



SALAHADDIN UNIVERSITY
COLLEGE OF ENGINEERING
Architecture Department



CONCERT HALL

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Year

2018-2019

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Dedication :

Every challenging work needs self efforts as well as guidance of elders specially who were very close to our hearts.

My humble efforts I dedicate to my sweet and loving **FAMILY**

Whose affection, love, encouragement and prays of days and nights helped me to get such success and honor,

Along with all hard working and respected **TEACHERS**



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CHAPTER ONE: INTRODUCTION

This chapter discusses the project's types, goals, objectives, and benefits. And it also provides an introduction and definitions to concert hall. And will also discuss the earliest examples of this type of facilities and how they impact not only the community, or the region, but the whole world.

Chapter Intro:

- 1.1 Thesis Statement
- 1.2 Definitions
- 1.3 Historical Background
- 1.4 Goals (Aims-Objectives)
- 1.5 Reasons Of Selection
- 1.6 Benefits Of The Project

1.1 THESIS STATEMENT

Concerts are a piece of art that goes in the ears straight to the heart..

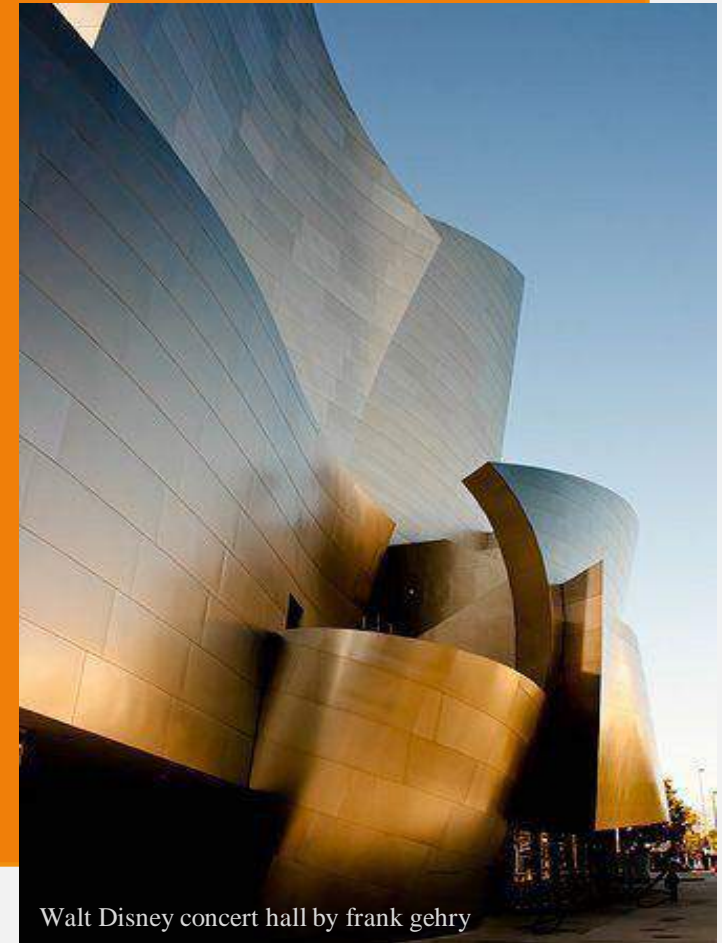
1.2 DEFINITION

CONCERT HALL is a cultural building with a stage that serves as a performance venue and an auditorium filled with seats.

It is used by different groups of people and from different age categories of children, young, women, men and the elderly.

Concert halls typically also contain orchestral rehearsal rooms. And have both public and private concert halls. concert halls may also be used to accommodate other activities, from theatrical performances to academic presentations and university graduation ceremonies.

is a cultural building with a stage that serves as a performance venue and an auditorium filled with seats.



Walt Disney concert hall by frank gehry



1.3 HISTORICAL BACKGROUND

Early concert halls built in the 18th and 19th century were designed for classical orchestra, concerto and opera concerts and ballet performances, halls built in the 20th and 21st century were often built to accommodate a wider range of performance types, including musicals.

In the 2010s, popular music such as rock music and traditional music such as folk music are also performed in these venues.

Acoustic multi-purpose rooms Churches were the first form of concert hall, with strong reverberation. The echo increases the holiness of the place, but domes and vaults are problematic for sermons and orchestral music.

Public concerts were first established in London during the 1670s. John Banister, a former violinist at the court of Charles II, set up a concert room in 1672 in his own house in White Friars. In 1678, a group of professional musicians known as the Music Meeting opened a concert room near Charing Cross, where Henry Purcell performed, and by about 1700, a number of music societies were performing in taverns. The most famous entertainments were the free concerts organized between 1678 and 1714 by Thomas Britton.

During the 19th century, music life was dominated by the Hanover Square Rooms, the Crystal Palace and the Queen's Hall. The Hanover Square Rooms dated back to February 1775. The auditorium housed up to 900 people. From its opening until its destruction by bombs in May 1941, the Queen's Hall dominated music life. The famous Promenade concerts were inaugurated there in August 1895, under the conductorship of Henry Wood, but transferred to the Royal Albert Hall after the Second World War. Since 1917, Wigmore Hall has been a small but very important venue for music lovers. In 20th century a lot of concert hall built until today.



James Gillray, 'A Bravura Air', Caricature of Elizabeth Billington, 1801. TM Collection

1.4 PROJECT GOALS



CULTURAL:

To more understanding about different kind of music and concert from all over the world.



SOCIAL:

To improve the social movement through making gathering space. The true beauty of concert is that it connects people .



SYMBOLIC:

To create symbolic building that enhance the music and culture



ECONOMICAL:

To increase the financial benefits through the income of the project.

1.5 THE REASONS OF SELECTING THIS PROJECT

- Lack of the orchestra hall in Kurdistan region.
- Concert halls enrich a city's cultural life and provide a stunning base for the world's best musicians.
- Our country have passed through many struggles so human psyche need a source of pleasure also make a place to reduce stress so Society needs concert and special event to be hold .



1.6 THE BENEFICIARIES OF THE PROJECT



Ministry of culture



Artist centre



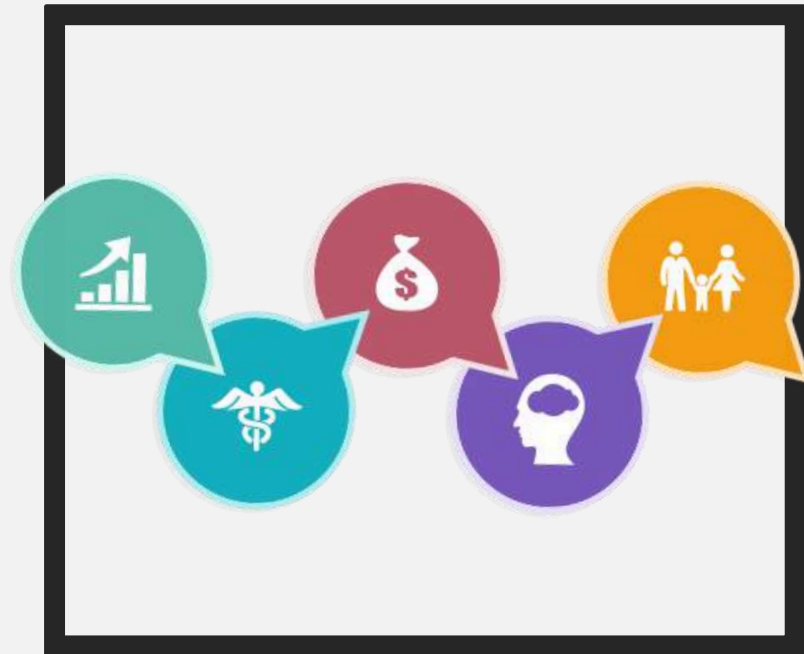
Community



Tourism



Developers and investor



CHAPTER TWO: SITE SELECTION

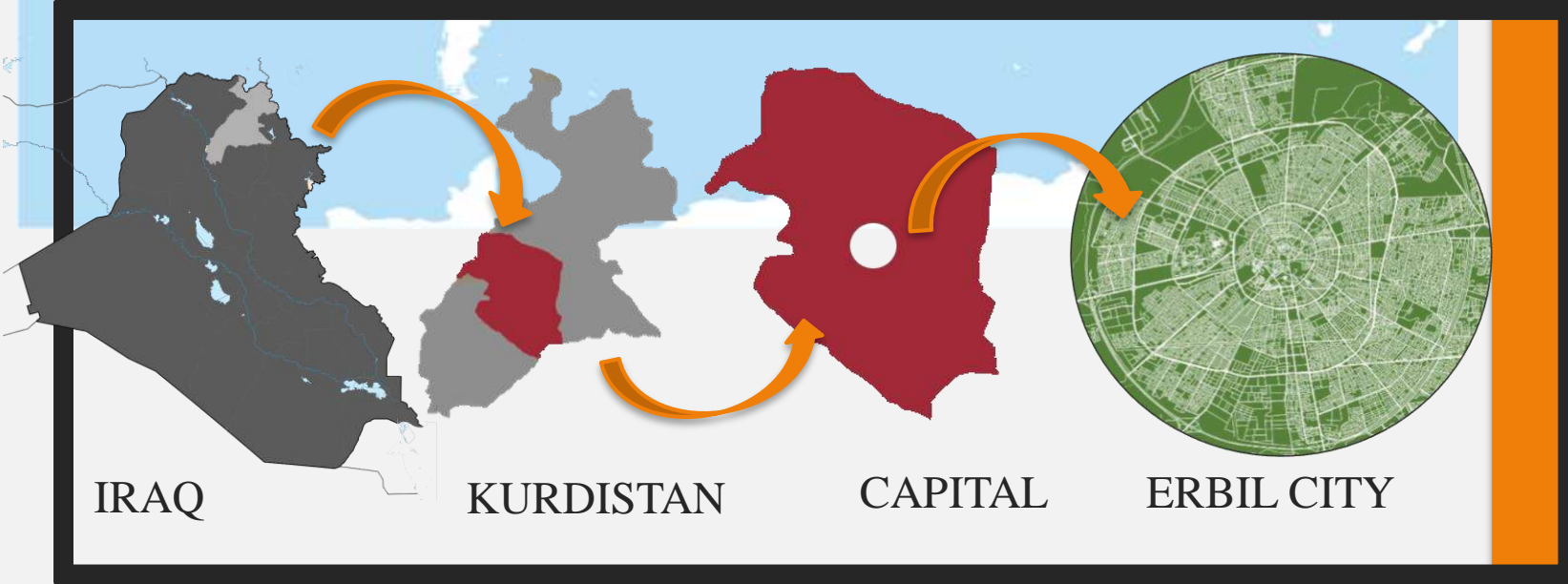
In this chapter three site being to select in order to evaluate them and selecting one of them as a main site to design the proposal project on it.

Chapter Intro:

- 2.1 Location
- 2.2 Erbil master plan
- 2.3 Criteria
- 2.4 Analysis of site
- 2.5 Evaluation of sites

2.1 LOCATIONS

ERBIL GEOGRAPHIC LOCATION



IRAQ

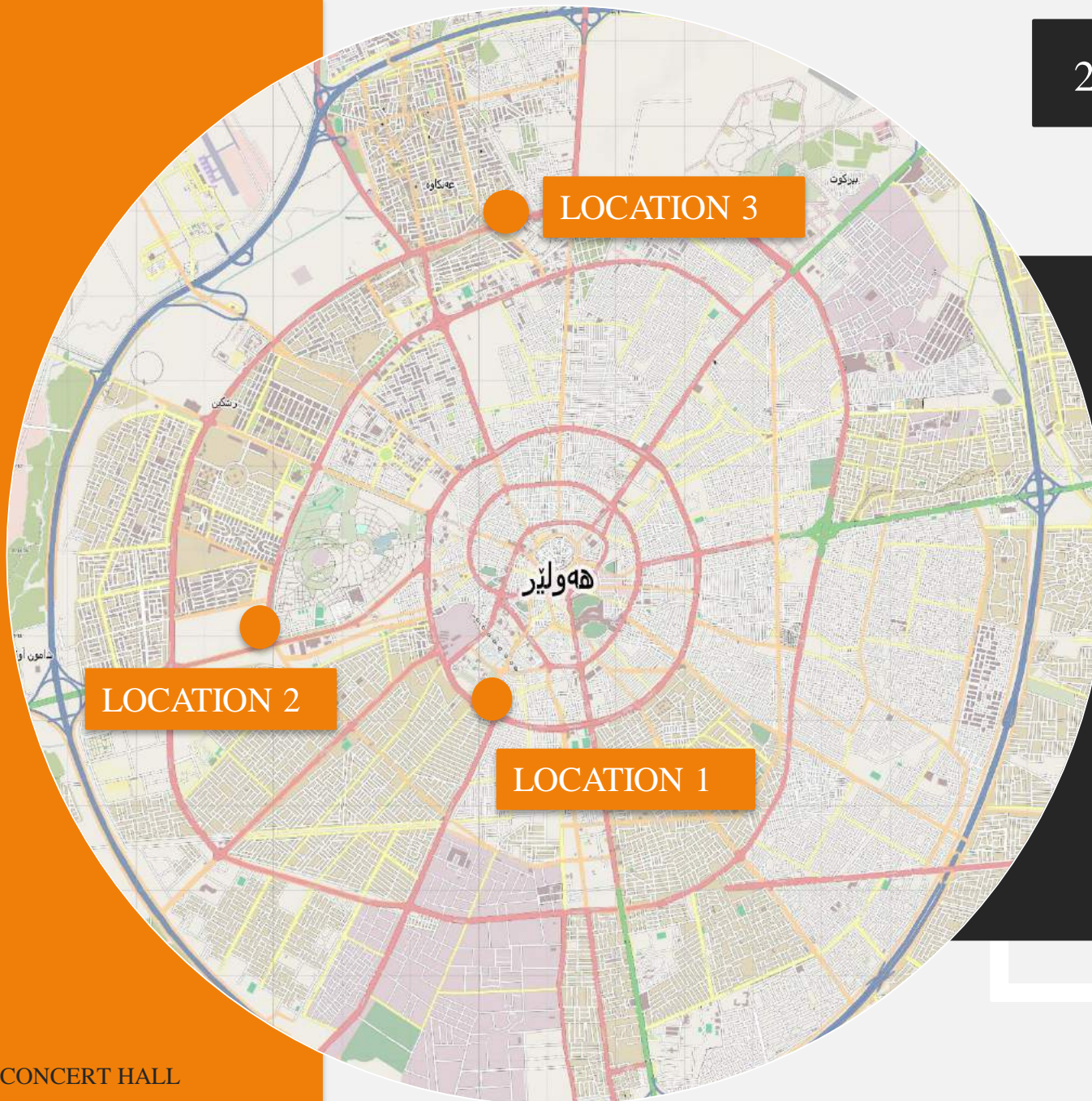
KURDISTAN

CAPITAL

ERBIL CITY

CONCERT HALL

2.2 ERBIL MASTER PLAN



is the capital of legal government of Kurdistan region and the most populous city in the Kurdish inhabited areas. It is located approximately 350 kilometers (220 miles) north of neighboring Baghdad Iraq. Erbil governorate has a permanent population of 2,009,367 as of 2015.

2.3 THE CRITERIA THAT EFFECTING ON THE SITE SELECTION

GENERAL CRITERIA



Location: Has to be on main road



Accessibility: Easy to reach



Visibility of the site: To be visible in the main access.



Relation with urban surrounding: Near to cultural and social zones.



Size: Large area should be provide.



Positive diversity of land use: For varied function.

PROJECT CERITERIA



Attractive point



Environmental factor: Near to green zone.



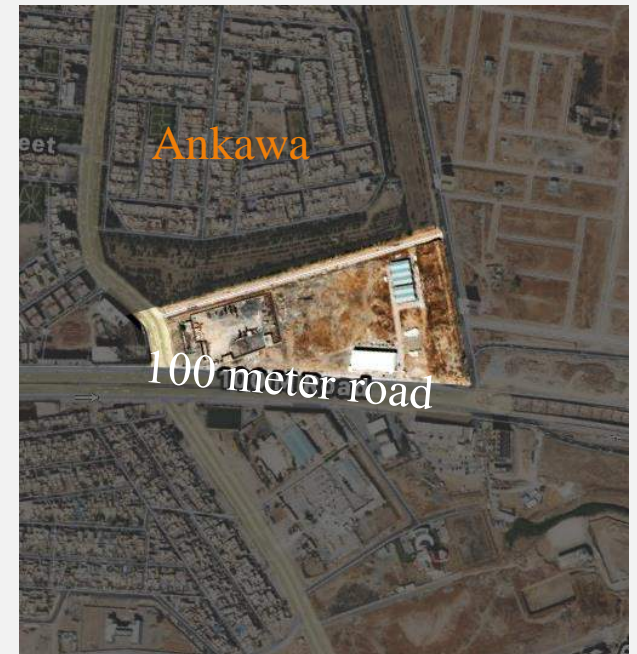
2.4 LOCATION AND SURROUNDING

The site (1) : located on 60meter street near shanadar park



The site (2) : located beside the park of sami abd al-Rahman on Golan road

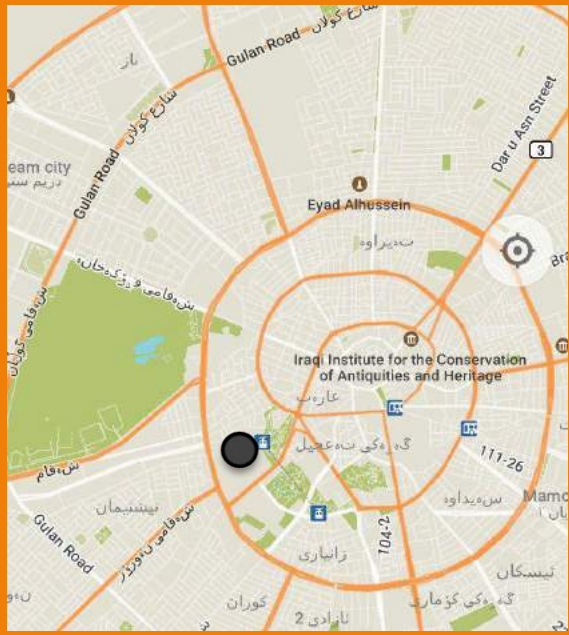
The site (3) : located on 100m street near Ankawa



2.4 ACCESSIBILITY AND LOCATION WITHIN THE CITY

1

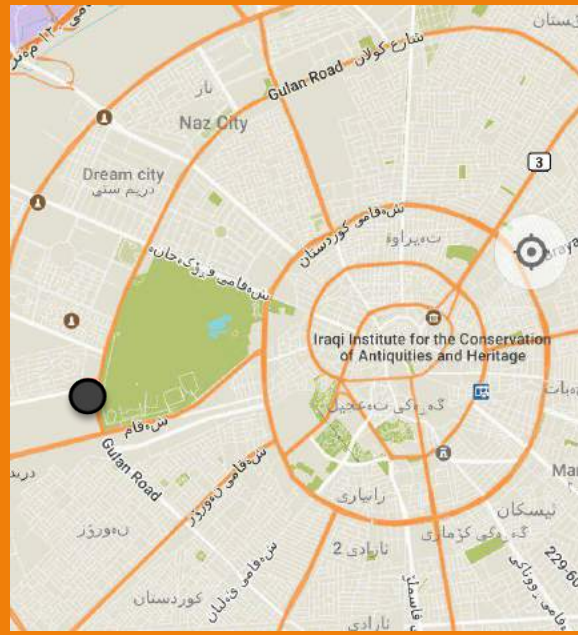
LOCATION



The site located in the south-west of Erbil city

2

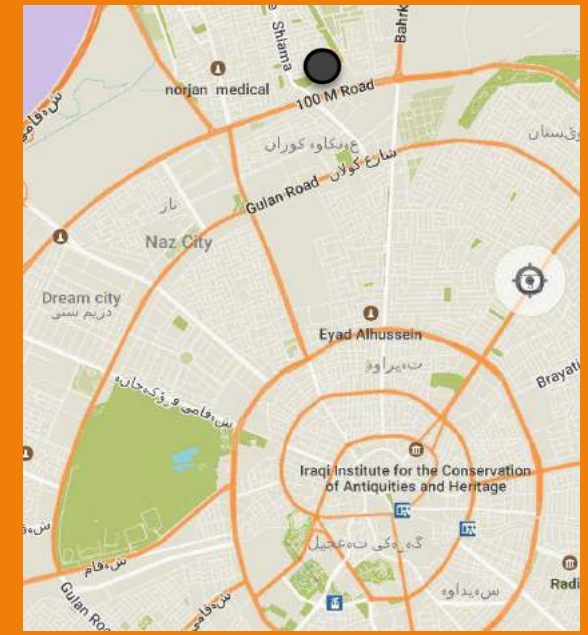
LOCATION



The site located in the west of Erbil city

3

LOCATION



The site located in the north of Erbil city

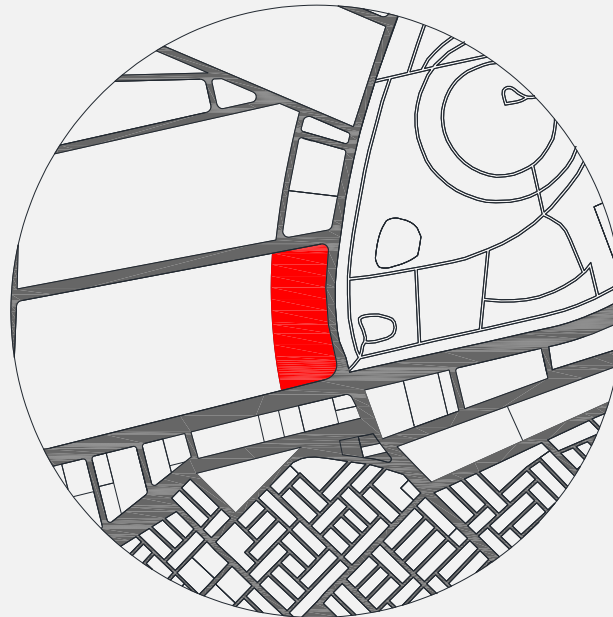
2.4 ROADS, PATHES AND AREA



1

LOCATION

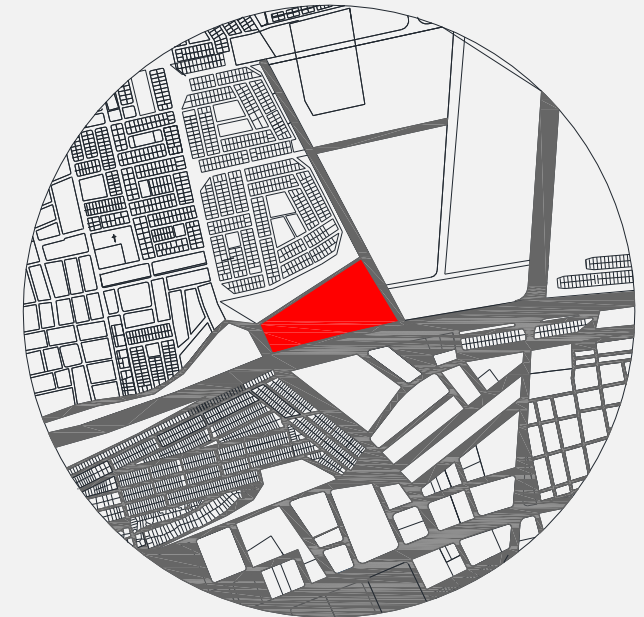
area 44,200 square meter



2

LOCATION

area 78,900 square meter



3

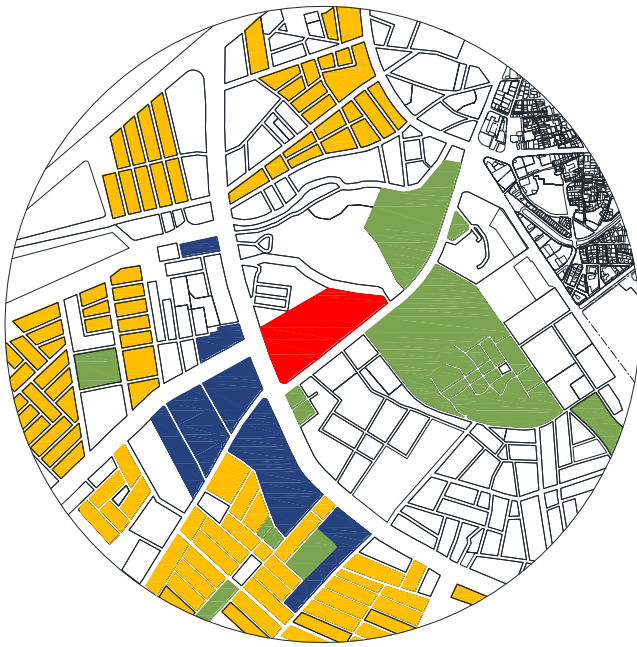
LOCATION

area 68,500 square meter

2.4 LAND USE

1

LOCATION



2

LOCATION



3

LOCATION



■ Vacant ■ residential ■ park

2.5 EVALUATION

| CRITERIA | W(1-10) | SITE(1) | | SITE(2) | | SITE(3) | |
|---------------------------------|---------|---------|-----|---------|-----|---------|-----|
| | | V(1-3) | WxV | V(1-3) | WxV | V(1-3) | WxV |
| GENERAL CRITERIA | | | | | | | |
| location | 8 | 3 | 24 | 3 | 24 | 2 | 16 |
| Accessibility | 8 | 3 | 24 | 3 | 24 | 2 | 16 |
| Visibility of the site | 7 | 2 | 14 | 3 | 21 | 3 | 21 |
| Relation with urban surrounding | 7 | 2 | 14 | 2 | 14 | 2 | 14 |
| Size | 6 | 1 | 3 | 3 | 18 | 3 | 18 |
| Positive diversity of land use | 5 | 2 | 10 | 2 | 10 | 2 | 10 |
| PROJECT CRITERIA | | | | | | | |
| Attractive point | 8 | 2 | 16 | 3 | 24 | 2 | 16 |
| Environmental factor | 7 | 3 | 21 | 3 | 21 | 1 | 7 |
| | | 126 | | 156 | | 118 | |

Table 2.1 • Evaluating the three alternative sites according to several criteria.

W= weight (1-10)

V= Value (1-3)

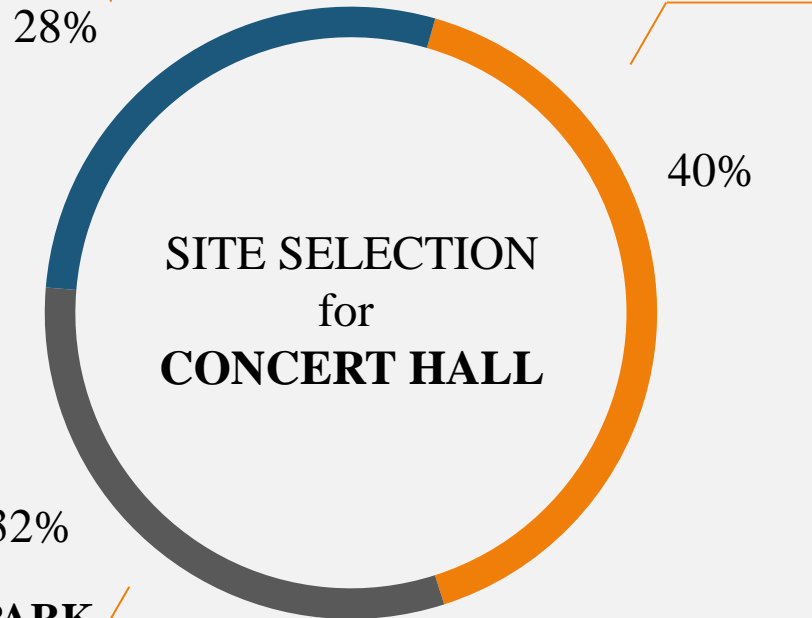
The site near Shanadar park and sailo wasn't selected for concert hall as the best criteria

The site near Sami park was selected for concert hall as the best criteria

The site Ankawa wasn't selected for concert hall because it doesn't have good relation with surrounding

2.6 CONCLUSION

SITE near ANKAWA

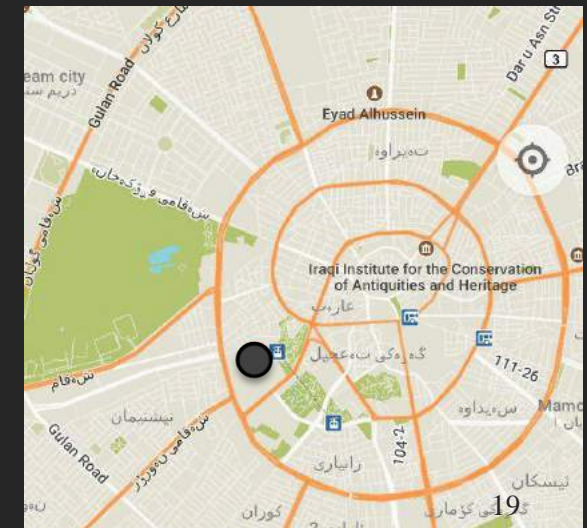


SITE near SHANADAR PARK

CONCERT HALL

SITE near Sami Abdulrahman

- IT has the best location it can be reach easily from all sectors
- the site is located on 40meter it can be reach easily
- the site had a good visual view located near to green zones
- In terms of its distance in the city centre to give the identity of the architecture of the city.
- Best location for cultural project because of the urban surrounding
- Has all the factors that must be provided at the site of the CONCERT HALL.



CHAPTER THREE: SIMILAR PROJECTS

The similar projects selected according to the benefits which these CONCERT HALL could give us in terms of theoretical ideas and concepts regarding the design, a functional idea for arranging spaces and component relationships.

The ability to understand the structure of forms, functions, and diagrams of these three projects.

Chapter Intro:

3.1 Zaha Hadid Architects to design concert hall for Ural Philharmonic Orchestra

3.2 AD Classics: Walt Disney Concert Hall / Frank Gehry

3.3 Beethoven Concert Hall | Zaha Hadid Architects

BEETHOVEN CONCERT HALL

ZAHA HADID ARCHITECT

3.1



Zaha Hadid Architects has submitted a design to Beethoven Festspielhaus in Bonn. The structure's Rhine-side glazed façade reveals the grand staircase that leads concertgoers upwards to the main concert hall. Which is located in Germany with area of 4,350 square meter .

| | |
|--------------|-----------------------|
| Architects: | Zaha hadid architects |
| Location : | Bonn, Germany |
| Population : | 320,000 |
| Area : | 4350 square meter |
| Seats | 950 |
| Style: | modern |
| Year: | 2009 |

3.1.1 ABOUT CONCEPT



WHAT'S THE CONCEPT IS TAKEN FROM?

A porous multi faceted crystalline mass growing out of earth floating out of earth
The curvilinear shell opens and closes, creating an ongoing dialogue between interior and exterior. The volume's form accentuates the continuity between the river and the city with folds and creases underlining the rise from the riverfront to the urban level. The result is 'a sense of flow, continuity, lightness, and movement'.



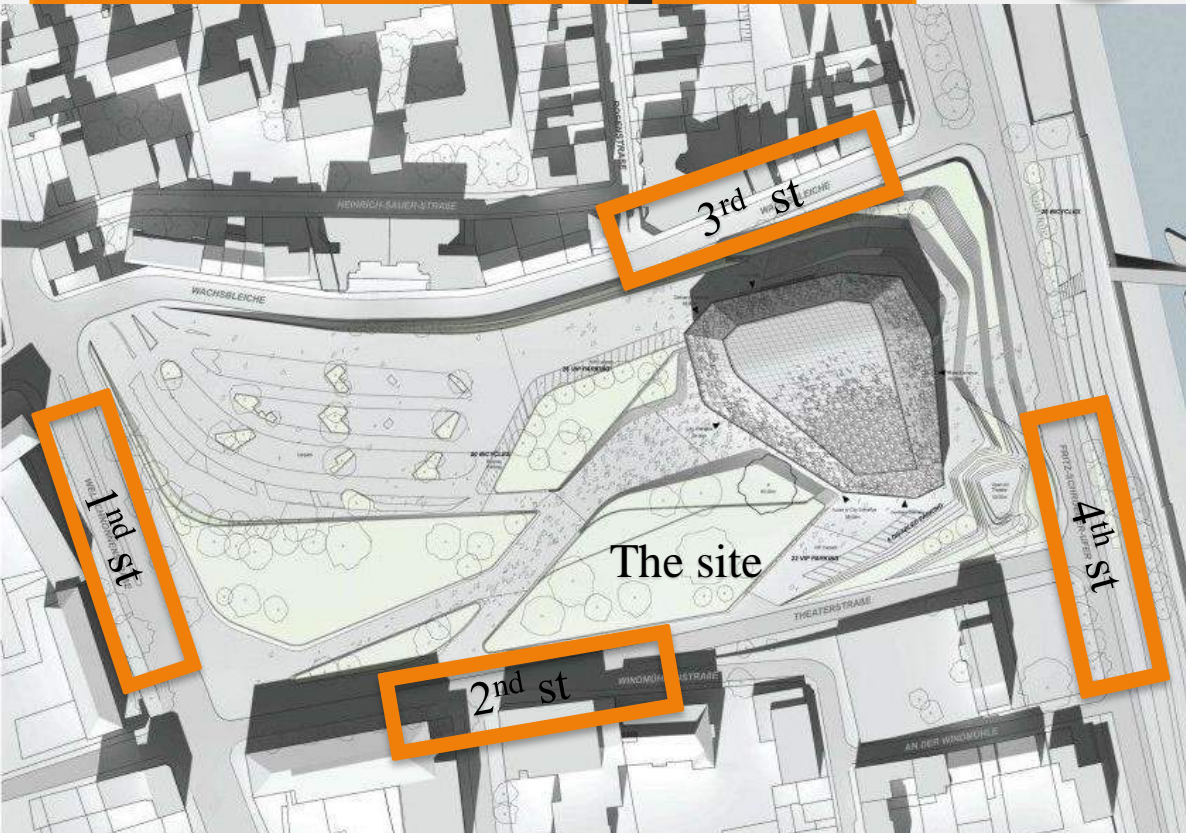
PROJECT AIMS

Zaha Hadid designed concert hall to create an inspirational venue meeting the orchestra's growing program, and to create a new public plaza for all citizens.



3.1.2 SITE LOCATION

The site surrounded by street from all sides and its near to cultural zones' museum and park . And its on the river which has a view from the concert hall.



Location :Bonn, Germany near the city's museum.



Accessibility :It is located on the main road.



Visibility :good visual view.



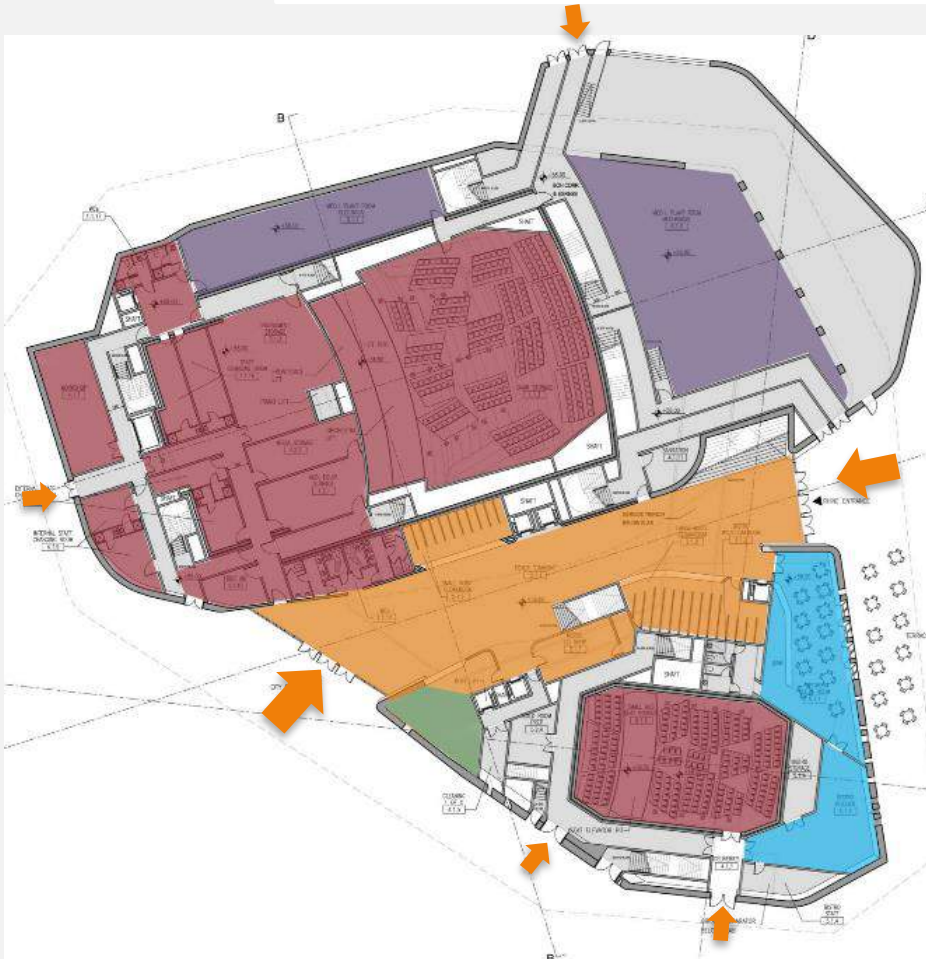
Relation with surrounding: near To cultural and green zones.



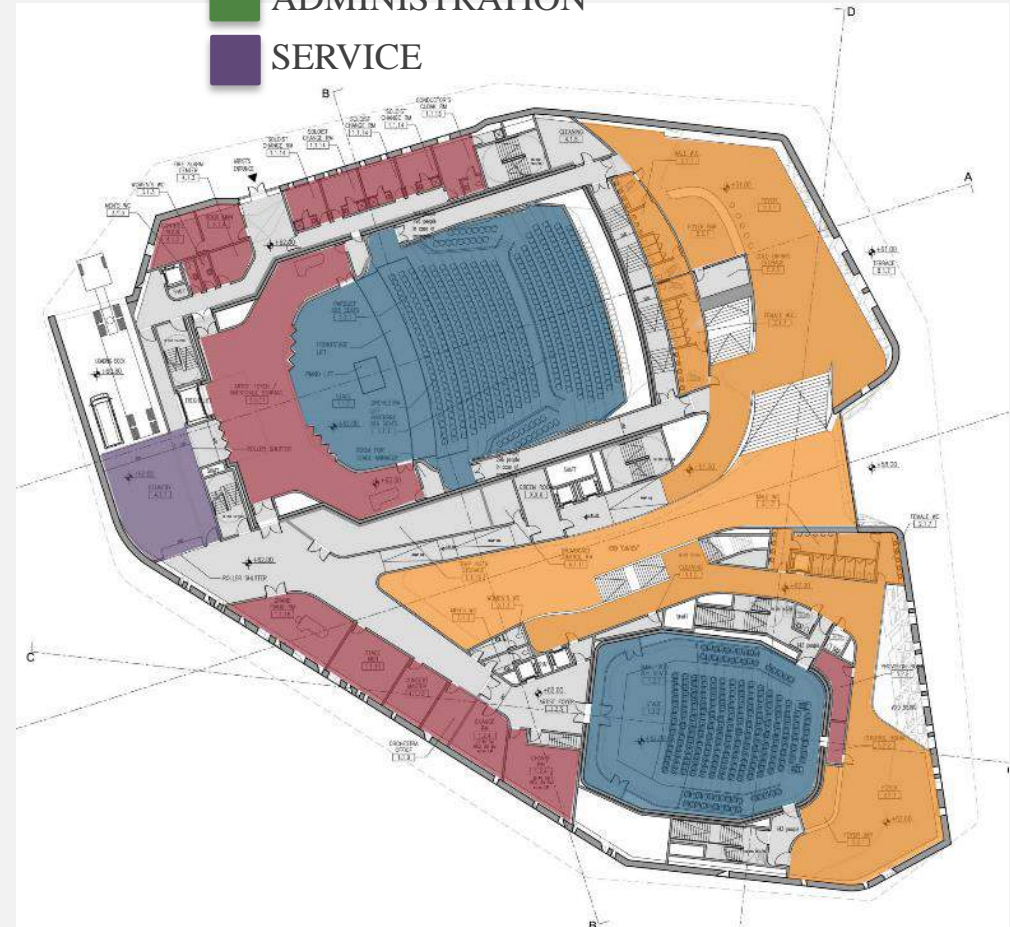
Size : large size is provided

3.1.3 ZONING AND ENTRANCES

- FRONT OF HOUSE
- BACK OF HOUSE
- HALLS
- RESTAURANT
- ADMINISTRATION
- SERVICE



GROUND FLOOR PLAN
CONCERT HALL

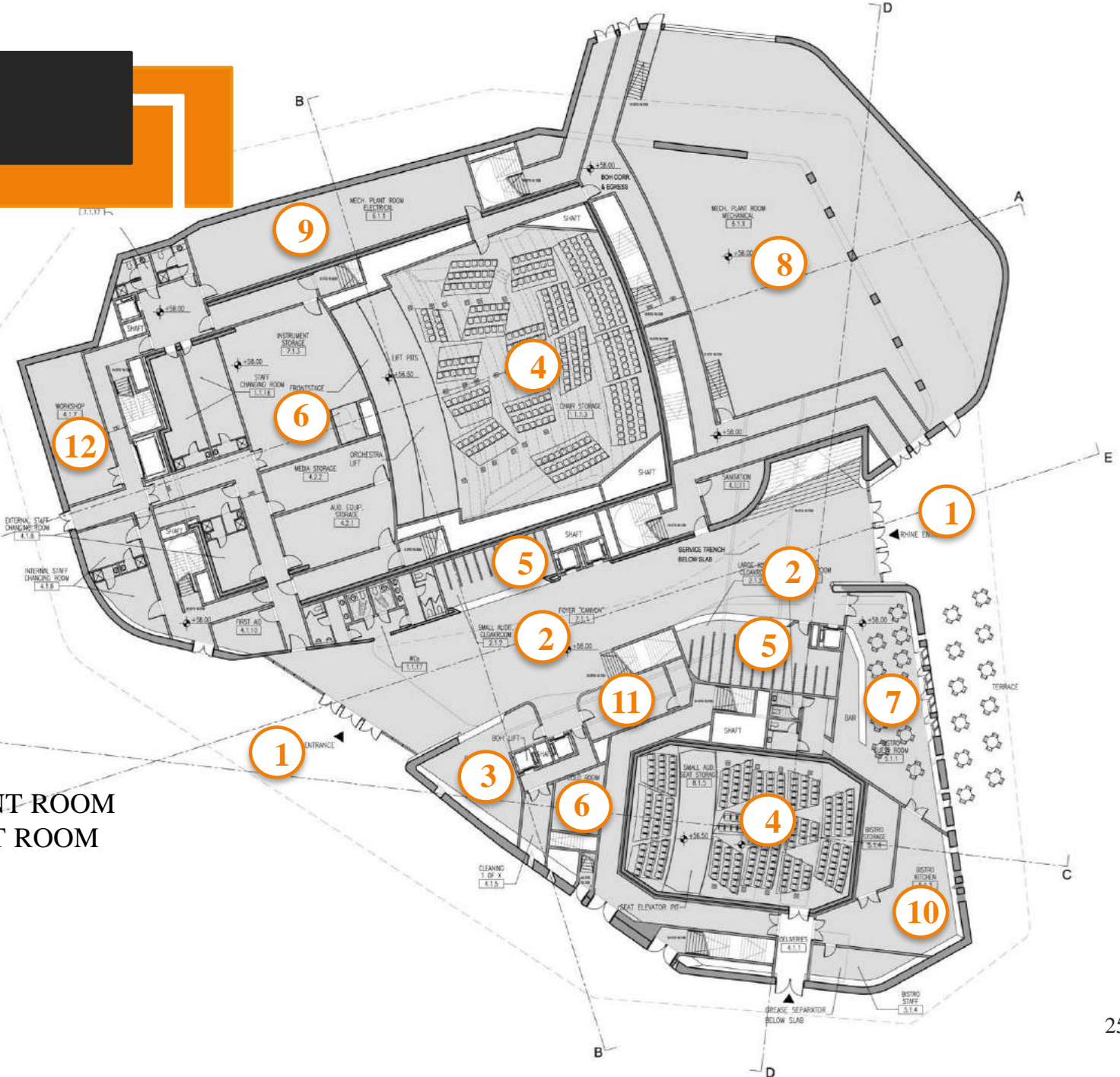


FIRST FLOOR PLAN

3.1.4 PLANS

GROUND FLOOR PLAN

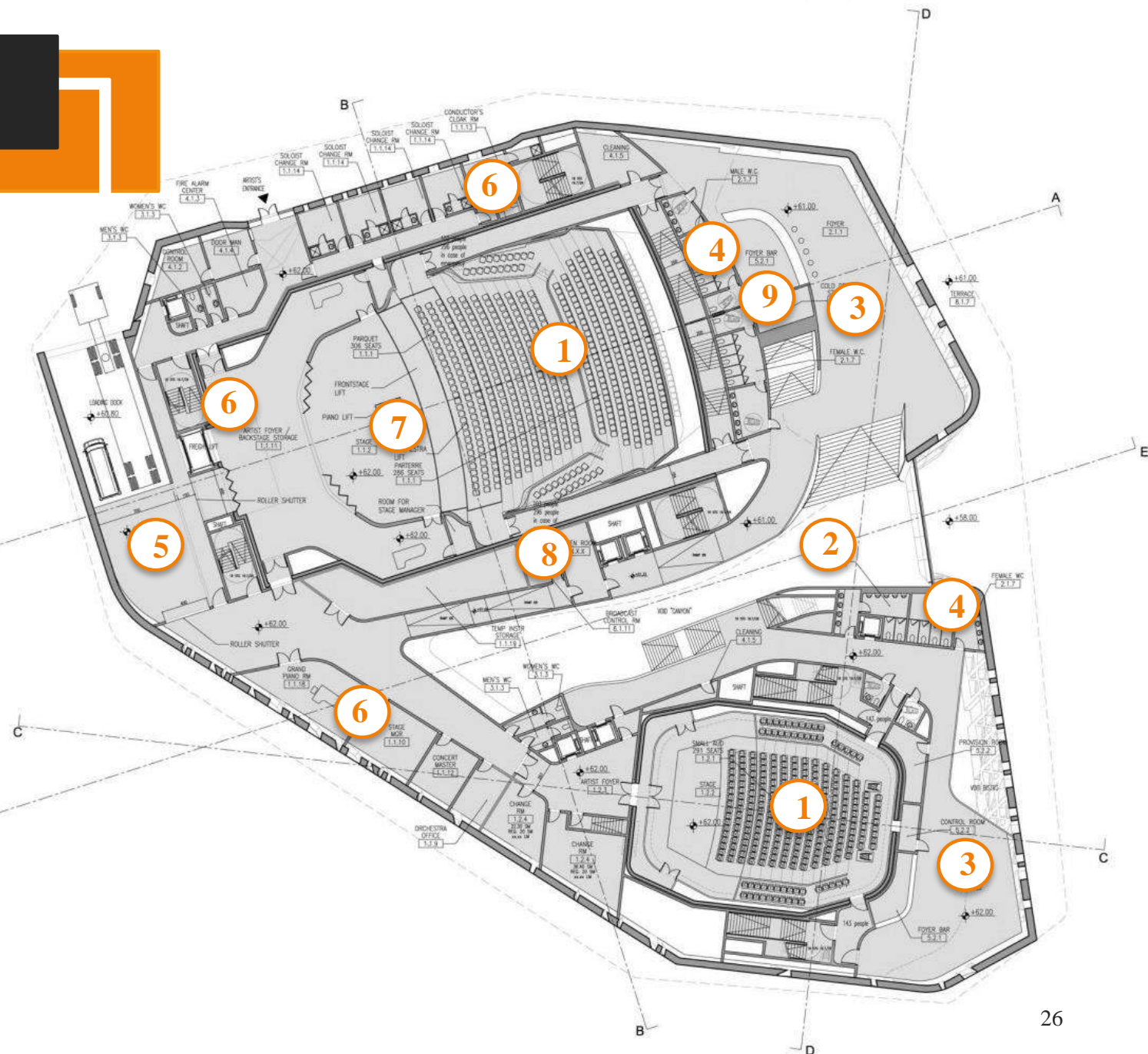
- 1- ENTRANCES
- 2- LOBBY
- 3- ADMINISTRATION
- 4- SEAT STORAGE
- 5- CLOAK ROOM
- 6- BACK OF HOUSE
- 7- RESTAURANT
- 8- MECHANICAL PLANT ROOM
- 9- ELECTRICAL PLANT ROOM
- 10- KITCHEN
- 11- SHOP
- 12- WORKSHOP



3.1.4 PLANS

FIRST FLOOR PLAN

- 1- AUDITORIUMS
- 2- LOBBY
- 3- FOYER
- 4- W.C
- 5- DELIVATY
- 6- BACK OF HOUSE
- 7- STAGE
- 8- GREEM ROOM
- 9- FOYER BAR
- 10- KITCHEN
- 11- SHOP
- 12- WORKSHOP

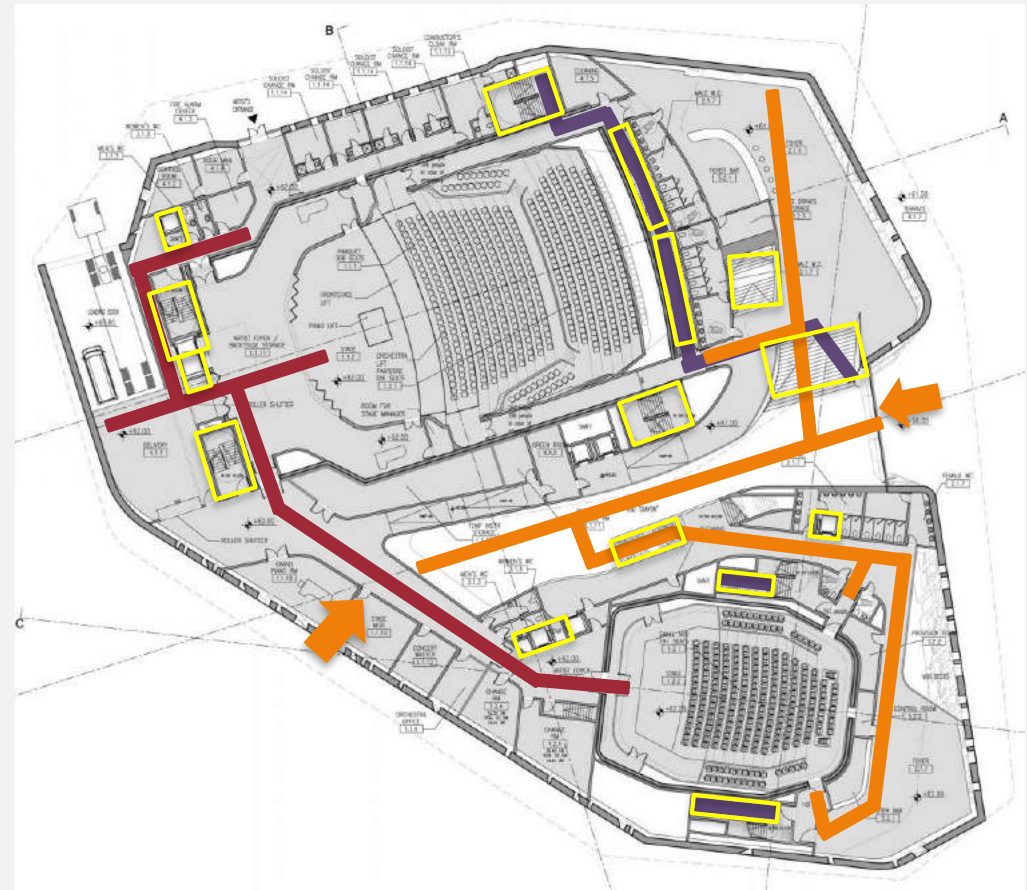


3.1.5 CIRCULATION

- AUDIENCE
- STAFF AND ARTIST
- EXIT
- SERVICE
- VERTICAL CIRCULATION

GROUND FLOOR PLAN

FIRST FLOOR PLAN



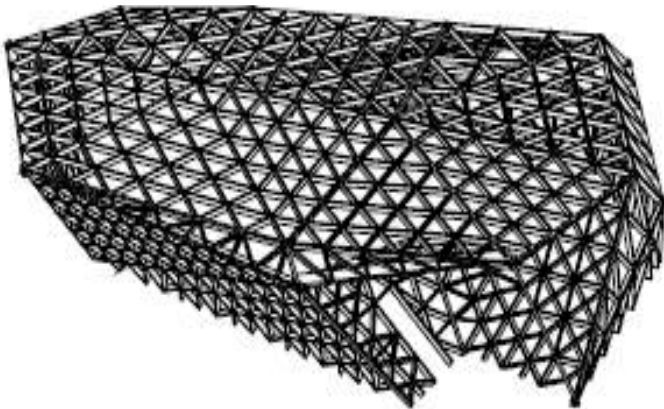
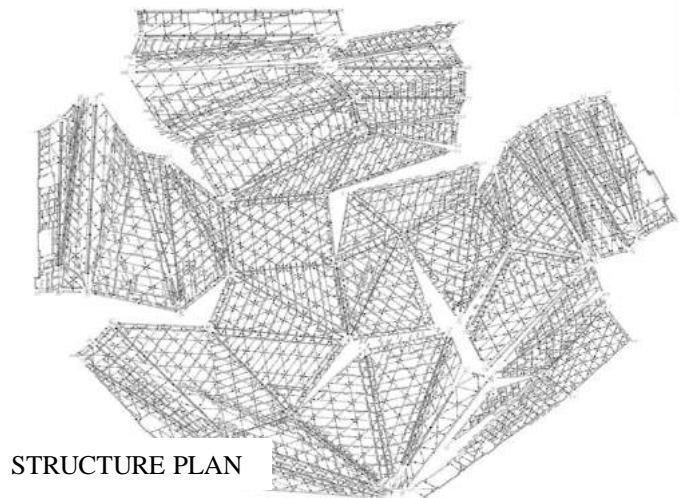
3.1.6 ABOUT STRUCTURE

WHAT'S THE CONCERT HALL STRUCTURE IS MADE FROM?

Using **steel structure in the roof** and **glass-fiber reinforced gypsum (GFRC) in elevations**

The Envelope System of Rigid Frame Structure.

The building is made from concrete and glazed panels with an inset cable net structure. This structure allows daylight to fill the volume's interior, thus brightening the space naturally.



3.1.7 ELEVATION

Concept: the crystalline mass concept can be seen from the elevation.

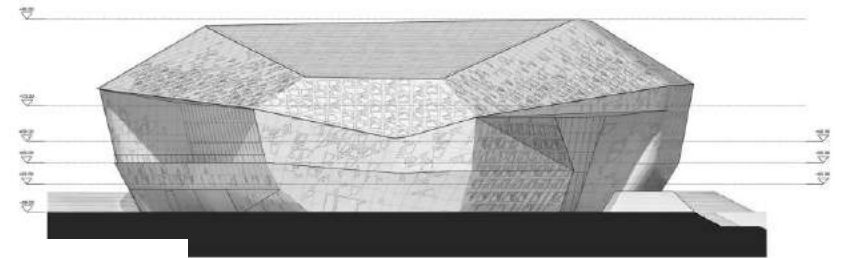
Shape: it has CRYSTAL shape.

Materials: concrete and glazed panels

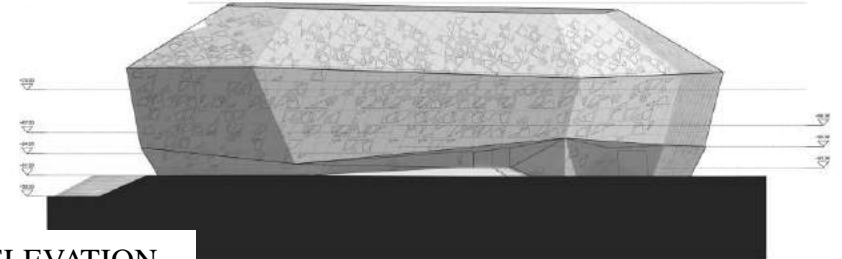
Lighting: lighting is used from inside of the lobby which gives good view from outside .



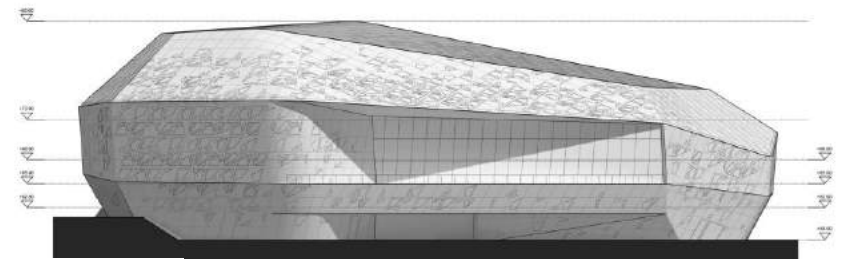
CONCERT HALL



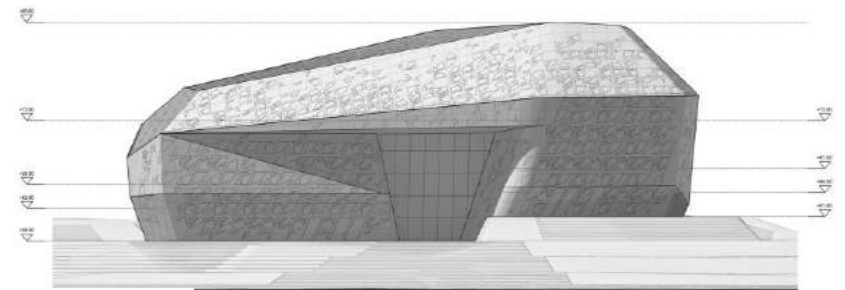
SOUTH ELEVATION



NORTH ELEVATION

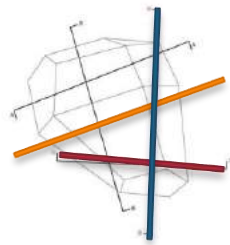


WEST ELEVATION

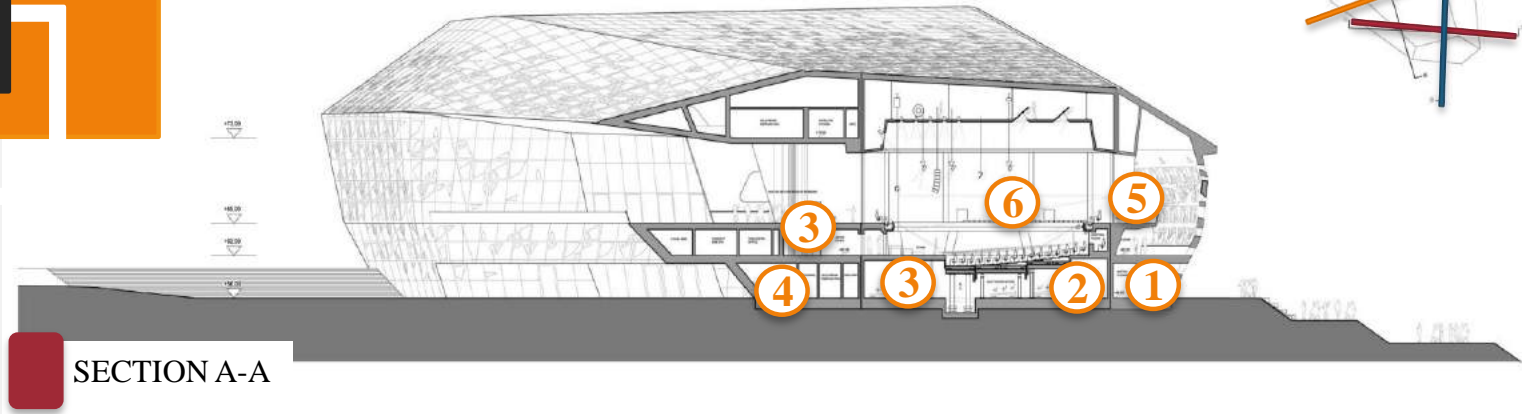


EAST ELEVATION

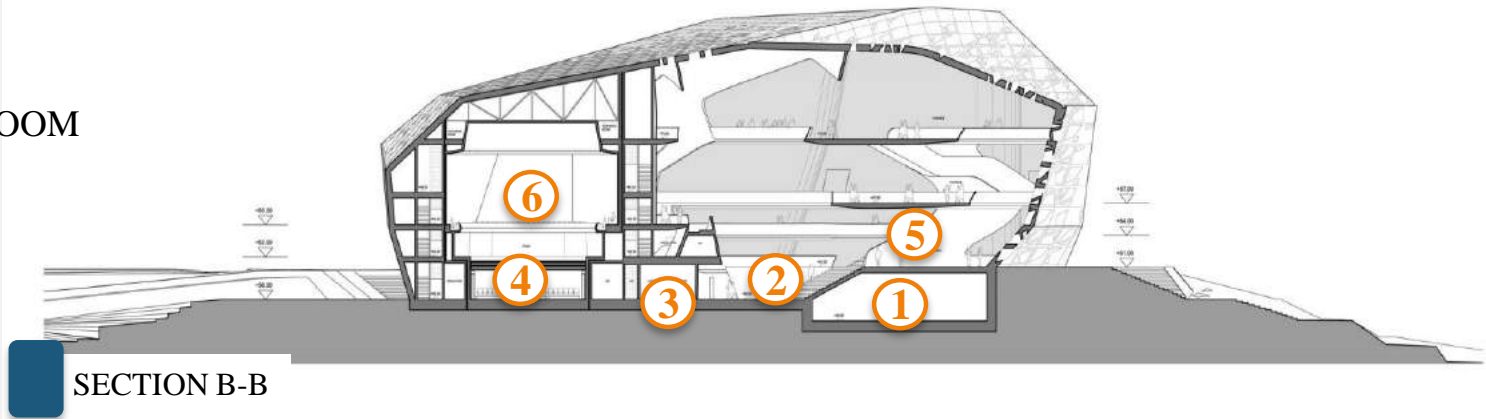
3.1.8 SECTION



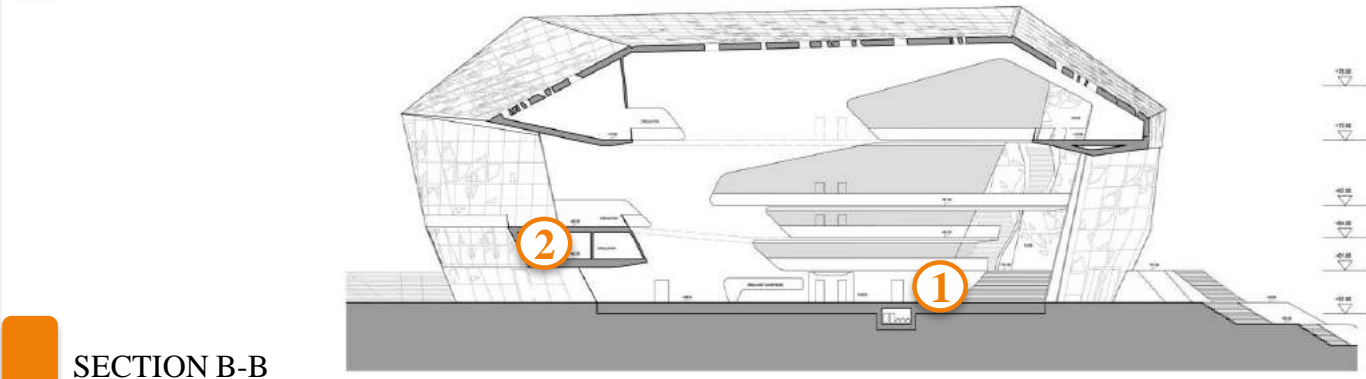
- 1- KITCHEN
- 2- SEAT STORAGE
- 3- BACK STAGE
- 4- ADMINISTRATION
- 5- FOYER
- 6- AUDITORIUM



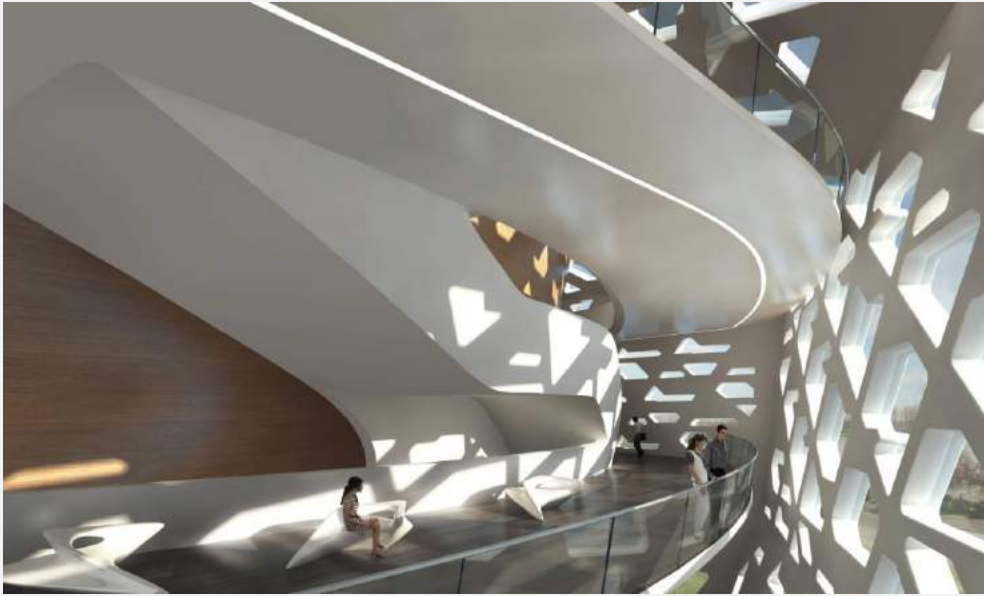
- 1- MECHANICAL PLANT ROOM
- 2- LOBBY
- 3- CLOAK ROOM
- 4- SEAT STORAGE
- 5- FOYER
- 6- AUDITORIUM



- 1- LOBBY
- 2- BACKSTAGE



CONCERT HALL



CONCERT HALL

Interior :The building is made from concrete and glazed panels with an inset cable net structure. This structure allows daylight to fill the volume's interior, thus brightening the space naturally. The creases provide viewing platforms and open performance spaces, both inside and out, with outdoor event space provided by the grand staircases leading from the Rhine to the elevated building mass

form: The main entry is situated below the building's dramatic cantilever, which is accessible from a grand architectural promenade connecting the new Festspielhaus with the city and the existing Beethovenhalle. Access to the main foyer is provided on two levels, its upper-level access still accessible during high-water conditions.



| SPACE | AREA Square meter |
|---------------------------------|----------------------|
| LARGE CONCERT HALL | 670 |
| SMALL CONCERT HALL | 360 |
| LOBBY | 400 |
| RESTAURANT & kitchen | 220 |
| Large concert hall foyer | 500 |
| Small concert hall foyer | 250 |
| Large concert hall backstage | 340 |
| Small concert hall backstage | 240 |
| Large concert hall artist foyer | 170 |
| Small concert hall artist foyer | 42 |
| Plant room mechanical | 280 |
| Plant room electrical | 60 |
| Large concert hall seat storage | 300 |
| Small concert hall seat storage | 200 |

DIMENSIONS



WALT DISNEY CONCERT HALL

FRANK GEHRY ARCHITECT

3.2



The Walt Disney Concert Hall in downtown Los Angeles, California, is the fourth hall of the Los Angeles Music Center and was designed by Frank Gehry. It opened on October 24, 2003, it seats 2,265 people and serves, among other purposes, as the home of the Los Angeles Philharmonic orchestra and the Los Angeles Master Chorale.

| | |
|-------------|---------------------|
| Architects: | Frank gehry |
| Location : | Los Angeles |
| Population: | 4 million |
| Area : | 18,600 square meter |
| Seats: | 2265 |
| Style: | Deconstruction |
| Year: | 2003 |

3.2.1 ABOUT CONCEPT

WHAT'S THE CONCEPT IS TAKEN FROM?

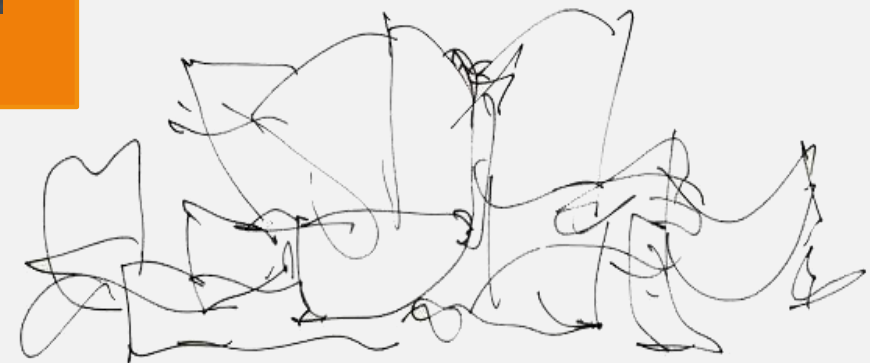
THE concept from exterior is taken from musical movement and the motion of los angels

And also from interior it is a single volume , spatial segregation was minimized .



PROJECT AIMS

Concert halls enrich a city's cultural life and provide a stunning base for the world's best musicians.



3.2.2 SITE LOCATION

The site surrounded by street from all sides and its near to cultural zones' museum and park . There may be a cost to creating a cultural center beside the concert hall



Location : Los Angeles, California near to museum of contemporary art and cultural zone



Accessibility : surrounded by street from all sides



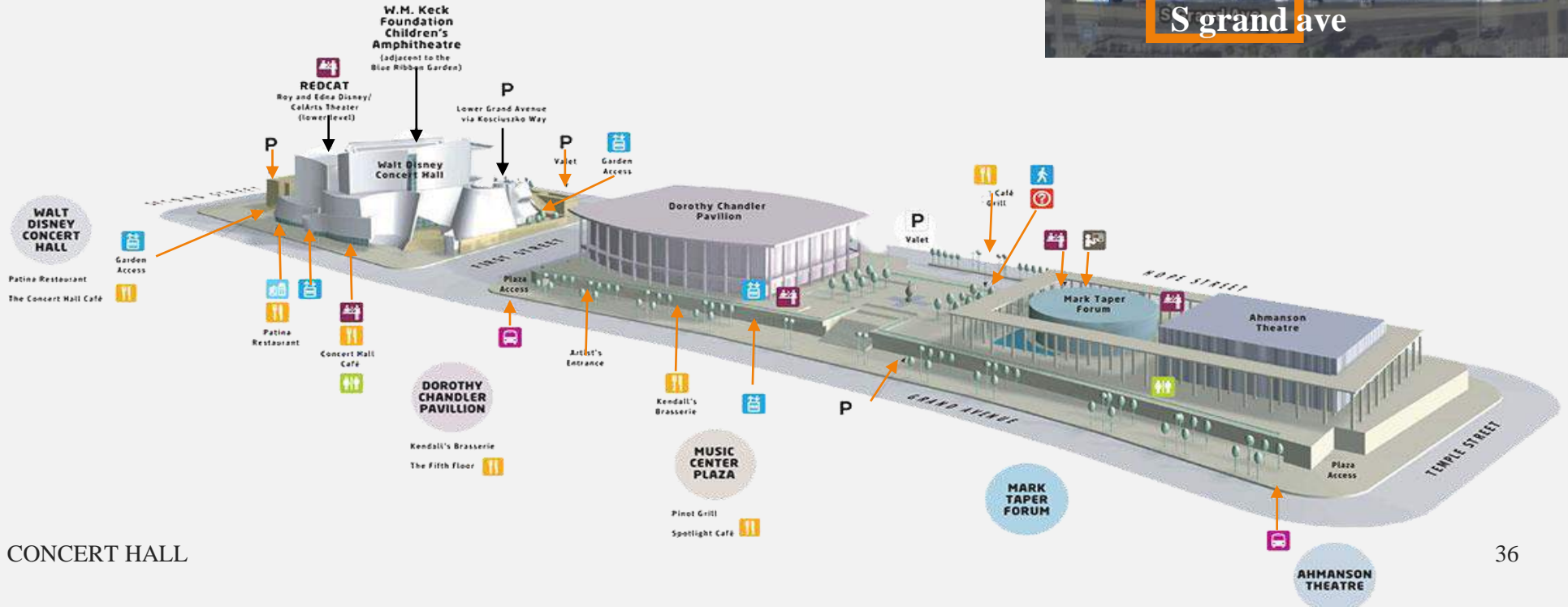
Visibility : perfect visual view.



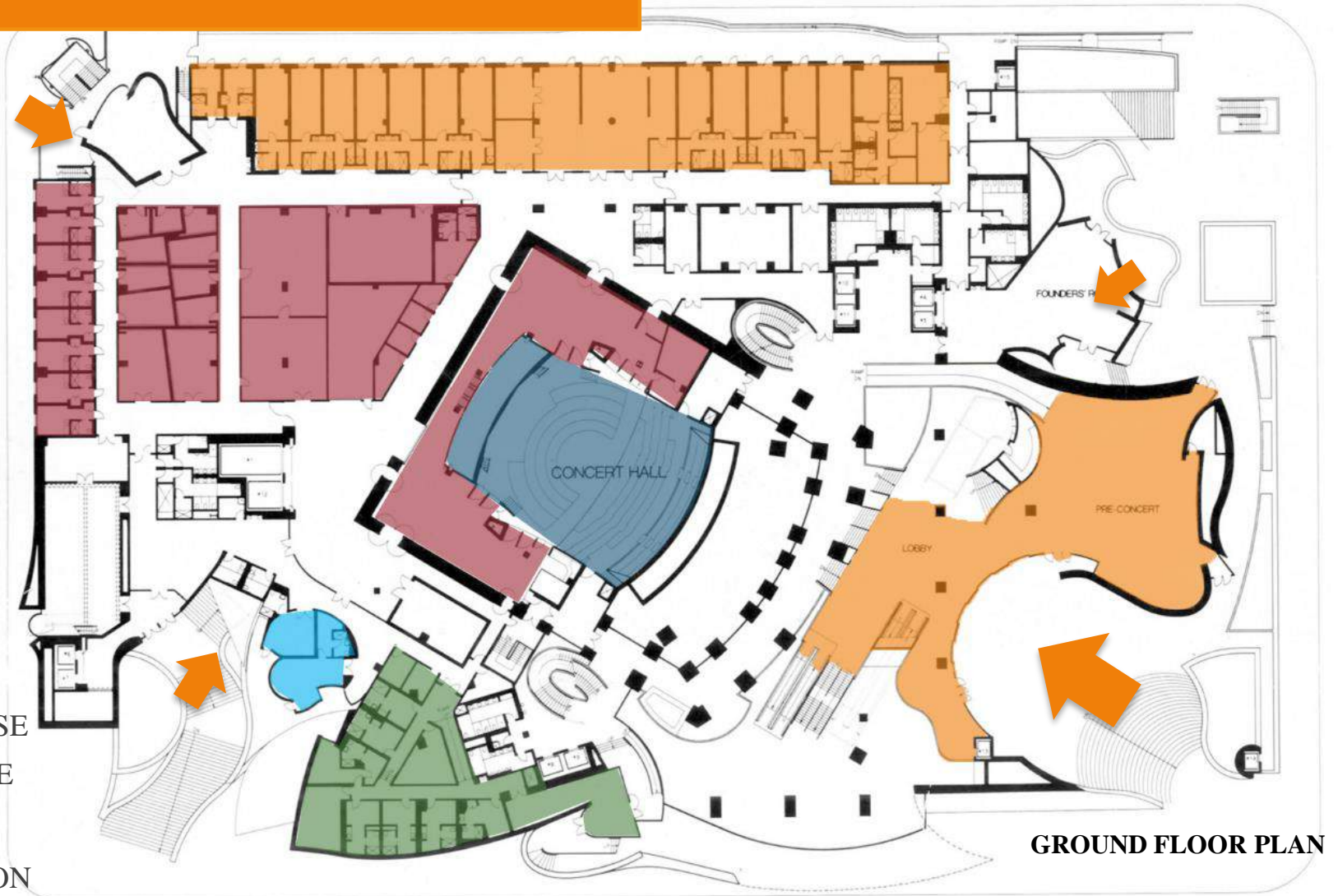
Relation with surrounding: near To cultural and green zones.



Size : large size is provided



3.2.3 ZONING AND ENTRANCES



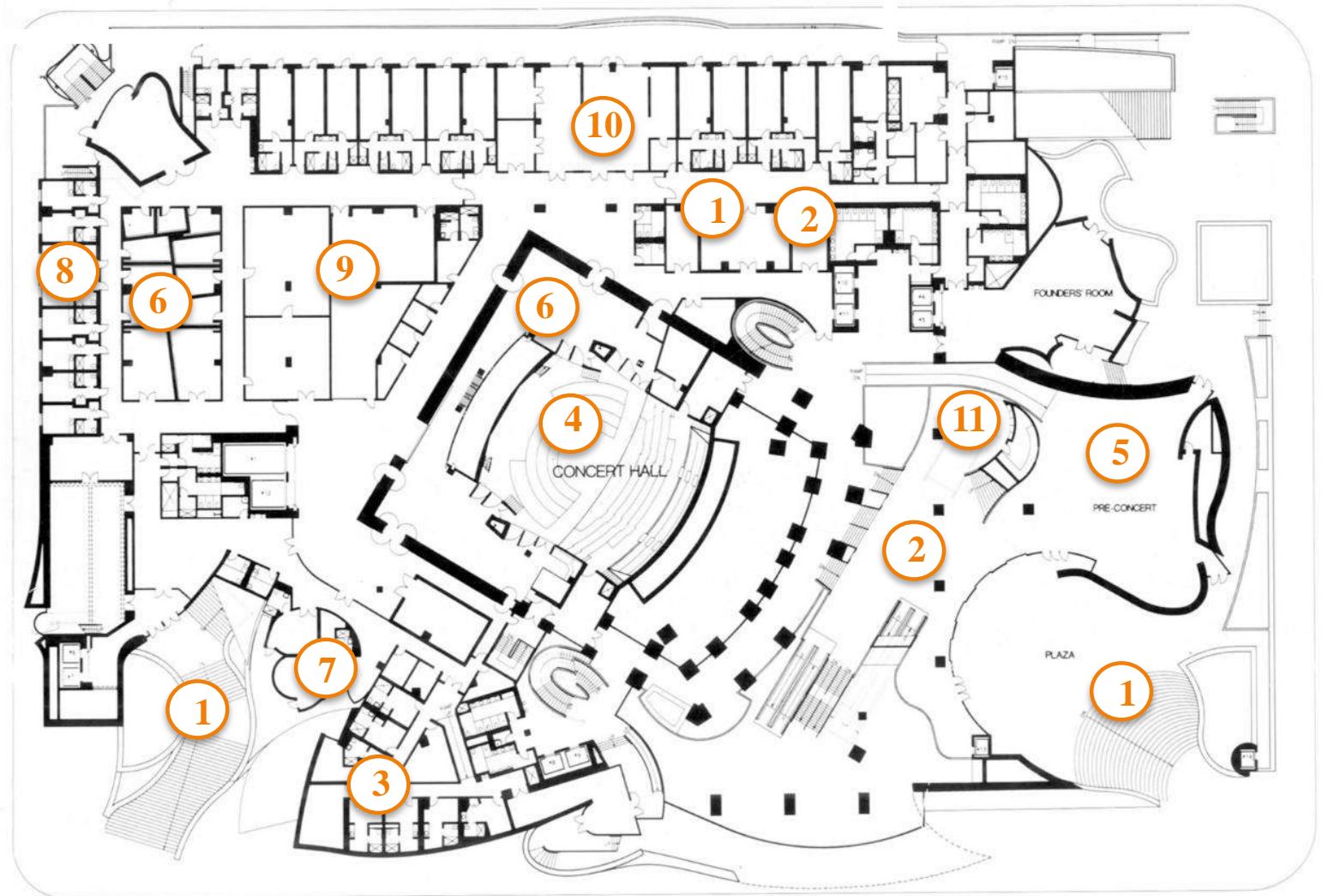
- HALLS
- FRONT OF HOUSE
- BACK OF HOUSE
- RESTAURANT
- ADMINISTRATION
- CONCERT HALL

GROUND FLOOR PLAN

3.2.4 PLANS

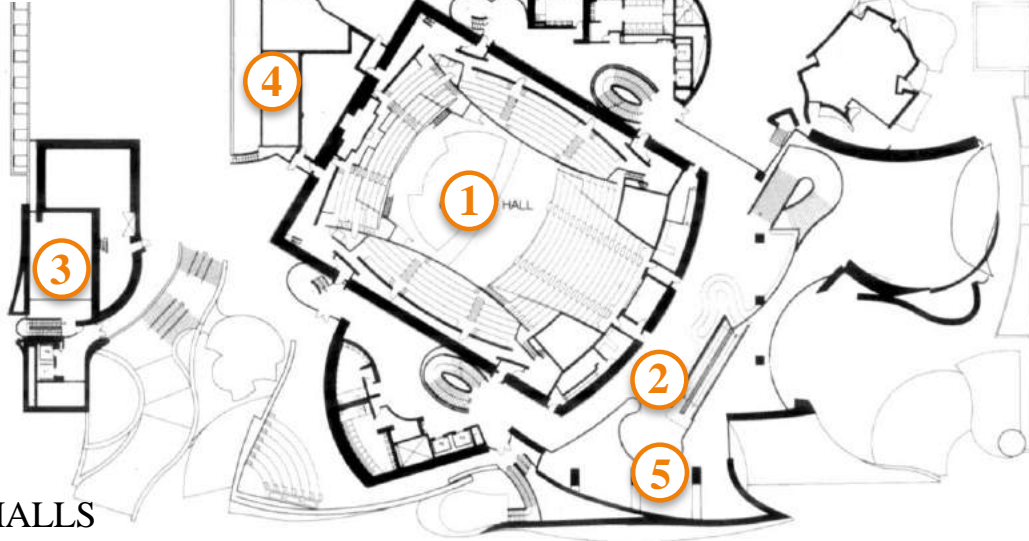
GROUND FLOOR PLAN

- 1- ENTRANCES
- 2- LOBBY
- 3- ADMINISTRATION
- 4- HALL
- 5- PRE CONCERT
- 6- BACK OF HOUSE
- 7- RESTAURANT
- 8- REDCAT
- 9- OUTDOOR AMPHITHEATER SERVICE
- 10- OFFICE
- 11- DONOR ROOM



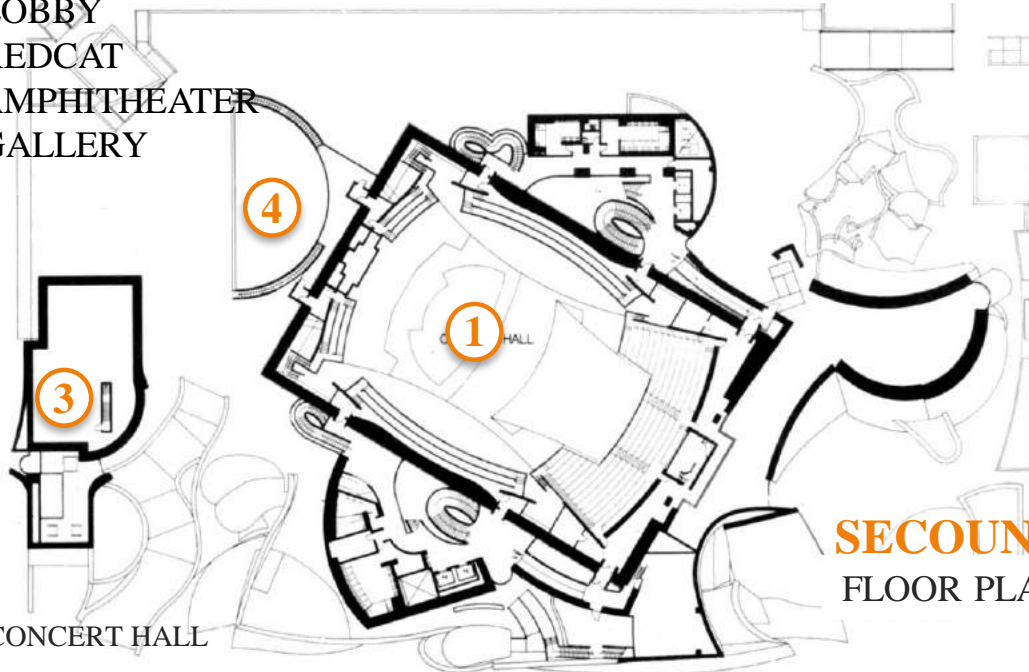
FIRST

FLOOR PLAN



- 1- HALLS
- 2- LOBBY
- 3- REDCAT
- 4- AMPHITHEATER
- 5- GALLERY

SECOND FLOOR PLAN



CONCERT HALL

The concert hall was designed as a single volume, with orchestra and audience occupying the same space. 2,265 Seats are located on each side of the stage, providing some audience members with distant views of the performers' sheet music. The steel roof structure spans the entire space, eliminating the need for interior columns.

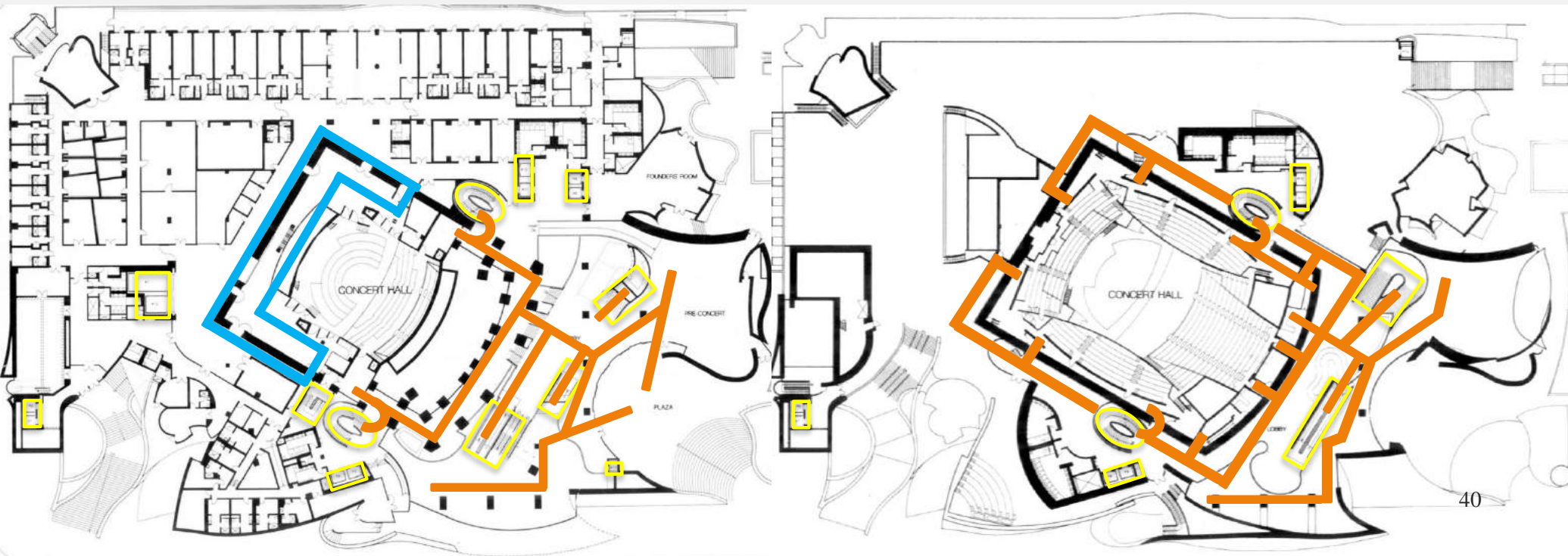


3.2.5 CIRCULATION

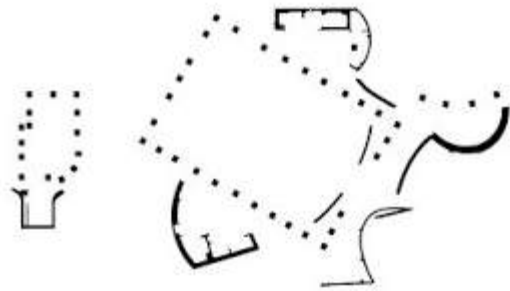
- AUDIENCE
- VERTICAL CIRCULATION
- ARTIST

GROUND FLOOR PLAN

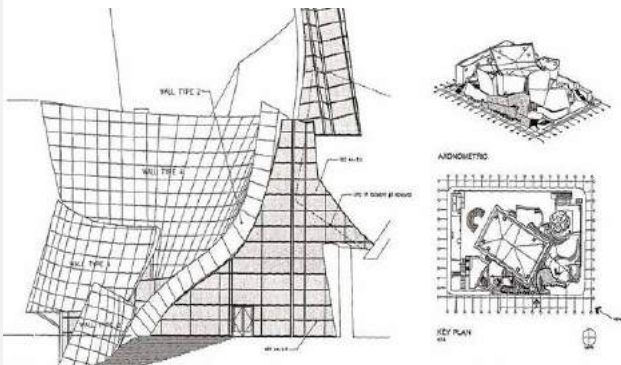
FIRST FLOOR PLAN



3.2.6 ABOUT STRUCTURE



STRUCTURE PLAN



CONCERT HALL

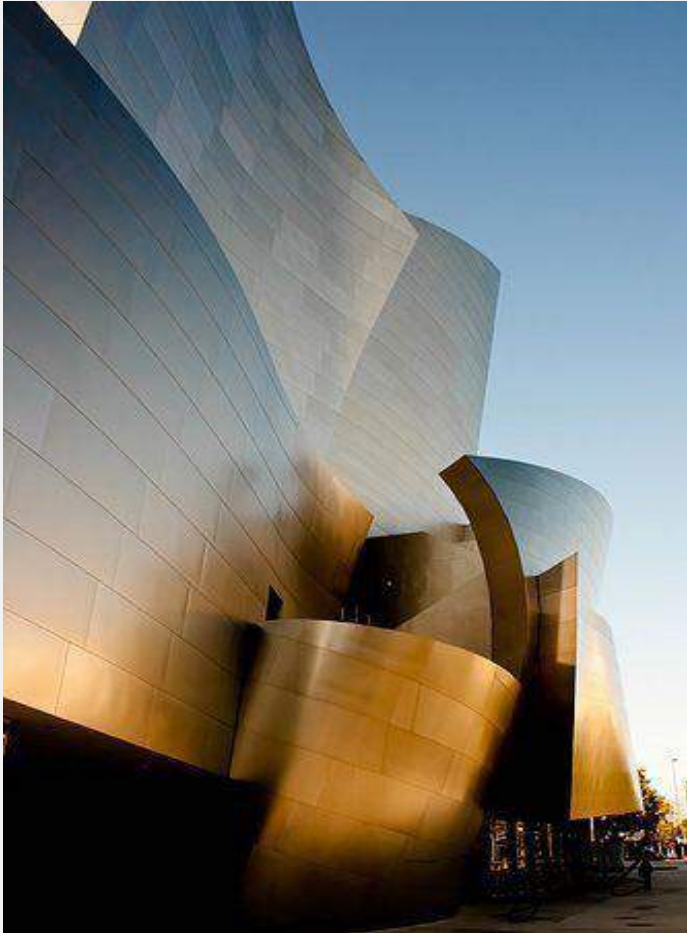
WHAT'S THE CONCERT HALL STRUCTURE IS MADE FROM?

The steel roof structure spans the entire space, eliminating the need for interior columns.

The reflective, stainless steel surface engages light as an architectural medium.

Thin metal panels allowed for more adventurous curvature and could be structurally disassociated from the ground.

3.2.7 ELEVATION



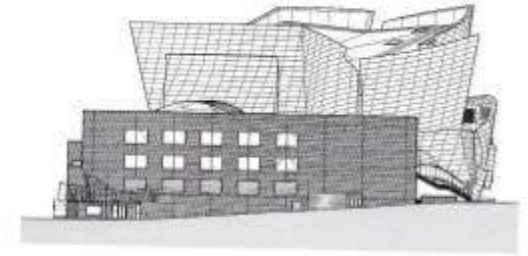
CONCERT HALL

Concept: the concept of the sound wave can be seen clearly .

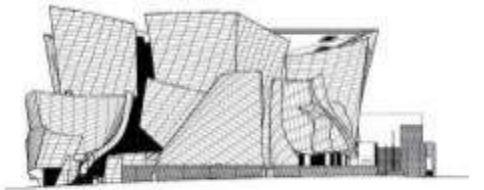
Shape: it has organic shape

Materials: The reflective, stainless steel surface engages light as an architectural medium. The facade's individual panels and curves are articulated in daylight and colored by city lights after dark. Thin metal panels allowed for more adventurous curvature and could be structurally disassociated from the ground.

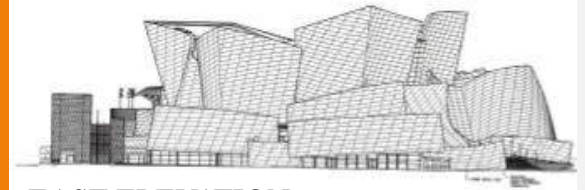
Lighting: lighting is used from inside of the lobby which gives good view from outside .



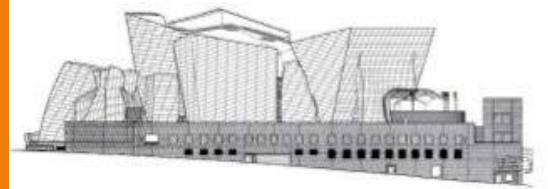
SOUTH ELEVATION



NORTH ELEVATION

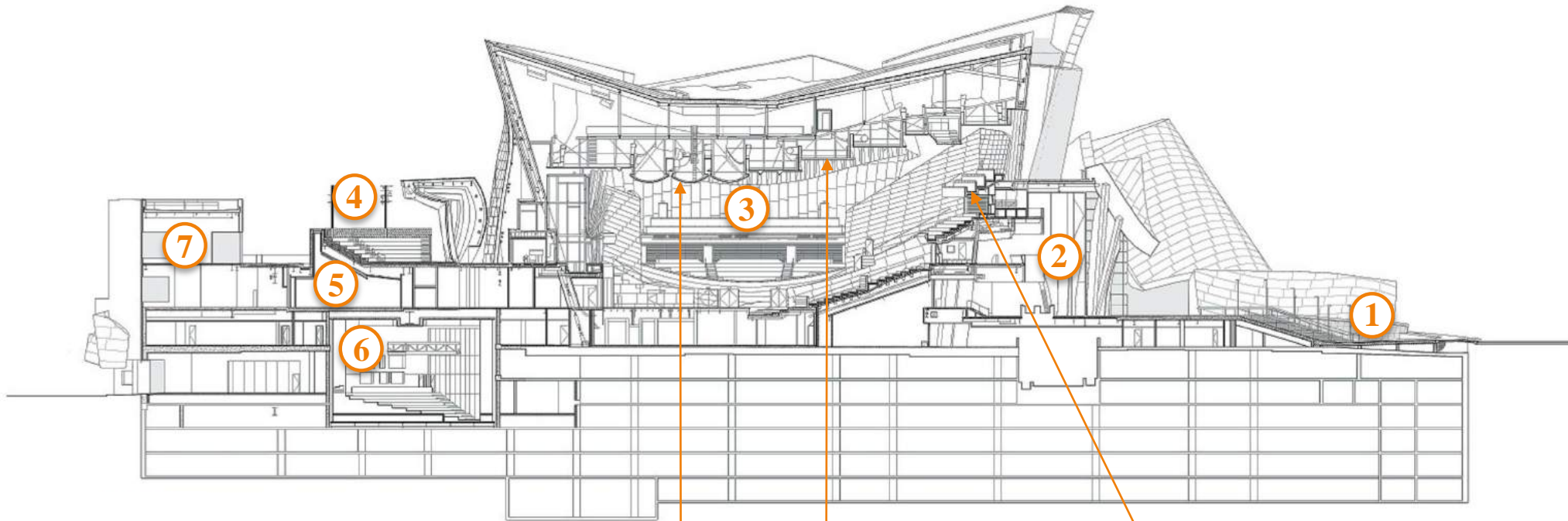


EAST ELEVATION



WEST ELEVATION

3.2.8 SECTION



- 1- ENTRANCES
- 2- LOBBY
- 3- AUDITORIUM
- 4- AMPHITHEATER
- 5- REHEARSAL
- 6- REDCAT
- 7- OFFICES

Low point of ceiling
reflects sound to stage

Draped wood- faced
backed by concrete

Minimal balcony overhang
eases sound distribution

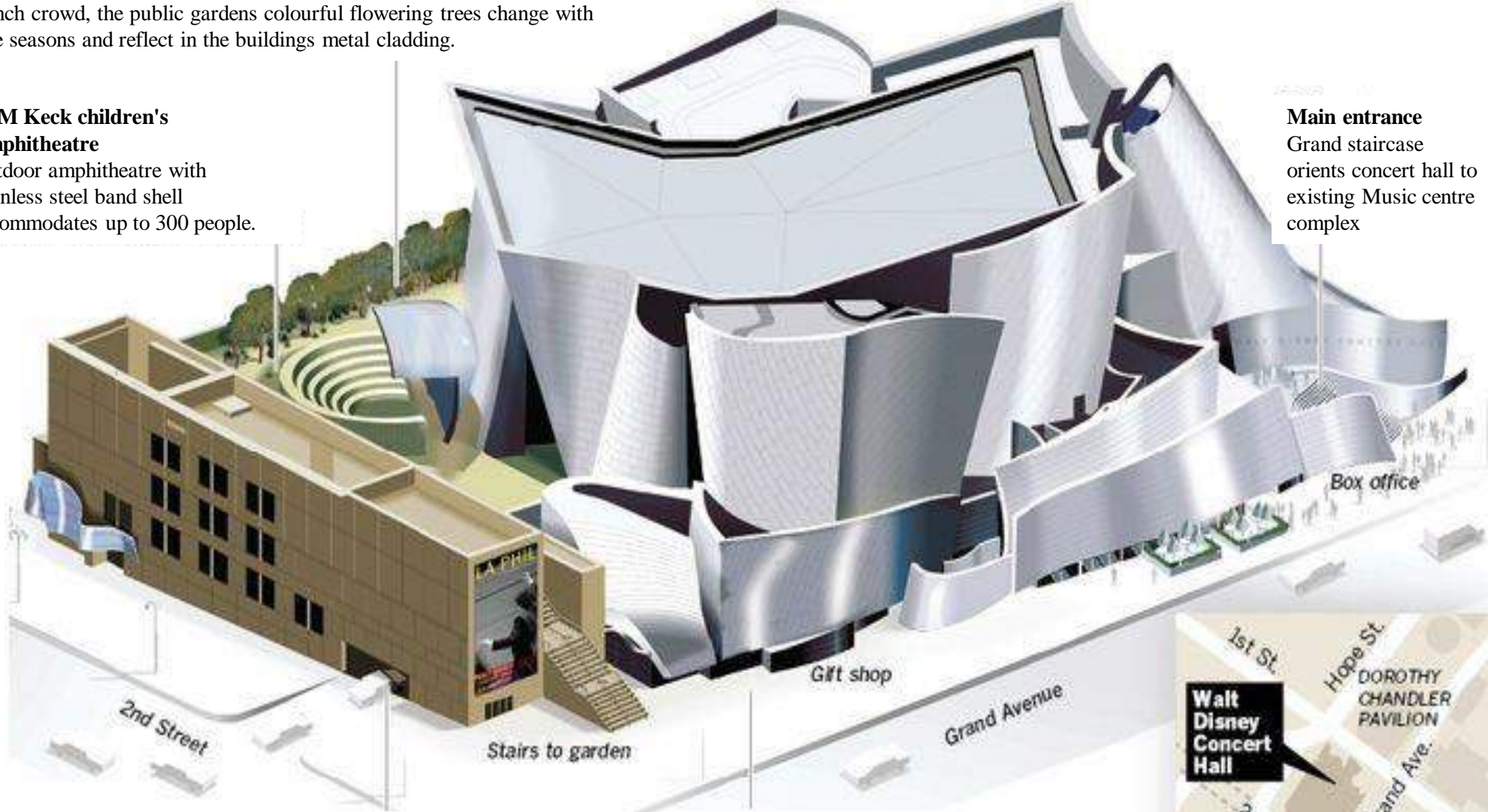
Garden

An urban park accessible to concertgoers and the downtown workaday Lunch crowd, the public gardens colourful flowering trees change with The seasons and reflect in the buildings metal cladding.

W.M Keck children's Amphitheatre

Outdoor amphitheatre with stainless steel band shell accommodates up to 300 people.

Main entrance
Grand staircase orients concert hall to existing Music centre complex



Parking

Parking entrances on 2nd street and hope street lead to a seven-level 2,200-spaces underground garage.

Outdoor space

Sidewalks up to 40 feet wide create a pedestrian promenade and outdoor dining space.



Auditorium

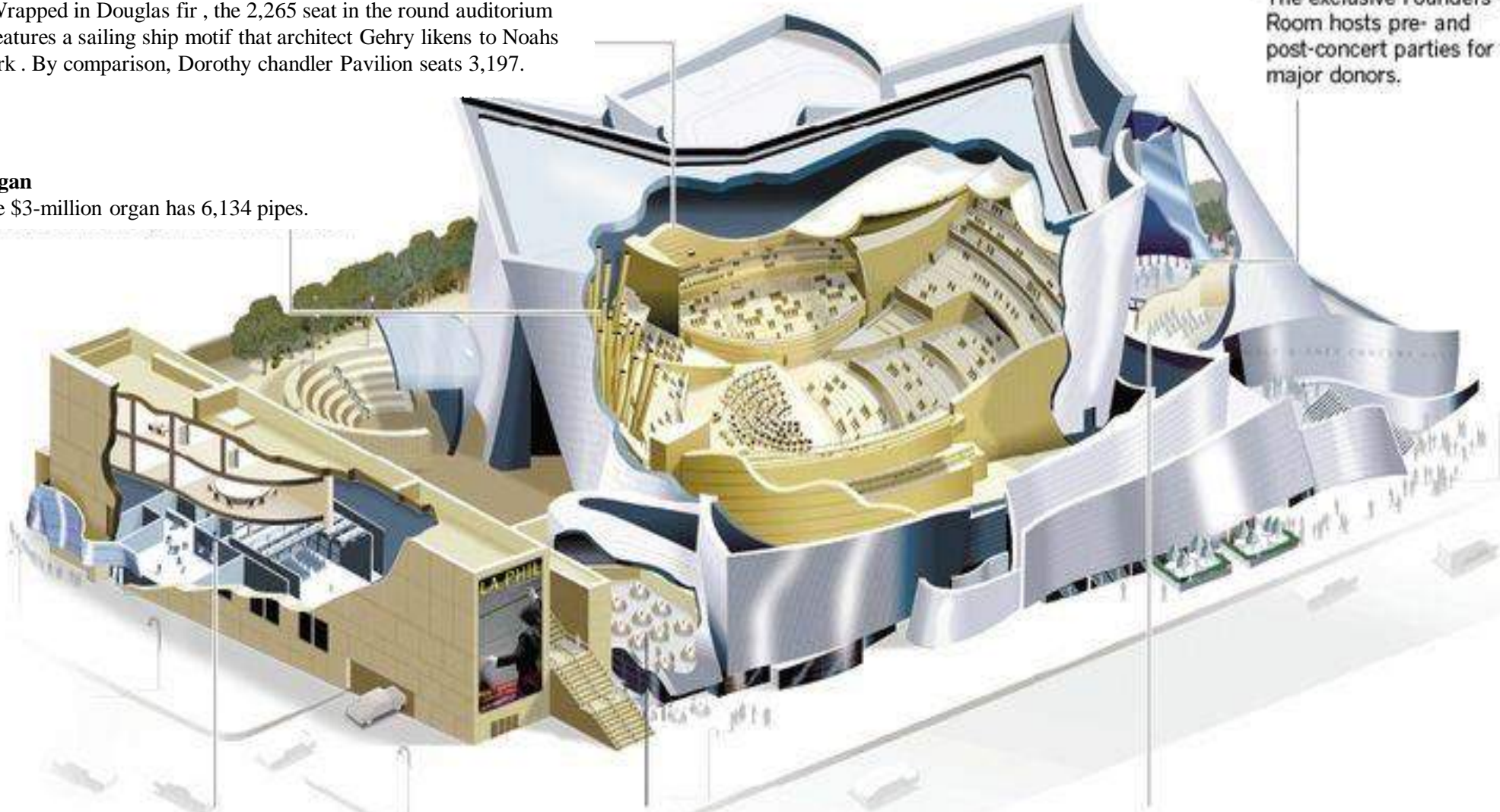
Wrapped in Douglas fir , the 2,265 seat in the round auditorium features a sailing ship motif that architect Gehry likens to Noahs ark . By comparison, Dorothy chandler Pavilion seats 3,197.

Donor room

The exclusive Founders Room hosts pre- and post-concert parties for major donors.

Organ

The \$3-million organ has 6,134 pipes.



REDCAT Theatre

The REDCAT performance space hosts Avant-grade and experimental music, dance, theatre, movies and art.

Dining

Patina restaurant 100 seat casual café

Reception area

The BP hall seats up to 500 guests for small concerts, dinners, cocktail parties, lectures and intermission events.



Exterior form :The exterior is a composition of undulating and angled forms, symbolizing musical movement and the motion of Los Angeles. The design developed through paper models and sketches. The custom curvature demanded a highly specific steel structure, including box columns tilted forward at 17° on the building's north side.

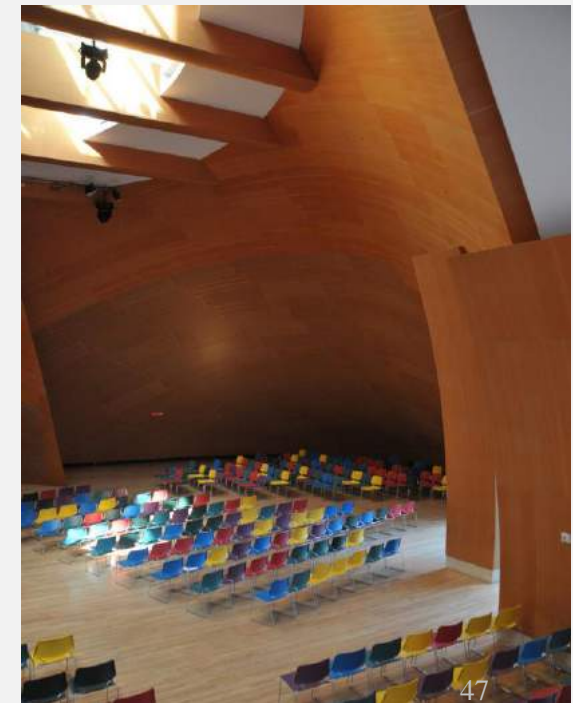
Sound treatment :Gehry used a 1:10 scale model of the auditorium, complete with a model occupant in each seat. This required all elements to be scaled accordingly, including increasing the frequency of sound in the space to reduce the wavelength by a factor of ten. The concert hall's partitions and curved, billowing ceiling act as part of the acoustical system while subtly referencing the sculptural language of the exterior



Light : The metallic forms appear to hover above an asymmetrical band of glazing at the building's base. Glass fissures in the facade bring light into the lobby and pre-concert room, reading as a grand entryway through the otherwise opaque façade.

Material : wood is used for covering the roofs also the columns , and some part of interior decoration in preconcert zone. And also white paint is used.

Shape : organic shape is used from interior also Which give the sense of sound movement, the concept can be read clearly.



| SPACE | AREA Square meter |
|--------------|----------------------|
| CONCERT HALL | 2900 |
| BACKSTAGE | 1230 |
| LOBBY | 670 |
| PRE CONCERT | 760 |
| DONOR ROOM | 180 |
| REDCAD | 1080 |
| OFFICE | 1890 |

DIMENSIONS



URAL PHILHARMONIC ORCHESTRA

ZAHA HADID ARCHITECT

3.3



CONCERT HALL

Zaha Hadid Architects has won an international competition for the design of the new Sverdlovsk Philharmonic Concert Hall in Yekaterinburg, Russia.

Designed as a new home for the Ural Philharmonic Orchestra, the venue will contain a 1,400-seat concert hall and a smaller 600-seat chamber-music hall .

| | |
|-------------|-----------------------|
| Architects: | Zaha hadid architects |
| Location : | Yekaterinburg, Russia |
| Population: | 1.6 million |
| Area : | 22,000 square meter |
| Seats | 2000 |
| Style: | Deconstruction |
| Year: | 2018 |

3.3.1 ABOUT CONCEPT

WHATS THE CONCEPT IS TAKEN FROM?

the concept is taken from the shape of sound wave .

“the design of the concert hall is based on the properties of musical sound resonance creating wave vibrations in a continuous smooth surface,” said Zaha Hadid Architects.

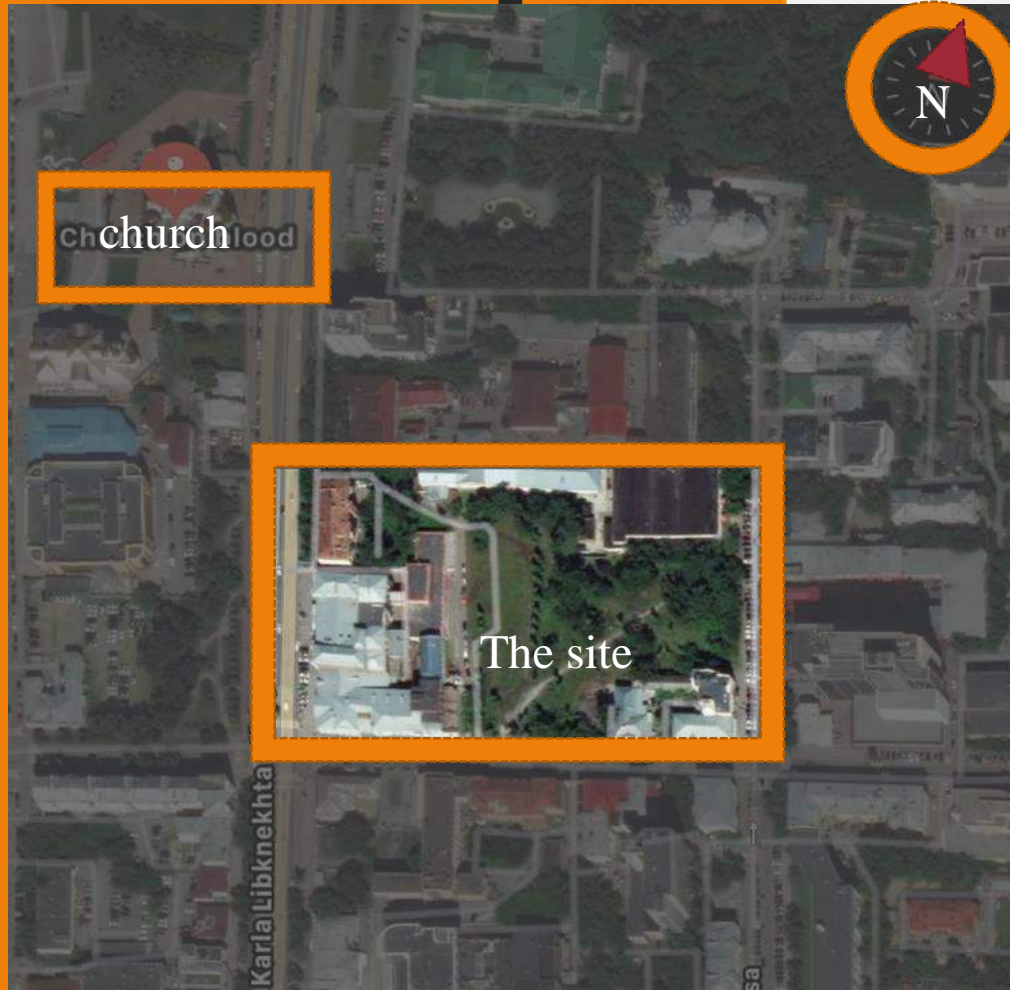
PROJECT AIMS

For the design of the Ural Philharmonic Orchestra’s new home, Zaha Hadid designed concert hall to create an inspirational venue meeting the orchestra’s growing program, and to create a new public plaza for all citizens.



3.3.2 SITE LOCATION

The site is near to music , cultural zones and restaurants. Atop the scheme, the procession of interconnected public spaces continues in the form of a rooftop terrace overlooking the city's Church of All Saints.



Location :Yekaterinburg, Russia near the city's Church of All Saints.



Accessibility :It is located on the main road.



Visibility :good visual view.

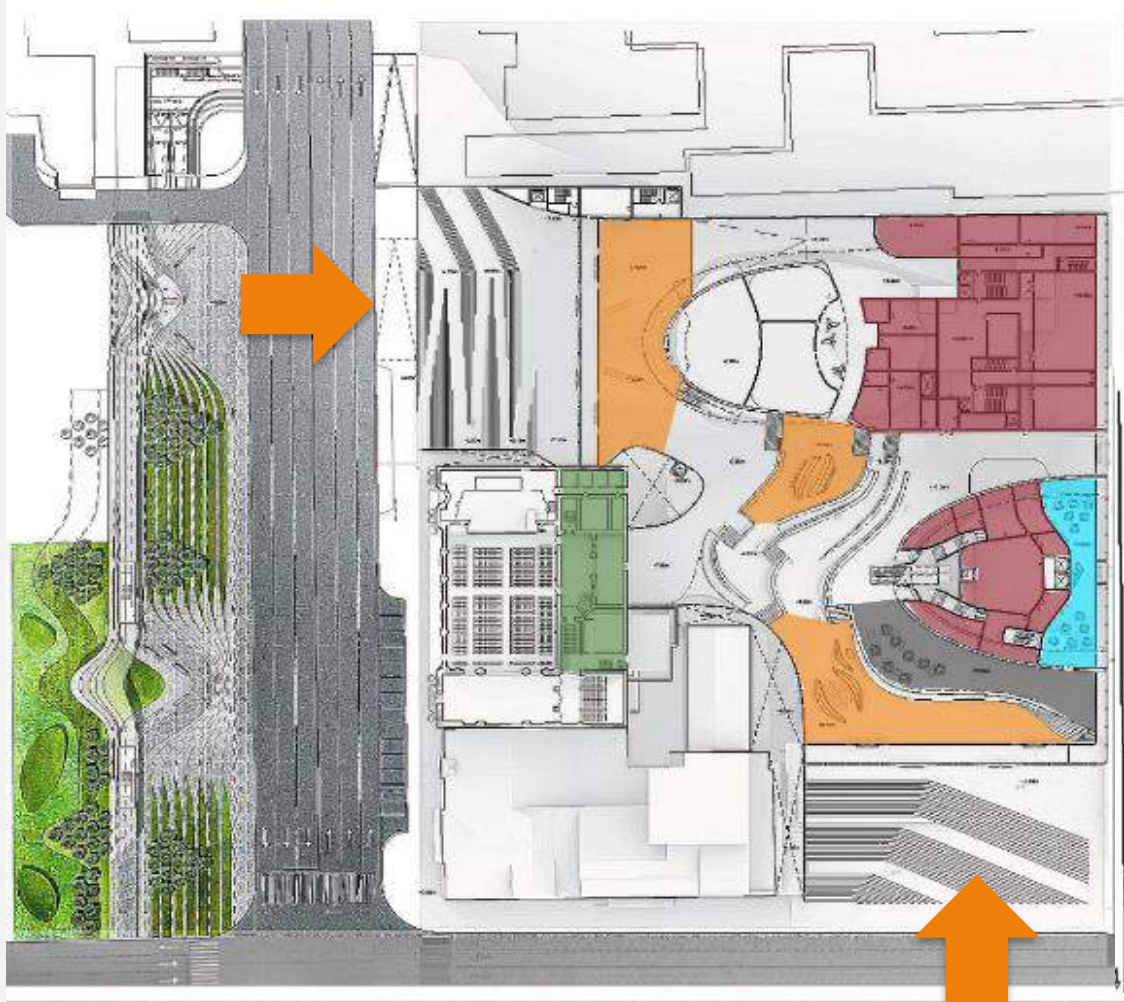


Relation with surrounding: near To cultural and religious zones.



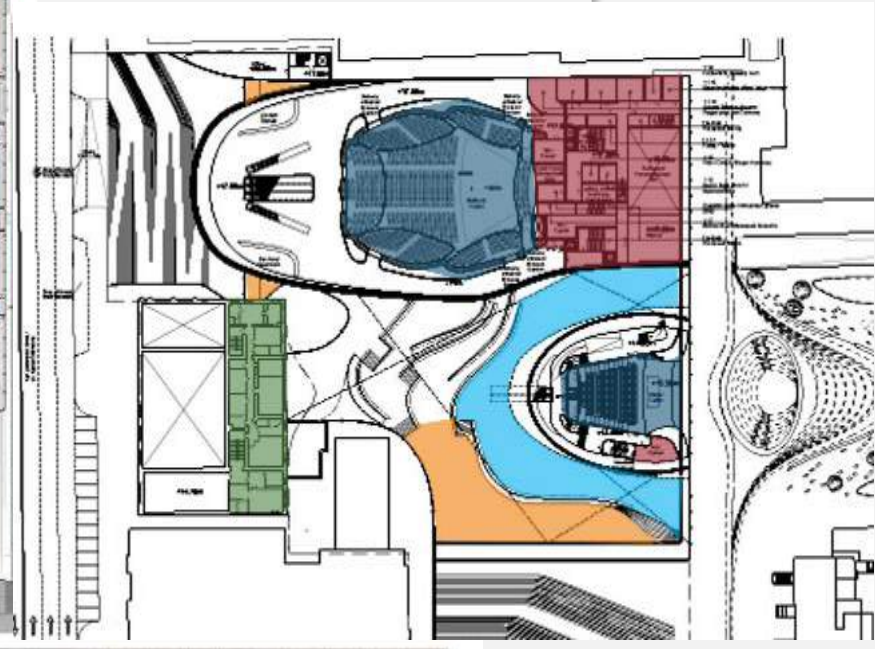
Size : large size is provided

3.3.3 ZONING AND ENTRANCES



GROUND FLOOR PLAN
CONCERT HALL

- FRONT OF HOUSE
- BACK OF HOUSE
- HALLS
- RESTAURANT
- ADMINISTRATION
- CAFETERIA



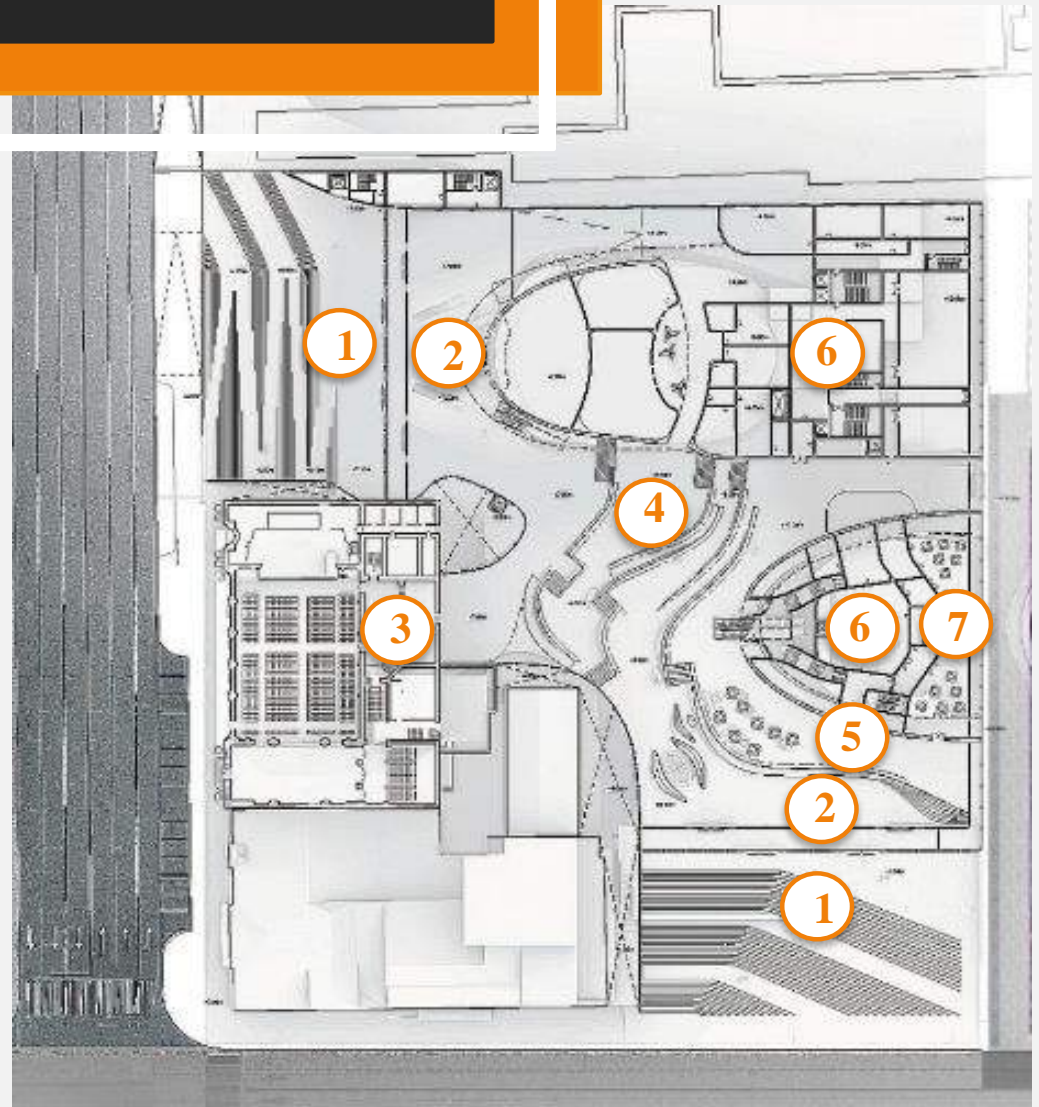
FIRST FLOOR PLAN

3.3.4 PLANS

GROUND FLOOR PLAN

- 1- ENTRANCES
- 2- LOBBY
- 3- ADMINISTRATION
- 4- LOUNGE
- 5- CAFETERIA
- 6- BACK OF HOUSE
- 7- SPECIAL RESTAURANT

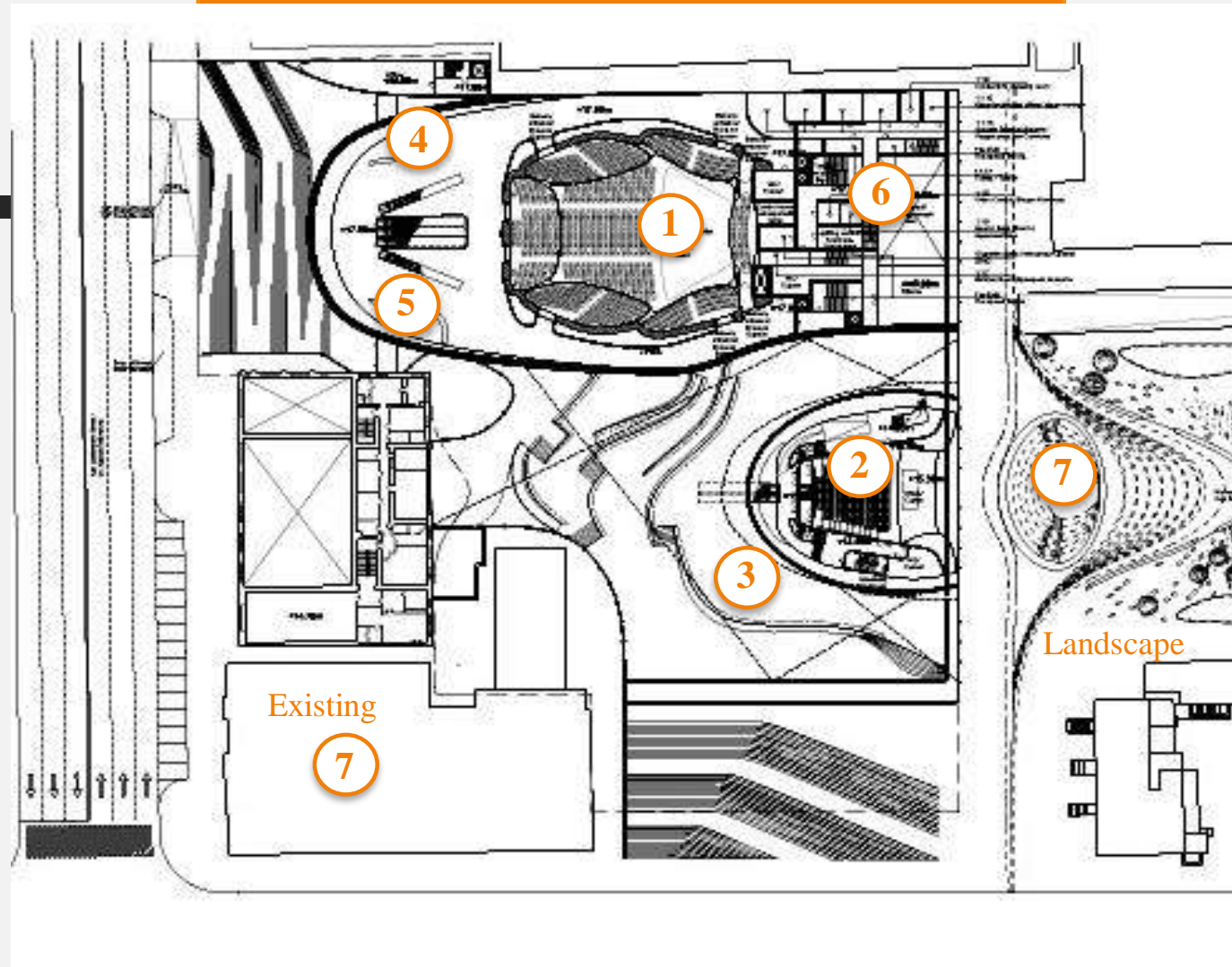
The scheme's centerpiece is a 1,600-seat Concert Hall and 400-seat Chamber Music Hall "nestled within the surface deformations of the suspended canopy." Elevated off the ground, this element creates an unobstructed lobby underneath, doubling as a vibrant public gathering space for a city whose population has increased by over 10% in the past decade.

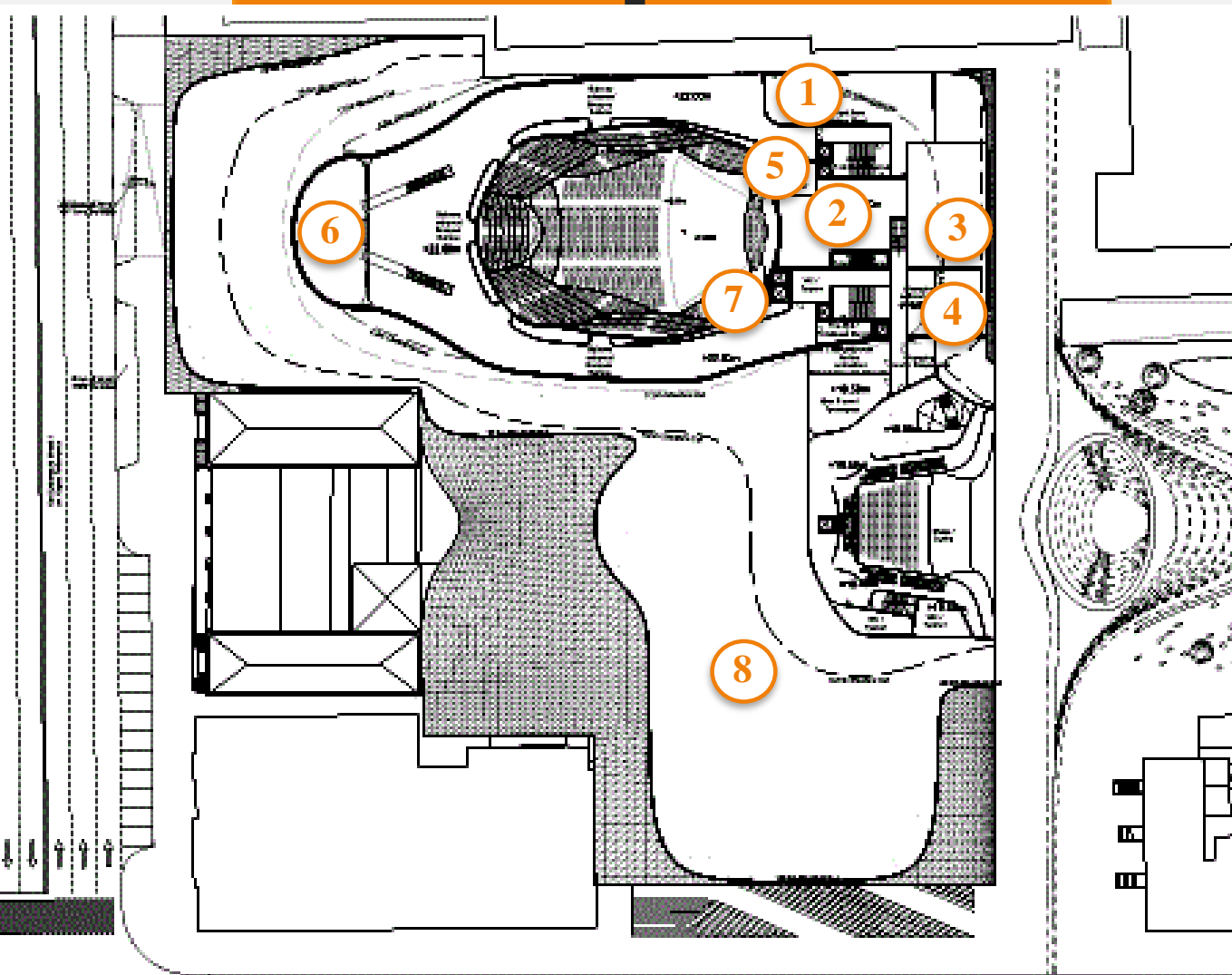


FIRST FLOOR PLAN

- 1- LARGE CONCERT HALL
- 2- SMALL CONCERT HALL
- 3- RESTAURANT
- 4- RECEPTION
- 5- BAR
- 6- LANDSCAPE
- 7- EXISTING

The proposal will sit in a void between existing heritage buildings and Weiner Gardens, connecting with the adjacent landscape through a transparent glass façade opening towards a renovated amphitheatre for summer outdoor performances. As part of the project, the existing concert hall will be preserved and renovated as an “integral element of the new world-class facility.”



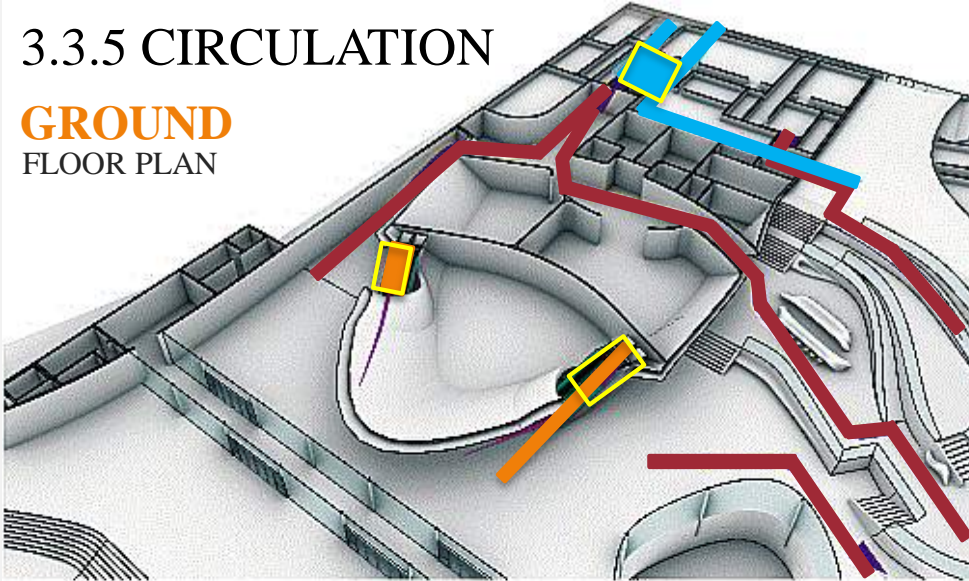


- 1- DRESSING ROOM
- 2- ARTIST AREA
- 3- REHEARSAL ROOM
- 4- GREEN ROOM
- 5- STORAGE
- 6- CLOAK ROOM
- 7- AIR CONDITIONAL STORAGE
- 8- STAFF PARKING

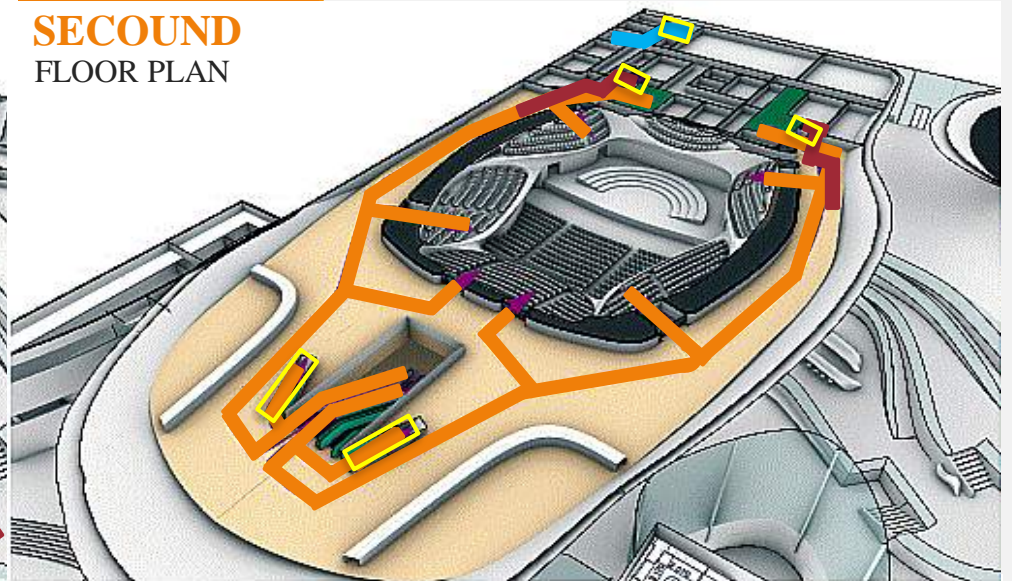
SECOUND FLOOR PLAN

3.3.5 CIRCULATION

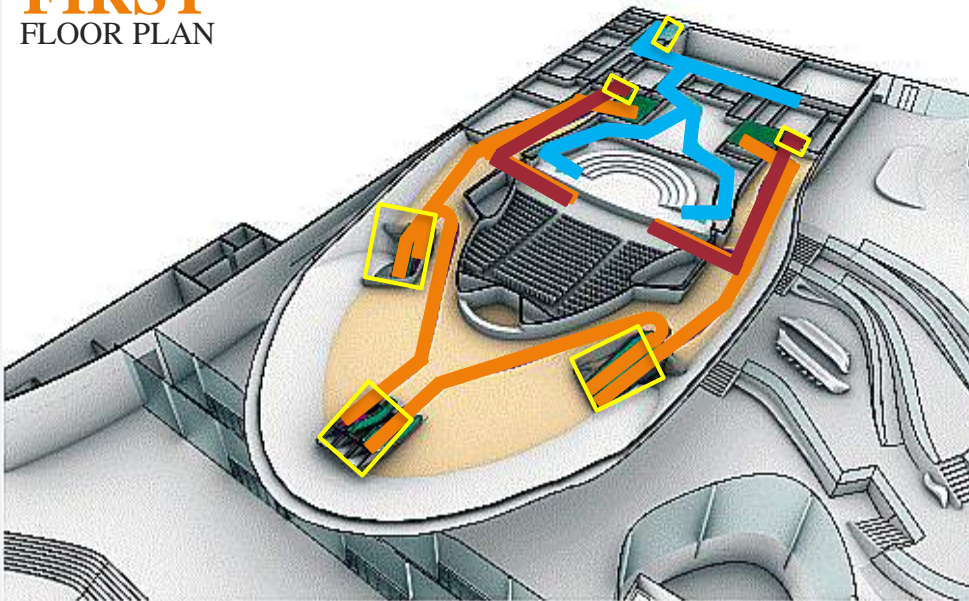
GROUND
FLOOR PLAN



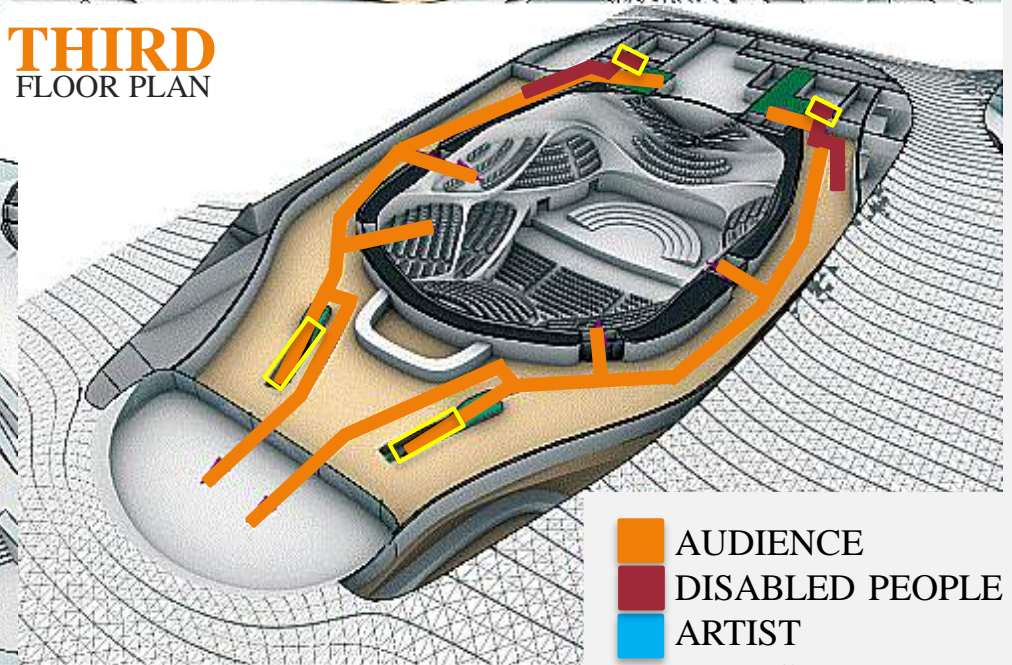
SECOND
FLOOR PLAN



FIRST
FLOOR PLAN



THIRD
FLOOR PLAN



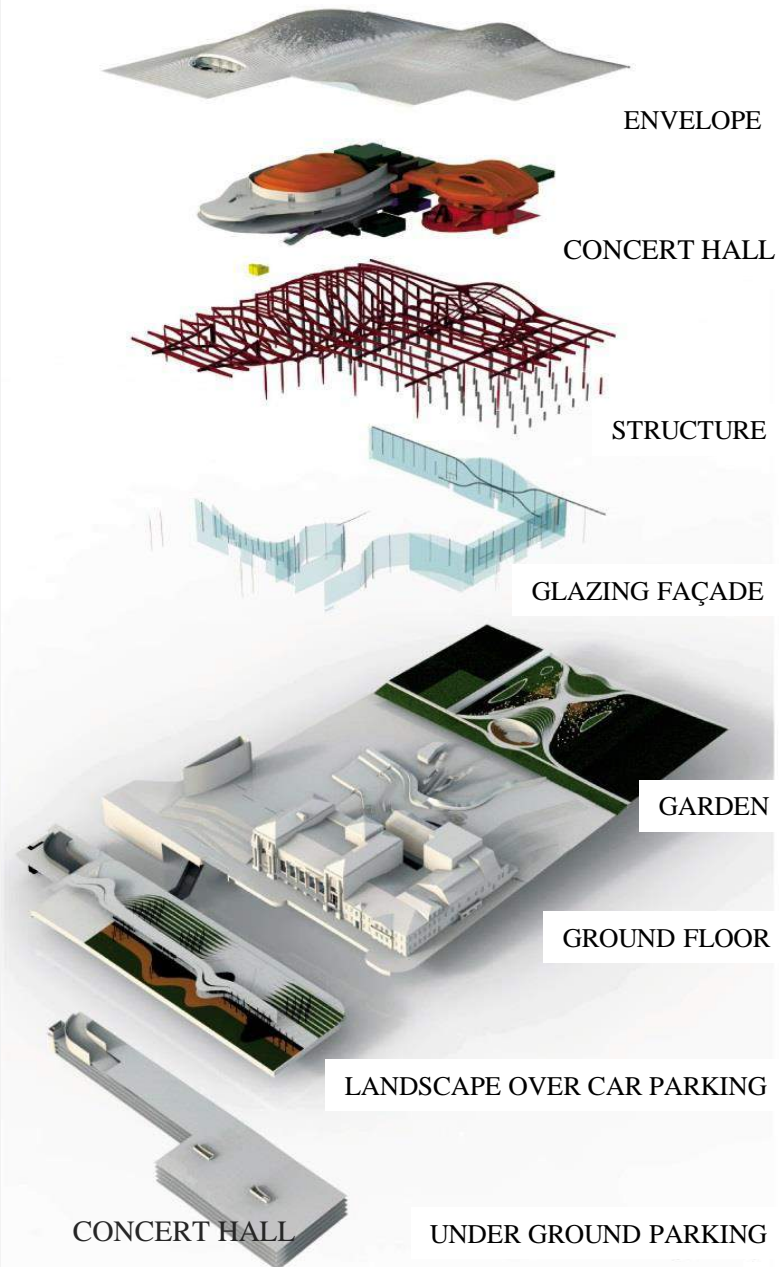
- AUDIENCE**
- DISABLED PEOPLE**
- ARTIST**
- VERTICAL CIRCULATION**

3.3.6 ABOUT STRUCTURE

WHAT'S THE CONCERT HALL STRUCTURE IS MADE FROM?

the building's roof, which takes its form from the shape of sound waves is made from steel structure.

Thin-shell is used for structure. thin-shell structures are light weight constructions using shell elements. These elements are typically curved and are assembled to large structures. Typical applications are fuselages of aero planes, boat hulls and roof structures in some buildings.



3.3.7 ELEVATION

Concept: the concept of the sound wave can be seen clearly .

Shape: it has organic shape and a terrace on the rooftop of the building will also have views across the city.

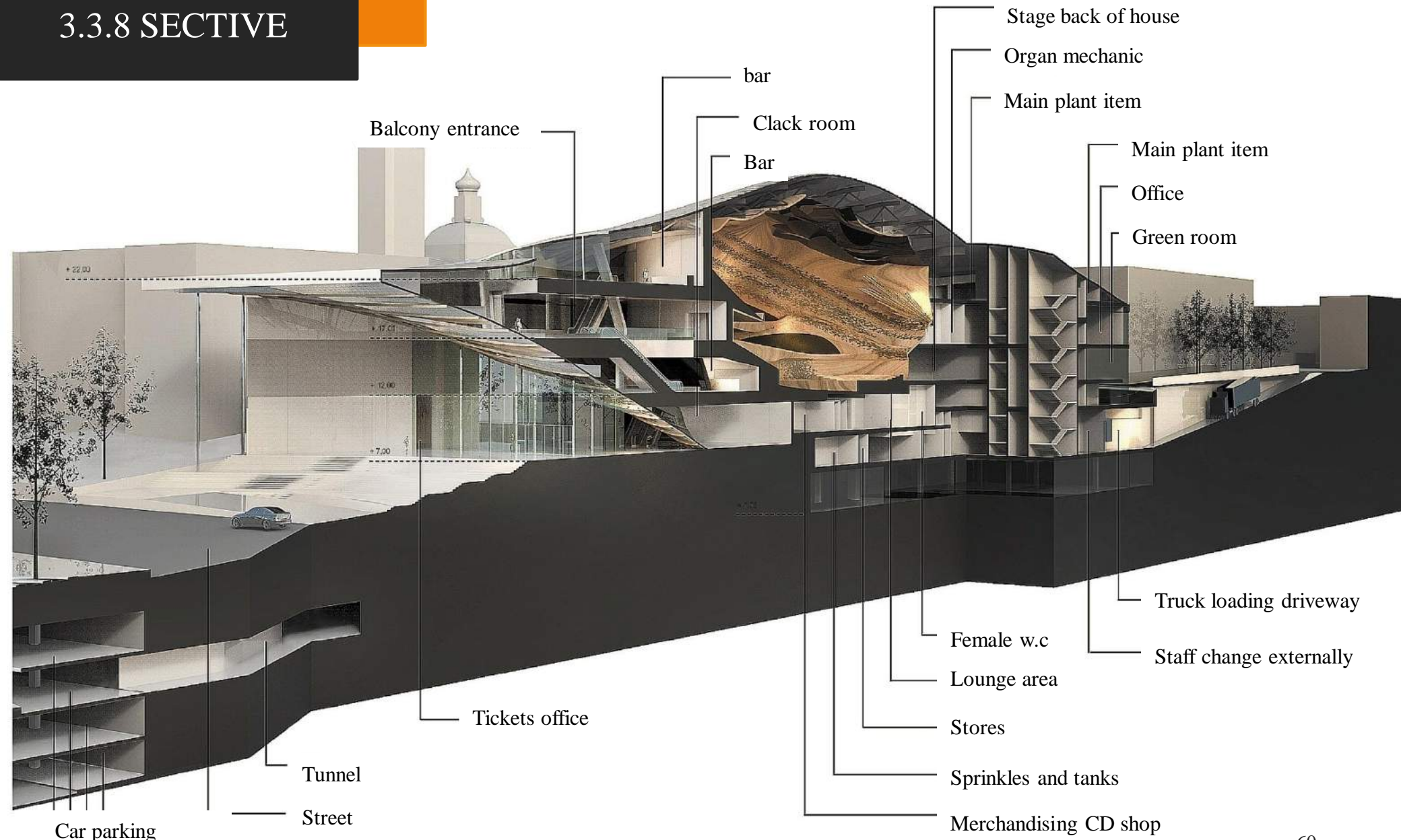
Materials: glass, steel, and concrete used for elevation

Lighting: lighting is used from inside of the lobby which gives good view from outside .

Colours : white and grey tones is used



3.3.8 SECTIVE





Lobby : The design re-interprets these physical acoustic properties to define spaces for the auditoria that are suspended within the canopy, appearing to float above the new civic plaza that is both the lobby of the Philharmonic Concert Hall and an enclosed urban square.

View : The smaller of the two concert hall will have a glass wall behind the stage that will give views out from the venue over the Weiner Gardens. This green space will be landscaped as part of the project. A terrace on the rooftop of the building will also have views across the city.



THE LARGER concert hall is 1400 seats
Which is surrounded by seats from all side and it has an area of 1800 square meter .

"The main features in this lobby are the volumes of the two auditorium, "The grand auditorium and the smaller auditorium come together to create an inverted topography that signals and signifies the movement of visitors and other guests alike through the public spaces."

THE SMALER concert hall is 600 seats
Which have a good view from one side and it has an area of 760 square meter .



| SPACE | AREA Square meter |
|-------------------------|----------------------|
| LARGE CONCERT HALL | 1800 |
| SMALL CONCERT HALL | 760 |
| LOBBY | 2000 |
| RESTAURANT | 620 |
| LOUNGE | 150 |
| BAR | 150 |
| DRESSING ROOM | 340 |
| ARTIST AREA | 360 |
| REHEARSAL ROOM | 240 |
| GREEN ROOM | 240 |
| CLOAK ROOM | 340 |
| STORAGE | 70 |
| AIR CONDITIONAL STORAGE | 140 |
| STAFF PARKING | 3200 |

DIMENSIONS

CHAPTER FOUR: COMPONENT

In this chapter , trying to explain the components of concert hall and the relationship between this component , trying to explain the strong , medium, weak relation between the main components and other components.

Chapter Intro:

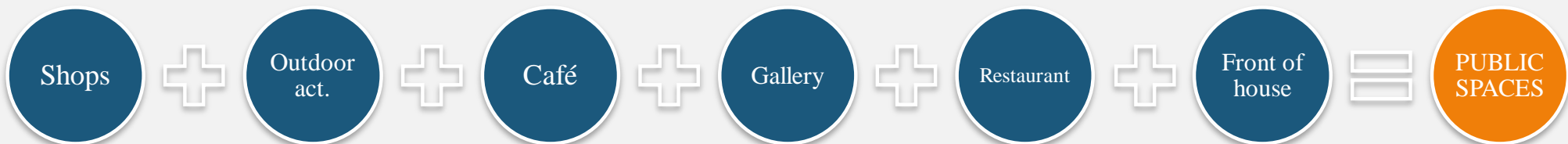
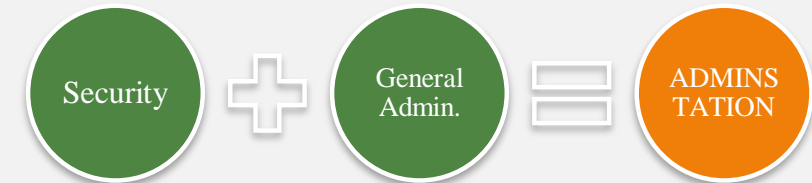
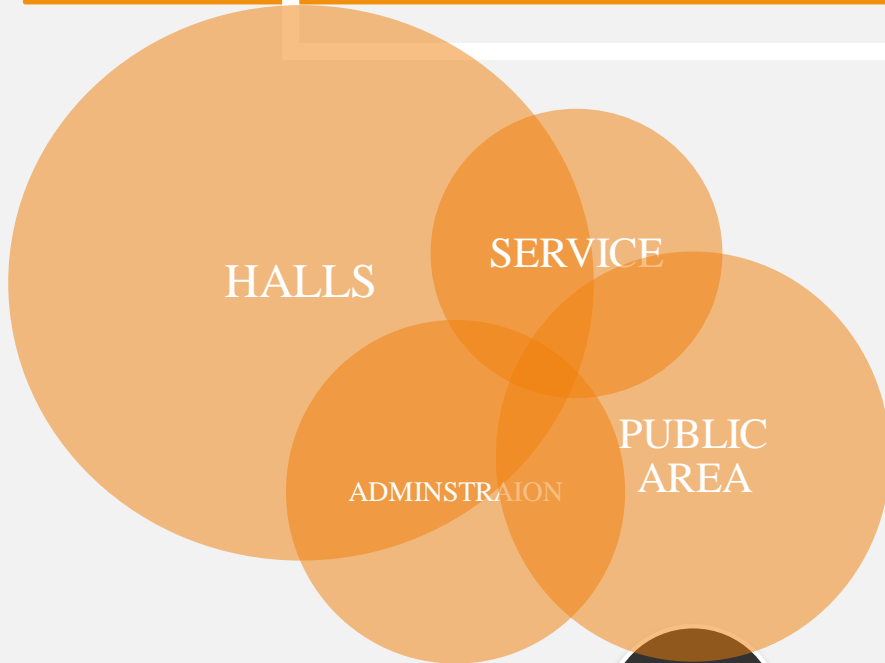
4.1 Components of concert hall

4.2 Relation between the space

4.1.1 COMPONENT OF THE CONCERT HALL

MAIN COMPONENT

- Halls
- Public area
- Administration
- Service



Halls

| Auditoriums HALL | Back of house | | |
|----------------------------|----------------------|--------------------------------|--------------------|
| Main Hall seating | Performer support | Workshop | Technical support |
| Multi purpose hall seating | Actor room | Decoration design workshop | Sound lobbies |
| Stage | Lockers showers | Decoration design manager | Control room |
| Balconies | Makeup & barber room | Carpenter work shop | Light control room |
| Orchestra pit | Dressing room | Metal work shop | Labor room |
| | Rehearsal room | Repair & maintenance Work shop | Engineers room |
| | Musician room | Storages | |
| | W.C + changing | W.C | |

Public area

| Front of house | Restaurant | Gallery | Cafeteria |
|--------------------|----------------------|----------------------|-------------------|
| Entrance vestibule | Fine dining area | Maintenance workshop | Main sitting area |
| Main lobby | Kitchen | Storage | Kitchen |
| Main foyer | Workers entrance | | w.C |
| Coat check | Storage | | |
| Retail area | Refrigerated Storage | | |
| Box office | | | |
| office | | | |
| Gate control room | | | |
| W.C | | | |

Administration

General administration

Manager

Secretary

Manager assistant

Meeting hall

Offices

Account manager

Account staff

Cashier

w.C

Security

Security manager

Staff rest room

Storage

Service

Electrical

Generator room

Transformer room

Maintenance room

Control room

Mechanical

Boiler chiller rooms

Control room

Water supply

Water pumps

Water tanker storage

Sewage treatment

Engineering spaces

Engineering rooms

Rest room

Lockers and showers

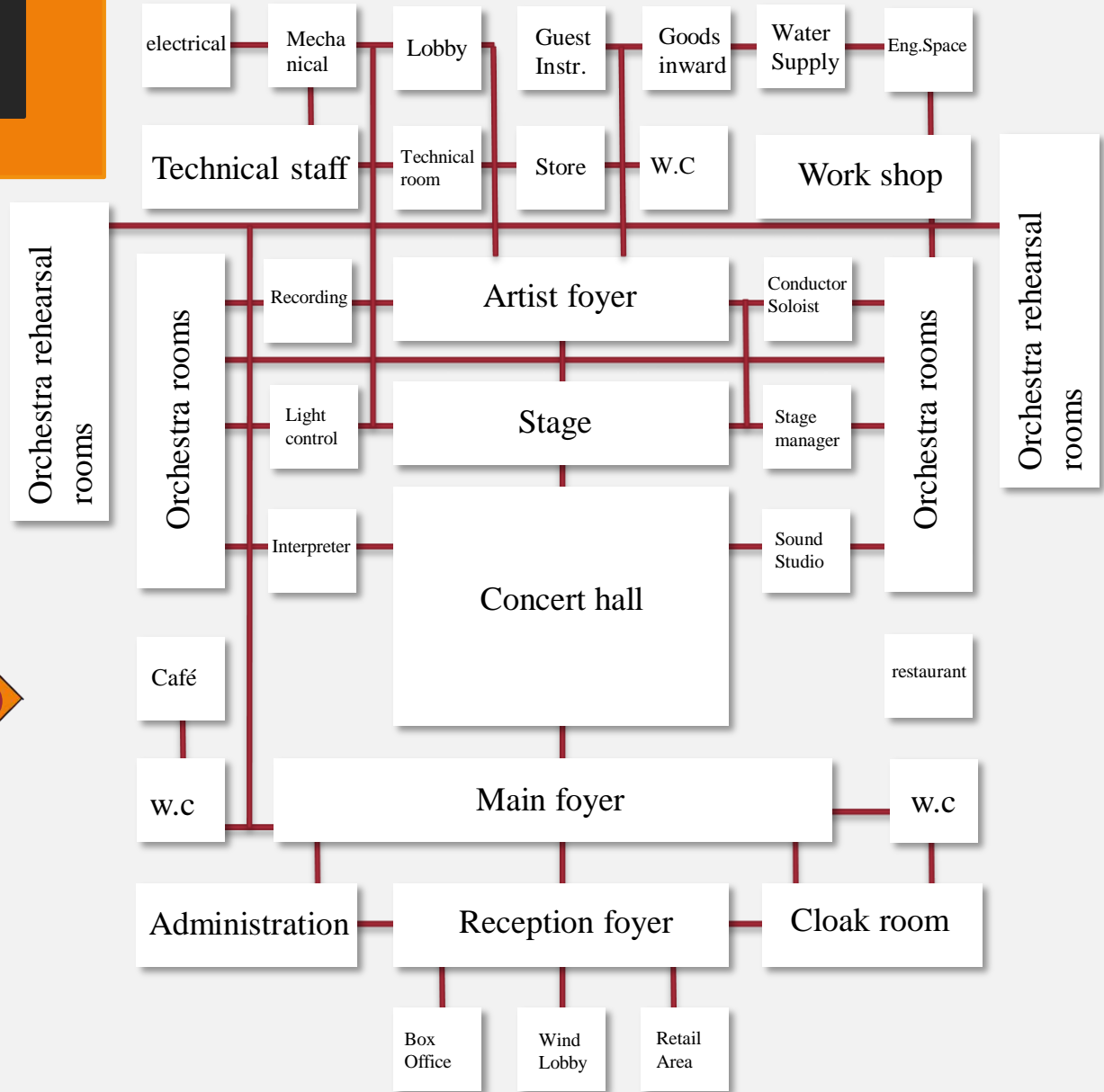
4.1.1 RELATION BETWEEN COMPONENT

SPACE MATRIX



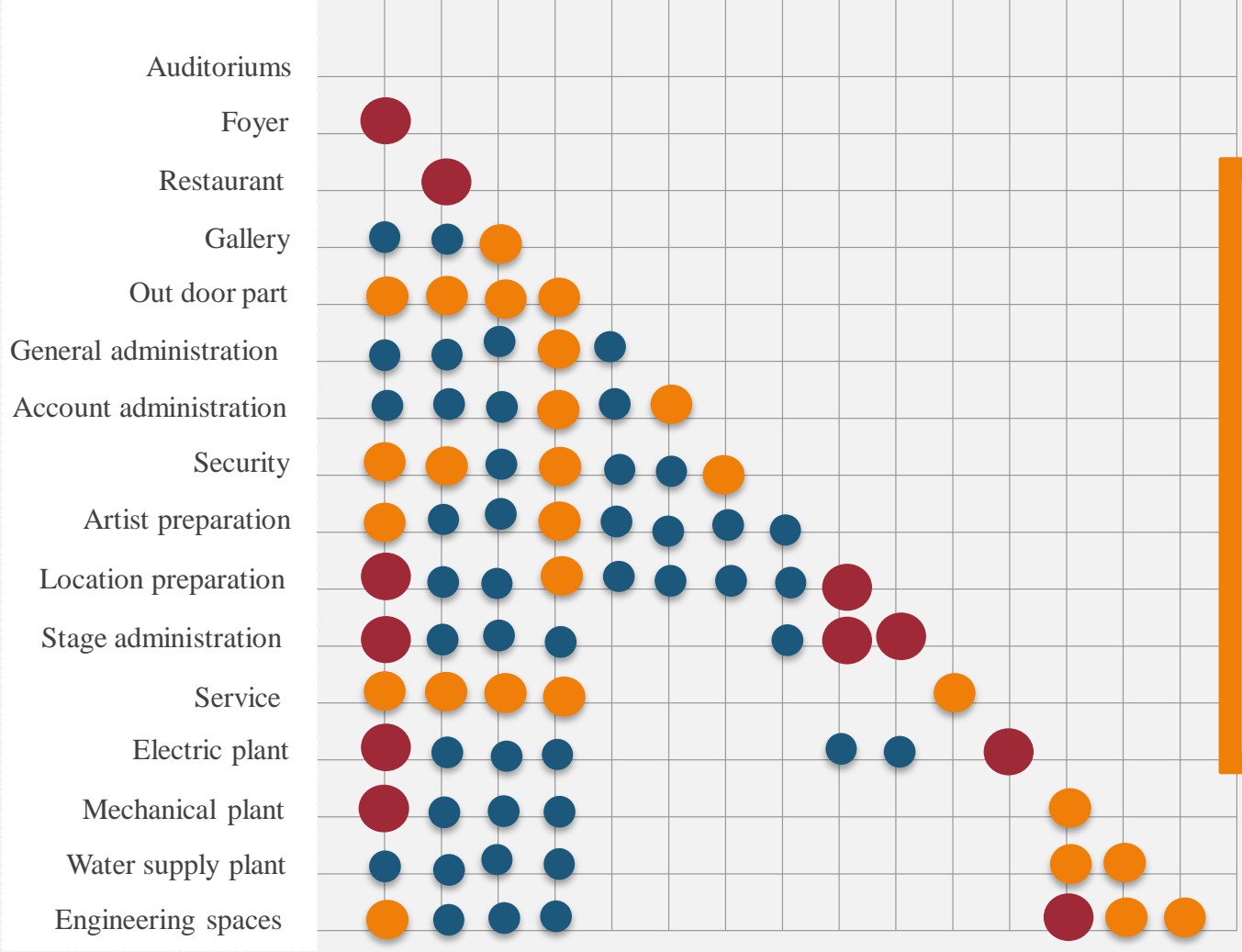
- Strong
- ◐ Medium
- Weak

CONCERT HALL



4.1.2 RELATION BETWEEN COMPONENT

Auditoriums
Foyer
Restaurant
Gallery
Out door part
General administration
Account administration
Security
Artist preparation
Location preparation
Stage administration
Service
Electric plant
Mechanical plant
Water supply plant
Engineering spaces



● **STRONG**
● **MEDIUM**
● **WEAK**

Matrix to explain the relationship between the secondary component of the concert hall. From strong to weak relation between them .

CHAPTER FIVE: SPACE PROGRAM

Creating an architectural spaces program has developed as an activity related to, but distinct from, architectural design and creating an adequate space program is almost the first step towards the actual design process of any project, let alone if the project was first of its kind, in this case the procedure must be very specific, systematic and considerate to every aspect. Also the achievement of the goals will be made easy or difficult, real or mirage, by the characteristics of the spaces program as a first step prior .

Chapter Intro:

5.1 Capacity calculation

5.2 standard

5.3 Table

5.1 THE CAPACITY OF THE PROJECT

FACTORS THAT CONTROL THE SIZE OF THE PROJECT :

The calculation phase will depend on three major factors. the first will calculate the amount of seats' in the standards. and the second phase will depend on the population of the city . the third phase will be the impact of the similar in category projects and their rational relevance to the concert hall.

- The population of Erbil city and the average of annual increase
- Number of similar project in the city .
- Number of seats in the project that Erbil city needs.
- Discussions about concert halls often revolve around the requirement to be of an international standard, balanced against the need to be “world-class”.
- ‘World class’, on the other hand, often refers to architectural impact and the building’s standing in the city and wider world.

SPACE PROGRAM CALCULATION

THE CALCULATION OF THE PROJECT DEPEND ON :

- Erbil ministry of cultural standards.
- Standards .

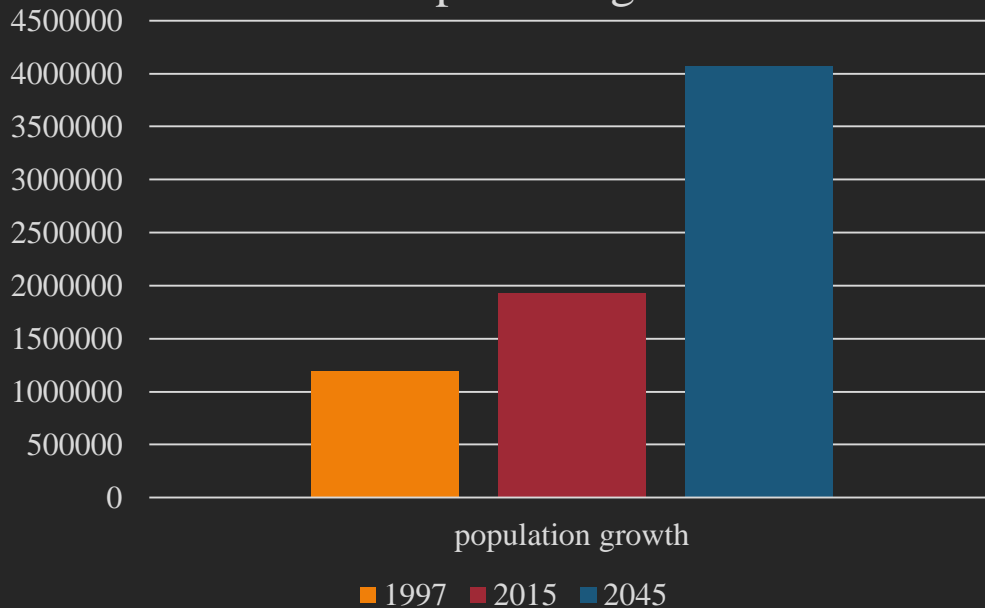


POPULATION ANALYSIS

The population of Erbil city is estimated in (2015) as 1,924,877 people .
The average annual increase of population of Erbil is about 3 % per year .
In other word , it is about 40,494 person per year .

But we should neglect the age between (0-4) of population that not coming to the museums, so According to Body count of Kurdistan region the total population without (0-4) =1676899 p.

Population growth



| Total | Female | Male | Age |
|---------|--------|--------|-------|
| 247978 | 121312 | 126666 | 0-4 |
| 260875 | 127219 | 133656 | 5-9 |
| 208348 | 100219 | 108129 | 10-14 |
| 229244 | 110968 | 118276 | 15-19 |
| 213620 | 105313 | 108307 | 20-24 |
| 172435 | 85635 | 86800 | 25-29 |
| 139589 | 69982 | 69607 | 30-34 |
| 117438 | 56918 | 60520 | 35-39 |
| 80821 | 41156 | 39665 | 40-44 |
| 51331 | 28947 | 22384 | 45-49 |
| 62255 | 32106 | 30149 | 50-54 |
| 41209 | 21373 | 19836 | 55-59 |
| 27054 | 13770 | 13284 | 60-64 |
| 25132 | 13460 | 11672 | 65-69 |
| 18820 | 9778 | 9042 | 70-74 |
| 16256 | 8397 | 7859 | 75-79 |
| 12472 | 7088 | 5384 | 80+ |
| 1676899 | | | TOTAL |

$$P_{\text{future}} = P_{\text{present}} (1+r)^n$$

- $P_{2045} = P_{2015} (1+0.03)^{30}$
- $P_{2045} = 1,676,899(1+0.03)^{30}$
- $P_{2045} = 4,070,274$

| No. of city population | seat/1000 person |
|------------------------|------------------|
| 200-350,000 | 5-6 |
| 350-500,000 | 4-5 |
| More than 500,000 | 3 |



So we take 3 seat/1000 person

No. of seats that Erbil need now = $3/1000 * 1,676,899 = 5030$ seats

No. of seats that Erbil need until 2045 = $3/1000 * 4,070,274 = 12,210$

Number of the seat that we have in Erbil city:

1. Media hall contain 1000 seats
2. M. Saad hall contain 1200 seats
3. Cultural hall contain 850 seats
4. Peshawa theatre contain 800 seats
5. Gall hall contain 500 seats

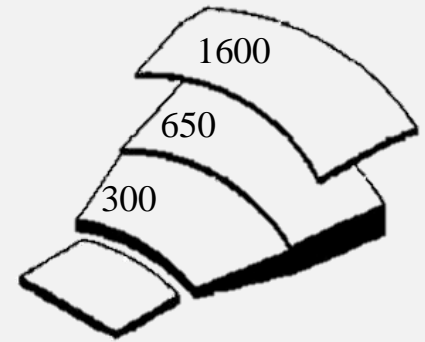
So we have 4350 seats in Erbil city

Number of seat $(12/274 - 4350) = 7860$

The total number of seats that cultural projects need in 2045 in Erbil city is 7860 seats

AUDIENCE CAPACITY

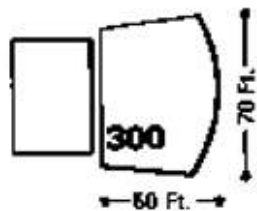
How many seats? From international standard of concert hall there are three phases



Phase one: 300 SEATS



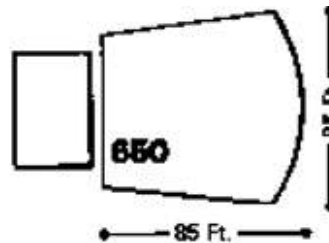
- For technical reasons 300 seats represent a small legitimate drama house for a modest, local community audience.
- It offers economical production, which in turn encourages exploration and frequent turnover for varied experience and participation.



Phase two: 650 SEATS



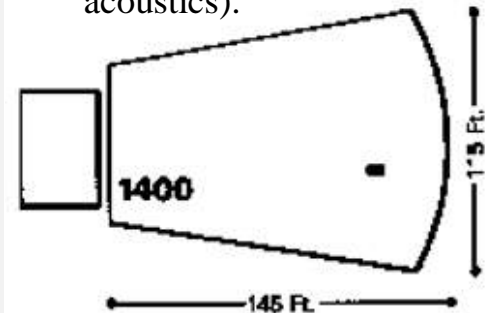
- Because it verges on the limit of optimum vision conditions in a Frontal house, 650 seats represent a large legitimate hall.
- Is too large for “serious” plays, and too small for musicals which consistently sell out.



Phase three: 1400 seats & more



- . By American standards 1400-seats represents a large recital ensemble room, or a medium capacity concert hall.
- Most recent symphony halls, partly for economic reasons, seat **2300-2500** (a practical upper limit for Frontal design with natural acoustics).



According to similar examples

If the city population was more than 1 million , the auditorium seat number will be between 1,400 to 2,500 seats in total (**phase 3**) , split between a stalls level and balconies wrapping around the sides and back. It is usual for the auditorium to have a volume of between 12 m³ to 15m³ per seat.



- Population: 1.6 million
- 2000 seats



- Population: 4 million
- 2,265 seats



- Population: 320,000
- 950 seats

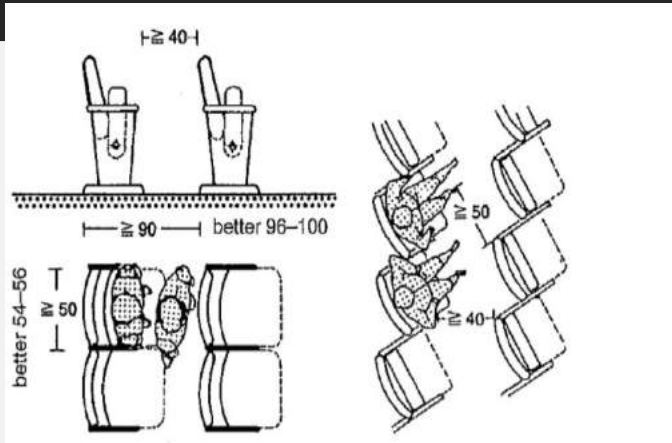
Conclusion :

The concert hall should have nearly have 2000 seats according to international standards and similar examples .

- The main hall with 1400 seats
- And multi purpose hall with 650 seats

The number of seats required in Erbil until 2045 is 7860 seats so this project isn't be enough and should build other similar projects.

5.2 STANDARD

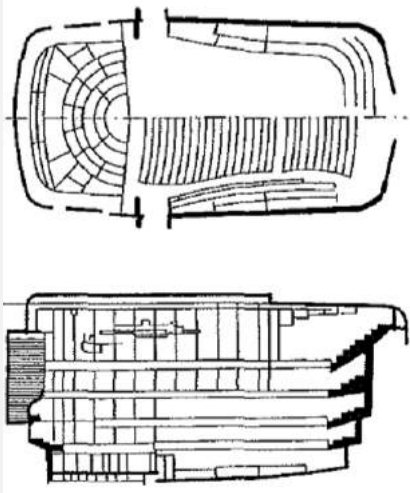


Seating capacity in general, the maximum capacity of an auditorium depends on the FORM SELECTION, and on aural and visual limitations set by the type of production. Other factors include ,levels , sightlines, acoustic, circulation and seating density as well as size and shape of the platform/stage. And it is 1.2-1.5 m³/per person

Orchestra size and layout :large symphony orchestra with 60-150 musicians this determine the additional space requirement on the stage 180 m²

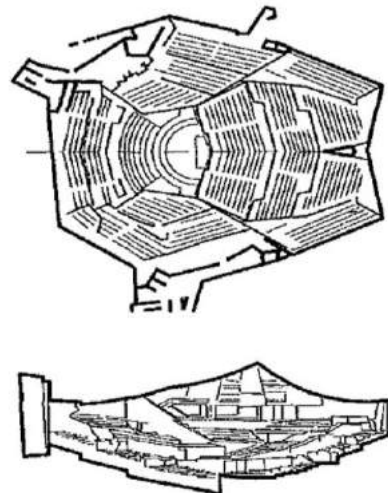
Orchestra pit :it is about 120 m²

BLOCK FORM

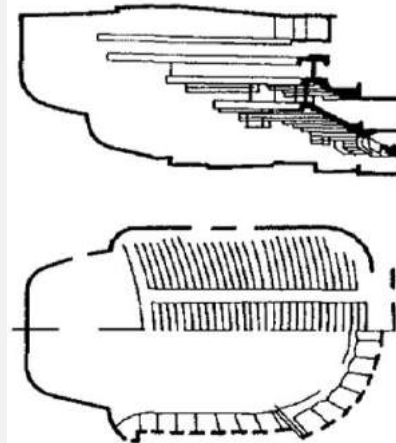


CONCERT HALL

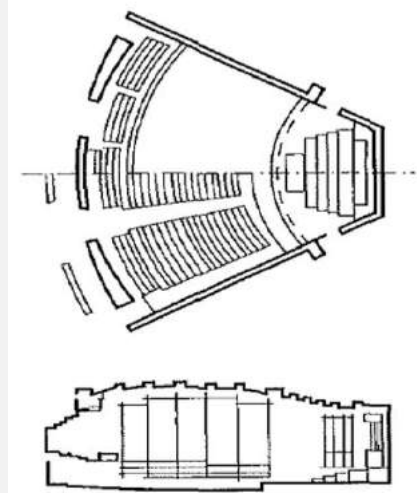
ARENA FORM

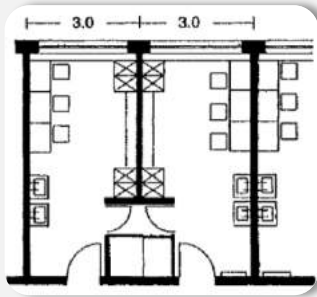


HORSESHOE FORM

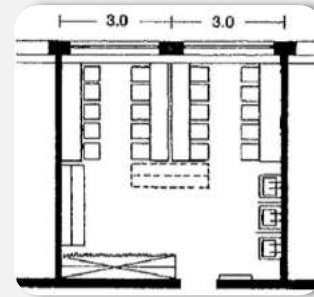


FAN SHAPE

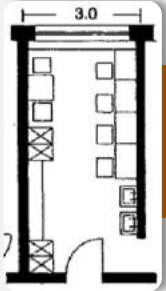




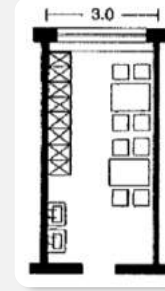
Soloist dressing room= $3.8-5\text{m}^2$ /person



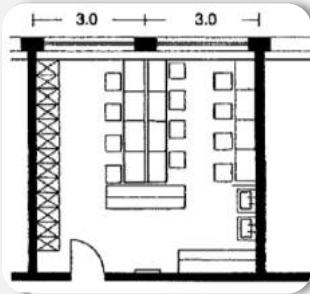
Additional Chorus dressing room= 1.65m^2 /person



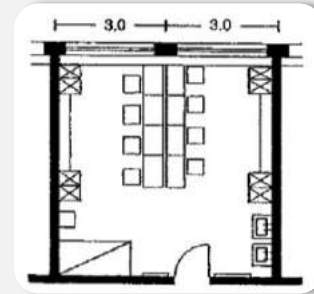
Soloist dressing room= 5m^2 /person



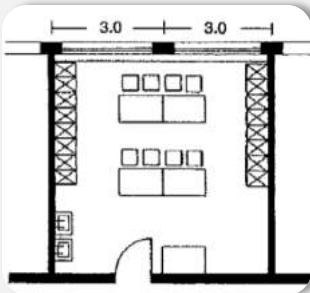
Changing and rest room for technical staff



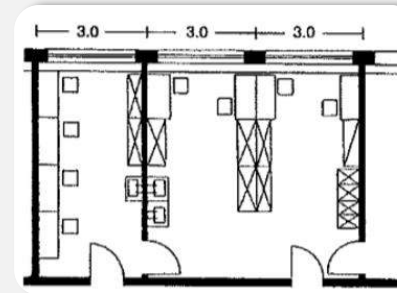
chorus dressing room= 2.75m^2 /person



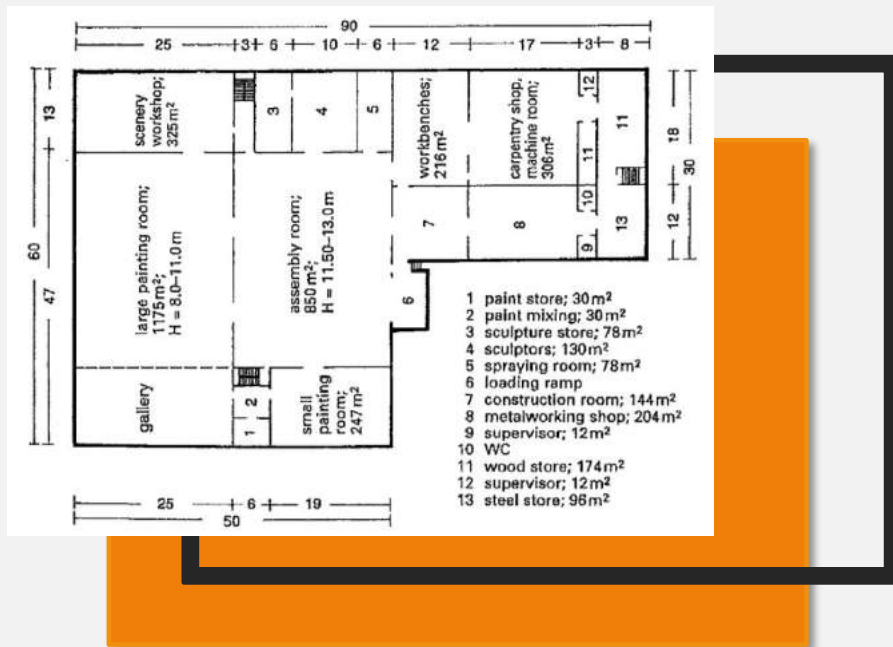
Ballet group dressing room= 4m^2 /person



Orchestra players dressing room = 2m^2 /person

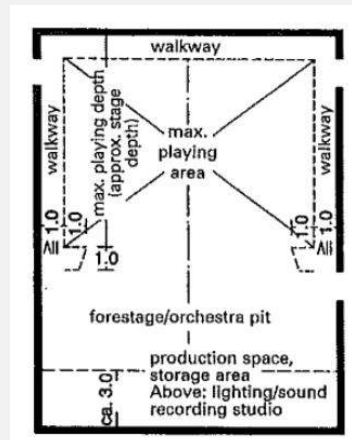


Makeup room and work room

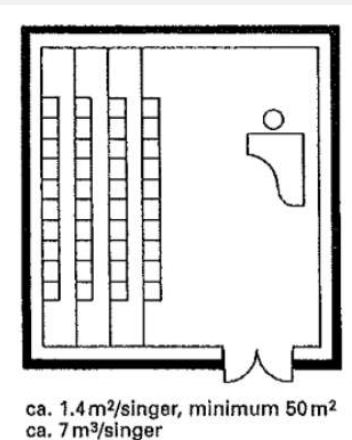


- Painting room: The floor area must be designed to accommodate two large backdrops or 'cycloramas'. The average size of a cyclorama is 10 x36 m. It must be possible to subdivide the room with a thick curtain for spraying work. The painting room is located next to the sewing room (with a size about 14 of the painting room) joining the pieces of material.
- Carpenter's shop: Divided into bench and machine rooms, it has wooden floors and an adjoining timber store for 3-10 productions.
- Upholstery: approx. 1/10 area of painting room.
- Metalwork: as carpenter's shop, screeded floor.
- Sculpture workshop.

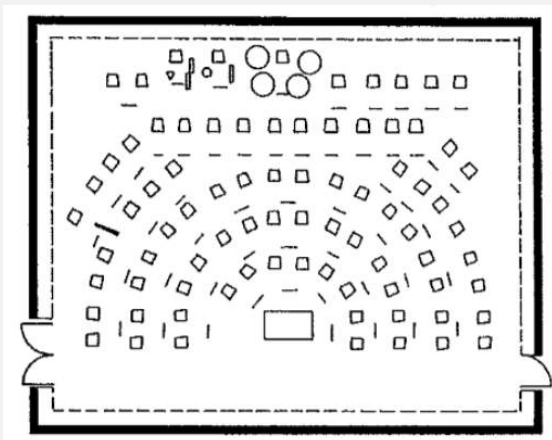
Rehearsal rooms: Every halls needs at least one rehearsal stage to back up the main stage. For example, The dimensions should correspond to the main stage. Typical floor plan of the rehearsal stage of a traditional theatre - Multipurpose halls and concert hall also require: orchestra rehearsal room - chorus rehearsal room, soloist rehearsal room and ballet room.



Large rehearsal stage



Chorus rehearsal room



Orchestra rehearsal room

5.3.3 HALLS TABLE

| No. | Space Name | User | Standard area m ² /P | No of spaces | Area in m ² | Total area m ² |
|-----|------------------|--------|---------------------------------|--------------|------------------------|---------------------------|
| 1 | Main Auditoriums | | | | | |
| 1.1 | Seating | 1400 | 1 | 1 | 1400 | 1400 |
| 1.2 | Orchestra area | 60-150 | 2 | 1 | 300 | 300 |
| 1.3 | Orchestra pit | 25-40 | 2.5 | 1 | 100 | 100 |
| | Total Area | | | | | 1800m ² |
| 2 | Secondary hall | | | | | |
| 2.1 | Seating | 650 | 1 | 1 | 650 | 650 |
| 2.2 | Stage | 30-60 | 1.2 | 1 | 80 | 80 |
| 2.3 | Pit | 16 | 2.5 | 1 | 40 | 40 |
| | Total Area | | | | | 770 m ² |

5.3.3 PERFORMAR SUPPORT TABLE

| No. | Space Name | User | Standard area m ² /P | Area in m ² | No of spaces | Total area m ² |
|------------|--------------------------------|------|------------------------------------|------------------------|-----------------|---------------------------|
| 2 | Back of house | | | | | |
| 2.1 | Performer support | | | | | |
| 2.1.1 | Soloist dressing room | 6 | 5 | 30 | 1 | 24 |
| 2.1.2 | Chorus dressing room | 20 | 1.65 | 33 | 3 | 99 |
| 2.1.3 | Orchestra dressing room | 8 | 2 | 16 | 10 | 160 |
| 2.1.4 | Ballet dressing room | 10 | 3.5 | 35 | 1 | 35 |
| 2.1.5 | Actor room | | 1.5 | 5 | 10 | 50 |
| 2.1.6 | Makeup room & barber room | 10 | 5.4 | 54 | 1 | 54 |
| 2.1.7 | Fashion design workshop | 4 | 15 | 1 | 60 | 60 |
| 2.1.8 | Fashion design manager | 1 | 12 | 1 | 12 | 12 |
| 2.1.9 | Rehearsal room | 30 | 2 | 30 | 1 | 30 |
| 2.1.10 | Chorus rehearsal room | 60 | 1.4 | 84 | 1 | 84 |
| 2.1.11 | Orchestra rehearsal room | 80 | 2 | 160 | 1 | 160 |
| 2.1.12 | 1 bath for every dressing room | | | 3.6 | 15 | 54 |
| 2.1.13 | W.C | | | 4 | 2 | 8 |
| Total Area | | | | | | 830m ² |

5.3.3 WORK SHOP TABLE

| No. | Space Name | User | Standard area m ² /P | Area in m ² | No of spaces | Total area m ² |
|--------|---------------------------------|------|---------------------------------|------------------------|--------------|---------------------------|
| 2 | Back of house | | | | | |
| 2.2 | Work shop | | | | | |
| 2.2.1 | Decoration design Workshop | 6 | 15 | 90 | 1 | 90 |
| 2.2.2 | Decoration design manager | 1 | 20 | 20 | 1 | 20 |
| 2.2.3 | Carpenter work shop | | | 300 | 1 | 300 |
| 2.2.4 | Metal work shop | | | 200 | 1 | 200 |
| 2.2.5 | Steel store | | | 96 | 1 | 96 |
| 2.2.6 | Wood store | | | 174 | 1 | 174 |
| 2.2.7 | Repair and maintenance workshop | | | 325 | 1 | 60 |
| 2.2.8 | painting room | | | 1000 | 1 | 1000 |
| 2.2.9 | Spraying room | | | 78 | 1 | 78 |
| 2.2.10 | Gallery | | | 250 | 1 | 250 |
| 2.2.11 | W.C | | | 4 | 2 | 8 |
| | Total area | | | | | 2,276 m ² |

5.3.3 TECHNICAL SUPPORT TABLE

| No | Space name | User | Standard aream ² /P | Area in m ² | No of spaces | Total area |
|------------|--------------------------|------|--------------------------------|------------------------|--------------|-------------------|
| 2 | Back of house | | | | | |
| 2.3 | Technical support | | | | | |
| 2.3.1 | Sound engineer room | 1 | 12 | 12 | 1 | 12 |
| 2.3.2 | Sound control room | 4 | 4 | 16 | 1 | 16 |
| 2.3.3 | Lighting engineer room | 1 | 12 | 12 | 1 | 12 |
| 2.3.4 | Lighting control room | 4 | 4 | 16 | 1 | 16 |
| 2.3.5 | Mechanical engineer room | 1 | 20 | 20 | 1 | 20 |
| 2.3.6 | Lockers + showers | 3 | 2 | 6 | 2 | 12 |
| 2.3.7 | General storage | | | | | 200 |
| 2.3.8 | Receive and control deck | | | | | 20 |
| 2.3.9 | Sells manager | 1 | 12 | 12 | 1 | 12 |
| 2.3.10 | Cleaners room + storage | | | | | 12 |
| 2.3.11 | Film operation + storage | | | | | 24 |
| 2.3.12 | Labors restroom | 12 | 3 | 36 | 1 | 36 |
| 2.3.13 | Translator Room | 4 | 12 | 48 | 1 | 48 |
| 2.3.14 | W.C | | | 4 | 6 | 24 |
| TOTAL AREA | | | | | | 464m ² |

5.3.3 FRONT OF HOUSE TABLE

| No. | Space Name | User | Standard area m ² /P | Area in m ² | No of spaces | Total area m ² |
|------|-------------------------------|------|------------------------------------|------------------------|-----------------|------------------------------|
| 3 | Front of house | | | | | |
| 3.1 | Main lobby | 2000 | 1 | 2000 | 1 | 2000 |
| 3.2 | Main foyer | 1400 | 0.6 | 840 | 1 | 840 |
| 3.3 | Secondary lobby | 650 | 0.6 | 390 | 1 | 390 |
| 3.4 | Coat check Main hall | 1400 | 0.08 | 112 | 1 | 112 |
| 3.5 | Coat check Multi purpose hall | 650 | 0.08 | 50 | 1 | 50 |
| 3.6 | Retail area | | | | | 100 |
| 3.7 | Box offices & info | 2 | 4 | 8 | 3 | 24 |
| 3.8 | Reception desk | 2 | 6 | 12 | 2 | 24 |
| 3.9 | Check room | | | 15 | 2 | 30 |
| 3.10 | Gallery & storage | 600 | 1.3 | 780 | 1 | 780 |
| 3.11 | W.C for women main hall | 840 | | 3 | 20 | 60 |
| 3.12 | W.C for men main hall | 560 | | 4 | 10 | 40 |
| 3.13 | W.C for women secondary hall | 390 | | 3 | 9 | 20 |
| 3.14 | W.C for men secondary hall | 260 | | 4 | 5 | 20 |
| 3.15 | Wheel chair w.c | 2 | | 6 | 2 | 10 |
| | Total area | | | | | 4,500m ² |

5.3.3 RESTAURANT AND CAFETERIA TABLE

| No. | Space Name | User | Standard area m ² /P | Area in m ² | No of spaces | Total area m ² |
|-----|----------------------|------|---------------------------------|------------------------|--------------|---------------------------|
| 4 | Restaurant | | | | | |
| 4.1 | Entrance | 1 | 1 | 15 | 1 | 15 |
| 4.2 | Fine dining room | 500 | 1.6 | 800 | 1 | 800 |
| 4.3 | Services platform | 10 | 3 | 30 | 1 | 30 |
| 4.4 | Kitchen | | | 200 | 1 | 200 |
| 4.5 | Refrigerated storage | | | 15 | 3 | 45 |
| 4.6 | Storage | | | 15 | 3 | 45 |
| 4.7 | Workers rest room | 10 | 1.5 | 15 | 1 | 15 |
| 4.8 | W.C | | | 4 | 5 | 20 |
| | Total area | | | | | 1,200 m ² |

| No. | Space Name | User | Standard area m ² /P | Area in m ² | No of spaces | Total area m ² |
|-----|-------------------|------|---------------------------------|------------------------|--------------|---------------------------|
| 5 | Cafeteria | | | | | |
| 5.1 | Main sitting area | 300 | 1.2 | 360 | 1 | 360 |
| 5.2 | CAFÉ bar | 40 | 1 | 40 | 1 | 40 |
| 5.2 | Kitchen | | | 100 | 1 | 100 |
| | Total area | | | | | 500 m ² |

5.3.3 ADMINISTRATION TABLE

| No. | Space Name | User | Standard area m ² /P | Area in m ² | No of spaces | Total area m ² |
|------|-------------------|------|---------------------------------|------------------------|--------------|---------------------------|
| 6 | Administration | | | | | |
| 6.1 | Manager | 1 | 1 | 30 | 1 | 30 |
| 6.2 | Secretary | | | 30 | 1 | 30 |
| 6.3 | Manager assistant | | | 20 | 1 | 20 |
| 6.4 | Meeting hall | | | 50 | 1 | 50 |
| 6.5 | Office | | | 20 | 4 | 80 |
| 6.6 | Account manager | | | 30 | 1 | 30 |
| 6.7 | Account staff | 4 | 8 | 32 | 1 | 32 |
| 6.8 | Cashier | 1 | 16 | 16 | 1 | 16 |
| 6.9 | W.C | 3 | 1 | 2 | 6 | 12 |
| 6.10 | Total area | | | | | 300 m ² |
| 7 | Security | | | | | |
| 7.1 | Security | 1 | 1 | 24 | 1 | 24 |
| 7.2 | Staff rest room | 4 | 2 | 8 | 1 | 8 |
| 7.3 | Storage | | | | | 18 |
| | Total area | | | | | 50 m ² |

5.3.3 SERVICE TABLE

| No | Space name | User | Standard area m ² /p | No of spaces | Area in m ² | Total area m ² |
|------------|---------------------------------------------------------|------|---------------------------------|--------------|------------------------|---------------------------|
| 8 | Electric plant | | | | | |
| 8.1 | Generator room | | | | | 100 |
| 8.2 | Transformer room | | 30 | 2 | 60 | 60 |
| 8.3 | Maintenance room | | | | | 30-60 |
| 8.4 | Control room | | | | | 30 |
| 8.5 | Mechanical plant | | | | | |
| 8.6 | Boiler & chiller room + water pump + water tank storage | | | | | 100 |
| 8.7 | Control room | | | | | 40 |
| 8.8 | Water supply plant | | | | | |
| 8.9 | Sewage treatment | | | | | 100 |
| 8.10 | Engineering spaces | | | | | |
| 8.11 | Engineering rooms | | 12 | 3 | 36 | 72 |
| 8.12 | Rest room | | 2 | 3 | 12 | 24 |
| 8.13 | Lockers + showers | | 2 | 3 | 12 | 24 |
| Total area | | | | | | 610m ² |

Parking area :
 The total audience number is 2000.
 If 0.8 of people using public transportation 1800 will remain .
 If we assumed that one car used by 4 people it means $1800/4= 450$ car for audience parking
 And 50 for orchestra and staff .
 Total car number 500 car.
 Parking area 12,500

TOTAL AREA

This table shows a typical area breakdown for a 2,000-seat Concert Hall

| Spaces | | m ³ | area | % |
|-----------------------------------------------------------------------------------------|------------------------------------------------------|----------------|---------------|--------------|
| Auditorium including stage, stalls, balconies, orchestra pit, control | 2000 seats auditorium 15m ³ per person | | 2570 | 18.86 |
| Back of house including performer support , workshop , technical support | | | 3570 | 20.64 |
| Public space including front of house ,lobby , gallery , restaurant, café, shops | Foyer at 1m ² per person | | 6200 | 35.85 |
| Administration including general admin and security | | | 350 | 2.63 |
| Service including electrical , mechanical , water supply and engineering space | | | 610 | 3.52 |
| Net Internal Area | | | 13,300 | 76.92 |
| Front and back of house circulation | 20% | | 2,660 | 15.38 |
| Risers/ducts/lift shafts | 3% | | 399 | 2.3 |
| Internal structure, partitions and voids | 7% | | 931 | 5.38 |
| Grossing | 30% | | 3,990 | 23.07 |
| Gross Internal Area | | | 17,290 | 100 |

Reference

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Books

- Neufert , Ernst and Peter Neufert , Updated by Professor Johannes Kister
- time saver standard for building standard , Edited by JOSEPH De CHIARA and JOHN HANCOCK CALLENDER
- An Introduction to Architectural Design: Theaters & Concert Halls, Part 1
BY J. Paul Guyer, P.E., R.A., Fellow ASCE, Fellow AEI
- Cost model New-build concert halls An edited version of this article first appeared in Building magazine in July 2017



The background is a vibrant, abstract composition of various colors including orange, blue, green, red, and white, with a textured, painterly appearance. A solid orange rectangular box is centered horizontally and vertically, containing the text 'THANK YOU' in a white, serif, all-caps font.

THANK YOU

