The Goodwill Theatre Inc.

Field Documentation, Concept Drawings and Design Studies

36 Willow Street
Johnson City, NY

For

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Cover Page: Front façade of the Goodwill Theatre showing the classical front façade and the auditorium to the left.

MECHANICAL, ELECTRICAL AND PLUMBING
WITH
LEED DISCUSSION AND CLEAN ENERGY OPTIONS

HEATING VENTILATION, PROCESS AND AIR CONDITIONING

GENERAL:

1) It is the intent of this document to describe the mechanical systems proposed for the Goodwill Theatre and surrounding buildings. This document is preliminary in nature, and is based on information available to date. Systems, equipment, sizes, quantities, and arrangements may change, increase or decrease during the preparation of final construction documents to more accurately reflect the end user criteria, needs, and goals.
2) The building complex is a combination of existing and new construction. The end user operates as a "not for profit" entity. Therefore, in addition to meeting strict indoor environmental conditions as required for the performing arts, cost of ownership will be given high priority. This includes but is not limited to:
   (a) Energy Efficiency
   (b) Maintenance Costs
   (c) Ease of Operation
3) Energy saving technologies are indicated in the write up.

Codes and Standards applicable to all systems as adopted by New York State:

i) International Building Code (New York State Edition) – 2015
ii) NFPA 101-2012, Code for Safety to Life from Fire in Buildings and Structures, Chapters 20 and 38
iii) NFPA 90A- 2009, Installation of Air Conditioning and Ventilating Systems
iv) 2015 - International Building Energy & Mechanical Codes
v) ASHRAE 62.1 -2016 Ventilation for Acceptable Indoor Air Quality Standard
vi) ASHRAE/IES Standard 90.1-2013 Energy Standards for Buildings Except Low Rise Residential Buildings

Indoor Environmental Conditions

Space Type	Summer		Winter	
	Dry Bulb	%RH	Dry Bulb	%RH
Auditorium / Theaters	72 °F	50	68 °F	40
Office/Conference Areas	75 °F	50	68 °F	30
Support Areas	75 °F	50	68 °F	30
Mechanical Rooms	80 °F	-	60 °F	-

Spaces will be designed in accordance with ASHRAE Standard 55 and all other user specific criteria

Outdoor Design Conditions

Design Conditions	Summer		Winter	
	Dry Bulb	Wet Bulb	Dry Bulb	%RH
Johnson City NY	89 °F	73 °F	-3 °F	50

General Concept

1. The facility mechanical system will be based on utilizing central heating and cooling plants. The central plants will distribute chilled and hot water to a series of terminal units and air handling equipment throughout the complex. Centralizing the generation of air conditioning and heating offers the following advantages:
   a. Minimization of serviceable equipment thus reducing maintenance expenditure
   b. Flexibility to move heating and air conditioning throughout the facility as internal loads dynamically shift from space to space
   c. Higher efficiency and lower energy expenditures
   d. Using piping to distribute the chilled and hot water in tight historic spaces rather than ductwork

2. Large auditoriums and performing arts areas will be served using constant volume air handling equipment with energy recovery, passive desiccant dehumidification and displacement ventilation air diffusion where possible. This system will offer the following advantages:
   a. Reduction of air conditioning, humidification and heating loads thus reducing central plant size and initial cost of construction
   b. Optimal acoustical performance
   c. Stratification in large spaces will allow more efficient ventilation and higher levels of comfort within the occupied zone.
   d. Increased indoor air quality due to laminar flow qualities of thermal plumes at contamination sources.

3. Support and office spaces will be served by dedicated outside air systems for latent load mitigation and meeting minimum outside air requirements. The DOAS units will be equipped with energy recovery and passive desiccant dehumidification equipment. Sensible loads will be handled with localized terminal equipment. This system will offer the following advantages:

a. Reduction of air conditioning, humidification and heating loads thus reducing central plant size and initial cost of construction
b. De-coupling of latent loads eliminates condensation on coils in occupied areas of the building. Thus, indoor air quality is greatly increased and maintenance costs associated with maintaining drain pan assemblies reduced

Central Refrigeration Plant

1. Based on preliminary load calculations it is recommended to utilize a water cooled chiller plant. The plant will be arranged as to provide at least 60% of the total plant capacity even with a major piece of equipment down for service or maintenance. It is anticipated that the following types of equipment will be utilized:
   a. Two (2) centrifugal water cooled chillers with magnetic bearings
   b. Three variable speed primary chilled water pumps with differential pressure bypass for low load conditions
   c. Three constant speed condenser water pumps
   d. Chilled water high efficiency air and dirt separation tank, expansion tank(s) and softened make up water provisions
   e. Two variable speed counter flow cooling towers with cold start capabilities. Option for solar powered cooling tower
   f. One free cooling plate and frame heat exchanger for water side economization
   g. Chemical free condenser water treatment system
   h. High efficiency full flow or basin sweeping condenser water solids separation
   i. Chilled water plant controller fully optimized and integrated into the facility management system
   j. Refrigerant detection and evacuation systems

2. The chillers will be located in a central mechanical room along with the associated pumping and ancillary equipment. The use of magnet bearings on the centrifugal compressors offers of the following advantages:
   a. Low sound power levels due to non-contact rotating parts
   b. Oil is not required for lubrication thus eliminating the associated service costs
   c. Increased system efficiency due to reduced rotational friction of compressor impellers
   d. Variable speed controllers modulate the compressor rpm’s to minimum unit power consumption during off peak hours
   e. Dual chillers will work in parallel and plant controller will optimize all associated equipment to produce the highest possible

plant efficiency while minimizing sound power levels of rotating equipment

3. The use of a dirt/air separator in lieu of air only separation efficiently removes particulates and maximizes heat transfer efficiency
4. Cooling towers will be mounted on steel supports and isolated from the building structure. The units can be located away from acoustically sensitive areas and will be equipped with low sound packages. The tower fans will be controlled by the plant controller and variable speed fans will be modulated as required using adaptive wet-bulb offset control to run at lowest possible speed while meeting plant demands
5. The use of a chemical free condenser water system in conjunction with solids separation minimizes both blowdown and make up water requirements as well as eliminates the need to purchase chemicals. The combination of these technologies results in significantly reduced operation and maintenance costs with regards to system cleaning, as well as maximizing the refrigeration system's ability to transfer heat to the condenser loop. A water treatment contract with a certified provider is still required for regular testing

Central Heating Plant (HVAC) – Hot Water

1. Based on preliminary load calculations it is recommended to utilize a water cooled chiller plant. The plant will be arranged as to provide 100% of the total plant capacity even with a major piece of equipment down for service or maintenance using N+1 redundancy. It is anticipated that the following types of equipment will be utilized:
   a. Three high efficiency fully modulating, condensing, natural gas fired boilers optimized for reduced supply water temperature
   b. Three variable speed primary hot water pumps with differential pressure bypass for low load conditions
   c. Hot water high efficiency air and dirt separation tank, expansion tank(s) and softened make up water provisions
   d. Closed combustion venting and intake systems with active fan assistance if required
   e. Boiler plant controller with sequencer to minimize each units firing rate and maximize efficiency

2. The boilers will be located in a central mechanical room to allow the associated pumping and ancillary equipment. The use of high efficiency gas fired condensing boilers in an N+1 configuration offers the following advantages:

a. Plant can be designed to minimize supply and thus return water temperatures. Lower return water temperatures offer higher total heat transfer efficiency throughout the entire firing range of the equipment
b. The boiler sequencer will fire all three boilers at reduced firing rates as required to meet the building loads. The lower the firing rate the higher the unit efficiency. This allows maximum operating hours with the lowest possible natural gas consumption
c. Any single boiler can be pulled out of service for preventative maintenance and the entire building load will still be met. If a single boiler is inactive the remaining two running units simply ramp up to meet the supply water temperature set point
d. Due to this configuration, issues with a single unit can always be addressed during regular business hours thus deferring high off-hour maintenance calls

3. The use of a dirt/air separator in lieu of air only separation efficiently removes particulates and maximizes heat transfer efficiency.

4. Closed combustion systems eliminate the need for large boiler-room louvers and the associated heat further reducing initial construction cost.

Co (Tri)-Generation Compatibility

1. The system as proposed can easily be served by a Tri-Generation system. The TriGen equipment would replace the chillers and boilers within the central utility plant. The system would most likely be natural gas fired air bearing micro-turbines. The turbines are able to provide electricity through the generator section, heat via exhaust and jacket cooling as well as cooling utilizing an absorption cycle. Alternate fuels the turbines could potentially be fired on are as follows:
    a. Natural Gas
    b. Associated Gas
    c. LPG/Propane
    d. Flare Gas
    e. Landfill Gas
    f. Digester Gas
    g. Diesel
    h. Aviation Fuel
    i. Kerosene

2. All of the piping and air handling equipment throughout the building would be consistent with the boiler/chiller system. The micro-turbines essentially provide a four-pipe hydronic distribution infrastructure the same as the traditional plan equipment.

3. The systems are modular and can be expanded upon based on customer base. The generators can be paralleled to produce up to 30 MW (approximately 6,000 homes).

Theater / Performing Arts Area(s) HVAC

1. When validating environmental control systems for performing arts facilities the following items must be addressed:

    a. Thermal comfort for audience members
    b. Thermal comfort for performers
    c. Proper humidity levels for vocal performance
    d. Maintaining maximum humidity levels to maximize stage floors or other sensitive finishes
    e. Meeting acoustical criteria
    f. Keeping occupied zones conditioned while minimizing the amount of wasted energy conditioning unoccupied areas of tall spaces

2. A proven effective method to meeting the goals stated above is the use of a displacement ventilation air distribution system. Providing pools of cool dry air at the occupied zone at low velocities can minimize supply air quantities and reduce the required amount of ventilation required by code. This can be achieved either through floor mounted, low wall mounted or freestanding specialized diffusers. Heat is provided utilizing an auxiliary radiant source

3. The air handling equipment serving these areas will include the following components:

    a. Air intake, mixing box and economizer sections with demand control capability
    b. Variable speed direct drive exhaust fan array
    c. Total energy recovery wheel for outside air preconditioning
    d. Chilled water coil
    e. Hot water coil
    f. Variable speed direct drive supply fan array
    g. Passive desiccant dehumidification device
    h. Evaporative humidification system
    i. Access and filtration sections as required
    j. Sound Attenuators

4. Utilizing direct drive fan arrays allows for optimal energy performance at reduced sound levels. The relief fan system will modulate as required to maintain differential pressure set point between the associated theater and outdoor this minimizing infiltrative loads. The supply fan array will utilize its VFDs for balancing, maintaining air flow during filter loading and slow start procedures thus eliminating the noticeability of speed changes.

Office, Classroom, Lobbies and Misc. Area HVAC

1. The ancillary and support areas will be served by a combination of terminal heating and cooling devices all centrally ventilated using dedicated outside air. The focus will be on the use of high efficiency ECM driven, variable speed fan coil units. The coils will be specially designed to properly heat and cool using water temperatures which maximize the central plant efficiencies.

2. This strategy allows the cooling and heating capacity to follow loads throughout the facility as people move from space to space. It also relies on hydronic piping to distribute heating and cooling in lieu of larger ductwork. Given existing conditions will need to be dealt with during installation; this aspect of the system will facilitate constructability.

3. Spaces such as restrooms, mechanical rooms, storage areas, maintenance areas etc. will simply be heated and ventilated using hydronic unit heaters and exhaust fans. Air conditioning can be provided on a case by case basis with fan coil units depending on the owner's project requirements.

4. Ventilation will be provided via a dedicated outdoor air unit. The unit will be centrally located and outside air distributed with ductwork. Since the total air being delivered is for humidity control and ventilation, the size is dramatically reduced as compared to an all air VAV application.

5. The dedicated outdoor air unit will include the following sections:
    a. Air intake, mixing box (for un-occupied mode recirculation) and exhaust sections with demand control capability
    b. Variable speed direct drive exhaust fan array
    c. Total energy recovery wheel for outside air preconditioning
    d. Chilled water coil
    e. Hot water coil
    f. Variable speed direct drive supply fan array
    g. Passive desiccant dehumidification device
    h. Access and filtration sections as required

Direct Digital Controls

1. Provide a networked direct digital controls system to integrate all mechanical equipment within the facility. The controls shall include command, monitoring alarming and graphics including but not limited to the following:
    a. *Central Chilled Water Plant*
    b. *Central Hot Water Plant*
    c. Air Handling Units
    d. Fan Coil and Terminal Units
    e. Exhaust Fans
    f. Unit Heaters

2. The system shall be web-enabled which will allow password protected, tiered access from any computer utilizing a web browser.

3. All major industry communication protocols will be supported as to allow the integration of information from other building systems.

4. A graphical user interface will be provided. The interface will be user friendly, clearly indicating the associated equipment and all adjustable set points and parameters.
5. A digital floor plan will be provided thus allowing a logical and intuitive workflow when accessing data.

6. Energy management protocols such as scheduling and optimization shall be provided. The system shall allow the user to schedule events well within the future and set the appropriate temperature and humidity parameters for each event.

7. The energy management software shall be integrated with utility monitoring to allow the trending of usages and assist in trouble shooting equipment malfunctions.

8. Alarms shall be user selectable and adjustable. Notifications will be sent via text message, email or other form of digital communication.

General Means and Methods

1. Ductwork shall be installed and provided per SMACNA standards.

2. Fire and smoke dampers shall be provided as required based on code review

3. Duct smoke detectors shall be provided on the supply and return of air handling units and tied into the fire alarm system

PLUMBING

General:

1. It is the intent of this section is to describe the plumbing systems proposed for this building. This document is preliminary in nature, and is based on information available to date. Systems, equipment, sizes, quantities, and arrangements may change, increase or decrease during the preparation of final construction documents to more accurately reflect the end user criteria, needs, and goals.

2. The building is a combination of existing and new construction. The end user operates as a "not for profit" entity. Therefore, in addition to meeting strict indoor environmental conditions as required for the performing arts, cost of ownership will be given high priority. This includes but is not limited to:

    a. Energy Efficiency
    b. Maintenance Costs
    c. Ease of Operation

3. Energy saving technologies are indicated with **green text**

4. Codes and Standards:
    a. NFPA
    b. International Building code (New York State Edition)
    c. International Plumbing code (New York State Edition)
    d. American Society of Plumbing Engineers Publications
    e. ASME B31.9 Building Services Piping

Domestic Water Systems:

1. Water Service:
    a. A new water service will be provided as required to meet the building demand. The service will be installed in accordance with utility regulations.

2. Water Distribution:
    a. A horizontal distribution system will serve plumbing fixtures and equipment requiring domestic water throughout.

b. Isolation valves will be provided at building domestic water entrance, at each branch to commons areas serving 2 or more fixtures, and at each wall hydrant or equipment connection.

c. Backflow prevention devices will be provided for all hvac equipment connections and wherever required by code.

d. Thermostatic mixing valves shall be provided at emergency shower / eyewash stations to provide tempered water as required by code.

e. Shock absorbers will be provided for shock suppression. All water piping shall be insulated and supported per current code.

3. Domestic Hot Water:
    a. The domestic hot water service will be provided from a storage type high efficiency gas water heater to the plumbing fixtures and all equipment requiring domestic hot water.

    b. Water heater will be gas, vertical commercial storage type with factory insulated jacketed tanks which meet ASHRAE 90.1 requirements. Water will be stored at 140°F for Legionella control, mixed and delivered at 110°F through master mixing valves to fixtures and equipment.

    c. Domestic hot water piping will be insulated in accordance with Plumbing and Energy Code requirements with fiberglass insulation with flame spread and smoke developed ratings in accordance with the building code.

4. Domestic Water Piping:
    a. Domestic water piping within the building will be type L hard copper with wrought copper sweat type fittings and lead free solder. Water piping below slabs on grade will be type K soft copper with no joints below slab.

b. Long runs of hot water piping shall be provided with suitable expansion compensation.

c. Piping shall be supported and installed in accordance with current code.

Drainage Systems:

1. Sanitary Sewer System:
   a. All underground sanitary drain waste and vent systems as well as exit laterals will remain from the existing connections to the site sanitary (5-feet from the building) in the existing building portion of the project.
   b. New above ground drainage and vent will be provided to all fixtures and equipment requiring service. Trenching and additional underground sanitary and/or vent will be selectively provided as required to facilitate the new floor plan.
   c. Vent piping will terminate through the roof. Vent terminations shall be coordinated with HVAC air intakes to insure proper separation.
   d. The drainage system will be provided with traps, vents, and cleanouts as required by code. Pro-set trap seals will be provided for drains susceptible to loss of water seal by evaporation in accordance with Plumbing Code requirements.

2. Storm Drainage System:
   a. Storm drainage systems will be installed where required (flat roof areas) and connected to the existing underground drainage and building exit laterals extending to the site storm water system 5-feet from the building in the existing building portion of the project.
   b. A new exit lateral is anticipated only for the new addition and will be extended to 5-feet from the building.

   c. Cleanouts will be installed as required by code. Drain bodies and horizontal rainwater piping above grade and within heated spaces will be insulated to prevent condensation.
   d. Storm drainage system shall be designed on a minimum 100-year, 60-minute storm event in accordance with the Plumbing Code.

3. Sanitary and Storm Drainage Piping:

    a. Sanitary waste, vent, and storm drainage piping below grade will be polyvinyl chloride (PVC) meeting ASTM D-2665 with solvent weld joints and PVC fittings or cast iron as conditions dictate
    b. Above ground piping shall be cast iron soil pipe meeting ASTM A-74 / CISPI-301, service class with mechanical sleeve joints will be used.
    c. Once in the design phase, verification will be provided that the existing sanitary and storm water systems can accept the flows from the proposed building.

Plumbing Fixtures:

1. General:

    a. Fixtures will be first quality vitreous china as manufactured by Kohler and be low flow water conservation type.
    b. Handicap fixtures will be provided as required by the International Building code.
2. Water Closets:
    a. Water Closets: Wall hung and floor mount, vitreous china, elongated, 1.28 gpf, wall outlet and floor outlet, hard wired senor operated flush valve with manual flush feature, heavy duty plastic seat with open frontless cover, and carrier. Mount handicap accessible units with rim 18" aff.
3. Lavatories/ Sinks:
    a. Lavatories: 20x18 vitreous china, wall hung and countertop mount, mounted 34" aff with hard wired sensor operated controls w/ gooseneck spout, grid drain, tempering valve, chair carrier, and plumbing trim.
    b. Sink: Stainless steel single bowl with gooseneck faucet and wrist blade handles.
    c. Service Sink: Enameled fiberglass, floor mounted, 12x12x12, without faucet holes, CRS rim guard, grid drain, trap standard, wall mounted solid brass faucet w/ 4 arm handles on faucet, vacuum breaker, pail hook
4. Urinals:
    a. Urinal: Wall hung, vitreous china, with integral trap, exposed flush valve, electronic sensor operated, .5 gpf, with chair carrier with rim

mounted 24" aff. Mount handicap accessible units with rim 17" aff.

5. Drinking Water Dispensers:
    a. Electric Water Cooler: will be electric, self-contained, dual level, wall hung type, bubbler style, 18x18x25, with bottle fill, front and side bar operation. Bottle filler stations will be integral to the unit.

Plumbing Specialties:

1. Overall building.
    a. Non-freeze hose bibs shall be provided on outside walls for building maintenance. A hose bib shall also be provided in the mechanical room. Backflow preventers and vacuum breakers shall be provided at hose faucets and all other areas required by code. Pipe anchors and supports and shock absorber devices shall be provided where required. Floor drains shall be provided in utility rooms, all rest rooms and mechanical areas. Provide valves on water piping where required.

FIRE PROTECTION

General:

1. It is the intent of this section is to describe the fire protection systems proposed for this building. This document is preliminary in nature, and is based on information available to date. Systems, equipment, sizes, quantities, and arrangements may change, increase or decrease during the preparation of final construction documents to more accurately reflect the end user criteria, needs, and goals.

2. The building is a combination of existing and new construction. The end user operates as a "not for profit" entity. Therefore, in addition to meeting strict indoor environmental conditions as required for the performing arts, cost of ownership will be given high priority. This includes but is not limited to:

    a. Energy Efficiency
    b. Maintenance Costs
    c. Ease of Operation

3. Codes and Standards
    a. NFPA 10, Portable Fire Extinguishers
    b. NFPA 13, Installation of Sprinkler Systems
    c. International Fire Code (New York State Edition)
    d. Society of Fire Protection Engineers- Handbook of Fire Protection.

Design Criteria:

1. The facility will be fully protected (sprinkled) as required by the New York State Fire Code and NFPA 13

2. Based on proposed height and vertical distance form fire department access and stand pipe system will be incorporated. The system will be designed in accordance with NFPA 14.

3. City water pressure will be reviewed to determine the need for a fire pump. Should a fire pump be required the design shall be in accordance with NFPA 20

4. Ancillary hose stations shall be provided at stage areas or where otherwise required by NFPA 13

5. Areas housing critical high value equipment such as control booths will be protected with a inert gas clean agent system. The gas being used will be an environmentally friendly blend of argon and nitrogen. The chemical holds a rating of zero ozone depletion potential (ODP) as well as zero global warming potential (GWP)

Monitoring:

1. The fire protection system will be monitored by the building fire alarm system. Monitor points will include trouble and alarm conditions for water flow switches and valve tamper switches. All alarms and sensors shall be provided new and tied into the fire alarm system.

Electrical

General

1. It is the intent of this section is to describe the electrical systems proposed for this building. This document is preliminary in nature, and is based on information available to date. Systems, equipment, sizes, quantities, and arrangements may change, increase or decrease during the preparation of final construction documents to more accurately reflect the end user criteria, needs, and goals.
2. The building is a combination of existing and new construction. The end user operates as a "not for profit" entity. Therefore, in addition to meeting strict indoor environmental conditions as required for the performing arts, cost of ownership will be given high priority. This includes but is not limited to:

    a. Energy Efficiency
    b. Maintenance Costs
    c. Ease of Operation

3. Energy saving technologies are indicated with **green text**

Codes

1. International Building Code (New York State Addition) - 2015
2. NFPA 70 National Electrical Code
3. NFPA 72 National Fire Alarm Code
4. NFPA 110, Emergency and Standby Power Systems

Service and power distribution

1. The proposed facility will be served by a secondary metered 3000 amp – 480/277 volt – 3 phase - 4 wire – 65 KAIC secondary metered service.

2. A new service rated Switchboard copper bussed with a full neutral shall be provided. It shall be served by a new utility owed 2500 KVA exterior pad mounted transformer. The board shall be both front aligned/accessible and equipped with the following:
    a. Fixed mounted main - insulated case 100 % rated power breaker with LSIG trip unit.
    b. Electronic main metering.
    c. Branch breakers shall be molded case type with electronic trip units and integral current meter/trip indicator.

d. Shunt trips on elevator feeds.

3. In general, loads will be served as follows:

Load	Service
Lighting	277V.
Motors 0.5 hp and larger	480V, 3-phase.
Miscellaneous receptacles and motors 0.33 hp and smaller	120V.

4. Distribution Panelboards – I-line type MLO – 65 KAIC copper bussed. Branch breakers shall be thermal magnetic with field interchangeable trip units. In addition to active breakers, one spare of each type shall be included as well as 25% space for future devices.

5. 480/277 volt lighting and equipment branch circuit panelboards will be provided to serve the lighting and electric VAV units. Panels shall be NF type MLO – 65 KAIC, copper bussed. Branch breakers shall be fixed thermal magnetic devices. In addition to active breakers, 25% spare of each type shall be included.

6. 208/120 volt general power panelboards will be provided to serve general building power loads. Panels shall be equipped with a main breaker, NQOD type – 10 KAIC, copper bussed. Branch breakers shall be fixed thermal magnetic devices. In addition to active breakers, 25% spare of each type shall be included. Panels dedicated to serving demountable partitions and classrooms shall have a 200% neutral.

7. Dry Type Transformers
    a. Dry type transformers shall be provided throughout and shall be copper wound with a NEMA 1 standard ventilated enclosure.
    b. Transformers shall meet DOE 2016 Energy Efficient requirements.

8. Surge Suppression Systems

    a. Include field-mounted SPDs for low-voltage (120 to 600 V) power distribution and control equipment. Units shall be UL 1449 rated with integral disconnect switch, thermal protection, indicating lights and surge counter. as follows:
        a. Switchboard

            1. Line to Neutral: 1200 V for 480Y/277 V
            2. Line to Ground: 1200 V for 480Y/277 V
            3. Line to Line: 2000 V for 480Y/277 V

4. Peak single-pulse surge current withstand rating per phase shall not be less than 200 kA

Grounding

1. The electrical systems, circuits, and equipment will be grounded and bonded in accordance with Article 250, NFPA.

2. All feeders and branch circuits shall have an insulated ground conductor run with the branch circuit. Raceways shall not be relied upon as the equipment ground.

3. Separate grounding will be provided for all A/V equipment.

Power and Branch Circuit Distribution

1. All feeders shall be copper type THWN/THWN-2 run in raceway. Feeders shall be sized to limit voltage drop to a maximum of 2% assuming a load of 80% of the panel rating.

2. Branch Circuits
    a. Branch circuits shall utilize raceways where exposed and for all homeruns back to panelboards. Circuit distribution to loads in concealed spaces shall utilize type MC cable from homerun to the load.
    b. Branch circuits serving 120 volt general power receptacles shall be loaded to a maximum of 1440 VA. A common neutral shall be allowed for general load 3 phase homeruns. An individual neutral shall be run in all circuits serving demountable partitions and computer training classrooms typically served from in-floor raceways or below raised floors.
    c. Branch circuits serving 277 volt lighting shall be loaded to a maximum of 3500 VA.
    d. Branch circuits serving dedicated loads shall be sized as appropriate.
    e. Branch circuits shall be sized to limit voltage drop to 3% at the furthest load served.
    f. Wiring will be insulated conductors installed in raceways where required by the National Electric Code. Conductors will be copper with type THWN/THWN-2 or XHHW insulation. Wire sizes for branch circuit power and lighting will be a minimum of #12 AWG and a maximum of 750 kcmil.

3. Raceways:
    a. Outdoors: Apply raceway products as specified below unless otherwise indicated:
        i. Exposed Conduit: GRC
        ii. Concealed Conduit, Aboveground: RNC, Type EPC-40-PVC.

iii. Underground Conduit: Type EPC-40-PVC direct buried for branch circuits and concrete encased for service entrance.
iv. Boxes and Enclosures, Aboveground: NEMA 250 Type 3R.

b. Indoors: Apply raceway products as specified below unless otherwise indicated:

i. Exposed, Not Subject to Physical Damage: EMT
ii. Homeruns and where concealed in inaccessible Ceilings: EMT.
iii. Connection to lighting and vibrating equipment: FMC except LFMC in damp or wet locations.
iv. Damp or Wet Locations: GRC
v. Boxes and enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in commercial kitchens and damp or wet locations
vi. Minimum Raceway Size: 3/4-inch trade size.

c. Raceway Fittings: Compatible with raceways and suitable for use and location.

i. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
ii. EMT: Use setscrew fittings. Comply with NEMA FB 2.10.
iii. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

Emergency Power

1. The facility will be protected by a diesel generator sized to handle the following life safety loads.
    a. Emergency Lighting
    b. Fire alarm system

2. If the budget allows; the following Equipment branch will also be supported:
    a. Elevator
    b. Miscellaneous IT loads
    c. Security System

Lighting and Control

1. All lighting shall be designed in conformance with the current version of the energy code.

2. All lighting levels shall conform to IES recommended practices.

3. Parking lot lighting shall utilize LED full cutoff, dark sky compliant fixtures with photocell/timeclock control.

4. General interior lighting shall utilize LED and fluorescent lamp sources as appropriate. Automatic lighting control shall be incorporated throughout using wall and wall/ceiling mounted devices as appropriate.

5. Custom LED Stage lighting shall be designed to meet the needs of the spaces.

6. Emergency life safety lighting shall be provide as follows:

    a. Exterior Doors: Install new lights over exit doors with fail on photocell control tied to the life safety branch.
    b. Interior life safety lighting shall consist of a combination night lighting/life safety system to provide a minimum of 1 FC in all required spaces as well as rest rooms. This shall apply to all areas of new and existing construction.
    c. Exit sign shall be provided throughout on the nearest life safety circuit in all areas of new and existing work.

Fire Alarm System

1. The entire facility; shall be equipped throughout with a new supervised addressable fire alarm system. The main Fire Alarm Control Panel shall be located in the first floor electrical room. A remote LCD annunciator shall be installed in main entrance vestibule.

2. Control equipment will be modular in construction, UL listed, and housed in surface mounted steel cabinet within electrical closets. Operating voltage will be 24V dc. Standby power will be furnished by self-contained emergency battery power supply sized as necessary to meet NFPA requirements.

3. The main fire alarm control panel will include solid state construction, plug-in modules and dead front construction. Signaling line circuits and initiating device circuits will be arranged so that the number of devices does not exceed 70% of circuit capacity. The fire alarm annunciator will include an LCD display with minimum 40 character capacity.
    a. Alarm initiating devices will include addressable manual pull stations, monitor modules, duct detectors, heat detectors, and smoke detectors. Addressable monitor modules will be provided for non-addressable devices including sprinkler water flow switches, and valve tamper switches.
    b. Alarm signaling devices will consist of visual and combination audio/visual devices located throughout.

i. The intent is to install a complete manual fire alarm system throughout the facility. Equipment shall consist of but not be limited to :

Main FACP.

1. Remote signal and power supply panels.
2. Remote LCD annunciator.
3. Smoke located above main FACP, elevator lobbies and in electrical rooms.
4. Combination smoke and heat detectors in elevator machine rooms and shafts for elevator recall.
5. Duct Detectors provided and wired by the E.C. and installed by the mechanical contractor. Each detector shall be provided with a remote test station located in the nearest electrical room.
6. Monitor modules for fire protect system flow switches; tamper switches and independent kitchen fire suppression system trouble and alarm signals.
7. Control modules for release of secured exit doors.
8. Visual and Combination A/V units.
9. All wiring in exposed locations and inaccessible ceiling cavities and walls shall be installed in raceway. Raceways for wall mounted devices shall extend 6” into the nearest accessible ceiling and bushed to protect the wire. Properly supported plenum wiring shall be run above accessible concealed plenum spaces.

Voice/IT Service

1. New service shall be provided through (2) 4" conduits (one active and one spare) terminated in the designated MDF Room.
2. Specific facility requirements, equipment and distribution shall be determined as construction documents are developed.

Example of Low Noise Fan Coil on Roof of a Theatre

END MEP DESCRIPTION

LEED CONSIDERATIONS IN THEATRE REHABILITATION

INTRODUCTION

This section of the Goodwill Theatre Broome County Report (GWTBC) is intended to focus attention on potential LEED Certification for the rehabilitation of a historic theatre. The Architectural Team assigned to the GWTBC Report has three individuals who have completed the only Certified Silver LEED Theatre Rehabilitation in the world. Killis Almond, FAIA, and Shantha Gunawardena, RA, LEED-AP were the Architects of record on the Ft. Sam Houston Theatre Rehabilitation and Fritz Schwentker of Wrightson Johnson Haddon and Williams, was the theatre consultants for the Fort Sam Houston project. This project which was completed through the Army Corps of Engineers was Certified Silver LEED and received the Air Force Merit Award for Rehabilitation. This experience gives the GWTBC Team a direct background in discussing LEED Project Certification vs. other alternatives used in rehabilitation.

The approach to cost savings and value engineering is substantially different when dealing with non-profit organizations, federal agencies and local government entities. With a non-profit client, the evaluation of any certification process must consider the cost of the LEED designation and what it does to the overall project schedule. The following is a discussion relating directly to theatre rehabilitation in light of potential LEED Certification cost.

The Ft Sam Houston Theatre (Building 2270) is the only historic theatre in the world to receive the LEED Certified Silver Rating. It was completed to be used as the home of "The Army Show" by the US Army Corps of Engineers, December 2011.

LEED CONSIDERATIONS

The LEED Certification process encompasses the entire construction schedule including the initial design and completion of Construction Documents. For this reason, the cost of LEED in a theatre project would include the following:

1. Professional LEED fees.
2. The cost of documentation and management of the compliance process.
3. Cost of research and design relating to creating input into the Design and Construction Document process before construction.
4. Commissioning costs and modeling compliance in the design process.
5. Cost of construction.

As can be seen from the previous list, the cost to create a LEED Certified theatre will involve a substantial amount of fees over and above the standard fee for theatre rehabilitation. Theatre rehabilitation in its own right involves a larger number of Consultants than a standard architectural project. In fact, the total number of Consultants on a standard theatre project can include 15 to 25 different Consultants involved in many different aspects of theatre architecture, engineering, sound, lighting, etc. There are also different LEED Consultants. The LEED Design Consultant will take the project through Construction Documents and bidding, however, a separate Consultant is required to commission the project and complete the final report for certification. Assuming cost savings in the LEED construction will be offset with savings in other parts of construction is a dangerous approach, especially on complicated structures such as theatre rehabilitation. LEED projects have been studied, especially by governmental agencies regarding the premium paid for LEED projects. The additional costs for LEED have been estimated at between 2 to 15% higher depending on type of building construction and level of certification.

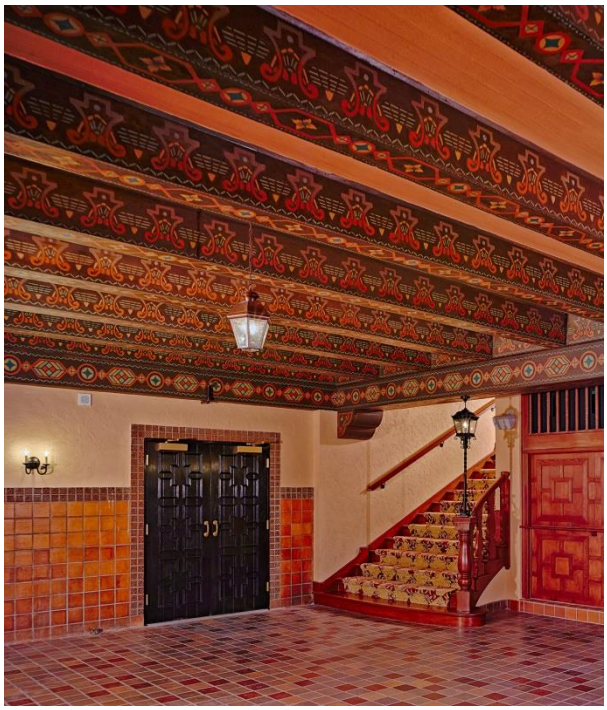
The Ft Sam Houston Theatre (Building 2270) interior was restored to reflect the original 1931 detailing including restoration of the murals on each side of the cheek walls of the proscenium. Special ADA accommodations were made to allow for additional wheelchair spaces and transfer seats for military personnel recuperating in the post hospital.

In dealing with historic structures, other factors affect the ability to consider any type of Certified LEED process. Building construction and existing structural elements can eliminate the certification process as an option if the existing building elements are impossible to work around. Space may not be available to

complete all of the aspects required to meet LEED requirements. Assuming this is the case, does not mean that the building cannot be built with the efficiencies and even the same equipment that would be used in a certified LEED rehabilitation process, but without going through the certification and the associated fees, documentation, modeling and commissioning costs.

Because non-profit money is normally raised through a Capital Campaign, government and foundation grants, and almost all theatre projects are budget driven and time sensitive. For this reason, the Certified LEED approach is more difficult. And ultimately the only difference between the high quality energy efficient theatre rehabilitation and a Certified LEED theatre is the plaque on the wall and a substantial amount of money being spent by the non-profit.

The rehabilitation of a theatre is normally substantially higher in cost than other building types except for those specialized structures like hospitals. In a way, theatres have more in common with hospitals than they do in other building types simply because there are activities and equipment that are absolutely necessary in a theatre that do not occur in any other building type.



The Ft Sam Houston Theatre (Building 2270) front lobby to the auditorium. The decorative beams were cleaned and the painting restored. The original concession stand (far right) was restored from original drawings and photographs.

LEED CONCLUSION

It is recommended that the approach to the Goodwill Theatre rehabilitation include planning for efficiency, quality equipment, low energy use lighting and all of the other elements that would normally be included in a quality construction project. However, with a theatre it would be more important to use money saved from the LEED process for energy efficient theatrical sound, lighting, rigging and lighting upgrades. The Certification process should not be considered unless:

1. Complete pre-planning process indicates that all of the elements for LEED can be accommodated within the new construction process.
2. Sufficient capital money has been raised to pay for the Certification of the structure.
3. A significant addition is constructed to the Goodwill Theatre structure that would allow the cost of Certification to be distributed throughout the new construction cost.

If the Certification process is not attempted, then the equipment, design and operational issues of the building should be focused with the same projected outcomes for efficiency as a Certified LEED project. The completion of the Capital Fund Drive may allow the non-profit to occupy the building with little or no debt, however, the monthly charges for electricity and maintenance will continue on into the future and energy savings are an important part of any non-profit's annual budget.

Certified LEED projects are one way to accurately measure the efficient approach to building operations. However, recent research competed by the Environmental Policy Alliance (EPA) has shown that private buildings certified by the USGBC LEED Standards actually use more energy than uncertified buildings. It is obviously an issue for initial cost consideration and operational cost consideration that will drive the expenditure. Energy efficiency must be a high priority but LEED Certification should be considered with great care due to cost increases and efficiency issues.

The previous discussion on LEED Certification emphasizes the additional cost especially to a nonprofit organization to approach the rehabilitation of a historic theatre with this formal process. However, it is important that the GWT take advantage of high energy-saving equipment, equipment with an expected long operational life and upgrades to that equipment using targeted grant money to take the equipment to a higher level of efficiency. The GWT has the potential to qualify for significant funding to increase the efficiency of the mechanical and electrical systems through the New York Energy Research and Development Agency (NYSERDA). Qualification for NYSERDA grants will demand capital funds that can be budgeted for high quality standard mechanical and electrical systems for the GWT are in place for the projected design and construction of the equipment. The NYSERDA grants could pay the difference between standard quality mechanical and electrical systems and higher quality systems that will make the building a true energy saver for the state of New York.

The Goodwill Theater can leverage multiple NYSERDA & utility initiatives available in the state of New York to maximize energy efficiency and minimize energy costs. GWT will be evaluating NYSEG Commercial and Industrial (C&I) Rebate Programs that offer energy efficiency options for both Prescriptive rebates on a broad range of specific, predetermined measures, and Custom rebates for projects that require site-specific assessment and cost analysis.

Utility and NYSERDA Energy Saving Measures which should be evaluated include the following:

NYSERDA Flexible Technical Assistance (FlexTech) Program (50% cost-share up to $250,000):

Strategic energy management assistance

Energy master planning

ASHRAE Level II or comparable energy analyses

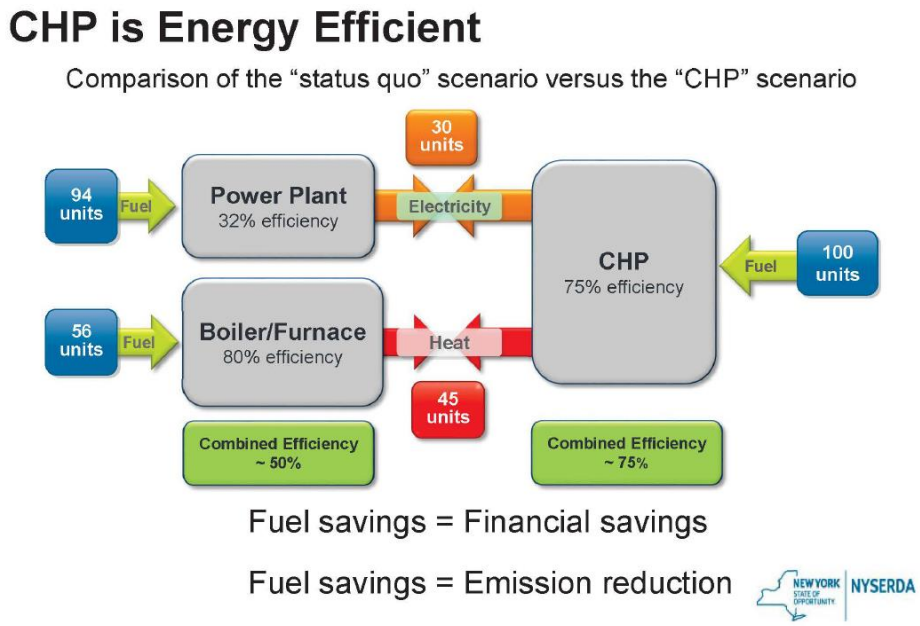
Targeted system or equipment upgrade options

Whole-building design techniques that consider all building energy components and systems.

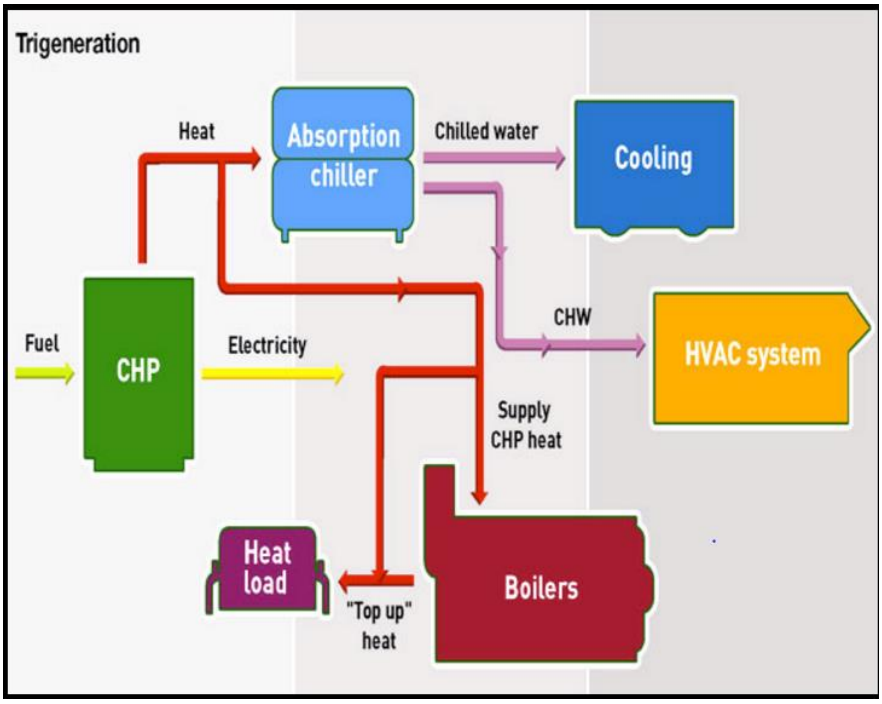
Building Energy Modeling - Develop an energy model of the building using simulation software to help make critical decisions about the building's design early in the process.

ENERGY MANAGEMENT CONTROL SYSTEM (EMCS) – access the NYSERDA Commercial Real Time Energy Management (RTEM) Program to develop computerized control systems that will regulate the energy consumption of the buildings by controlling the operation of energy consuming systems, including heating, ventilation and air conditioning (HVAC), lighting, and water heating systems. Capabilities will include monitoring environmental and system loads, and adjusting HVAC operations in order to optimize energy usage and respond to demand response signals

Combined Heat and Power (CHP) - use natural gas fuel to create both heat and electricity, leveraging NYSERDA's flex-tech study and Program Opportunity Notice (PON) 2568 to improve efficiency & reliability while decreasing overall energy costs.



Combined Cooling, Heat and Power (CCHP) – expand the CHP to include the potential to add an absorption chilling in a TriGeneration system – Combined Cooling, Heating & Power (CCHP):



Solar Electric: Access part of the $1 billion NY Sun Incentive program and Reforming the Energy Vision (REV) to install Solar Electric (Photovoltaic or PV systems) on the roof and/or on carports in the parking lots..

Community Solar – For the load that isn't met by the CCHP and Solar systems, evaluate the potential to participate in accessing local, clean solar energy from a community solar project that can offset all or a portion of electric bills with predictable rates and terms

Vehicles - Electric Vehicles (EVs) & EV Charging Stations

EVs reduce transportation fuel costs by 50% to 70%, and the ~20 moving parts cost dramatically less to maintain than the 2,000 moving parts of an internal combustion engine. EV prices are annually decreasing by 18% as sales increase by 70% worldwide.

Create a public-private partnership to take advantage of the NYS Tax Credit for 50% of the cost of an EV Charging Station and $7,500 federal tax credit on EV purchases, as well as the $1,700-$2,000 NYS EV purchasing incentive program.

Access the Cleaner Greener Community Grant programs to secure $8,000 per 2 head EV chargers as well as the technical and financial support offered by NYSERDA's Charge to Work programs.

Evaluate the 31 models of Plug-In EVs for potential employee & facility operational suitability

Carpooling - Offer employee incentives to use public transportation, encourage carpooling, reduce unnecessary travel, and choose fuel-efficient shipping methods.

Occupancy & CO2 sensors – control air flow and lighting with occupancy and carbon dioxide sensors

On-Demand Hot Water in bathrooms – Minimize the cost of providing hot water to bathroom sinks by utilizing on-demand heaters.

Batteries – Use rechargeable batteries for products including cordless phones and PDAs

Boiler Operations

Economizer to recover waste heat

Insulation on boilers

Annual combustion testing and boiler tune-ups

Consider multiple small boilers vs. one large central unit

Lighting

Incorporate daylighting into the total lighting approach for not theatrical spaces. Daylighting technology, including photosensors and dimming ballasts, creates the opportunity to incorporate more cost-effective solutions than in the past. LED lights use 80-90% less energy and last 35 to 50 times longer than incandescent lighting, and 2 to 5 times longer than fluorescent lighting. LEDS will also reduce cooling costs since they produce very little heat.

Install motion sensors and/or photosensors to prevent outdoor lights from operating during daylight hours.

- Use occupancy sensors in private offices and conference spaces so they are not lit when vacant.

- Install switch plate manual-on, auto-off occupancy sensors in proper locations to automatically turn off lighting when no one is present.

ENERGY STAR qualified equipment for computers, refrigeration, commercial food service equipment, exit signs… Energy Star equipment can save over 45% of the energy used by conventional models.

- Set copiers, printers, fax machines and other office products to standby mode when not in use.

- Turn off office equipment during non-production periods

- Plug TV, computer, and other electronics into a power strip to centrally "turn off" all appliances and save energy.

Train Staff

- Develop a program to educate and motivate employees on ways to save in the office.

- Train maintenance staff and occupants on energy-efficient and renewable energy technologies.

- Order brochures and posters from the EPA to promote saving energy in the facility

- Use EPA's ENERGY STAR Facility Energy Assessment tool to evaluate energy management practices and save money.

Motors

- Install variable frequency drives for fluctuating loads, and replace old motors with NEMA premium efficiency motors.

Printers

- Default all printers to double-sided printing.
- Use ink-jet printers that consume 90% less energy than laser printers.

Toilet

- Evaluate waterless urinals
- Avoid automatic flushers which waste water and energy.

The guidelines addressed in this discussion of LEED Certification and the potential for NYSERDA participation in the GWT project should be followed since the potential efficiencies gained in the operational costs can be significant for the nonprofit. However it should be understood, that essentially all of the elements discussed in this section do not reduce the cost of construction. On the contrary design and construction costs can increase to accommodate the elements which coordinate the electronic operational systems, pump and fan controls and other portions of required monitoring of these complicated systems. It also becomes mandatory that the nonprofit hire, train and maintain a building engineer who can make sure that these complicated systems are operating at their fullest potential.

The GWT organization should also work closely with the new development around the theater site. It may be possible to work closely with the village of Johnson City, the hospital, university and college to create a Utilities Plant that would serve multiple organizations and could even create a micro-grid in the area based on close cooperation of all the surrounding organizations. In this scenario the potential for energy savings could be substantial and the impact on the New York Electrical Grid would be reduced if a joint approach can be developed for this area.

Whether the GWT ultimately uses high-efficiency standard four pipe system, a modified four pipe system with higher efficiencies link directly to NYSERDA grants or the nonprofit ties into a joint cogeneration development, the goal should be efficiencies, lower cost for operations and additional comfort for users and staff of the Goodwill Theater Development.

END MEP AND LEED DISCUSSION

REVISED PROGRAMING MATRIX
WITH
ACTUAL SQUARE FOOT ALLOCATIONS IN YELLOW

by
Janis Barlow, Theatrical Consultant

BUILDING PROGRAM UPDATED ACCORDING TO FINAL DRAFT CONCEPT DRAWINGS

The building program has been updated with the Architect Concept square footage based on the revised square footage possible in the basement and 2 story infill concept.

SCHORR FAMILY FIREHOUSE STAGE

A.	Schorr Family Firehouse Stage	Formula/ 150 per	Current s.f.	Optimum	Architect Concept
	Public Entry Areas At Grade				
1.	Foyer/Box Office	1 ft2pp	?	150	**See C.4**
2.	Elevator		--	200	**230**
3.	Lobby	2 ft2	?	300	**See A.4**
4.	Lounge/Bar/Storage/Service Entry	8 ft2	?	1,000	**1,297**
5.	Unisex Toilet Rooms (2 per floor)	40 ft2	?	100	**See C.20**
6.	Public Toilet Rooms (1/30 people)	25 ft2	?	150	**456**
7.	Washrooms/Janitorial Closet 1/floor	25 ft2	?	50	**70**
	Subtotal			**1,950**	**2,053**
	"Auditorium"				
8.	Seating (150 seats - cabaret)	12 ft2	?	1,800	**3,033**
9.	Sound and Light Locks (@ 2)	60 ft2		120	**-**
10.	Control/Technical Booth	120ft2	?	120	**128**
11.	Sound Mixing Station	60 ft2		60	**-**
	Subtotal			**2,100**	**3,161**
	Staging Area				
12.	Stage	20' x 32'	?	640	**See A.8**
13.	Wings	20' x 16'		320	**See A.8**
14.	Crossover Corridor	6' x 32'		192	**-**
	Subtotal			**1,152**	**-**
	Stage Support Spaces				
15.	Quick Change	-	?	50	**-**
16.	Unisex Toilet Room(s)	40 ft2	?	40	**113**
17.	Dressing Rooms (2 @ 2 or 3 people)	60 ft2 pp	?	300	**280**
18.	Green Room/Spare Dressing	-	?	200	**498**
19.	Live Prop Room/Kitchenette	100 ft2	?	100	**-**
20.	Touring Company Management Office	150 ft2	?	100	**-**
21.	Piano Storage	150 ft2	?	150	**128**
22.	Chair and Table Storage	0.5-0.8	?	150	**671**
	Subtotal			**1,090**	**1,690**
	Subtotal –Firehouse Stage			**6,292**	**6,904**

BLACK BOX STUDIO "ROOFTOP" THEATRE(S) (Up To 150 Seats Each)

B.	Black Box Studio Theatre (Third Floor)	Formula/ 150 per	Current s.f.	Optimum	Architect Concept
	Public Entry Areas				
1.	Foyer/Box Office (Temporary at Grade)	1 ft2pp		150	**See A.1**
2.	Elevator			200	**See A.2**
3.	Lobby	2 ft2		300	**500**
4.	Lounge/Rehearsal Area (double purpose)	10 ft2		1,500	**2,283**
5.	Toilet Rooms (1/30)/Janitorial Closet (1)/Unisex	25 ft2		250	**652**
	Subtotal			**2,400**	**3,435**
	Flexible Seating Areas				
6.	Seating (75-150) (wire grids & units in II)	10 ft2		1,500	**1,340**
7.	Refuge and Circulation	2 ft2		500	**441**
8.	Sound and Light Locks (@ 2)	60 ft2		120	**1 @ 220**
9.	Control/Technical Booth	120 ft2		120	**450**
10.	Sound Mixing Station	20 ft2		20	**See B.9**
11.	Follow Spot Positions/light storage	--		120	**See B.9**
	Subtotal			**2,380**	**2,451**
	Staging Area				
12.	Stage (End stage, thrust, middle)	24' x 30+'		720	**720**
13.	Offstage Areas			300	**300**
	Subtotal			**1,020**	**1,020**
	Stage Support Spaces				
14.	Quick Change	-	-	-	**-**
15.	Unisex, Barrier Free Toilet Room	40 ft2		80	**See B.16**
16.	Dressing Rooms (2 @ 3 people)	60 ft2 pp		360	**455**
17.	Green Room/Kitchenette/Dressing	-	-	200	**414**
18.	Storage (as much as possible)			400	**335**
	Subtotal			**1,040**	**1,204**
	Subtotal - Black Box Studio Theatre			**6,840**	**8,110**

FRONT-OF-HOUSE – PUBLIC SPACES

C.	Public Spaces	Formula	Current	Optimum	Architect Concept
1.	Drop Offs (vehicular, bus and pedestrian)	12' x 50'			✓
2.	Signage/Marquee/Canopy	N/A			✓
3.	Readograph, Shadow Boxes	N/A			✓
4.	Foyer/Vestibule	1		1,800	**740**
5.	Box Office – 4 wickets and back-up office			250	**246**
6.	Self-Serve Café for company and public			350	**See C.18**
7.	Retail (for Goodwill at Willow St. entry)			200	**210**
8.	Storefront Retail (for rent on Corliss St.)			1,000	**N/A**
	Subtotal – Public Spaces			**3,600**	**1,196**
	Ticket Holders & Authorized Personnel Only				
9.	Coat/Bag Check	0.1		180	**240**
10.	Elevators to upper and lower floors x 2	600		600	✓
11.	Admission Control (tickets scanned)	N/A		-	✓
12.	First Aid	0.1		180	**92**
13.	Food Services/Catering	0.2		360	**618**
14.	Lobbies – Shared	2		1,000	**2,232**
15.	Lounge - Goodwill Theatre	6-8		6,000	**4,772**
16.	Lobby/Lounges – Black Box Venues	6-8		2,400	**See B.4**
17.	Lounge – Studio/Lecture Hall	6		600	**3,900**
18.	Bar/Concessions/Storage – Goodwill	0.5		500	**1,364**
19.	Bars/Storage	0.6		400	**See C.18**
20.	Unisex Toilet Rooms (2 per area)	40 ft2		320	**203**
21.	Public Toilet Rooms (1/30 people)	25 ft2		600	**1,054**
22.	Janitorial Closets (every floor)	25 ft2		100	**33**
23.	Front-of-House Receiving and Storage	0.1		180	**-**
24.	Personnel Changing Rooms & Lockers	0.2		320	**360**
	Subtotal – Ticket Holders			**13,740**	**14,868**
	Subtotal - Front-of-House Facilities			**17,340**	**16,064**

ADMINISTRATION

D.	Goodwill Theatre Inc. Offices	Current	Optimum	Architect Concept
1.	Executive Director's Office		160	**227**
2.	Administrator's Office		120	**200**
3.	Facility Manager's Office		120	**200**
4.	Technical Director's Office		100	**180**
5.	Market & Development Mgr's Office		100	**135**
6.	House Management Office		100	**135**
7.	Box Office Manager's Office		80	**135**
8.	Administrative workspaces 4 @ 80		320	**320**
9.	Additional Administrative Support		120	**135**
	Subtotal		**1,220**	**1,667**
	Young People's Theatre/Professional Theatre			
10.	Artistic Director's Office		150	**165**
11.	General Manager's Office		150	**150**
12.	Production Manager's Office		120	**130**
13.	Technical Director's Office		120	**120**
14.	Marketing & Development Manager's Office		120	**120**
15.	Accounting and Finance Office		120	**150**
16.	Freelance Director		120	**-**
17.	Administrative workspaces @ 4		320	**332**
18.	YPT Stage Management Office (2-3 workspaces)		120	**240**
19.	Design Office (2-3 workspaces)		180	**240**
	Subtotal		**1,520**	**1,647**
	Other Artistic Partners			
20.	Office/Meeting Space (for rent)		120	**450**
21.	Office/Meeting Space (for rent)		200	**700**
	Subtotal		**320**	**1,150**
	Shared Space			
22.	Toilet Rooms		300	**456**
23.	Meeting Room/library (seats 20)		250	**460**
24.	Computer Room		100	**-**
25.	Mail/Copying/Supply Room		100	**163**
26.	Storage		200	**141**
27.	Reception (shared)		125	**230**
28.	Parking for 20 cars and bike racks			✓
	Subtotal		**1,075**	**1,450**
	Subtotal – Administrative Spaces		**4,135**	**5,914**

NEW THRUST STAGE THEATRE WITH NEW FRONT-OF-HOUSE FOR IT AND GOODWILL THEATRE

The thrust stage is intended to be a multi-purpose, professional caliber 250 to 300 seat theatre. The stage level tier of seating may accommodate cabaret style seating, bringing the capacity up to
300 and the fixed seating should contain 250 seats with cup holders.

E.	Thrust Stage (250 -300 seat theatre)	Formula	Current/ Site	Optimum	Architect Concept
	Ticket Holder Spaces (shared by 1,100)				
1.	Elevator			300	**84**
2.	Lobbies inc. coat check, first aid, receiving	2 ft2		2,200	**2,400**
3.	Lounges/Rehearsal/Galleries/Bars	8 ft2		8,800	
4.	Toilet Rooms/Janitorial closets			1,000	**482**
5.	Administrative support, changing area			400	-
6.	Community Education Studio	40’ x 40’		1,600	
	Subtotal			**3,900**	**2,966**
	Auditorium				
7.	Thrust Auditorium fixed seating (250)	10 ft2		2,500	**2,620**
8.	Sound and Light Locks (@ 2)	60 ft2		120	**186**
9.	Control/Technical Booth	200 ft2		200	**1,151**
	Subtotal			**2,820**	**3,957**
	Staging Area				
10.	Perimeter staging/cabaret seating for 50	12 ft2		600	-
11.	Staging and upstage area			1,400	**1,304**
12.	Wings and Crossover Corridor			1,400	**863**
13.	Staging Storage			300	**280**
	Subtotal			**3,700**	**2,447**
	Stage Support Spaces and Rehearsal				
14.	Quick Change	60 ft2		120	-
15.	Unisex, Barrier Free Toilet Room(s)	40 ft2		160	**75**
16.	Dressing Rooms (2 @ 4 people)	60 ft2 pp		480	**1 @ 718**
17.	Chorus Dressing Room (1 divisible)	60 ft2 pp		480	**718**
18.	Green Room/Spare Dressing Room			400	**500**
19.	Rehearsal Studio	46’ x 50’		2,300	**2,850**
20.	Rehearsal Storage			260	**360**
	Subtotal			**4,200**	**5,221**
	Subtotal – Thrust Stage Theatre			**14,620**	**14,591**

COST ESTIMATE FOR THE GOODWILL THEATRE ASSUMING COMPLETION OF THE THEATRE AS A SINGLE PROJECT.

Statement of Probable Cost

Goodwill Theatre Only - Dec 2018 - NY - Binghamton

Prepared By:	**Killis Almond, FAIA** **Killis Almond Architects** **342 Wilkens Ave.** **San Antonio, TX 78210** **210-532-3212 Fax:210-532-9919**	Prepared For:	**Naima Kradjian** **The Goodwill Theatre, Inc.** **P.O. Box 1** **Johnson City, NY 13790** **(607) 772-2404 Fax:**
Building Sq. Size:	**24548**	Site Sq. Size:	**30000**
Bid Date:	**10/15/2012**	Building use:	**Performing Art**
No. of floors:	**2**	Foundation:	**CON**
No. of buildings:	**1**	Exterior Walls:	**MAS**
Project Height:	**35**	Interior Walls:	**GYP**
1st Floor Height:	**12**	Roof Type:	**PVC**
1st Floor Size:	**34000**	Floor Type:	**CAR**
		Project Type:	**REN**

Division		Percent	Sq. Cost	Amount
00	**Bidding Requirements**	**12.06**	**61.95**	**1,520,649**
	Architect/Engineer	8.28	42.52	1,043,860
	Surveying	0.16	0.81	19,919
	Geotechnical Engineering	0.23	1.18	28,964
	Exterior Lighting Design	0.10	0.51	12,552
	Theatre Consultant	1.00	5.11	125,519
	Acoustical Consultant	0.24	1.23	30,125
	Sound Design	0.28	1.42	34,795
	Owners Representation	1.10	5.67	139,181
	Permit and Application Fees	0.51	2.60	63,721
	Printing	0.17	0.90	22,013
01	**General Requirements**	**15.14**	**77.76**	**1,908,809**
	Demolition	1.66	8.50	208,772
	General Conditions	6.80	34.94	857,720
	Insurances	0.38	1.96	48,234
	Contractors Fee (5.5%)	5.01	25.74	631,883
	Inspections	0.41	2.12	52,136
	Builders Risk Insurance	0.55	2.83	69,514
	Street Closing Fees	0.05	0.24	5,793
	Impact and Utility Fees	0.28	1.42	34,757
02	**Site Work**	**0.28**	**1.42**	**34,795**
	Site Work & Sidewalks	0.28	1.42	34,795
03	**Concrete**	**3.25**	**16.70**	**409,995**
	Concrete/Masonry	3.25	16.70	409,995
04	**Masonry**	**0.40**	**2.05**	**50,208**
	Repair and Modify Openings	0.40	2.05	50,208
05	**Metals**	**1.81**	**9.28**	**227,762**
	Structural Steel & Misc Steel	0.99	5.10	125,263
	Railings	0.81	4.18	102,499
06	**Wood & Plastics**	**5.02**	**25.80**	**633,275**
	Carpentry	1.93	9.92	243,567
	Millwork	3.09	15.88	389,708
07	**Thermal & Moisture Protection**	**2.03**	**10.44**	**256,287**
	Acoustical Treatment&Insulation	0.99	5.10	125,263
	Caulking&Waterproofing	0.49	2.50	61,433
	Roofing&Accessories	0.55	2.83	69,591
08	**Doors & Windows**	**4.40**	**22.58**	**554,269**
	Windows Restoration	1.30	6.70	164,561
	Doors & Hardware	3.09	15.88	389,708
09	**Finishes**	**9.98**	**51.26**	**1,258,407**
	Acoustic Plaster	2.21	11.34	278,363
	Drywall	0.88	4.54	111,345
	Floor Covering & Tile	2.71	13.92	341,662
	Acoustical Ceilings	0.23	1.16	28,461

	Painting	2.76	14.17	347,953
	Decorative Painting/Sculpture	1.19	6.14	150,623
10	**Specialties**	**9.24**	**47.44**	**1,164,600**
	Specialties	0.54	2.78	68,332
	Fixed Seating	4.10	21.05	516,711
	Food Services	0.31	1.59	38,971
	Audio System	2.10	10.77	264,444
	Rigging	2.19	11.25	276,141
11	**Equipment**	**4.15**	**21.32**	**523,322**
	Stage Lighting-Fixtures	2.10	10.77	264,444
	Lightning Protection System	0.09	0.45	11,135
	Security System	0.22	1.13	27,836
	Maintainence Equipment	0.31	1.59	38,971
	Communications and Data	0.39	1.98	48,713
	Main Curtain and softgoods	0.83	4.25	104,386
	Equip.for downstage lighting positi on	0.22	1.13	27,836
12	**Furnishings**	**0.92**	**4.71**	**115,546**
	Window Treatments	0.08	0.42	10,250
	Equipment(cash registers etc.)	0.05	0.28	6,833
	Concession Glassware etc.	0.06	0.28	6,959
	Front of House Items	0.18	0.94	23,171
	Signage	0.54	2.78	68,332
13	**Special Construction**	**1.37**	**7.06**	**173,222**
	Sign and Canopy	1.05	5.39	132,222
	Exterior Lights-Lanterns	0.33	1.67	40,999
14	**Conveying Systems**	**0.66**	**3.40**	**83,509**
	ADA Lift to Stage	0.66	3.40	83,509
15	**Mechanical**	**14.68**	**75.39**	**1,850,638**
	Sprinklers	2.48	12.76	313,158
	HVAC	12.19	62.63	1,537,480
16	**Electrical**	**14.63**	**75.16**	**1,844,976**
	Electrical	14.63	75.16	1,844,976
Total Building Costs		**100.00**	**513.70**	**12,610,266**

Statement of Probable Cost

Base Costs include 1st Fl. Finish and Partial Basement Finish

Goodwill 2 Story Infill Shell - Dec 2017 - NY - Binghamton

Prepared By:	**Killis Almond FAIA** **Killis Almond Architects** **342 Wilkens Ave.** **San Antonio, TX 78210** **2105323212 Fax:2105329919**	Prepared For:	**Naima Kradjian** **The Goodwill Theatre Project, Inc.** **P.O. Box 1** **Johnson City, NY 13790** **(607) 772-2404 Fax:**
Building Sq. Size:	**73288**	Site Sq. Size:	**50000**
Bid Date:	**12/15/2017**	Building use:	**Performing Arts**
No. of floors:	**3**	Foundation:	**CON**
No. of buildings:	**1**	Exterior Walls:	**MAS**
Project Height:	**35**	Interior Walls:	**GYP**
1st Floor Height:	**16**	Roof Type:	**PVC**
1st Floor Size:	**21712**	Floor Type:	**CON**
		Project Type:	**NEW/REN**

Division		Percent	Sq. Cost	Amount
00	**Bidding Requirements**	**0.00**	**0.00**	**0**
01	**General Requirements**	**12.85**	**43.02**	**3,153,140**
	General Conditions @ 6%	5.23	17.50	1,282,740
	Contractor's OH & P @ 3%	2.81	9.39	688,500
	Contingency @ 5%	4.82	16.13	1,181,900
03	**Concrete**	**11.45**	**38.34**	**2,809,870**
	Excavation @ new basement	2.43	8.14	596,520
	Concrete Footings @ Walls	0.45	1.49	109,200
	Concrete Piers	0.16	0.53	39,200
	Concrete Foundation Walls	2.67	8.92	653,800
	Slab On Grade	2.56	8.58	629,125
	Concrete topping floors & roof	2.55	8.54	625,620
	Concrete Fireproofing	0.64	2.13	156,405
04	**Masonry**	**5.20**	**17.41**	**1,275,750**
	Brick Veneer w/ Mtl. Studs	5.20	17.41	1,275,750
05	**Metals**	**13.07**	**43.74**	**3,205,675**
	Steel Frame.Columns/Beams	9.46	31.66	2,320,000
	Metal Deck	1.06	3.56	260,675
	Misc. steel & concrete allow	0.10	0.34	25,000
	Stairs 5' wide/rails/platforms	0.61	2.05	150,000
	Stairs 5' wide/rails/platform	0.37	1.23	90,000
	Stairs 5" wide/rails/platforms	1.47	4.91	360,000
06	**Wood & Plastics**	**2.05**	**6.87**	**503,300**
	Woodwork/Cabs/Sills	2.05	6.87	503,300
07	**Thermal & Moisture Protection**	**2.56**	**8.58**	**629,125**
	Roofing Insulation/flashing	2.56	8.58	629,125
08	**Doors & Windows**	**5.78**	**19.34**	**1,417,500**
	Facade Glass at 25%	5.78	19.34	1,417,500
09	**Finishes**	**10.26**	**34.34**	**2,516,500**
	Basements Finishes Min.	0.51	1.72	125,825
	Interior Partitions/Doors/Walls	6.15	20.60	1,509,900
	Flooring/Base/Ceiling w/ Finishes	3.59	12.02	880,775
10	**Specialties**	**0.00**	**0.00**	**0**
11	**Equipment**	**0.62**	**2.06**	**150,990**
	Equipment and Specialties	0.62	2.06	150,990
12	**Furnishings**	**0.00**	**0.00**	**0**
13	**Special Construction**	**0.00**	**0.00**	**0**
14	**Conveying Systems**	**1.83**	**6.14**	**450,000**
	Elevators	1.83	6.14	450,000

15	**Mechanical**	**21.57**	**72.22**	**5,292,500**
	Fire Protection	2.52	8.44	618,400
	Plumbing	2.05	6.87	503,300
	Mechanical/HVAC	17.00	56.91	4,170,800
16	**Electrical**	**12.75**	**42.68**	**3,128,100**
	Electrical	12.75	42.68	3,128,100
Total Building Costs		**100.00**	**334.74**	**24,532,450**
02	**Site Work**	**100.00**	**2.90**	**145,000**
	Demo Exist/Site Work	51.72	1.50	75,000
	Fencing/Protection	17.24	0.50	25,000
	Sidewalks and Paving	31.03	0.90	45,000
Total Non-Building Costs		**100.00**	**2.90**	**145,000**
Total Project Costs		**--**	**--**	**24,677,450**

Building Division Notes

Goodwill 2 Story Infill Shell - Dec 2017 - NY - Binghamton

General Conditions @ 6%

Unit Cost Information:

General Conditions @ 6%
Cost Code:
Unit:
Units(s)/Size:21379000
Cost:.06
Calculated Value:1282740

Contractor's OH & P @ 3%

Unit Cost Information:

Contractor's OH & P @ 3%
Cost Code:
Unit:
Units(s)/Size:22950000
Cost:.03
Calculated Value:688500

Contingency @ 5%

Unit Cost Information:

Contingency @ 5%
Cost Code:
Unit:
Units(s)/Size:23638000
Cost:.05
Calculated Value:1181900

Excavation @ new basement

CY for estimate
Unit Cost Information:

Excavation @ new basement
Cost Code:
Unit:
Units(s)/Size:14913
Cost:40
Calculated Value:596520

Concrete Footings @ Walls

CY at footings for wall & Columns
Unit Cost Information:

Concrete Footings @ Walls
Cost Code:
Unit:
Units(s)/Size:78
Cost:1400
Calculated Value:109200

Concrete Piers

CY at Piers
Unit Cost Information:

Concrete Piers
Cost Code:
Unit:
Units(s)/Size:28
Cost:1400
Calculated Value:39200

Concrete Foundation Walls

CY
Unit Cost Information:

Building Division Notes

Goodwill 2 Story Infill Shell - Dec 2017 - NY - Binghamton

	Concrete Foundation Walls Cost Code: Unit: Units(s)/Size:467 Cost:1400 Calculated Value:653800
Slab On Grade	5" thick with Vapor Barrier and Granular Fill Unit Cost Information: ---------- Slab On Grade Cost Code: Unit: Units(s)/Size:25165 Cost:25 Calculated Value:629125
Concrete topping floors & roof	Unit Cost Information: ---------- Concrete topping floors & roof Cost Code: Unit: Units(s)/Size:52135 Cost:12 Calculated Value:625620
Concrete Fireproofing	Spray fireproofing at all steel Unit Cost Information: ---------- Concrete Fireproofing Cost Code: Unit: Units(s)/Size:52135 Cost:3 Calculated Value:156405
Brick Veneer w/ Mtl. Studs	Metal studsa/sheathing,insulation and 37,000 SF of facade with 77% masonry Unit Cost Information: ---------- Brick Veneer w/ Mtl. Studs Cost Code: Unit: Units(s)/Size:28350 Cost:45 Calculated Value:1275750
Steel Frame.Columns/Beams	Tons of steel Unit Cost Information: ---------- Steel Frame.Columns/Beams Cost Code: Unit: Units(s)/Size:464 Cost:5000 Calculated Value:2320000
Metal Deck	Dect at floors and roof Unit Cost Information: ---------- Metal Deck Cost Code: Unit:

Building Division Notes

Goodwill 2 Story Infill Shell - Dec 2017 - NY - Binghamton

	Units(s)/Size:52135 Cost:5 Calculated Value:260675
Misc. steel & concrete allow	Lump Sum
Stairs 5' wide/rails/platforms	Unit Cost Information: ---------- Stairs 5' wide/rails/platforms One Flight Stairs X 5 units Cost Code: Unit: Units(s)/Size:5 Cost:30000 Calculated Value:150000
Stairs 5' wide/rails/platform	3 flights high X 1 stair Unit Cost Information: ---------- Stairs 5' wide/rails/platform Cost Code: Unit: Units(s)/Size:1 Cost:90000 Calculated Value:90000
Stairs 5" wide/rails/platforms	four flights high X 3 sets of stairs Unit Cost Information: ---------- Stairs 5" wide/rails/platforms Cost Code: Unit: Units(s)/Size:3 Cost:120000 Calculated Value:360000
Woodwork/Cabs/Sills	Unit Cost Information: ---------- Willwork.Cabs/Sills Cost Code: Unit: Units(s)/Size:52135 Cost:20 Calculated Value:1042700 Unit Cost Information: ---------- Woodwork/Cabs/Sills Cost Code: Unit: Units(s)/Size:25165 Cost:20 Calculated Value:503300
Roofing Insulation/flashing	roof accessories and pitch pockets Unit Cost Information: ---------- Roofing Insulation/flashing Cost Code: Unit: Units(s)/Size:25165 Cost:25 Calculated Value:629125

Building Division Notes

Goodwill 2 Story Infill Shell - Dec 2017 - NY - Binghamton

Facade Glass at 25%	37800 X 25% for glass coverage =9450 Insulated Glass Unit Cost Information: ---------- Facade Glass at 25% Cost Code: Unit: Units(s)/Size:9450 Cost:150 Calculated Value:1417500
Basements Finishes Min.	Unit Cost Information: ---------- Basements Finishes Cost Code: Unit: Units(s)/Size:25165 Cost:20 Calculated Value:503300 Unit Cost Information: ---------- Basements Finishes Min. Cost Code: Unit: Units(s)/Size:25165 Cost:5 Calculated Value:125825
Interior Partitions/Doors/Walls	Unit Cost Information: ---------- Interior Partitions/Doors/Walls Cost Code: Unit: Units(s)/Size:52135 Cost:60 Calculated Value:3128100 Unit Cost Information: ---------- Interior Partitions/Doors/Walls Cost Code: Unit: Units(s)/Size:25165 Cost:60 Calculated Value:1509900
Flooring/Base/Ceiling w/ Finishes	Unit Cost Information: ---------- Flooring/Base/Ceiling w/ Finishes Cost Code: Unit: Units(s)/Size:52135 Cost:35 Calculated Value:1824725 Unit Cost Information: ---------- Flooring/Base/Ceiling w/ Finishes Cost Code: Unit: Units(s)/Size:25165 Cost:35

Building Division Notes

Goodwill 2 Story Infill Shell - Dec 2017 - NY - Binghamton

	Calculated Value:880775
Equipment and Specialties	Unit Cost Information: ---------- Equipment and Specialties Cost Code: Unit: Units(s)/Size:77300 Cost:5 Calculated Value:386500 Unit Cost Information: ---------- Equipment and Specialties Cost Code: Unit: Units(s)/Size:25165 Cost:6 Calculated Value:150990
Elevators	12 Stops @ $35,000/stop Unit Cost Information: ---------- Elevators Cost Code: Unit: Units(s)/Size:12 Cost:35000 Calculated Value:420000 Unit Cost Information: ---------- Elevators Cost Code: Unit: Units(s)/Size:3 Cost:150000 Calculated Value:450000
Fire Protection	$8/SF Unit Cost Information: ---------- Fire Protection Cost Code: Unit: Units(s)/Size:77300 Cost:8 Calculated Value:618400
Plumbing	$20/SF Unit Cost Information: ---------- Plumbing Cost Code: Unit: Units(s)/Size:77300 Cost:20 Calculated Value:1546000 Unit Cost Information: ---------- Plumbing Cost Code: Unit: Units(s)/Size:25165 Cost:20

Building Division Notes

Goodwill 2 Story Infill Shell - Dec 2017 - NY - Binghamton

	Calculated Value:503300
Mechanical/HVAC	$70/SF Unit Cost Information: ---------- Mechanical/HVAC Cost Code: Unit: Units(s)/Size:77300 Cost:70 Calculated Value:5411000 Unit Cost Information: ---------- Mechanical/HVAC Cost Code: Unit: Units(s)/Size:52135 Cost:80 Calculated Value:4170800
Electrical	$60/SF Unit Cost Information: ---------- Electrical Cost Code: Unit: Units(s)/Size:77300 Cost:60 Calculated Value:4638000 Unit Cost Information: ---------- Electrical Cost Code: Unit: Units(s)/Size:52135 Cost:60 Calculated Value:3128100

Non-Building Division Notes

Goodwill 2 Story Infill Shell - Dec 2017 - NY - Binghamton

Demo Exist/Site Work	Unit Cost Information: ---------- Demo Exist/Site Work Cost Code: Unit: Units(s)/Size:77300 Cost:3 Calculated Value:231900
Fencing/Protection	Lump Sum
Sidewalks and Paving	Unit Cost Information: ---------- Sidewalks and Paving Cost Code: Unit: Units(s)/Size:2100 Cost:15 Calculated Value:31500

Project Notes

Goodwill 2 Story Infill Shell - Dec 2017 - NY - Binghamton

Estimate Based On Case: 011617Good - Goodwill 2 story Infill
Location: NY - Binghamton
Date: Dec 2017
Building Size: 73,288

Assumes interior finish on most of first floor and partial second floor. Some finish on backstage dress and loading. Open basement with fire stairs protected.
Fire stairs and exitways finished.
Sprinklers throughout
HVAC equipment for finished areas only.
Electrical feeds and drops plus finished areas only
3 elevators in service all floors

THEATRICAL AND TECHNICAL SYSTEMS NARRATIVE.

Wrightson, Johnson, Haddon & Williams, Inc.

INTRODUCTION

Wrightson, Johnson, Haddon & Williams, Inc. (WJHW) has been engaged to work with the Killis Almond Architects team in developing the design for an anticipated renovation of the Goodwill Theatre. Our work is in the areas of: theatrical consulting including facility planning, seating and sightline review; performance facility and systems design including theatrical lighting, rigging, audio, and audio-visual presentation systems. This program document serves as the basis and direction for subsequent design.

The design scheme described here for the renovated facility assumes this will be a community-based multi-purpose space suitable to host both professional and nonprofessional live performance events. The goal is to provide a facility and technical infrastructure suitable for musical theatre, drama, live music presentations, and spoken-word or lecture events. The technical design has been developed with an understanding that the facility may ultimately be operated by a combination of both local community and professional technical personnel.

The renovation plan is also described in preliminary seating and sightline sketch drawings provided under separate cover to the Architect. These drawings also outline some of the essential technical infrastructure planned for the systems described below.

The program document should be reviewed for thoroughness and accuracy. Please note, the content is subject to revision based on design team and Owner discussion. Once any modifications have been made and the document is approved by the Owner, design documents will be prepared using the detail included as a guide.

RIGGING SYSTEMS AND CONTROLS

Main Theatre

The Auditorium rigging will consist of a combined system of traditional manually-operated counterweight linesets and fixed speed motorized linesets. The motorized linesets will support the heaviest loads which are anticipated to be the stage lighting battens; these shall be operated by a simple electronic control system. Traditional manually operated counterweight rigging will allow stage drapery and utility battens (intended for backdrops and scenic use) to be raised and lowered. The combination of motorized rigging for the heaviest loads and counterweight rigging for drapery and utility linesets maximizes safety and utility in a cost effective solution.

WJHW will work with the Architect and structural engineer to develop the requirements for revisions to the specialized over-stage structure required to support the theatrical rigging. This includes the “gridiron” – a fully walkable platform across the extents of the stage tower at ~ 60 ft. above the stage and beneath the roof structure. Various components of the stage rigging system will mount onto the gridiron and the roof structure above, this will allow for ease of

access and maintenance. Additionally, the gridiron will allow temporary or additional rigging connections that may be required as required per production demands. Adjacent to the gridiron at the side wall of the stage, a specialty catwalk "loading gallery" shall be provided to allow personnel to safely load counterweight onto and off of the rigging linesets.

Model life-safety and building codes will require, based on the height and size of the stage tower, that a fire safety curtain system shall be installed in this facility. A new fire safety curtain shall be fabricated from a specialty woven fiberglass (non-asbestos) cloth intended for such use. All new system components shall be provided for the facility as required by ANSI and NFPA to include:

Emergency release operation by fusible link.

Emergency release by manual pull-stations at the proscenium wall.

Remote emergency release by the building fire-detection (rate-of-rise) systems.

Non-emergency operation will be via motorized hoist simple push-button controls.

Lineset hoists for the fire curtain, front of-house (FOH,) and stage electric linesets will mount on the gridiron or overhead structure. Each hoisting motor will be equipped with limit safety-switches that will establish the ultimate upper and lower limit of travel. Each motor gearbox shall be equipped with an integral brake, as well a redundant or over-speed brake. The system Emergency-Stop function will halt all movement and disconnect the power to the motors. Encoders provided on the motors shall provide real-time position feedback for each hoisted lineset at all times. Primary control functions will be implemented via dedicated dead-man momentary pushbutton integrated as part of an electronic control system. The rigging control panel located backstage will allow simple position presets to be stored and recalled as required for production use.

Given the anticipated size of the stage, a preliminary minimum complement of rigging linesets and drapery along with their use is as follows. (Note this preliminary estimate of line sets may be augmented or modified as the stage layout develops during the design development phase):

FOH front lighting electric hoisted batten—mounted to new supplemental structure in the attic above the auditorium ceiling.

Fire safety curtain system—automatically released, mounted on a fixed speed hoist.

Front valence—mounted on a counterweight lineset.

Main curtain at the proscenium that will draw open—mounted on a counterweight lineset.

Three (3) lighting battens with integrated lighting system power and data cable management—mounted on fixed speed hoists.

Mid-stage Traveler (or act curtain)—mounted on a counterweight lineset.

Borders in front of the masking legs and lighting battens (3 to 4 sets) — mounted on counterweight linesets.

Masking legs (3-sets) suspended—mounted on counterweight linesets.

Utility battens (a minimum of 14) for use with scenery, painted drops, or banners—mounted on counterweight linesets.

Upstage black-out traveler—mounted on a counterweight lineset.

Two (2) scrims – one white and one black -each mounted on a counterweight lineset.

A white muslin cyclorama behind the blackout drape located downstage of the rear wall — mounted on a counterweight lineset.

Dual tracking masking draperies (tabs) located stage left and right to mask audience sightlines into the wings—dead-hung from the gridiron structure.

Supplemental rigging infrastructure shall include:

Fixed 1-1½" dia. steel pipe assemblies -for mounting of performance lighting equipment -will be included at the front of the balcony rail and along the auditorium side walls (box booms) in coordination with the Architect.

Dedicate rig points above the ceiling at the auditorium shall be provided to accommodate temporary rigging of touring/rental lighting truss and loudspeaker systems that may be required for specialty events.

ORCHESTRA PIT LIFT

A lift mechanism supporting a movable platform shall be installed in the orchestra pit in front of the stage. The lift will allow the platform to be used at a variety of elevations as required. At a minimum, the lift platform can operate as an extension of the stage, at the level of the auditorium floor, and as a traditional orchestra pit for musical theatre performance.

The lift mechanism will mount on the orchestra pit floor beneath the platform. Penetrations below the floor level shall not be required. In the down position, a series of lifting actuators collapse into storage cartridges beneath the platform. Electric motors with integrated holding brakes drive and extend the actuators, thus pushing the platform upward.

The platform shall be equipped with vertical guides attached to the side walls of the pit structure to ensure safe and level movement. Simple pushbutton controls located on a pendant operator station shall be located backstage. All access doors and pinch points shall be protected by safety switches that inhibit lift motion if an unsafe operating condition is present.

The platform of the orchestra pit shall be fabricated to match the finish surface of the rest of the stage floor.

STAGE DRAPERIES

Stage curtains will mount on the rigging system as described above. These shall be fabricated from synthetic (not cotton) velour to prevent the deterioration caused due to fluctuating humidity and temperature levels common in tall stage towers. Additionally, this material is inherently flame resistant (as required by code.) All other cotton materials such as cyclorama and scrims require an immersion flame-proofing process before leaving the mill in order to bear a label stating the material is flame retardant.

All stage velour's shall be of nominal 25 oz. fabric. The main setting (valance and main drape) shall be selected from the fabric manufacturer's stock color palette as appropriate to the interior design of the auditorium; these curtains shall be sewn with 100% pleated fullness. Masking legs and borders shall be black and sewn flat (no fullness.) Spare legs and borders shall be provided for specialty use if/as required for production use. Wheeled hampers shall be provided for storage of spare drapery.

THEATRICAL LIGHTING AND CONTROLS

Performance Lighting

The lighting system and network for the theatre will include comprehensive controls for the house and work lights, running lights, and stage (performance) lighting. The system will be a hybrid design to accommodate: (1) modern LED theatrical-type lighting fixtures, automated lighting fixtures, and (3) conventional/legacy incandescent/halogen sources.

The lighting control system will reside on its own local area network (LAN.) The system will exist on a networked backbone that employs Category 6 cable, Power over Ethernet switches (802.3af compliant,) radio remote access points, network output and input nodes, portable LCD touchscreen stations, and a computer-based performance lighting console.

The control booth and backstage stage manager's panel shall serve as the primary control locations and will include LCD master stations offering access to common controls functions. Secondary control locations will be wall-mounted preset and key-switch stations located at entryways for cleaning, rehearsals, and general access to task-lighting functions. Each control location will have access to all relevant stage, work, and house lights; each station will have the ability to be independently programmed to serve its specific purpose. Master stations shall have the ability to lockout other stations during performances.

The lighting control booth will be located at the rear of the theatre above at the balcony. Secondary control inputs backstage, at the audio mix position, and technical rehearsal floor-box within the orchestra level seating will allow the lighting console to be relocated where required for specific tasks and events.

The performance control console will allow for ease of setup and operation and be capable of operating all entertainment industry standard fixture types. The system will be designed to provide control to the dimmer racks and to distribute networked DMX512 (E-DMX) control signals to the various lighting output positions arrayed about the facility.

A portable radio remote focus control will be provided to bring up lighting circuits for focusing or use during rehearsals. An option to operate the lighting controls via networked handheld devices (e.g., iPhone, iPad) can be provided if/as desired.

Lighting load circuits (typically 120V-20A) shall be served from dimmer and relay racks located in a specialty fully conditioned electrical equipment (dimmer) room. Dimmed circuits are included to operate conventional tungsten based theatrical lighting fixtures, and relay-operated (switched) circuits will serve LED and automated lighting equipment. Dimmer racks will be floor mounted on a 4" cleaning pad. Relay racks shall be wall mounted similarly to typical panelboards. A wall mounted control distribution rack will be located adjacent to the dimming racks; the control distribution rack serves as the central control signal distribution point. No patching will be required to send signals to/from the control input and/or output locations. Load circuits will run from the dimmer racks to stage lighting circuits in the front of house catwalk, vertical lighting positions in the house, over stage lighting battens, floor pockets in the stage, and wall boxes mounted to the walls back stage. An approximate distribution of lighting circuits shall be as follows:

FOH Electric Catwalk Connector Strip –(24) circuits total.

FOH Drop-Boxes (x3) – (18) circuits total.

Auditorium Side Wall Boxes (x6) – (30) circuits total

Balcony-Rail Plug Boxes (x4) – (16) circuits total

Stage Apron Wall Boxes (x2) – Six (6) circuits total

1st Electric Connector Strip – (30) circuits total

2nd Electric Connector Strip – (30) circuits total

3rd Electric Connector Strip – (38) circuits total

Gridiron Drop Boxes (x8) – (48) circuits total

Stage Floor Pockets (x8) – (48) circuits total

Stage Wall Boxes (x5) – Fifteen (15) circuits total

An inventory of theatre lighting fixtures will be included in the lighting control package. This will include a mix of both tungsten lamped and LED-based sources. High-efficiency color changing LED cyc lights will be provided for lighting of the cyclorama. Overstage washes shall utilize color changing LED PAR-type or Fresnel equivalent fixtures. Traditional tungsten fixtures such as ellipsoidal reflector spotlights will be provided at the front of house positions and elsewhere where high intensity long throw illumination is needed. All legacy fixtures will be provided with grounded stage pin connectors. A small quantity (~12) of moving head profile and wash fixtures may also be included in the inventory as an alternate; automated fixtures shall be fanless or low-noise type. All integral-dimming fixtures requiring constant voltage sources shall have U-ground plugs.

Two (2) medium/long throw followspots will be located within designated rooms at the rear of the balcony.

Extension cables of varying lengths and configurations will be provided for circuiting lighting instruments and control modules; along with an inventory of gobos and sheets of color medium.

Permanent work lights are to be mounted to the perimeter walls of the stage. Work-light circuits (provided for temporary overhead fixtures above the stage) are to be located in the connector strip raceway wiring devices on the stage electric battens.

Architectural Lighting

The architectural lighting shall be controlled through the theatrical lighting control network. The design shall incorporate various control locations to allow for control of the architectural fixtures in the lobby and auditorium as noted above. WJHW recommends use of long lasting LED fixtures (50,000 hr. or greater) versus incandescent fixtures. Fluorescent house lighting is not recommended due to poor dimming characteristics. Due to their short lifespan, incandescent fixtures would require access for maintenance by a manual tracked lighting system from catwalks or motorized hoists.

In an emergency, life safety codes require a certain minimum foot-candle levels to allow for safe egress. There should be several sources of illumination so that if one fails there is always a back-up. As the seating and aisle design develops, many of the aisles and step lights should still allow audience members see where they are walking, even if all other lighting were to fail. Note that the auditorium shall have some kind of emergency power source that can provide a secondary power source for lighting. An emergency transfer switch or battery back-up system, working in conjunction with the house lighting system, will insure that multiple dimmed circuits will be switched to an all-on condition if the main power source failed. The final product shall be incorporated, circuited and specified by the electrical engineer.

Lobbies / Adjacencies Control for the architectural lobby lighting can be integrated with and operated by the theatrical lighting system. Supplemental control stations may be provided at the housemanager’s station/office as required.

Power Considerations WJHW recommends that lighting systems be powered from a separate riser fed from a dedicated isolation transformer and include 200% sized neutrals for all dimmer racks to mitigate the effects of phase switched dimming equipment.

A supplemental power feed (Company Switch) at 120/208V 3-phase with 400A capacity shall be provided backstage for use with rental or touring systems use.

AUDIO VIDEO SYSTEMS AND EQUIPMENT

Main Theatre

Performance Audio and Intercommunications

The main audio mix position will house a front-of-house (FOH) digital mixing console along with the program sources, wireless microphone receivers, effects and monitor speaker processing. One CD player-recorder (CDR) will provide for recording and playback of program material and one CD player (CDP) will provide for playback of program material only. An alternate to allow high-quality archival recording capability can be provided.

A wireless microphone system will be to include (12) channels of wireless microphone receivers located in the mix position equipment racks; an alternate to provide additional wireless channels can be provided. Padded storage drawers for storing the belt-pack transmitters and microphones when not in use shall be provided. All channels will be equipped with belt-pack transmitters, miniature headset microphones and lavaliere microphones while four channels will also include handheld transmitters. A selection of standard wired microphones, along with miscellaneous cables, stands, and accessories.

Microphone inputs from stage panels will terminate to the digital mixing console and will be soft patchable to any console channel through the console LCD display. Microphone inputs will also be provided at the grid level to facilitate the use of hanging microphones from the rigging battens.

The amplifier rack (ER-AMP) located in a dedicated audio room will house the power amplifier(s), digital signal processors (DSP) signal processors, assisted listening transmitter and other miscellaneous equipment. Signal feeds for the DSP processor will be supplied from the main audio mix position digital mixing console and the stage manager's panel analog mixer. System presets programmed in the DSP processor and controlled from the Stage Manager's Panel (ER-SMP) and the main audio mix position will select either the stage mixer or main control room console for a given event. A preset will also be programmed to mute the system when a contact closure is received from the fire alarm system.

The house speaker system will be comprised of a full-range left, center, and right loudspeaker clusters, and (2) supplemental fills as required. A dedicated subwoofer speaker will be located appropriate to the speaker system type selected. Receptacles at the stage will provide for four channels of foldback/effects monitor speakers that are fed from aux-sends on the front-of-house mixing console. Supplemental overhead balcony and under-balcony fill speakers may be required to provide optimum coverage throughout the listening area. As an alternate, four permanent effects speakers can be mounted over the audience seating which will be controlled from matrix sends on the front-of-house mixing console, but could be soft-patched to different console outputs.

Speakers throughout the auditorium lobby and restroom area will provide a delayed program feed for event latecomers and will provide paging as described below.

The Stage Manager's audio rack (ER-SMP) will provide an assembly (simple) lecture system which will allow for the operation of the sound system without the use of the large mixing console at the mix position. This rack will be portable to allow for use on either side of the stage or in the audience area. The stage manager's rack will be equipped with an automatic gating mixer and a CD player for program playback. Microphone inputs in the stage floor pockets, at the director's floor pocket and a stereo aux input at the rack will be controlled from this stage mixer. System presets programmed in the DSP processor and controlled from the Stage Manager's Panel (ER-SMP) and the main audio mix position will select either the stage mixer or main mix position for a given event. An additional input will be located at the director's floor pocket for connection of a portable rack. Only one of these systems, main or stage, will be able to be activated at a time.

A power sequencing system will control the sequence in which the system's power is turned on and off. The system power will be controlled from both the main mix position and the stage manager's rack.

The theater system will mute in case of a fire alarm and remain muted for the duration of the alarm. When the alarm condition has ended, the system is to revert back to the standard system configuration. This feature is to be implemented through the use of control ports linked to system presets within the digital signal processing system.

Intercommunications

Intercom receptacles will be provided at multiple locations around the building. The intercom is to be a two-channel system with the main station being located at the permanent stage manager's rack. Intercom receptacles for belt-pack units are located at the stage panels, director's floor pocket, and B.O.H. locations. The dressing room locations will have two-channel speaker stations connected to the theatre system. Headset stations are located in the main audio and lighting control room, mounted in the casework at the lighting position and panel mounted within the audio equipment racks. Intercom speaker stations are located in the B.O.H. performer related rooms to allow for hands-free use during a performance. A headset station with a

telephone handset style user interface will be located in the house manager's station near the main entrance to the auditorium.

Paging will be possible into the performers' areas from the stage manager's panel. Paging to the lobby area will be able to be initiated from both the stage manager's panel and from the house manager's station. Each zone will act independently and the page signal will be preceded by a single chime tone activated by the page microphones push-to-talk button. An ascending multi-tone chime will be provided for audience call back to the lobby and will be activated by a push-button at the stage manager's panel and the house manager's station. Lobby and restroom master loudspeaker volume will be controlled from the house manager's station. Reference the lighting documentation for information regarding the lighting control station to be housed within the house manager's station.

Systems for Hearing Impaired and Visually Impaired Patrons

A wireless radio frequency hearing assist system will provide coverage to the audience area for those with hearing difficulty and must operate on FCC approved frequencies. The transmitting unit will be located in the amplifier rack and the antenna will be located at a remote location suitable to provide full coverage to the auditorium. Portable receivers will allow the users to be seating anywhere within the auditorium and will be equipped with a variety of listening devices including, ear speakers, lightweight headsets, and inductive coil loops. The minimum quantity of receivers shall be as required by ADA.

A supplemental program channel shall be provided and used for descriptive audio and other amplified content intended to serve the visually impaired.

Audio-Visual Presentation

The AV presentation system in the auditorium will provide a large screen projected display of video and data sources that can be easily viewed in most of the seating area. The display will utilize a projection screen integrated into the stage rigging system. The screen should be a 16:9 (16 units wide x 9 units high) wide-screen format. The projector should have a minimum resolution of 1920 x 1080 and minimum light output of 10000 ANSI lumens.

Sources for the AV presentation system should include a Blu-ray player (rack-mounted in the control room in the rear of the theater), and two video and data input jacks (to be positioned at the stage floor boxes for the connection of portable equipment such as laptop computer, document camera, etc.). All video and data sources will be routed through a matrix switcher that is rack-mounted in the theater control room.

Control of the AV presentation system (projector power, source selection, Blu-ray transport functions, etc.) should be simple and intuitive. A color touch screen control panel will be provided for use inside the control room.

A video monitoring system will allow a video image of on-stage events to be seen by individuals in the dressing rooms and lobby. A camera will be mounted on the back wall of the theater. Camera should be a high resolution, high contrast, color camera with both auto and manual iris. Camera shall be statically set on a wide shot view of stage area.

Power Considerations

WJHW recommends that all audio and AV systems be powered from a separate riser fed from an isolation transformer and an isolated grounding system.

A supplemental power feed (Company Switch) at 120/208V 3-phase with 200A capacity shall be provided backstage for use with rental or touring systems use.

ACOUSTICAL CONSIDERATIIONS

Main Theatre

The Main Theatre shall serve as a multipurpose space for musical theatre, dramatic and spoken-word events, and musical performance. The intent of the acoustical design shall still provide a space which supports all types of activities while meeting user and architectural needs.

To achieve acceptable interior room acoustics, the interior design of space should not need major additional work, but should include the following supplemental features:

Rear walls and balcony fronts should be primarily absorptive to prevent harsh reflections back to the stage and front seating. Curtains or fabric-wrapped acoustical wall panels with minimum Noise Reduction Coefficient (NRC) 0.90 and minimum 2 in. thick are generally recommended here.

Floors should be carpeted in the aisles; sealed concrete is acceptable under seats and in non-traffic areas.

Seats should be fully upholstered.

Any new partitions separating the theater from corridor and lobby spaces should be rated minimum Sound Transmission Class (STC) 55, and any new partition construction separating the theater from back of house spaces should be rated minimum STC 50.

At the vestibule entries from the lobby to the theater, we recommend solid-core wood doors with frame and bottom seals be used; center mullions with seals or acoustical astragals should be specified for double door entries. Where single door entry points occur, doors are recommended to be minimum STC 47. Where mechanical or electrical rooms open directly to the performance space, we recommend minimum STC 52 doors. Overhead coiling doors separating the stage from scene construction areas should be rated minimum STC 27 (i.e., standard insulated door with appropriate seals).

Mechanical systems should be deigned to meet an interior noise level of Noise Criteria (NC) 22-25. Mechanical equipment should not be located within the footprint of the space, nor should equipment be placed on the roof directly above the theater or stage. Ducts should be sized to achieve air velocities between 500 and 600 fpm within the performance space. Diffusers should be selected to have an NC 15 rating or less. We recommend allowing for minimum five foot attenuators on both the supply and return air sides of air handlers serving the auditorium and stage within the budget and mechanical duct layout.

Backstage Support Facilities

The intent for acoustical treatments in these spaces is generally to reduce noise build up and to promote good speech communication. As such, the ceilings should have a high NRC rated ceiling material – NRC 0.70+ ceiling panels, spray-on or pin-fixed insulation, etc. – applied to the majority of the ceiling surface. Floors can be carpeted or hard surfaced as needed.

Lobbies – Common Spaces

Common Spaces such as the Lobby generally do not require specific acoustical materials to promote presentational communication, but should nonetheless be treated to limit sound build-up when large groups of people are gathered. Such sound build-up is often a result of the commonly used hard reflecting materials and elements often used in these spaces.

WJHW will work with the design team to identify elements in the design of these public spaces that may be amenable to the types of treatment that can mitigate excessive sound build-up. Examples include stretched fabrics or acoustical plaster systems on the ceiling with a minimum NRC 0.70 rating. Generally, this minimizes noise build up and keeps the space comfortable. Hard flooring material is acceptable.

Mechanical systems should be designed to meet an NC 35-40 in the common spaces.

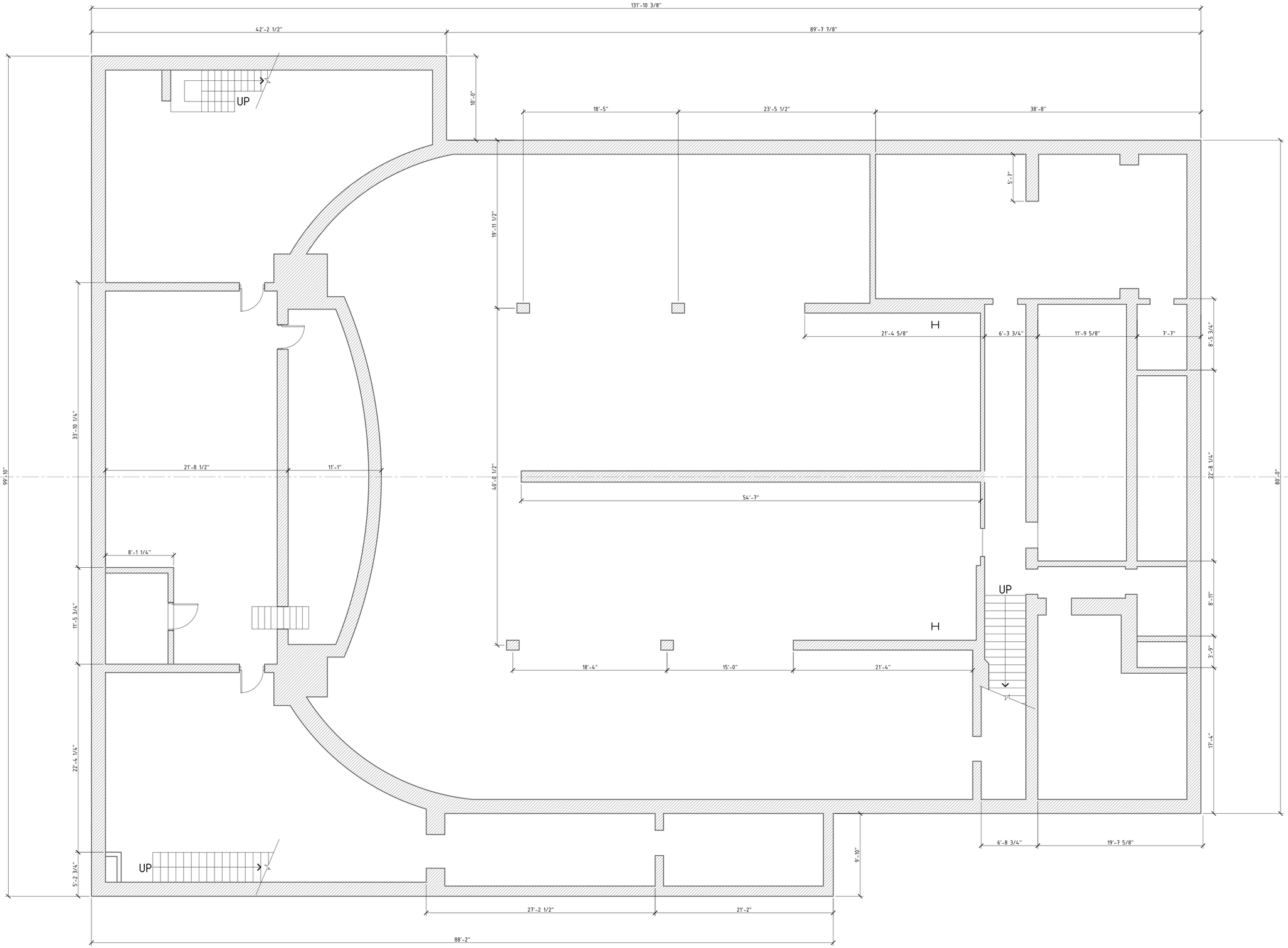
END THEATRICAL

Architectural As-Found Drawings A-1.01 to A-3.06

Architectural Concept Drawings Showing the Integration of the ADA and Fire Stairs into the Total Design

And

Theatrical Concept Drawings
TC-101; TC-102; TC-201;



1 BASEMENT FLOOR PLAN - AS FOUND DRAWINGS

3/16" = 1'-0"

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JOHNSON CITY, NEW YORK

BASEMENT FLOOR AS FOUND

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PROJECT NUMBER
16-05-06

REVISION	DESCRIPTION	DATE

A-1.01

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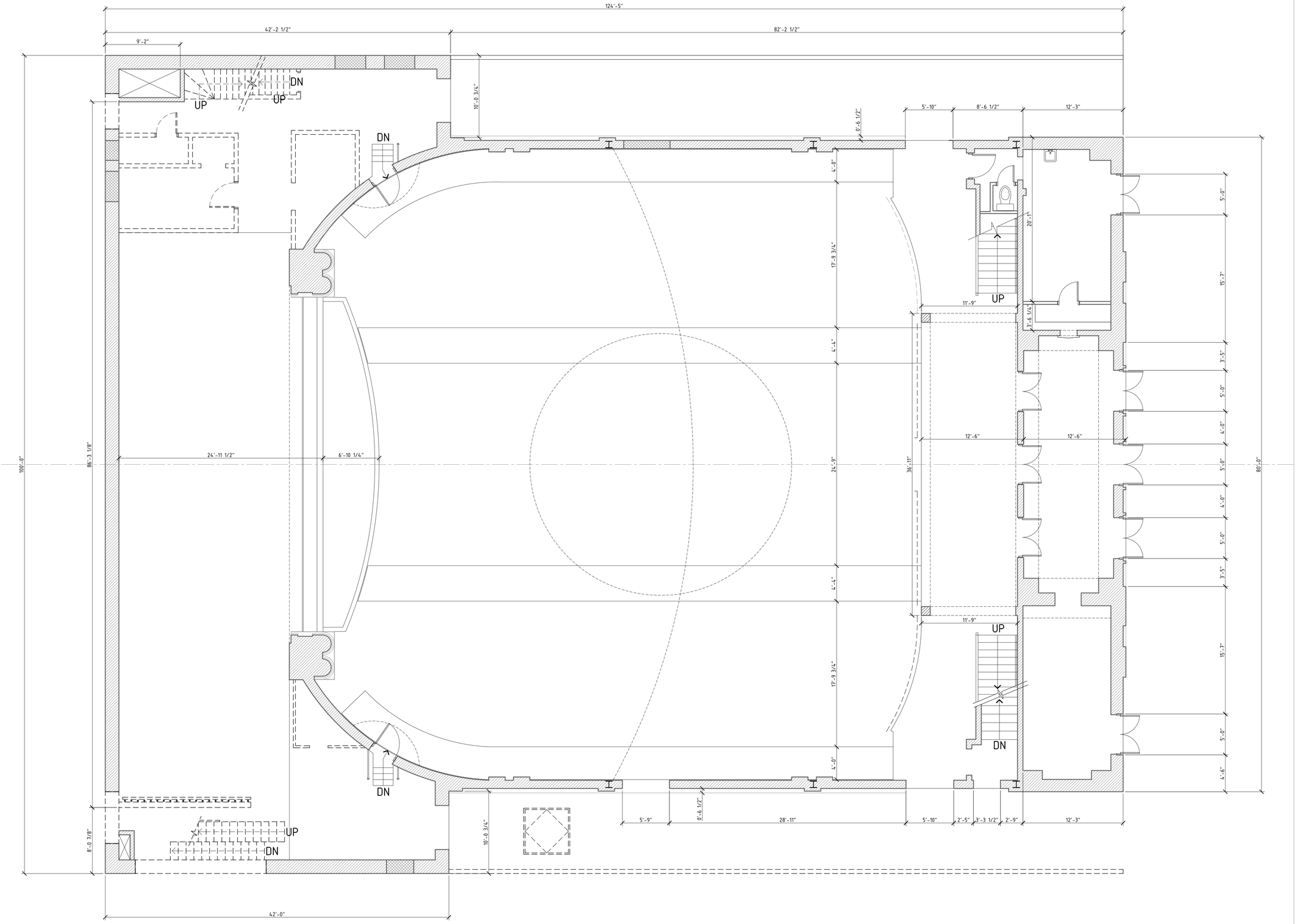

1 FIRST FLOOR PLAN - AS FOUND DRAWINGS

3/16" = 1'-0"

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FIRST FLOOR AS FOUND

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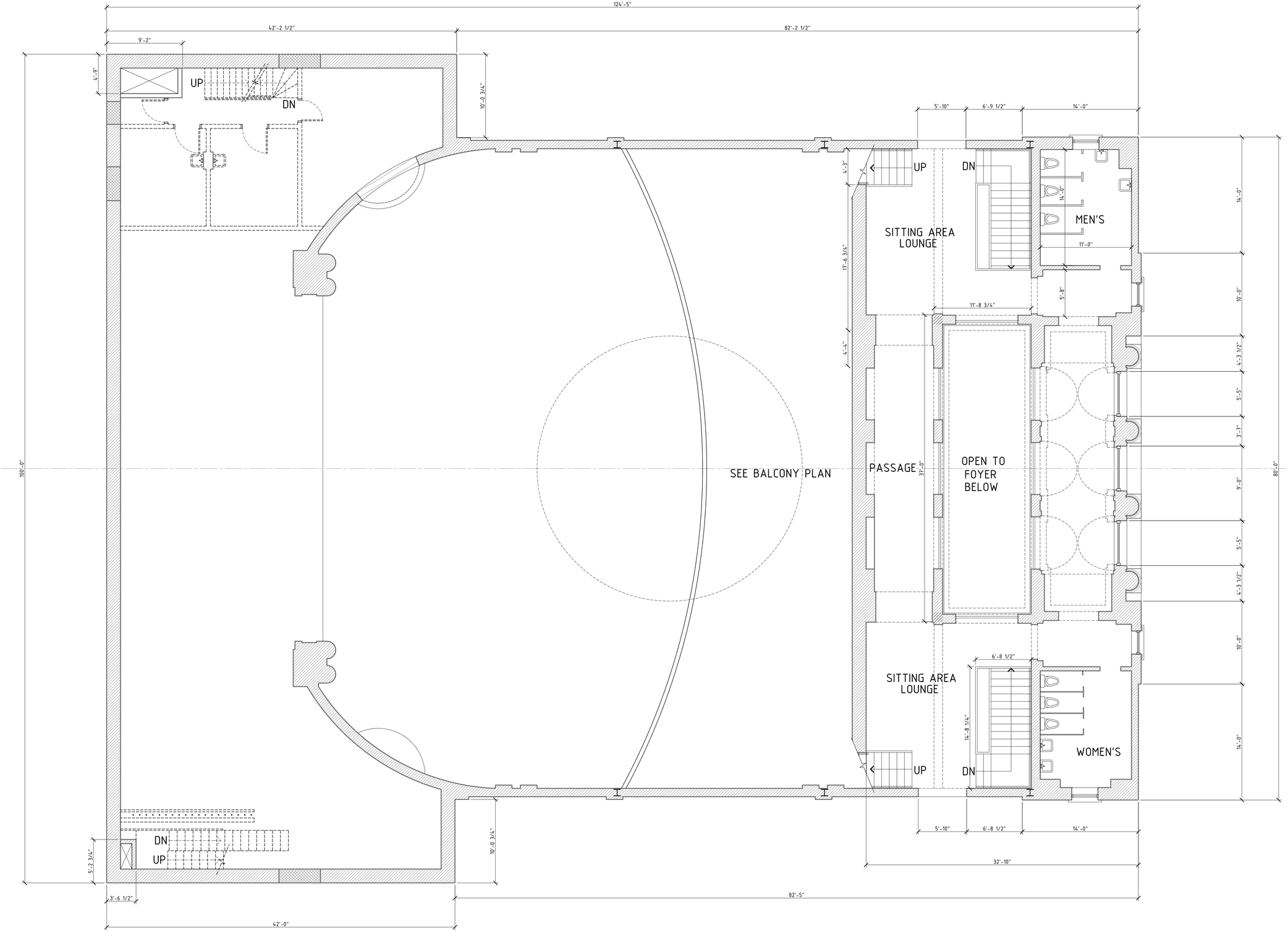

1 SECOND FLOOR PLAN - AS FOUND DRAWINGS

3/16" = 1'-0"

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SECOND FLOOR AS FOUND

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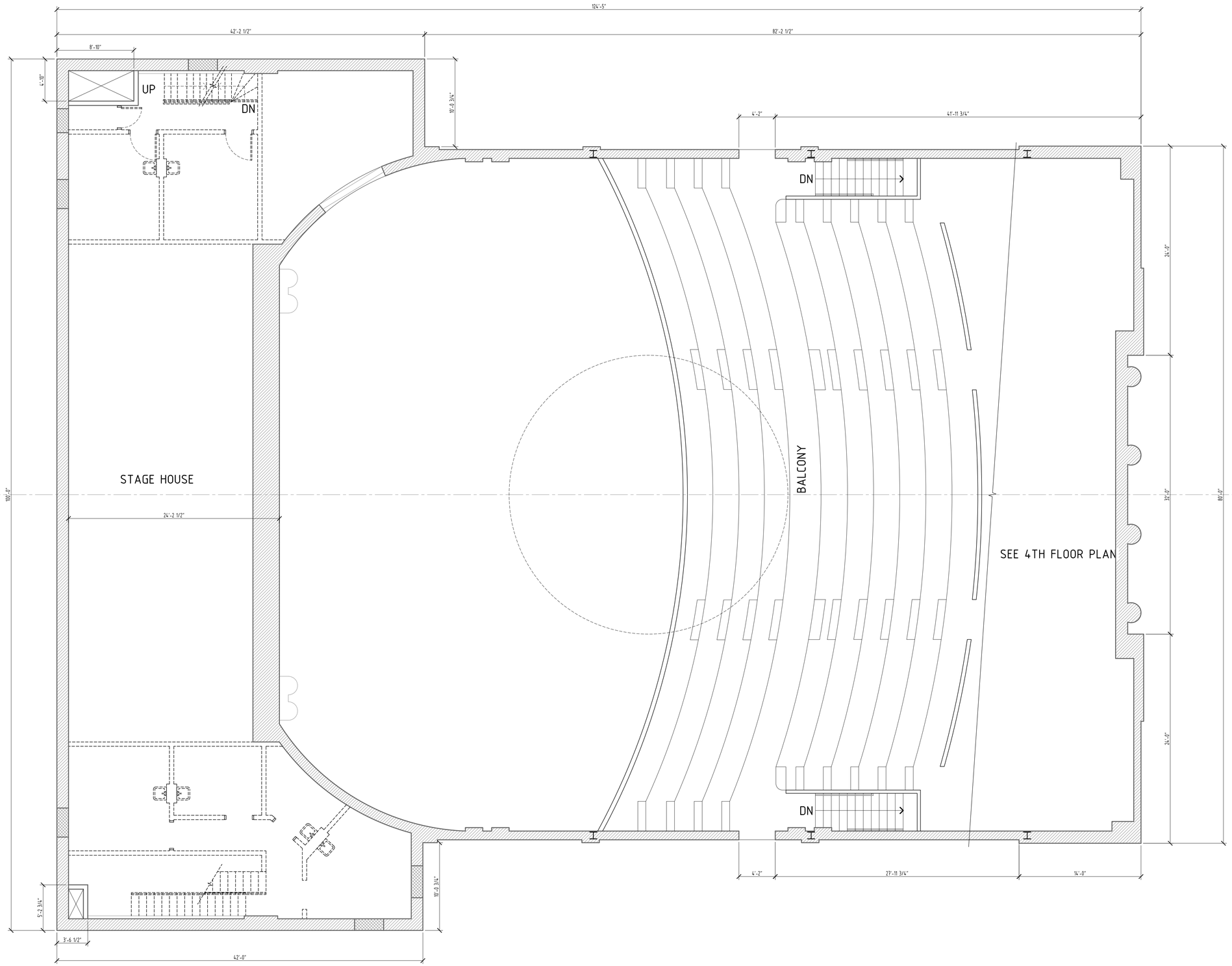

1 BALCONY/THIRD FLOOR PLAN - AS FOUND DRAWINGS

3/16" = 1'-0"

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BALCONY/THIRD FLOOR AS FOUND

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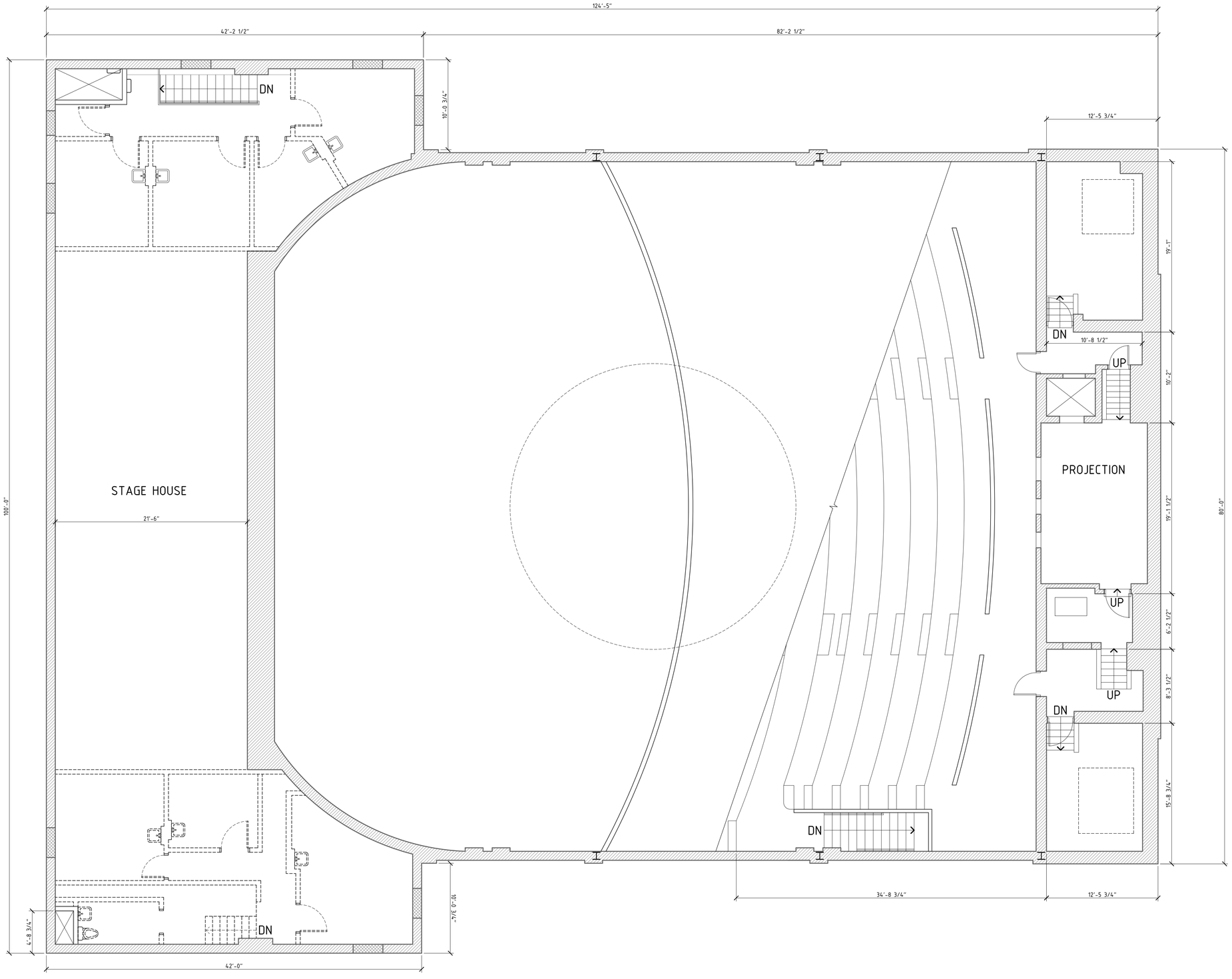

1 FOURTH/PROJECTOR FLOOR PLAN - AS FOUND DRAWINGS

3/16" = 1'-0"

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FOURTH/PROJECTOR FLOOR AS FOUND

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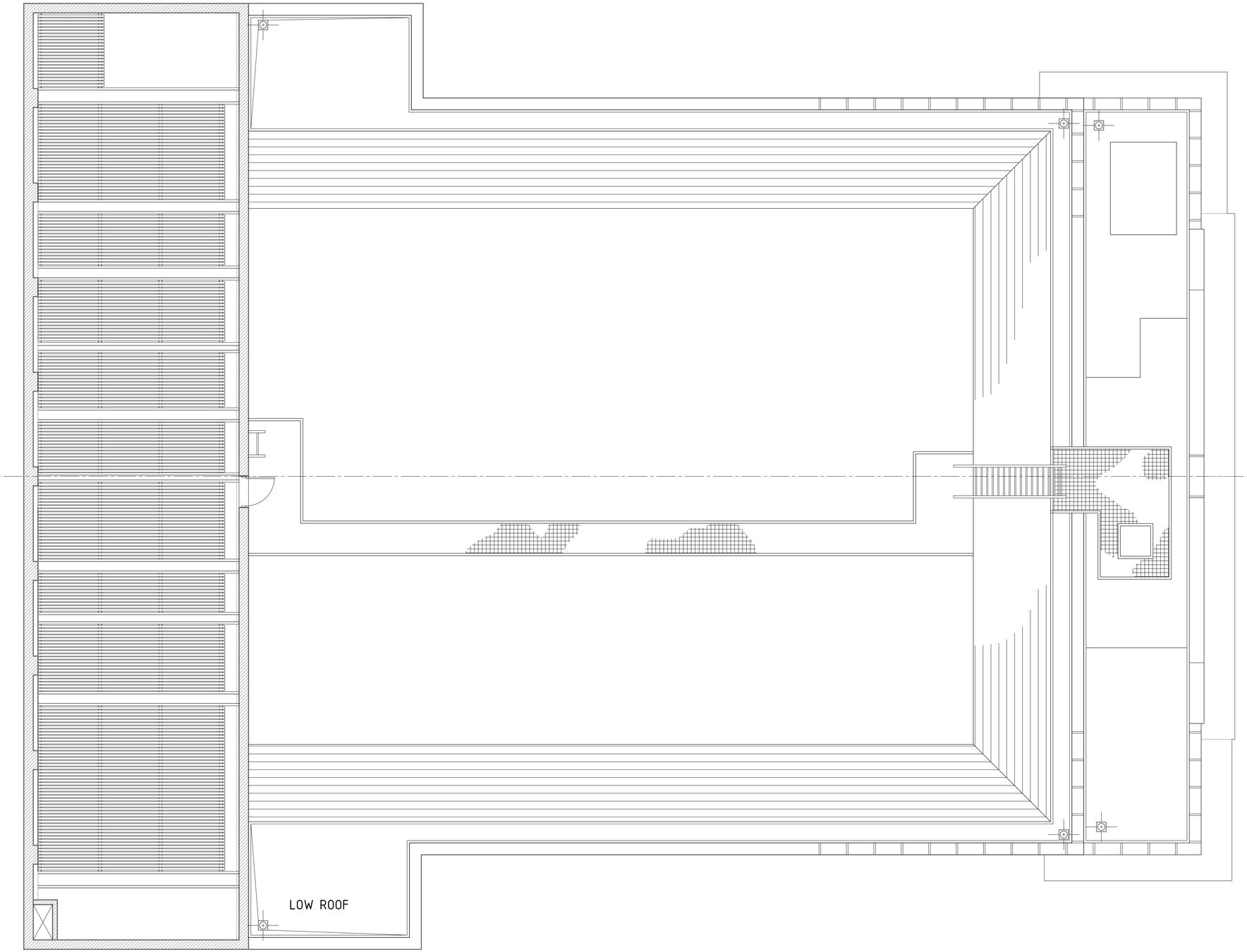

1 ROOF AND GRID IRON PLAN - AS FOUND DRAWINGS

3/16" = 1'-0"

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ROOF & GRID IRON PLANS - AS FOUND

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1 EAST ELEVATION - AS FOUND FIELD VERIFICATION

1/4" = 1'-0"

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EAST ELEVATION

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1 WEST ELEVATION - AS FOUND FIELD VERIFICATION

3/16" = 1'-0"

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WEST ELEVATION

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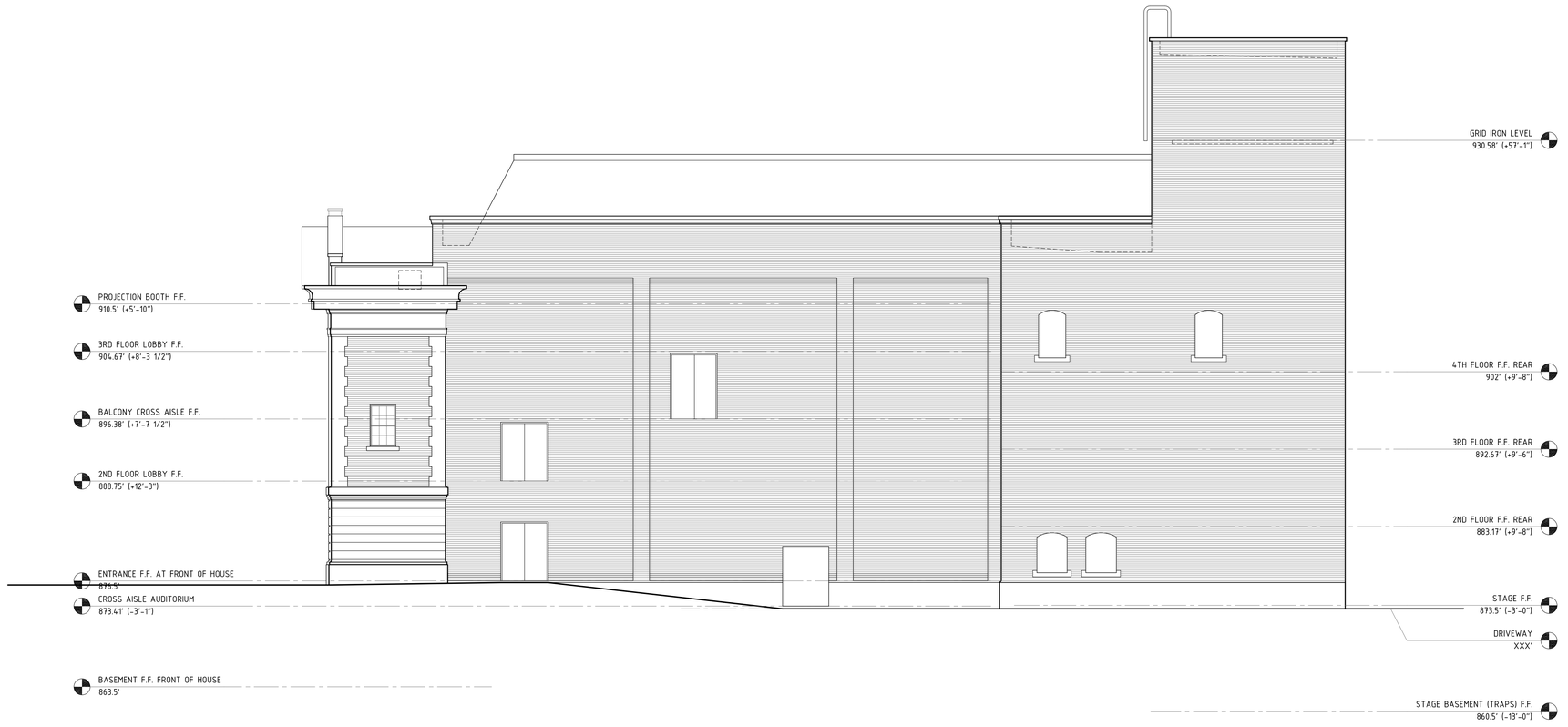

1 NORTH ELEVATION - AS FOUND FIELD VERIFICATION

1/8" = 1'-0"

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NORTH ELEVATION

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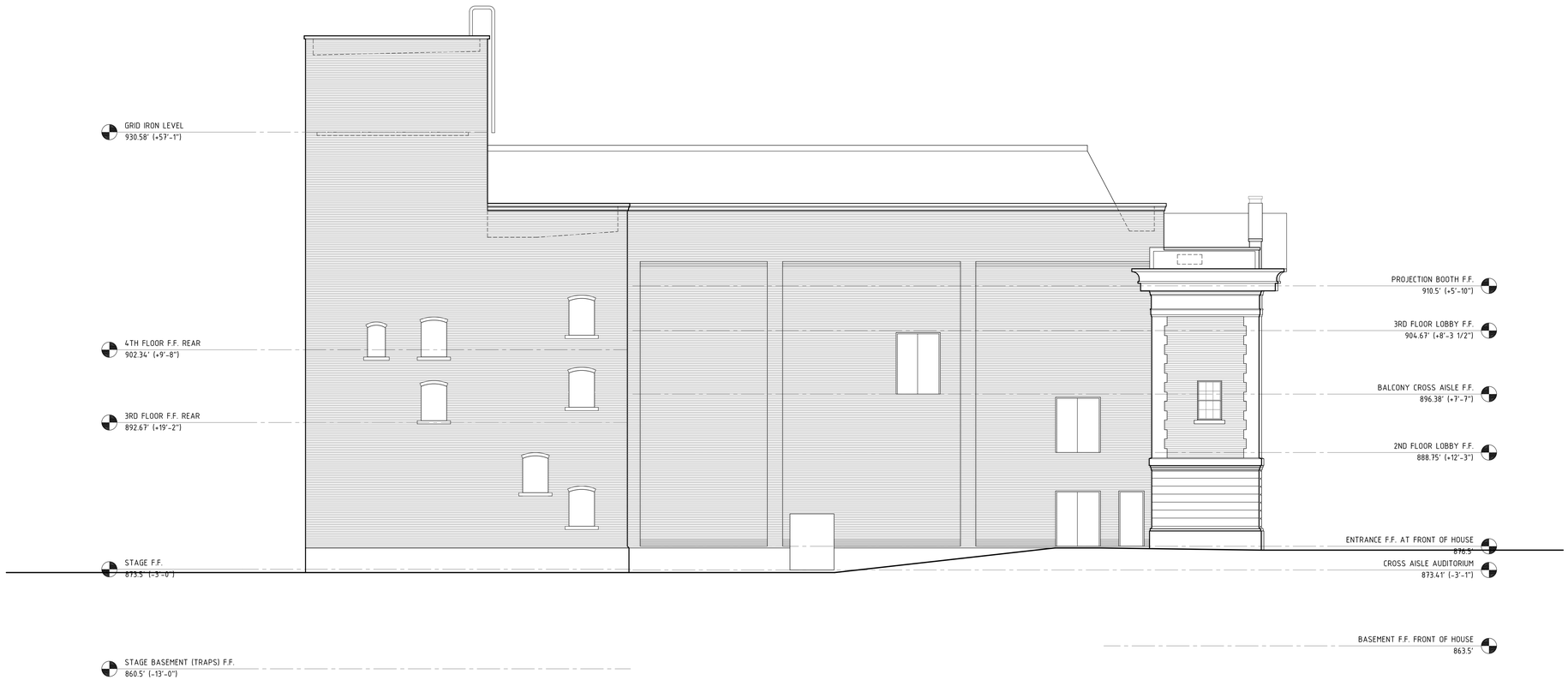

1 SOUTH ELEVATION - AS FOUND FIELD VERIFICATION

1/8" = 1'-0"

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NORTH ELEVATION

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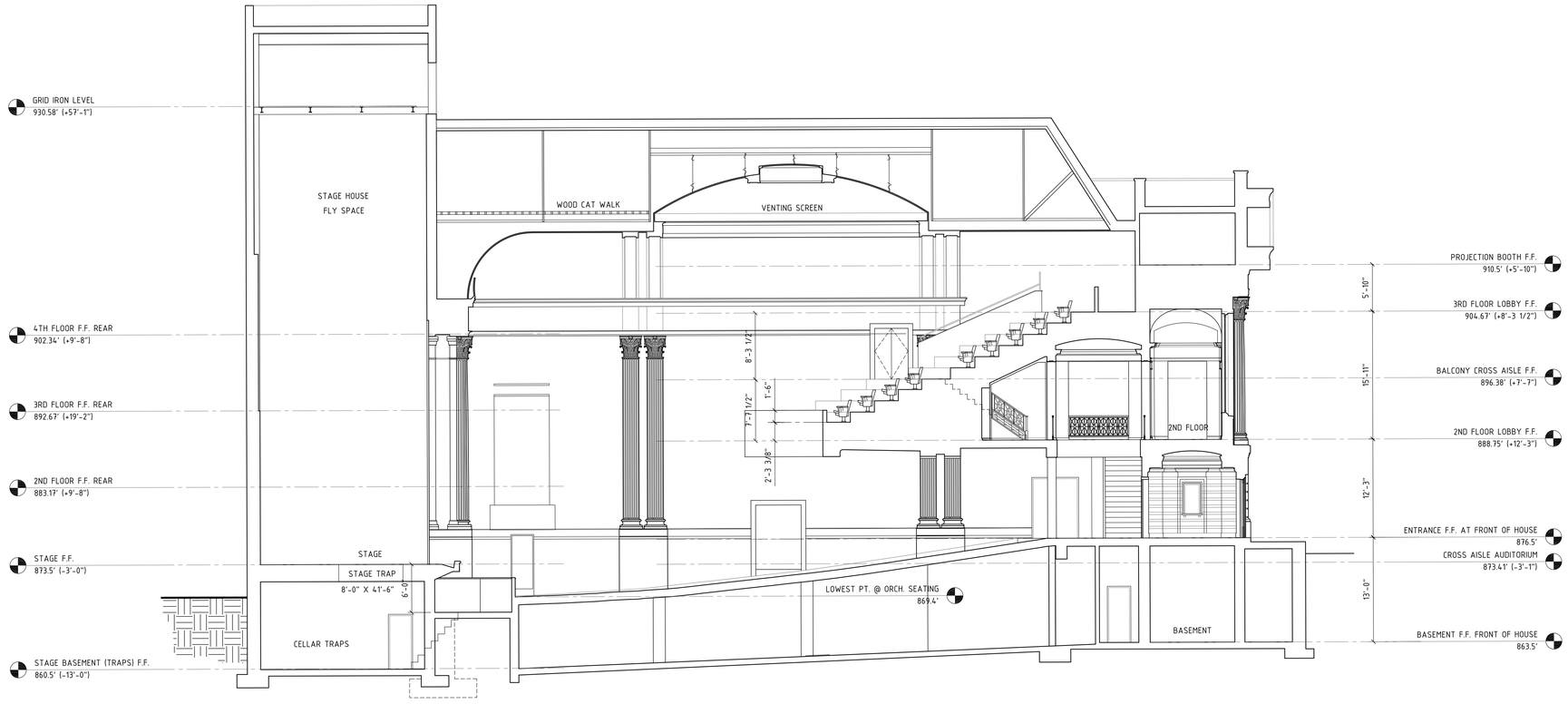

1 LONGITUDINAL SECTION - AS FOUND FIELD VERIFICATION

1/8" = 1'-0"

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LONGITUDINAL SECTION

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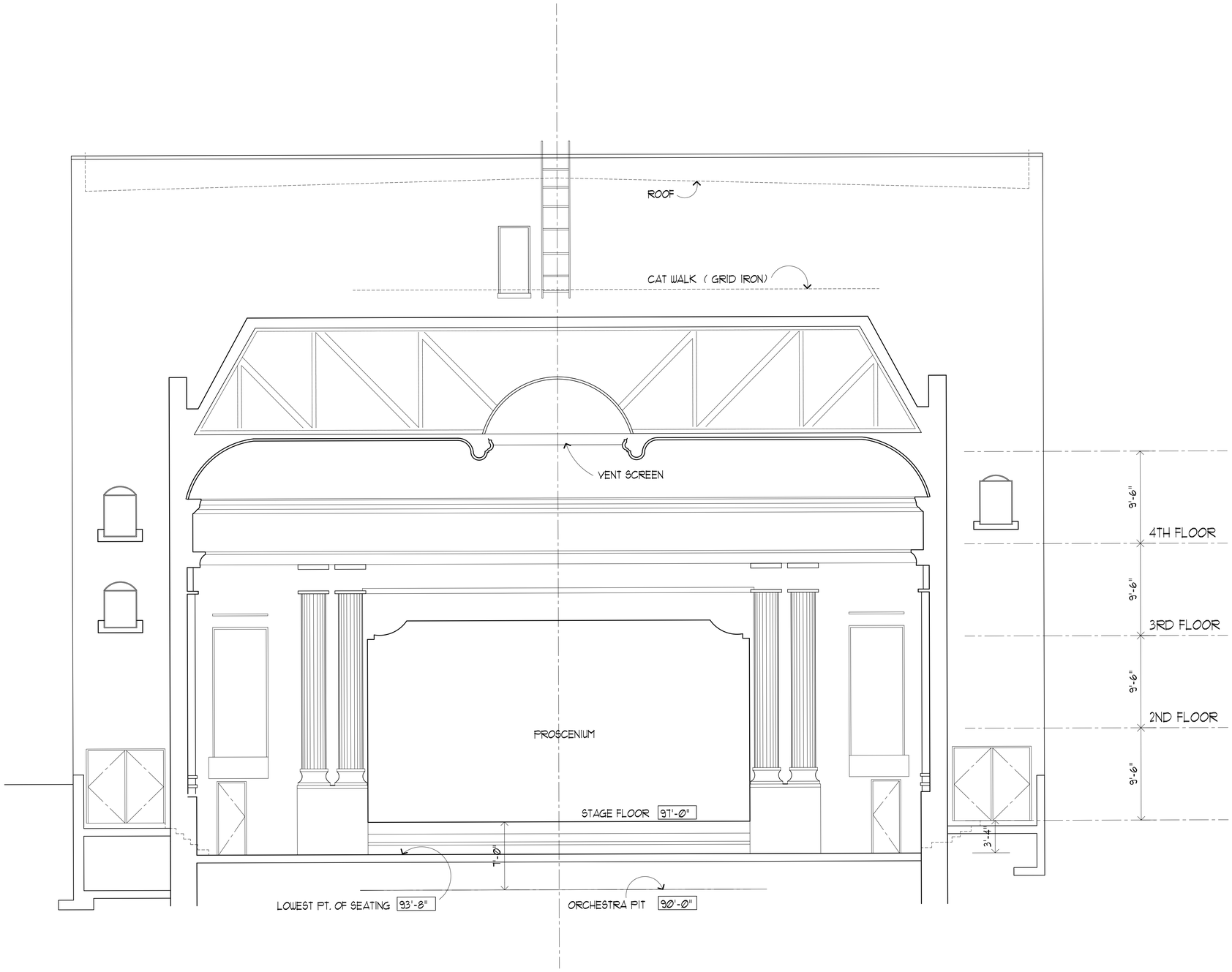

1 CROSS SECTION - AS FOUND FIELD VERIFICATION

3/16" = 1'-0"

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GOODWILL THEATRE STUDY
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CROSS SECTION

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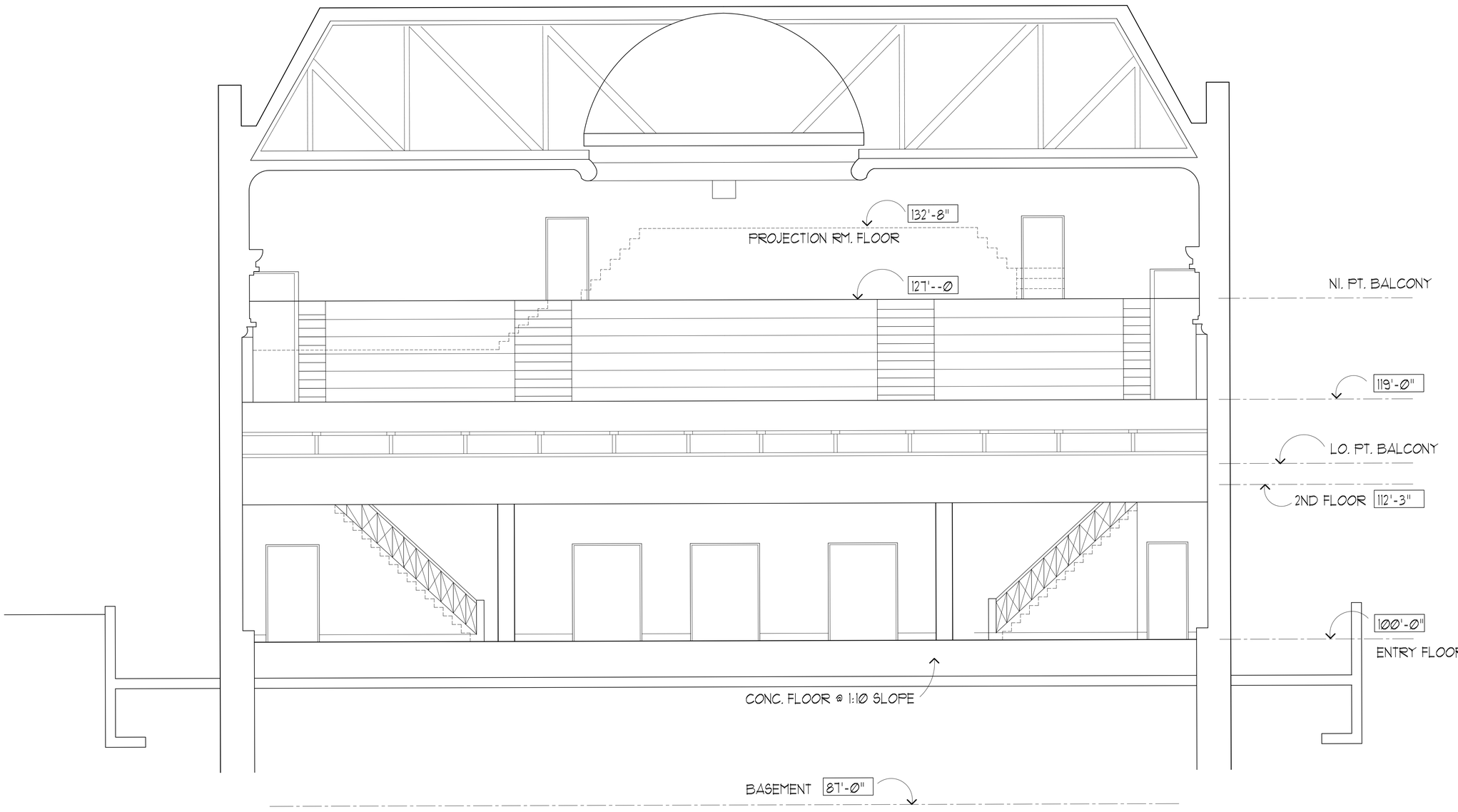

1 CROSS SECTION - AS FOUND FIELD VERIFICATION

1/4" = 1'-0"

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GOODWILL THEATRE STUDY
JOHNSON CITY, NEW YORK

CROSS SECTION

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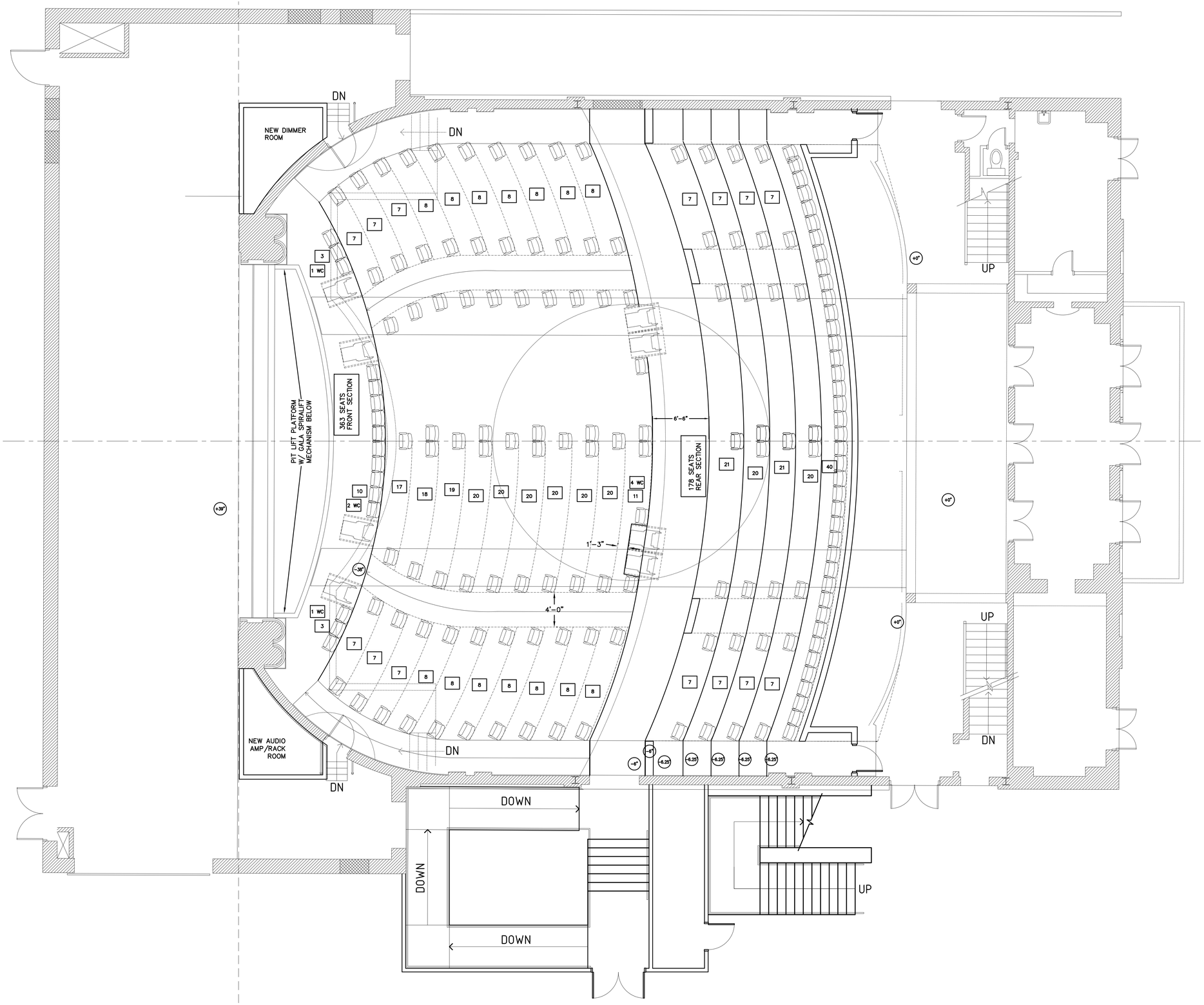
Goodwill Theatre

Johnson City, New York



ORCHESTRA LEVEL SEATING PLAN

SCALE: 3/16" = 1'-0"

G0

WJHW

WRIGHTSON JOHNSON HADDON & WILLIAMS

Consultants in Acoustics, Noise Control, Audio, Video, and Audio Visual Systems

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WJHW PROJECT NO: 16142

Drawn By: WJHW

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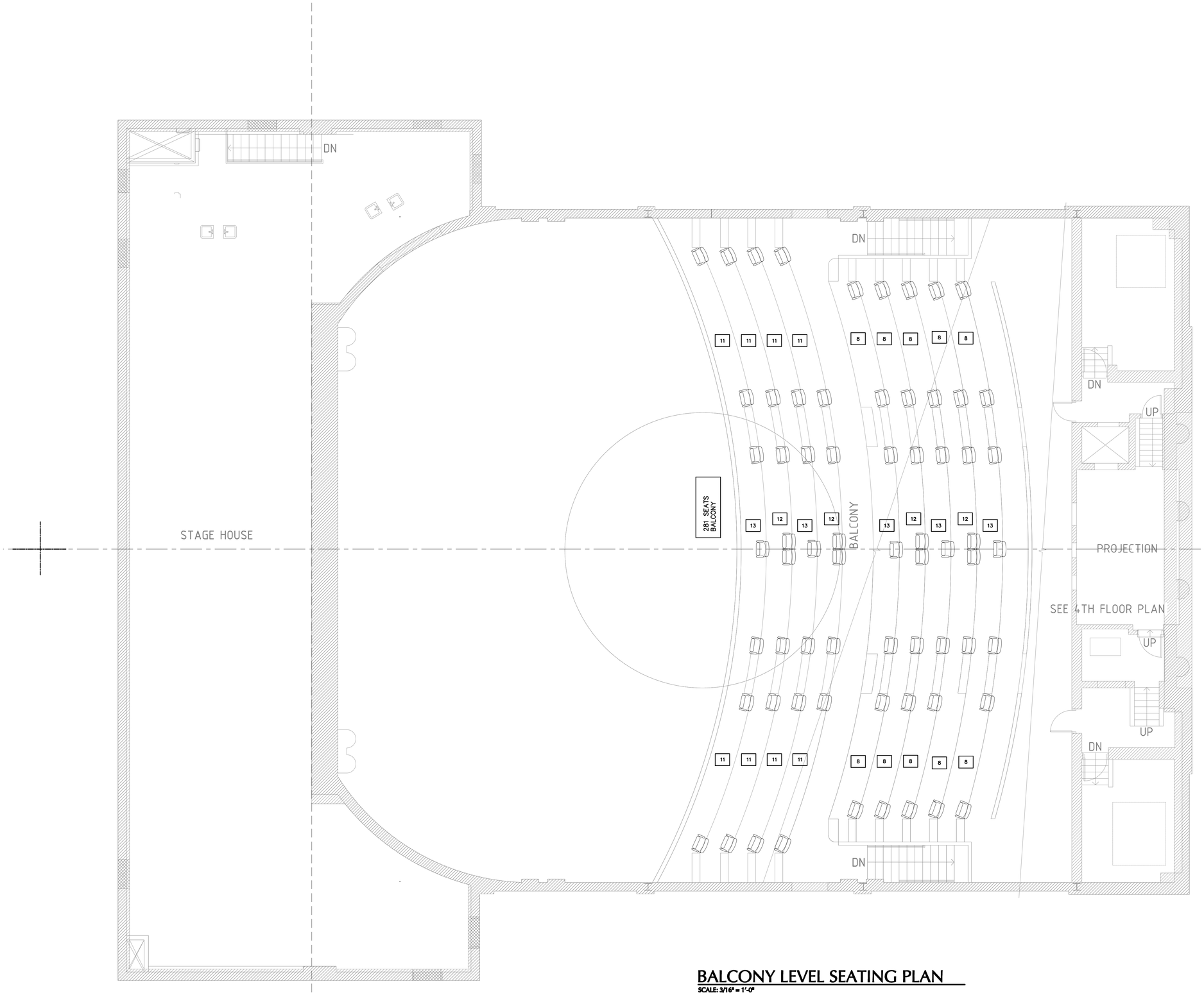
Title: THEATRICAL RENOVATION SCHEME — ORCHESTRA LEVEL SEATING PLAN

Sheet Number: TC-101



BALCONY LEVEL SEATING PLAN

SCALE: 3/16" = 1'-0"

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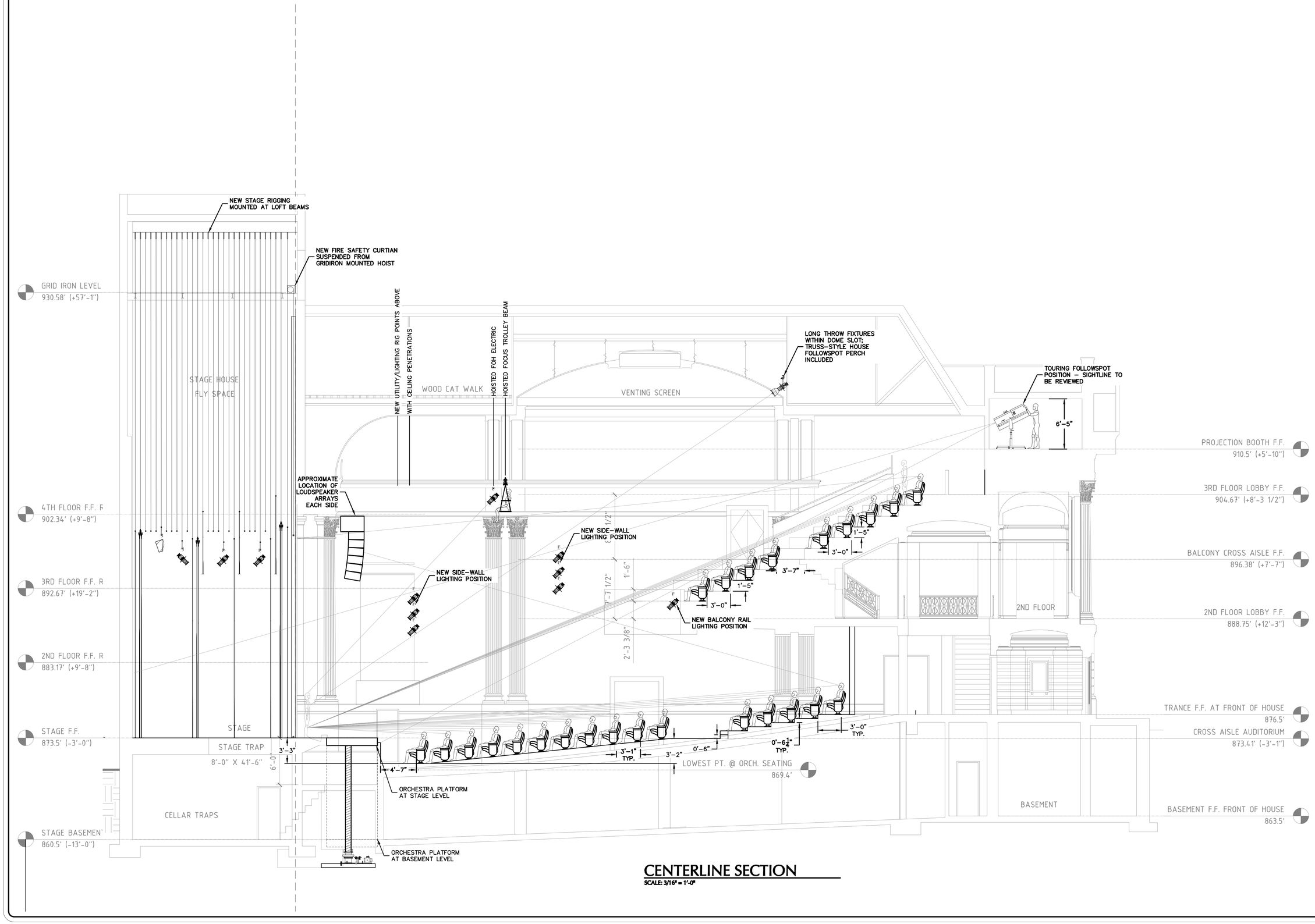
Goodwill Theatre
Johnson City, New York



CENTERLINE SECTION

SCALE: 3/16" = 1'-0"

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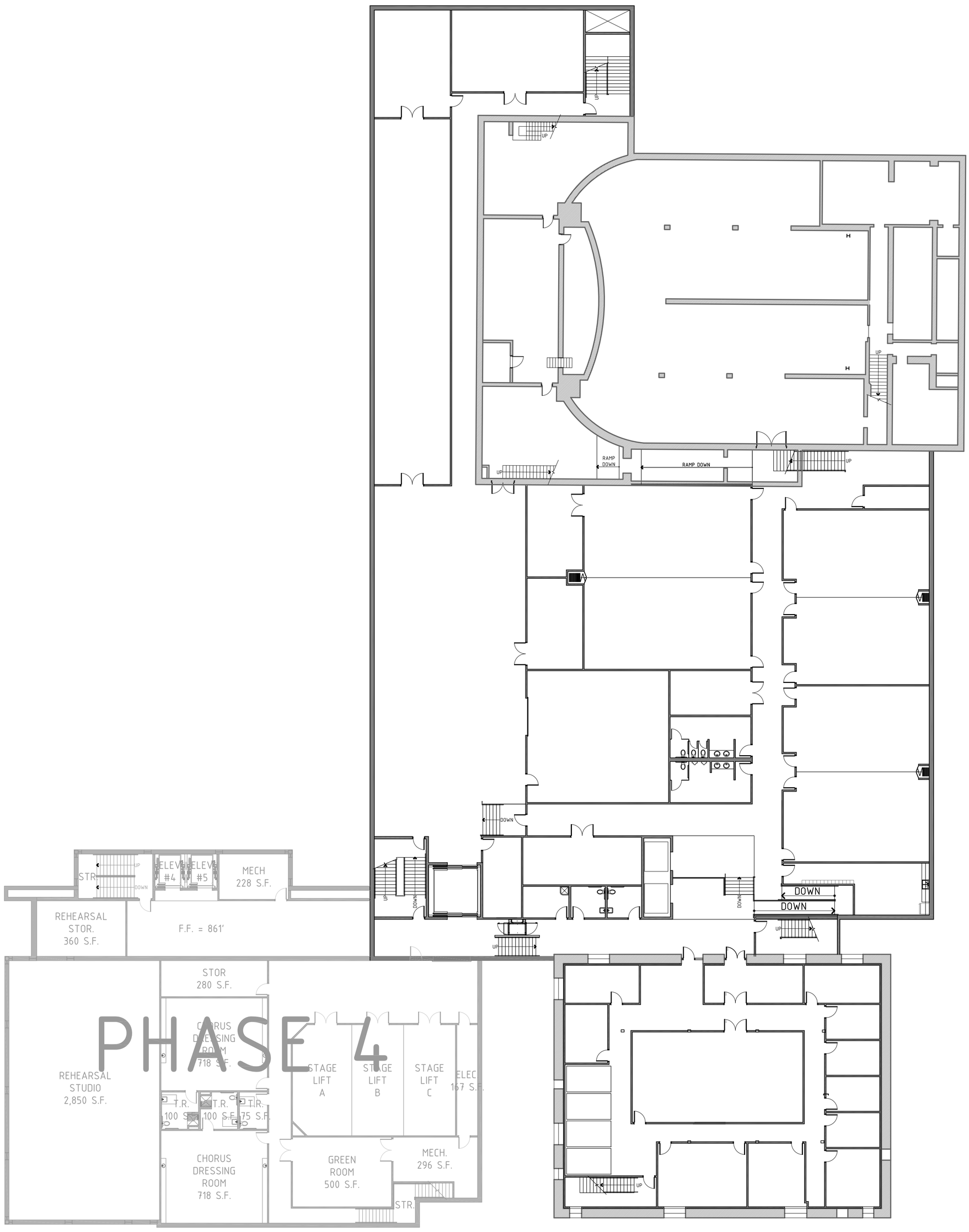

BASEMENT PLAN CONCEPT DESIGN - GWT COMPLEX

GOODWILL FIREHOUSE STAGE & PORTAL BUILDING
Johnson City, New York
February 2017

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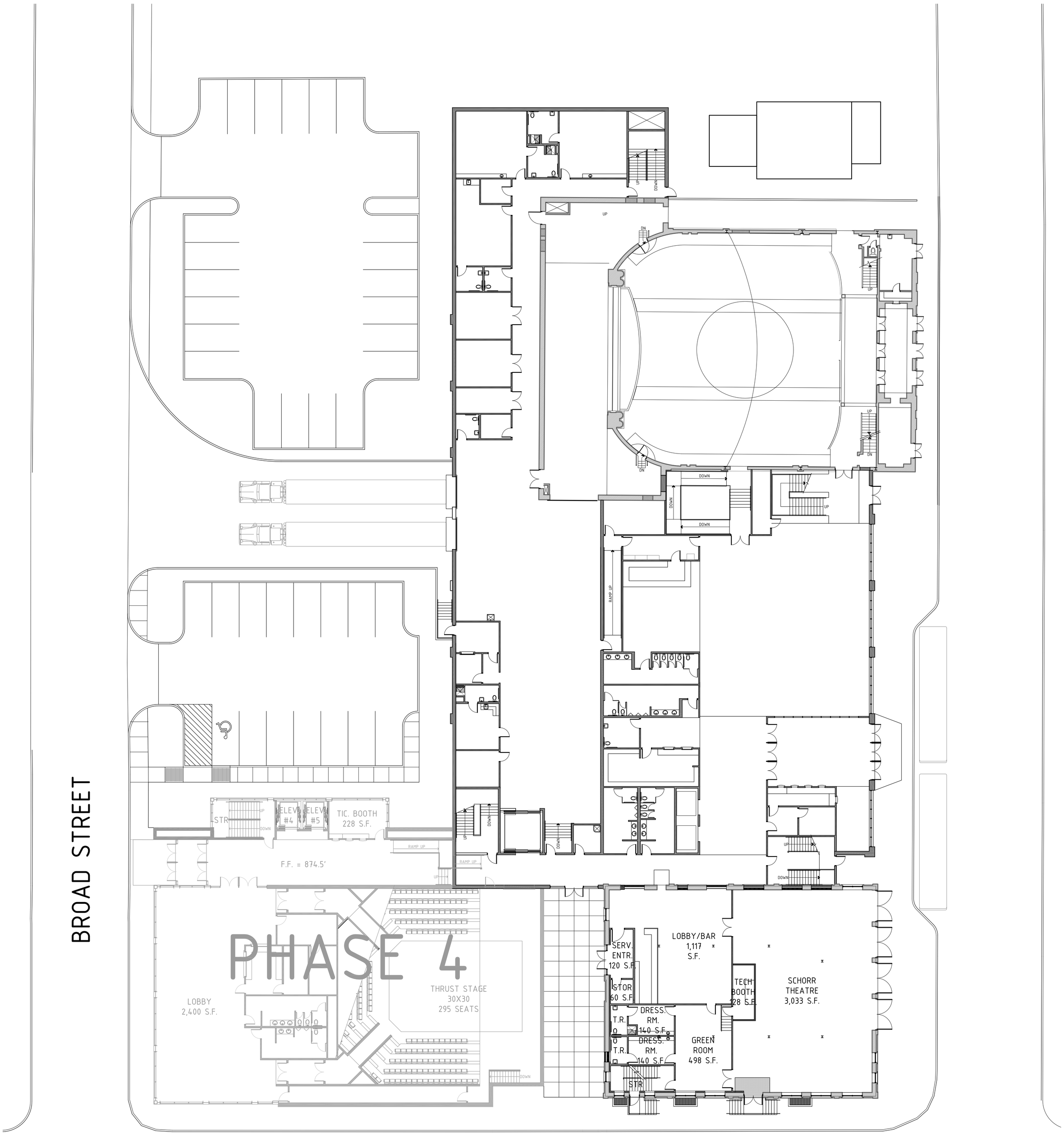

1 SITE PLAN AND FIRST FLOOR PLAN

SCALE: 1/16" = 1'-0"

TRUE NORTH

PLAN NORTH

SITE/FIRST FLOOR CONCEPT DESIGN - GWT COMPLEX

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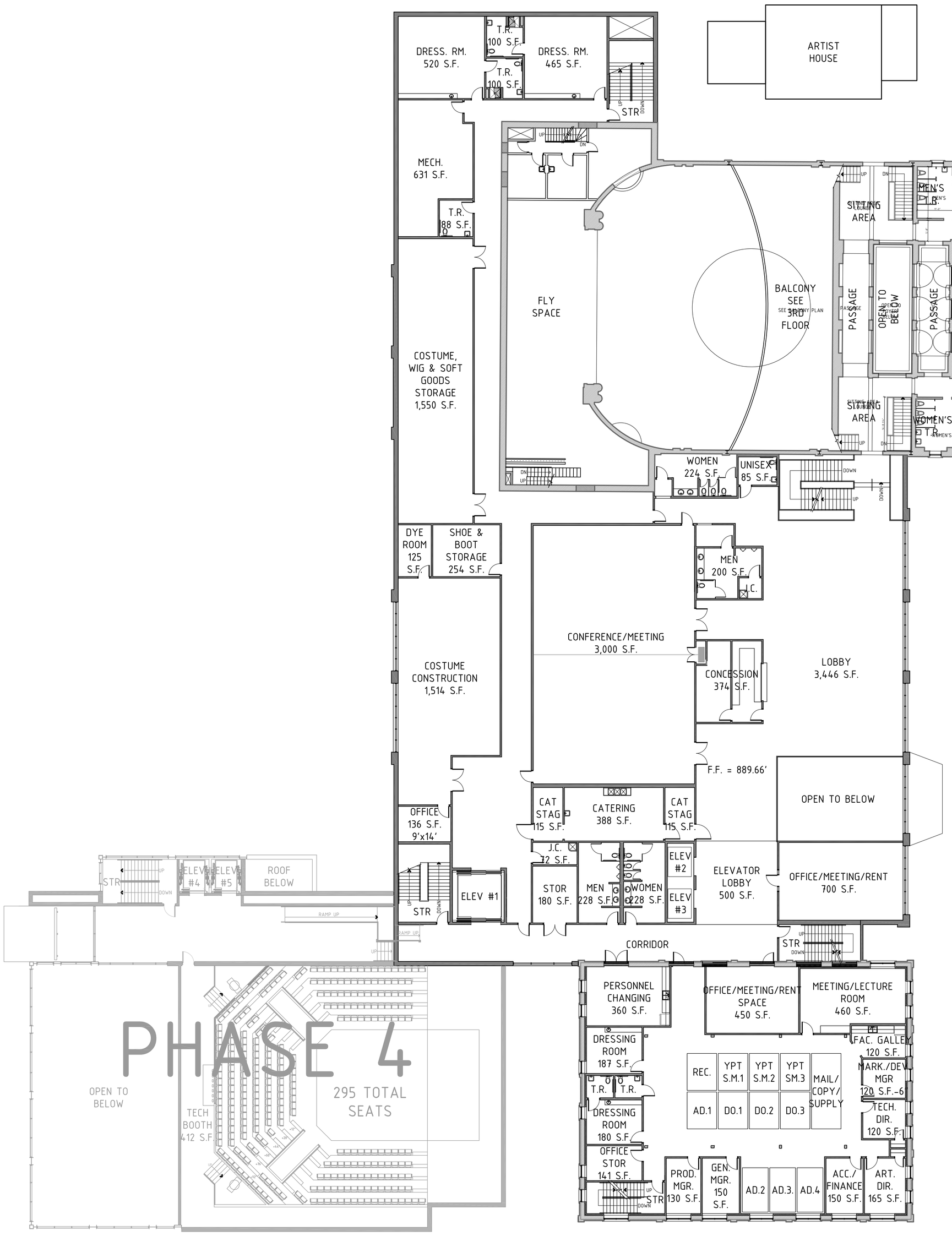

1 SECOND FLOOR PLAN

SCALE: 1/16" = 1'-0"

TRUE NORTH

PLAN NORTH

SECOND FLOOR CONCEPT DESIGN - GWT COMPLEX

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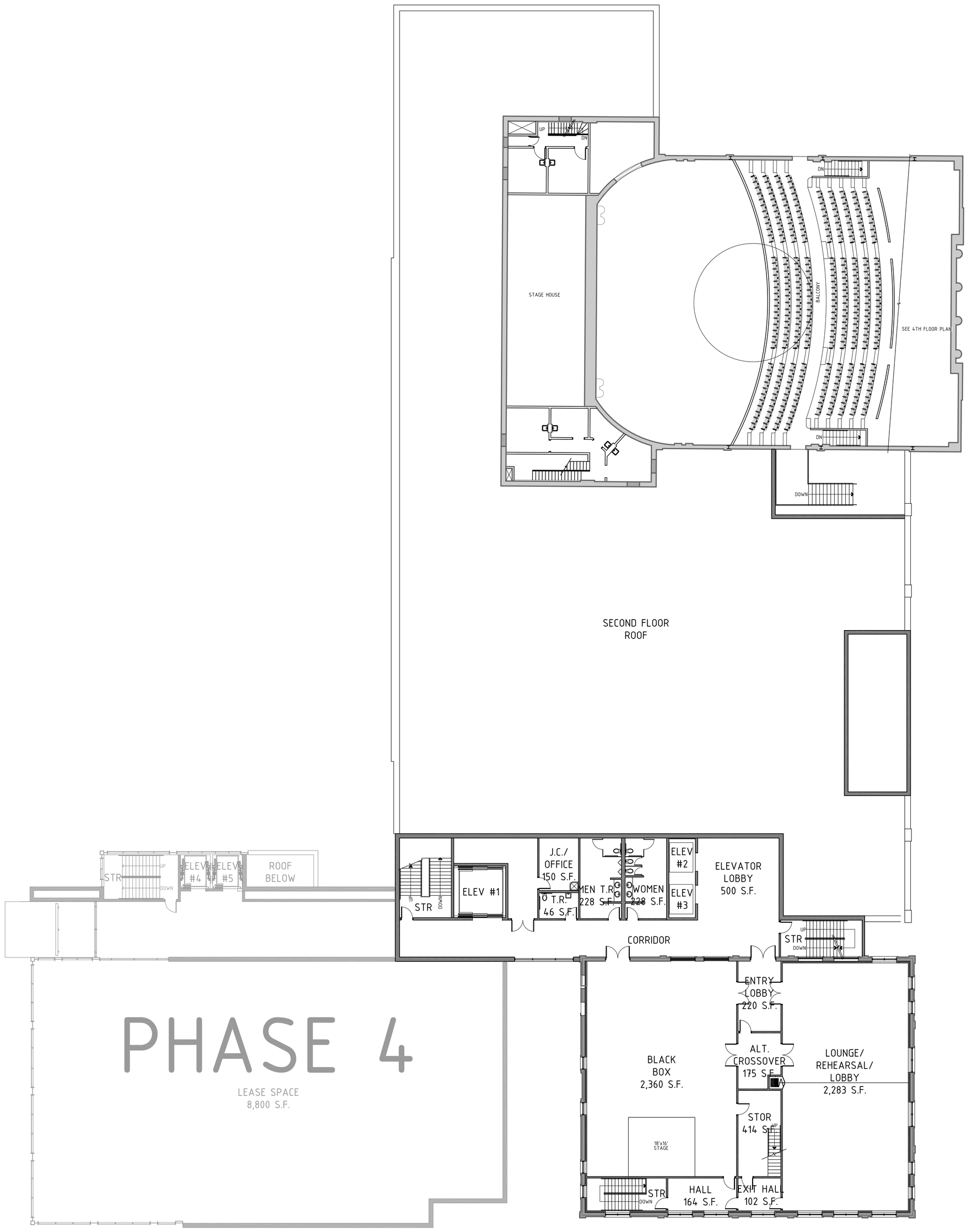

1 THIRD FLOOR PLAN

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

TRUE NORTH

PLAN NORTH

THIRD FLOOR CONCEPT DESIGN - GWT COMPLEX

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