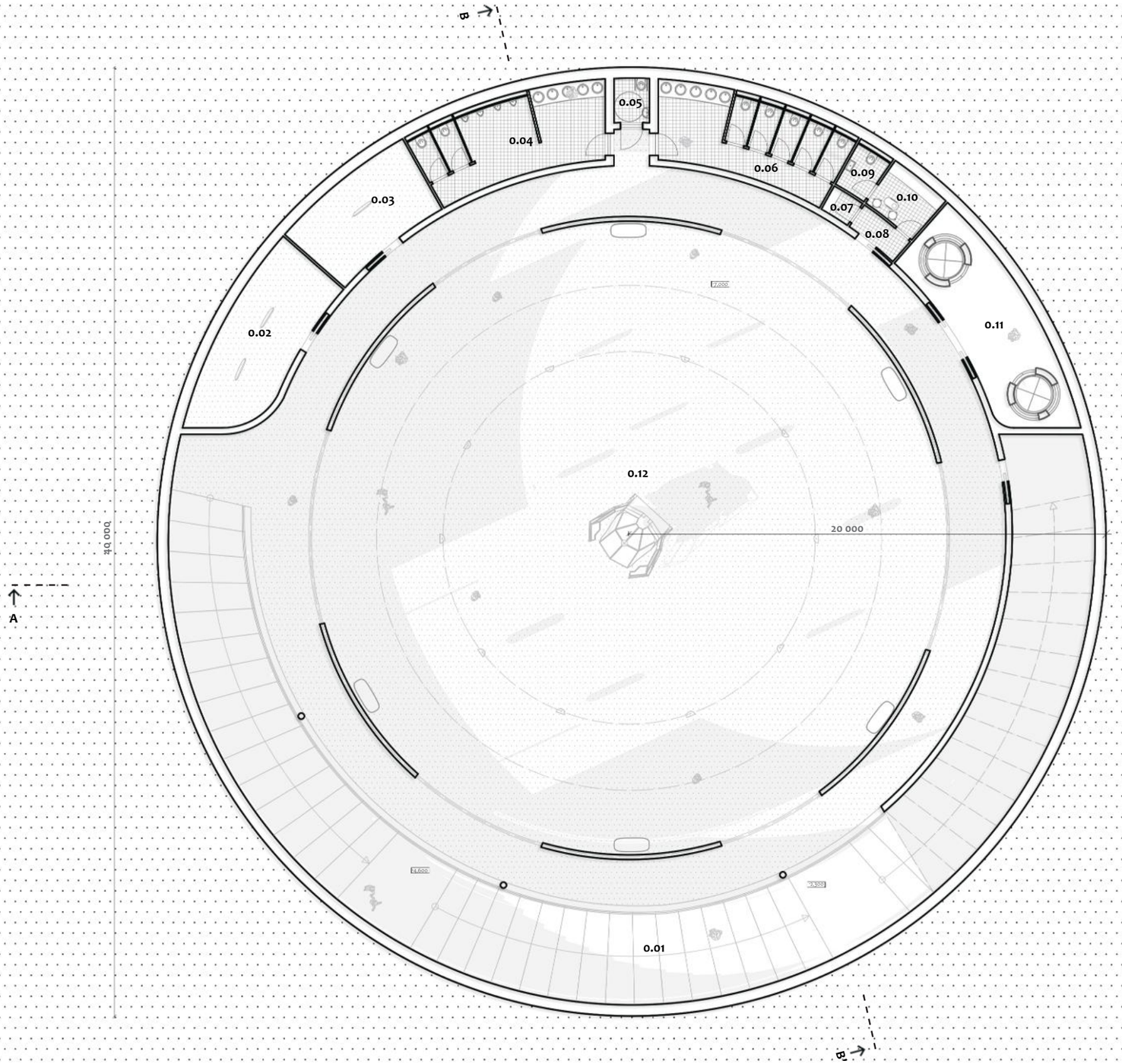
2.2.16 **FUNCTIONAL-OPERATIONAL SCHEME OF THE PLANETARIUM BUILDING**



LEGEND

1.00	Vestibule	**5 m²**
1.01	Main entrance space	**838 m²**
1.02	Ticket office	**7.2 m²**
1.03	WC - employees	**2.5 m²**
1.04	Cloakroom - employees	**2.5 m²**
1.05	Day room	**3.0 m²**
1.06	Cloakroom	**15.3 m²**
1.07	Elevator core	**36 m²**
1.08	Staircase	**92 m²**
1.09	Immersive dome planetarium	**255 m²**
1.10	Café	**34 m²**
1.11	Preparation room	**7.8 m²**
1.12	Storage	**2.8 m²**
1.13	Entrance hall	**2.0 m²**
1.14	Cloakroom - staff	**2.5 m²**
1.15	WC - staff	**2.5 m²**
1.16	Day room	**3 m²**
1.17	Souvenir shop	**10.1 m²**
TOTAL		**1321.2 m²**

2.2.17 **1ST FLOOR PLAN**
SCALE 1:200



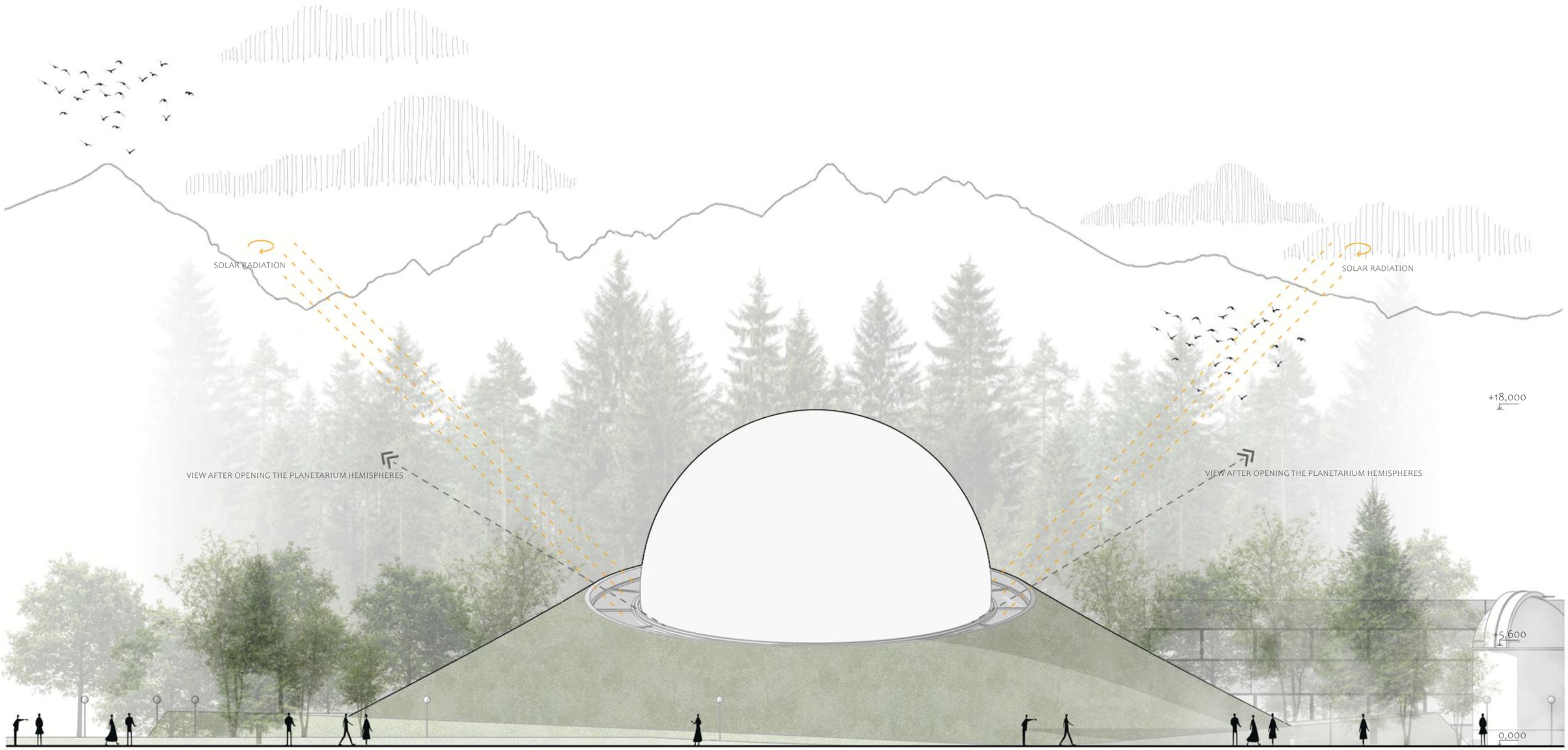
LEGEND

0.01	Staircase	**254 m²**
0.02	Exhibition	**30.5 m²**
0.03	Exhibition	**22.8 m²**
0.04	WC - Men	**30.5 m²**
0.05	WC - Disabled	**3.5 m²**
0.06	WC - Women	**30.5 m²**
0.07	Storage	**1.7 m²**
0.08	Entrance hall	**3.10 m²**
0.09	WC - Staff	**3.8 m²**
0.10	Cleaning room	**6.5 m²**
1.11	Elevator core	**36 m²**
1.12	Flexible exhibition	**902 m²**

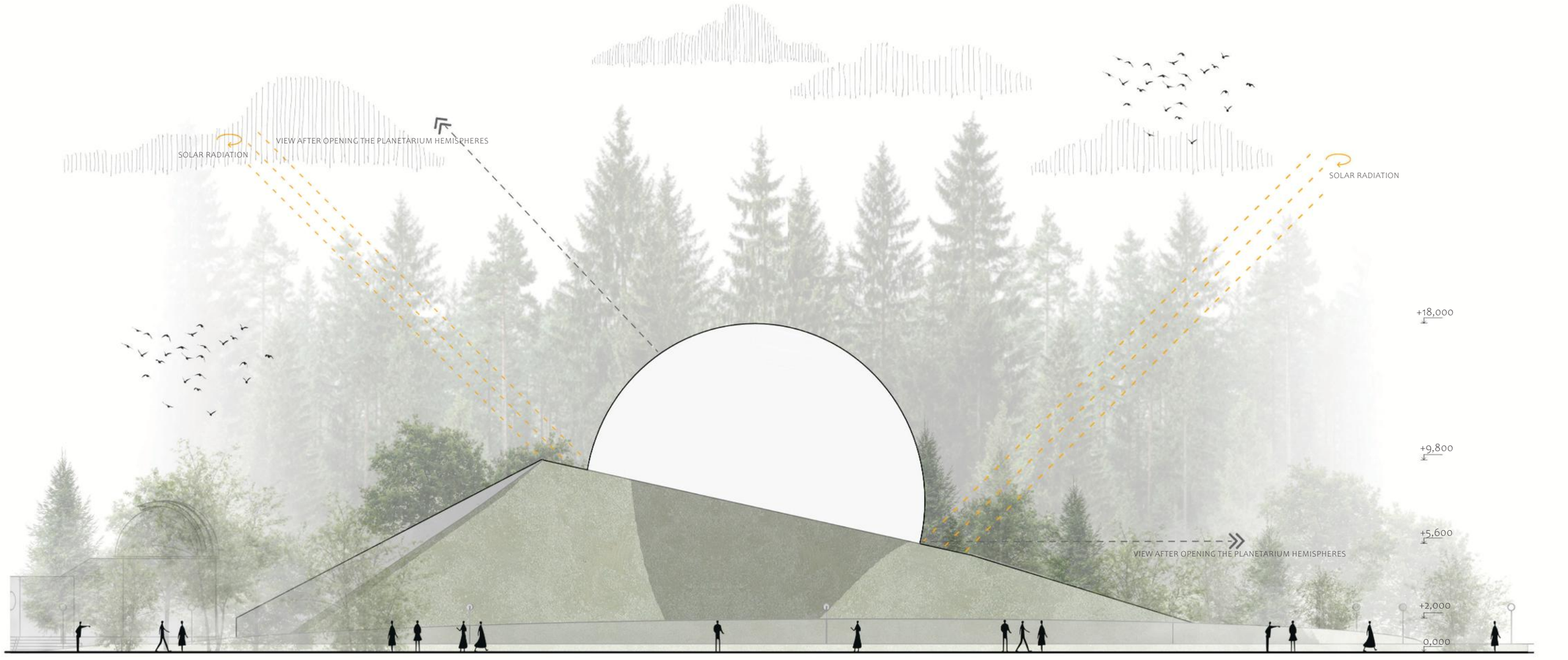
TOTAL **1325 m²**

2.2.18 FLOOR PLAN - 1ST FLOOR

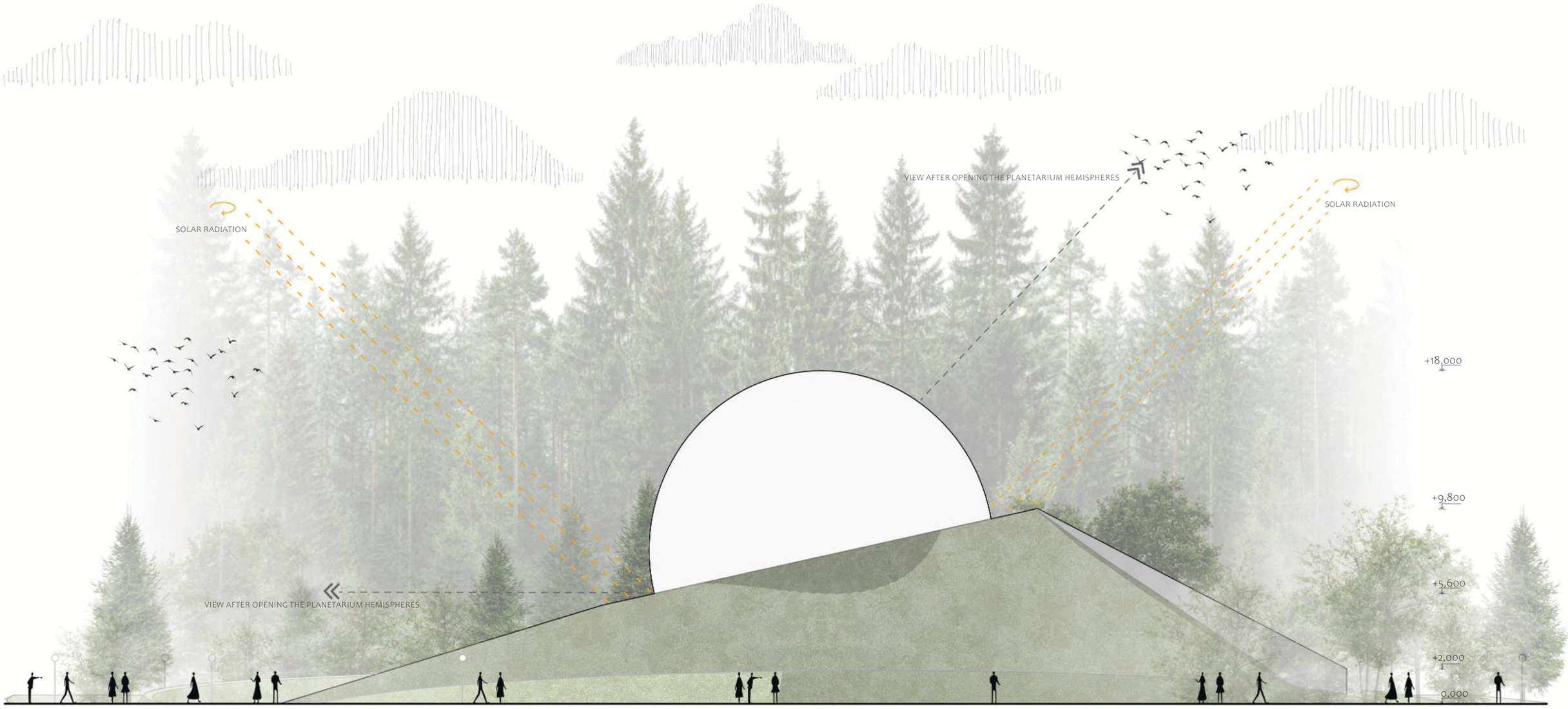
SCALE 1:200



2.2.19 **SOUTH VIEW**
SCALE 1:200

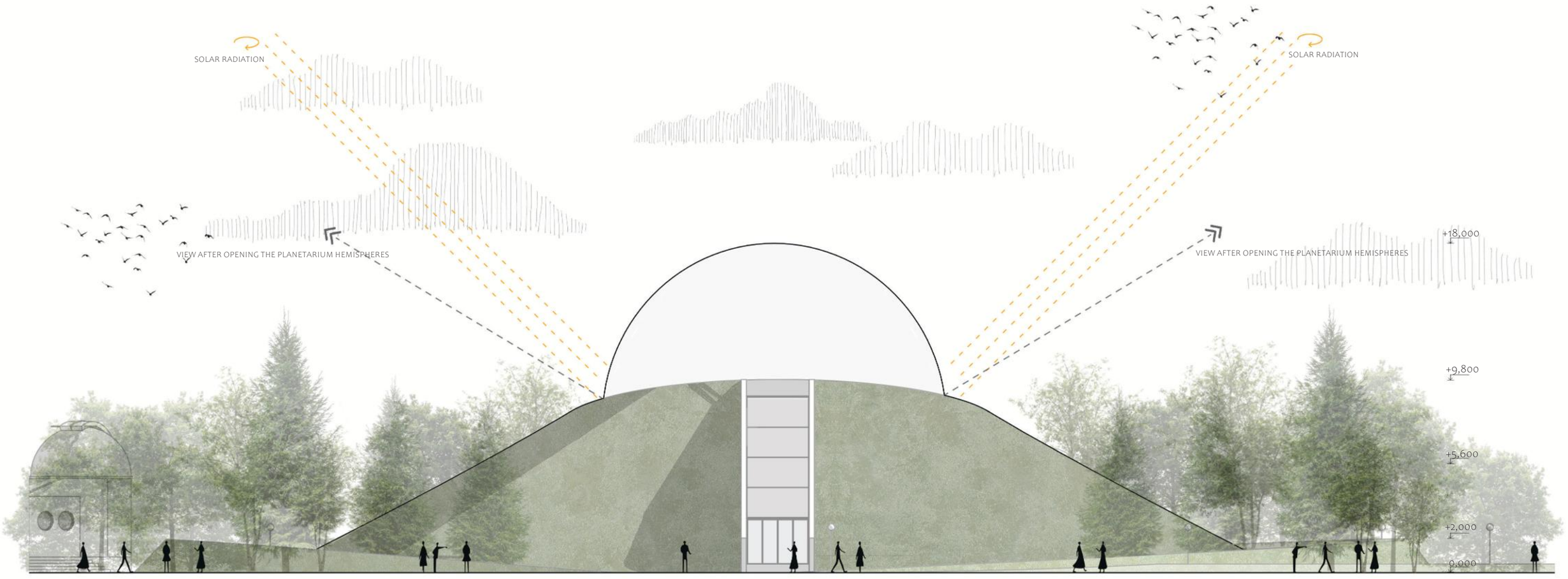


2.2.20 **WEST VIEW**
SCALE 1:200

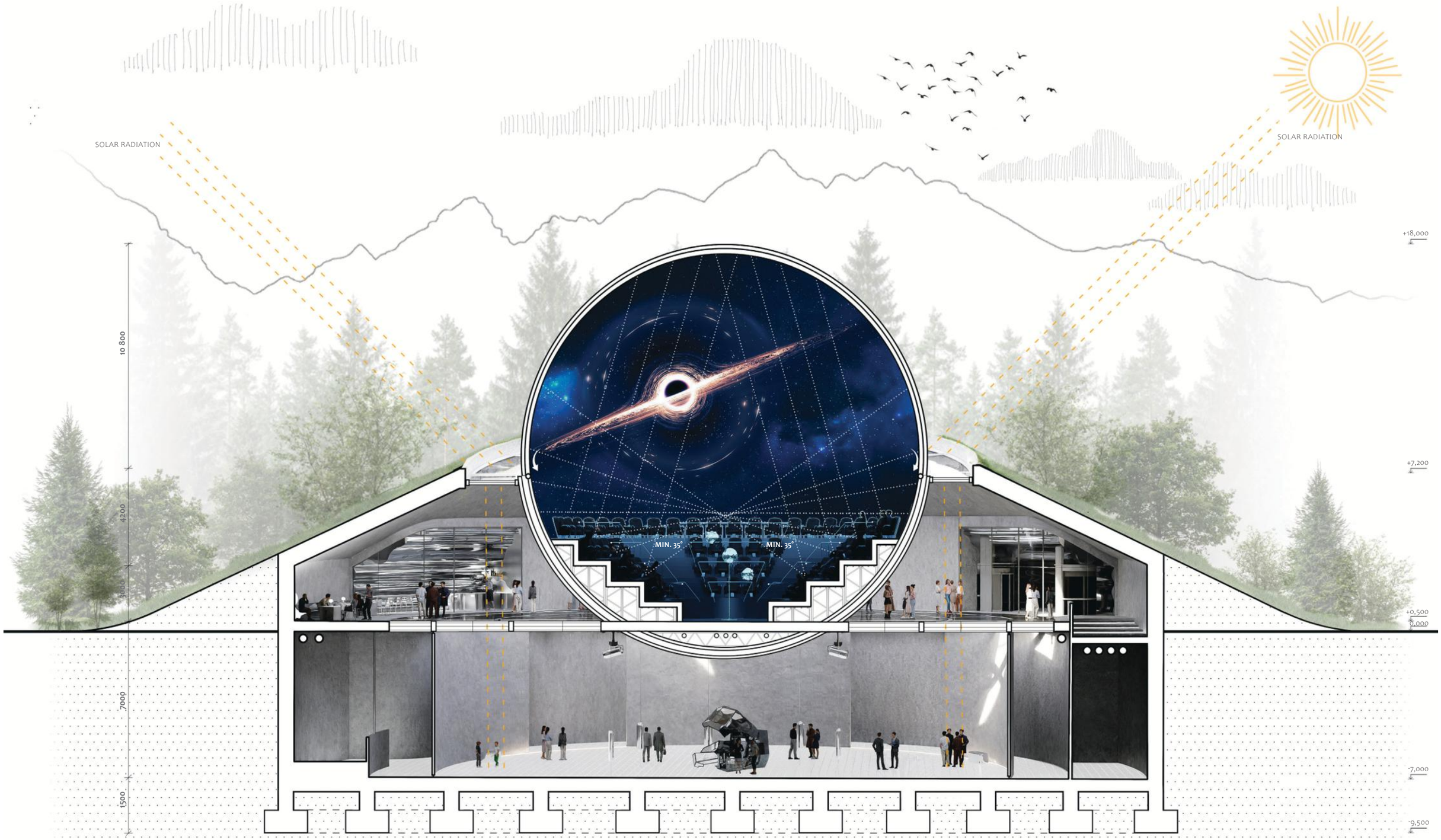


2.2.21

EAST VIEW
SCALE 1:200

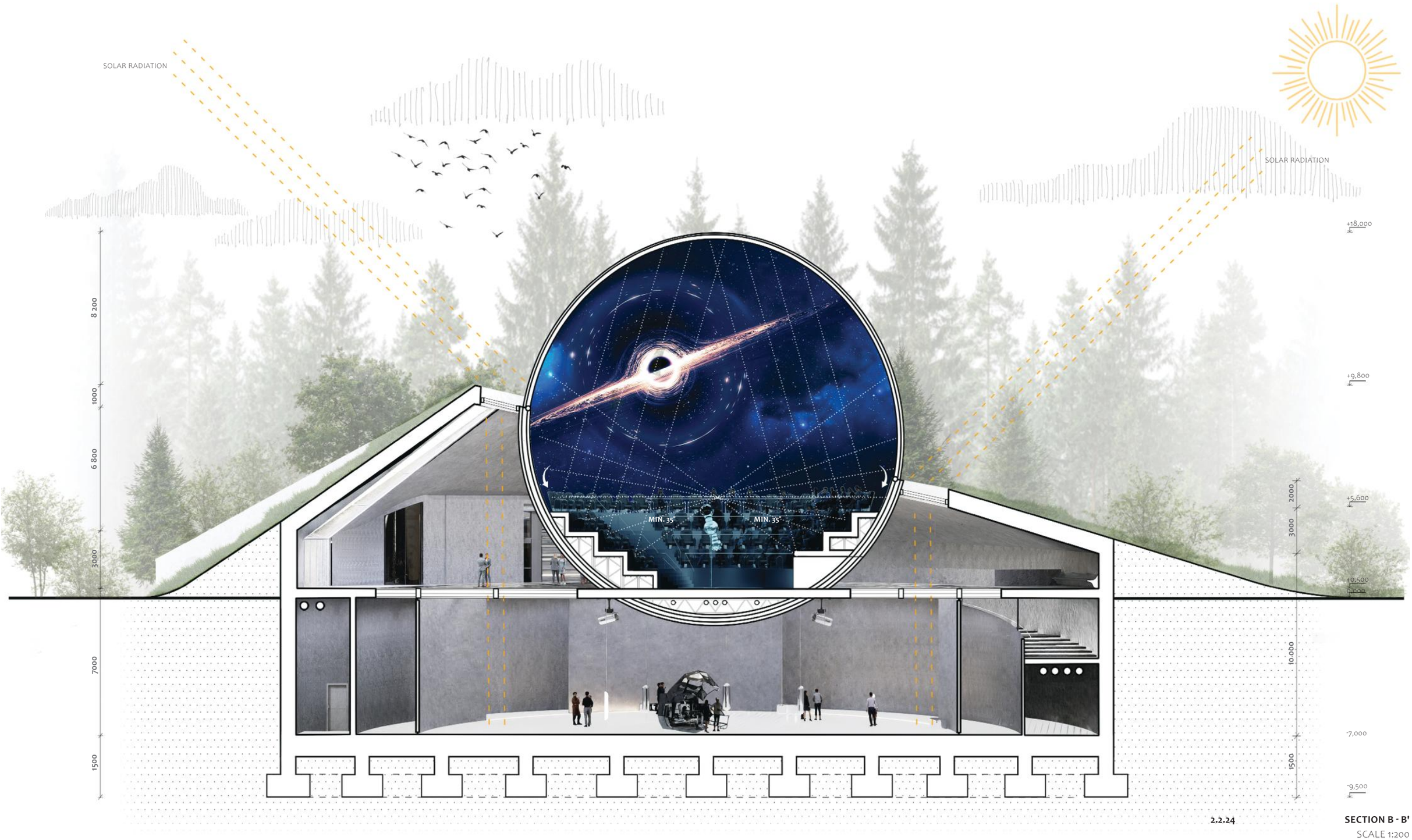


2.2.22 **SOUTH VIEW**
SCALE 1:200



2.2.23

SECTION A - A'
SCALE 1:200



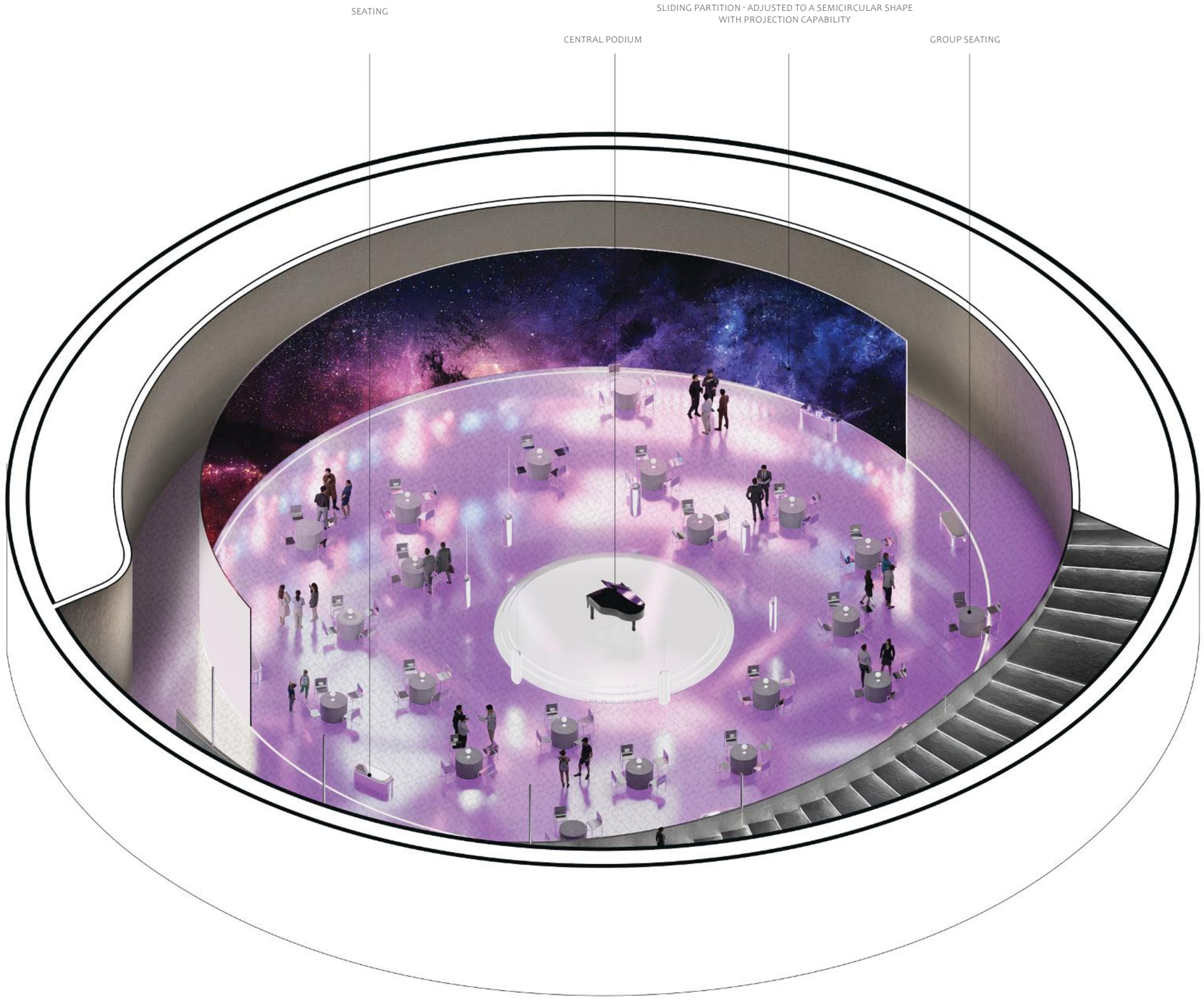
2.2.24

SECTION B - B'
SCALE 1:200

2.2.25 VISUALIZATION OF PLANETARIUM INTERIOR SPACES - ENTRANCE AREA

2.2.26 VISUALIZATION OF PLANETARIUM INTERIOR SPACES - FLEXIBLE LAYOUT IN THE UNDERGROUND PART

2.2.27 **AXONOMETRIC VIEW OF THE INTERIOR - 1ST FLOOR WITH FLEXIBLE LAYOUT**
VARIANT - EXHIBITION



2.2.28 **AXONOMETRIC VIEW OF THE INTERIOR - 1ST FLOOR WITH FLEXIBLE LAYOUT**
VARIANT - EVENT

2.2.29 **VISUALIZATION OF PLANETARIUM INTERIOR SPACES - FLEXIBLE LAYOUT IN THE UNDERGROUND PART**
VARIANT - EVENT

2.2.30 **VISUALIZATION OF PLANETARIUM INTERIOR SPACES - FLEXIBLE LAYOUT IN THE UNDERGROUND PART**
VARIANT - EXPERIENTIAL EXHIBITION

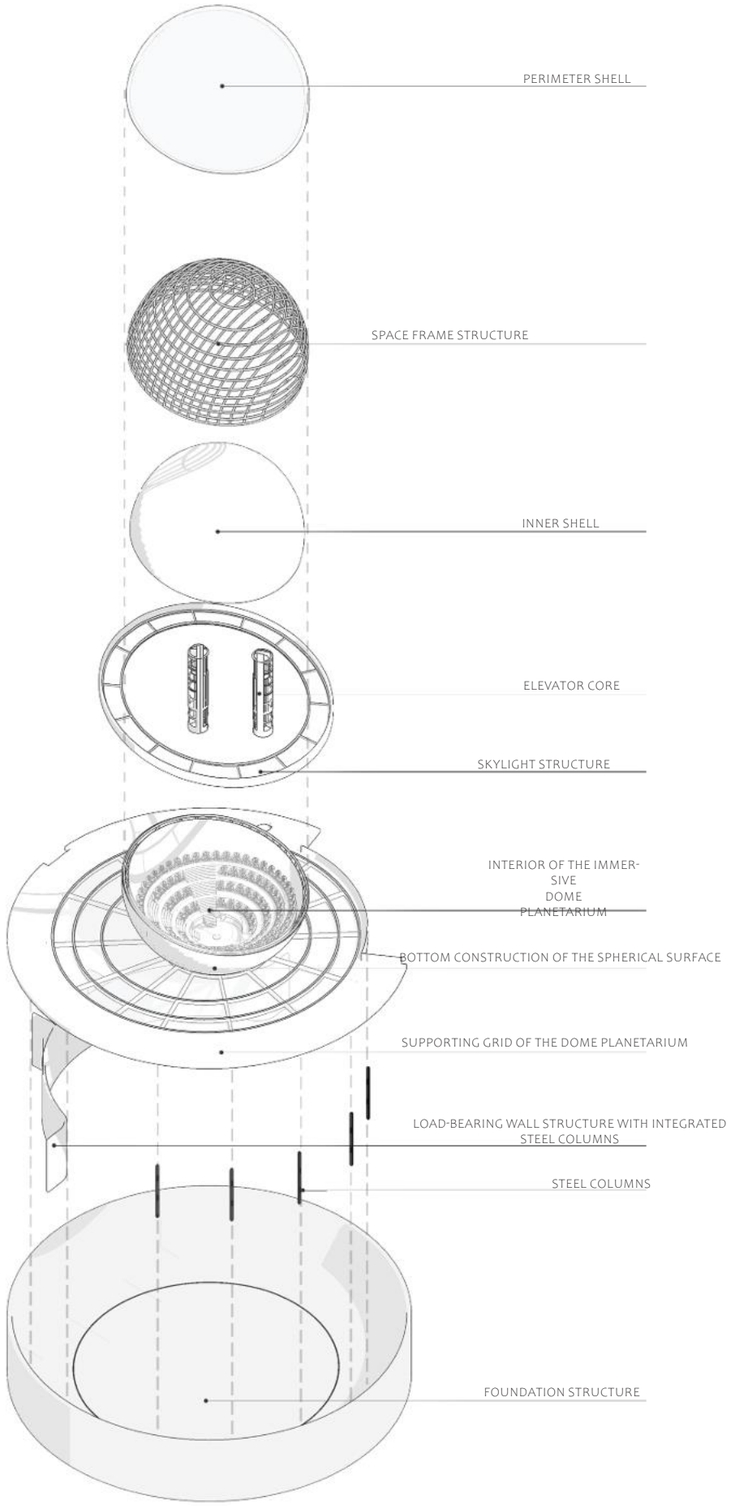
2.2.31

VISUALIZATION OF PLANETARIUM INTERIOR SPACES - ENTRANCE AREA

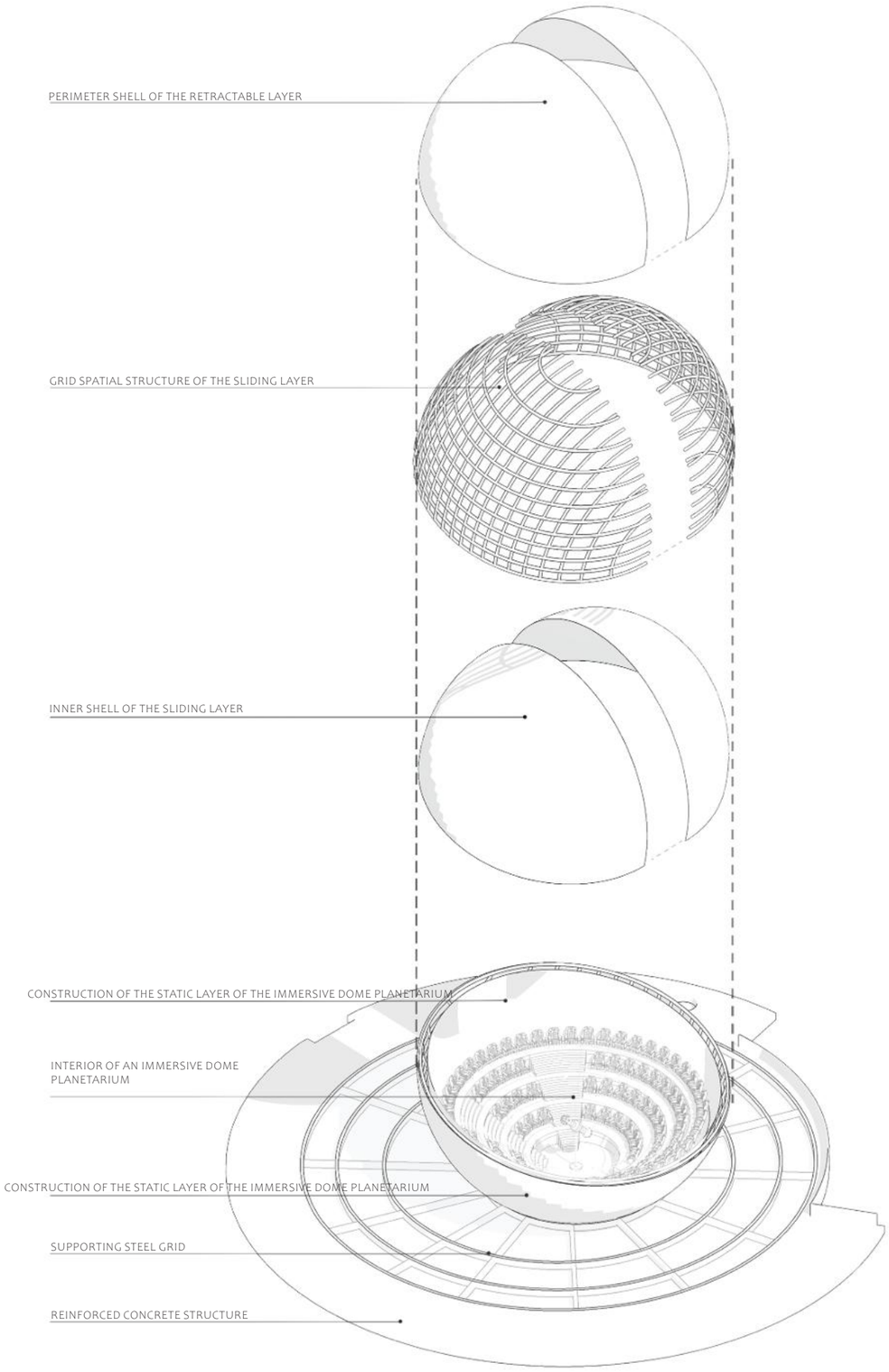
VARIANT - EVENT

2.2.32 **VISUALIZATION OF PLANETARIUM INTERIOR SPACES - ENTRANCE AREA**
VARIANT - EXPERIENTIAL EXHIBITION

AXONOMETRIC DETAIL OF THE DESIGN'S LOAD-BEARING STRUCTURES

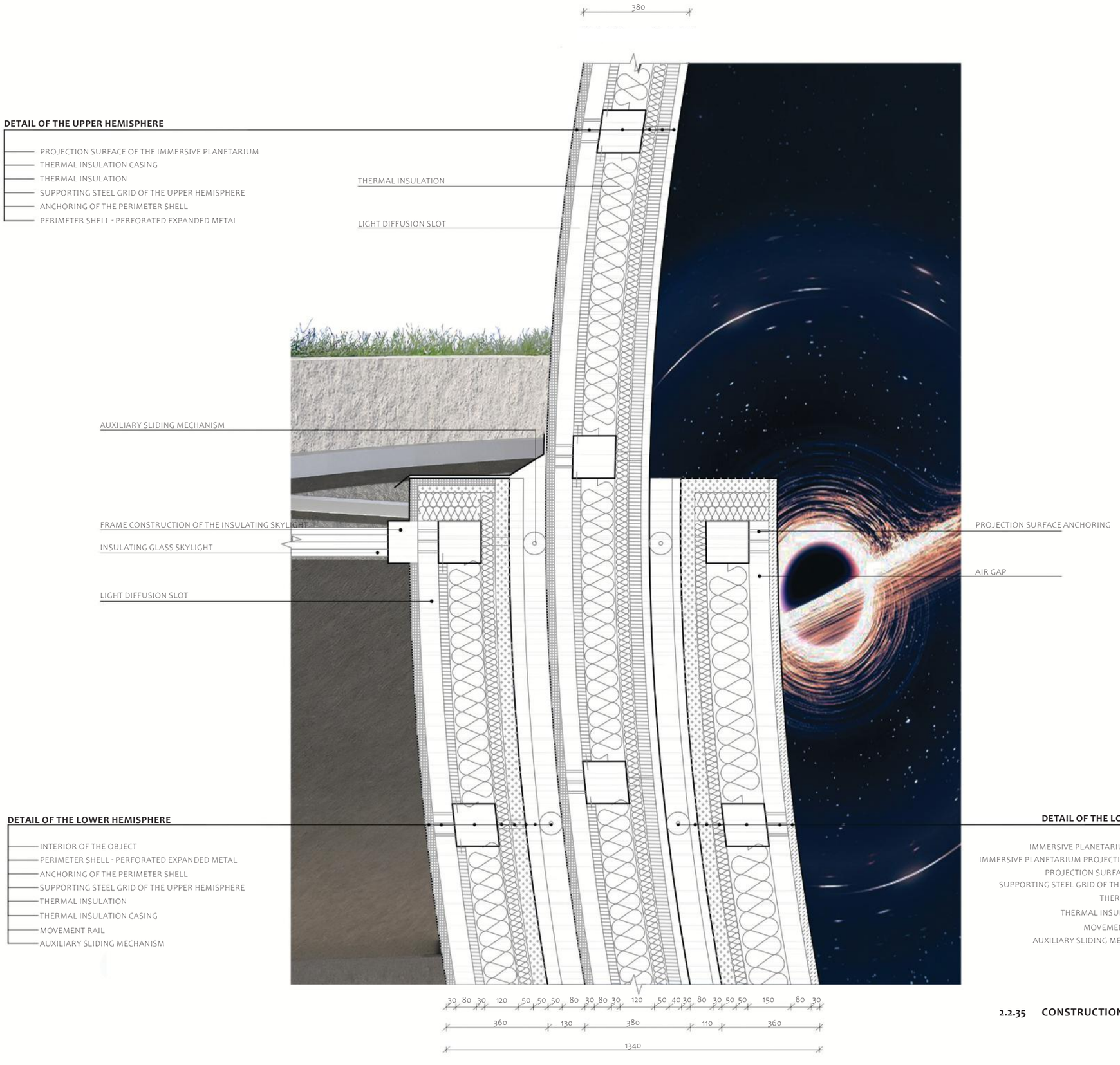


AXONOMETRIC DETAIL OF THE IMMERSIVE DOME PLANETARIUM STRUCTURE



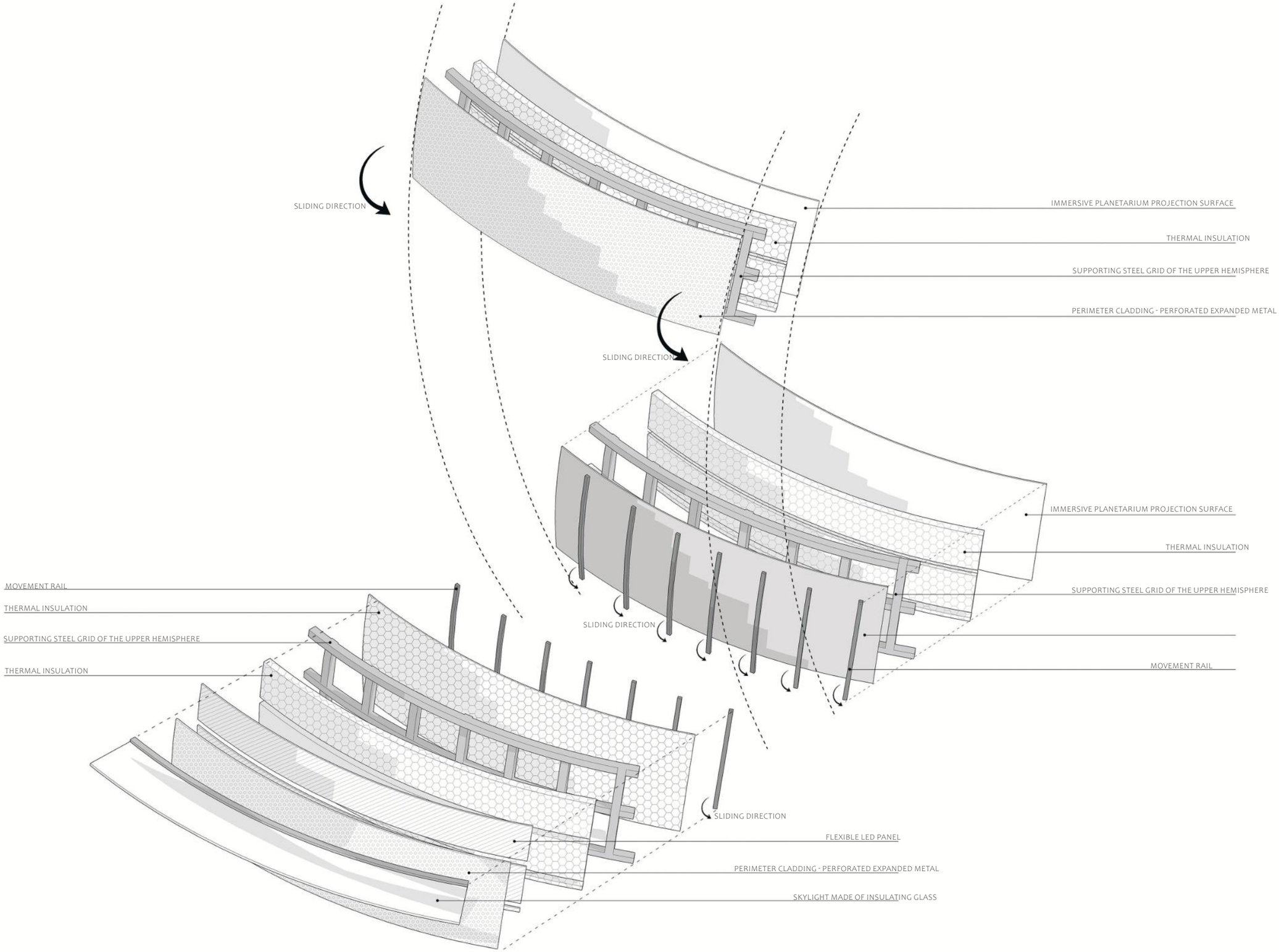
2.2.33 **AXONOMETRIC DETAILS OF THE PLANETARIUM INTERIOR**

2.2.34 VISUALIZATION OF THE SPHERICAL SURFACE OF THE PLANETARIUM IN THE EXTERIOR

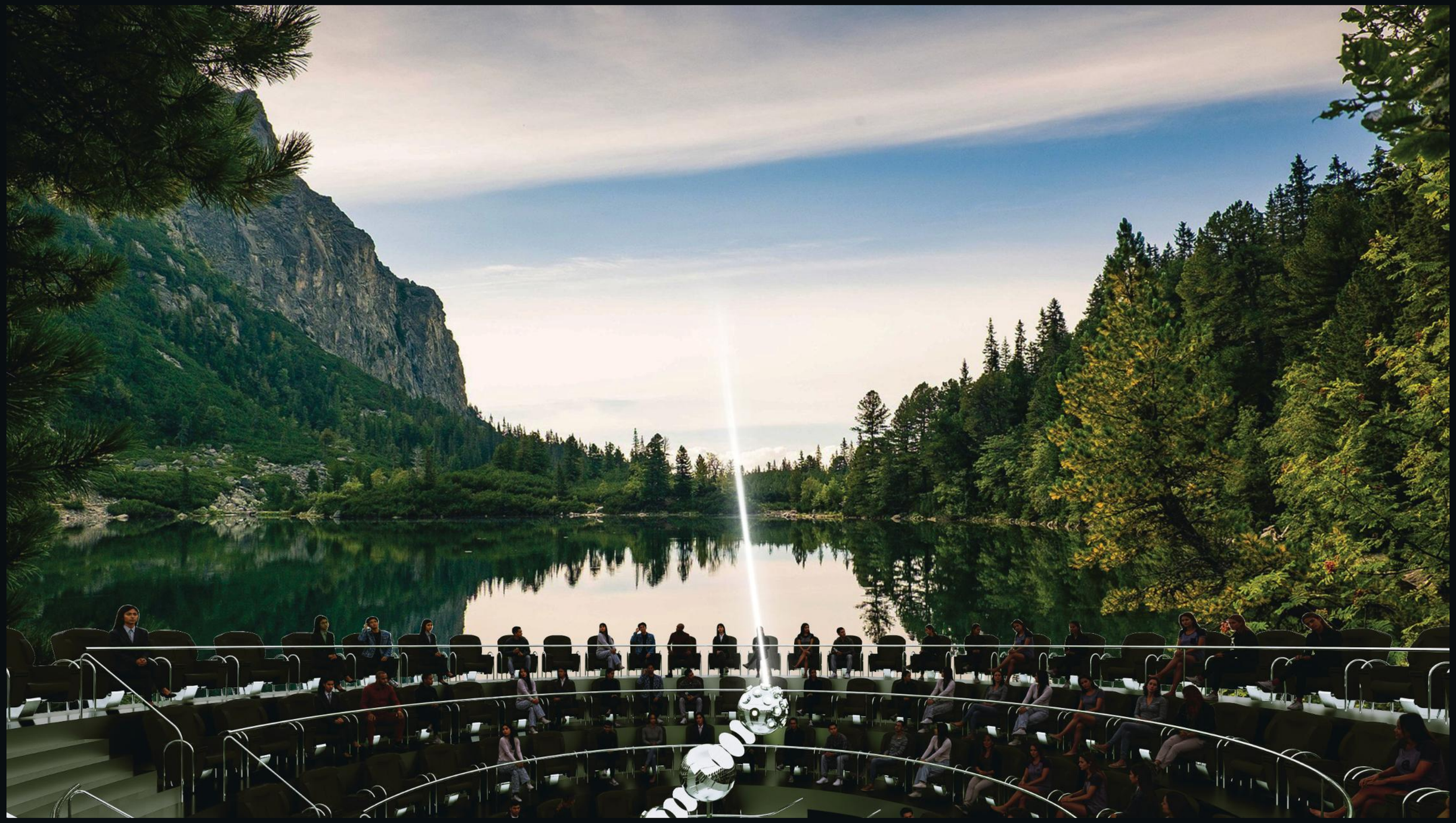


2.2.35 CONSTRUCTION DETAIL OF THE IMMERSIVE DOME PLANETARIUM ENVELOPE

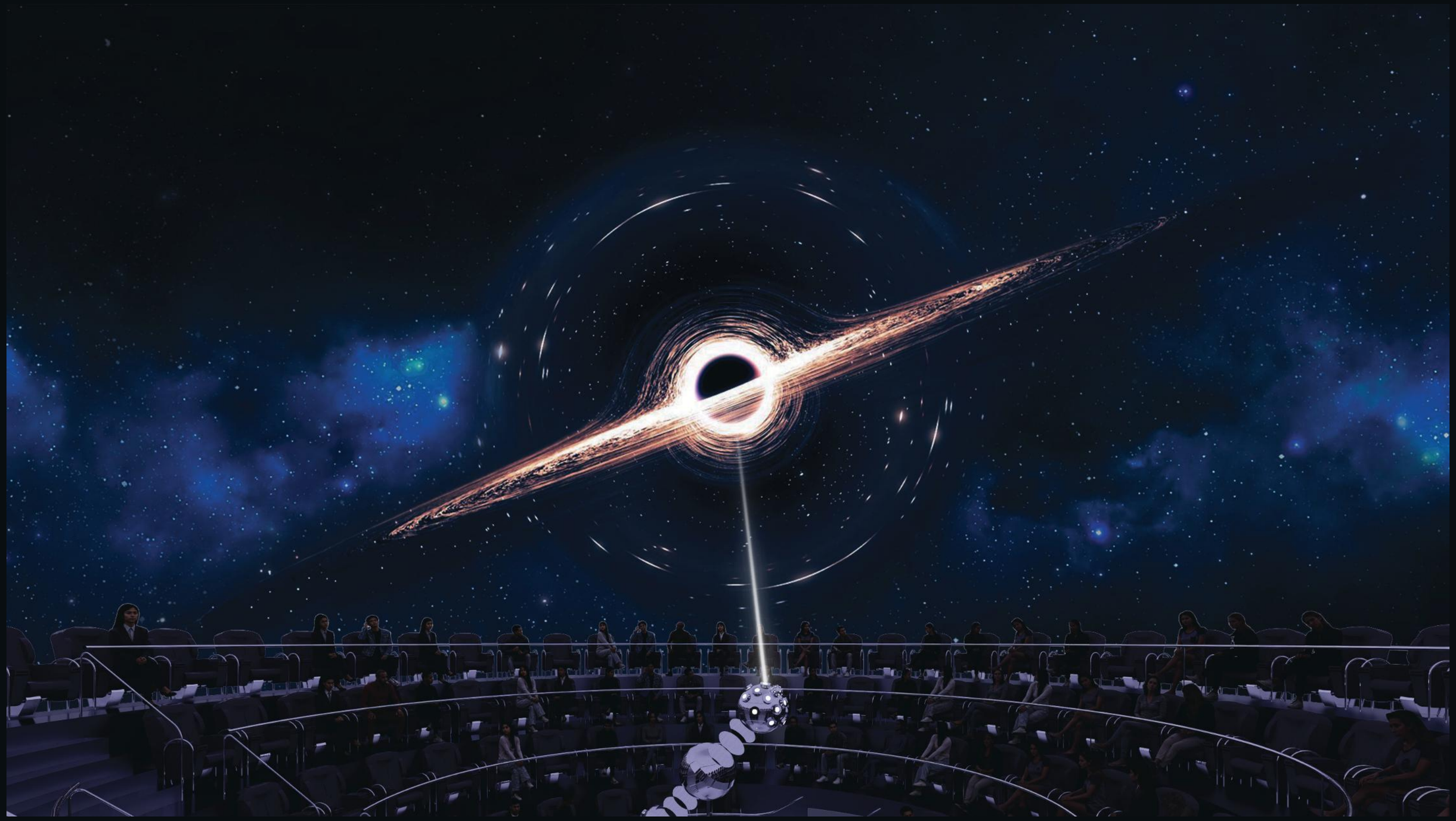
M 1:20



2.2.36 **AXONOMETRIC SCHEME OF THE IMMERSIVE DOME PLANETARIUM ENVELOPE DETAIL**



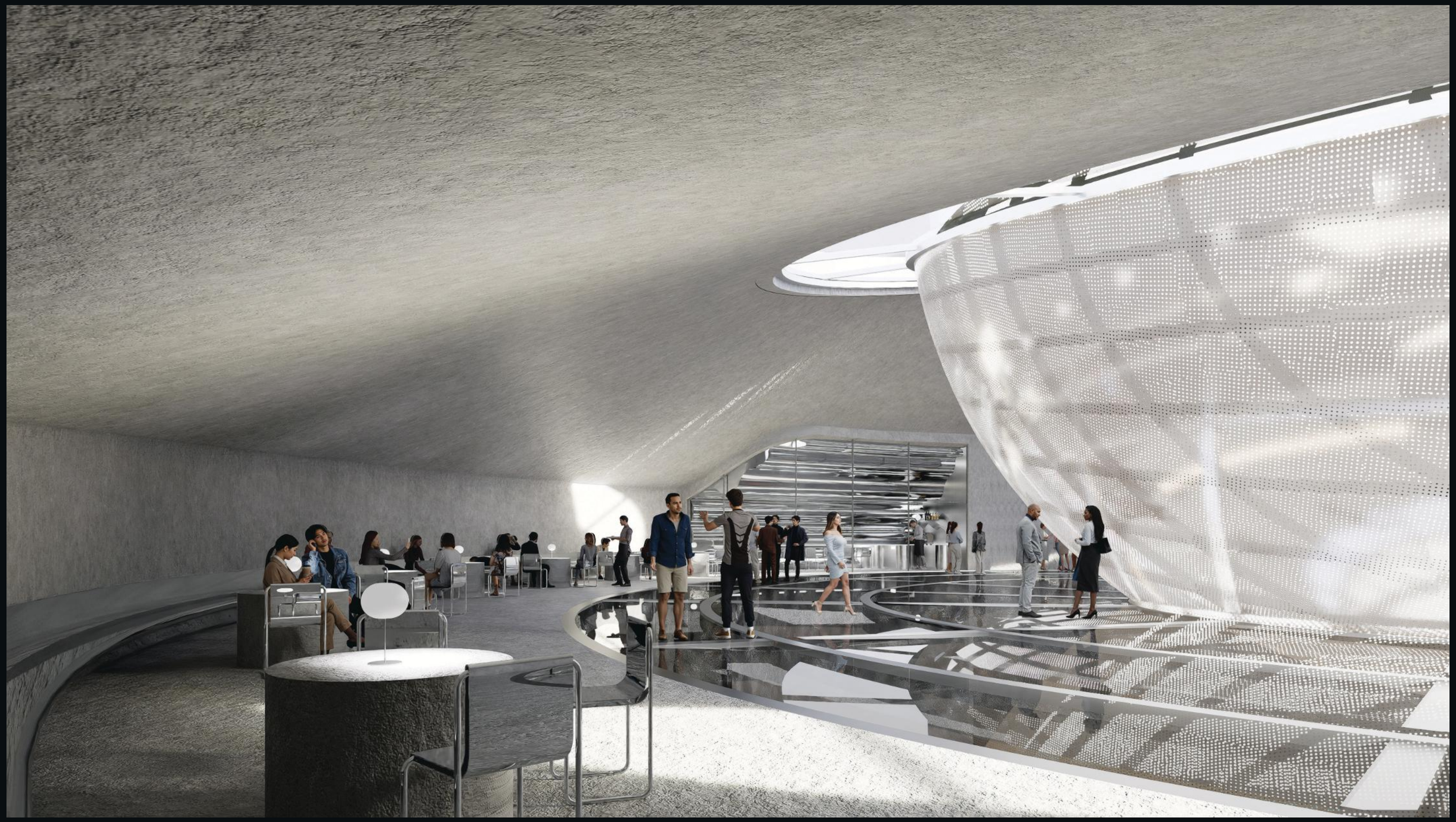
2.2.37 **VISUALIZATION OF THE IMMERSIVE DOME PLANETARIUM INTERIOR**
VARIANT - PROJECTION - HIGH TATRAS



2.2.38 **VISUALIZATION OF THE IMMERSIVE DOME PLANETARIUM INTERIOR**
VARIANT - PROJECTION - SPACE

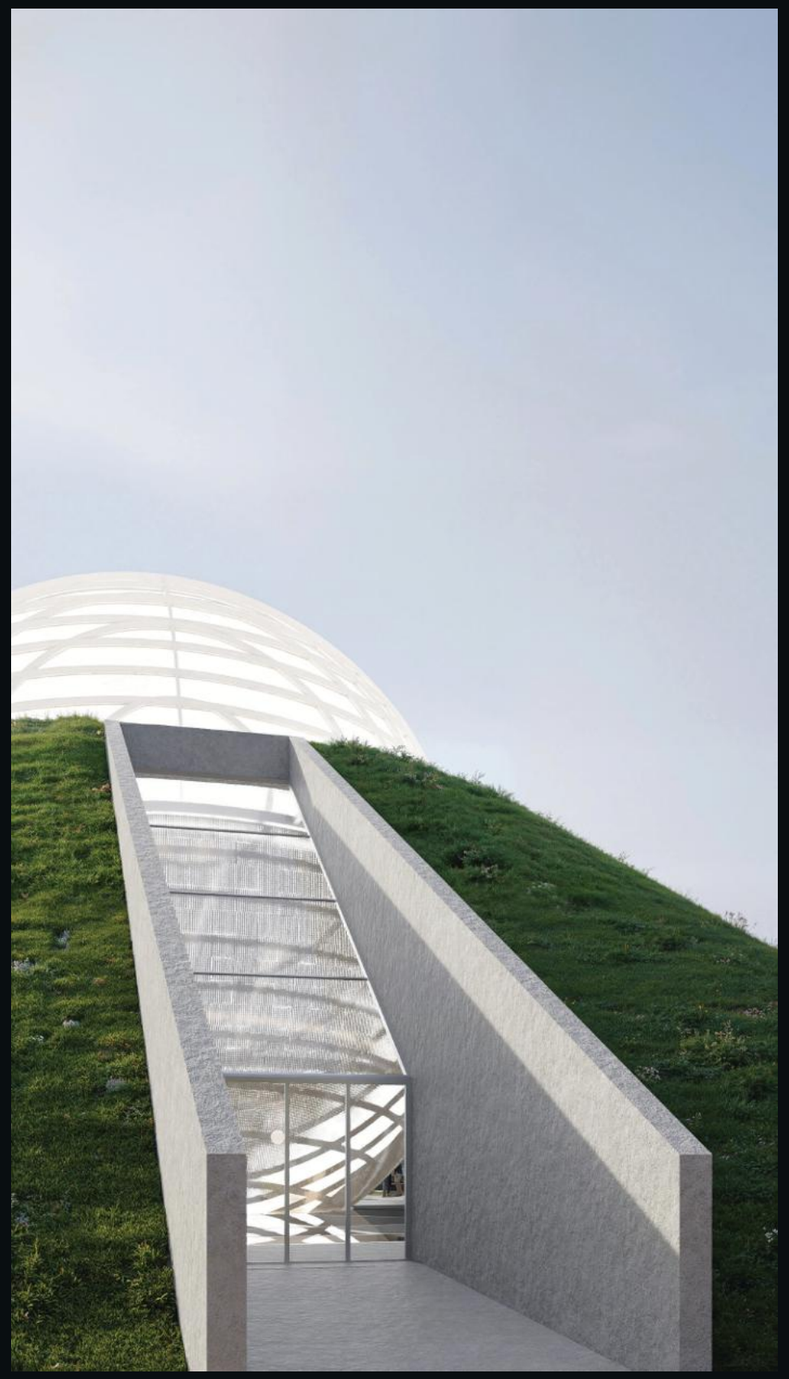
2.2.39 **VISUALIZATION OF THE IMMERSIVE DOME PLANETARIUM INTERIOR**
VARIANT - OPEN OBSERVATION

2.2.40 **VISUALIZATION OF THE IMMERSIVE DOME PLANETARIUM IN OPEN MODE**
VARIANT - PROJECTION - SPACE



2.2.41 VISUALIZATION OF THE PLANETARIUM INTERIOR SPACES - FOYER WITH A CAFE

DETAIL OF THE CAFE INTERIOR



DETAIL OF THE BUILDING ENTRANCE

2.2.43 VISUALIZATION OF THE MAIN ENTRANCE PATH TO THE PLANETARIUM

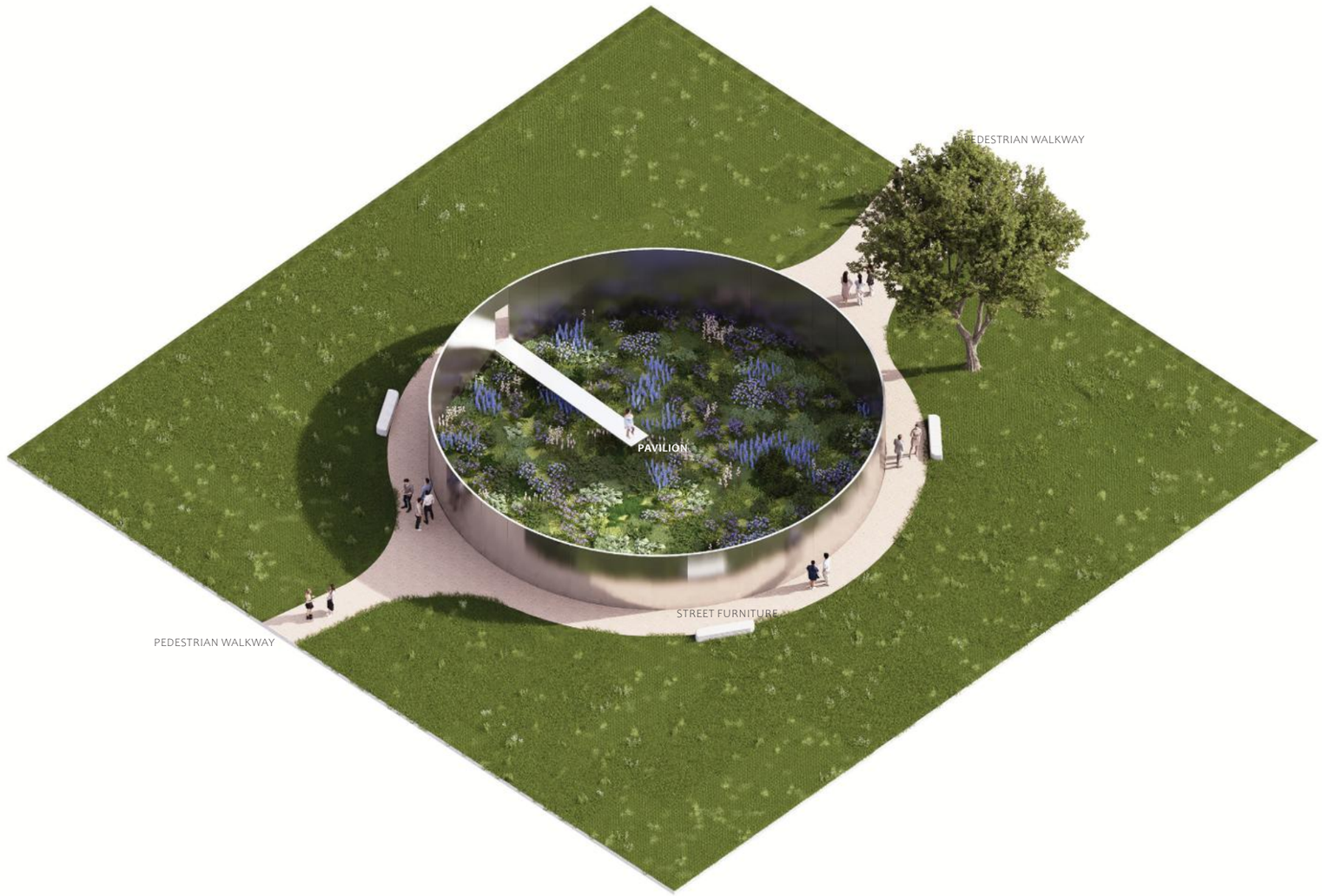
2.3 EXTERIOR PART OF THE AREA AND THE SAS RESEARCH INSTITUTE

2.3.1 **AXONOMETRIC VIEW - VOID PAVILION**

2.3.2 VISUALIZATION OF THE VOID PAVILION

2.3.3 **AXONOMETRIC VIEW - ROTATION PAVILION**

2.3.4 VISUALIZATION OF THE ROTATION PAVILION



2.3.5 **AXONOMETRIC VIEW - NEBULA PAVILION**

2.3.6 VISUALIZATION OF THE NEBULA PAVILION

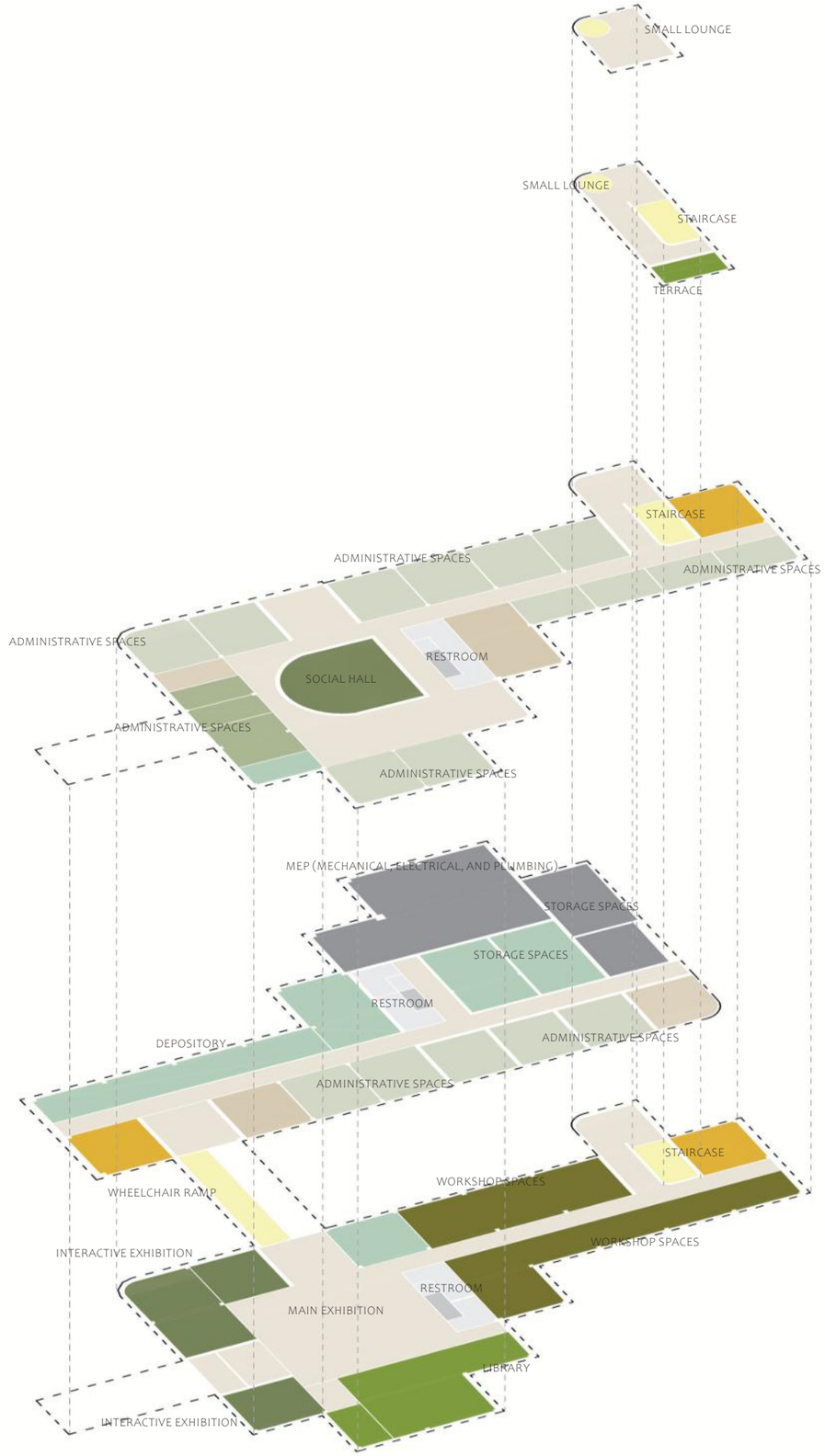
2.3.7 **AXONOMETRIC VIEW - FUSION PAVILION**

2.3.8 VISUALIZATION OF THE FUSION PAVILION

2.3.9 **AXONOMETRIC VIEW - SOLAR SYSTEM PAVILION**

2.3.10 VISUALIZATION OF THE SOLAR SYSTEM PAVILION

VISUALIZATION OF THE FORECOURT OF THE SAL[illegible]RCH INSTITUTE

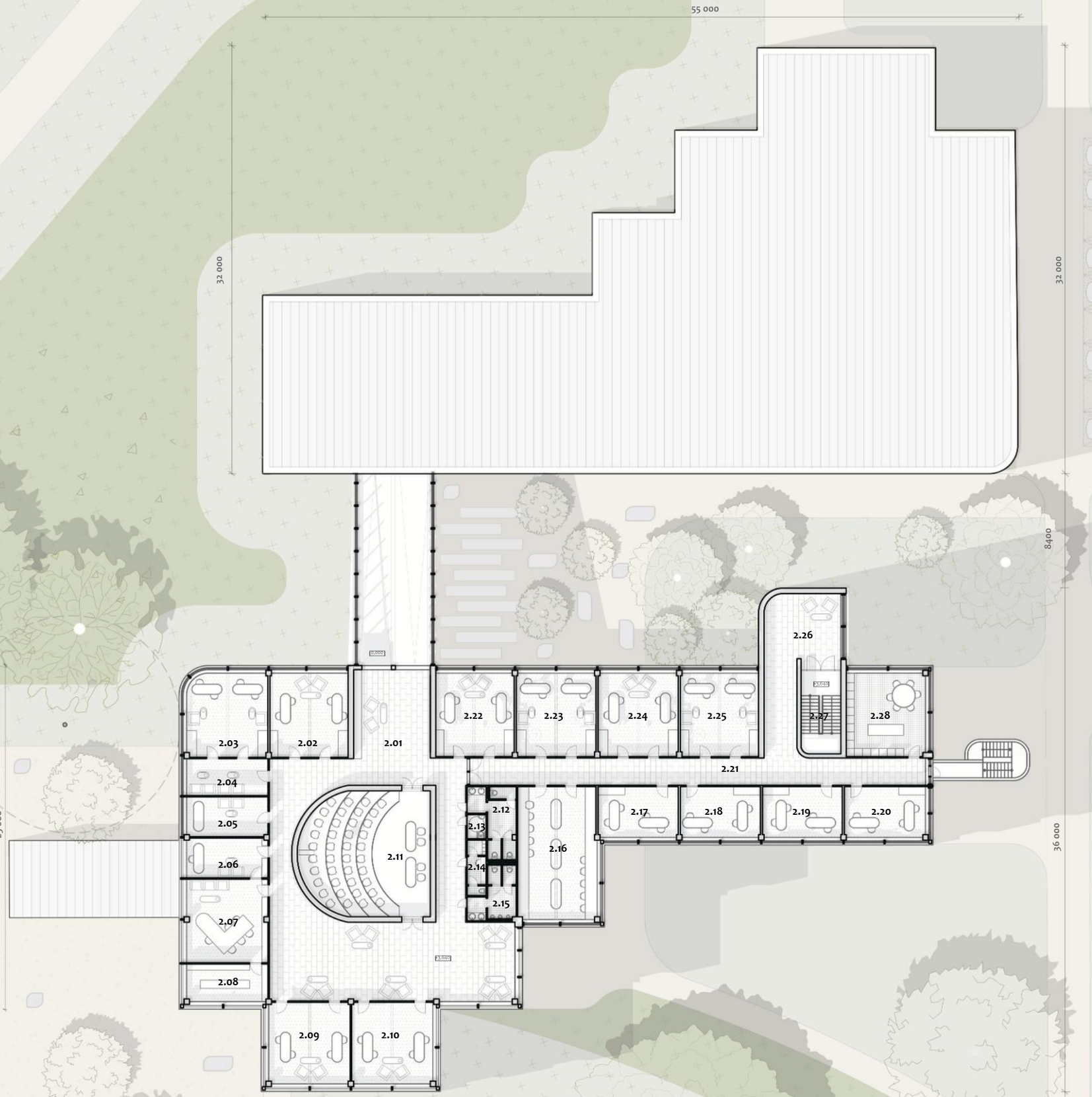


2.3.12 FUNCTIONAL-OPERATIONAL SCHEME OF THE SAS RESEARCH INSTITUTE

LEGEND

1.01	Windbreak	**12.8 m²**
1.02	Entrance hall	**20.1 m²**
1.03	Exhibition - Virtual reality	**35.2 m²**
1.04	Hallway	**11.2 m²**
1.05	Reading room	**17.0 m²**
1.06	Library	**113.2 m²**
1.07	Primary exhibition	**242.5 m²**
1.08	Exhibition - Virtual reality	**71.1 m²**
1.09	Exhibition - Virtual reality	**34.1 m²**
1.10	Storage areas	**37.7 m²**
1.11	WC - Ladies	**14.4 m²**
1.12	WC - Disabled	**2.5 m²**
1.13	Cleaning room + storage	**5.6 m²**
1.14	WC - Gentlemen	**11.0 m²**
1.15	Variable workshop room	**144.5 m²**
1.16	Corridor	**58.6 m²**
1.17	Variable lecture room	**107.7 m²**
1.18	Corridor	**46.3 m²**
1.19	Staircase	**17.5 m²**
1.20	Day room	**35.5 m²**
1.21	Ramp	**34 m²**
1.22	Day room	**37.5 m²**
1.23	Intermediate landing	**35 m²**
1.24	Laboratory	**36 m²**
1.25	Administrative premises	**36.5 m²**
1.26	Administrative premises	**35.5 m²**
1.27	Administrative premises	**33.6 m²**
1.28	Administrative premises	**33.6 m**
1.29	Administrative premises	**33.6 m²**
1.30	Day room	**35 m²**
1.31	Corridor	**130 m²**
1.32	Depository	**88.1 m²**
1.33	Depository	**58 m²**
1.34	WC - Ladies	**14.0 m²**
1.35	Cleaning room	**4.0 m²**
1.36	WC - Gentlemen	**11.0 m²**
1.37	WC - Disabled	**2.7 m²**
1.38	Storage	**53.8 m²**
1.39	Storage	**52.0 m²**
1.40	Garden tool storage	**32.4 m²**
1.41	MEP (Mechanical, Electrical, Plumbing)	**51.5 m²**
1.42	Storage	**180 m²**
TOTAL		**2066.3 m²**

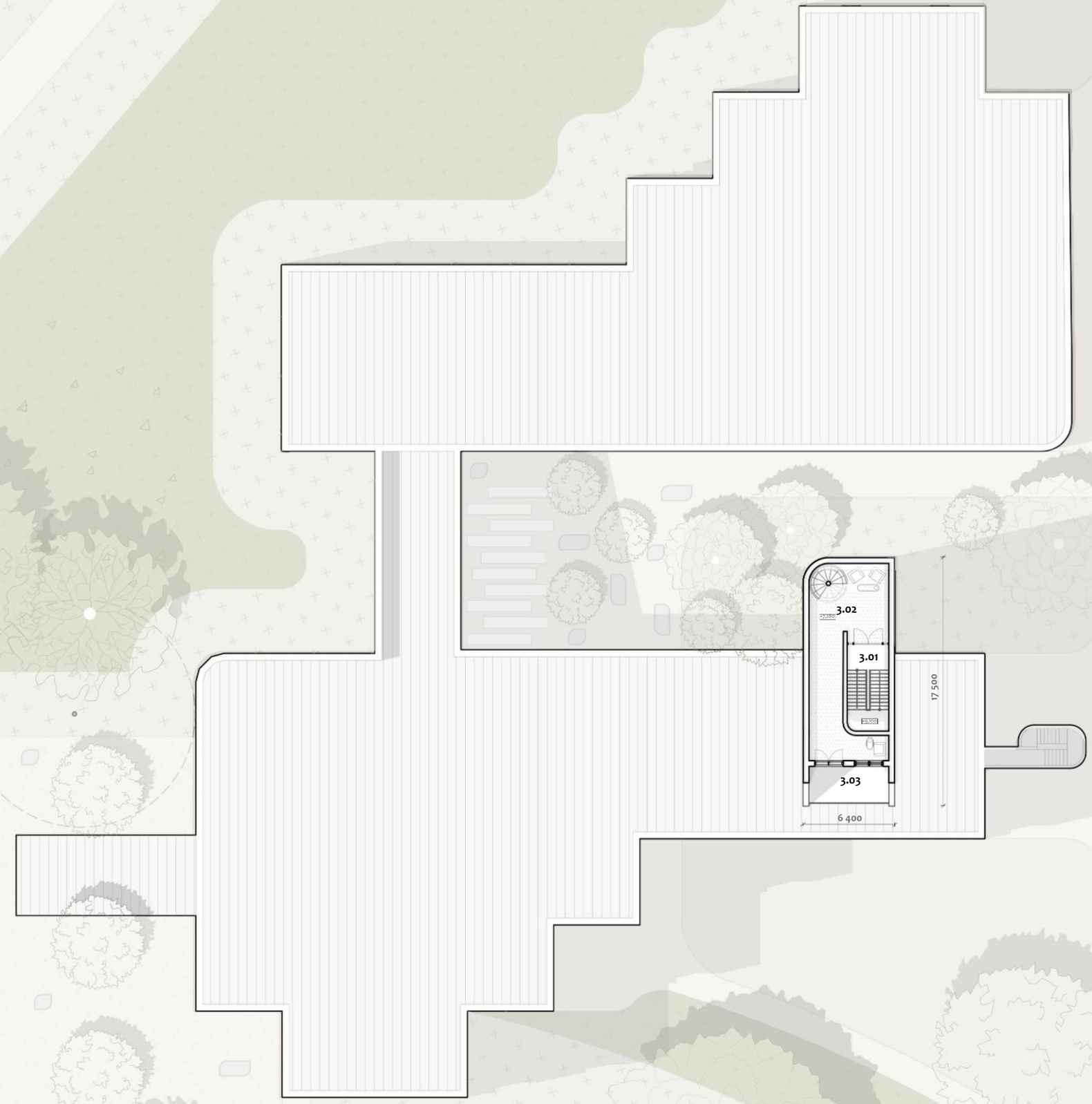
2.3.5AV FLOOR PLAN 1ST FLOOR
SCALE 1:200



LEGEND

2.01	Foyer	**215.7 m²**
2.02	Administrative premises	**35.1 m²**
2.03	Administrative premises	**35.7 m²**
2.04	Visitor room	**16.0 m²**
2.05	Administrative premises	**17.1 m²**
2.06	Director's secretary	**17.1 m²**
2.07	Director	**36.0 m²**
2.08	Director's depository	**16.2 m²**
2.09	Administrative premises	**35.2 m²**
2.10	Administrative premises	**35.2 m²**
2.11	Common room	**80.7 m²**
2.12	WC - Ladies	**14.4 m²**
2.13	WC - Disabled	**2.5 m²**
2.14	Cleaning room + storage	**5.6 m²**
2.15	WC - Gentlemen	**11.0 m²**
2.16	Laboratory	**55.8 m²**
2.17	Administrative premises	**21.5 m²**
2.18	Administrative premises	**21.5 m²**
2.19	Administrative premises	**21.5 m²**
2.20	Administrative premises	**21.5 m²**
2.21	Corridor	**67.1 m²**
2.22	Administrative premises	**35 m²**
2.23	Administrative premises	**35 m²**
2.24	Administrative premises	**35 m²**
2.25	Administrative premises	**35 m²**
2.26	Corridor	**46.3 m²**
2.27	Staircase	**17.5 m²**
2.28	Living room	**35.5 m²**
TOTAL		**952.7 m²**

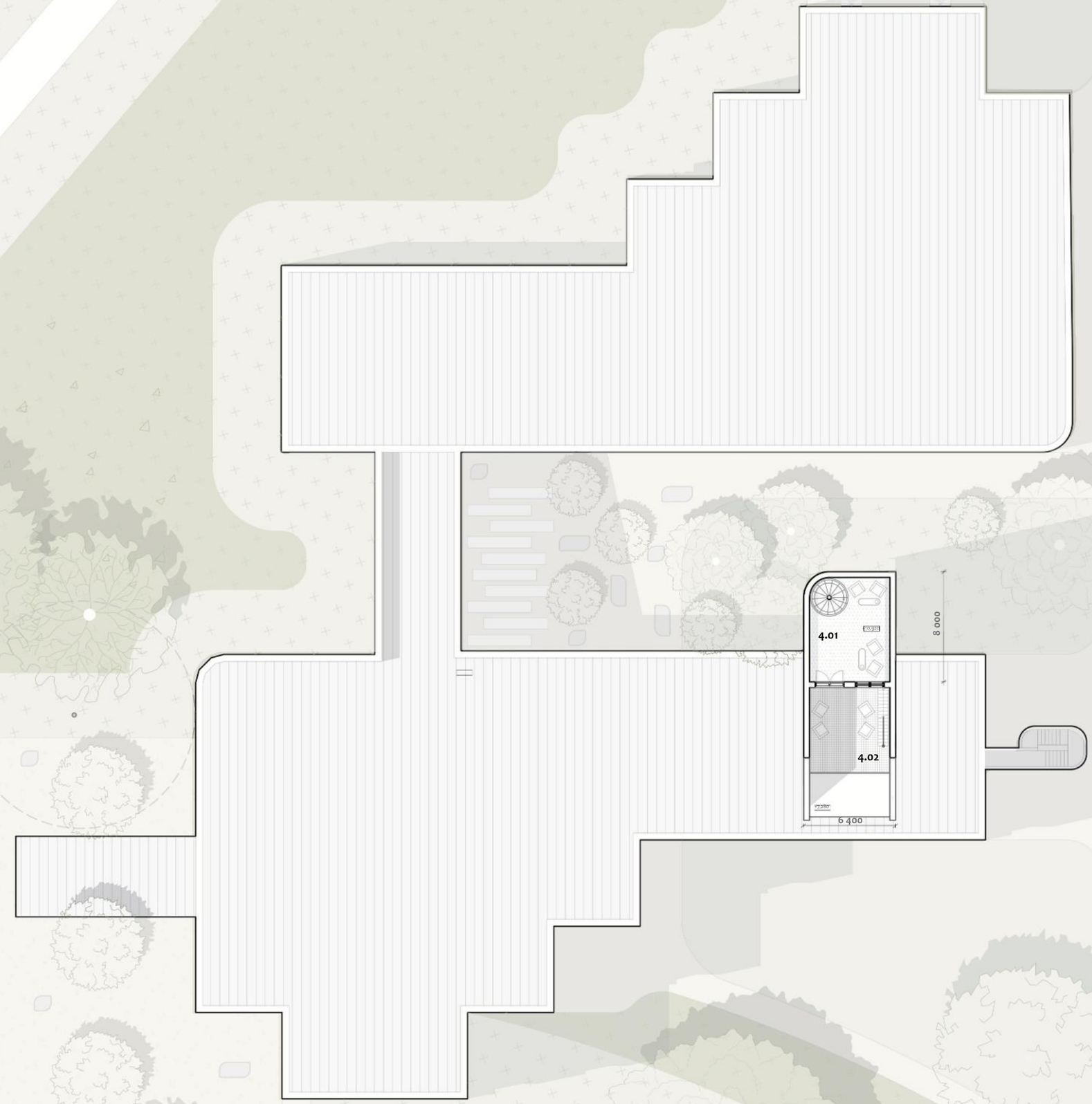
2.3.14 **SAV FLOOR PLAN 2ND FLOOR**
SCALE 1:200



LEGEND

3.01	Staircase	**17.5 m²**
3.02	Small lounge	**50.5 m²**
3.03	Terrace	**14.3 m²**
TOTAL		**82.3 m²**

2.3.15 **SAV FLOOR PLAN 3RD FLOOR**
SCALE 1:200



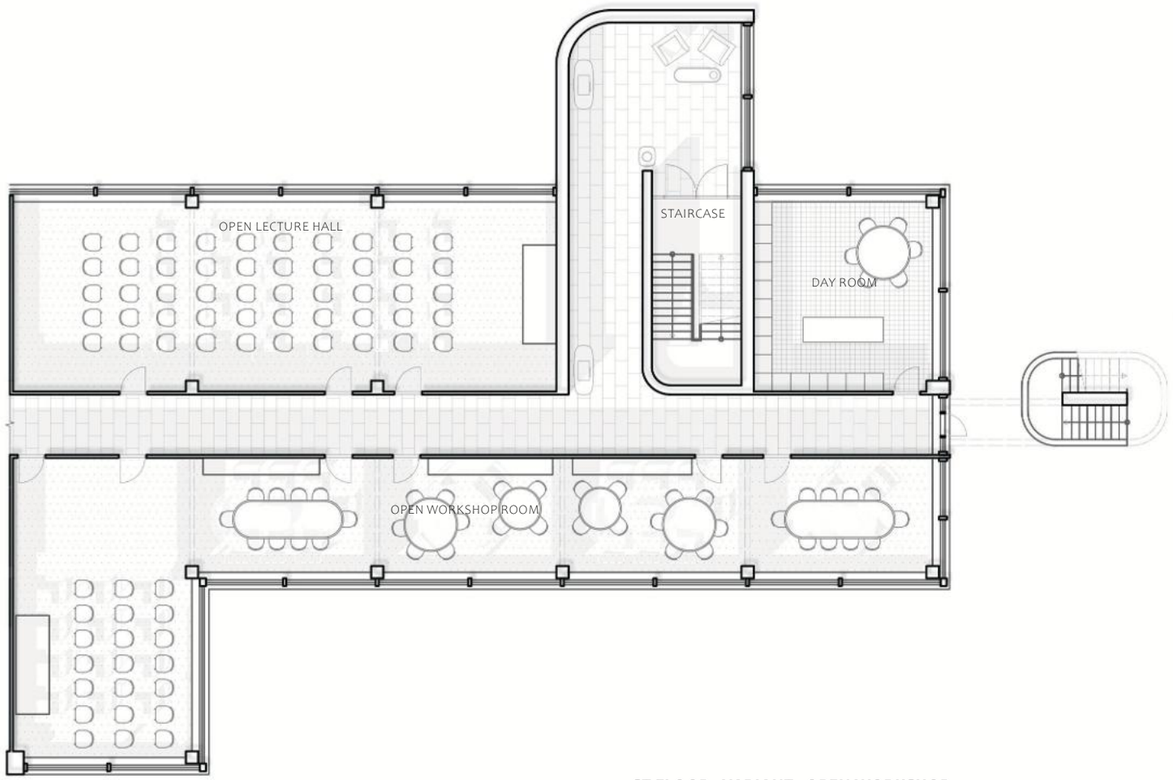
LEGEND

4.01	Small lounge	**35 m²**
4.02	Terrace	**30 m²**
TOTAL		**65 m²**

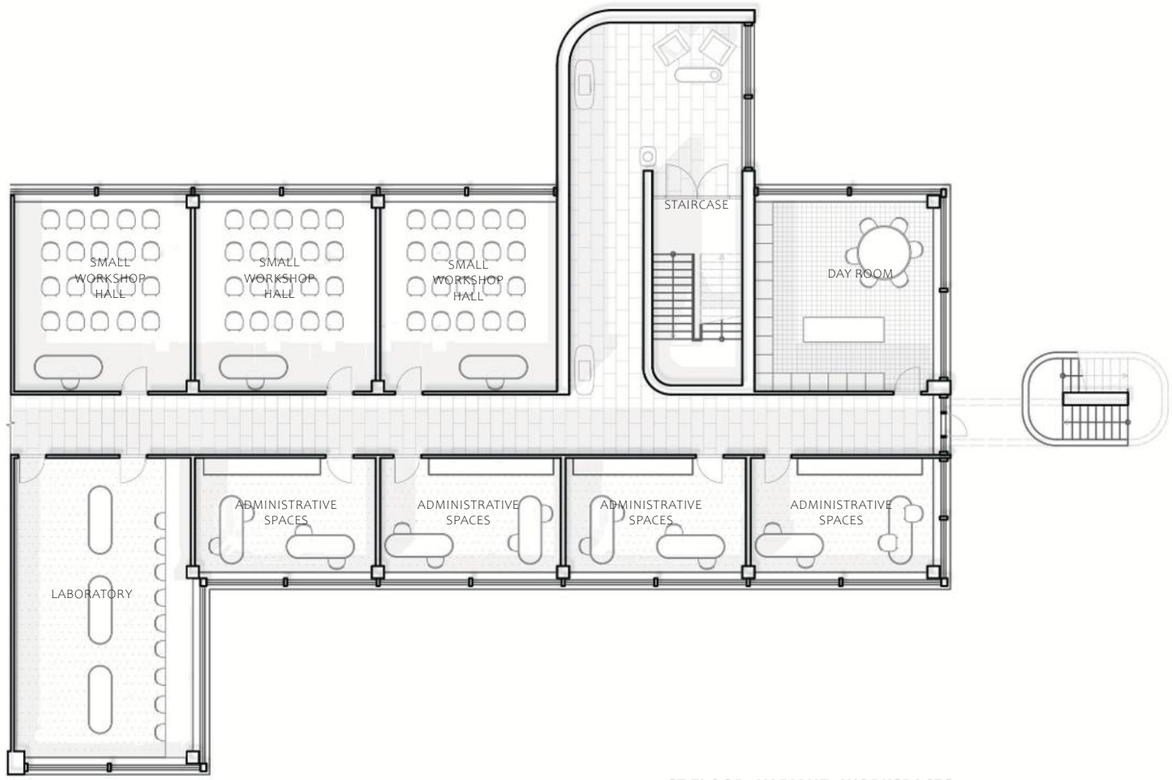
2.3.16 **SAV FLOOR PLAN 4TH FLOOR**
SCALE 1:200

2.3.17 VISUALIZATION OF THE FACADE DETAIL OF THE SAV RESEARCH INSTITUTE

1/150 VISUALIZATION OF THE RESIDENTIAL ATRIUM OF THE SAV RESEARCH INSTITUTE



1ST FLOOR - VARIANT - OPEN WORKSHOP



1ST FLOOR - VARIANT - WORKSPACES

2.3.20 **AXONOMETRIC VIEW OF THE SAS RESEARCH INSTITUTE EXHIBITION**

2.3. VISUALIZATION OF THE INTERIOR EXHIBITION OF THE SAS RESEARCH INSTITUTE

2.3.22 VISUALIZATION OF THE INTERIOR EXHIBITION OF THE SAS RESEARCH INSTITUTE

2.3.23 VISUALIZATION OF THE INTERIOR EXHIBITION OF THE SAS RESEARCH INSTITUTE

2.3.24 VISUALIZATION OF THE INTERIOR EXHIBITION OF THE SAS RESEARCH INSTITUTE