LAUDERDALE COUNTY AGRI-CENTER NEW SOUND REINFORCEMENT SYSTEM 1022 MS-19, Meridian, MS 39301

Lauderdale County Board of Supervisors

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AV CABLING & TERMINATION NOTES

GENERAL

- All plenum wire shall meet applicable local codes.
 Cable types are specified based on terminated end points.
- See single lines, provide as required to provide the system as shown. Cable callouts shown on the single line drawings are for reference to the Basis of Design, UON.
- All wire and cable shall be provided as recommended by the manufacturer for the connected equipment, UON. 6. All exposed wire and cable shall be plenum rated per NÉC and NFPA.
 - Verify all cable types during submittal with the AV Consultant.
 - 8. Verify cable lengths with manufacturer of connected equipment for all cable types.
 - 9. Wire and cable for any device shall be supplied in accordance with the requirements of the device manufacturer 10. Wire and cable shall be installed in compliance with the National Electrical Code.
 - 11. Wire, cable and signal conductors shall be new and unused.

 - Wire, cable and signal conductors shall be new and unused.
 All low level field cabling shall enter racks at punch points or directly soldered to equipment connectors.
 Buss punch block ground points to single rack ground, see jack field detail.
 Mechanically isolate all panel connectors from raceway system and finish plate.
 Mechanically isolate connector chassis from rack panel. Pin 1 shall not be at the same potential as connector chassis or panel.
 Mechanically isolate service entrance conduits from equipment rack.
 Use #10AWG solid wire min. for all ground jumpers.
 Isolate equipment rack from conduit, raceway and power distribution system.
 Maintain proper twist ratio for all pairs (Category 6 patching and interconnect).
 There shall be no ground loops, regardless of equipment configuration.
 Use 3-wire grounded devices when possible.
 Use only balanced audio terminations throughout system, U.O.N. Use only ratchet type crimp tools.

 - 23. Use only balanced audio terminations throughout system, U.O.N. Use only ratchet type crimp tools. 24. All wire and cable shall have a unique numering designator at each end of the physical media.

 - 25. Contractor shall supply the cable in accordance with the recommendations of the connected equipment manufacturer. 26. Install and terminate cabling per AES, ANSI, IEC or BICSI standards, UON.
 - 27. Contractor shall supply the optimum cable for the application.
 - 28. All cabling shall be subject to the circuit type.
 - 29. All cabling shall be subject to environmental conditions.
 - 30. All calbing shall be provided and installed for bandwidth requirements. 31. Wiring designators are shown to indicate the requirements and to denote circuiting.
 - 32. Contractor is free to use their own numbering scheme.
 - 33. Contractor shall document all wire numbers on their shop drawings and as-built drawings. 34. Provide cable schedules for all cables UON. See specifications for additional requirements.

Loudspeaker Trim & Tilt by Zone

Zone	Down Tilt	Acoustical Center Height
Arena	-90	30
Barn East	-90	37
Barn West	-90	37
Bleachers	-80	30
Concourse		30.71
Connector East	-60	30
Connector West	-60	30
Loading Area	-45	15

NOTE: Verify all mounting locations, trim and angles with consultant prior to integration.

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GENERAL LOUDSPEAKER NOTES

1. All details are for reference, illustration of applicable device coordinates and mounting configurations and general device orientation.

2. Obtain final loudspeaker coordinates, aiming data and dimensional details from the consultant prior to integration. 3. Refer to the architectural drawings for details and dimensions, architectural details provided herein are for reference only. SYSTEMS

Final adjustment of loudspeaker aiming and mouting configuration will be determined on-site during commissioning.

- Provide rigging hardware that supports adjustment of all loudspeakers for 360 degrees of adjustment. Provide lift, scaffolding and rigging kits required for loudspeaker mounting and adjustment. Ensure that all equipment is adjustable as to not impede loudspeaker dispersion during commissioning.

Pull cable through pull box, do not splice or use panel connectors.

Amplifier circuit shall terminate directly to transducer UON.

- Ensure that all equipment is adjustable as to not impede loudspeaker dispersion during commissioning.
 Refer to single line drawings for component callouts, circuiting and related signal processing requirements.
 Attached to structure only, coordinate with owner, see specifications.
 Equipment shall be held firmly in place with proper mounting hardware, suspension or rigging materials.
 Equipment attached to any building structure, sub-structure or other load-bearing member shall be self-supporting.
 All mounting or rigging hardware shall be installed with a safety factor of at least three times the required load.
 Provide 100%% redundancy for all rigging attachment points, verify with owner.
 Provide bumpers, array brackets, dead-hang hardware, fasteners, safety equipment as required by the loudspeaker manufacturer.
 Use manufacturer's rigging hardware if available.
 The AV Contractor shall verify coordinate and obtain color preferences for all loudspeaker enclosures, related rigging, mounting
- 17. The AV Contractor shall verify, coordinate and obtain color preferences for all loudspeaker enclosures, related rigging, mounting hardware and accessories with the architect and/or owner.

CABLING

- 1. All low level field cabling shall enter rack at punch points or directly soldered to terminating connector at equipment or terminal panel.
- 2. Buss punch block ground points to single rack ground, see jack field detail. If power supply includes ground to AC connector, do not terminate signal ground.
- Mechanically isolate all panel connectors from raceway system and finish plate.
- Mechanically isolate connector chassis from rack panel. Pin 1 shall not be at the same potential as connector chassis or panel. Mechanically isolate service entrance conduits from equipment rack.
- Use #10AWG solid wire min. for all ground jumpers.

Provide cabling as reflected by single line drawings.

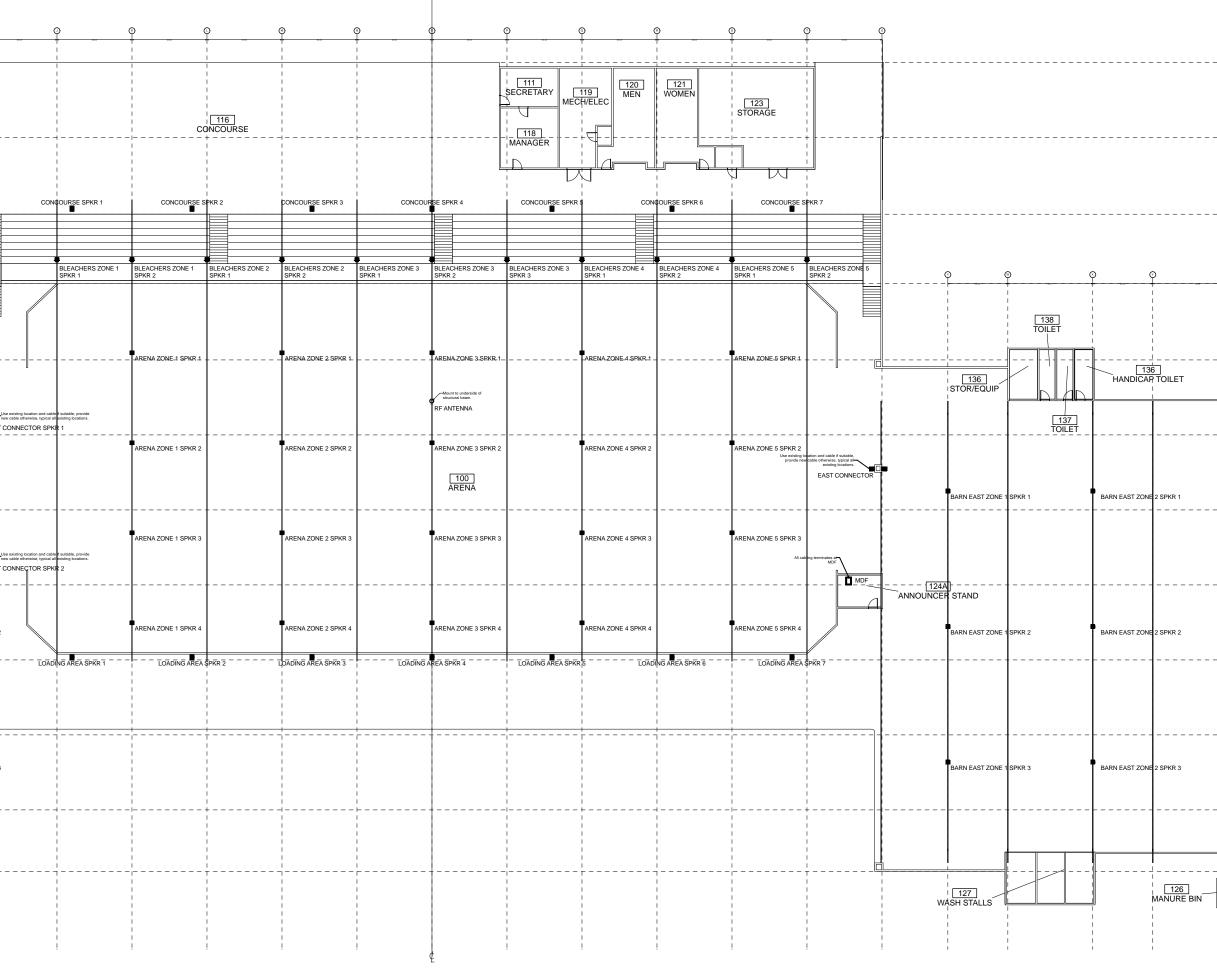
Obtain aiming coordinates from consultant, UON.

- There shall be no ground loops, regardless of equipment configuration.
- 9. Use 3-wire grounded devices when possible. 10. Use only balanced audio terminations throughout system, U.O.N.

WIRE NUMBERS

- All wire and cable shall have a unique numering designator at each end of the physical media.
 Contractor shall supply the cable in accordance with the recommendations of the connected equipment manufacturer, per AV best practice or AES, ANSI, IEC or BICSI standards. 3. Contractor shall supply the optimum cable for the application, considering the circuit type, environmental conditions, bandwidth
- requirements, termination type, cable construction and performance requirements. 4. Wiring designators are shown to indicate the requirements and to denote circuiting. Contractor is free to use their own numbering
- scheme. 5. Contractor shall document all wire numbers on their shop drawings and as-built drawings. Provide cable schedules for all cables UON

6. See specifications for additional requirements.



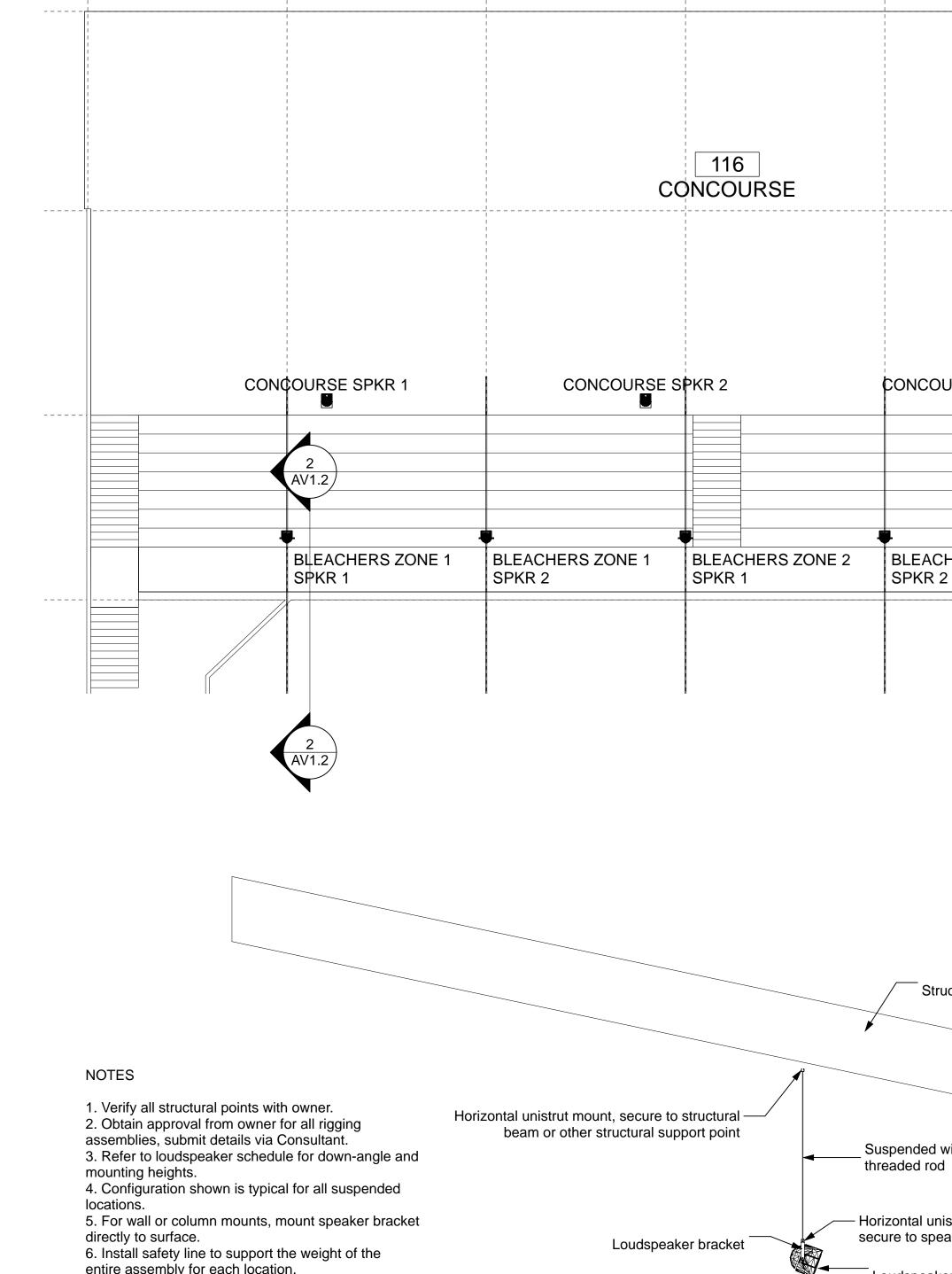
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Project#21-046 ©Roland, Woolworth & Associates	A

TRUE NORTH BLDG NORTH

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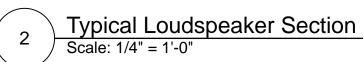
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6. Install safety line to support the weight of the entire assembly for each location.7. Submit details for all structural hangs to owner for approval prior to installation.

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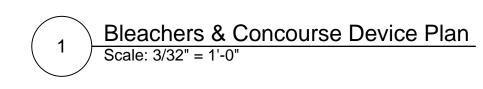
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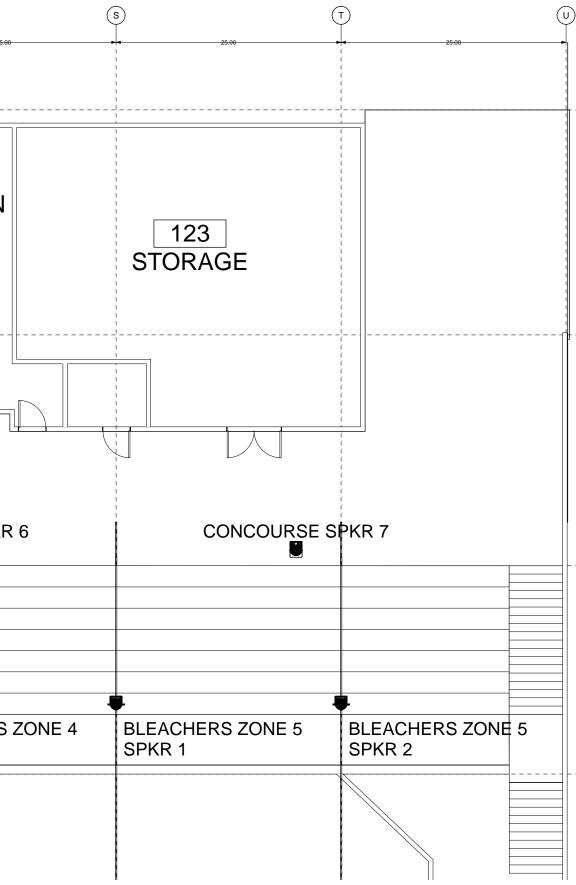


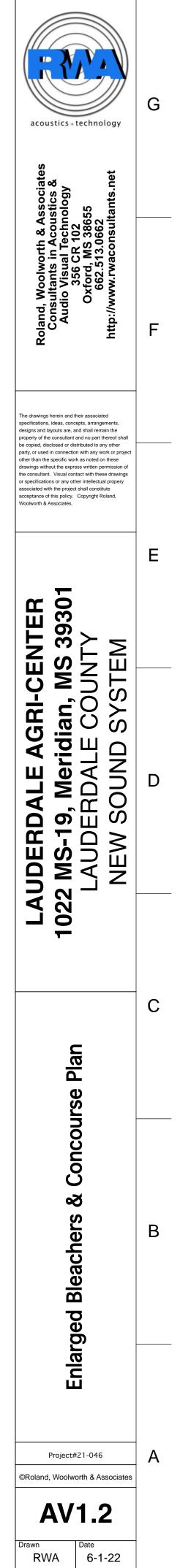
Structural beam

Suspended wire or

— Horizontal unistrut mount, secure to speaker bracket

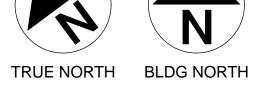
Loudspeaker assembly







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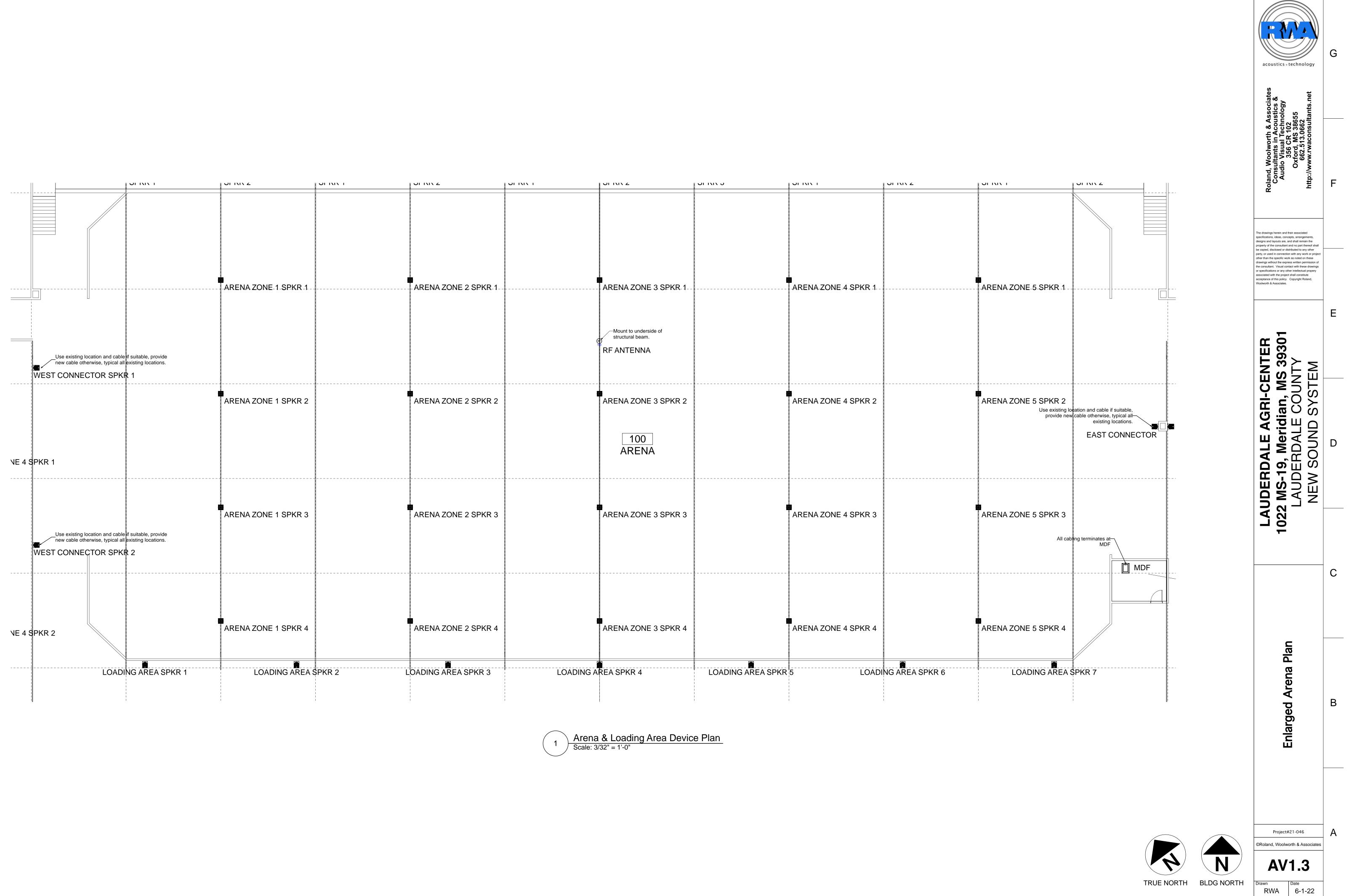












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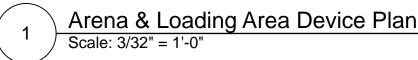
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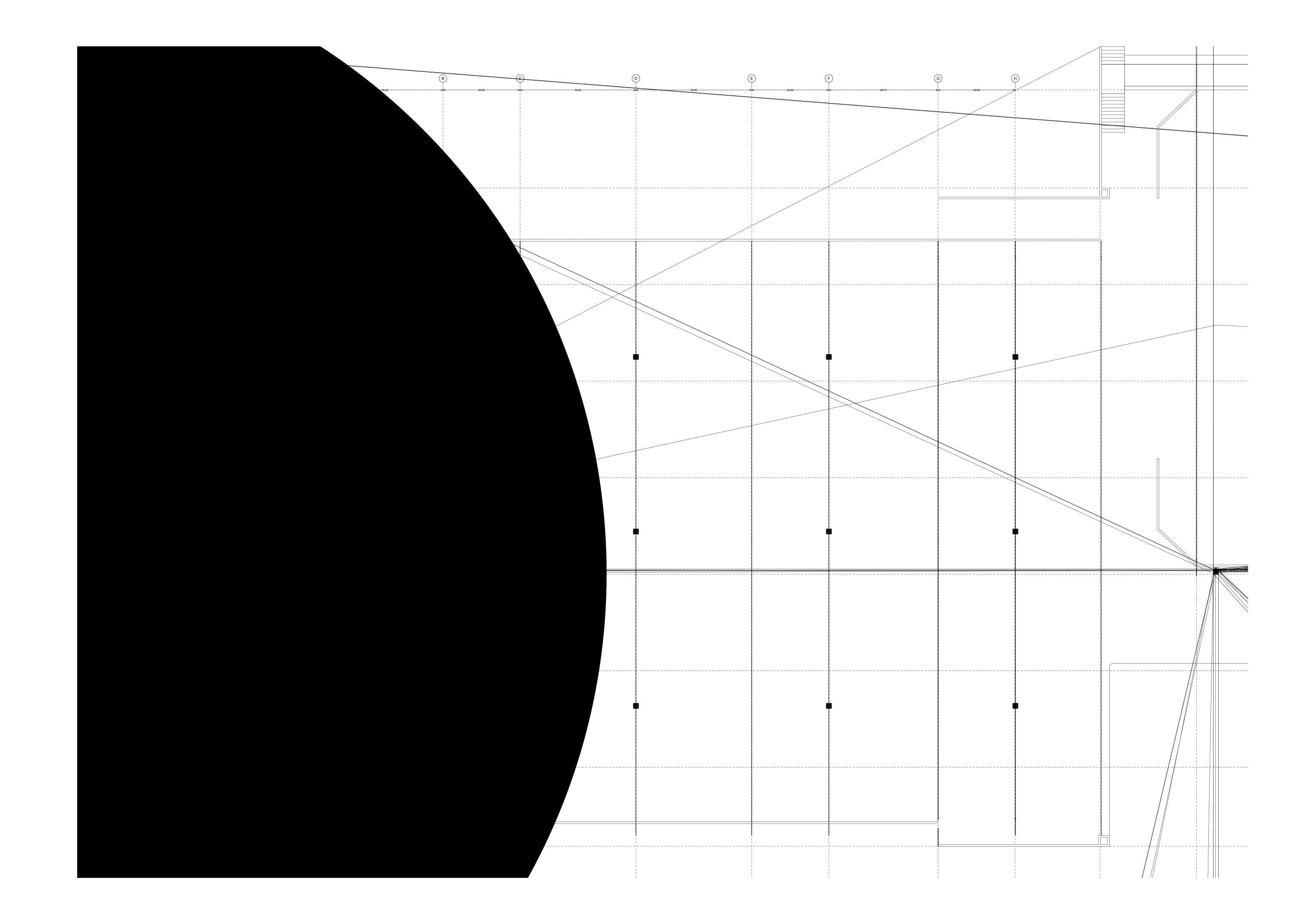
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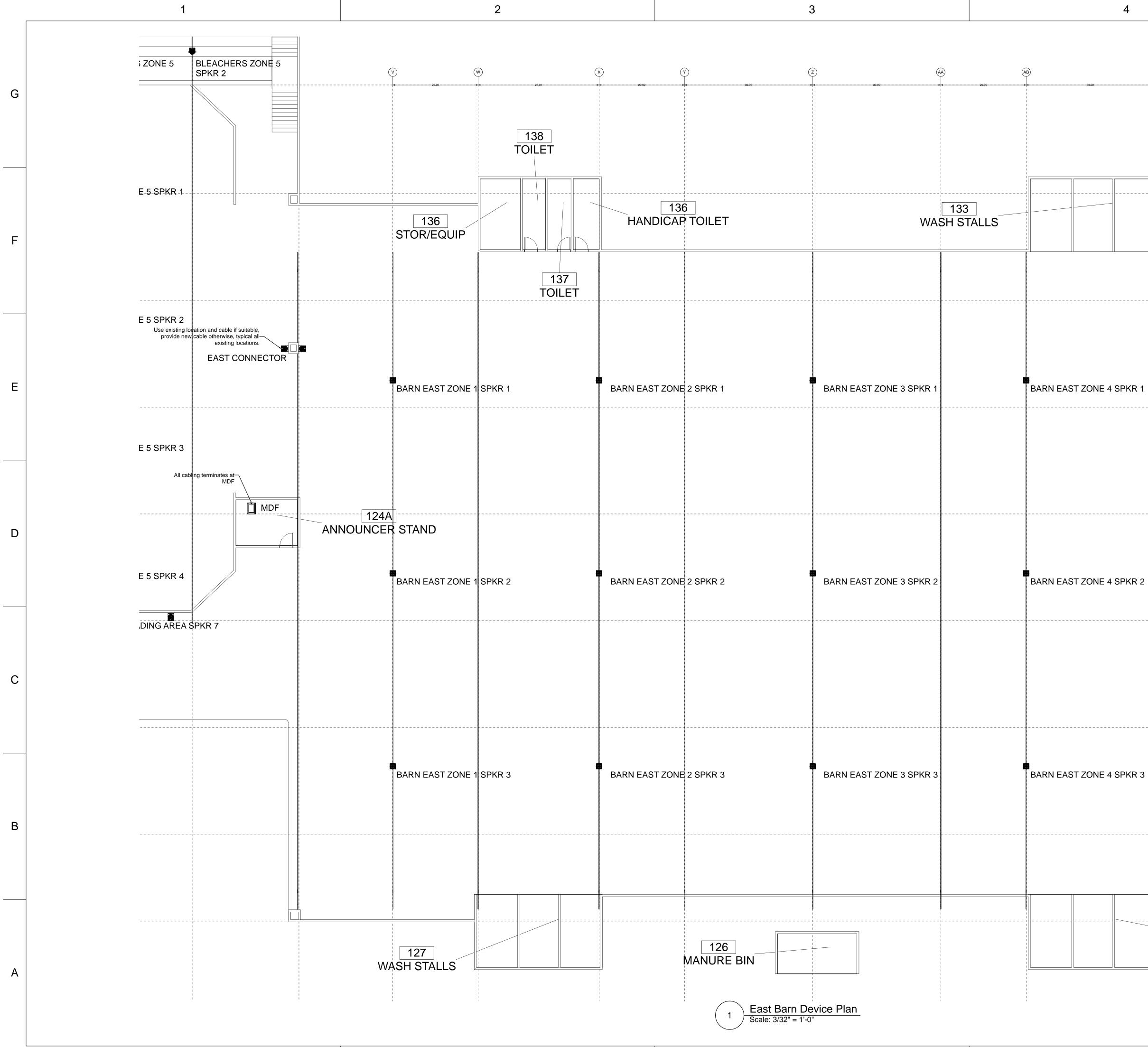
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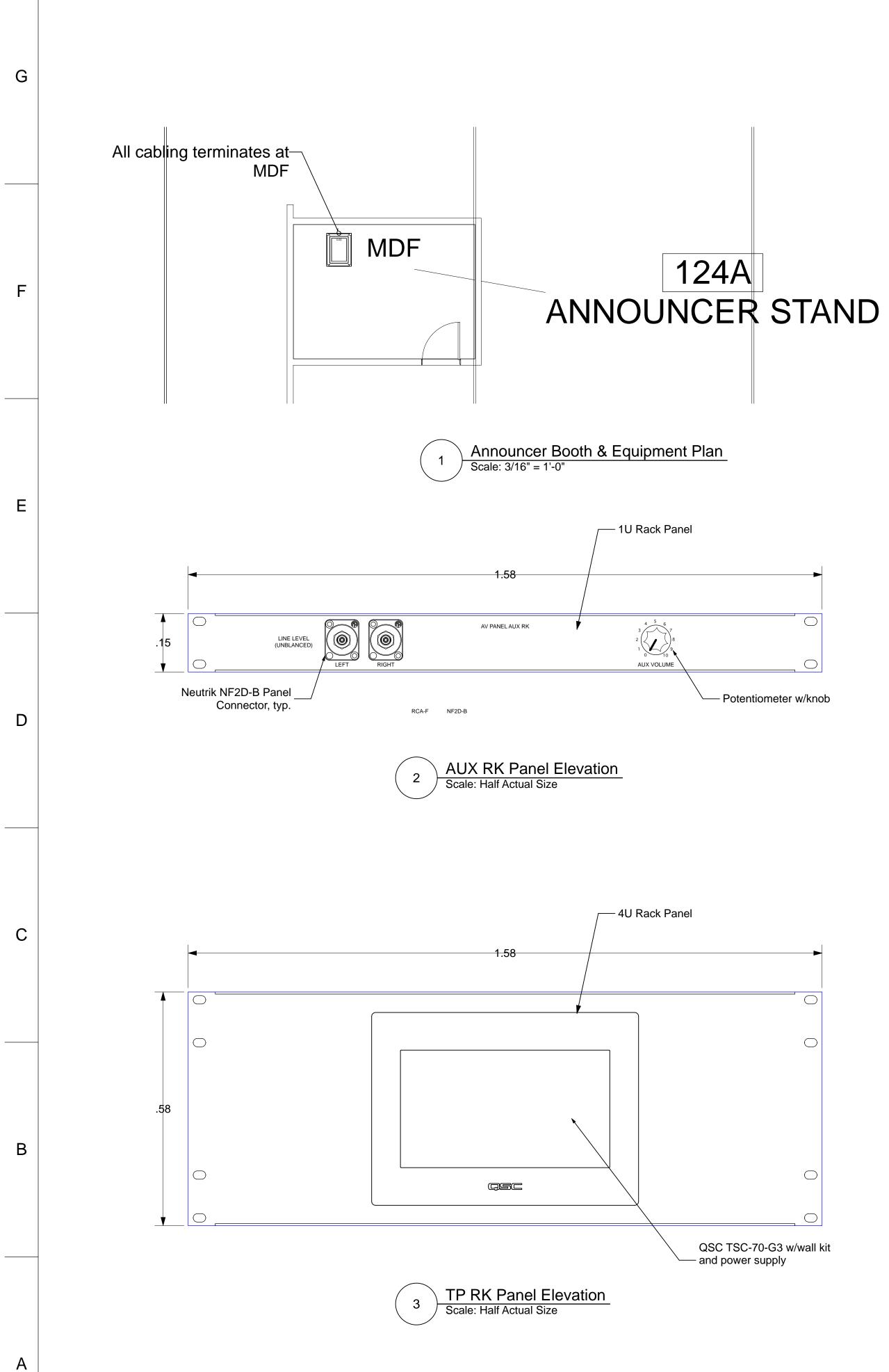
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RACK & DISTRIBUTION FRAME NOTES

- 1. Clearance dimensions shown are minimum requirements.
- Coordinate all power distribution landings with owner.
 Dimensions are conceptual, actual dimensions are dependent on rack manufacturer and requirements, see details.
- 4. Do not install front doors UON.
- Do not use rack base for signal cabling, for power distribution only.
 Ensure that all requipment is accoommodated, see signal flow drawings.
- 7. Equipment not suitable for rack mounting or equipment may not be shown on rack elevations.
- 8. Mount non-EIA equipment on rear rack rails or DIN rail. Submit details. 9. Isolate raceway and power distribution systems from A/V conductors and racks.

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- 10. Ground conductor shall be isolated from all mechanical systems.
- Ground conductor shall be isolated from all mechanical systems.
 Mount all devices securely. Back of rack devices shall be securely mounted to rack panels, DIN rail or other rigid device, typ.
 Provide blanks or vents in all spaces. Do not allow open spaces.
 Provide casters as recommended by the manufacturer for all portable and ATA style racks, UON.
 Provide conduit stubs and fittings OR open rack space on top of racks for cable access.
 Provide exhaust fan for each rack/bay as required by the heat load, coordinate with consultant.
 Provide full height EIA rails for front and rear.

- 17. Provide incandescent work light in all racks.
- 18. Provide passive and switched 120VAC power distribution with automated sequencing for all rack bays. 19. Provide passive power circuits for DSP, control and source equipment and switched circuits for each power amplifier.
- 20. Provide end-user controls at rack location and the primary control location, coordinate with AV Consultant. 21. Provide solid rear doors with vents.
- 22. Rack details applicable for all locations.
- 23. Rack illustrations shown throughout these drawings do not represent specific manufacturers.
- 24. Rack layouts are suggested.
- 25. Provide rack space to accommodate all equipment, regardless of elevations. 26. Submit details for all rack layouts prior to construction.
- 27. See details for cabling and power configurations.
- 28. See specifications for rack products information.
- 29. Separate cable bundles by signal type as much as possible. 30. Use only black 6-32 Phillips head screws for all rack mounts.
- 31. Use only black racks, black anodized vents, blanks and accessories, UON.
- 32. Provide active fan-based system for controlling dust intake and exhaust.

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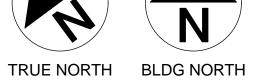
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MDF Rack Elevation Scale: 3" = 1'-0"







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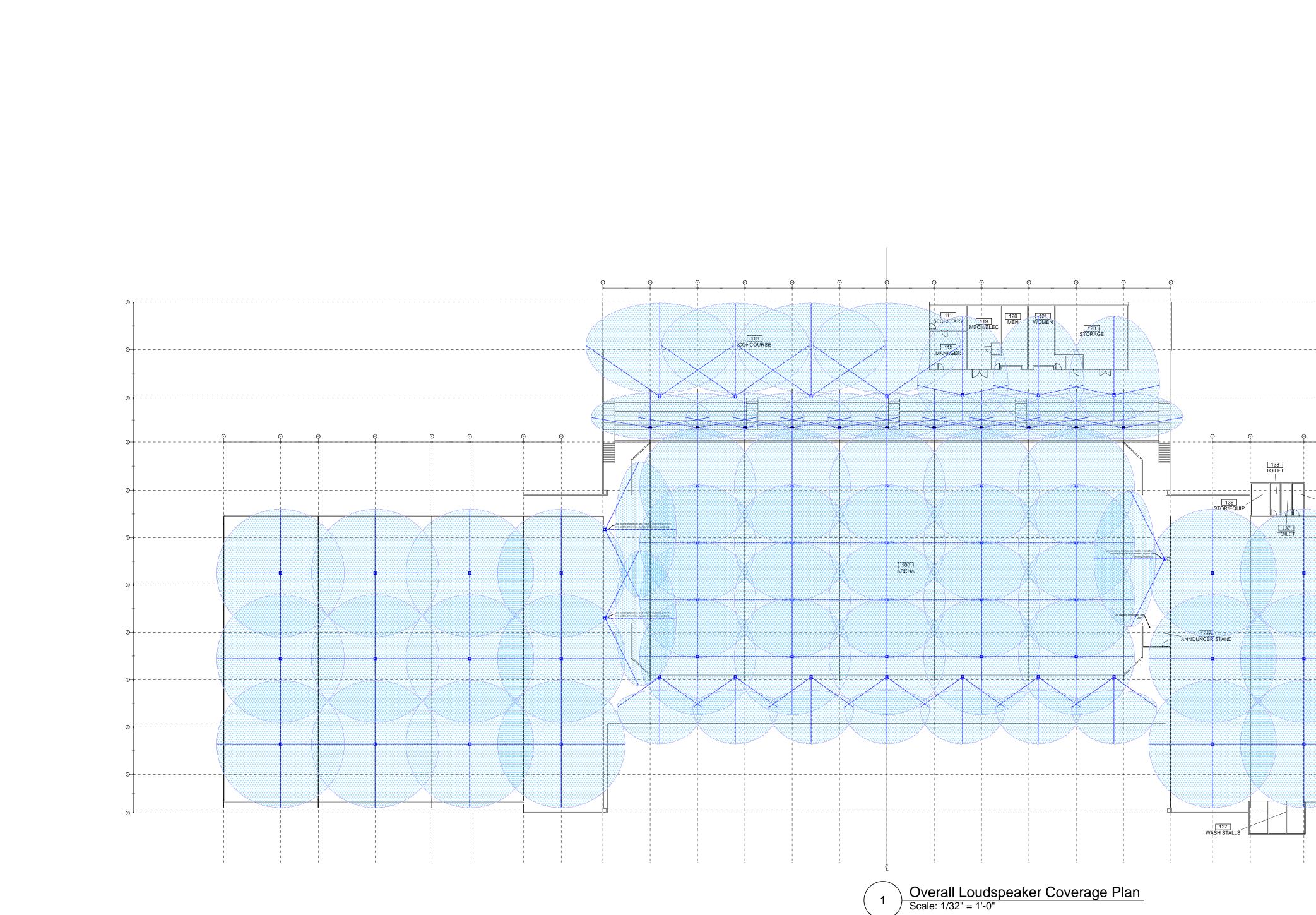
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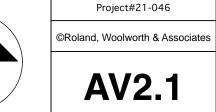








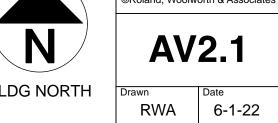




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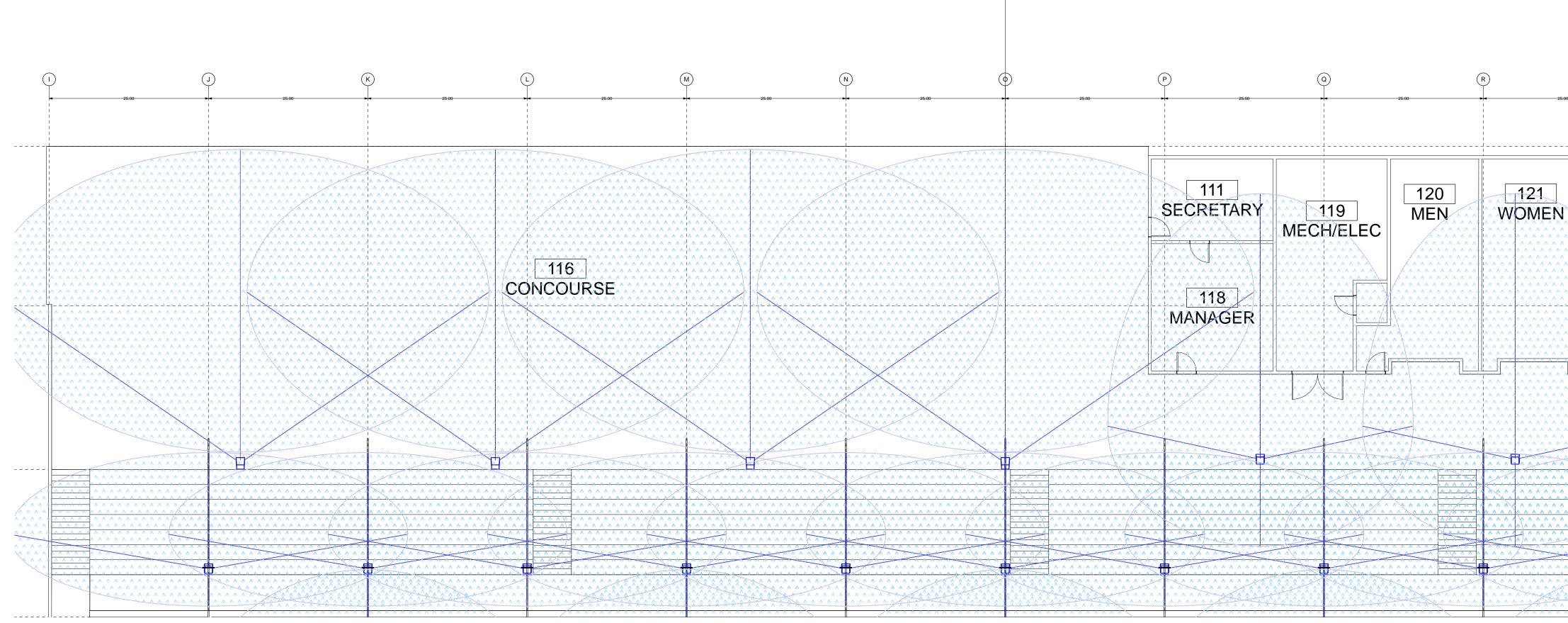
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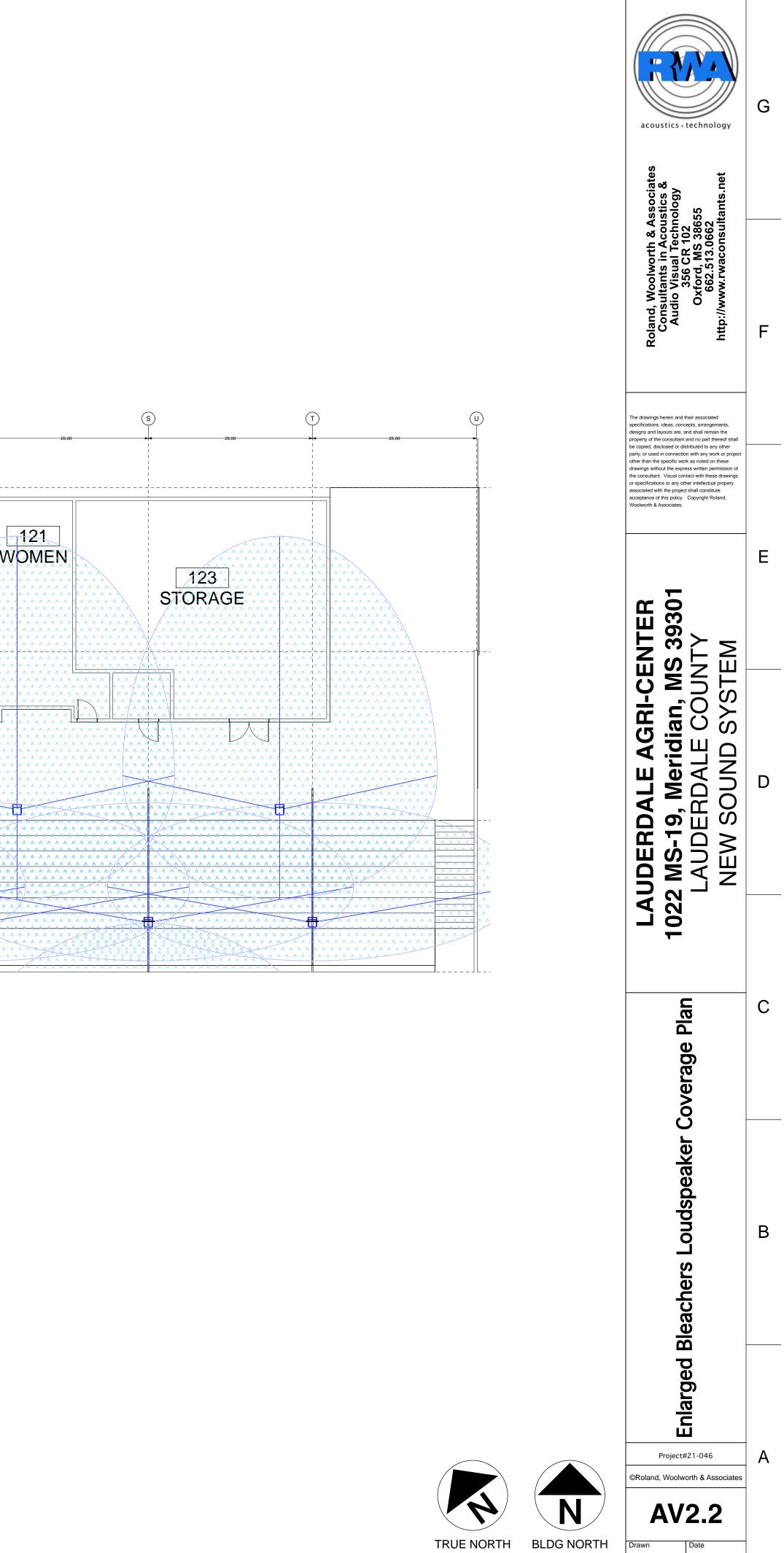


3 Bleachers & Concourse Coverage Plan Scale: 3/32" = 1'-0"

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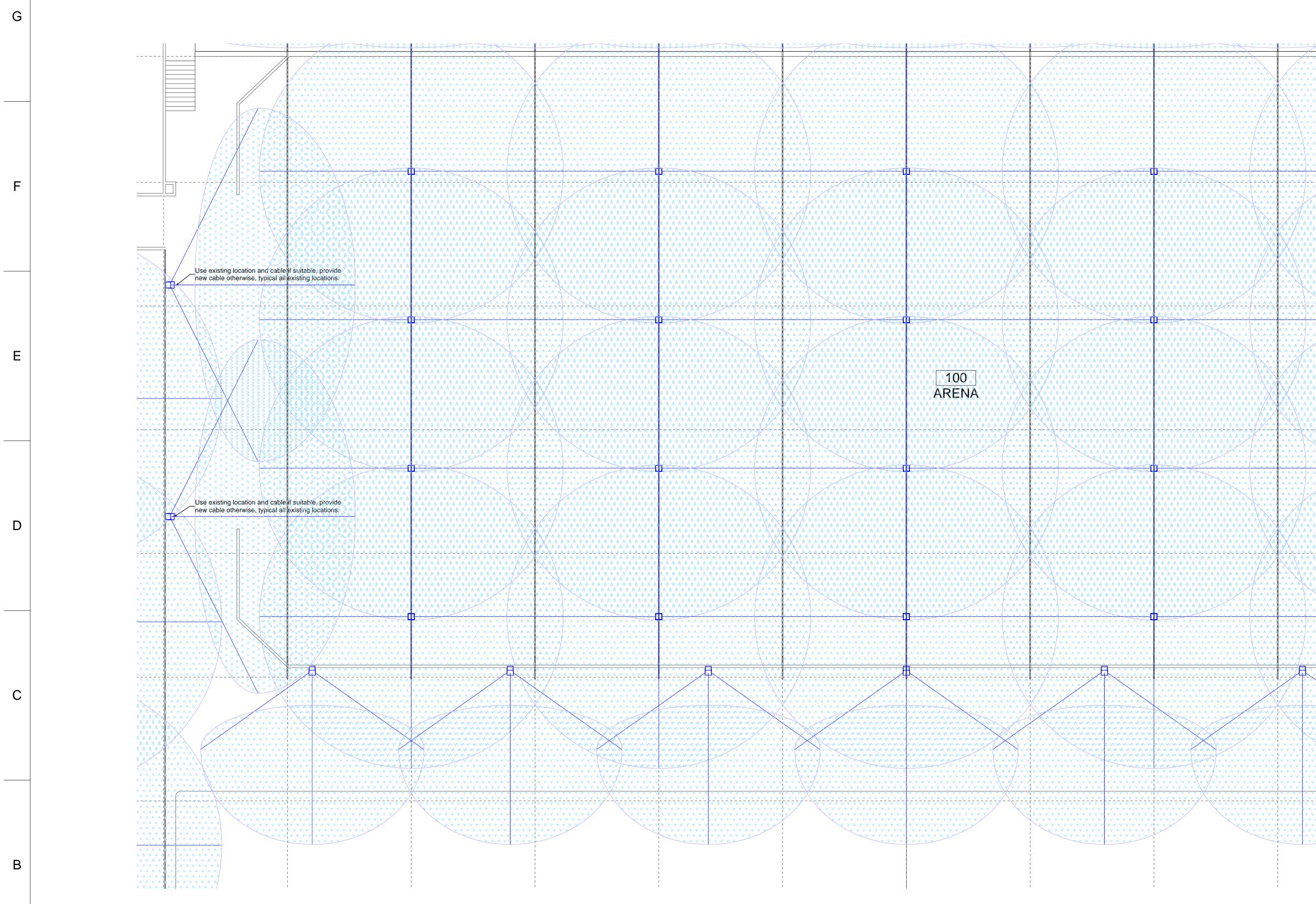
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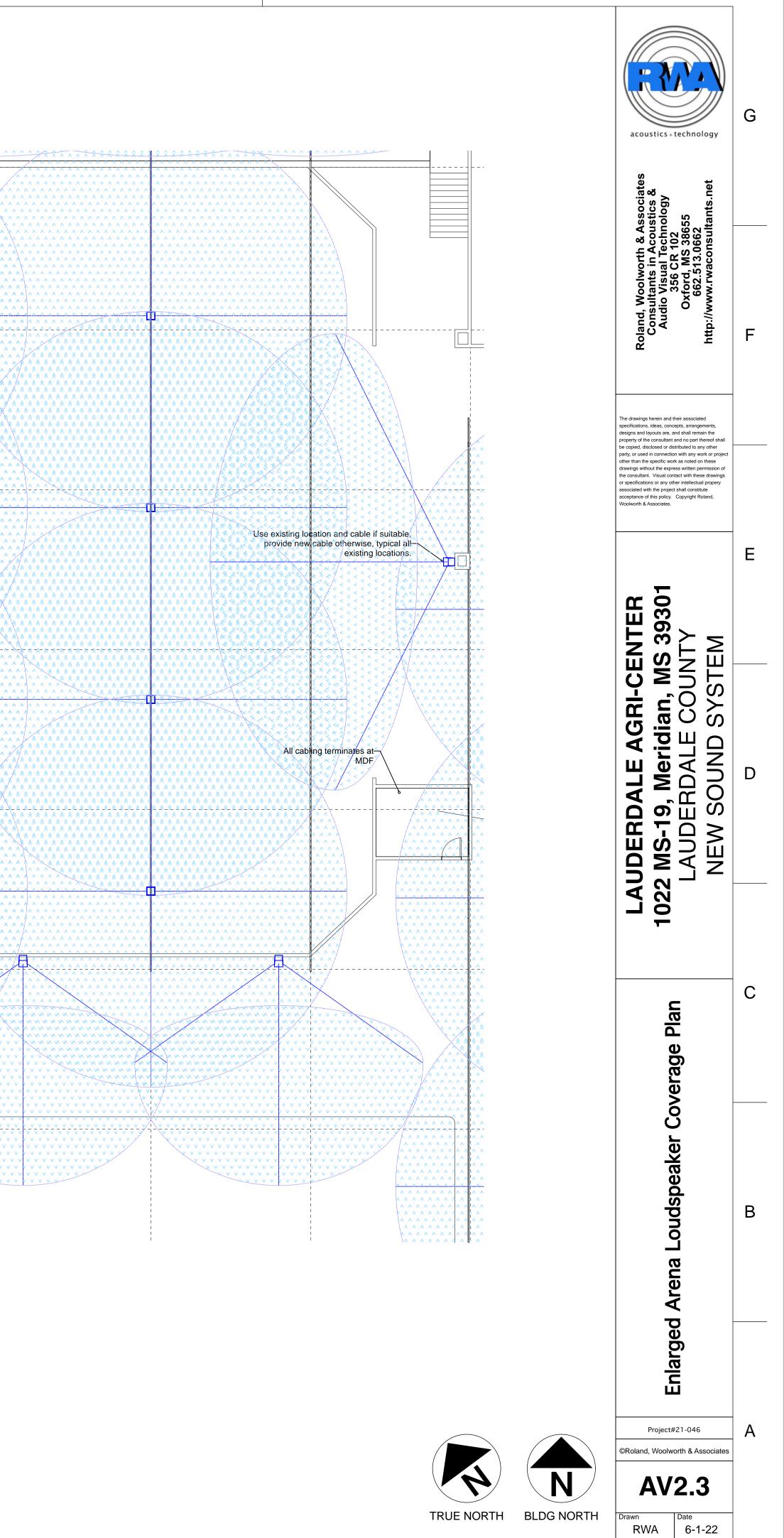
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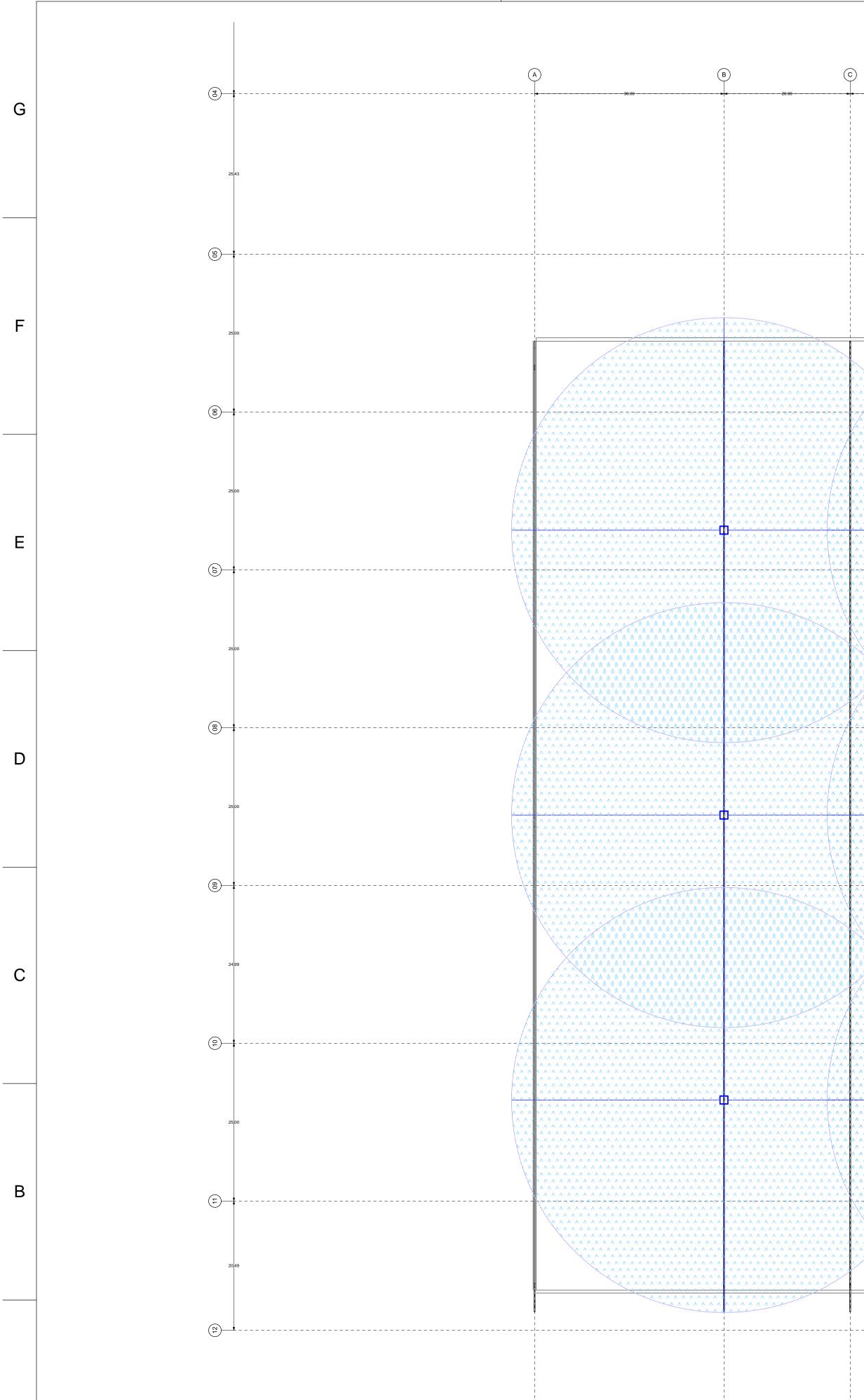


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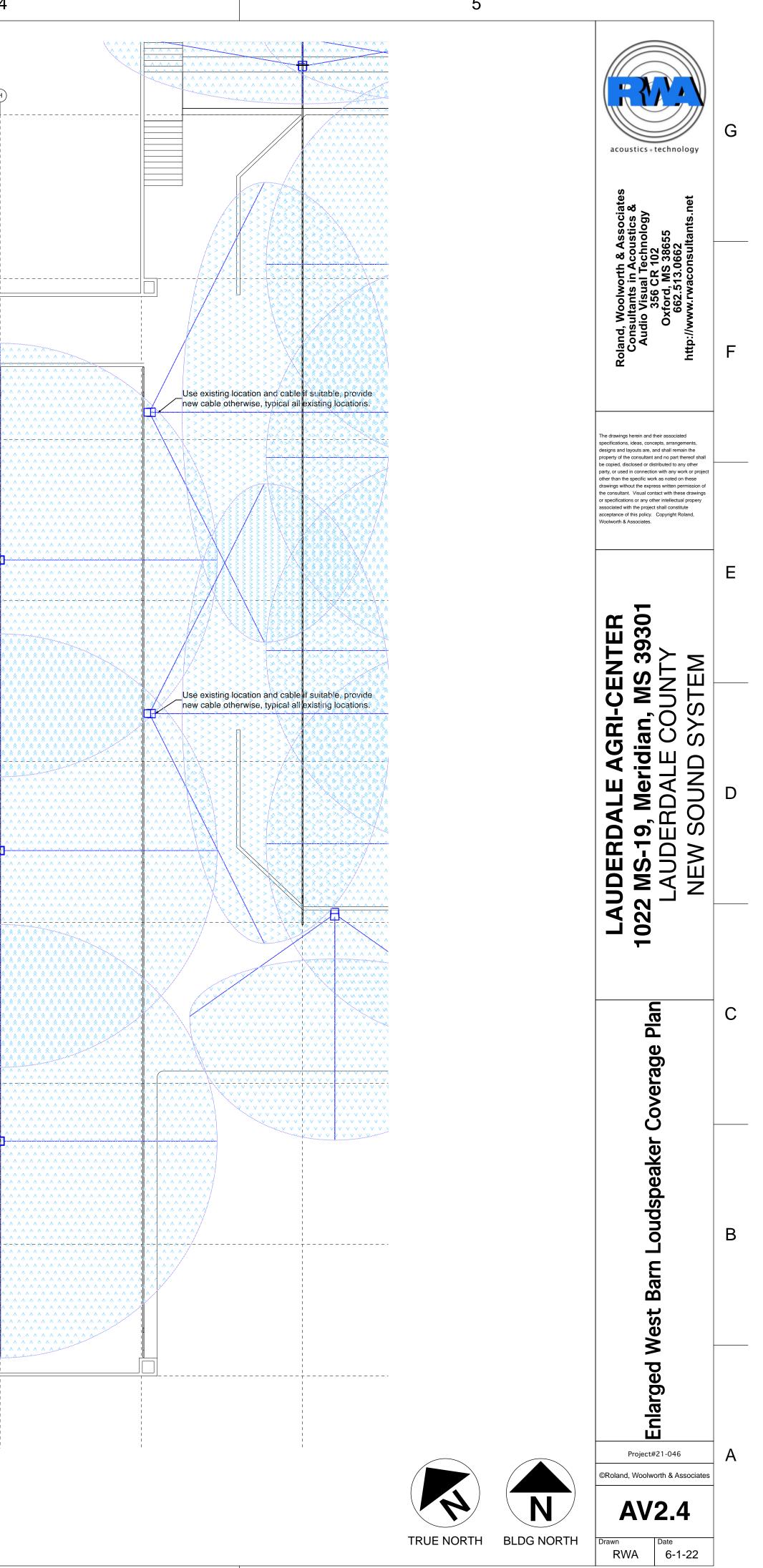
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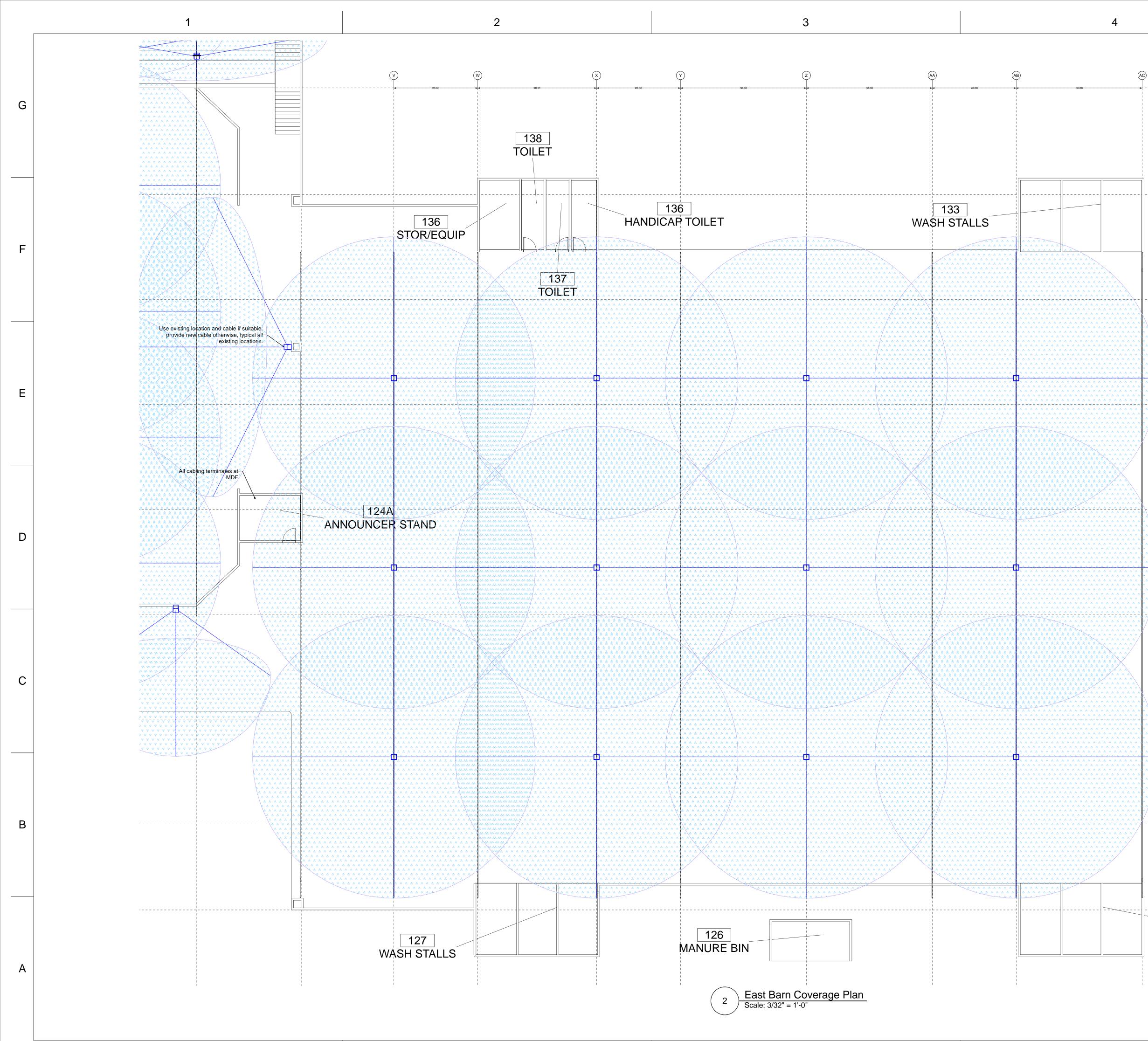




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West Barn Coverage Plan Scale: 3/32" = 1'-0"





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	Enlarged East Barn Loudspeaker Coverage Plan
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-----130 WASH STALLS

ABBREVIATIONS

AIC

AOC

ATK

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GPIO

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LAN LCD LIM

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MDF

MLK

MLS MOD

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NC

NO OFE

PTZ

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TERMINAL PANELS & FIELD PANELS

Field and/or Terminal panels shall be configured to provide circuit access to the end-user at the finish side of the

panel metal. The interior shall be terminated per the standards noted in the specification, or as recommended by

CABLE & WIRE REFE		BASIS OF DESIGN	NOTES
ML	Audio, Low Level	West Penn 452	OK for racks, conduit only. Do not expose.
S	Audio, High Level	West Penn 225	
S	Audio, High Level	West Penn 226	
S	Audio, High Level	West Penn 227	
S	Audio, High Level	THHN, #10-#12 AWG	>1000W Audio Power RMS or as recommended by equipment manufacturer.
COM, 232, SERIAL	Control	West Penn 452	OK for racks, conduit only. Do not expose.
GPIO	Control	As Required	As Recommended by the equipment manufacturer.
LAN, D	Data	West Penn 4246F	Ethernet and similar networks, <50 meters.
LAN, D	Data	West Penn 4246AF	Ethernet and similar networks, >50, <100 meters.
DTP	UTP, Proprietary	As Required	AV Transport, as recommended by Extron
DM	UTP, Proprietary	As Required	AV Transport, as recommended by Crestron
FX, OPT	Optical Fiber	As Required	As recommended by the manufacturer of connected endpoints.
AES	AES3 (EBU)	Belden 1696A	All uses within the limits of the AES specification.
AES50	AES50 Audio	West Penn 4246AF	All uses within the limits of the AES specification.
SDI	HD-SDI	Belden 1855A	In racks, risers, conduit installation, 250' max.
SDI	HD-SDI	Belden 1505A	In racks, risers, conduit installation, 300' max.
SDI	HD-SDI	Belden 1694A	Conduit installation, 400' max.
SDI	HD-SDI	Belden 1695A	Plenum or exposed installation, 300' max.
RGB	RGB/VGA	West Penn 3CRGB	OK for racks, conduit only, do not expose
NTSC	NTSC Video	West Penn 819	OK for racks, conduit only, do not expose
PCOM	Production Com	West Penn 452	OK for racks, conduit only, do not expose, use similar for 2-channel systems.
DMX	DMX Control, XLR Type	Belden 9842	OK for racks, conduit only, do not expose.
RF	RF	RG6 or As Required	As recommended by the manufacturer of connected endpoints.

RACK & DISTRIBUTION FRAME NOTES

1.	Clearance dimensions shown are minimum requirements.

2.	Coordinate all power distribution landings with site conditions.
3.	Dimensions are conceptual, actual dimensions are dependant on rack manufacturer and requirements
see	e details.

- Do not install front doors UON. 5. Do not use rack base for signal cabling, for power distribution only. Ensure that all requipment is accoommodated, see signal flow drawings.
- Equipment not suitable for rack mounting or equipment may not be shown on rack elevations. 8. Mount non-EIA equipment on rear rack rails or DIN rail. Submit details.
- 9. Isolate raceway and power distribution systems from A/V conductors and racks. 10. Ground conductor shall be isolated from all mechanical systems.
- 11. Mount all devices securely. Back of rack devices shall be securely mounted to rack panels, DIN rail or other rigid device, typ. 12. Provide blanks or vents in all spaces. Do not allow open spaces.
- 13. Provide casters as recommended by the manufacturer for all portable and ATA style racks, UON. 14. Provide conduit stubs and fittings OR open rack space on top of racks for cable access. 15. Provide exhaust fan for each rack/bay as required by the heat load, coordinate with consultant 16. Provide full height EIA rails for front and rear.
- 17. Provide incandescent work light in all racks. 18. Provide passive and switched 120VAC power distribution for all rack bavs.
- 19. Provide passive power circuits for DSP, control and source equipment and switched circuits for each power amplifier. 20. Provide end-user controls at rack location and the primary control location, coordinate with AV Consultant.
- 21. Provide solid rear doors with vents. 22. Rack details applicable for all locations.
- 23. Rack illustrations shown throughout these drawings do not represent specific manufacturers. 24. Rack layouts are suggested.
- 25. Provide rack space to accommodate all equipment, regardless of elevations. 26. Submit details for all rack layouts prior to constructio
- 27. See details for cabling and power configurations. 28. See specifications for rack products information.
- 29. Separate cable bundles by signal type as much as possible. 30. Use only black 6-32 Phillips head screws for all rack mounts. 31. Use only black racks, black anodized vents, blanks and accessories. UON.

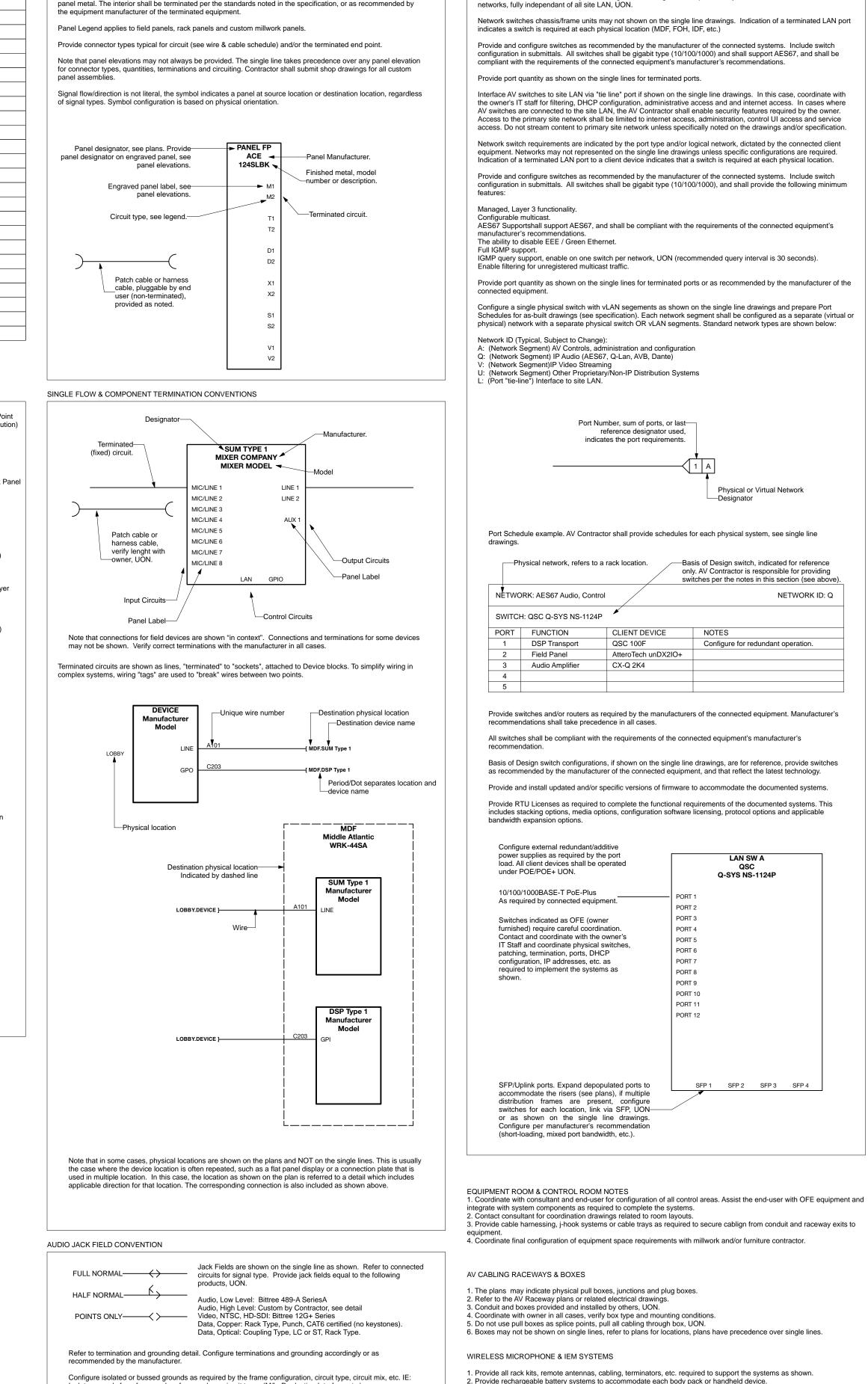
PANEL & PLATE NOTES

- 1 All exterior papel mounts shall be rivets or tamper proof screws LION submit detail 2. All panels shall be brushed, black anodized 1/8" aluminum UON.
- All text shall be at least 1/8" high bold characters. Engrave and fill in white ink. 4. Bevel all panel edges by 1/16".
- 5. Connector borders shall be engraved 1/8" thick, filled in white ink. 6. Connector compliment is typical, see single line drawings and specifations for details, submit for
- 7. Each character shall have a unique number corresponding to the conductor number, see single lines. 8. Panel elevations are conceptual, refer to single line drawings for connection requirements.
-). Submit shop drawings for all panels. 10. Coordinate field panel installation with electrical contractor
- Isolate panel metal from backboxes where necessary.
 Verify backboxes with electrical drawings and/or AV Raceway drawings for all panel locations. 3. Verify field conditions for all panel locations, adjust panel sizes or finish configuration as required.
- 14. Verify that all conduit is isolated from backbox metal. 15. Do not couple signal ground to raceway system UON.
- 16. Where panels include 120VAC, coordinate with electrical contractor. 17. Do not install high voltage circuits, coordinate with electrical contractor.
- 18. All BNC connectors shall be as shown, isolated from chassis metal or Neutrik D Series UON. 19. All connectors shall be as shown UON.
- 20. All high-level audio connectors shall be Neutrik NL Type UON. 21. All RČA type connectors shall be Neutrik NF type.
- 22. All UTP data connectors shall be equal to CAT6 compliant, Neutrik etherCON Series UON. 23. All XLR type connectors shall be Neutrik DLX Series, solder cup type.
- 24. Match connector finish with panel color, verify all colors UON. 25. Provide optical connectors as shown, equal to Neutrik opticalCON Serieis. 26. Verify circuiting requirements for all optical connectors with connected manufacturer's recommendation.

Antenna or Antenna Connection Point Alternating Current (Power Distribution) Above Finished Floor Audio Input Card Assited Listening Amplitude Modulation (AM Radio) Audio Output Card Constant Voltage Attenuator Constant Voltage Attenuator Rack Panel Audio Video Interface Breakout Box Center Line Cathode Ray Tube Display Control Unit, Control Panels Distribution Amplifier Direct Current (Circuit Designator) DSP Signal Processor Data Terminal Digital Video Digital Video or Versatile Disc Player Fire Alarm Foldback, Floor Box Format Converter Frequency Modulation (FM Radio) Floor Pocket Flat Panel Display Filter Set General Purpose Input/Output Input/Output Interface Intermediate Distribution Frame Interface Junction or Junction Box Line Level (+4dBm) Local Area Network Liquid Crystal Display Limiter Microphone Level (<-20dBm) Master Control Server/Controll Master Distribution Frame Mic or Line Level Mic, Line on Rack Panel Mic, Line, Speaker Modulator Monitor Normally Closed or No Connection Normally Open Owner Furnished Equipment Power Amplifier Pan/Tilt/Zoom Computer (Mac, Windows, Linux) Projector Power Supply Record or recorder Radio Frequency Rack Mounted device Receiver Loudspeaker, Speaker Audio Mixer Fhunderbolt Touch Panel Transmitter Unless Otherwise Noted /olume Volume Control Visual or Video Display Switch Crossover Impedence

IP NETWORKS CONVENTIONS

All network switches indicated by the AV single line drawings shall be provided by the AV Contractor as stand-alone



Isolate grounds from frames when frames share circuit types (M/L, Production Interfom, etc.). Include details on all shop drawings and as-built drawings, see specifications.

3. Provide charging stations to support the total number of battery-operated devices.

the single line drawings.

4. Provide remote antenna and related distribution to support the systems as shown, regardless if such systems are shown on

5. Provide LAN access for supported receivers and transmitters in all cases, configure software per manufacturer's

recommendation for end-user use. Configure software UI as needed, coordinate with the end-user.

AV CABLING & TERMINATION NOTES

GENERAL

All plenum wire shall meet applicable local codes. Cable callouts shown on the single line drawings are for reference to the Basis of Design, UON. 3. All wire and cable shall be provided in accordance with the recommendations of the manufacturer for the connected

equipment, UON. 4. All exposed wire and cable shall be plenum rated per NEC and NFPA.

5. Verify all cable types during submittal with the AV Consultant. Verify cable lengths with manufacturer of connected equipment for all cable types.

Wire and cable for any device shall be supplied in accordance with the requirements of the device manufacturer Wire and cable shall be installed in compliance with the National Electrical Code.

10. Wire, cable and signal conductors shall be new and unused. 11. All low level field cabling shall enter racks at punch points or directly soldered to equipment connectors 12. Buss punch block ground points to single rack ground, see jack field detail.

3. Mechanically isolate all panel connectors from raceway system and finish plate. 14. Mechanically isolate audio connector chassis from rack panel.

 Mechanically isolate service entrance conduits from equipment rack 16. Use #10AWG solid wire min. for all ground jumpers.

17. Isolate equipment rack from conduit, raceway and power distribution system 18. Maintain proper twist ratio for all pairs (Category 6 patching and interconnect).

19. Terminate all pins and conductors (Category 6 patching and interconnect). 20. There shall be no ground loops, regardless of equipment configuration.

21. Use 3-wire grounded devices when possible. 22. Use only balanced audio terminations throughout system, U.O.N. Use only ratchet type crimp tools 23. All wire and cable shall have a unique numering designator at each end of the physical media.

24. Contractor shall supply the cable in accordance with the recommendations of the connected equipment manufacturer, the cable types shown are for reference only. 25. Install and terminate cabling per AES, ANSI, IEC or BICSI standards, UON.

26. Contractor shall supply the optimum cable for the application. 27. All cabling shall be subject to the circuit type.

28. All cabling shall be subject to environmental conditions. 29. All calbing shall be provided and installed for bandwidth requirements 30. Wiring designators are shown to indicate the requirements and to denote circuiting.

31. Contractor is free to use their own numbering scheme. 32. Contractor shall document all wire numbers on their shop drawings and as-built drawings

33. Provide cable schedules for all cables UON. See specifications for additional requirements. 34. Cable types are specified based on terminated end points. See single lines, provide as required to provide the system as shown. Provide cables as recommended by the manufacturer of the terminated equipment, UON. 35. Provide cable as mandated by site conditions, including, but not limited to, conditions that require cable type to support return air plenums, fire ratings, adjacent cable paths that could impact performance, physical obstructions and federal, state

AUDIO CABLING

1. All low level field cabling shall enter rack at punch points or directly soldered to terminating connector at equipment or terminal panel. 2. Buss punch block ground points to single rack ground, see jack field detail.

3. If power supply includes ground to AC connector, do not terminate signal ground. 4. Mechanically isolate all panel connectors from raceway system and finish plate. 5. Mechanically isolate connector chassis from rack panel. Pin 1 shall not be at the same potential as connector chassis or

6. Mechanically isolate service entrance conduits from equipment rack.

Use #10AWG solid wire min. for all ground jumpers. 8. There shall be no ground loops, regardless of equipment configuration.

9. Use 3-wire grounded devices when possible. 10. Use only balanced audio terminations throughout system, U.O.N.

DATA CABLING

2. The presence of a non-ratchet crimp tool on the job site shall render all connections suspect 2. Use only standard wiring and active devices, do not use crossover cables unless specifically noted on the drawings.

3. Use pre-made (manufactured) cables whenever possible. 4. Certify all Ethernet cable runs for Gigabit operation, min., per specifications.

5. Certify all proprietary cable runs per the manufacturer's recommendation 6. All cabling transporting data shall be provided and installed in compliance with the connected endpoints. 7. For this section, "connected endpoints" indicates manufacturer requirements of devices connected to data cabling plants.

WIRE NUMBERS

1. All wire and cable shall have a unique numering designator at each end of the physical media. 2. Contractor shall supply the cable in accordance with the recommendations of the connected equipment manufacturer, per AV best practice or AES, ANSI, IEC or BICSI standards. 3. Contractor shall supply the optimum cable for the application, considering the circuit type, environmental conditions, bandwidth requirements, termination type, cable construction and performance requirements.

4. Wiring designators are shown to indicate the requirements and to denote circuiting. Contractor is free to use their own numbering scheme. 5. Contractor shall document all wire numbers on their shop drawings and as-built drawings. Provide cable schedules for all

6. See specifications for additional requirements.

LOUDSPEAKERS

Provide cabling as reflected by single line drawings. Pull cable through pull box, do not splice or use panel connectors.

Amplifier circuit shall terminate directly to transducer UON. 4. Final adjustment of loudspeaker aiming and mouting configuration will be determined on-site during commissioning. 5. Obtain aiming coordinates from consultant. UON.

rovide rigging hardware that supports adjustment of all loudspeakers for 360 degrees of adjustment? Provide lift, scaffolding and rigging kits required for loudspeaker mounting and adjustment. 8. Ensure that all equipment is adjustable as to not impede loudspeaker dispersion during commissioning.

Refer to single line drawings for component callouts, circuiting and related signal processing requirements. 10. Attached to structure only, coordinate and/or obtain approval from owner, see specifications.

11. Equipment shall be held firmly in place with proper mounting hardware, suspension or rigging materials. 12. Equipment attached to any building structure, sub-structure or other load-bearing member shall be self-supporting 13. All mounting or rigging hardware shall be installed with a safety factor of at least three times the required load.

14. Provide 100% redundancy for all rigging attachment points. 15. Provide bumpers, array brackets, dead-hang hardware, fasteners, safety equipment as required by the loudspeaker

14. Use manufacturer's rigging hardware if available.

SIGNAL FLOW

1. Single line drawings, reconciled with the plans, constitute the design. 2. Wire numbers are shown for reference only.

3. All cables shall be numbered. Contractor is free to use their own cable numbering scheme. 4. Single line drawings may not include minor supplemental items, accessories and cabling.

5. Provide all required items to support the systems as drawn as recommended by the manufacturer or per AV best practice. 6. Configure LAN switches to support the ports shown on the single lines and applicable port schedules . Refer to legends, abbreviations and callouts for specific direction.

CONTROLS

1. Configure control server to accommodate all control ports shown, see control port schedule. 2. Provide applicable wireless gateway or other interfaces as required for wireless controls.

3. Provide local power for all devices under control, control clients and dedicated control panels/touch panels 4. Where possible, power control panels and devices interface and transport units with Power Over Ethernet (POE).

5. Provide additional power supply to support POE or power to end-points where required. 6. All control cabling shall be provided as recommended by the specified or approved control system manufacturer 7. Provide UI clients for all systems, duplicate primary control interface for each client.

8. UI clients shall be provided for Mac OS, Windows, Linux, iOS and Android devices. Verify and coordinate with owner.

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