

A SCHOOL OF MUSIC, DRAMA AND ART MUSEUM COMPLEX
FOR
KANSAS STATE UNIVERSITY
MANHATTAN, KANSAS

by *1264*

KEEYOUN CHO

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INTRODUCTION

Today in 1969, most colleges of Kansas State University are experiencing shortages in educational facilities because of the increase in enrollment during the decade of 1960-1969. The College of Arts and Sciences, and especially its Department of Music, has had the most serious loss of educational facilities. The losses by fire of the auditorium in 1965 and of Nichols Gymnasium in 1968 resulted in great losses by the department of both facilities and equipment.

Drama, a sub-department of the Department of Speech of the College of Arts and Sciences, has been handicapped along with the other sub-departments of the Department of Speech, by the auditorium fire and poor facilities. Also the Kansas State Art Collection-paintings, sculptures and other art works which have been collected for the past thirty or forty years by Kansas State University - has never had its own permanent space for display and safekeeping.

There is now a strong demand for a cultural center for the purpose of offering a more effective education in music and drama and to provide for extracurricular activities in music, drama and the fine arts for other schools and the community.

From such a view point, this cultural center should be designed to meet requirements for a concert hall, theatre, educational facilities for both music and drama, and an art museum.

The following topics are described in this report as a

main design concept for a Cultural Center:

Historical background of cultural aspects in Kansas State
University

Discussion of similar facility

General considerations and design process

Environmental technology and miscellaneous considerations

Presentation of design works

HISTORY OF MUSIC, DRAMA, AND THE K-STATE ART COLLECTION

A. Department of Music

In 1863 Bluemont Central College was renamed Kansas State Agricultural College. In the Bluemont College, preparatory department courses in melodeon and piano had been offered. In the same year 1863, the music department was separated from the preparatory department, and Mr. J. Everts Platt became the professor of vocal music; in the next year Dr. C. Hubschman became a professor of instrumental music. In 1876, the music rooms were located in the shop building erected in 1875. They provided facilities for the increasing number of music students. Four rooms on the second floor of Mechanic's Hall were being used by the music department in 1881. In 1899, the office of the music department was moved into the farm office, and by 1900 the department occupied the entire building. In 1904, the Kansas State Agricultural College built a new auditorium which provided some facilities for the music department. In 1905 the music department moved into the new auditorium. In 1918, new studios were built on the second floor of the auditorium. In 1920, some practice rooms for the Department of Music were provided in the basement of Anderson Hall. In 1933, the department gave up the annex, a house on the south side of Anderson Avenue, which had been used for several years for practice and teaching. The Alpha Beta Hall in Nichols Gymnasium was divided into one waiting room and five practice room.

In 1947, the music department moved part of its facilities

into the Wareham Building across Anderson Avenue from the campus. After the Auditorium fire in January 15, 1965, music classes previously conducted in the auditorium were relocated in Nichols Gymnasium and the music annex. Music offices and class rooms were also relocated in the north end of East Stadium. The Music Department office was relocated on the second floor of Kedzie Hall. As indicated above, the facilities and equipment of the department have been located in eight campus buildings.

The fire forced the legislature to provide means to build a new auditorium which will also provide the space for music instruction. However, in rebuilding, a music wing has been added to enlarge instructional facilities. In the near future, a music wing of the auditorium will provide classrooms, rehearsal rooms, and department office. Although the new wing will not take care of the entire music department, it will replace the old auditorium space with better facilities, and will provide room for expansion. According to a planning authority for the university, plans for the music wing include a music library, two administrative offices, an instrument storage room, classrooms, and two organ classrooms. On the same level as the auditorium there will be a vocal and an instrumental library, as well as a storage room for instruments and also large vocal and instrumental classrooms. The new native stone building has the same location as the old auditorium.

B. Department of Drama

In 1897, the Department of Oratory, the present speech

department, was established by Professor Fredric A. Metcalf as its head. In 1903 the department was renamed the Department of Public Speaking. Presentation of dramatic productions on the initiative of students took place at an early date, and has been continued more or less enthusiastically ever since. Assistance was rendered by members of the faculty, and about 1920 general supervision of these presentations was taken over by the Department of Public Speaking; since then many members of the staff have devoted much time to the development of this form of public expression. Formal courses in dramatics have been offered in the department since 1923. According to the "Faculty Records" January 15, 1875, the Alpha Beta Society (literary society) provided public entertainment including the acting of a drama in the college chapel. In 1908, the KSAC (Kansas State Agricultural College) dramatic club, the first ancestor of the present K-State Players was organized. In 1915, this group became the Purple Masque Players, and for over twenty years was an active and much respected theatrical group. The group merged with local Manhattan citizens in 1926 to form the Manhattan Theatre. This group was very popular and well known for many years. As the former glory of the Purple Masque gradually dwindled and died out leaving the group composed almost entirely of townsfolk, there arose a need to incorporate a new organization for the students.

In 1943, the group, known as the Kansas State Players, was officially organized. Its initial nucleus was formed of people who desired to participate in dramatic production as an extra-

curricular student activity. Today, the Players no longer exist solely as an extracurricular student activity. The Players offer a laboratory for testing the practical application of dramatic theory and principles which are taught in the academic classes of the Speech Department. Before the fire, the auditorium was used for performances, rehearsals, and courses in acting, dancing, lighting, and setting. After the fire, the dramatic courses were offered in the performance theatre of the west stadium; a few lecture courses have been offered in Eisenhower Hall.

C. Art Museum

A university or a college is the center of cultural and art activities as well as being the cradle of knowledge. To accomplish this objective, a university must rely primarily on philanthropy for acquiring art collections and museums. The university museum has historical, symbolic and instructional functions.

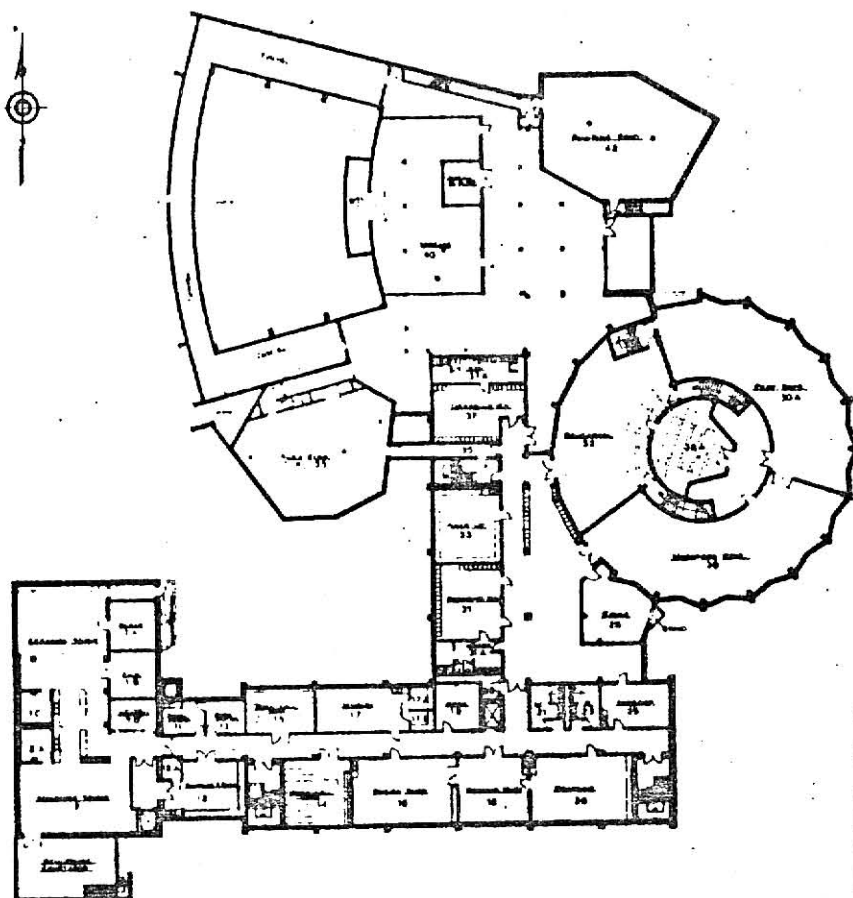
Unfortunately, Kansas State University has not had its own art museum since its establishment in 1863. However, since the completion of the K-State Union in 1956, the Exhibition Room of the Union has been the center for display of art works for Kansas State University and for its community. However the Kansas State Art Center Foundation has been created to secure funds for construction of a center to be used for the display and safe-keeping of art works. Groundwork for this program has been in the making for the past 40 years.

DISCUSSION OF SIMILLAR FACILITY

The Fine Arts Center of Washburn University, Topeka, Kansas

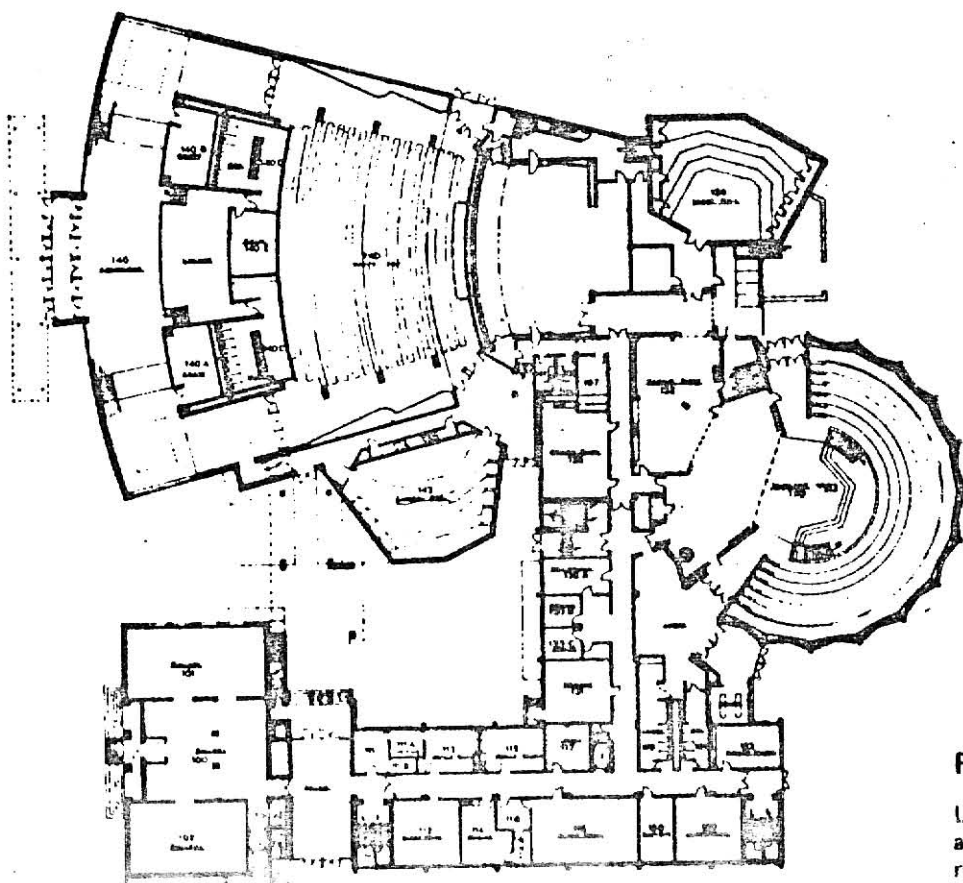
The new buildings for the Fine Arts Center of Washburn University were completed in 1968. By the serious damages of tornado in 1966, the Fine Arts Center lost its facilities and most of its equipment and collections. The new facilities designed by Van Doren, Hazard, Stallings, and Schnacke satisfy the physical and architectural requirements. The exterior walls are rich limestone which is the native stone of this State of Kansas.

The main facilities of the center are the concert hall, theatre, existing art gallery and three-story educational building. The continental seating concert hall has a capacity of 1200 seats. The chorus and orchestra rehearsal rooms are adjacent to the concert hall. This concert hall has the optimum acoustical conditions. The arena stage theatre has a capacity of 400 seats in circular plan and has the multi-purpose of instructional and experimental performances. The educational facilities accommodate the departments of music, drama and fine arts in three-story building which connects the old art gallery and the new concert hall and theatre. Dr. Verne Knudsen, University of California at Los Angeles was consultant in acoustical design for this Fine Arts Center.



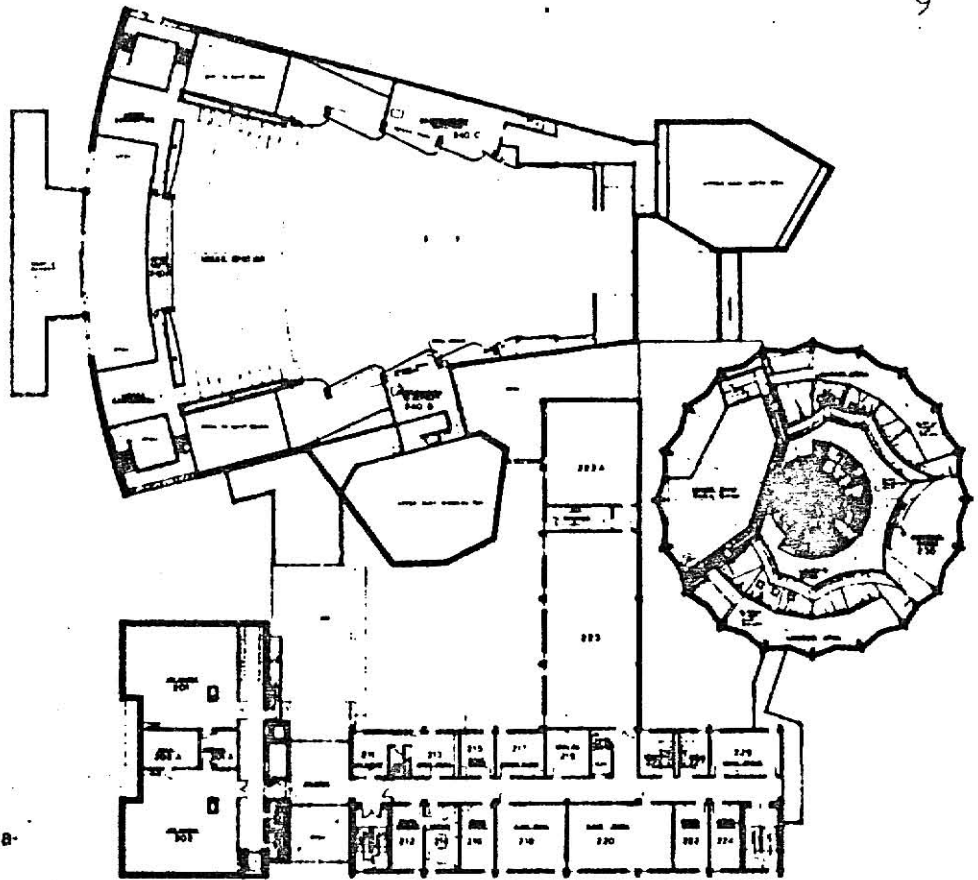
Basement

Wardrobe, property, music and permanent collection storage rooms; rehearsal, dressing and makeup rooms; drafting, design, machine, ceramics, jewelry and sculpture shops.



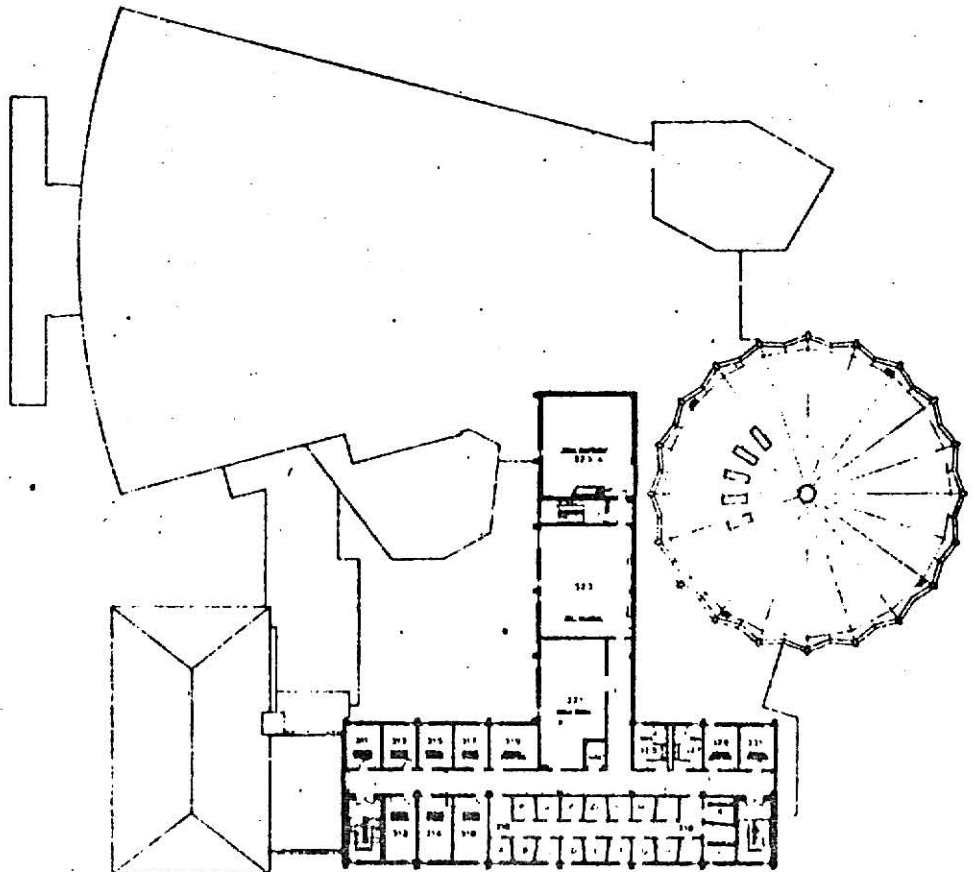
First Floor

Little theater, rehearsal rooms, scene and set design shops, galleries, classrooms, offices and concert hall.



Second Floor

Classrooms, control booths, observation platforms, studios.



Third Floor

Studios, practice rooms.

GENERAL CONSIDERATION

A. Site

A general consideration of the proposed site for a Cultural Center indicates it should be located in the south-east area of the campus; that is between Lover's Lane on the north and Vattier Drive on the south and between Manhattan Avenue on the east and the president's residence on the west. This site has little slope. It is very close to the new auditorium and within two minutes walking time from the Danforth Chapel. This site also has good approaches from the off-campus area on Vattier Drive and from the on-campus area across Oak Drive. It has access to the large parking lots to the south across Vattier Drive. This site establishes a Cultural Center encircled by the new auditorium, and chapel to the south and the Department of Fine Arts in Justin Hall north of Lover's Lane.

This site has approximately 6.3 acres. It has the advantage of existing trees and shrubs to enhance the landscape and to provide a sound barrier. Because this site is located in front of Anderson Hall in the center of the campus it will provide a good visual effect from Anderson Hall. The noise from Manhattan Avenue can be controlled by the dense trees and shrubs planted along the street and by use of good insulation for the exterior walls.

B. Functional Requirements

1. Department of Music facilities

a. Combination rehearsal-recital hall.

Provides accommodations for all choral groups from small ensembles to an oratorio chorus of 200 members.

Provides riser seating plus floor space for oratorio and large vocal-instrumental combination rehearsals (an orchestra of 60).

For a recital hall.

Seminar room for music department classes, preparatory students, summer camp, and director's workshop.

b. Instrumental rehearsal hall

It provides adequate rehearsal areas for the symphony orchestra, concert band, marching band, other bands, and wind and string instrument classes.

c. Vocal library

To house music folders, supplies for the performing choral group of the music department.

d. Instrumental library

To house instrumental music and related equipment.

e. Library supply and repair room

To house music repair, duplication equipment and musical supplies.

f. Instrument storage

Provides storage for large pieces of equipment used by the music department.

g. Organ studio

Provides teaching studio for music faculty for private lessons

and to conduct classes and seminars in organ and organ literature.

h. Music education classroom

Provides classroom space and physical equipment and needs for classes in music education.

i. Record listening room

Provides a space and facilities for record listening.

j. Department office

Department office room for files, supplies and administration.

k. Head studio office

Private office and conference room for department head.

l. Graduate studio

A classroom for graduate seminar courses, smaller advanced theory classes.

m. Vocal-instrumental studio

Teaching studio for faculty for private lessons.

n. Studio office

Teaching space and office space for certain faculty members whose studio must also serve as an office.

o. Practice room

Vocal and instrumental practice space for music students.

p. Ensemble practice room

Practice space for instruction and practice for ensembles as follows; trios, quartets, quintets, small brass and string ensembles, and choirs.

q. Classroom

Lecture space for music majors and qualified non-music majors in theory, composition, music history, conducting, instrumentation and orchestration, band administration, form and analysis.

r. Seminar room

Meeting facilities for faculty and students.

2. Department of Drama facilities

a. Drama main office

General office for administration and student records.

b. Head office

Attached to the main office.

c. Seminar and meeting room

Room for drama committee meetings, faculty meetings, seminars and other activities.

d. Faculty office

Faculty office room for study and office student advisory, and other purposes.

e. Graduate assistant office

Office room for graduate assistant for the purpose of study, research, student advisory and other work.

f. Graduate student studio

Studio for graduate students for the purpose of study, research, lecture and other activity.

g. Library

Department library for students and faculty with the dramatic bibliography and reading tables, chairs and stacks.

h. Lecture rooms

Classrooms of the general lecture type.

i. Lecture and demonstration room

Classroom for the purpose of lecture and acting demonstration.

Raised seating area and acting area.

j. Practice room

Large floor room for acting, dancing and fencing.

k. Medium-size performance hall

Proscenium type theatre seating 500 for the purpose of dramatic performance and practice with the facilities of stage, workshop, dress room, lighting equipment, custom shop and other necessary rooms.

3. Art Museum

a. Galleries

Large galleries for permanent display of paintings, sculpture and other art works.

b. Temporary exhibit room

Temporary display space for the fine art department activities, visiting art exhibits, and other campus art activities.

c. Special study room

Smaller, more intimate galleries for drawings and prints.

d. Meeting room

Meeting room for the art activities, the official meeting room for activities concerning the museum and other meetings.

e. Curatorial rooms and live stock storage

Rooms near to the galleries for the curatory and stock of art works.

f. Library

Space for having reading room and book stacks.

g. Administration office

General office for the museum administration.

h. Director's office

Director's official room.

i. Receiving, shipping, packing room

The space near to the curatorial rooms and live storages with the access for receiving and shipping.

j. Storages

The general storages for the miscellaneous articles.

DESIGN PROCESS

A. General Concept of a Cultural Center

This cultural center has two main functions. The first one is all the extracurricular cultural activities related to music, drama and the art museum. The second is the academic and educational aspects related to music, drama and the art museum. The public space for the first function will have three attractive buildings in harmony - the Concert Hall, the Drama Theatre and the Art Museum - around the plaza which is the introductory space for the cultural center. The educational space for the second one will contain both departmental buildings which are connected to the Concert Hall and the Drama Theatre.

In plan, the public space provides for the direct approaches from off-campus and from the core of the campus into the plaza. This plaza leads to the three main buildings, concert hall, theatre, and art museum, and to the inner court which also leads to the educational facilities of the departments of Music and Drama. This inner court is a more calm space and is a forum for the faculties and students. These two departments including the Concert Hall and the Drama Theatre are interrelated each other in their educational and extracurricular activities concerning with music and drama.

B. Concert Hall

The concert hall will provide for a versatile range of uses from concert performances to solo recitals. It will have a total of 920 seats. 680 seats of the total number will be provided by

the continental seats on the main floor, and 240 seats will be provided by the standard seats on the balcony. The intermission areas of the main floor and balcony floor will provide for cocktail lounges.

The lobbies have several entrances into the auditorium from both sides. The main rest areas for intermissions are located on the first floor. These three areas are the main public space. The stage area including the work shop at the backstage, and another service facility in the basement of the stage are the performing spaces. The performing space is directly connected with the rehearsal halls and practice rooms located in the music educational facilities.

In the plan, the elliptical form of the concert hall is repeated for the auditorium area. The acoustical problems such as sound foci can be solved by the use of acoustical panels along the curved wall and acoustical clouds at the ceiling. In elevation, the glass areas are treated by use of vertical louvers to shield them from direct sunshine.

Required Space and Footage

Main floor

a. Auditorium	5,856
b. Lobby	3,515
c. Toilets	294
d. Cloak room	329
e. Stairs	722
f. Corridors	992

g. Stage	2,328
h. Storage	94
i. Work shop	1,384

Total 15,512

Balcony

a. Balcony	2,705
b. Lobby	2,243
c. Toilets	294
d. Cloak room	329
e. Office	196
f. Stairs	854
g. Corridor	1,163
h. Work shop	330

Total 8,114

Basement

a. Locker room	574
b. Robe storage	260
c. Lounge	366
d. Green room	537
e. Toilets	294
f. Storage	503
g. Office	186
h. Coat room	77

i. Stairs	722
j. Mechanical room	325
k. Corridor	896

Total 4,737

C. Theatre

The drama theatre with a hexagonal plan is located at the north side of the plaza. The drama theatre has 500 seats and will provide for the dramatic performances of the curricular and extracurricular activities. The theatre is entered from two sides with the wide cross aisle giving access to the orchestra seats or stadium type seats at the rear.

The main entrance and intermission area have the cocktail bar, toilets, and cloak room. The auditorium is served by a second floor intermission area providing cocktail lounges for those seated in the stadium type of seats. This provides two areas with three cocktail lounges serving intermission crowds.

The proscenium type stage contains the scenery shop, make-up room, toilets, offices, and the backstage passway. The locker rooms, toilets with showers, lounge, green room, tailor shop, tailor storage, office rooms, mechanical room, and other facilities for effective performance are located below the stage area. All levels of the stage are directly connected by a corridor with the practice areas and the Department of Drama.

Required Space and Footage

1. First floor

a. Auditorium	4,909
b. Lobby	1,348
c. Cocktail bar	264
d. Cloak room	186
e. Toilets	404
f. Stairs	336
g. Corridor	461

Total 7,908

2. Mezzanine

a. Lobby	630
b. Stair	132

Total 762

3. Second floor

a. Lobby	1,836
b. Cocktail bar	135
c. Projection room	282
d. Spot-light control room	644

Total 2,897

4. Stage level

a. Acting area	4,712
b. Scenery shop and paint shop	996

c. Toilet	140
d. Waiting room	220
e. Office room	100
f. Record play room	84
g. Make-up room	276
h. Corridor	225
i. Stair	423

Total	7,176
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5. Upper stage level

a. Meeting room	360
b. Toilet	140
c. Catwork and Corridor	1,296
d. Storage	100
e. Stair	423

Total	2,319
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6. Basement

a. Locker room	1,170
b. Toilet	140
c. Green room	360
d. Lounge	522
e. Orchestra pit	528
f. Office room	412
g. Costume shop	396

h. Costume storage	351
i. Stair	423
j. Storage	1,010
k. Fan room	337
l. Control room	84
m. Corridor	1,608
n. Meeting room	225

Total	7,366
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D. Art Museum

The Art Museum encloses the third side of the plaza but it is not directly connected to the rest of the complex. Each building surrounding the plaza has its own character but a common roof shape housing in the structural space frame has been used as a unifying element. A well-proportioned two-story columnade faces the plaza. Having passed through this entrance one enters directly into a two story sculpture gallery with a second story balcony mezzanine. Three galleries, stairs, toilets, offices, library, conference rooms, and service area are directly adjacent to the sculpture gallery.

Required Space and Footage

1. First floor

a. Lobby	2,280
b. Gallery	2,220
c. Temporary exhibit room	1,110

d. Director's office	165
e. Business office	242
f. Toilet	342
g. Curator's office	126
h. Special study room	560
i. Live stock room	560
j. Packing room	440
k. Lift	81
l. Stairs	300
m. Corridor	444
n. Storage	90

Total 8,960 (sq. ft)

Second floor

a. Lobby	722
b. Gallery	2,220
c. Meeting room	384
d. Library	1,300
e. Conference room	777
f. Curator	171
g. Live stock room	560
h. Lift	81
i. Toilets	270
j. Corridor	1,238
k. Stairs	300

1. Janitor room	35
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Total	2,240
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3. Basement

a. Work shop	560
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b. Storage	560
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c. Fan room	297
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d. Lift	81
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e. Control room	135
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f. Corridor	485
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g. Stair	122
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Total	2,240
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E. Educational facilities

1. Department of Music

This department, needs facilities of good architectural, acoustical, and environmental design to provide a better environment for a general music education, and for the technical practice for 300 music students.

In plan, the Department of Music building is located at the end of the inner court connected with the concert hall and the Department of Drama building through the single corridor which will have an all-glazed wall facing the inner court. On the first floor, it houses the business office, department head office, studio offices, lobby and an instrumental rehearsal hall which is close to the concert hall stage. The second floor contains the

music studios, record listening room, and music education classroom. In the basement, there will be small private practice rooms, ensemble practice rooms, studio offices and the vocal-instrumental rehearsal hall which will be connected by a corridor to the basement of the concert hall stage. The Department of Music will share the lecture rooms on the second floor with the Department of Drama. This departmental facility is designed to have a close relationship with the Concert Hall and the Department of Drama facility, in functional and physical aspects. The acoustical and other environmental problems will be discussed in the following chapter.

Required Space and Footage

1. First floor

a. Lobby	532
b. Business office	399
c. Head office	399
d. Studio offices (6) 266	1,596
e. Studio office	315
f. Studio office	256
g. Studio	297
h. Instrument rehearsal hall	1,960
i. Instrument storage	532
j. Recording room (including storage)	133
k. Corridor	2,466
l. Stairs	266
m. Toilets (2)	257

Total 9,408

2. Second floor

a. Studios (7) 266	1,862
b. Studios (3) 184.3	553
c. Music education class room	532
d. Record listening room	532
e. Studio office	315
f. Toilets (2)	257
g. Stairs	266
h. Corridor	2,466

Total 6,783

3. Basement

a. Vocal-instrumental rehearsal hall	2,632
b. Music library	252
c. Pipe organ room	252
d. Ensemble practice rooms (12) 147	1,764
e. Practice rooms (12) 87	1,044
f. Practice rooms (2)	133
g. Corridor	2,542
h. Toilets	257
i. Stairs	266
j. Fan room	266

Total 9,408

2. Department of Drama

The Department of Drama building has a very close relationship with the theatre and the Department of Music in functional and physical aspects. This building will house all the facilities for 70 students. Since this facility will serve mainly as an educational facility for the students, it contains the business office, head office, faculty offices, lecture rooms, practice rooms, a graduate students studio, and the library. Several courses of this department will be conducted on the theatre stage because students in these courses need the practice.

Physically, this department building is located between the theatre and is perpendicular to the Department of Music building. It will have a main entrance from the inner court. It will also have an all-glazed wall along the single corridor. On the first floor, it will have the business office, head office, faculty offices, demonstration classroom, and a multi-purpose practice room next to the backstage. The class rooms, design studio, faculty offices, and library which is provided for both the Music and Drama Departments will occupy the second floor. In the basement, this department will have the faculty offices, graduate student studios which will be provided for both departments, and a mechanical room.

Required Space and Footage

1. First floor

a. Lobby	266
b. Business office	399

c. Head office	399
d. Faculty offices (3) 266	798
e. Practice room	1,974
f. Lecture and demonstration classroom	924
g. Corridor	1,638
h. Stairs	266
i. Toilets (2)	532

Total	7,196
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2. Second floor

a. Classrooms (2) 532	1,064
b. Classrooms (2) 266	532
c. Faculty offices (2) 225	550
d. Storage	84
e. Library	1,974
f. Design studio	616
g. Corridor	1,638
h. Stairs	266
i. Toilets	532

Total	7,196
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3. Basement

a. Faculty offices (2) 266	532
b. Graduate student studios (5)	1,330
c. Mechanical room	1,708
d. Fan room	266

e. Corridor	1,638
f. Stairs	266
g. Toilets (2)	532

Total	6,272
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ENVIRONMENTAL TECHNOLOGY

A. Climatology

1. Sun

a. Sunrise and Sunset

month day		March	June	September	December
1	sunrise	6.59	5.01	5.54	7.28
	sunset	18.19	19.47	18.57	17.03
15	sunrise	6.39	4.59	6.06	7.38
	sunset	18.33	19.54	18.35	17.03

b. Monthly and annual heating degree day normals

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1097	897	698	303	112	12	0	0	45	248	651	973	5013

Based on 65°F

Data recorded for 30 years.

c. Sunshine

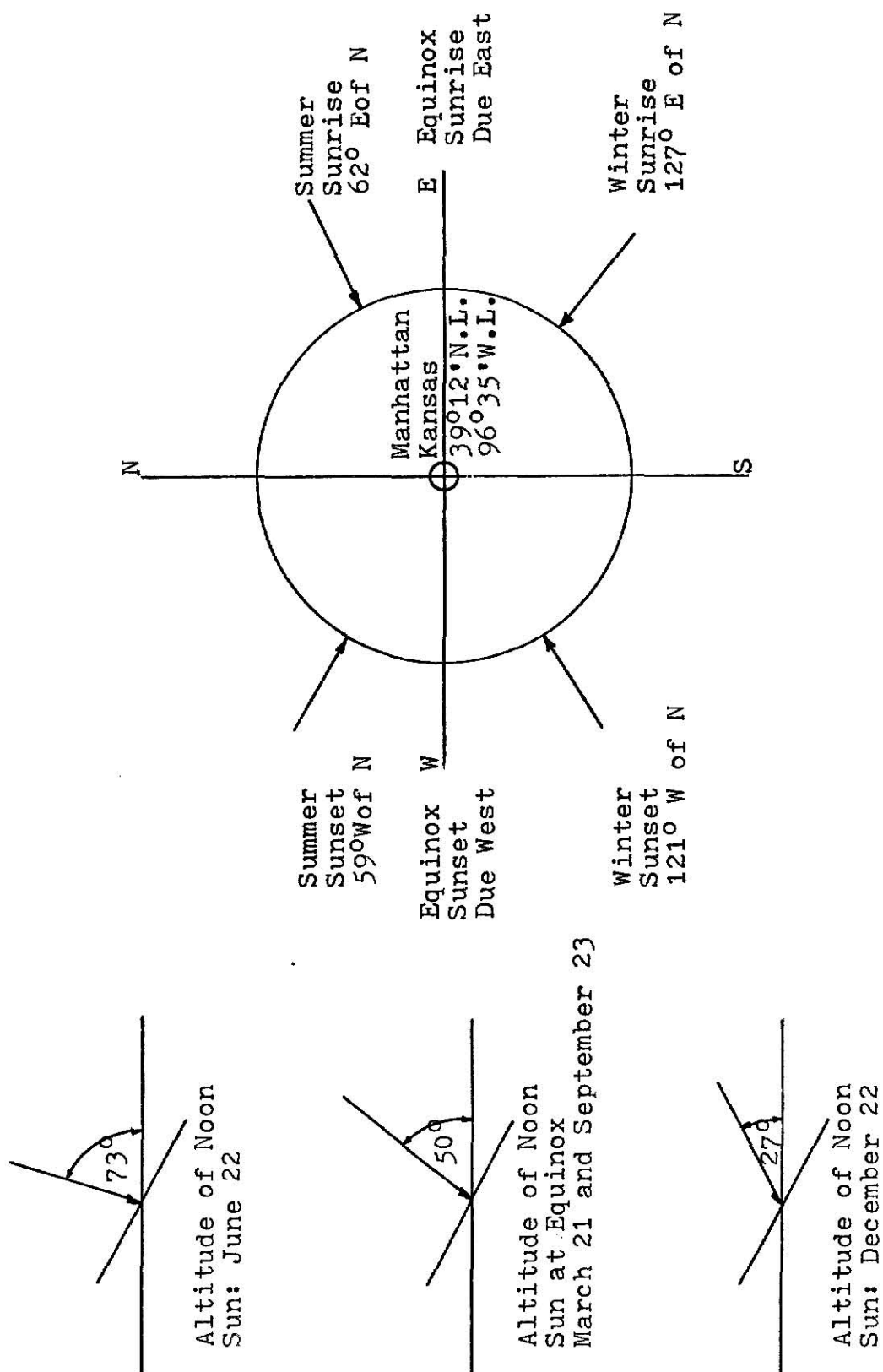
monthly percentage of possible sunshine	Jan	50-60 %	recorded thru 1964
monthly percentage of possible sunshine	Jul	70-80 %	recorded thru 1964
mean annual % of possible sunshine		65 %	recorded thru 1964
mean annual total hours of sunshine	2800-3000 hours 1931-1960		

d. Monthly mean total hours of sunshine

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
160-180	160-180	200-220	240-260	280-300	300-320	340-360	300-320	260-280	220-240	180-200	160-180

Data based on period, 1931-1960

e. Solar Angles



2. Prevailing winds

	years of record	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Concordia	61	N	N	S	S	S	S	S	S	S	S	S	S	S
Topeka	59	NW	N	N	S	S	S	S	S	S	S	S	S	S
Wichita	57	S	N	S	S	S	S	S	S	S	S	S	S	S

Based on records through 1945

3. Precipitation

a. Normal annual total precipitation (inches) 32" based on period, 1931-1960

b. Monthly mean total precipitation (inches)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1.15	1.18	2.25	3.47	5.13	4.92	3.78	4.11	3.96	2.48	1.76	1.39	35.58

Data based on period, 1931-1955

c. Mean annual total snowfall (inches)
18"-24"

Data based on period of record through 1960

4. Temperature

Mean monthly temperature

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
29.6	33.8	42.5	55.3	65.0	75.4	80.7	79.7	70.6	59.1	43.3	33.6	55.7

Data based on period 1951-1960

5. Humidity

Mean monthly and annual relative humidity (%)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
70- 80	60- 70	60- 70	60- 70	60- 70	60- 70	60- 70	60- 70	60- 70	60- 70	60- 70	70- 80	60- 70

20 years of record through 1959 (1:30, 7:30 A.M and P.M)

B. Air Conditioning Requirements

1. General Considerations

Heating and air-conditioning, as the terms imply, refer to the heating of a building and the treatment of air supplied and circulated through a ventilating system in order to clean the air and to control the temperature and humidity within the occupied space both in winter and summer.

In the designing of the music department of a school, as in any application of heating and air-conditioning, the comfort and health of the occupants is a prime consideration. Proper temperatures and humidity levels should be maintained.

The following items should be considered in designing the educational facilities peculiar to music.

a. Since wind instruments require a great deal of inhalation and some instruments require considerable physical exertion to play, a mechanical ventilation system and fresh air supply in excess of normal design should be provided. In fact, in the average school practice room, larger vocal or instrumental groups often generate enough heat to make the room uncomfortable even though no heat is provided for the room. To avoid this problem of overheating, it is necessary to provide a controlled source of cooler air.

While natural window ventilation is the cheapest type to provide, it permits noise nuisance from adjacent areas and makes temperature, humidity, and dust control difficult.

b. Ventilating ducts, which are normally constructed of some form of sheet metal, are excellent sound transmitters.

To reduce the transmission of sound from room to room the ducts

should be lined with fireproof acoustical material or constructed of specially designed acoustical material or provided with baffles and slight bends, or combinations of these methods in sufficient quantity to provide the desired absorption.

c. The pitch of a musical instrument is affected by temperature change, and the change in pitch per degree temperature change is not the same for all instruments. To maintain the instruments in tune, a consistent and uniform temperature in the music room is highly desirable.

d. The stringed instruments are especially sensitive to changes in humidity and temperature, and suffer damage if the humidity is too high or too low. The recommended relative humidity for practice rooms and instrument storage rooms is 40-50 per cent.

Provisions for automatically maintaining this level should be included in the design wherever stringed instruments are stored.

e. For the production of music, quick mental responses are necessary. Thus, it becomes imperative to maintain healthful and comfortable conditions in the music room. The recommended dry bulb temperature range for comfort is from 68° to 72° Fahrenheit.

To satisfy the conditions outlined above, the music department of the school should be equipped with a heating and air-conditioning system that will provide a constant uniform temperature, supply clean air composed of adequate fresh air, and recirculated air, and maintain the proper humidity in rooms where instruments are stored and played.

The mechanical and air-conditioning requirements for the

educational and performance facilities of drama are inevitable factors. As mentioned in discussing the music facility, the comfort and health of the occupants is a prime consideration. Proper temperatures and humidity levels should be maintained. Various authorities have shown that proper ventilation, uniform temperatures, and humidity play an important part in health, learning and teaching abilities of the occupants of a building.

Even though the drama facility does not have musical instrument problems in the relations to temperature and humidity, it should be provided with the same considerations as the music facility in regard to the aspects of comfort and health of the occupants, and noise insulation from the outside building.

Complete air conditioning - with winter heating, summer cooling, and year - round control of humidity as well as the cleaning of the air before it is moved through the building - are conditions that people have come to expect in urban public buildings. Museums are also planned accordingly.

There are two ultimate objectives of air-conditioning in museums, namely, comfort of visitors and employees, and conservation of collections. Both ends are of great, and ever growing, importance. In some climates there are seasons when outdoor air may be about right for museums; but in most parts of this country the times of such conditions are of short duration.

Adequate air-conditioning retards or eliminates shrinking, bulging, warping, and cracking that may come from temperature and humidity changes.

During seasons of problem weather, if not all the time,

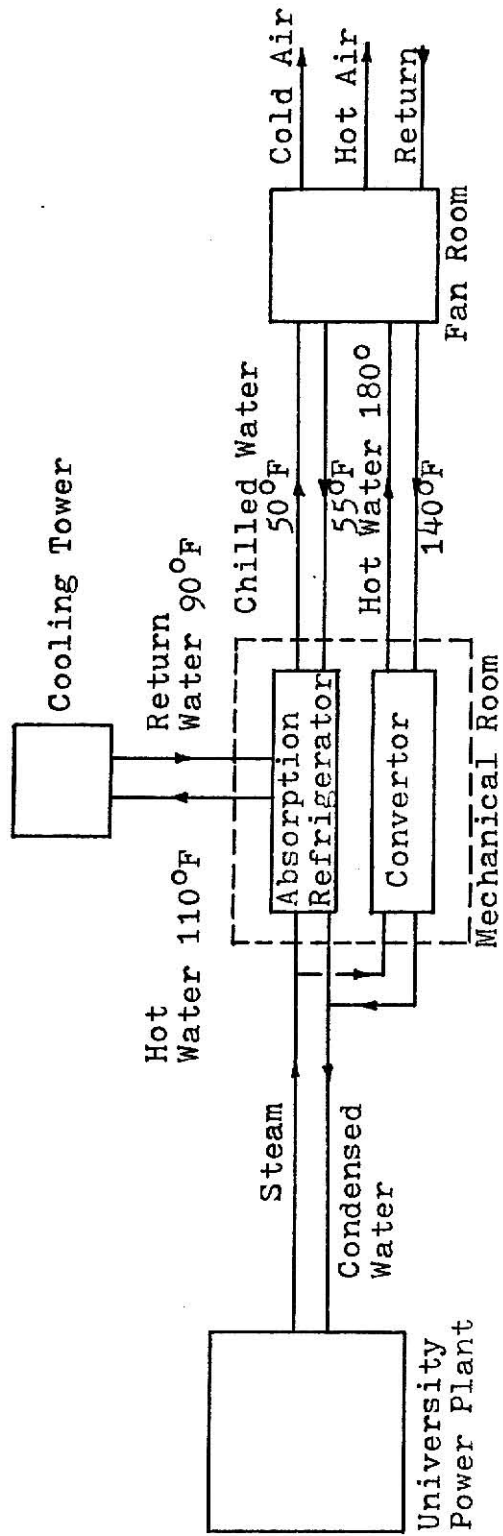
every museum must face also the modern public's expectation of indoor comfort. This expectation is a complicated matter in human terms, and for the museum it means cooling in summer as well as heating in winter, and equally it means year-round control of humidity and removal of dust and odors.

2. Application of air-conditioning system:

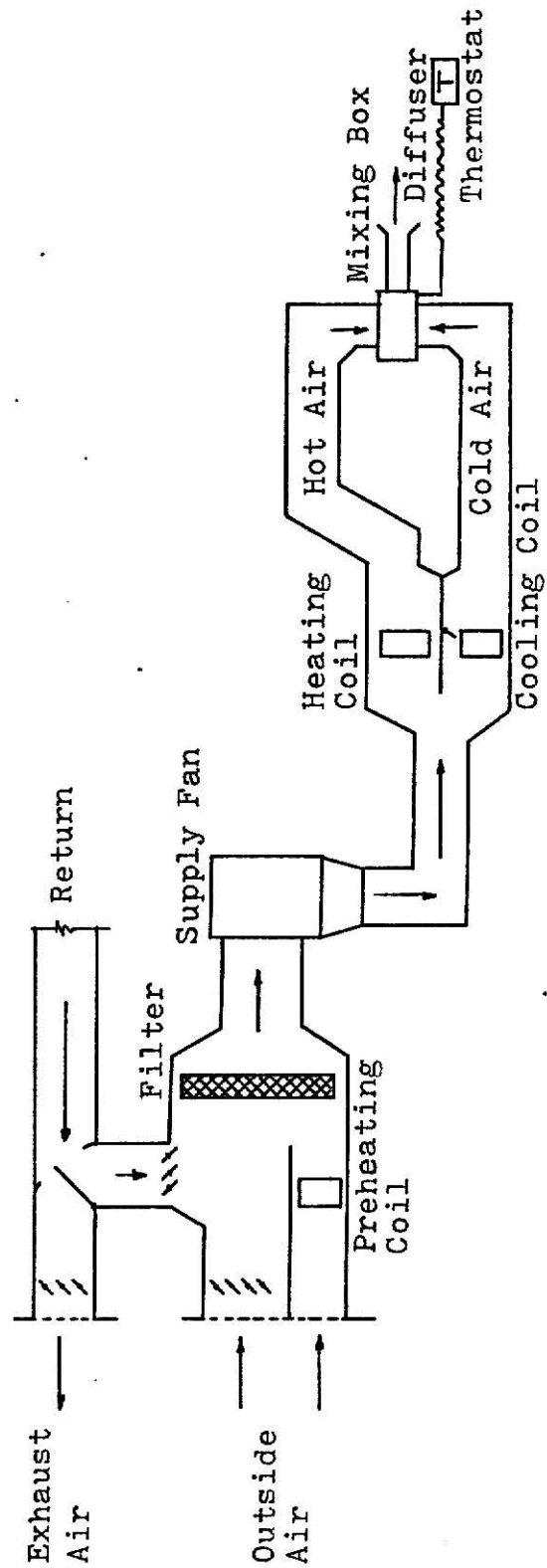
The main air-conditioning system applied to this project is a low velocity double duct air-conditioning system. The university power plant carries steam through the tunnel to the existing president's residence which is adjacent to this new cultural center. Shown in the diagram, the new project needs a mechanical room to accommodate the absorption refrigerator for chilled water and the convertor for hot water. The cooling tower is installed on the ground away from the building because of the noise problem and architectural aesthetics.

The chilled water and hot water are supplied from the mechanical room to separate fan rooms for the drama theater, drama department facility, music department facility, concert hall and the art museum.

From each fan room the low velocity double duct system supply warm air and cool air to the spaces requiring air-conditioning. However, as a part of the air-conditioning system applied to this project, the fan coil unit system will be applied to the music practice rooms to avoid the sound transmission from one practice room to another through the common duct. The accoustical problems occurring from air-conditioning system will be discussed in the following acoustics.



CENTRAL AIR-CONDITIONING SYSTEM



SCHEMATIC LAYOUT OF A DOUBLE DUCT SYSTEM

C. Lighting

1. Lighting problems in music facilities

Lighting to enhance the music room environment and to promote student visual efficiency and comfort involves the application of standard school lighting principles to the specific problems of vocal and instrumental areas. Lighting specifications for rooms should consider the following;

a. Irregular seating arrangements with students facing the director from various angles complicates the problems of eliminating glare and distracting objects.

b. Music rooms are equipped with furnishings which can create a condition of "visual clutter". Orchestral equipment such as horns, music racks, and folios are in this category and must be considered in the lighting plan.

c. Music rooms are used day and night, winter and summer, for rehearsals, recitals, lectures, picture projection, and varied activities, all of which have specific lighting requirements.

d. There is a natural tendency for many students to perform by ear rather than sight; good lighting encourages reading the printed page, an objective which is major in music education.

e. Music classes are especially responsive to an appropriately planned environment.

f. Rooms with risers present the problem that the man standing on the top riser is in a much different seeing situation to the light sources than the man sitting at floor level

or standing on the director's podium.

The quality and quantity of light in a comfortable classroom are dependent upon three factors:

- 1) Illumination level of the task.
- 2) Reflective pattern of the room.
- 3) Brightness control of the light sources.

Illumination levels of school tasks have been the subject of extensive research including reading of music. The American standard practice for school lighting recommends 30 foot candles as a minimum to be maintained in general classrooms. Music room activities indicate levels above those of the ordinary classroom.

The reflection pattern of the room influences lighting quantity and quality. Proper choice of colors and finishes within the reflectance range will produce an efficient, comfortable, balanced-brightness environment. The ceiling should have a flat, non-glossy finish. Acoustical materials vary widely as to reflectance value because of the holes or voids in the material; 60-75 per cent may be expected.

Brightness control of the light sources involves the shielding and optical control features of the windows and lighting equipment.

Electrical lighting must be provided in music rooms. A comparison of filament and fluorescent lighting is frequently involved.

Fluorescent lighting is indicated where:

- 1) Energy rates are average or above, and annual hours of

use are long.

- 2) The most light is wanted for a given wiring capacity.
- 3) Thirty-five foot candles or more are required.

Filament lighting is indicated where:

- 1) Energy rates are low and annual hours of use are relatively low.
- 2) Footcandle levels are of the order of thirty-five or lower. Higher levels with filament lamps may result in objectionable heat from the high wattage required.
- 3) Lower initial cost and simplicity of maintenance are prime consideration.

2. Lighting problems in drama facilities

Principles of stage lighting

Individual lanterns normally serve one of two purposes: either they light the acting area or they illuminate a backing. On a proscenium stage, for example, we normally direct spot-lights on to the acting-area and use flood lights on a backing seen through a door. Whatever the shape of the stage-area, open or end - we must use acting - lights. Lighting the backing is normally very important on an end stage, but is less so on an open stage, and not required on an arena. But we should note that when both types of illumination are used. The acting-area is usually lit to a greater intensity than the backing.

Lighting backings

Lighting backings are mainly concerned with small openings in the scenery (door, windows, etc.) and the wider expanse of

the cyclorama. Backings behind doors and windows are usually illuminated by floodlights, often on telescopic stands. But as the positions of the lanterns must vary from show to show, lighting is required at both the top and bottom of the cyclorama.

3. Lighting problems in art museum

Lighting for art museums has two main methods: One is skylighting and the other is artificial lighting-electrical lighting. Skylight lighting is uncontrollable and useless in evening or night time. Also it has the glare and the brightness which attracts the eye to them and causes some unpleasantness. On the other hand, electrical lighting has many advantageous factors-easy control, use of valuable wall space, flexibility of lighting pattern and effectiveness of displaying.

In this art museum project, fluorescent lighting and incandescent lighting are used together. This scheme of the combination is to control the different colorful effects from both fluorescent and incandescent lightings. With the other purpose, fluorescent lighting is used for the general illumination of the displaying room and incandescent lighting is the special illumination on the certain area by the spotlighting. Basically, the layout of the lighting in the displaying room should have the flexibility which can easily change the lighting patterns for the different purpose.

4. Exterior Lighting

Exterior lighting is usually introduced to control the

area lighting and to complement and enhance surrounding landscapes and architecture. Particularly in this cultural center project, the architectural aesthetics and functional illumination should be carefully considered for nighttime as well as daytime because the most of the extracurricular activities of music and drama will be held at night. At the daytime, the natural lighting - sun light - creates the variety of the architectural structure from the view point of the elevation by the contrast of brightness and shadow. Those visual effects also come from the variety of the structure itself in plan and elevation, and from the surrounding landscape.

Flood and spot lighting with various colors for the fountain at the center of the main plaza gives very attractive atmosphere to the visitors at the night. For the area lighting of the main plaza, inner court, parking area, streets and walkways, the combination of the incandescent and mercury vapor lamps are suggested. Also flood and spot lighting is suggested for the illumination of the facades.

D. Acoustics

Acoustics, like illumination, air conditioning, and structural engineering, is an integral attribute of a building. At each stage of planning there are acoustical problems to be analyzed and solved. All of the problems of acoustics can be approached in a rational way.

Particularly, there can be no full enjoyment or appraisal of music and performance unless the sound can be heard with

some measure of fidelity. Satisfactory acoustics is more than providing a music and performance space free from obvious acoustical faults; and it is more than isolating sound from persons in surrounding spaces where the sound is not desired. The acoustic properties of a room can enhance the quality of music for the listener, and can give the performer a sense of support which adds to the pleasure of the performance.

Briefly then, acoustics play the role of an essential functional element in the design of music and drama facilities. The location of site, the plan of the building, and the arrangement of its spaces, the gross and fine features of room shape, the structural materials and their method of use, the details of doors and windows, the characteristics of interior finishes and furnishings all these may influence acoustic design.

1. Department of Music facility

General considerations

a. The music rooms for the purpose of performance and practice should be provided with sound insulation for 50 D. B. or more in all perimeter walls, doors, and ventilation ducts, including ceiling and floor.

b. Parallel walls should be avoided to eliminate the flutter echo. Also all the room shapes which may cause sound foci, echos, dead spots, etc. should be avoided.

c. The acoustical treatments having different absorptive coefficients and diffusive effects which are the patches, strips, and resonator-panel absorbers should be used in the music rooms for the variable range of sound frequencies.

d. To eliminate sound transfer through solid structures, all machines should be placed on an isolated pad or structure from the main structure by use of a spring or rubber isolator.

e. The music rooms should provide varieties of break-ups in walls and ceiling to increase musical harmony by the sound diffractions.

f. The music rooms which will have variable range of the reverberation time such as those of the combination rehearsal-recital hall and the instrumental rehearsal hall should be provided with the variable absorbers. These can be hinged panels, rotatable cylinders or rotatable panels.

g. The ventilation ducts should be specially insulated at the fan and plenum with muffler type filters at inlets and outlets.

h. The splayed ceiling should be provided in the music rooms to eliminate flutter echos.

i. To eliminate resonant frequency, variable air space should be provided at the backside of the wall surface.

2. Department of Drama facility

The drama theatre and the educational facilities for drama have similar problems in acoustics to those of the music facilities. Even though the optimum reverberation time for drama facility is different from the reverberation time for music, the acoustical design in the drama facility is the same as that of the music facility. The treatments of acoustics for the Department of Drama facilities will be similar to those for the Department of Music.

3. Art Museum

General consideration

a. The art museum building itself should have insulative qualities since the galleries in the building have the door ways, which have a very high transmissive effect. It is very important to select for the museum building a site having a very low background noise level.

b. The art museum should be provided with sound insulation in all perimeter walls, doors, and ventilation ducts, including the ceiling and the floor.

c. Very high absorptive treatment of the parallel walls should be provided for the galleries to eliminate the flutter echo.

d. The ceilings of galleries seldom have the acoustical treatments in order to provide the lighting installations.

e. Ventilation ducts should be carefully insulated at the fan and plenum with muffler type filters at inlets and outlets.

f. No windows are suggested because of the need to use all wall space of the gallery for displays and sound insulation.

g. To eliminate sound transfer through the solid structures, all machines should be placed on isolated pads or structures from those of the main structure by using spring or rubber isolators.

4. Reverberation Time Calculation

CONCERT HALL

1	Floor	8820 sq. ft.			
2	Wall	10077 sq. ft.			
3	Ceiling	9189 sq. ft.			
4	Surface S. (1)+(2)+(3)	28086 sq. ft.			
5	Volume V.	212662 cu. ft.			
6	Volume/Person 212662/922	238 cu. ft./p.			
7	72° F 50% Relative Humidity				
			125 cps	500 cps	2000 cps
8	Opt. Reverb. Time				
9	$X = -2.30 \log_{10}(1-\bar{\alpha})$ $t_{60} = 0.049 \times V / SX$ $X = \frac{0.049 \times 212662}{28086 \times t_{60}}$		$1.56 \times 1.4 = 2.18$	1.56	1.56
10	$\bar{\alpha}$.170 .156	.238 .212	.238 .212
11	Total Absor. Area Req.		4381	5954	5954

	Materials	Area	125 cps		500 cps		2000 cps	
			Coef.	Area	Coef.	Area	Coef.	Area
12	Audience in Upholstered Seats 920 x 2/3	613	3.2	1961.6	3.8	2329.4	4.5	2758.5
13	Upholstered Seats Empty 920 x 1/3	307	2.5	767.5	3.2	982.4	3.5	1074.5
14	Orchestra member	55	4.0	220	5.5	302.5	8.0	440
15	Air-Per 1000 cu. ft.	212662					2.3	488.1
16	Ceiling. Plaster on metal lath	9189	0.4	367.5	.06	551.3	.04	367.5
17	Carpet Cardinal Batala, on concrete, 7/16"	2320	.12	278.2	.28	649.6	.21	487.2
18	Door and Casting	420	.07	29.4	.07	29.4	.07	29.4
19	Back stage opening	120	.30	36	.40	48	.50	60
20	Stage Front Wood Sheathing, Pine	150	.10	15	.10	15	.08	12
21	Wainscot, 7' high Plywood paneling 3/8"	2420	.28	672.5	.17	480.3	.10	240.2
22	Wall, Plaster, rough finish on lath	6985	.02	139.7	.04	279.4	.04	279.4
23	Total Abs. Area			4487.4		5595.3		6420.5

24	Check $\bar{\alpha} = \Sigma S/S$ $X = -2.30 \log_{10}(1-\bar{\alpha})$ $t_{60} = 0.049 V/SX$.159 .173 2.14 $\frac{2.14-2.18}{2.18} \times 100$ = -1.83 %	.199 .222 1.67 $\frac{1.67-1.56}{1.56} \times 100$ = 7.05 %	.226 .258 1.44 $\frac{1.44-1.56}{1.56} \times 100$ = -7.69 %
25	Error %			

DRAMA THEATRE

1	Floor	5746 sq. ft.			
2	Wall	5094 sq. ft.			
3	Ceiling	5110 sq. ft.			
4	Opening	1401 sq. ft.			
5	Surface S. = (1)+(2)+(3)+(4)	17354 sq. ft.			
6	Volume V.	129610 cu. ft.			
7	Volume/Person	259 cu. ft./p.			
8	72° F 50% Relative Humidity				
			125 cps	500 cps	2000 cps
9	Opt. Reverb. Time				
10	$X = -2.30 \log_{10}(1-\bar{\alpha})$		1.03 x 1.4=1.44	1.03	1.03
	$t_{60} = 0.049 V/SX$				
	$X = \frac{0.049 \times 129610}{17354 \times t_{60}}$.253	.354	.354
11	$\bar{\alpha}$.223	.298	.298
12	Total Absor. Area Req.		3869	5171	5171
			$S\bar{\alpha}$		

	Materials	Area	125 cps		500 cps		2000 cps	
			Coef.	Area	Coef.	Area	Coef.	Area
13	Audience, Upholstered Seats 500 x 2/3	334	3.2	1068.8	3.8	1269.2	4.5	1503
14	Upholstered Seats Empty 500 x 1/3	166	2.5	415	3.2	531.2	3.5	581
15	Orchestra member	40	4.0	160	5.5	220	8.0	320
16	Air-Per 1000 cu. ft.	129610					2.3	298.1
17	Proscenium Opening	1404	.30	420	.40	561.6	.50	702
18	Ceiling Plaster on metal lath	5110	.04	204.4	.06	306.6	.04	204.4
19	Carpet Cardinal Batala on Concrete, 7/16"	2056	.12	246.7	.28	575.4	.21	431.8
20	Door and Casing	210	.07	14.7	.07	14.7	.07	14.7
21	Wainscot 7' high Plywood paneling 3/8"	1064	.28	297.9	.17	180.8	.10	106.4
22	Rear wall, 1"x2", 1"x4", 2"x2" and 2"x4" wood strip at random spacing	594	.30	178.2	.90	534.6	.80	475.2
23	Wall, 1/16" Plywood panel with 1" mineral-wool blanket Wall, 3/4" Spayed Asbestos on unpainted metal lath, air	2698	.23	620.5	.31	836.3	.02	53.9
		399	.45	179.5	.80	319.2	.90	359.1

24	Stage front Wood sheathing, Pine 3/4"	129	.10	12.9	.10	12.9	.08	10.3
25	Total Abs. Area			3818.6		5362.8		5059.7
26	Check $\bar{\alpha} = \Sigma S\alpha/S$ $X = -2.30 \log_{10}(1-\bar{\alpha})$ $t_{60} = \frac{0.049 V}{SX}$.220 .248 1.47		.318 .383 .96		.292 .345 1.06
27	Error %			$\frac{1.47-1.44}{1.44} \times 100$ = 2.08%		$\frac{.96-1.03}{1.03} \times 100$ = -6.97%		$\frac{1.06-1.03}{1.03} \times 100$ = 2.91%

DRAMA THEATRE STAGE HOUSE

1	Floor	5731 sq. ft.			
2	Wall	12365 sq. ft.			
3	Ceiling	4255 sq. ft.			
4	Opening	2392 sq. ft.			
5	Surface	24743 cu. ft.			
6	Volume	123936 cu. ft.			
7	72° F 50% Relative Humidity				
			125 cps	500 cps	2000 cps
8	Opt. Reverb. Time as Theatre		1.44	1.03	1.03
9	X = -2.30 log ₁₀ (1-)		.170	.238	.238
10			.156	.212	.212
11	Total Absor. Area Req.		3869	5171	5171

	Materials	Area	125 cps		500 cps		2000 cps	
			Coef.	Area	Coef.	Area	Coef.	Area
12	Floor Stage level, wood sheathing pine, 3/4"	4625	.10	462.6	.10	462.6	.08	370.0
13	Floor, Balcony, Concrete slab.	1105	.01	11.0	.02	22.1	.02	22.1
14	Air, per 1000 cu. ft.	123936					2.3	284.9
15	Ceiling, 1/2" Gypsum Board	4255	.29	1233.9	.06	255.3	.04	170.2
16	Curtain, 18 oz. per sq. yd.	1804	.14	252.5	.55	992.2	.70	1262.8
17	Cyclorama, painted canvas	1500	.05	75	.35	525	.38	570
18	Door and Casing	238	.07	16.7	.07	16.7	.07	16.7
19	Proscenium and Stairway opening	2392	.30	717.6	.40	956.8	.50	1196
20	Wall, 3/4" Sprayed Asbestos on unpainted solid back	2190	.30	657	.70	1533	.95	2080.5
21	1/2" Gypsum Board wall	1861	.29	539.6	.06	111.6	.04	74.4
22	Concrete wall	8156	.01	81.5	.02	163.1	.02	163.1
23	Total Absob. Area			4047.4		5038.4		5208.7

24	Check $\bar{\alpha} = \Sigma S \alpha / S$ $X = -2.30 \log_{10}(1 - \bar{\alpha})$ t_{60}			
25	Error %	$\frac{1.64}{1.37} \times 100 = -4.85\%$	$\frac{1.204}{1.07} \times 100 = 3.88\%$	$\frac{1.211}{1.034} \times 100 = 0.38\%$

E. Landscaping

The use of plant materials in this proposed design has two main purposes: the first one is the creation of a natural environment around the structures, and the second one is the creation of the visual and sound barriers by the planting of trees and shrubs. Fortunately, the proposed site has many good quality trees and shrubs around the president's residence and along the east boundary of the site. The trees and shrubs planted along the pedestrian approaches to the plaza will give a very attractive and natural feeling to the people who are walking. The big trees in the inner court offer a natural surrounding and good shade where people may communicate and relax. The fountain at the plaza will create not only a more attractive environment but also be a landmark for the pedestrian approaches which originate at the fountain. The random placement of existing trees and shrubs around the buildings will give a good natural surrounding and will provide shade for rest and recreation of the people who will use this Cultural Center.

F. Structure

The primary design for a cultural center has two main structural systems. The first is the steel space frames for the large clear span areas at the roofs which are applied to the three activity facilities; Concert Hall, Drama Theatre and Art Museum which are of different shapes in plan. From the stand point of elevation the combination of the steel space frames and the columns will give a strong feeling of unity in the architectural

aesthetics. The second is waffle slab, which will solve the structural, economical, and plumbing problems. The waffle slab will also support the large clear span area and make possible the flexible plan arrangements. These two structural systems will satisfy the structural needs of the entire complex.

G. Materials

The selection of material is as important as the structural system. The material in architecture produces many feelings and values. A material has color, texture, shape, and size, and also has its own feeling and value. A good match of a structural system and a material can create a good structure. We should also consider the native materials which have any symbolic value for the locality. The designer has a conception of the appearance that will be produced by the combined materials, which are the steel, concrete and limestone. The steel space frame and concrete are usually used together. In contrast to the concrete, the limestone, which is the native stone of Kansas, gives a warm and a non-colorful feeling. The warm and non-colorful material rarely gives rise to boredom. The material as well as the structural system should be considered a factor which is needed to compose the entire structural system.

H. Water Supply and Sanitation

The existing 6-inch city water line runs paralleled to Vattier Drive. The existing 12-inch sanitary sewer line runs paralleled to Manhattan Avenue. The Cultural Center may be connected by several branches to both lines.

MISCELLANEOUS CONSIDERATIONS

A. Building Code and Zoning Requirement

The campus planning authority of Kansas State University in Manhattan, Kansas follows the National Building Code whose regulations govern the construction, equipment, use and occupancy, location and maintenance, and the moving and demolition of existing buildings and structures.

This proposed design for a Cultural Center for Kansas State University will also follow the requirements set forth in the National Building Code.

1. Campus Planning

The proposed Cultural Center will occupy a part of the campus which has already been considered for this use. Therefore, it will not conflict with campus planning.

2. Fire Code

The structures of the Cultural Center must satisfy the conditions of the Building Code. These conditions include the fire-resistive construction type B. According to the fire resistive-construction type B in Section 703 of the National Building Code, the main columns, floors, roofs, girders, trusses, and walls must have more than a 3-hour fire rating. Sections 401 and 402 of Article IV regulate the height restrictions and floor area limits. In the Table 401 of Section 401, the fire-resistive type B has an 85 feet maximum roof height. But that requirement is no problem for this proposed Cultural Center because the maximum roof height is 56 feet at the Concert Hall except for 77 feet at the stage

area of the Drama Theatre. Also there is no problem in floor area limits because the fire-resistive type B has no limit according to Table 402 of Section 402. The exit aisles, exit doorways, interior stairways, exterior stairways, and hallways of this cultural center satisfy the regulations described in the Article VI, Means of Egress.

B. BUDGET

Square foot of total costs

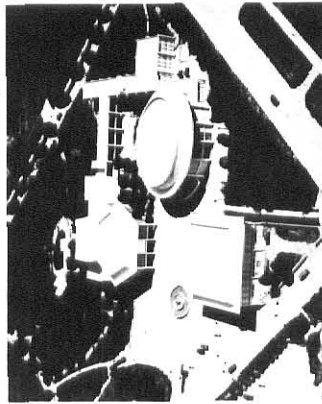
Description	Unit	Total sq.ft.	\$/sq.ft.	Amount
1. Concert Hall				
Total project costs	sq.ft.	28,363	42.80	1,213,936.40
Plumbing			2.40	68,071.20
Heating, Ventilating and Air-conditioning	sq.ft.	28,363	5.25	148,905.75
Electrical			3.35	95,016.05
Total: Mechanical and Electrical	sq.ft.	28,363	10.40	292,975.40
Subtotal				1,213,936.40
2. Drama Theatre				
Total project costs	sq.ft.	28,428	42.80	1,218,718.40
Plumbing			2.40	68,277.20
Heating, Ventilating and Air-conditioning	sq.ft.	28,428	5.25	149,247.00
Electrical			3.35	95,233.80
Total: Mechanical and Electrical	sq.ft.	28,428	10.40	295,651.20
Subtotal				1,218,718.40
3. Art Museum				
Total project costs	sq.ft.	19,258	60.60	1,167,034.80
Plumbing			2.65	51,033.70
Heating, Ventilating and Air-conditioning	sq.ft.	19,258	8.40	161,767.20
Electrical			5.25	101,104.50
Total: Mechanical and Electrical	sq.ft.	19,258	14.00	269,612.00
Subtotal				1,167,034.80

Description	Unit	Total sq.ft.	\$/sq.ft.	Amount
4. Department of Music				
Total project costs	sq.ft.	25,599	51.25	1,311,948.75
Plumbing	sq.ft.	25,599	2.90	74,237.10
Heating, Ventilating and Air-conditioning			8.30	215,471.70
Electrical	sq.ft.	25,599	6.80	174,073.20
Total: Mechanical and Electrical			11.20	282,108.80
Subtotal				1,311,948.75
5. Department of Drama				
Total project costs	sq.ft.	20,644	51.25	1,059,030.00
Plumbing	sq.ft.	20,644	2.90	59,925.60
Heating, Ventilating and Air-conditioning			8.30	171,511.20
Electrical	sq.ft.	20,644	6.80	140,515.20
Total: Mechanical and Electrical			11.20	231,436.80
Subtotal				1,059,030.00
Landscape				
10% of total construction costs				663,407.60
Total Construction Cost				\$6,634,075.95

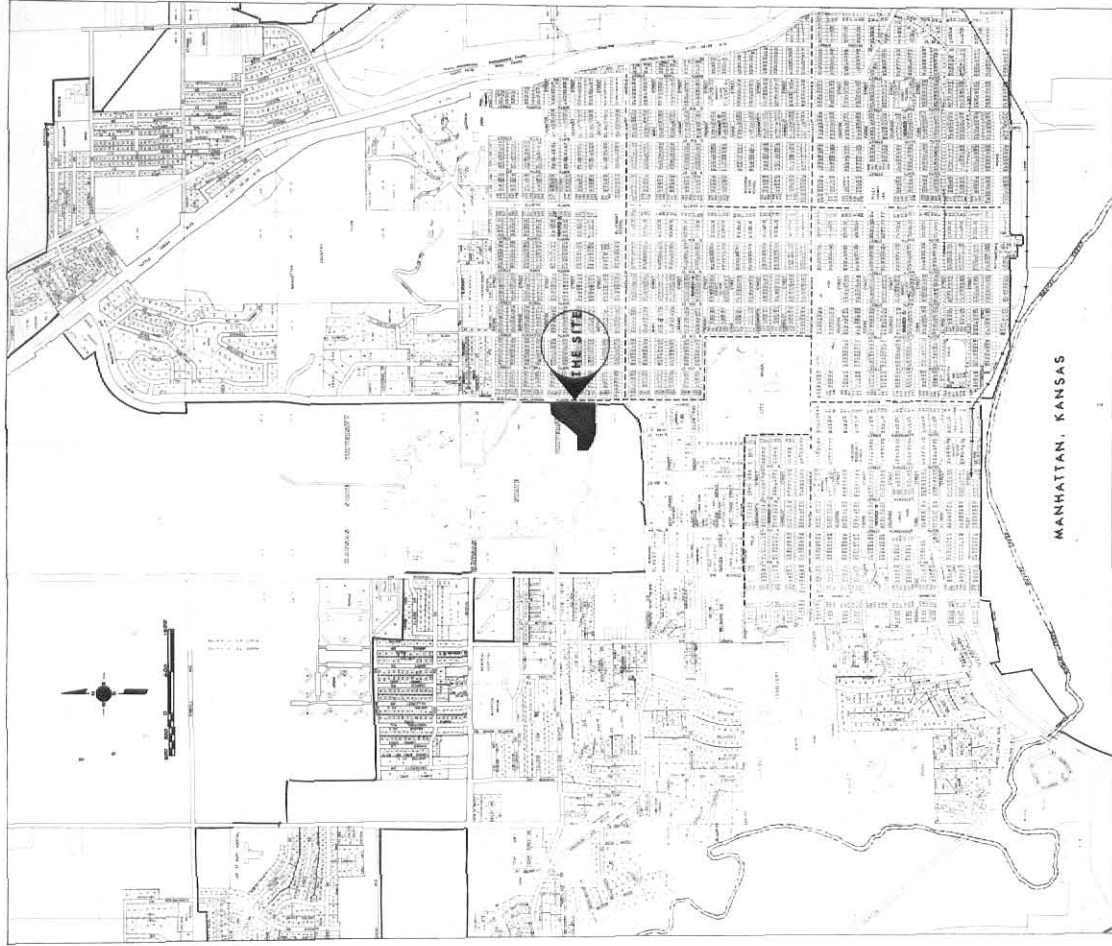
The cost data (\$/sq.ft.) based on " Building Construction
Cost Data, 1969, the 27th Annual Edition "

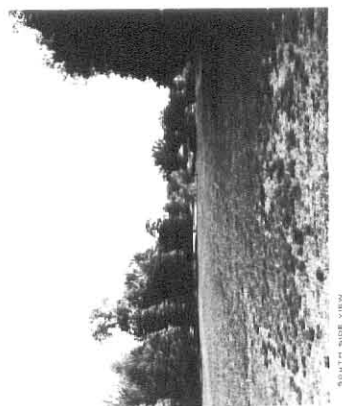
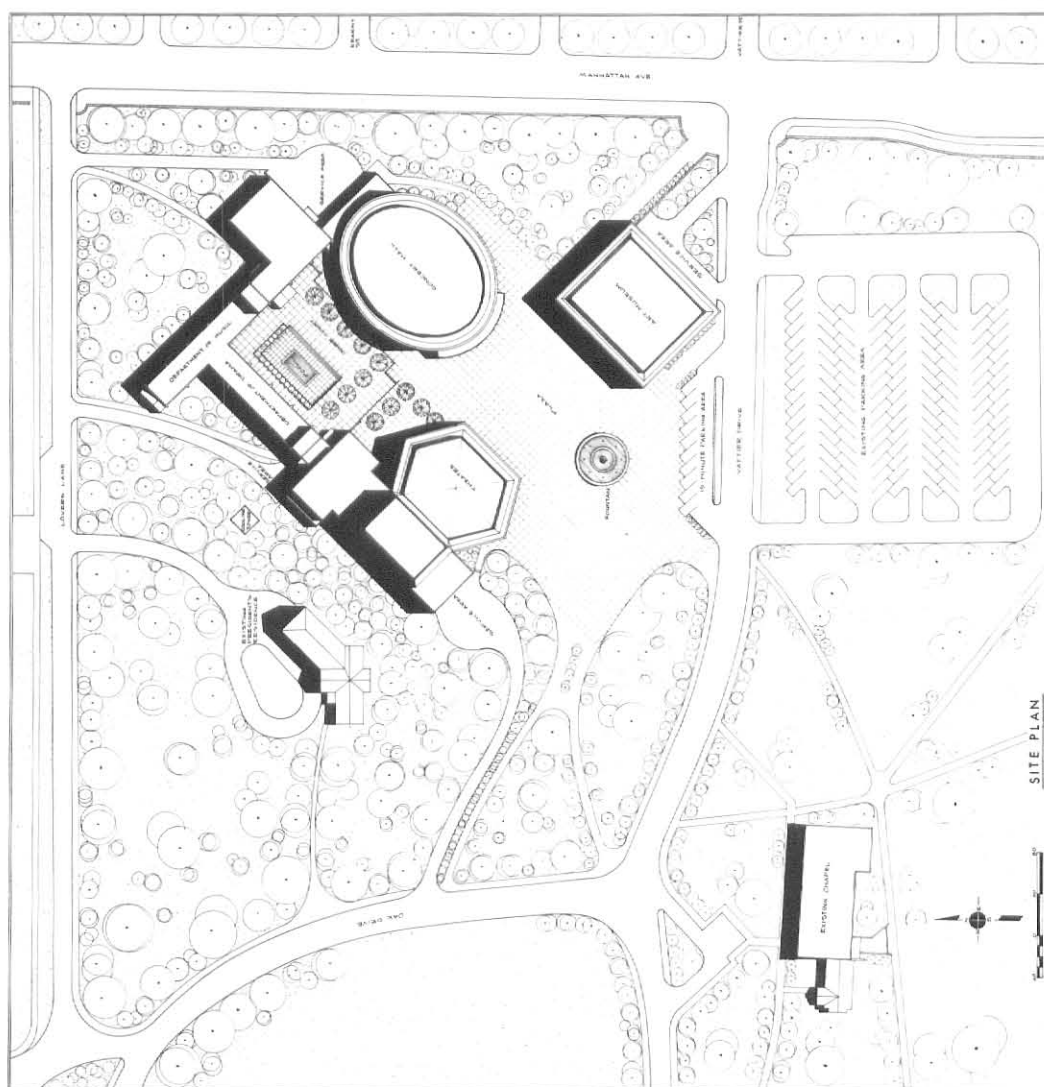
PRESENTATION

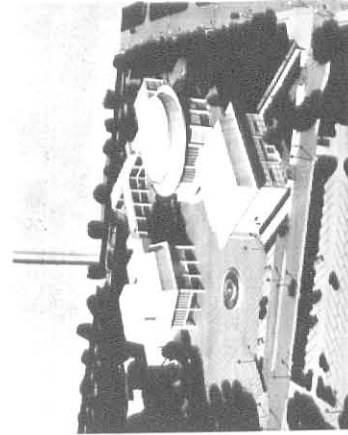
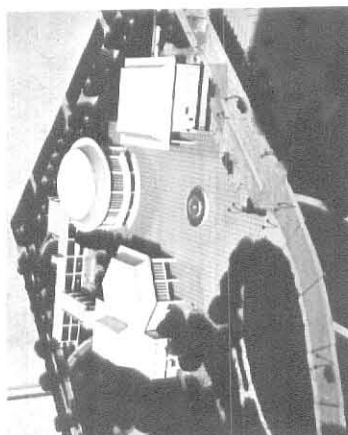
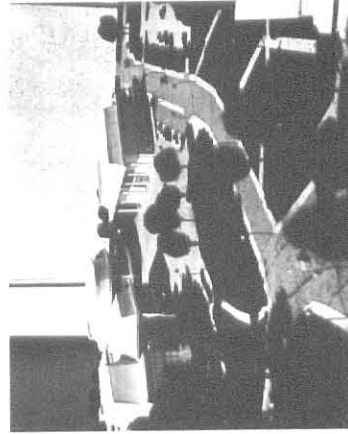
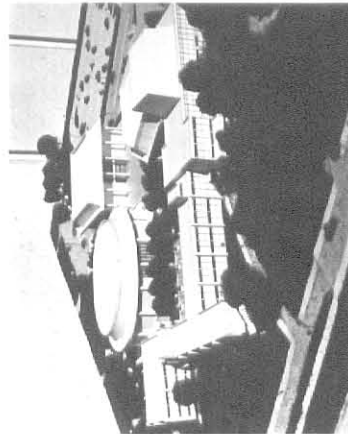
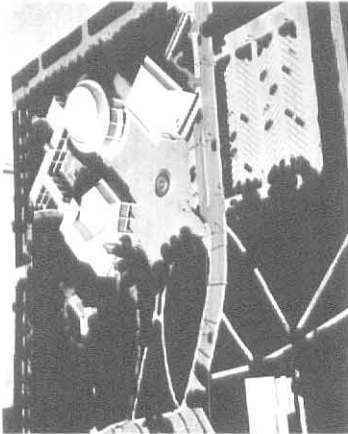
**A SCHOOL OF MUSIC, DRAMA
AND ART MUSEUM COMPLEX
FOR
KANSAS STATE UNIVERSITY
MANHATTAN, KANSAS**

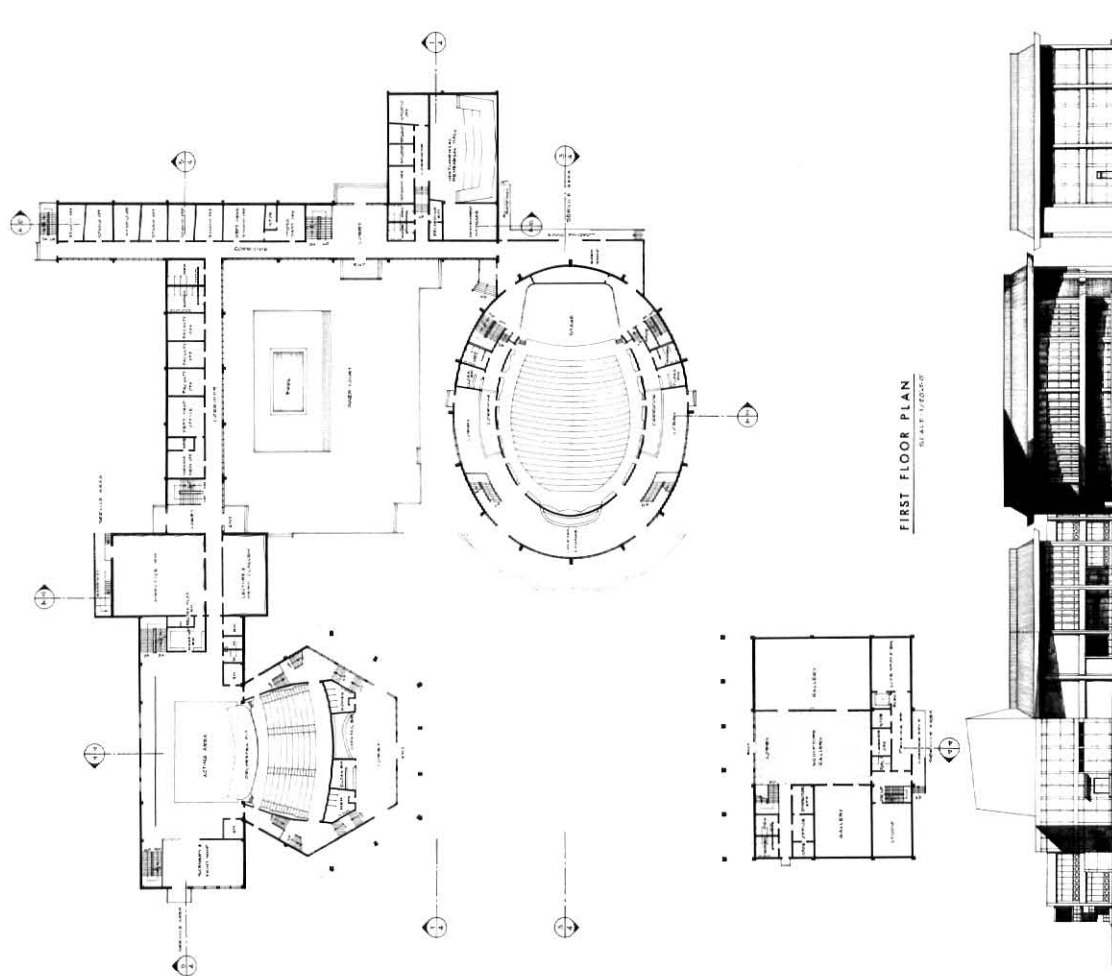


DESIGN FOR MASTER'S DEGREE
DESIGNER: KEEYOUN CHO
INSTRUCTOR: PROF. FRED D. MILES
COLLEGE OF ARCHITECTURE & DESIGN
KANSAS STATE UNIVERSITY
FALL SEMESTER 1969



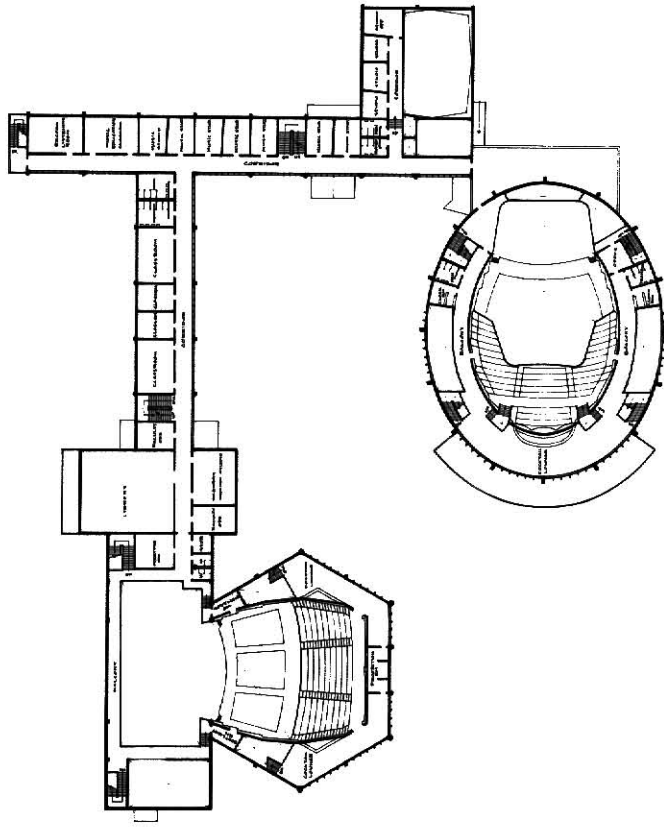




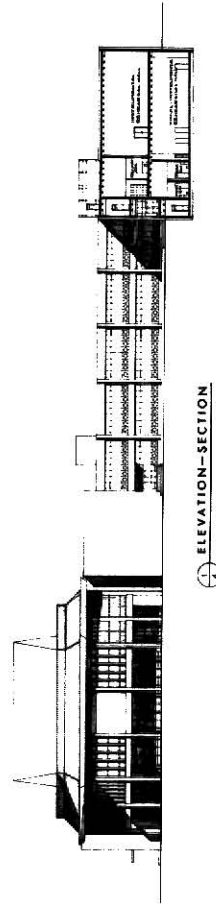
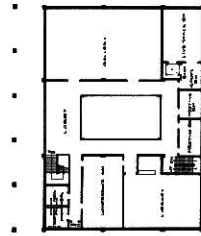


FIRST FLOOR PLAN
SCALE 1/8" = 1'-0"

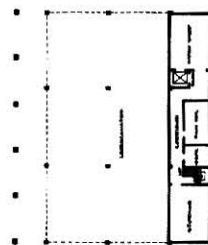
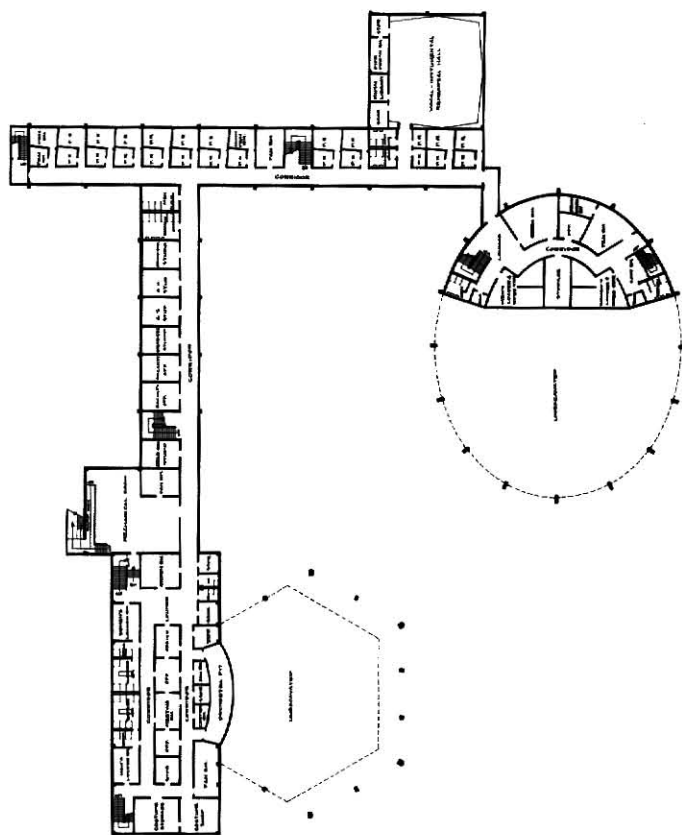
SOUTH-WEST ELEVATION
SCALE 1/8" = 1'-0"



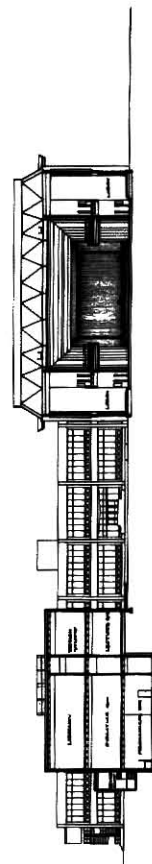
SECOND FLOOR PLAN
SCALE: 1/8" = 1'-0"



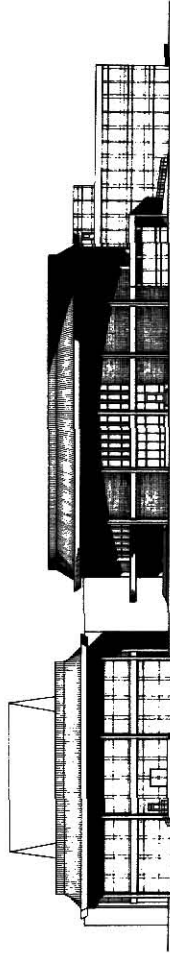
ELEVATION—SECTION



BASEMENT PLAN
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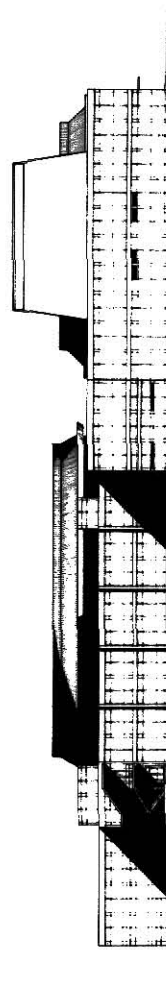
ELEVATION - SECTION
SCALE: 1/8" = 1'-0"



SOUTH-EAST ELEVATION

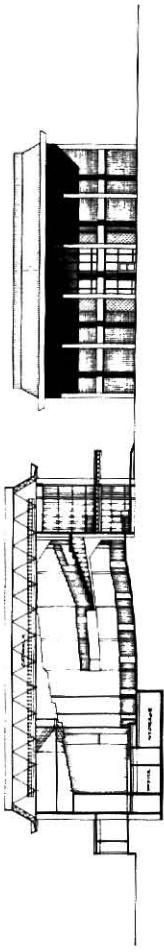


NORTH-EAST ELEVATION

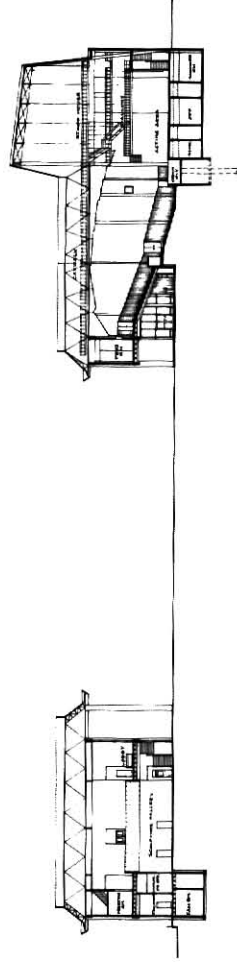


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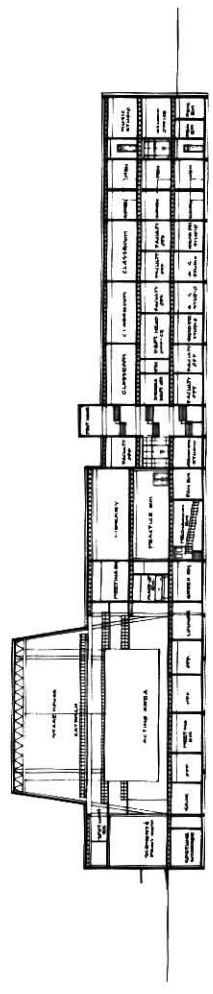
SCALE: 1/8"=1'-0"



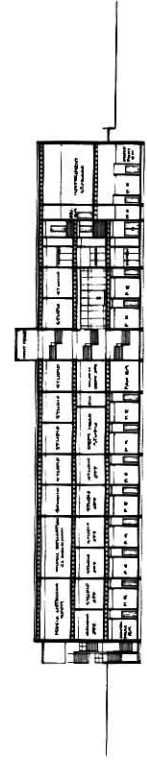
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ELEVATION - SECTION



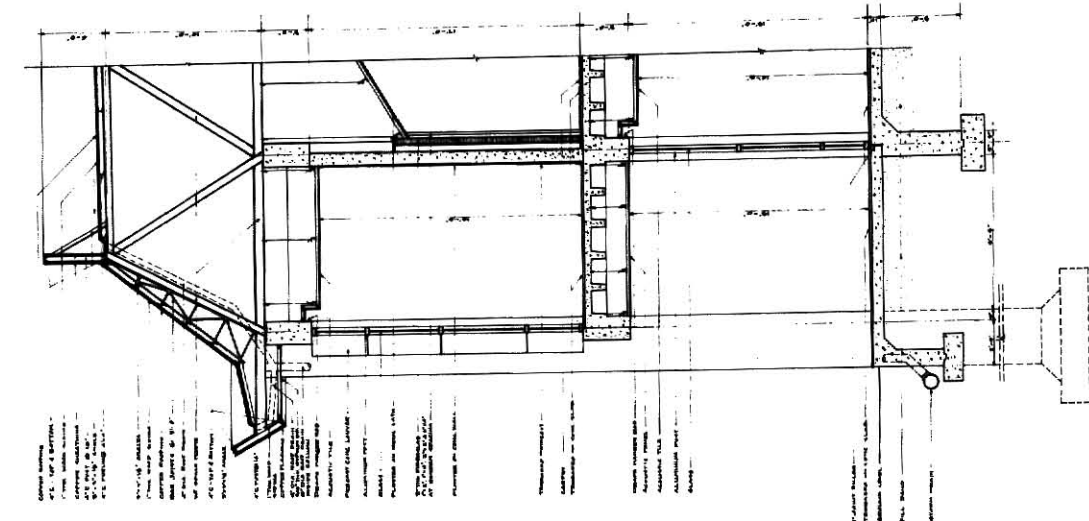
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SECTION



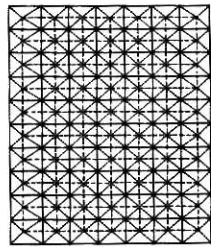
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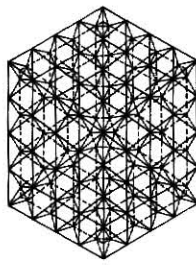
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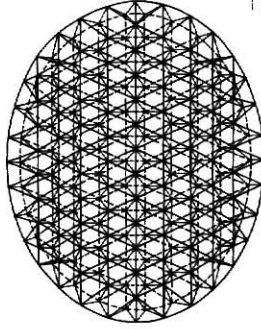
SECTION - THEATRE



ART MUSEUM

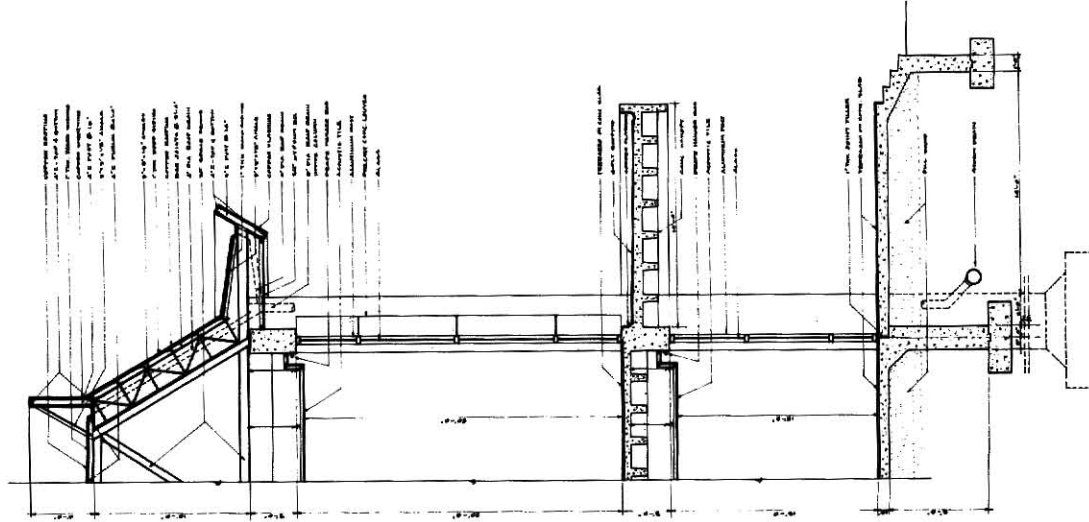


THEATRE



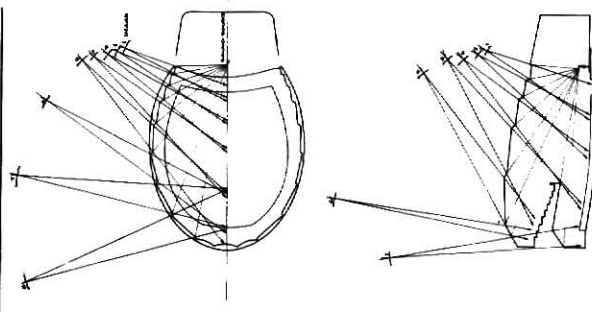
CONCERT HALL

SPACE FRAME - STRUCTURAL PLAN

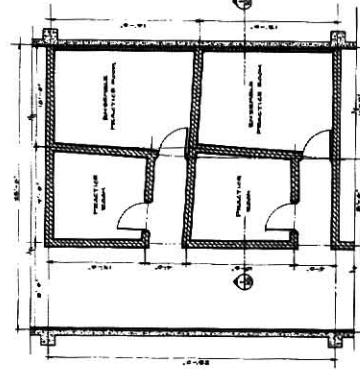


SECTION - CONCERT HALL

RAY DIAGRAM OF SOUND REFLECTIONS

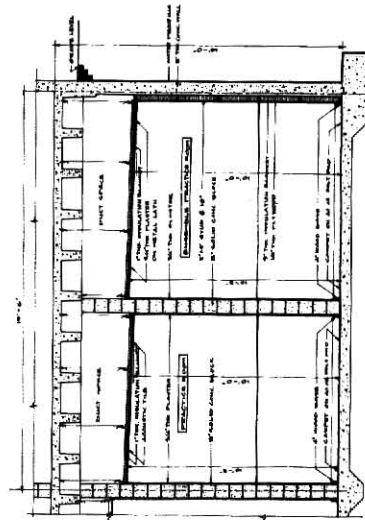


CONCERT HALL



TYPICAL MUSIC PRACTICE ROOM PLAN

THEATRE

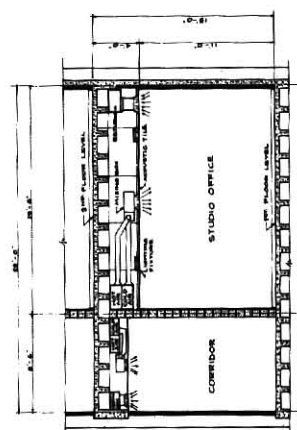
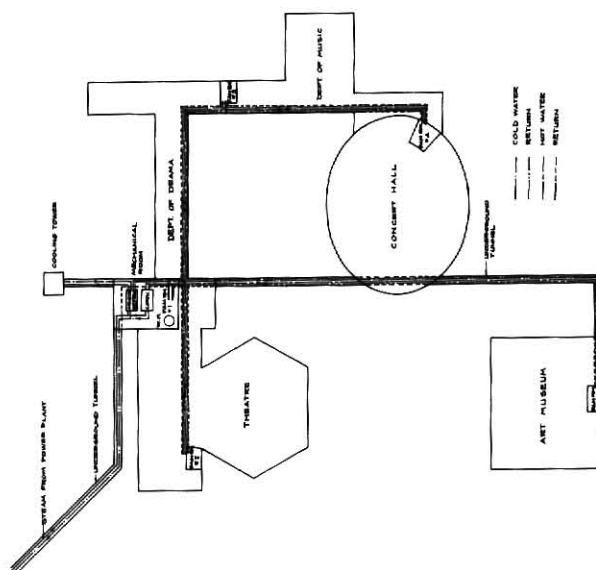
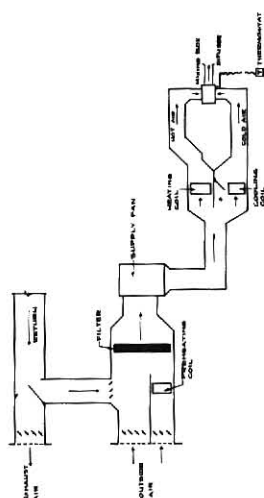
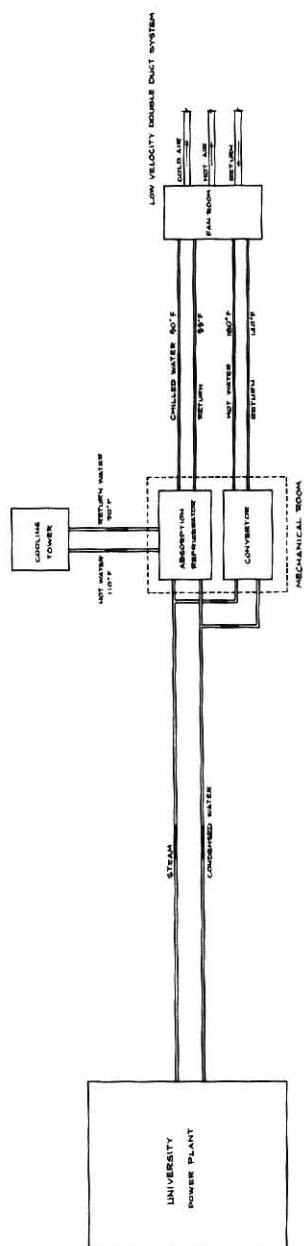


SECTION

SECTION

REVERBERATION TIME CALCULATION

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CONCLUSION

The design concept of this proposed Cultural Center was based on functional form and environmental technology. As the space for performing music and drama and for displaying art works, this Cultural Center facility should have not only well-designed architecture but also a well-treated environment.

In the design process, the Concert Hall gave rise to some problems with the architectural forms and the acoustical considerations. However, the compromise of the architectural approach and the special acoustical treatments should solve these problems. In the aspects of architecture and aesthetics the two main areas which are the public space and the educational space were harmonized with the organic functions of the overall scheme.

ACKNOWLEDGEMENTS

The author wishes to acknowledge the continued encouragement, the efficient suggestions and other aids given by his major advisors, Professor Fred D. Miles, Professor Theodore A. Chadwick and members of his committee, Dean Emil C. Fischer, Professor Henry Wright and Professor Alton A. Barnes, all of the College of Architecture and Design. The author also wishes to appreciate to Dr. John F. Helm, professor in the College of Architecture and Design, Professor Luther O. Leavengood, Head of the Department of Music and Professor Wallace Dace of the Department of Speech for their help.

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A SCHOOL OF MUSIC, DRAMA AND ART MUSEUM COMPLEX
FOR
KANSAS STATE UNIVERSITY
MANHATTAN, KANSAS

by

KEEYOUN CHO

B. S. in Arch. Engineering
Seoul National University
Seoul, Korea, 1965

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARCHITECTURE

College of Architecture and Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1970

The purpose of this proposed Cultural Center is to provide the space for the academic and public activities of the university and its community which are concerned with music, drama and the art museum. To meet these needs of the university this cultural complex has two main spaces. The needs of the public are met by the Concert Hall, the Drama Theatre, and the Art Museum. The needs of the students are satisfied in part by the Concert Hall, the Drama Theatre, and the Art Museum, and by the educational facilities of the Department of Music and the Department of Drama.

Briefly, the following facilities are the basic elements on which this project will be based:

1. The Concert Hall to seat 920 persons.
2. The Drama Theatre to seat 500 persons.
3. The Art Museum.
4. The Department of Music facilities.
5. The Department of Drama facilities.

The Concert Hall, the Drama Theatre, and the Art Museum create a public space which includes the main plaza. Furthermore, the Concert Hall and the Drama Theatre, which belong to separate departments, provide not only the public space for the extracurricular activities concerned with music and the drama but also space for academic curriculums. The Concert Hall in elliptical form, the Drama Theatre in hexagonal form, and the rectangular Art Museum provide contrasts in plan but have unity in elevation within the space frame.

The several pedestrian approaches from on-campus and

off-campus to this Cultural Center terminate at the main plaza which is shared by the Concert Hall, Drama Theatre and Art Museum. The Art Museum for displaying and safekeeping of the art works will have three main galleries, a library, conference rooms and a service space in the two-story structure. The inner court embraced by the Concert Hall, Drama Theatre and both Department facilities has another function. It provides an open space for communications, relaxation of the students, faculty and visitors. The educational facilities for Departments of Music and Drama, which are perpendicular to each other, face the inner court along the single corridor. The two-story music department structure contains large practice rooms, small practice rooms, faculty offices, library, department offices, classrooms, graduate student studios and other educational facilities including those of the Concert Hall and the Drama Theatre. The heavy dense trees and shrubs planted at both the east and west sides of the site create not only an attractive landscape but also a sound barrier.

The designer wished to create a cultural complex which would supplement the existing facilities, the new Auditorium and Danforth Chapel.